

Z. MOLLUSCA
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SHELLS AND SEA LIFE

A MONTHLY PUBLICATION ON MOLLUSKS AND MARINE LIFE

\$3.00 January, 1985 **Volume 17, Number 1**



Calliostoma variegatum Carpenter, 1864. 25 mm specimen photographed by Ronald L. Shimek at 30 m depth, Effingham Inlet, (fjord west side of Vancouver Island, British Columbia, Canada), 18 July, 1984.

IN THIS ISSUE: Cones, Olives, Murex, Cowries, Abalone, Ceriths, Land Shells and more!

EDITOR'S NOTES

Here we go with 1985 -- our 17th year of monthly publication. The past year has seen tremendous growth and not without a few problems. We still have not been able to get the issues out early in the month on a regular basis but hope to settle into a smoother production schedule this year. We changed printers 5 times last year, working to keep the quality high while controlling costs. We also purchased a major typesetting capability and other production equipment so that we could ensure the magazine quality and accuracy. The format change has been in mind for several years now and is the "final" step toward our goals.

Each month you will see the latest information on shells and sea life with more pages in color and more articles this year. Our goal is to provide a unique publication for everyone who enjoys mollusks, from beginner to professional, with everything you want to pursue your interests.

This issue has over a dozen shell articles. Our new page size allows us to include many more articles and to separate things so you can look at the table of contents and go right to your favorite subject. The convenient size will also make **Shells and Sea Life** easier to read and use wherever you are. Our goal isn't to knock your eyes out but to make our information more useful -- easier to find, easier to read, easier to understand. The new type size is designed to get more information in each issue without sacrificing readability.

Each month's issue will include more short articles so that you will find several things of interest. We will also have one or more feature articles of longer length for in-depth coverage of important subjects. Finally, to make the complex tales we tell easier to understand, we're grouping more of our subjects into bite-size pieces. We like the short notes with a photograph or two along with a simple description of what happened and where the subject came from. Your comments indicate that you like the same type of articles. Let us know how we are doing.

A special thanks to all of our Editorial Review Board for their labors last year. We also thank Kenneth Boss, Jack Brookshire, C.M. Burgess, Anthony D'Atillio, William K. Emerson, Jerry Haraseywich, Roland Houart, Russ Jensen, Eveline Marcus, James H. McLean, Robert Robertson, Joseph Rosewater, Barry Roth, Walter Sage, Emily H. Vokes and R.C. Willan for help reviewing articles. Finally, thanks to all of you who wrote or called with suggestions, comments and criticisms.

* * * * *

We have received word of the passing of two friends in recent weeks. Torry C. Orest died November 19, 1984 and Faye Howard de Montañón died on December 14, 1984. We hope to have additional information in the February issue.

SHELLS and SEA LIFE

January, 1985 Contents Volume 17, Number 1

- 04 NOTES FROM HANS BERTSCH: Looking both ways.
07 Working Abalone Shell is Hazardous. Russ Jensen
08 DEALING WITH DEALERS: "Gem" Condition; does it Exist?
David DeLucia
09 ON THE REEF WITH BOB PURTYMUN: *Cerithium*,
Pseudostomatella, & *Conus*.
11 The "Cabbage Patch" Snails. John Bernard
12 Albino Black Abalone Update. David W. Behrens
13 The Status of "*Murex*" *funafutiensis* Hedley, and some *Favaria*
Species. Walter O. Cernohorsky
15 Announcement: Delaware Museum of Natural History.
16 YOUR COLLECTION -- A HOW-TO COLUMN: No. 6. Why make
a Catalog? Susan J. Hewitt
16 Announcement: Smithsonian Position Available.
17 Common Names List of North American Marine
Gastropods, Part 3. American Malacological Union
27 Sand Trails. Stephanie Prince
28 The Camaenidae, a Diverse Family of Land Mollusks, Part 1.
Richard L. Goldberg
32 PERSONAL NOTES
34 Seashell Stamps. Tom Rice
36 Photographic Techniques. David K. Mulliner
39 Observations of a Dwarf Octopus, *Octopus micropyrsus*.
Peter L. Haaker

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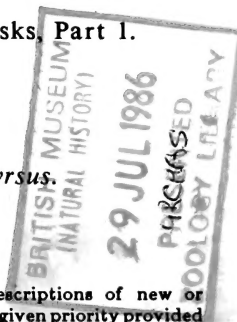
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SHELLS and SEA LIFE was formerly known as the OPISTHOBANCH NEWSLETTER. The magazine is open to articles and notes on any aspect of malacology or related marine life. Articles submitted for publication are subject to editorial board review and may include color or black & white illustrations. Short notes [less than 500 words] will normally appear in PERSONAL NOTES or READER FORUM. Articles should be submitted typed and double-spaced. For additional information send for free booklet "Suggestions to Contributors".

Articles containing descriptions of new or repositioned taxa will be given priority provided the holotype(s) have been deposited with a recognized public museum and museum numbers are included with the manuscript. 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. Reprints will be supplied at \$0.15 per page provided they are ordered prior to publication.

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NOTES FROM HANS BERTSCH: Looking both ways.

Janus was the Roman God of gates and beginnings, represented by two opposite faces. As we begin a new year, it is traditional to review the past year and look forward. It is certainly appropriate for a monthly column to tie up loose ends and warn readers what is in store for them in the coming months.

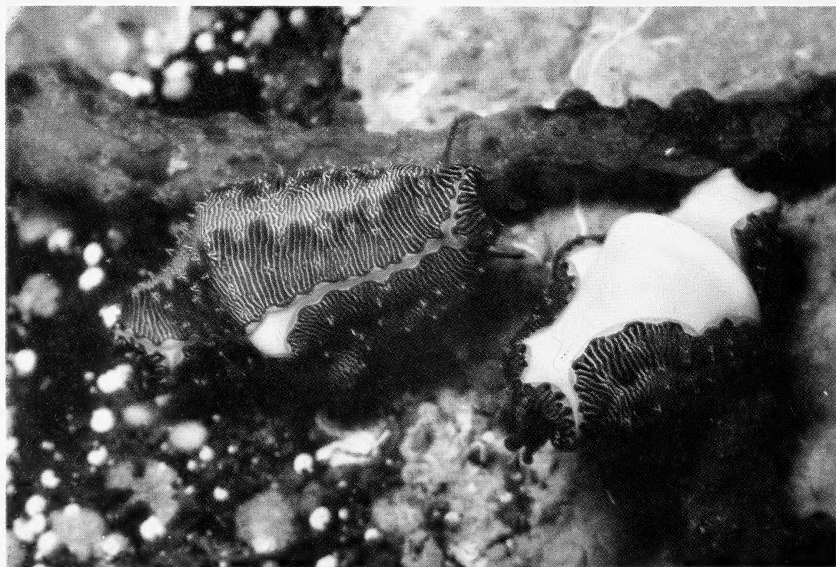
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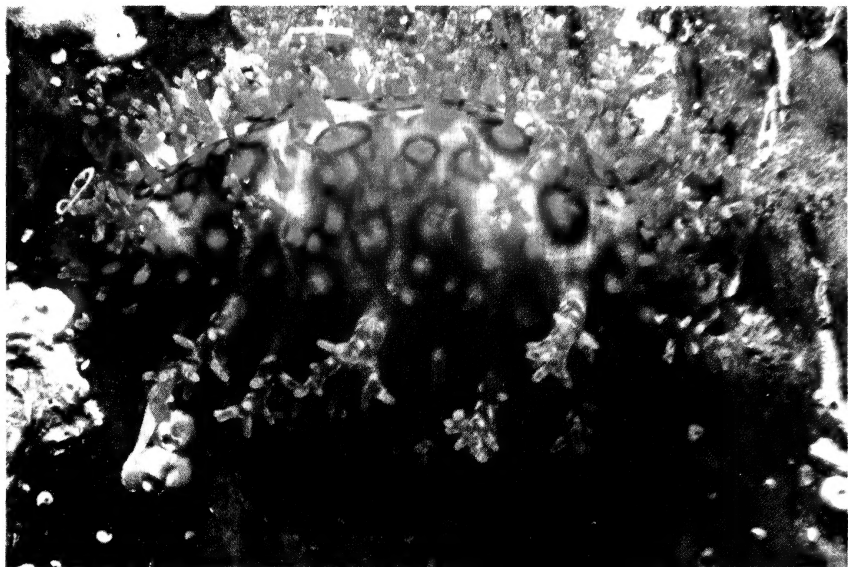
During the last twelve months, I have discussed a diversity of mollusks and other marine invertebrates, various evolutionary adaptations, and research expeditions.

In October, I illustrated two camouflaged commensal shrimp on the eastern Pacific crown-of-thorns sea star, *Acanthaster elisii*. Alex Kerstitch kindly informed me that the shrimp are the wide ranging and color variable Indo-Pacific *Periclimenes soror*. If you had difficulty spotting the shrimp (page 184), they are on the left hand side of the picture (not right as stated in the figure explanations); the printed photo was oriented differently than I had intended. [Sorry Hans, Sally].

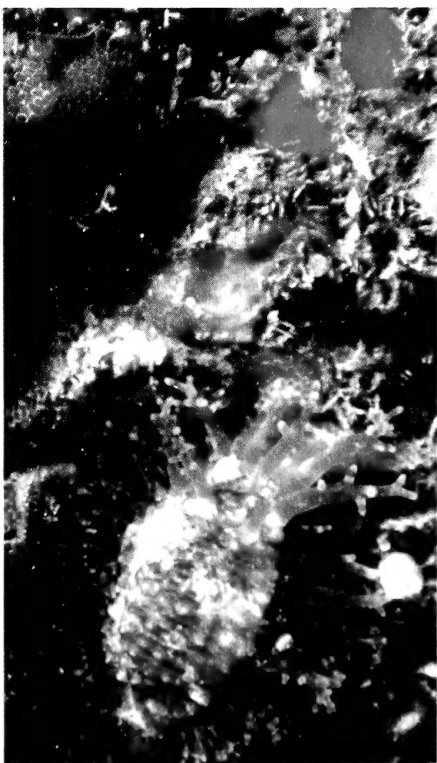
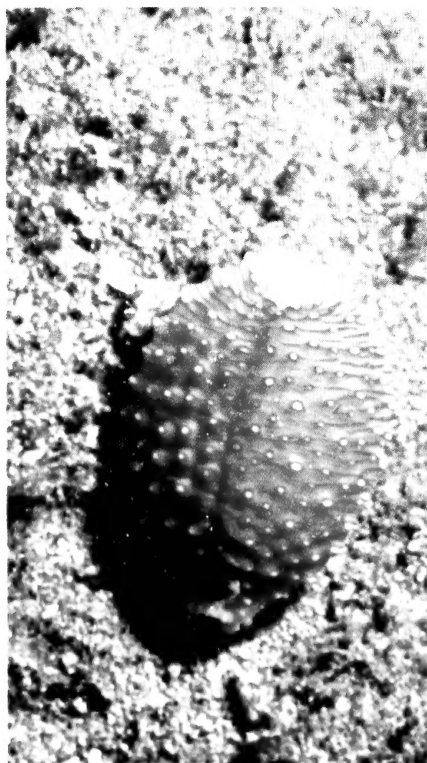
During the summer months, I discussed the biology and anatomy of species of *Cyphoma*. In October, Dr. Terrence Gosliner and I were diving on Dave Mulliner's "secret reef" south of Isla Coronado in Bahía de Los Angeles, Baja California, Mexico. We found a pair of *Cyphoma emarginatum*. The dark brown and cream striations on the mantle are obvious and prominent; there are also small pointed papillae projecting from the mantle surface.

BELOW: *Cyphoma emarginatum*. October, 1984.





ABOVE: Jenneria pustulata juvenile, October, 1984, 18 mm.
BELOW: Cypraea granulata. October, 1984, 25 mm, 20 mm.



In February I wrote about *Jenneria pustulata*, during the same October expedition to Bahía de Los Angeles (Terry, Dave and I were also accompanied by Dr. Antonio J. Ferreria and California Academy of Sciences' curatorial assistants Robert Van Syoc and David Catania). I found various specimens of *Jenneria pustulata*. Two were probably a male and female pair since I also found their small round pinkish-red egg capsules underneath them. The adult shell is distinctive with the hard knobs brilliantly colored orange with an encircling brownish band. At one of my favorite dive sites I found a small juvenile (with bulla-like shell) at 7 m depth. The photo shows some very interesting features. Note the extremely long, dendritic papillae. The orange dots and brown rings are obvious. However, these colors are in the mantle skin, not the shell. The bulloid shell is darkish gray brown without the spots. The orange spots on the mantle may well be indicative of secretory processes that will deposit the adult shell coloration.

PRESENT

The Hawaiian Islands are an exciting evolutionary showcase of speciation and adaptation. Their distance from other islands and land masses has made it difficult for marine organisms to reach the islands by larval transport on oceanic currents. Hence, there is a fair amount of endemic marine species.

Cypraea granulata Pease, 1863, is one such endemic species. Known only from the Hawaiian Islands, it has been found in Pleistocene fossil deposits on Oahu and Molokai. The 25 mm shell is pinkish-gray, rough textured with marginal and ventral ridges (the apertural teeth continue around the side of the shell partly reaching the dorsal surface), and numerous nodules on the dorsal side. It is a distinctive exception among the characteristically smooth-shelled cowries.

The mantle of *Cypraea granulata* is brownish with dark striations and white mottling. It has long papillae (some nearly half the length of the shell) which branch distally.

FUTURE

During the coming year I look forward to writing about numerous interesting features of the ocean. Anthony D'Attilio is letting me photograph specimens of *Angaria* in the collections of the San Diego Natural History Museum. Among other topics I will be discussing and illustrating species of Hawaiian miters, *Conus dusavelli* (H. Adams, 1872), and molluscan egg masses. Throughout the coming months, I will share with you many interesting and intriguing facets of the evolution and ecology of shells and sea life.

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Dr. Hans Bertsch, 4444 West Point Loma Blvd. #83, San Diego CA 92107.

Working Abalone Shell is Hazardous!!!

by Russ Jensen

You can tumble abalone shell in fine quartz sand. Put in a barrel (tumbler) with enough water to cover them and rotate for 1 to 2 days. Wash thoroughly and put in barrel (tumbler) with two ounces of tripoli for each 6 pounds of shells. Tumble for 12 to 15 hours. Wash and dry thoroughly. Fill tumbler half full with shells, then add sawdust from a hardwood for cushioning. Add polish of your choice at ratio of two ounces to 6 pounds of shell. Run dry for 2 to 3 hours. Wash and admire.

CAUTION: Remember when tumbling abalone shells, they emit a poisonous gas. Release the gasses every day and do it outdoors. **DO NOT** inhale the gas fumes from the abalone.

Abalone shell is composed of two materials - a horny substance called chitin and calcium carbonate. The calcium carbonate is present in two forms: calcite and aragonite. Working abalone shell can be hazardous in two ways. First - grinding, dry burns the chitin in the shell, producing a toxic gas which may cause headaches and prolonged exposure could possibly cause serious illness. Second - the dust produced when the shell is worked is so fine that it floats readily in the air. This dust contains tiny crystals which, under magnification, are seen to have many razor-sharp, jagged edges. Inhaled, these micro-crystals cut and slash the delicate lung tissues with each breath movement. The injured tissue is easily infected. Miners' disease (or emphysema) often results from breathing calcium carbonate dust.

Do all sanding, grinding, and polishing **VERY WET**. Wear a **WET** dust mask. When finished working, wash away **ALL** mud from tools, bench, apron, hands and clothes with lots of water because when the mud dries out it is **again dangerous**.

(This article prompted by an accident in a high school. The teacher didn't realize the danger. Information taken in part from O.L. Frye's "Red Abalone, Queen of New World Gems.") [Russ Jensen, 2 Mt. Vernon Place, Chadds Ford, PA 19317]

INTRODUCING:

suncoast Conchologists!



A new shell club has been formed to serve North Pinellas, Pasco and Hillsborough Counties in Florida, with meetings and other activities bringing together beginners and experienced shellers in a relaxed and friendly atmosphere. They plan to meet the last Tuesday of each month (except July and August). Plan to visit them and get acquainted! For more details write the club president, Carolyn Petrikin, P.O. Box 1564, Palm Harbor, FL 33565, or call (813) 785-4761 or 343-9245.

DEALING WITH DEALERS: "Gem" Condition; does it Exist?

by David DeLucia

Most dealers are fair and ethical, and are fully aware of their responsibility as far as "truth in advertising" is concerned. However, there are a few who, whether by design or accident, appear to mislead potential customers, and you should be aware of what to look for.

I just received a list in the mail today which proudly proclaimed "all shells in 'gem' condition unless otherwise noted". At best this is an enthusiastic overstatement. True "gem" shells are about as rare as a dealer who lists them correctly. Even in such genera as *Cypraea* or *Oliva*, one has to be very careful. The shiny surface can hide a multitude of sins which are usually not detected for a few weeks, when it's too late.

Dealers have developed a whole lexicon of terms which are used to disguise the fact that only about one in 50 shells is a true "gem". One such phrase is "gem for species." This has been used for cold water whelks which are in "fine" class, at best. Besides being inaccurate, this is very misleading. The prospective customer expects a specimen with only a few natural flaws and is subsequently shocked to receive a shell with the tip missing or the lip half gone.

Another phrase I see all the time is "gem except for..." This is a contradiction in terms. The "except for" cancels out any possibility of the shell being a gem. Nevertheless some dealers use the phrase because the customer sees the word "gem" right away and first impressions are important "gem, except for..." has been known to cover shells with filed lips, tiny nacre flaws, or blunted spires. One list I saw the other day ran as follows: "gem, except for three small chips in the lip, slight dorsal mends, missing protoconch, and several pin holes". Wow! I was tempted to order it just to see the part that was "gem" - perhaps the suture?

The obvious solution is for dealers to grade shells accurately with no props. I suspect many are afraid that too many "goods" or "fines" will discourage customers from ordering. Well, that may be true in cases when the shell can be obtained in better condition, but at least if the customer does order such an item he knows exactly what he is getting.

So, how does one assess a new dealers list? First of all most shells should be in the "fine" to "fine+" range, with "gems" relatively rare. "Good" or even "fair" is permissible with a genus such as *Buccinum*, for example. One should avoid completely any list that uses no grading system at all. In such a case, you have absolutely no way of knowing what you are getting and could end up getting someone else's junk for exorbitant prices.

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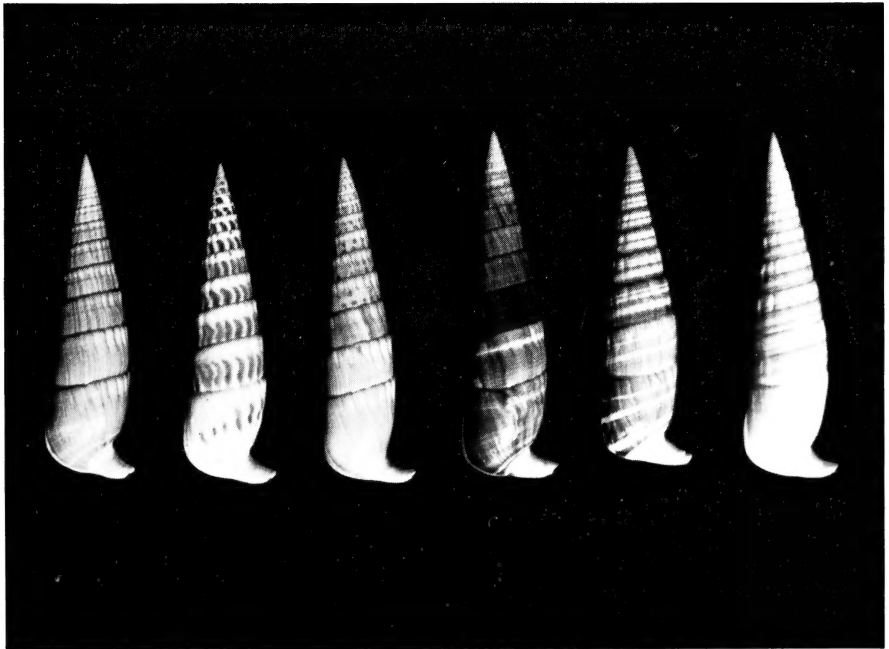
ON THE REEF WITH BOB PURTYMUN: Cerithium, Pseudostomatella & Conus.

We made our first dive of the trip in the lee of Wheeler Reef, about 90 kilometers N.E. of Townsville, Australia. This was the check-out dive. The divemaster was checking us over to see what help he would have to give the various divers. The calm water was about 10 m deep and was crystal clear over brilliant white sand. As I drifted down I could see trails all over; we had anchored over a colony of *Cerithium fasciatus* (Bruguière, 1792).

The shells were the largest and most colorful I had ever seen, no two were alike. (Kiener, 1841 named this form *C. f. procerum*). For the next 61 minutes I worked the sand and coral rubble, occasionally turning a coral slab, and ended my dive in only 3 m water behind the reef.

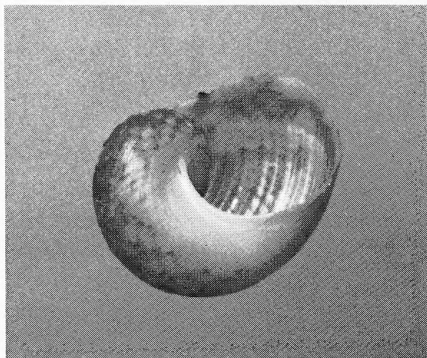
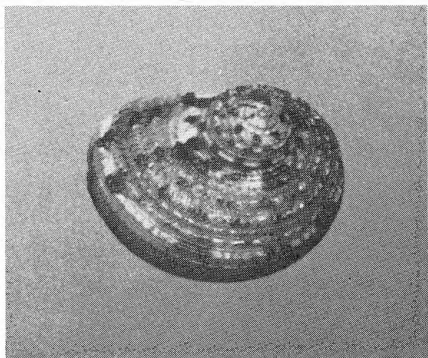
In all I found 26 different species. I left behind two *Conus nussatella* Linnaeus, 1758 that I found in a jumble of dead antler coral. They were tending a cluster of yellow egg capsules. (about 20 flat flakes, 2 mm thick and 8-10 mm round).

BELOW: *Cerithium fasciatus*



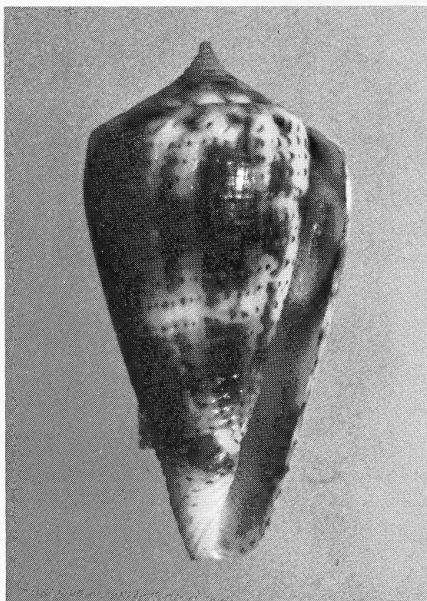
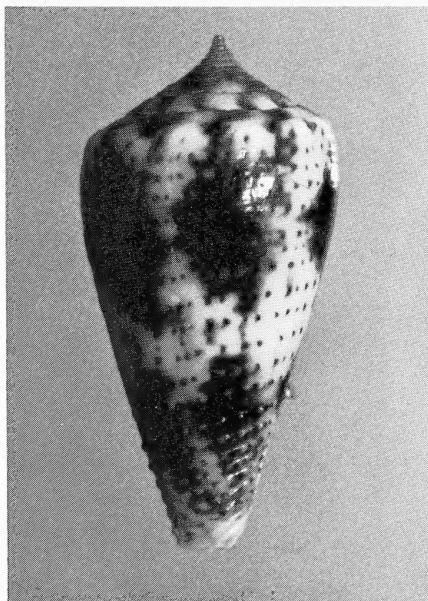
Some shells were new to me, like the *Pseudostomatella maculata* (Quoy and Gaimard, 1834), which I found on a hard algae-covered substrate under a coral slab.

BELOW: *Pseudostomatella maculata*



Others were old favorites, like the beautiful little *Conus boeticus* Reeve, 1842. This is color form #2 in Jerry Wall's "Cone Shells". I question whether his color forms #1 and #2 should carry the same name as the animals are quite different. Also the periostracum on form #1 is thin and transparent, while on form #2 it is much thicker and has 6 to 8 bands of hair-like tufts on the body whorl. I was very happy as I finned my way back to the boat, what a great way to start a trip!

BELOW: *Conus boeticus*



The "Cabbage Patch" Snails.

by John Bernard

In June 1984, I sent some land snails which I had found in my garden, to Dr. [Harry G.] Lee for identification. He replied that they were juvenile *Mesodon downieanus* (Bland, 1861), and that I should look for some adult specimens.

I wasn't sure where they lived in my garden, I just knew they were eating it! But I set about looking for some live adult snails for Dr. Lee (I never did find a live mature one).

I do not use chemical sprays or fertilizers on my garden, but the day after using a natural insect killer, I found a few large snails and several little ones, dead under the plants I had sprayed.

I hunted in my garden morning, noon and night but to no avail - no snails. However, early one morning - 3 am - I arose and sure enough there were several live snails eating my cabbage patch! They were all about 3-4 mm in length, and I knew from Dr. Lee that these were babies. I collected about 20 in a small goldfish bowl and placed aluminum foil on top. I thought I was smarter than they, and gave them some dead oak leaves to eat, but I am not and they do not. They did not grow much on their diet of oak leaves, and they laid no eggs.

At this time (July 1984) I had a brainstorm and decided to get a bigger container for them and to supplement their diet. I placed them in a 5 gallon fish tank with the oak leaves as well as some cabbage and lettuce leaves. I placed this in my room, in which the temperature is 80-85°F in the summer. In less than 3 months, there were egg cases on the glass! This must be a good hatching temperature because in about 3 weeks there were a lot of what looked like little white worms crawling on the glass. They were 8 mm long with what looked like a pinhead on top. I took these to be little shells.

At the end of 3 weeks these little worms had grown to have a foot 10 mm long and 5 mm wide with a shell of 3.5 mm. The foot at this time was a transparent white, and the shell was a golden cream in color. At 6 weeks the foot was still white, but not transparent, 13 mm long and 6 mm wide. The shell was 6 mm and still a golden color. At 10 weeks the foot was 16 mm long and 8 mm wide, with the shell now being 15 mm and turning tan in color. At 12 weeks the foot was 30 mm long and 11.5 mm wide and about 2.5 mm thick. The shell was now 18 mm and a brownish-tan in color.

Dr. Lee told me that they are mature at 15-20 mm but I do not really know how big they get, though I have found dead broken ones in my garden that were almost 30 mm. Who knows how big they will get as they now have plenty of what they like to eat? If they need it, I will get them a larger home, and even plant a bigger cabbage patch for their food supply!

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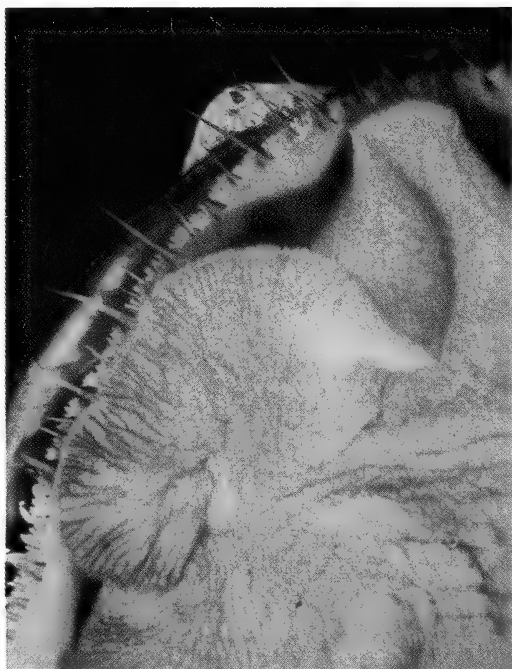
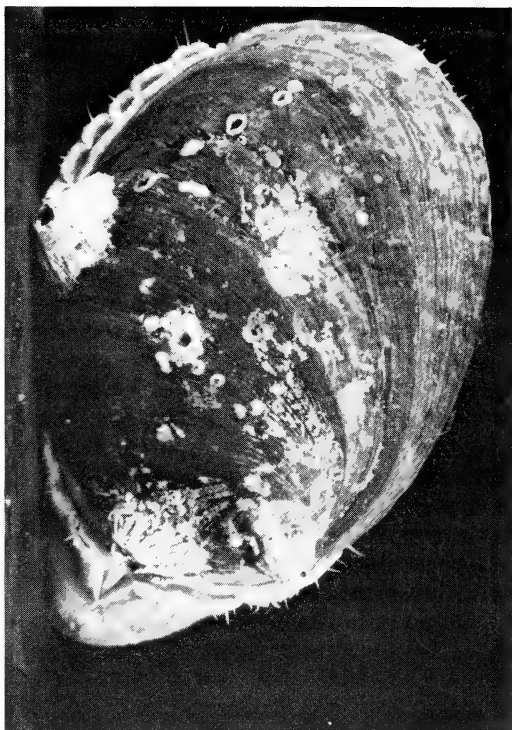
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Albino Black Abalone Update

by David W. Behrens

In 1979 I reported the collection of an ambicolored "albino" female black abalone, *Haliotis cracherodii* Leach, 1817. (California Fish & Game 65(1):54-55). The animal, originally collected in October, 1975, near Double Rock, San Luis Obispo County, California, then measured 92 mm in length and weighed 132 gms. As reported the epipodium, mantle and eyes of the specimen were whitish to cream yellow, while the mantle cavity, viscera and shell were of normal coloration. Soon after the original publication several institutions expressed interest in the animal when it succumbed. Well, they will have a bit longer to wait. This unique specimen remains quite healthy in the display aquarium of the Pacific Gas & Electric Co., Biological Research Laboratory at Diablo Canyon, California. After 5 years it has grown to 129 mm in length. No weight is available as I prefer not to remove it from its comfortable pose in the sanctuary of our laboratory.

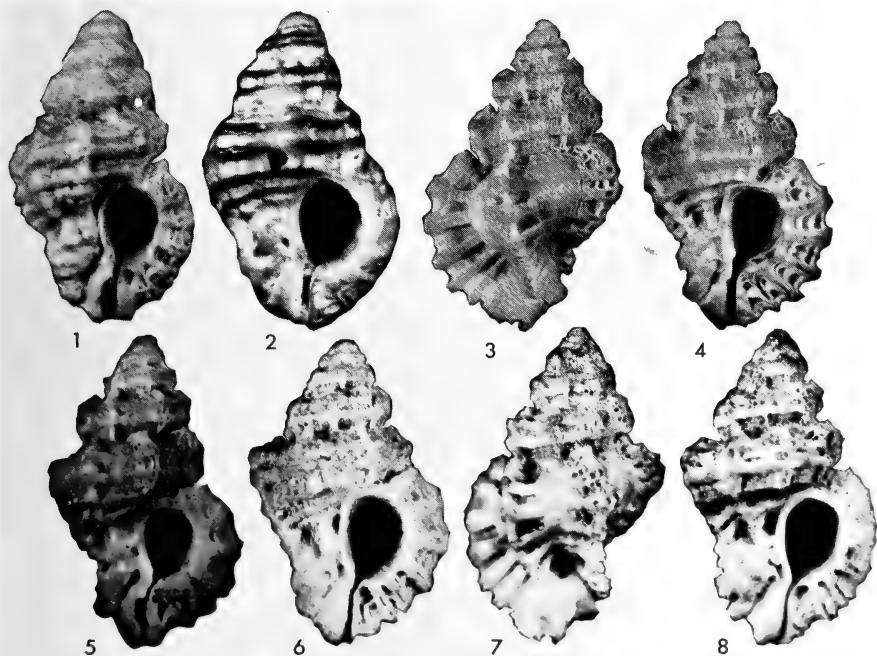


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The Status of "Murex" funafutiensis Hedley, and some Favartia Species.

by Walter O. Cernohorsky

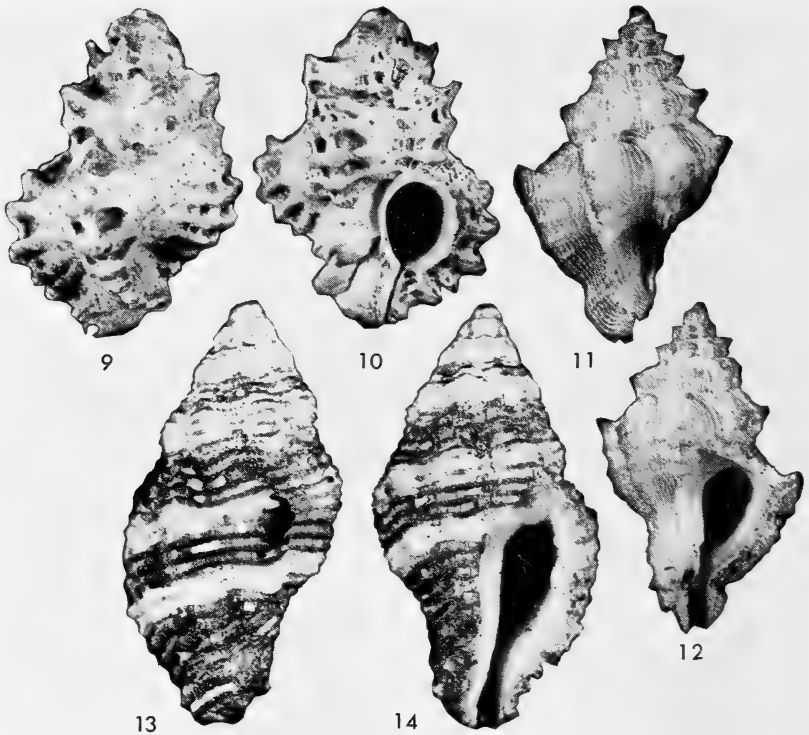
Dr. Emily Vokes (1984, *Shells and Sea Life*, 16(10):160) did solve the identity of *Murex peasei* Tryon 1880, a species now considered conspecific with *Favartia poormani* Radwin and D'Attilio, 1976, from the west coast of America. "*Favartia peasei*" can now be expunged from the Pacific muricid nomenclature, and a name must be found for the specimen sent by Pease to Tryon and which is in the Academy of Natural Sciences, Philadelphia No. 36144 (fig. 1). I think this is the species *Favartia garrettii* (Pease, 1868) [a new name for *Murex exigua* Garrett, 1857 - not *M. exiguus* Broderip, 1833], described from rocky coasts of Hawaii. This species itself has been misunderstood and specific shell-characters have been usually interpreted on the basis of juvenile specimens. Although Radwin and D'Attilio (1976) state that the shell may reach 5.0 mm, I have seen several large Hawaiian specimens reaching almost 14.0 mm in length. Pilsbry (1921) overlooked Garrett's previous description and also Pease's re-naming of *F. garrettii* because he described



Figures 1-8

Figures 1-8. *Favartia garrettii* (Pease). 1. Specimen in ANSP No. 36144, ex-Pease; length 12.6 mm. 2. Very worn holotype of *Murex cyclostoma baldwiniana* Pilsbry, ANSP No. 127835 from Maui Id., Hawaii; length 8.4 mm, width 5.3 mm. 3-4. Specimen from Nawiliwili, Kauai, Hawaii, leg. Dr. Haas; length 10.6 mm, width 6.9 mm. 5. Same data, length 12.8 mm, width 7.4 mm. 6. Specimen from Pearl Harbor, Oahu, Hawaii, USNM; length 11.7 mm, width 7.7 mm. 7-8. Holotype of *Murex sykesi* Preston from Sri Lanka, B.M.(N.H.) No. 1905.2.8.7.; length 20.8 mm, width 13.0 mm.

very worn specimens from Kailua and Maui as *Murex cyclostoma baldwiniana* (fig. 2). *Favartia* species are prone to variation and *F. garrettii* is no exception (see figs. 3-8). One would be hard pressed to try and separate *F. sykesi* Preston, 1904 (figs. 7,8) from Sri Lanka, from *F. garrettii*. It is my opinion that *F. garrettii* is not endemic to Hawaii but has an Indo-Pacific distribution.



Figures 9-14

Figures 9-10. *Favartia brevicula* (Sowerby), syntype B.M. (N.H) No. 197488; length 26.1 mm, width 20.6 mm.

Figures 11-12. "*Murex*" *funafutiensis* Hedley, holotype Australian Museum, Sydney No. C-6004; length 8.4 mm, width 5.5 mm.

Figures 13-14. *Cronia bicatenata* (Reeve) from Sri Lanka, USNM; length 13.3 mm, width 7.0 mm.

"*Murex funafutiensis*" Hedley, 1899, described from 40-80 fathoms at Funafuti, Tuvalu, is another misunderstood species. It was placed in the genus *Pazinotus* by Vokes (1971) and Fair (1976) [which on conchological grounds is a reasonable placement], in *Favartia* by Radwin & D'Attilio (1976) and in the subgeneric group *Pygmaepterys* by Vokes (1984). Both Fair and Radwin & D'Attilio did not see actual specimens of the species and merely repeated Hedley's original description. The holotype, which is probably unique, measures 8.4 mm in length, has 5 mature whorls and two and one-half embryonic whorls, 6 varices on the body whorl, 4 denticles on the outer lip, 3 minute denticles on the base of the columella,

and distinct, close-set longitudinal striae (figs. 11,12). Although only a radular examination will enable us to make a definite generic placement, it is my opinion that *M. funafutiensis* is not congeneric with *Favartia*. The latter genus, as defined by its type-species *Favartia brevicula* (Sowerby, 1834)[figs. 9,10], has strong spirally sculptured shells, a short, dorsally recurved siphonal canal which is narrowly open or almost closed and the aperture is small, ovate and narrowly rimmed. The species "*Ricinula*" *bicatenata* Reeve, 1846 (figs. 13,14) has none of the features of *Favartia* but is most similar to *Cronia* (*Ergalatax*) *contracta* (Reeve) in shell-features, a species known by its thaidine and not muricine radula.

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ANNOUNCEMENT

The Delaware Museum of Natural History, Greenville, Delaware, is pleased to announce the appointment of Dr. Barbara H. Butler of Kennett Square, Pennsylvania, as director. Dr. Butler succeeds Mr. Robert L. Dimit who left in August, 1984 due to poor health following an accident.

Dr. Butler is looking forward to expanding and building on the progress of recent years in making the Delaware Museum of Natural History a viable and vital resource in the community. "The building, location and collections are outstanding," said Dr. Butler, "and, I want to help the museum increase its role in serving the public and scientific community as an educational resource. Photo by M.J. Arden.

YOUR COLLECTION -- A HOW-TO COLUMN: No. 6. Why make a Catalog? Susan J. Hewitt

When you have amassed a good collection, perhaps all from one area, nicely labelled lots, everything in order, then you should find yourself considering cataloging the collection.

What does this mean? it means having a list, traditionally in a ledger book, or, perhaps now on a computer, of everything that is in your collection. Why do I need this? I hear you asking, when I already have everything well labelled with information, and I know what I've got, more or less. Well, there are several reasons. One good one is that someone else, coming to look at your collection would find it hard to know what you had from where, without looking at everything lot by lot. Even if you have the collection arranged by order of classification it might be hard to know if you had a particular species, especially if you placed it in the wrong family.

Another excellent reason is that when you catalog a 'lot' (a group of specimens of one species collected in the same locality on the same date). You give that 'lot' a catalog number. (maybe the first number would be 00001). Every shell and the label(s) in that lot is given that number. It is usually written on the labels and on the shells themselves, if they are large enough, or on a slip of paper securely enclosed in the tube or box in which small shells or specimens are kept. Once a whole drawer of lots has its catalog numbers, if you have the misfortune to drop the whole lot on the floor, all the specimens and labels can easily be matched up.

I imagine that appropriate computer software may soon be available for cataloging collections. This would certainly be more versatile than the ledger system. Data storage and rapid data retrieval are what cataloging is all about, and it is precisely these things that computers were originally designed to help us with.

In the meantime, those of us who are living without computers can catalog perfectly well with the antique ledger and pen system.

Susan J. Hewitt, 75 Leonard St. #4 NE, New York, NY 10013

Announcement of Open Position

The Department of Invertebrate Zoology, National Museum of Natural History, seeks candidates for Zoologist GS-11/12/13 (starting at \$25,489-36,327 per annum), to perform curatorial functions and collections-oriented research in Systematic and Evolutionary Malacology. Candidates will be evaluated according to the quality, breadth, progressiveness, and recency of research accomplishments (publications) and academic study; museum curatorial and field experience; relation of candidate's research to present Department collections and research strengths and needs; and the potential for research interaction with other NMNH staff and outside colleagues.

Submit by 15 February, SF 171 (Personal Qualifications Statement), Curriculum vitae, copies of publications, and statement of long term research goals to: Smithsonian Institution, Office of Personnel Administration: 900 Jefferson Drive SW, Rm. 1410, Washington D.C. 20560, ATTN.: MPA-85-2F.

Common Names List of North American Marine Gastropods, Part 3. American Malacological Union.

SCIENTIFIC NAME	OCCURRENCE	COMMON NAME
ORDER GYMNOSOMATA		
Clionidae		
<u>Clione limacina</u> (Phipps, 1774).....	A,P,Ac.....	common clione
<u>Clionina longicaudata</u> (Souleyet, 1852).....	A,(P).....	
<u>Paedoclione doliiformis</u> Danforth, 1907.....	A.....	
Cliopsidae		
<u>Cliopsis krohni</u> Troschel, 1854.....	A,(P).....	
Thliptodontidae		
<u>Thliptodon diaphanus</u> (Meisenheimer, 1903).....	A,P.....	
Pneumodermatidae		
<u>Crucibranchaea macrochira</u> (Meisenheimer, 1905)....	A,(P).....	
<u>Pneumoderma atlanticum</u> (Oken, 1815).....	A,(P).....	
Notobranchaeidae		
<u>Notobranchaea macdonaldi</u> Pelseneer, 1886.....	A,(P).....	
<u>Prionoglossa tetrabranchiata</u> (Bonnievie, 1913)....	A,(P).....	
Hydromylidae		
<u>Hydromyles globulosa</u> (Rang, 1825).....	A,P.....	
ORDER ASCOGLOSSA		
Cylindrobullidae		
<u>Ascobulla ulla</u> (Ev. Marcus and Er. Marcus, 1970...)	A.....	
<u>Cylindrobulla beauii</u> P. Fischer, 1856.....	A.....	Beau paper-bubble
Oxynoidae		
<u>Oxynoe antillarum</u> Mörch, 1863.....	A.....	Antilles oxynoe
<u>Oxynoe azuropunctata</u> Jensen, 1980.....	A.....	blue-spot oxynoe
Lobigeridae		
<u>Lobigeridae souverbiei</u> P. Fischer, 1856	A,(P).....	Souverbie lobiger
Juliidae		
<u>Berthelinia caribbea</u> Edmonds, 1963.....	A....	Caribbean bivalved snail
Bosellidae		
<u>Bosellia corinneae</u> Ev. Marcus, 1973.....	A.....	
<u>Bosellia marcusi</u> Ev. Marcus, 1972.....	A.....	
<u>Bosellia mimetica</u> Trinchese, 1891.....	A.....	
Elysiidae		
<u>Elysia canguzua</u> Er. Marcus, 1955.....	A.....	
<u>Elysia catulus</u> Gould, 1870.....	A.....	kitty cat elysia
<u>Elysia chlorotica</u> (Gould, 1870).....	A.....	eastern emerald elysia
<u>Elysia evelinae</u> Er. Marcus, 1957.....	A.....	Eveline elysia
<u>Elysia hedgpethi</u> Er. Marcus, 1961.....	P.....	Hedgpeth elysia
<u>Elysia ornata</u> (Swainson, 1840).....	A.....	ornate elysia
<u>Elysia papillosa</u> A.E. Verrill, 1901.....	A.....	papillose elysia
<u>Elysia patina</u> Ev. Marcus, 1980.....	A.....	
<u>Elysia picta</u> A.E. Verrill, 1901.....	A.....	painted elysia
<u>Elysia serca</u> Er. Marcus, 1955.....	A....	Caribbean seagrass elysia
<u>Elysia subornata</u> Verrill, 1901.....	A.....	
<u>Elysia tuca</u> Ev. Marcus and Er. Marcus, 1967.....	A.....	

Tridachia crispata (Mörch, 1863).....A.....lettuce slug

Costasiellidae

Costasiella ocellifera (Simroth, 1895).....A.....eyespot costasiella

Stiligeridae

Alderia modesta (Lovén, 1844).....A,P.....modest alderia

Ercolania coerulea Trinchese, 1893.....A.....blue stiliger

Ercolania costai Pruvot-Fol, 1951.....A.....

Ercolania funerea (A. Costa, 1867).....A.....

Ercolania fuscata (Gould, 1870).....A.....dusky stiliger

Limapontia zonata Girard, 1852.....A.....

Olea hansineensis Agersborg, 1923.....P.....Hansine sea slug

Placida dendritica (Alder and Hancock, 1843).....A,P.....

Placida kingstoni T.E. Thompson, 1977.....A.....

Stiliger fuscovittatus Lance, 1962.....A,P.....brown-streak stiliger

Stiliger vossi Ev. Marcus and Er. Marcus, 1960.....A.....Voss stiliger

Hermaeidae

Aplysiopsis enteromorphae

(Cockerell and Eliot, 1905).....P.....

Aplysiopsis smithi (Er. Marcus, 1961).....P.....

Aplysiopsis zebra Clark, 1982.....A.....

Hermaea cruciata Gould, 1870.....A.....

Hermaea olivae MacFarland, 1966.....P.....

Hermaea vancouverensis (O'Donoghue, 1924).....A,P.....

Caliphyllidae

Caliphylla mediterranea A. Costa, 1867.....A.....

Cyerce antillensis Engel, 1927.....A.....Antilles glass-slug

Cyerce cristallina (Trinchese, 1881).....A.....harlequin glass-slug

Mourgona germaineae

Ev. Marcus and Er. Marcus, 1970.....A.....

Phyllobranchillus viridis (Deshayes, 1857).....A,P.....

ORDER ANASPIDEA

Akeridae

Akera thompsoni Olsson and McGinty, 1951.....A.....

Aplysiidae

Aplysia brasiliana Rang, 1828.....A.....sooty sea-hare

Aplysia californica Cooper, 1863.....P.....California sea-hare

Aplysia cervina (Dall and Simpson, 1901).....A.....

Aplysia dactylomela Rang, 1828.....A.....spotted sea-hare

Aplysia donca Ev. Marcus and Er. Marcus, 1959.....A.....

Aplysia geographica (A. Adams and Reeve, 1850).....?A.....

Aplysia juliana Quoy and Gaimard, 1832.....A,(P).....walking sea-hare

Aplysia morio A.E. Verrill, 1901.....A.....giant black sea-hare

Aplysia parvula Guilding in Mörch, 1863.....A.....

Aplysia reticulopoda Beeman, 1960.....P.....net-foot sea-hare

Aplysia vaccaria Winkler, 1955.....P.....giant black sea-hare

Aplysia willcoxi Heilprin, 1886.....A.....Willcox sea-hare

Bursatella leachii pleii Rang, 1828.....A.....ragged sea-hare

Dolabrifera dolabrifera (Rang, 1828).....A,(P).....warty sea-cat

Notarachus punctatus Philippi, 1836.....A.....

Petalifera petalifera (Rang, 1828).....A,(P).....

Petalifera ramosa Baba, 1959.....A.....

Phyllaplysia cymodacea K. Clark, 1976.....A.....

Phyllaplysia engeli Er. Marcus, 1955.....A.....

Phyllaplysia smaragda Clark, 1977.....A.....emerald leaf-slug

Phyllaplysia taylori Dall, 1900.....P.....zebra leaf-slug

Stylocheilus citrinus (Rang, 1828).....A,(P).....

Stylocheilus longicauda (Quoy and Gaimard, 1825).....A,(P).....

ORDER NOTASPIDEA

Tylodiniidae

<u>Tylodina americana</u> Dall, 1890.....	A.....	
<u>Tylodina fungina</u> Gabb, 1865.....	P.....	yellow umbrella shell
<u>Tylodinella spongotheras</u> Bertsch, 1980.....	P.....	

Umbraculidae

<u>Umbraculum umbraculum</u> (Lightfoot, 1786).....	A.....	Atlantic umbrella shell
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Pleurobranchidae

<u>Berthella agassizii</u> (MacFarland, 1909).....	A.....	
<u>Berthella californica</u> (Dall, 1900).....	P.....	California side-gill slug
<u>Berthella sideralis</u> (Lovén, 1847).....	(A), P.....	
<u>Berthella tupala</u> Er. Marcus, 1957.....	A.....	
<u>Berthellina citrina</u> (Rüppell and Leuckart, 1828).....	P.....	
<u>Berthellina engeli</u> Gardiner, 1936.....	A, P.....	
<u>Pleurobranchus areolatus</u> Mörch, 1863.....	A, P.....	Atlantic side-gill slug
<u>Pleurobranchus reesi</u> White, 1952.....	A.....	
<u>Pleurobranchus strongi</u> MacFarland, 1966.....	P.....	

Pleurobranchaeidae

<u>Pleurobranchaea bonnieae</u>		
Ev. Marcus and Gosliner, 1984.....	A.....	
<u>Pleurobranchaea californica</u> MacFarland, 1966.....	P.....	
<u>Pleurobranchaea confusa</u>		
Ev. Marcus and Gosliner, 1984.....	A.....	
<u>Pleurobranchaea hedgpethi</u> Abbott, 1952.....	A.....	
<u>Pleurobranchaea inconspicua</u> Bergh, 1897.....	A.....	
<u>Pleurobranchaea occidentalis</u> Bergh, 1897.....	A.....	
<u>Pleurobranchaea tarda</u> A.E. Verrill, 1880.....	A.....	

ORDER NUDBRANCHIA

Corambidae

<u>Corambe pacifica</u> MacFarland and O'Donoghue, 1929..	P.....	frost-spot corambe
<u>Doridella burchi</u> Ev. Marcus and Er. Marcus, 1967..	A.....	Burch corambe
<u>Doridella obscura</u> A.E. Verrill, 1870.....	A.....	obscure corambe
<u>Doridella steinbergae</u> (Lance, 1962).....	P.....	Joan Steinberg corambe

Goniodorididae

<u>Ancula evelinae</u> Er. Marcus, 1961.....	A.....	
<u>Ancula gibbosa</u> (Risso, 1818).....	A, Ac.....	Atlantic ancula
<u>Ancula lentiginosa</u> Farmer in Farmer and Sloan, 1964.....	P.....	freckled ancula
<u>Ancula pacifica</u> MacFarland, 1905.....	P.....	Pacific ancula
<u>Hopkinsia rosacea</u> MacFarland, 1905.....	P.....	Hopkins rose
<u>Okenia angelensis</u> Lance, 1966.....	P.....	Angeles okenia
<u>Okenia ascidicola</u> Morse, 1972.....	A.....	
<u>Okenia cupella</u> (Vogel and Schultz, 1970).....	A.....	
<u>Okenia impexa</u> (Er. Marcus, 1957).....	A.....	
<u>Okenia modesta</u> A.E. Verrill, 1875.....	A.....	
<u>Okenia plana</u> Baba, 1960.....	P.....	flat okenia
<u>Okenia pulchella</u> Alder and Hancock, 1854.....	A, Ac.....	
<u>Okenia sapelona</u> (Ev. Marcus and Er. Marcus, 1967).....	A.....	Sapelo okenia
<u>Okenia vancouverensis</u> (O'Donoghue, 1921).....	P.....	Vancouver okenia
<u>Okenia zoobotryon</u> (Smallwood, 1910).....	A.....	
<u>Trapania dalva</u> Ev. Marcus, 1972.....	A.....	
<u>Trapania velox</u> (Cockerell, 1901).....	P.....	swift brown-and-yellow nudibranch

Onchidorididae

<u>Acanthodoris armata</u> O'Donoghue, 1927.....	P.....	
<u>Acanthodoris atrogriseata</u> O'Donoghue, 1927.....	P.....	

<u>Acanthodoris brunnea</u> MacFarland, 1905.....	P.....	Pacific brown spiny dorid
<u>Acanthodoris caerulescens</u> Bergh, 1880.....	P.....	
<u>Acanthodoris hudsoni</u> MacFarland, 1905.....	P.....	
<u>Acanthodoris lutea</u> MacFarland, 1925.....	P.....	orange peel dorid
<u>Acanthodoris nanaimoensis</u> O'Donoghue, 1921.....	P.....	wine-plumed spiny dorid
<u>Acanthodoris pilosa</u> (Abildgaard in O.F. Müller, 1789).....	A,P,Ac.....	hairy pilose dorid
<u>Acanthodoris rhodoceras</u> Cockerell in Cockerell and Eliot, 1905....	P.....	black-tipped spiny dorid
<u>Adalaria proxima</u> (Alder and Hancock, 1854).....	A,Ac.....	yellow false doris
<u>Onchidoris aspera</u> Alder and Hancock, 1842.....	A.....	
<u>Onchidoris bilamellata</u> (Linnaeus, 1767).....	A,P,Ac.....	barnacle-eating onchidoris
<u>Onchidoris diademata</u> Gould, 1870.....	A.....	
<u>Onchidoris diaphana</u> Alder and Hancock, 1845.....	A.....	
<u>Onchidoris grisea</u> Gould, 1870.....	A.....	
<u>Onchidoris hystricina</u> (Bergh, 1878).....	P.....	fuzzy onchidoris
<u>Onchidoris muricata</u> (O.F. Müller, 1776).....	A,P,Ac.....	muricate doris
<u>Onchidoris tenella</u> Gould, 1870.....	A.....	

Triophidae

<u>Crimora coneja</u> Marcus, 1961.....	P.....	rabbit dorid
<u>Triopha catalinae</u> (Cooper, 1863).....	P.....	sea clown triopha
<u>Triopha maculata</u> MacFarland, 1905.....	P.....	maculated triopha
<u>Triopha occidentalis</u> (Fewkes, 1889).....	P.....	grand triopha

Heterodorididae

<u>Heterodoris robusta</u> A.E. Verrill and Emerton, 1882.....	A.....	
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Aegiretidae

<u>Aegires albopunctatus</u> MacFarland, 1905.....	P.....	salt-and-pepper dorid
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Gymnodorididae

<u>Nembrotha gratiosa</u> Bergh, 1890.....	A.....	
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Polyceratidae

<u>Issena pacifica</u> (Bergh, 1894).....	A,P.....	
<u>Issena ramosa</u> (A.E. Verrill and Emerton, 1881)....	A.....	
<u>Laila cockerelli</u> MacFarland, 1905.....	P.....	laila dorid
<u>Polycera atra</u> MacFarland, 1905.....	P.....	orange-spike polycera
<u>Polycera aurisula</u> Er. Marcus, 1957.....	A.....	Marcus polycera
<u>Polycera chilluna</u> Er. Marcus, 1961.....	A.....	
<u>Polycera dubia</u> (M. Sars, 1829).....	A.....	
<u>Polycera hedgpethi</u> Er. Marcus, 1964.....	P.....	Hedgpeth western polycera
<u>Polycera hummi</u> Abbott, 1952.....	A.....	Humm polycera
<u>Polycera odhneri</u> Er. Marcus, 1955.....	A.....	
<u>Polycera rycia</u> Ev. Marcus, 1970.....	A.....	
<u>Polycera tricolor</u> Robilliard, 1971.....	P.....	three-color polycera
<u>Polycera zosteriae</u> O'Donoghue, 1924.....	P.....	eelgrass polycera
<u>Polycerella conyna</u> Er. Marcus, 1957.....	A.....	
<u>Polycerella davenportii</u> Balch, 1899.....	A.....	
<u>Polycerella emertoni</u> A.E. Verrill, 1881.....	A.....	

Cadlinidae

<u>Cadlina flavomaculata</u> MacFarland, 1905.....	P.....	yellow-spot cadlina
<u>Cadlina laevis</u> (Linnaeus, 1767).....	A,Ac.....	white Atlantic cadlina
<u>Cadlina limbaughi</u> Lance, 1962.....	P.....	
<u>Cadlina marginata</u> MacFarland, 1905.....	P.....	yellow-rim cadlina
<u>Cadlina modesta</u> MacFarland, 1966.....	P.....	modest cadlina
<u>Cadlina pacifica</u> Bergh, 1879.....	P.....	
<u>Cadlina rumia</u> Er. Marcus, 1955.....	A.....	
<u>Cadlina scabriuscula</u> (Bergh, 1890).....	A.....	

Cadlina sparsa Odhner, 1921.....P.....dark-spot cadlina

Chromodorididae

Chromodoris aila Er. Marcus, 1961.....A.....aila blue dorid

Chromodoris clenchi (H.D. Russell, 1935).....A.....neona blue doris

Chromodoris dalli (Bergh, 1879).....P.....

Chromodoris macfarlandi Cockerell, 1901.....P.....MacFarland blue dorid

Chromodoris nyalya

Ev. Marcus and Er. Marcus, 1967.....A.....

Chromodoris roseopicta (A.E. Verrill, 1900).....?.....

Felimare bayeri Ev. Marcus and Er. Marcus, 1967.....A.....

Hypselodoris californiensis (Bergh, 1879).....P.....California blue dorid

Hypselodoris edenticulata (White, 1952).....A.....Florida regal dorid

Mexichromis porterae (Cockerell, 1901).....P.....Porter blue dorid

Asteronotidae

Aphelodoris antillensis (Bergh, 1879).....A.....

Sclerodoris tanya (Ev. Marcus, 1971).....P.....feline dorid

Actinocyellidae

Hallaxa chani Gosliner and Williams, 1975.....P.....

Conualeviidae

Conualevia alba Collier and Farmer, 1964.....P.....white smooth-horn dorid

Aldisidae

Aldisa cooperi Robilliard and Baba, 1972.....P.....

Aldisa sanguinea (Cooper, 1863).....P.....blood spot dorid

Aldisa zetlandica (Alder and Hancock, 1854).....A,Ac.....

Rostangidae

Rostanga pulchra MacFarland, 1905.....P.....red sponge dorid

Dorididae

Doris odonoghuei Steinberg, 1963.....P.....

Doris verrucosa Linnaeus, 1758.....A.....

Siraius kyolis Ev. Marcus and Er. Marcus, 1967.....A.....kyolis dorid

Dendrodorididae

Dendrodoris krebsii (Mörch, 1863).....A,(P).....Krebs dorid

Dendrodoris warta Ev. Marcus and Gallagher, 1976..A.....

Doriopsilla albopunctata (Cooper, 1863).....P.....salted yellow dorid

Doriopsilla areolata (Bergh, 1880).....A.....

Doriopsilla leia Er. Marcus, 1961.....A.....

Doriopsilla nigromaculata

(Cockerell in Cockerell and Eliot, 1905)..P.....tiny black-spot dorid

Doriopsilla pharpa Er. Marcus, 1961.....A.....

Phyllidiidae

Phyllidiopsis papilligera Bergh, 1890.....A.....

Archidorididae

Archidoris montereyensis (Cooper, 1863).....P.....Monterey sea lemon

Archidoris odhneri (MacFarland, 1966).....P.....white night dorid

Atagema alba (O'Donoghue, 1927).....P.....hunchback dorid

Atagema prea (Ev. Marcus and Er. Marcus, 1967).....A.....

Discodorididae

Anisodoris nobilis (MacFarland, 1905).....P.....Pacific sea lemon

<u>Anisodoris</u> <u>prea</u> Ev. Marcus and Er. Marcus, 1967.....A.....		
<u>Anisodoris</u> <u>lentiginosa</u> Millen, 1982.....P.....	mottled pale sea lemon	
<u>Anisodoris</u> <u>worki</u> Ev. Marcus and Er. Marcus, 1967..A.....		
<u>Diaulula</u> <u>sandiegensis</u> (Cooper, 1863).		ringed dorid
<u>Discodoris</u> <u>alba</u> White, 1952.....A.....		
<u>Discodoris</u> <u>heathi</u> MacFarland, 1905.....P.....	Heath gritty dorid	
<u>Discodoris</u> <u>evelinae</u> Er. Marcus, 1955.....A.....		
<u>Discodoris</u> <u>phoca</u> Ev. Marcus and Er. Marcus, 1959..A.....		
<u>Discodoris</u> <u>purcina</u> Ev. Marcus and Er. Marcus, 1967.....A.....		
<u>Discodoris</u> <u>pusae</u> Er. Marcus, 1955.....A.....		
<u>Geitodoris</u> <u>complanata</u> (A.E. Verrill, 1880).....A.....		
<u>Peltodoris</u> <u>greeleyi</u> MacFarland, 1909.....A.....		
<u>Taringa</u> <u>alvica</u> <u>timia</u> Ev. Marcus and Er. Marcus, 1967....P.....	dusky brown taringa	
<u>Taringa</u> <u>telopia</u> <u>disa</u> Ev. Marcus and Er. Marcus, 1967.....A.....		
<u>Thordisa</u> <u>bimaculata</u> Lance, 1966.....P.....	two-spot thordis	
<u>Thordisa</u> <u>rubescens</u> Behrens and Henderson, 1981....P.....	red thordis	

Kentrodorididae

<u>Jorunna</u> <u>pardus</u> Behrens and Henderson, 1981.....P.....	leopard jorunna	
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Platydorididae

<u>Platydoris</u> <u>angustipes</u> (Mörch, 1863).....A.....		
<u>Platydoris</u> <u>macfarlandi</u> Hanna, 1951.....P.....	MacFarland flat dorid	

Tritonidae

<u>Tochuina</u> <u>tetraquetra</u> (Pallas, 1788).....P.....	giant orange tochui	
<u>Tritonia</u> <u>bayeri</u> Ev. Marcus, 1978.....A.....	Bayer tritonia	
<u>Tritonia</u> <u>bayeri</u> <u>missa</u> Er. Marcus, 1967.....A.....		
<u>Tritonia</u> <u>diomedea</u> Bergh, 1894.....A,P.....	rosy tritonia	
<u>Tritonia</u> <u>festiva</u> (Stearns, 1873).....P.....	diamondback tritonia	
<u>Tritonia</u> <u>palmeri</u> (Cooper, 1862).....P.....		
<u>Tritonia</u> <u>wellsi</u> Er. Marcus, 1961.....A.....		

Hancockiidae

<u>Hancockia</u> <u>californica</u> MacFarland, 1923.....P.....	Hancock nudibranch	
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Dendronotidae

<u>Dendronotus</u> <u>albopunctatus</u> Robilliard, 1972.....P.....		
<u>Dendronotus</u> <u>albus</u> MacFarland, 1966.....P.....	whitefrond aeolid	
<u>Dendronotus</u> <u>dalli</u> Bergh, 1879.....P.....	Dall frond aeolid	
<u>Dendronotus</u> <u>diversicolor</u> Robilliard, 1970.....P.....	multicolor frond aeolid	
<u>Dendronotus</u> <u>frondosus</u> (Ascanius, 1774).....A,P,Ac.....	frond aeolid	
<u>Dendronotus</u> <u>iris</u> Cooper, 1863.....P.....	giant frond aeolid	
<u>Dendronotus</u> <u>robustus</u> A.E. Verrill, 1870.....A.....	robust frond aeolid	
<u>Dendronotus</u> <u>rufus</u> O'Donoghue, 1921.....P.....	red frond aeolid	
<u>Dendronotus</u> <u>subramosus</u> MacFarland, 1966.....P.....	stubby frond aeolid	

Tethyidae

<u>Melibe</u> <u>leonina</u> (Gould, 1852).....P.....	lion nudibranch	
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Lomanotidae

<u>Lomanotus</u> <u>stauberi</u> Clark and Goetzfried, 1976.....A.....		
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Scyllaeidae

<u>Scyllaea</u> <u>pelagica</u> Linnaeus, 1758.....A,(P)....	sargassum nudibranch	
--	----------------------	--

Phylliroidea

<u>Phylliroe atlantica</u> Bergh, 1871.....	A.....	
<u>Phylliroe bucephalum</u> Péron and Lesueur, 1810.....	A.....	

Dotoidea

<u>Doto amya</u> Er. Marcus, 1961.....	P.....	hammerhead doto
<u>Doto chica</u> Er. Marcus, 1960.....	A.....	
<u>Doto columbiana</u> O'Donoghue, 1921.....	P.....	British Columbia doto
<u>Doto coronata</u> (Gmelin, 1791).....	A.....	crown doto
<u>Doto divae</u> Er. Marcus, 1960.....	A.....	
<u>Doto doerga</u> Ev. Marcus and Er. Marcus, 1963.....	A.....	
<u>Doto formosa</u> A.E. Verrill, 1875.....	A.....	
<u>Doto kya</u> Er. Marcus, 1961.....	P.....	dark doto
<u>Doto pita</u> Er. Marcus, 1955.....	A.....	
<u>Doto uva</u> Er. Marcus, 1955.....	A.....	
<u>Mieseae evelinae</u> (Er. Marcus, 1957).....	A.....	

Arminidae

<u>Armina tigrina</u> Rafinesque, 1814.....	A.....	tiger armina
<u>Armina californica</u> (Cooper, 1863).....	P.....	California armina

Dironidae

<u>Dirona albolineata</u> Macfarland in Cockerell and Eliot, 1905.....	P.....	white-line dirona
<u>Dirona aurantia</u> Hurst, 1966.....	P.....	golden dirona
<u>Dirona picta</u> Macfarland in Cockerell and Eliot, 1905.....	P.....	painted dirona

Janolidae

<u>Antiopella barbarentis</u> (Cooper, 1863).....	P.....	cockscomb nudibranch
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Coryphellidae

<u>Coryphella cooperi</u> Cockerell, 1901.....	P.....	blue-patch aeolid
<u>Coryphella diversa</u> (Couthouy, 1839).....	A.....	
<u>Coryphella fusca</u> O'Donoghue, 1921.....	P.....	predaceous aeolid
<u>Coryphella iodinea</u> (Cooper, 1863).....	P.....	purple aeolid
<u>Coryphella longicaudata</u> O'Donoghue, 1922.....	P.....	long-tail aeolid
<u>Coryphella nobilis</u> A.E. Verrill, 1880.....	A.....	
<u>Coryphella pellucida</u> (Alder and Hancock, 1843).....	A.....	pellucid aeolid
<u>Coryphella pricei</u> MacFarland, 1966.....	P.....	smooth-tooth aeolid
<u>Coryphella salmonacea</u> (Couthouy, 1839).....	A,P,Ac.....	salmon aeolid
<u>Coryphella subrosacea</u> (Eschscholtz, 1831).....	P.....	
<u>Coryphella trilineata</u> O'Donoghue, 1921.....	P.....	three-line aeolid
<u>Coryphella trophina</u> (Bergh, 1894).....	P.....	
<u>Coryphella verrucosa rufibranchialis</u> (Johnston, 1832).A,(P),Ac.....		red-finger aeolid

Eubranchiidae

<u>Eubranchus conicla</u> (Er. Marcus, 1958).....	A.....	conicla aeolid
<u>Eubranchus columbianus</u> (O'Donoghue, 1922).....	P.....	
<u>Eubranchus exiguus</u> (Alder and Hancock, 1848).....	A,Ac.....	dwarf balloon aeolid
<u>Eubranchus misakiensis</u> Baba, 1960.....	P.....	misaki balloon aeolid
<u>Eubranchus olivaceus</u> (O'Donoghue, 1922).....	P.....	green balloon aeolid
<u>Eubranchus pallidus</u> (Alder and Hancock, 1842).....	A.....	
<u>Eubranchus rustyus</u> (Er. Marcus, 1961).....	P.....	rusty aeolid
<u>Eubranchus sanjuanensis</u> Roller, 1972.....	P.....	
<u>Eubranchus tricolor</u> (Forbes, 1838).....	A,Ac.....	painted balloon aeolid

Cumanotidae

<u>Cumanotus beaumonti</u> (Eliot, 1906).....	P.....	polyp aeolid
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Tergipedidae

<u>Catriona columbiana</u> (O'Donoghue, 1922).....P.....	red-tentacle cuthona
<u>Catriona gymnota</u> (Couthouy, 1838).....A.....	
<u>Catriona maua</u> Ev. Marcus and Er. Marcus, 1960.....A.....	maua cuthona
<u>Catriona rickettsi</u> Behrens, 1984.....P.....	
<u>Cuthona abronia</u> (MacFarland, 1966).....P.....	colorful cuthona
<u>Cuthona albocrusta</u> (MacFarland, 1966).....P.....	white-crust cuthona
<u>Cuthona aurantia</u> (Alder and Hancock, 1842).....A,Ac.....	orange-tip cuthona
<u>Cuthona cocoachroma</u> Williams and Gosliner, 1979...P.....	brown cuthona
<u>Cuthona concinna</u> (Alder and Hancock, 1843).....A,P.....	concise cuthona
<u>Cuthona flavovulta</u> (MacFarland, 1966).....P.....	yellowish cuthona
<u>Cuthona fulgens</u> (MacFarland, 1966).....P.....	black and yellow cuthona
<u>Cuthona lagunae</u> (O'Donoghue, 1926).....P.....	oranged-face cuthona
<u>Cuthona nana</u> (Alder and Hancock, 1842).....A.....	
<u>Cuthona perca</u> (Er. Marcus, 1958).....A,P.....	Lake Merritt cuthona
<u>Cuthona phoenix</u> Gosliner, 1981.....P.....	bornagain cuthona
<u>Cuthona pustulata</u> (Alder and Hancock, 1845).....?A.....	
<u>Cuthona stimpsoni</u> A.E. Verrill, 1880.....A.....	
<u>Cuthona tina</u> (Er. Marcus, 1957).....A.....	
<u>Cuthona veronica</u> (A.E. Verrill, 1880).....A.....	
<u>Cuthona virens</u> (MacFarland, 1966).....P.....	green cuthona
<u>Precuthona divae</u> Er. Marcus, 1961.....P.....	rose-pink cuthona
<u>Tenellia adspersa</u> (Nordmann, 1845).....P.....	miniature aeolid
<u>Tenellia fuscata</u> Gould, 1870.....A.....	
<u>Tenellia ventilabrum</u> (Dalyell, 1853).....A.....	
<u>Tergipes tergipes</u> (Forskäl, 1775).....A,Ac.....	Johnston balloon aeolid

Fionidae

<u>Fiona pinnata</u> (Eschscholtz in Rathke, 1831).....A,P.....	fiona
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Babakinidae

<u>Babakina festiva</u> (Roller, 1972).....P.....	single-stalk aeolid
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Facelinidae

Austraeolis catina

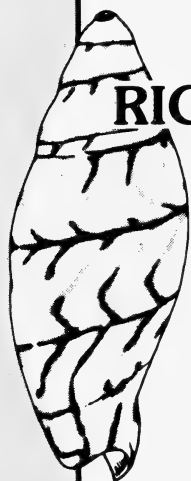
Ev. Marcus and Er. Marcus, 1967.....A.....	
<u>Cratena kaoruuae</u> Er. Marcus, 1957.....A.....	
<u>Cratena pilata</u> (Gould in Binney, 1870).....A.....	
<u>Dondice occidentalis</u> (Engel, 1925).....A.....	western dondice
<u>Emarcusia morroensis</u> Roller, 1972.....P.....	orange-blotch aeolid
<u>Facelina bostoniensis</u> (Couthouy, 1838).....A.....	Boston facelina
<u>Facelina stearnsi</u> Cockerell, 1901.....P.....	scarlet-tip aeolid
<u>Favorinus auritulus</u> Er. Marcus, 1955.....A.....	
<u>Godiva rubrolineata</u> Edmunds, 1964.....A.....	
<u>Hermisenda crassicornis</u> (Eschscholtz in Rathke, 1831).....P.....	hermissenda
<u>Learchis poica</u> Ev. Marcus and Er. Marcus, 1960.....A.....	
<u>Phidiana hiltoni</u> (O'Donoghue, 1927).....P.....	pugnaceous aeolid
<u>Phidiana lynceus</u> Bergh, 1867.....A.....	
<u>Sakuraeolis enosimensis</u> (Baba, 1930).....P.....	white-tentacle Japanese aeolid

Aeolidiidae

<u>Aeolidia papillosa</u> (Linnaeus, 1761).....A,P,Ac.....	shag rug aeolid
<u>Aeolidiella takanosimensis</u> Baba, 1930.....P.....	vermillion Japanese aeolid
<u>Cerberilla mosslandica</u> McDonald and Nybakken, 1975...P.....	brown burrowing aeolid
<u>Cerberilla tanna</u> Er. Marcus, 1959.....A.....	

Spurilliidae

<u>Baeolidia benteva</u> Er. Marcus, 1958.....A.....	
<u>Berghia verrucicornis</u> (O.G. Costa, 1864).....A.....	
<u>Spurilla chromosoma</u> Cockerell in Cockerell and Eliot, 1905...P.....	frosted spurilla



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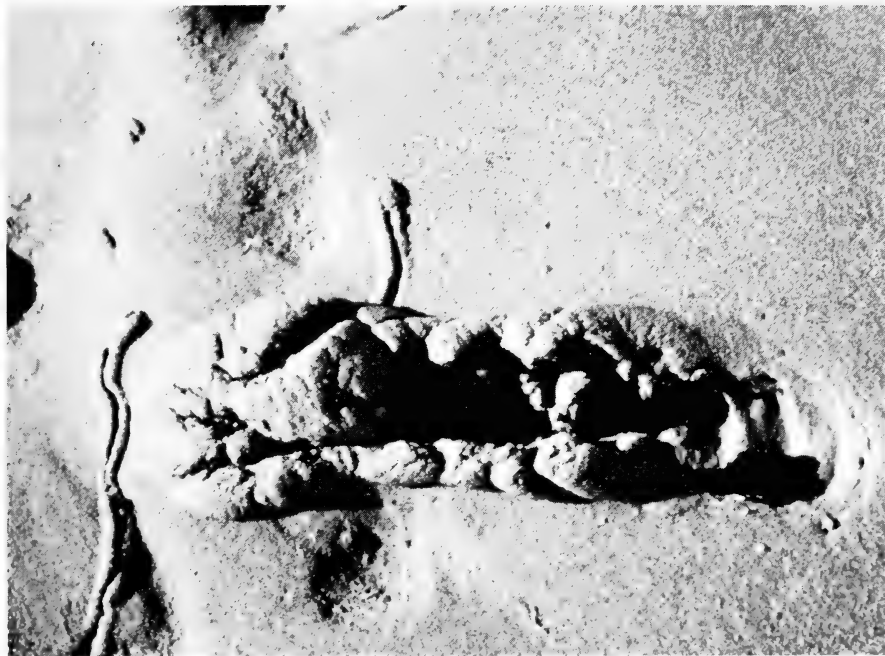
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Sand Trails.

by Stephanie Prince

On a trip to San Felipe, Baja, California I was fortunate to find several beautiful *Oliva incrassata* Lightfoot, 1786. We had a good low tide and the water was a good 1/4 of a mile out when we walked to the tide line. We walked out over the exposed silt, often sinking to our knees in mud.

We found many shells; the most abundant being *Oliva incrassata*. Some of the olives were as large as 65 mm and their sand trails looked like a small bulldozer had been at work (see photo). Smaller trails usually led to an *Olivella* or other species.



Oliva incrassata sand trail. (note also the *Olivella* trails near the large trail).
Photo by David K. Mulliner

Two olive forms from this area are most prized by collectors-- a golden yellow form *O. i. burchorum* Zeigler, 1969, and beautiful albino form *O. i. nivea* Pilsbry, 1910. There is also an extremely rare unnamed black form reported to come from the San Felipe area. Unfortunately, none of the rarer forms were found on this trip.

Stephanie Prince, c/o De Portola School, 27031 Preciados, Mission Viejo, CA 92667

The Camaenidae: A Diverse Family of Land Mollusks (Part 1). Richard L. Goldberg

The Camaenidae Moellendorff, 1898, are a large and widespread family of land mollusks, exhibiting an extremely diverse range of shape, form and size. Some of the popular genera included in this group are *Pleurodonte* of the West Indies, Central and South America, *Obba* of the Philippines and north central Indonesia, *Papuina* of New Guinea and the Soloman Islands, *Amphidromus* of southeast Asia, Philippines and Indonesia, and the Indo-Chinese genus *Camaena*, among others. There is an absence of Camaenid species from Tasmania, Southwest Australia, Argentina, Chile, all of the African Continent and the Malagasy Republic. A synonym of Camaenidae is *Pleurodontidae* von Ihering, 1912.

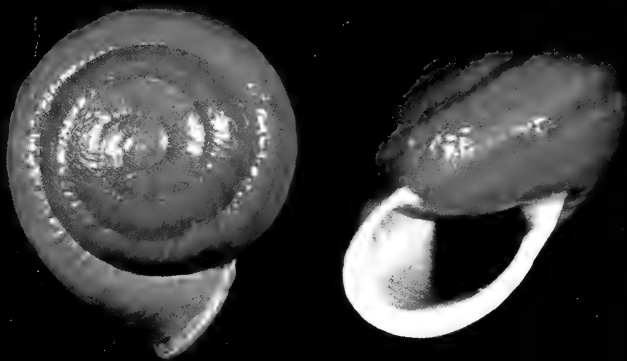
The Camaenids' diversity of shell structure and shape rival that of any other family of terrestrial mollusks. The type species of the genus *Camaena* Albers, 1850, *C. cicatricosa* (O.F. Mueller, 1774) (Fig. 1), is in fact a sinistral species. The genus *Camaena* is made up of rather large, thick-shelled species with a center of distribution in Southeast Asia. Both sinistral and dextral forms are found in the genus. Many form names have been proposed for *C. cicatricosa*, but their validity is doubtful since the species varies greatly in individual populations. The habitat data sent to me for some specimens collected in Canton, China was, "taken from garbage dump!"

A subgenus of *Camaena*, *Pseudobba* Moellendorff, 1891, is an interesting group restricted to the high elevations of the northern Celebes and Sangir, Indonesia. The type species of the subgenus is *P. mamilla* (Férussac) (Fig 2). The nominate forms of this group are characterised by their typical Camaenid shape, and wrinkled surface. However, Rench (1933) described a smooth form of *P. mamilla* called *crassiventris* from Mengkoka-Gebirge, Celebes. Other forms of *P. mamilla* have been described for wider and narrower specimens. The largest species of this subgenus is *P. quoyi* (Deshays), reaching almost two inches in diameter. *Pseudobba* species are rare in collections, probably due to their inaccessible habitat.

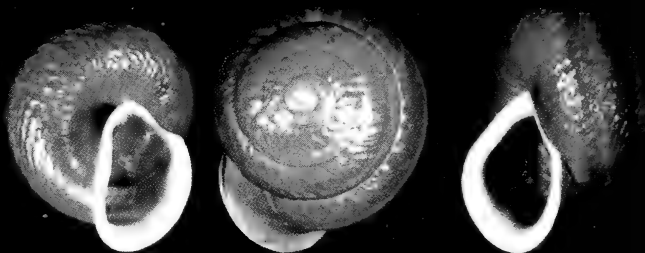
BELOW: *Chloritis unguina* (Linnaeus), Ceram, Indonesia, 44 mm.



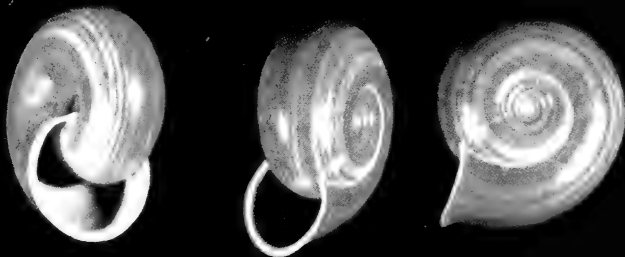
Camaena
cicatricosa
(Mueller),
Volskpark,
Canton,
China,
46 mm.



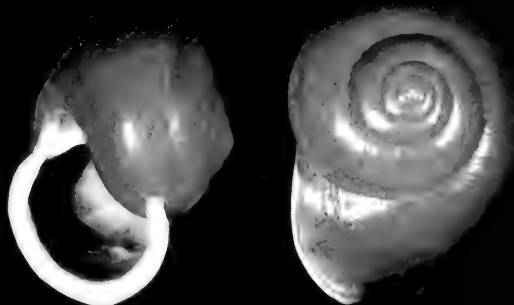
Camaena
(Pseudobba)
mamilla
(Férussac),
Celebes,
Indonesia.
37 mm.



Chloritis
maforensis
(Tapparone
Canefri), Sorong,
Western New
Guinea (Irian
Jaya), 25 mm.



Albersia granulata
(Quoy &
Gaimard),
Waigeo Island,
off Western
New Guinea,
54 mm.



The genus *Chloritis* Beck, 1837, is another group of rather large, solid helical-shaped mollusks with a distribution from New Guinea, Soloman Islands, through Indonesia. *C. unguina* (Linnaeus, 1857) (Fig. 3) is the type species of the genus, and is characterised by its deep umbilicus and sunken spire. It is reported to be found in the Moluccas and Indonesia (Tapparone Canefri, 1883). Specimens at the American Museum of Natural History have the basic data of Ceram. I know of no recently collected specimens of *C. unguina*, and it is very rare in private collections.

Another similar species of the genus *Chloritis*, is *C. maforensis* (Tapparone Canefri, 1886) (Fig. 4), from Western New Guinea (now Irian Jaya, Indonesia). This striking species also has a deep umbilical region and sunken spire. The type locality is Mafor Island, Western New Guinea. *C. circumdata* (Férussac) is an almost identical species from the neighboring Aru Islands, and *C. maforensis* may be in fact a subspecies or form of *circumdata*. Since no specimens have been collected recently, further research is needed to determine the exact identity of the two species.

Not all species of *Chloritis* exhibit the sunken spire and deep umbilicus. Seven subgenera cover a wide variety of other species found in Indonesia, Australia, the Soloman Islands and New Guinea.

A genus closely related to *Chloritis* is *Albersia* H. Adams, 1865. The type species is *A. granulata* (Quoy & Gaimard) (Fig. 5). This group is characterised by its rather globose helical, unicolorated and thin shells. The type locality of *A. granulata* is Port Dorey, New Guinea, island of Waigeo, (Western New Guinea). The species of *Albersia* range from New Guinea to the Moluccas. Not visible in the illustration of *A. granulata* is the fine granular, almost stippled surface of the shell. Specimens of *A. granulata* are considered quite rare, also due to their inaccessible habitat.

In future parts of this article, other genera of world wide Camaenidae will be discussed. In the next part, I will cover the New World genera including *Pleurodonte*, *Labrinthus*, *Zachrysia*, and other related forms.

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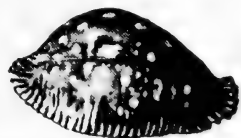


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PERSONAL NOTES

From **James Blaser**: Enclosed is my renewal check Congratulations on the quality of SHELLS and SEA LIFE. Illustrations are superb. Proofreaders are obviously at work. Many articles are outside my own fields of interest, but they are so well presented and illustrated that I enjoy and learn from them. At one time or another, since becoming interested in malacology in 1956, I have received a multitude of publications, scientific and popular. SHELLS and SEA LIFE and HAWIIAN SHELL NEWS are now my two contacts with the malacological world.

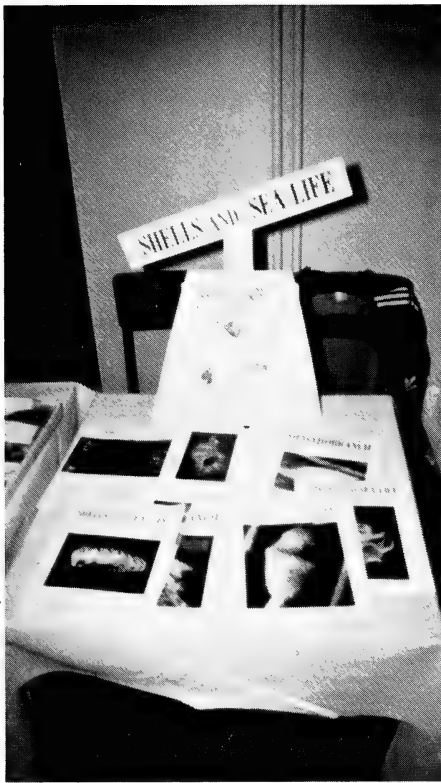
The beautiful illustrated article by Dr. Vokes epitomizes the joys and frustrations of shell study. Many familiar species are illustrated and discussed, but the nomenclature is impossible. Esoteric changes seem to occur endlessly. The comment "... no members of *Murex s.s.* in the New World..." (p. 215, Note 1.) leaves me hopelessly confused. I fear I shall continue to file the humble apple *Murex* under *Murex pomum* Gmelin. No *Phyllonotus*, *Chicoreus*, *Hexaplex*, or *Murexiella* for me. The splitters are triumphant. [James Blaser, 1846 Laurel Lane, Amhurst, OH 44001].

From **Luis D. Beltrán**: I would appreciate if you, or any of the readers of *Shells and Sea Life* can give me any further information on where I can contact Dr. Thomas V. Borkowski, who has done a great deal of research on the mollusks of rocky intertidal shores, especially on the periwinkles (genus *Littorina*). I have inquired of Dr. (R. Tucker) Abbott on the subject, as well as Dr. Joseph Rosewater (Smithsonian Institution, Washington DC), but none of them seem to know where he might be at present. Thanks for your attention, and keep up the good work on your fine journal. [Luis D. Beltrán, Ernesto Cadiz St. #26, Juncos, P.R. 00666]

From **Manuel Ballesteros**: I send you the logo of a divers club we have founded at the biology faculty of the Barcelona University and named C.I.B., of which I am the president. The logo was drawn by Daniel Martín, a biologist and managing member of the club. The nudibranch is *Platydoris atromaculata*, a common species from the Mediterranean sea. Our objectives are to popularise marine biology between the current people and to encourage future marine biologists by means of diving courses. [Manuel Ballesteros Vázquez, Dept. Zoologica, Fac. Biologica, University Barcelona, Av. Diagonal, 637-647, Barcelona - 28, Spain].



MD_n



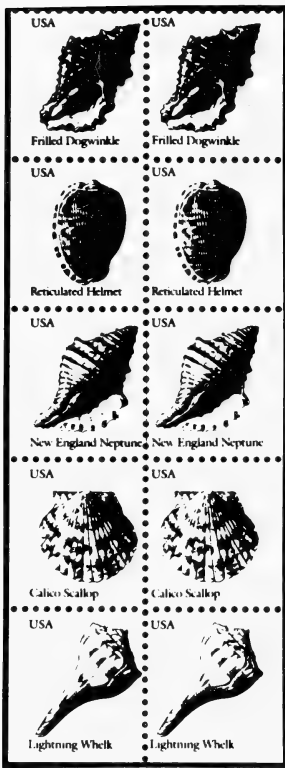
From Gerard Venken: Enclosed is a picture I took myself at the yearly big day of the Dutch-Belgium Shell Association. Many people had their stand to sell their sometimes highly valued shells (like a fabulous *Strombus goliath* nearly unchipped, big smooth colored mouth + operc: \$200.00 approximately). I made a stand on SHELLS and SEA LIFE there too. My association enjoyed my idea and even took the issues home to study them. They all find it mighty good work but for the moment the exchange rate is poor in relation to the dollar. (now approximately 62 Belgian Francs they used to be 50 and once stood 28. I am happy with the issues and this year too I will stay a member. [Ed. Subscriptions may now be paid in most foreign currencies. We hope this makes it easier for your friends to subscribe.] [Gerard Venken, Schoolstraat 21, B-3500 Hasselt, Belgium]

Sally and Travis Payne won the DuPont Trophy at the Cincinnati Shell Club's third Tri-State Shell Show October 13-14, for their exhibit entitled "Phylum Mollusca", which showed the characteristics and habitats of the seven classes of mollusks.

The COA, Display Techniques Award, PeoplesChoice Award, and Exhibitors Choice Award all went to Judith Brooks of the Crown Point Shell Club for her marvelous exhibit of *Cypraea*.

Shell of the Show went to Roberta Cranmer's beautiful *Conus aurisiacus*.





Seashell Stamps. Tom Rice

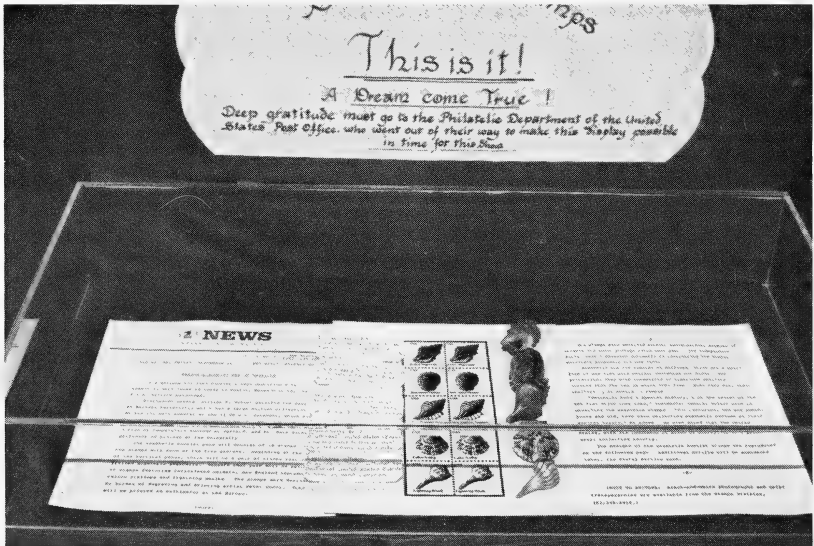
FINALLY!! On September 21, 1984 Postmaster General William F. Bolger announced designs for U.S. SEASHELL STAMPS! The fact that the United States would issue a booklet with shell-design stamps had been made known months ago and the booklet was originally scheduled for release in 1984. It has been delayed until some time in 1985.

The seashell booklet will consist of two panes of stamps, each pane having 10 stamps, two each with the 5 shell designs. From top to bottom of the pane, the stamps show: the frilled dogwinkle, the reticulated helmet, New England neptune, calico scallop and lightning whelk. The denomination of the stamps likely will be 22 cents each.

So, finally, the United States joins the ranks of those countries with seashell stamps. About time too!

Tom Rice, Of Sea and Shore Museum, Port Gamble, WA 98364.

Mary "Pecten" Flenz won the du Pont Trophy at the Santa Barbara shell show October 13-14, 1984, for her exhibit on the new seashell stamps featuring shells. Congratulations Mary (and John)! See photo below.



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Shell Pictures

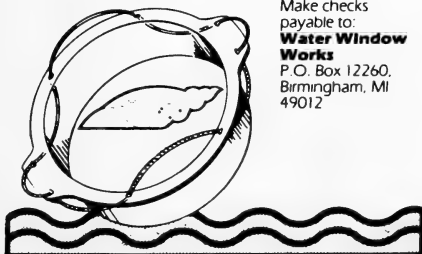
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Photographic Techniques.

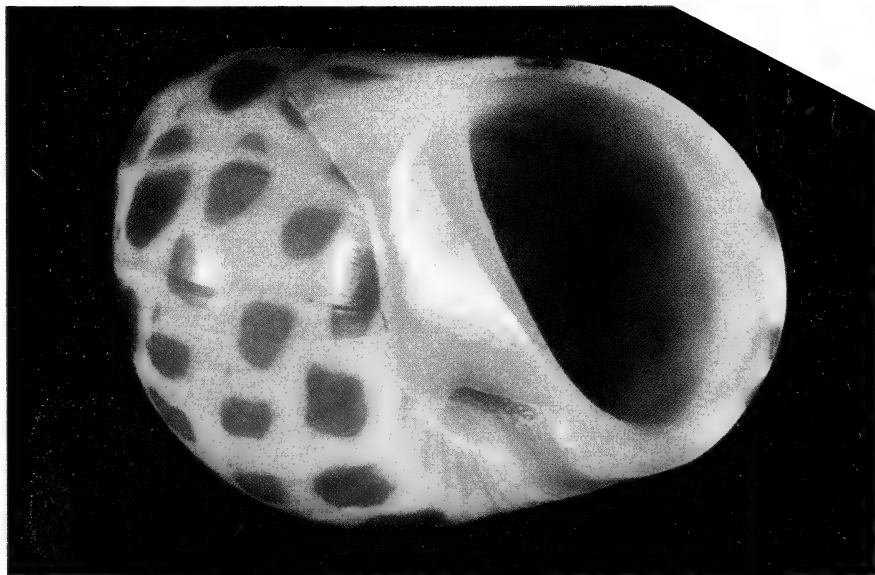
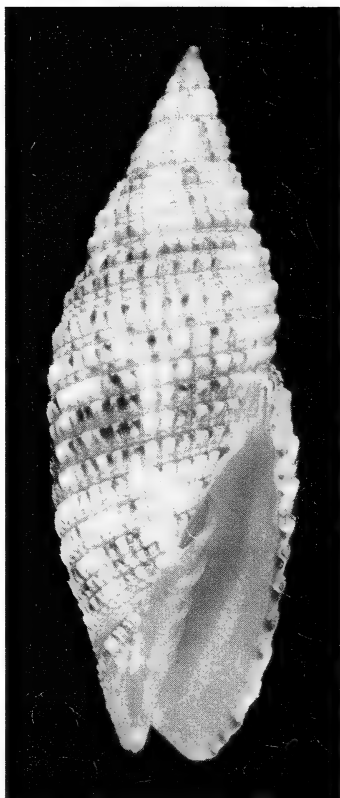
David K. Mulliner

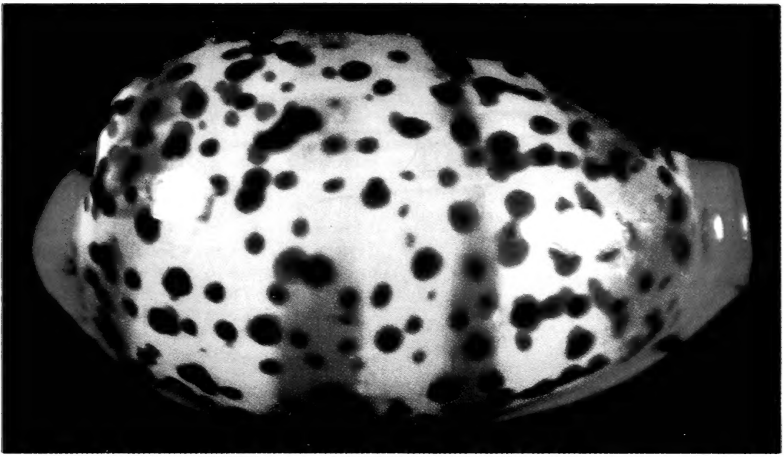
These shells were photographed with a Nikon camera with a micro 55 lens (adding a bellows when the shell was less than 20mm). I always set the aperture at F22 or F32 to obtain maximum depth of field (to keep it all in focus). The shells were placed on a wire rod (using sticky wax) above a black velvet background. Two photoflood lights were placed at a 45° angle above and opposite the shell with a black cardboard tent-like arrangement to prevent the lights from shining on the velvet. I used tungsten film at the exposure indicated by the meter reading with a 1/4 stop each side (bracketing exposures is necessary to obtain the best color rendition).

The illustrated shells were collected on the exposed reefs, and by snorkeling and SCUBA diving in deeper water at the Vava'u Island group, Tonga, South Pacific in May, 1978.

David K. Mulliner, 5283 Vickie Drive
San Diego, CA 92109

AT RIGHT: *Scabricola desetangii* (Kiener, 1838), 28mm.
BELOW: *Natica violacea* Sowerby, 1825, 17mm.



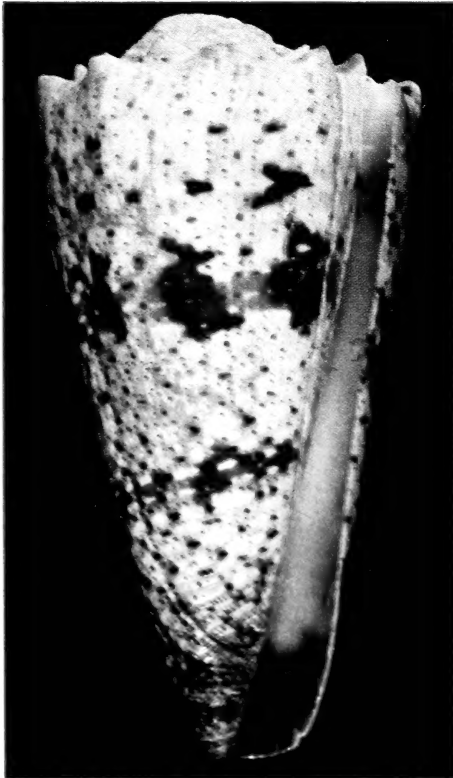


ABOVE: Cypraea humphreysii Gray, 1825, 11mm.

BELOW:

Conus imperialis Linnaeus, 1758, 60mm.

Imbricaria conularis (Lamarck, 1811), 12mm.



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Observations of a Dwarf Octopus, Octopus micropyrsus.

by Peter L. Haaker

One of the smallest, and least known, octopuses occurs in the waters of Southern California. *Octopus micropyrsus* Berry, 1953, grows to only 25 mm in dorsal mantle length, a size which probably relegates it to relative anonymity. It has been found living in gastropod shells and the holdfasts of giant Kelp. Its range is from Santa Barbara to San Diego, including the Channel Islands (Hochberg and Fields, 1980).

In many years of diving, I had never observed this species. In May 1982, on an abalone transplant evaluation survey, I had the occasion to photograph this unusual octopus. In the course of our work, Mia Tegner, of Scripps Institution, had broken a short horizontal mudstone pinnacle riddled with piddock clam bores, and had found a small octopus guarding eggs at the inner end of an empty piddock hole. We replaced the pinnacle, marked the spot, and returned to the boat for my camera.

Later, while re-opening the den for photographs, I apparently ruptured one of the eggs. A miniature fully developed octopus scurried out of the den and disappeared into another piddock hole (Photo # 924). The adult, presumably a female, was quite defensive of the remaining eggs, which were well along in their development. Close inspection of the photographs revealed a single well pigmented octopus in each egg. The adult did not try to leave the clutch of eggs, a behavior similar to that observed in other egg guarding octopuses.

The photographs showed a total of four eggs in this den (Photo # 925). The large egg size is a requirement of having fully developed juveniles at hatching. The small adult size limits the number of such eggs that can be guarded by any individual.

Octopus micropyrsus can have fewer eggs because of its cryptic nature, defense of the nest, and especially because of the advanced development at hatching, which eliminates the planktonic stages, where high mortality occurs. This adaptation is a classic example of how fecundity may be reduced by better protecting the early life stages.

Field notes: These observations were made on May 19, 1982, at Palos Verdes Point, Palos Verdes Peninsula, Los Angeles County, California. Water depth was about 10 m. Neither the adult, any juveniles, nor eggs were collected.

References

- Hochberg, F.G., Jr., & W.G. Fields 1980. Cephalopoda: The Squids and Octopuses. p. 437. In: Morris, R.H., D.P. Abbott & E.C. Haderlie. Intertidal Invertebrates of California. Stanford Univ. Press, Palo Alto, California, 690 p.

Peter L. Haaker, California Dept of Fish and Game, 1301 W. 12th St, Long Beach, CA 90813.

See photographs back page.

Photo 925



*Octopus
micropyrsus*
Berry, 1953

Photo 924



See Article inside back cover.