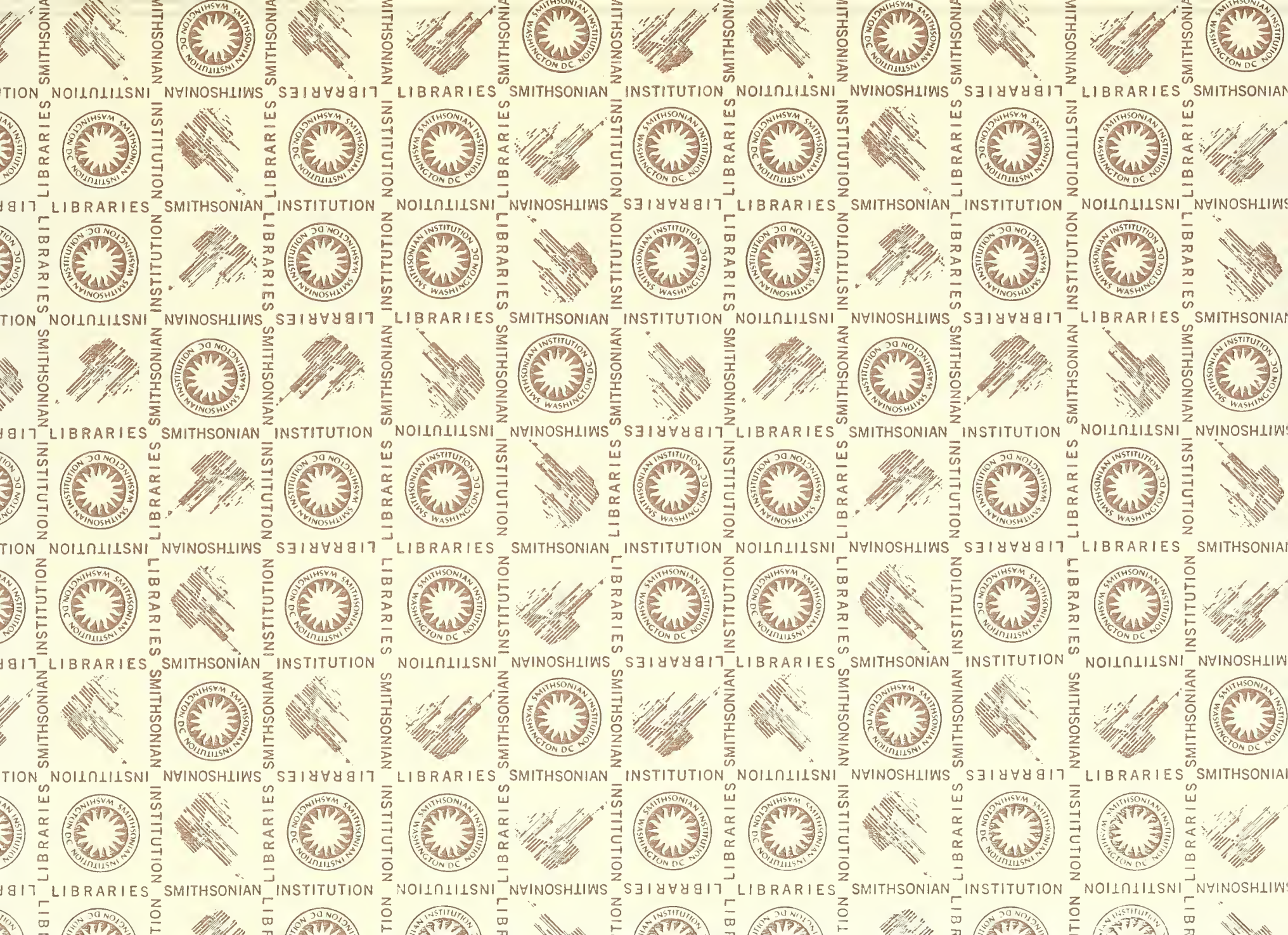
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THE FESTIVUS

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional.

Meeting date: third Thursday, 7:30 P.M. Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

"Twenty-eight years of the Ocean World"

Sam Hinton, scientist and folksinger, and former director of the Scripps Ocean Aquarium for eighteen years will be the speaker (and, we hope, singer) for the evening.

Meeting date: January 15, 1987

CONTENTS

EMENDED DESCRIPTION AND DESIGNATION OF LECTOTYPES FOR FAVARTIA (MUREXIELLA) HUMILIS (BRODERIP, 1833) AND F. (M.) NORRISII (REEVE, 1845) AND DISCUSSION OF F. (M.) LAURAE (E. H. VOKES, 1970): MURICIDAE

BY

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Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

ABSTRACT

Syntypes of *Murex humilis* Broderip, 1833, and *Murex norrisii* Reeve, 1845, were examined and a lectotype for each species is designated. Comparison is made between *M. humilis* and *M. norrisii*. *Favartia (Murexiella) laurae* (E. H. Vokes, 1970) is discussed and the distribution is extended to Ecuador.

INTRODUCTION

In Radwin and D'Attilio (1976) the synonymy for *Murexiella humilis* (Broderip, 1833) erroneously included *Murex norrisii* Reeve, 1845, and *Murexiella laurae* E.H. Vokes, 1970. In this paper we are clarifying the specific characters for each species and comparing them with each other

FAVARTIA (MUREXIELLA) HUMILIS (BRODERIP, 1833)

Murex humilis Broderip, 1833:175; figured Sowerby (1834) Conch. Illus. pl. 65, figs. 46-47
Murex humilis Broderip: REEVE (1845), pl. 13, fig. 50a, 50b
Murexiella keenae E.H. Vokes, 1970:325-326, pl. 50, figs. 1-3
Murexiella keenae E.H. Vokes: KEEN (1971:519, fig. 989)
Murexiella humilis Broderip: RADWIN and D'ATTILIO (1976:157, pl. 25, figs. 3-5)

The type lot of *Murex humilis* in the British Museum (Nat. Hist.) consists of three specimens, reg. #197482, from the H. Cuming collection. Broderip indicated the type locality as Sanctae Elenae, Ecuador. All three specimens are worn and probably were collected dead (Figs. 1 and 2). We could not match exactly any of the syntypes to Sowerby's figures (46 and 47) in the Conchological Illustrations. However, one of the syntypes is very close to Sowerby's figure. We here designate this specimen as the lectotype (Figs. 3 and 4). The other two syntypes closely resemble the figure by Sowerby in Reeve (1845, pl. 13, figs. 50a and 50b). Vokes (1970) noted that this Reeve figure resembled her new species *Murexiella keenae*. We consider that all three specimens of the syntypic lot represent morphological variation of the same species and we are, therefore, designating the

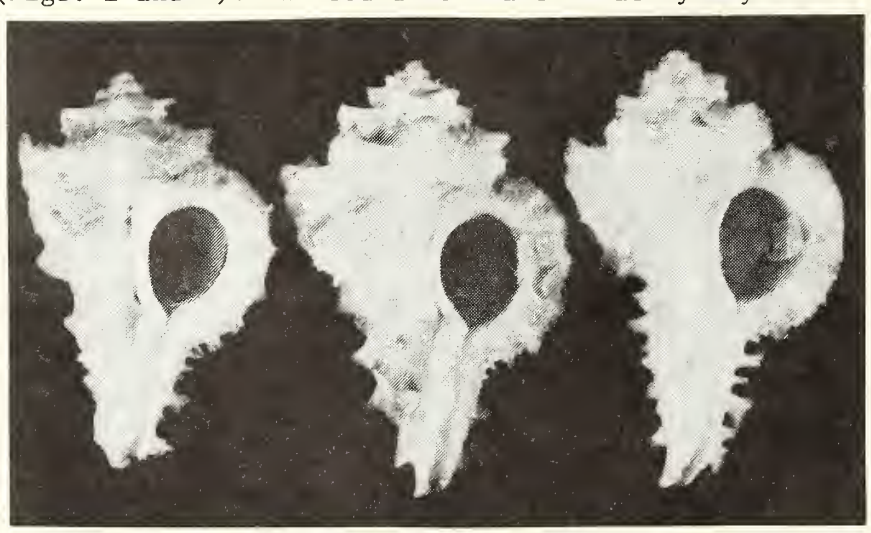

Figure 1. *Favartia (Murexiella) humilis* (Broderip, 1833) Syntypes Reg. #197482 British Museum (Nat. Hist.), apertural view. Courtesy of the Trustees of the British Museum of Natural History.

remaining two specimens paralectotypes. Based on the syntypic material and other specimens studied, it is our conclusion that *M. keenae* falls in the synonymy of *Favartia (M.) humilis*.

The lectotype measures 33.9mm x 22.2 mm and is fusiform with a rather short spire and convex body whorl. Siphonal canal is straight, narrowly open and distally recurved. The nucleus is eroded and there are five weakly shouldered postnuclear whorls with an impressed suture. Aperture is subcircular with no apparent anal sulcus; outer lip weakly crenulate and weakly lirate within. The

Figure 2. Dorsal view of syntypes of *F. (M.) humilis* shown in Figure 1.

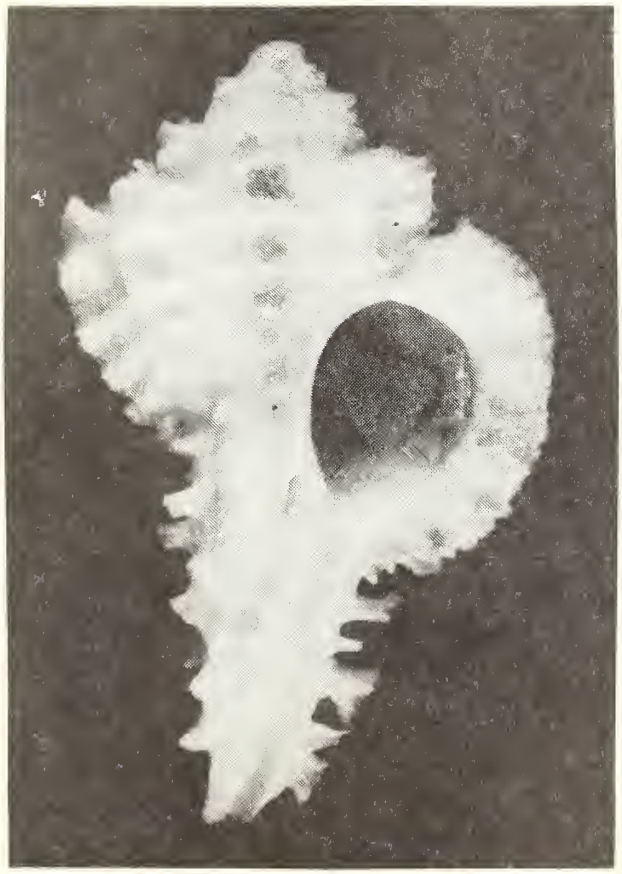

Figure 3. *F. (M.) humilis*. Lectotype here selected. 33.9 x 22.2 mm, apertural view.
Brit. Mus. (N.H.) Reg. #197482

Figure 4. Dorsal view of lectotype of *F. (M.) humilis*. Courtesy Trustees of the British Museum (Nat. Hist.)

columellar lip is adherent above and detached and weakly erect below. There are eight varices on the body whorl, which cross the shoulder and terminate at the suture. There are five strong cords on the body, one on the shoulder and three on the canal. Where the cords intercept the varices, short recurved open spines are developed. The leading edge of the final varix is somewhat scabrous.

Color is dull white with faint traces of pale ochre banding at the shoulder and in the interspaces of the cords at the varices.

The two paralectotypes measure 34.5 x 22.9 mm [A] and 31.0 x19.0 mm [B]. They differ mainly in their thicker varices, overall robust appearance and shorter canal. Neither of the two paralectotypes had a preserved protoconch. Color is dull gray-white with traces of rust color banding at the shoulder, midway on the body whorl, and on the tips of the short spines of the canal.

FAVARTIA (MUREXIELLA) NORRISII (REEVE, 1845)

Murex norrisii Reeve, 1845, pl. 28, sp. 129a and b
Murexiella norrisii (Reeve): FAIR (1976), fig. 276 [syntype #197416 (sic)]
Murex norrisii Reeve: D'ATTILIO (1986:48-50, figs. 2 and 3)

Early in 1986 the senior author received from Carol Skoglund of Phoenix, Arizona, two specimens of a muricid collected at San Pedro, Ecuador. These two specimens were identified as *Murex norrisii* Reeve, 1845. A statement in his article (D'Attilio, 1986) that the type was lost occasioned an immediate reply from Ms. Kathie Way of the British Museum (Nat. Hist.) stating that three syntypes were deposited in the British Museum Reg. #1974064. Thereafter we borrowed these types to confirm our understanding of this species (Figs. 5 and 6). A note accompanying the types stated, "The middle-sized specimens appears to be that figured. Reeve mentions a further syntype in the Norris colln., whereabouts unknown."

We here designate as lectotype the middle-sized specimen, since it appears to be closest to the size of Reeve's figure. However, the spines, although similar, are not as long or delicately recurved as in Reeve's figures. Further the siphonal canal on Reeve's figures appears nearly straight relative to the axis of the shell, whereas the canal in the syntypes is strongly bent to the left. Except for these slight differences, the three syntypes do not differ to any degree from the figured specimen.

The lectotype (Figs. 7 and 8) 32.8 x 20.7 mm, is a fusiform shell with a moderately high spire, impressed suture, tapering body whorl and long, narrowly open siphonal canal which is bent to the left. The nucleus is eroded and there are five moderately tabulate whorls. Aperture is subcircular; outer lip crenulate, inner lip appressed above, erect and detached below. There are six varices which cross the shoulder and terminate at the suture. There are five major cords on the body whorl with a minor cord in each interspace. Each major cord has several grooves and remnants of lamellae are visible on all cords. There are two cords on the canal with an interstitial minor cord and three minor cords are present in the gap between the body and canal. Where

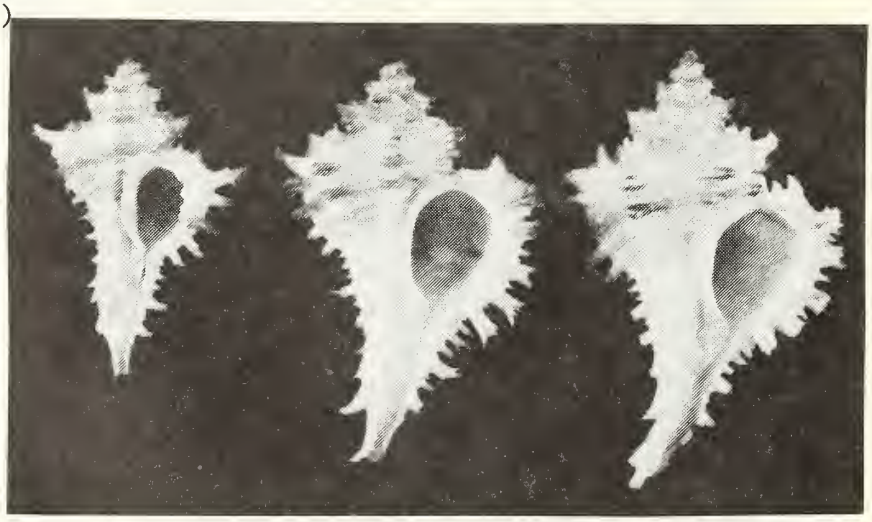

Figure 5. *Favartia (Murexiella) norrisii* (Reeve, 1845) Syntypes Reg. #1974064 Brit. Mus. (Nat. Hist.), apertural view.

the cords are intercepted by the varices, there are short, open, branched spines. Color is white with brown spots on the posterior three spines; spire is mostly pale brown.

The two paralectotypes measure 35.9 x 24.9 mm [A] and 26.3 x 17.6 mm [B]. "A" has six postnuclear whorls. Color of the paralectotypes is the same as the lectotype.

Inasmuch as Reeve did not designate a type locality, we here designate San Pedro, Ecuador, from which two living specimens were collected (C. Skoglund, pers. comm.).

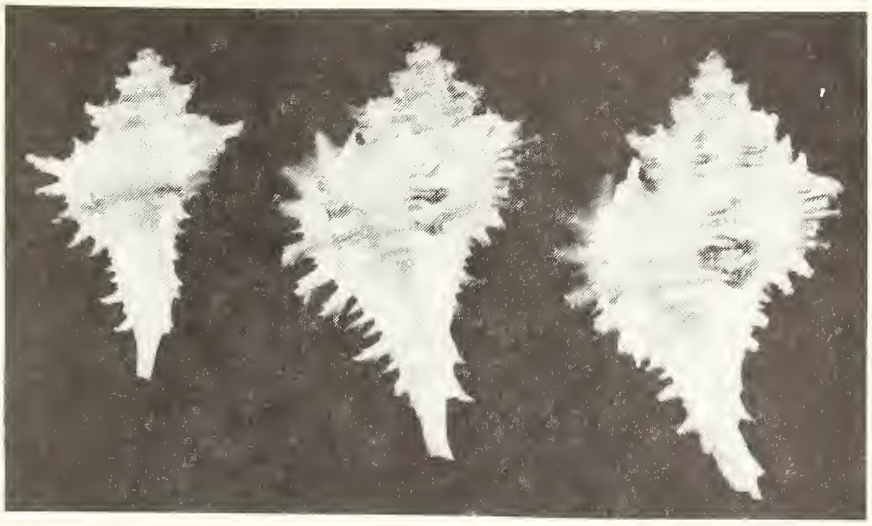

Figure 6. *F. (M.) norrisii* (Reeve, 1845) dorsal view of syntypes. Courtesy Trustees of the British Museum (Nat. Hist.).

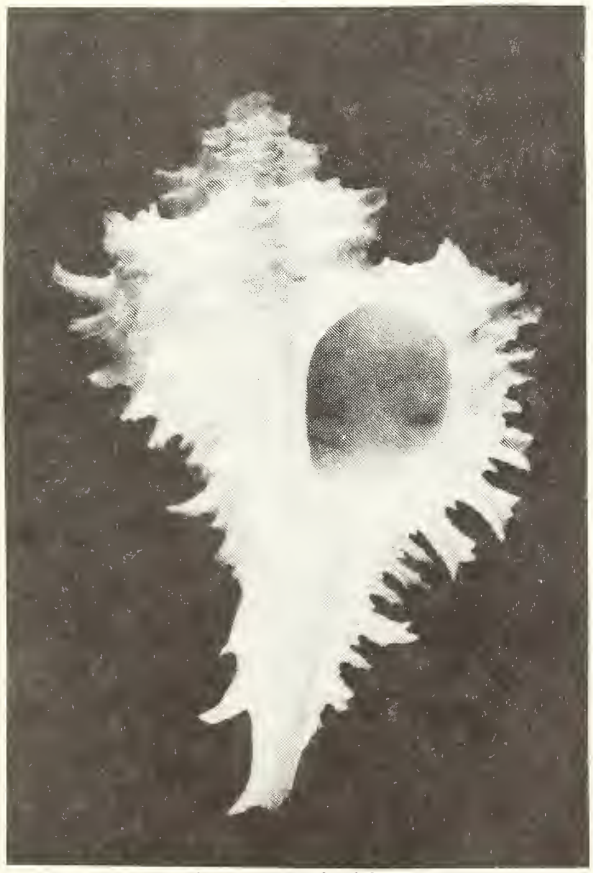

Figure 7. *F. (M.) norrisii* (Reeve, 1845) Lectotype here selected. 32.8 x 20.7 mm, apertural view, Brit. Mus. (Nat. Hist.) Reg. #1974064.

Figure 8. *F. (M.) norrisii* (Reeve, 1845) dorsal view of lectotype.

Favartia (Murexiella) norrisii differs from *F. (M.) humilis* in its overall shape with a body whorl that tapers gently to the narrowing siphonal canal, while *F. (M.) humilis* has a convex to globose body whorl that becomes tightly constricted at the canal. *F. (M.) norrisii* is a lighter, more delicate shell and tends to have numerous frondose and branching spines in contrast to *F. (M.) humilis* which is strong and heavy with a single spine at the termination of each cord where it is intercepted by a varix. The protoconch of *F. (M.) humilis* (Fig. 9) has 3½ conical whorls. The surface is abraded and the extreme terminal portion is eroded. It differs from the protoconch of *F. (M.) norrisii* (Fig. 10) which has 2¼ to 2½ smooth, brown, low, broadly convex whorls.

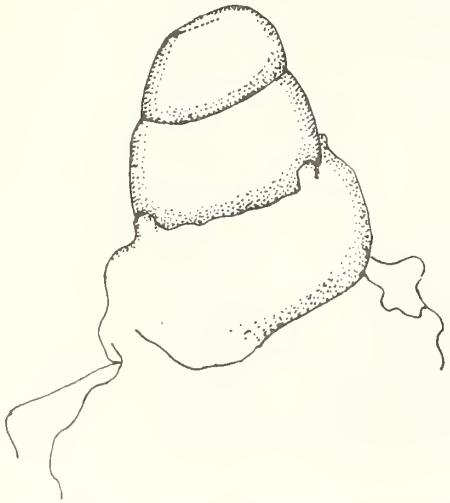

Figure 9. *F. (M.) humilis*, detail drawing of protoconch, X50. SDNHM #82936, off Danzante Is., Gulf of California.

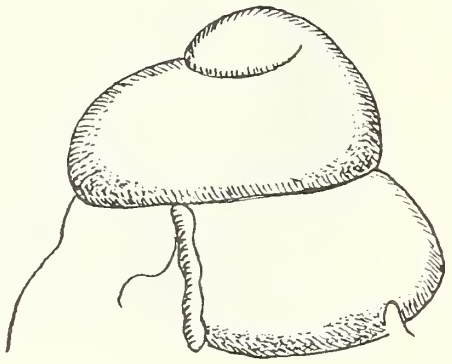

Figure 10. *F. (M.) norrisii*, detail drawing of protoconch, X50. San Pedro, Ecuador. SDNHM #90734 ex C. Skoglund collection

FAVARTIA (MUREXIELLA) LAURAE (E.H. VOKES, 1970)

Murexiella laurae E.H. Vokes, 1970:328-329, pl. 50, figs. 4 and 5
Murexiella laurae Vokes: POORMAN, 1980:273, figs. 5 and 6

Favartia (Murexiella) laurae (E.H. Vokes, 1970) was erroneously placed in the synonymy of *F. (M.) humilis* by Radwin and D'Attilio (1976) but was treated as a valid species by Poorman (1980). After our examination of the syntypes of *F. (M.) humilis* we also consider *F. (M.) laurae* to be a valid species.

Favartia (M.) laurae differs from *F. (M.) humilis* by its smaller size, fewer varices, three to five rather than six to eight for *F (M.) humilis,* and the deep pits between the cords at the varices characteristic of *F. (M.) laurae.*

We have examined specimens of *F. (M.) laurae* from Playa del Coco, Guanacaste, Costa Rica (one specimen, C. Skoglund collection); La Plata Island, Ecuador (one specimen); Salango Island, Ecuador (one specimen); Chatham Bay, Cocos Island, Costa Rica (one specimen, D.R. Shasky collection) (Figs. 11 and 12); Juluapan, Colima, Mexico (eight specimens, L. Poorman collection).

Previously cited distribution for *F. (M.) laurae* was from Guaymas, Sonora, Mexico to White Friars, Mexico (Poorman, 1980). The records for Costa Rica, Cocos Island, and Ecuador indicate the distribution may extend to the south nearly 2,000 miles.

ACKNOWLEDGMENTS

We wish to thank the British Museum (Nat. Hist.) for loan of the syntypic material of *Murex humilis* Broderip, 1833 and *M. norrisii* Reeve, 1845. The photographs of these syntypes are published here with the kind permission of the Trustees of the British Museum (Natural History).

We also wish to thank Mrs. Carol Skoglund of Phoenix, Arizona; Dr. Donald R. Shasky of Redlands California and Mr. Leroy H. Poorman of Westminster, California,

for the loan of study material.

We are very grateful to Mr. David K. Mulliner of San Diego, California, for the photographs used in this paper, and Mrs. Theo H. Fusby, department secretary, for typing the manuscript.

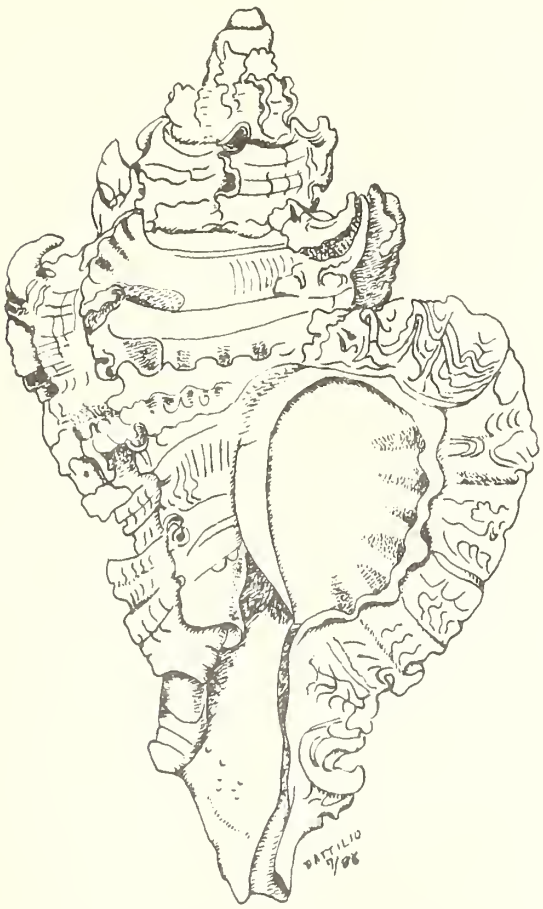

Figure 11. *Favartia (M.) laurae* (E.H. Vokes, 1970). Drawing of a 12.7 x 8.0 mm specimen, dredged, Chatham Bay, Cocos Is., Costa Rica. 1984.

Figure 12. *F. (M.) laurae*, dorsal view of specimen shown in Figure 11. D.K. Shasky collection.

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BOOK REVIEW

SEASHELLS OF BRAZIL
By E.C. Rios. 1985
Published by Museu Oceanographico, Rio Grande, Brazil
328 pages, including index, 102 black and white plates, 1421 species of marine mollusks treated.
Price: $27.50

The long coastline of Brazil includes the southern limits of the tropical Caribbean faunal province, as well as the northern limits of the subtropical Argentinian faunal province. The need for compilation of this fauna has been met since 1970 by E.C. Rios of the Rio Grande Oceanographic Museum, Rio Grande, Brazil.

Although the title implies that this is a new book, SEASHELLS OF BRAZIL is the third edition of a work that first appeared in 1970 under the title COASTAL BRAZILIAN SEASHELLS, followed by BRAZILIAN MARINE MOLLUSKS ICONOGRAPHY in 1975. The new edition is a major improvement over the previous edition, including a substantial increase in the number of species treated, which now number 1421, compared to 1328. For each species, the previous edition gave the range in the western Atlantic, records in Brazil, habitat, and dimensions. The text in the new edition has been amplified to include a brief description of each species, as well as a diagnosis of the genera and subgenera, and citation of the type species (but not where it occurs). Synonyms are listed, although the format precludes detailed discussion or justification. In general, the format of the text is similar to that of the second edition of AMERICAN SEASHELLS by R. Tucker Abbott.

The bibliography is extensive but includes mostly the work of recent authors; it does not lead the user to the original descriptions of all the species treated in the book.

A faunal analysis based on the distributional limits given in the book would be useful for a future edition or a separate publication.

SEASHELLS OF BRAZIL is indispensible to a study of western Atlantic mollusks.

James H. McLean

CLUB NEWS

THE ANNUAL CHRISTMAS PARTY

The Club's annual Christmas party, held at the Mariners' Club on December 6 was a joyful success. Club members and guests, in their holiday finery, filled the festive room. June King provided the lovely poinsettia in shell centerpieces for the tables and members' gaily wrapped exchange gifts were near the tree awaiting the gift exchange. Jules Hertz, the Master of Ceremonies, led off the evening with humor and gave background on the Club which this year celebrated its 25th anniversary. Officers for 1986 were thanked both by Jules and outgoing president Richard Herrmann, and the 1987 board was installed.

After dinner Dave Mulliner and Richard Herrmann presented a slide show enjoyed by all which highlighted activities of the Club and its members during 1986. Following the raffle (a 1987 San Diego Tide Calendar) which was won by Barbara Farmer, the members enjoyed the Club's traditional gift exchange.

It was a beautiful evening, warm with friendship and the spirit of the season.

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Meeting date: third Thursday, 7:30 P.M. Room 104, Casa Del Prado, Balboa Park

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PROGRAM

EARTHQUAKE'S EFFECT ON MEXICAN COASTLINE AND MARINE LIFE

Terrie Klinger, biologist at Scripps Institution of Oceanography will give an illustrated talk on the actual uplifting of the ground after the September 19, 1986 earthquake in Mexico, revealing a 150 mile long strand of intertidal mollusks, algae and barnacles, many killed by the quake. She will discuss the impact on the mollusks and other organisms forced to compete in a new environment. Ms. Klinger and geologist Paul Bodin, also of Scripps, published their rare discovery in Science magazine.

Meeting date: February 19, 1987

CONTENTS

THE SYNONYMY OF EPITONIUM (GYROSCALA) LAMELLOSUM (LAMARCK, 1822)

BY

HELEN DUSHANE *

15012 El Soneto Drive, Whittier, California 90605

When Lamarck named *Scalaria lamellosa* in 1822, (Figure 1) type locality unknown, little did he think that subsequently it would be found to be world-wide in distribution and would be renamed many times. For well over 160 years authors have overlooked this Lamarckian species. The many synonymic names may be attributed to the following.

1) There was a lack of communication among early naturalists.

2) Papers were often published in obscure journals not readily available to the general reader.

3) Because type localities were widely separated geographically, it was thought specimens must represent different species.

4) More recent authors failed to refer to the monographs on the family Epitoniidae by Sowerby (1844), Nyst (1871), Clench and Turner (1950-1953), DuShane (1974, 1979) to compare their supposed new species with others.

Only primary synonymy is being presented here. Since some of the type material is lost or unavailable having been placed in private collections, the synonyms are based on shell characters shown in figured specimens.

Figure 1. *Epitonium (Gyroscala) lamellosa* (Lamarck, 1822) Collected Oct. 1968, live-taken intertidally. Collector unknown. Size: 18 x10 mm DuShane collection

EPITONIUM (GYROSCALA) LAMELLOSUM (LAMARCK, 1822)

Scalaria lamellosa Lamarck, 1822. Hist. natur. des anim. sans verteb. 6(2):227

Turbo clathrus Linnaeus, 1758, Ed. 10:765 (no locality given). Is *Epitonium clathrus* Linnaeus, 1758 without a basal keel, fide (Clench and Turner, 1951:283).

Turbo lamellosa Brocchi, 1814:379, pl. 7, fig. 2 (Tertiary, Italy). Is not a homonym or a synonym of *S. lamellosa* Lamarck, although sometimes cited as both. Each is in a different genus at this time (fide Clench and Turner, 1951:281).

Turbo pseudoscalaris Brocchi, 1814:379, pl. 7, fig. 1 (Tertiary, Italy).

Scalaria pseudoscalaris 'Risso' Philippi, 1836:167, pl. 10, fig. 2 (non *T. pseudoscalaris* Brocchi, 1814). (Tertiary, Italy).

Scalaria monocycla 'Lamarck' Kiener, 1839:19, pl. 3, fig. 9 (no locality given).

Scalaria fimbriosa Wood, 1842, ser. 3, vol. 9:536 nom. nud.

Scalaria contabulata Deshayes, 1861 (1856-1865), vol. 2:334, pl. 11, figs. 11, 12 (fossil, France).

Scalaria perplexa Deshayes, 1863. Catalogue des mollusques...Reunion. Note: Deshayes either saw a MS name or had a specimen sent to him by Pease from which he recorded the species from Reunion Island. This is not a Deshayes species.

Scalaria consors Crosse and Fischer, 1864. vol. 4:347; vol. 5, pl. 3, figs. 11, 12 (South Australia).

Scalaria perplexa Pease, 1867. vol. 3:288 (Hawaii).

*Research Associate, Los Angeles County Museum of Natural History, Los Angeles, California 90007

Scalaria candida Monterosato, 1877. vol. 9:240 (Algiers).
Scalaria commutata Monterosato, 1877. vol. 9:240 [unnecessary name change for *Epitonium (Gyroscala) lamellosum*(Lamarck, 1822)].
Epitonium basicum Dall, 1917:485 (Gulf of California, Mexico).
Epitonium zephyrium Dall, 1917:485 (San Diego, California).
Epitonium "pyramis" Dall, 1917 (MS name only).
Scala perplicata Iredale, 1929:344 (Australia).
Scalaria albocostata Turton, 1932:80-84 (South Africa).
Scalaria reitensis Turton, 1932:80-84 (South Africa).
Scalaria rufanensis Turton, 1932:80-84 (South Africa).
Scala (Pomiscala) reevesbyi Cotton, 1939:172, pl. vii, fig. 1 (Australia).
Epitonium (Gyroscala) torquatum (Fenaux, 1943):pl.1, fig. 1 (South Pacific). Note: not seen by me.
Epitonium pyramis Tinker, 1952:38, 2 figs.; revised ed. 1958:38, 2 figs. (Hawaii).
Epitonium hachijoensis Taki, 1957:178, pl. 34, figs. 4-6; pl. 37, fig. 13; pl. 38, fig. 2 (Japan).

Description:

Shell length 13-31 mm, width 6-10 mm; costae 8-12, white, continuous from whorl to whorl, rarely double; whorls 9-11, without sculpture, well rounded, brown, two protoconch whorls usually eroded; suture moderately deep; basal ridge well developed, white; aperture subcircular; outer lip thickened, somewhat reflected; operculum dark brown, thin, paucispiral.

Note: *Epitonium coronatum* (Lamarck, 1816) is not a synonym of *E. (G.) lamellosum* (Lamarck, 1822) although many authors have so regarded it. *E. coronatum* has a brown line separated from the suture by a gap, often with some dots or smudges of brown on the costae. *E. coronatum* is not nearly so widespread in distribution nor as common as *E. (G.) lamellosum*.

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CONCERNING OTALA LACTEA (MÜLLER, 1774)*

BY

R. TUCKER ABBOTT

American Malacologists, Inc., P.O. Box 2255, Melbourne, Florida 32902-2255

*From a letter from Dr. Abbott and published with his permission. See Festivus (17(11):119-120 and 18(6):80-81).

"I was interested in your *Otala lactea* story and am enclosing some "eastern" references. So far as I know, Howard Hill was the first to report it in L.A. in 1941. It had been in a park there for sometime, maybe as early as the 1930s (Nautilus 55:31). Our second eastern record was in Georgia by Ravenel in 1874. Intense collecting in San Diego reports *Helix aspersa* and *Theba pisana* there and in La Jolla from about 1854 on. Stearns (1903), Josh Baïly and Maxwell Smith (1907), Orcutt (1919) (Naut. 33:62) and I in 1950 (Natural History) did not know about *Otala* in Calif. My guess is that Hill's is the first report, and that *Otala* got to California (or to San Diego) just before or after World War II.

The best discussion of the problem (*Helix aspersa)* is by W.J. Reese, "Escaped Escargots" (Naut. 68(3):90-94)...."

REMARKS ON FAVARTIA (MUREXIELLA) PERITA (HINDS, 1844) (MURICIDAE)

BY

ANTHONY D'ATTILIO

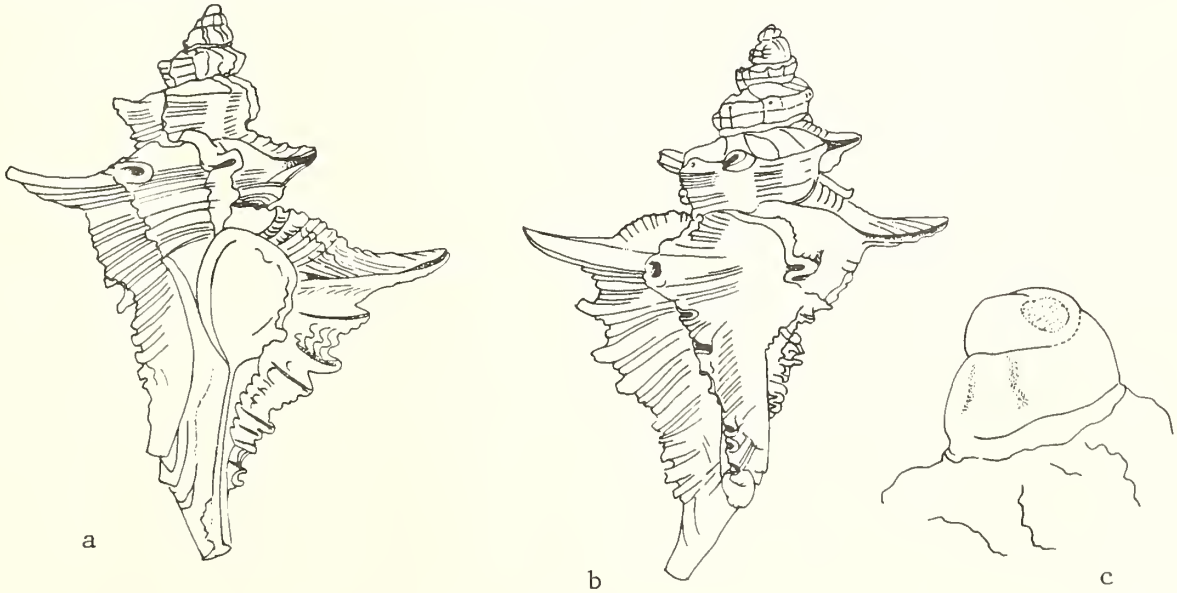
Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California, 19112

Murex peritus Hinds, 1844 is a subtidal species occurring to depths of 100 meters from Magdalena Bay, Baja California to the Gulf of Tehuantepec, Mexico (Radwin and D'Attilio, 1976). The probable holotype is on deposit in the British Museum (N.H.) (reg. #1902.2.13.2) and measures 24 mm L (Figure 1). The type locality is Magdalena Bay.

Figure 1. *Murex peritus* Hinds, 1844, probable holotype, BMNH reg. no. 1902.2.13.2, Photo courtesy of E.H. Vokes

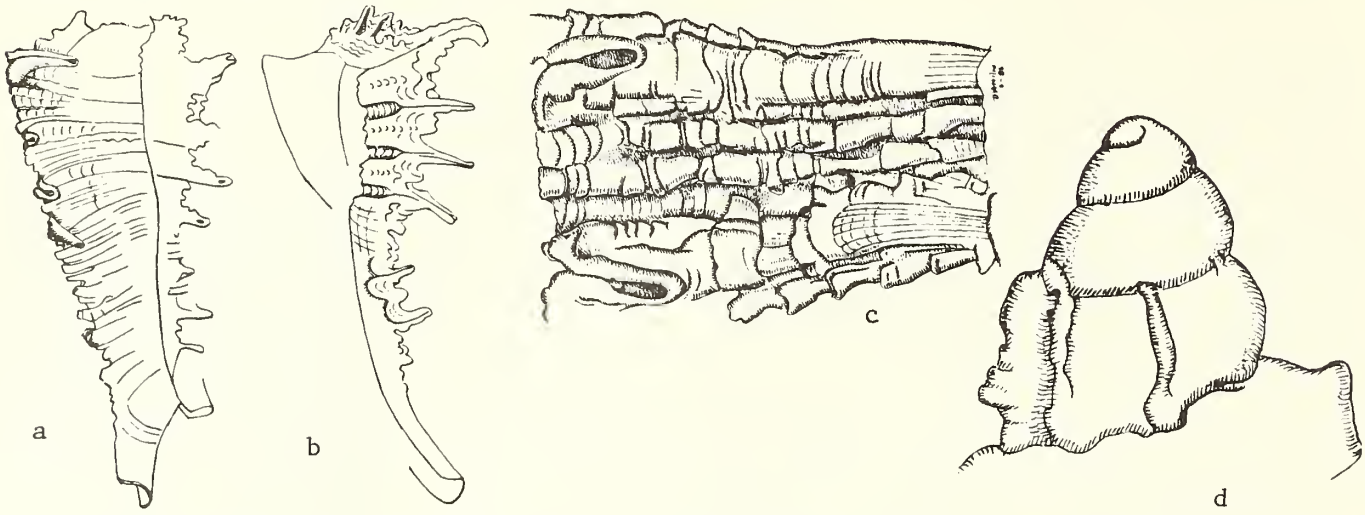
The figure in the original publication was an engraved drawing by G.B. Sowerby, Jr. [copied in Keen (1971)]. Sowerby refigured it in Reeve (1845) and in the Thesaurus Conchyliorum (1879). Radwin and D'Attilio (1976, pl. 26, fig. 8) illustrated a specimen from the Gulf of Tehuantepec. These figures all show *Favartia (Murexiella) perita* with curved or hooked spines at the shoulder and on the varical flange. Reeve's pertinent remark stated, "This species may be known by the curious hooked termination of the lacinae," that is, the spines on the varical flanges.

Two specimens collected at Cebaco Island, Montijo Bay, Panama in 75-100 m by James Ernst were lent to me for study by Donald R. Shasky. On one of these specimens the shoulder spines extend at right angles from the shoulder and are not bent or hooked posteriorly (Figures 2a-c). The protoconch of this specimen is eroded (fig. 2c) and the number of whorls cannot be determined.



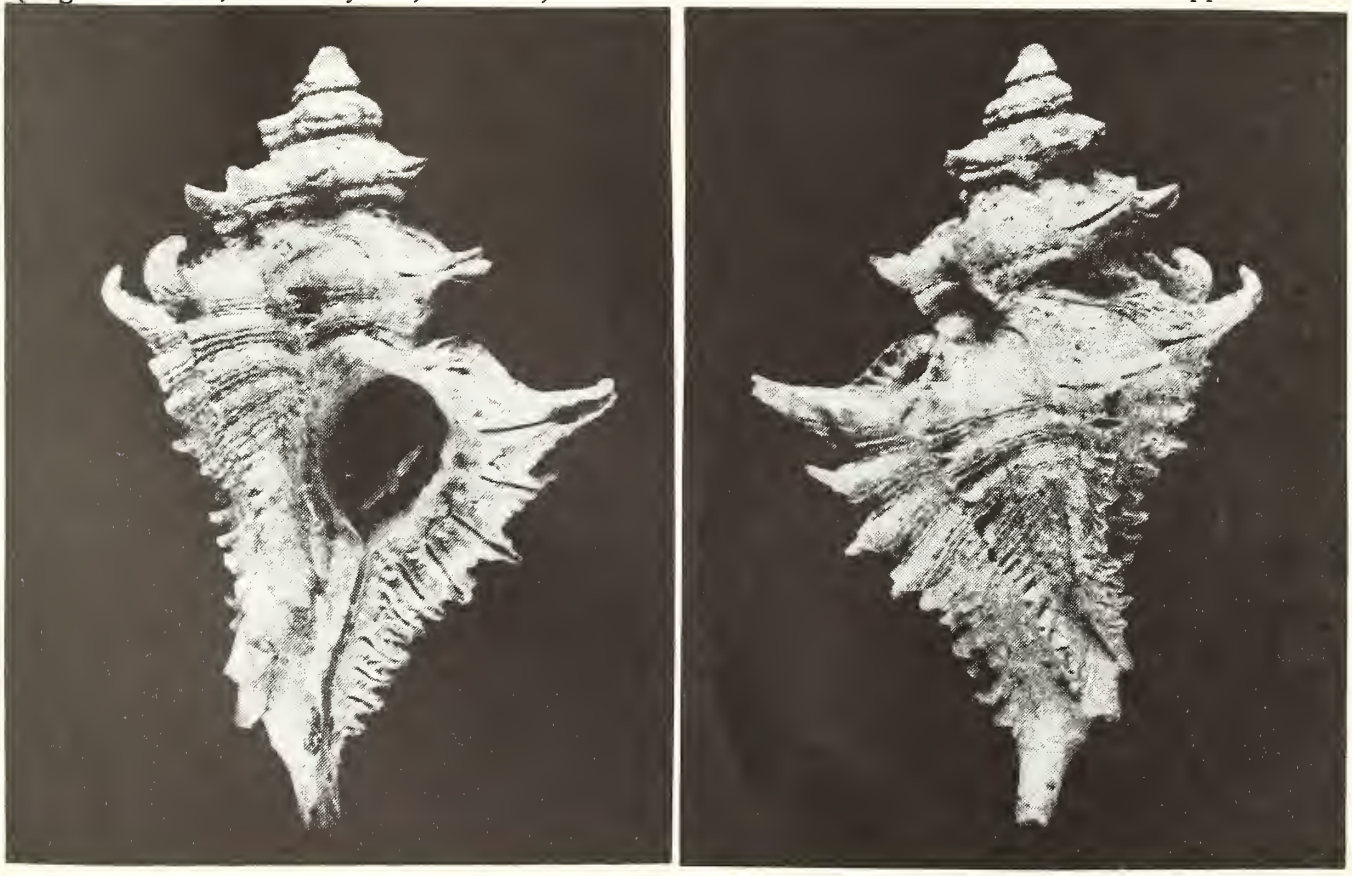
Figures 2a-c. *Favartia (Murexiella) perita* (Hinds, 1844). 25 x 20 mm. Loc.: Cebaco Is., Montijo Bay, Panama, James Ernst collection. a) apertural view b) dorsal view c) protoconch, much eroded

Figures 3a-d show the better known form of *F. (M.) perita* with a complete protoconch of 3¼ to 3½ smooth convex whorls.



Figures 3a-d. *F. (M.) perita*. SDNHM 91140, 16.2 x 8.0 mm, ex Skoglund collection, Dredged 12.5-16.6 m, Manzanillo, Colima, Mexico. a) detail of receding side of apertural varix showing formation of varical spines b) leading side of apertural varix c) detail of area between 2nd and 3rd spine from shoulder d) protoconch of 3¼ to 3½ convex whorls

Three specimens of *F. (M.) perita* dredged in 31 m (17 fm.) by Leroy Poorman (Figures 4a-b) at Guaymas, Sonora, Mexico extend its distribution to the upper



Figures 4a-b. *F. (M.) perita*. 24.6 x 17.4 mm, dredged in 31 m, San Carlos, Guaymas, Sonora, Mexico, December 1965. Poorman collection. a) apertural view b) dorsal view

Gulf of California. The specimens from Guaymas and those from Cebaco Island indicate the distribution for *F. (M.) perita* may include the entire Panamic Province.

ACKNOWLEDGMENTS

The following friends and colleagues provided me with specimens and useful information: Mrs. Carol Skoglund of Phoenix, Arizona; Dr. Donald R. Shasky of Redlands, California; Mr. James Ernst of Panama and Mr. Leroy Poorman of Westminster, California. Mr. David K. Mulliner photographed the Poorman specimen and the photograph of the type was courtesy of Dr. Emily H. Vokes.

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IN MEMORIAM
FAY HENRY WOLFSON

It is with regret that we report the death of Fay Wolfson on January 23, 1987 at the age of 71. Fay was a charter member of the San Diego Shell Club and worked in the field of malacology for many years.

Formerly, as an Associate in the Marine Invertebrate Department of the San Diego Natural History Museum, she spent much time working at the Museum's marine station in the Gulf of California. Later she was associated with Scripps Institution of Oceanography and more recently was a marine zoologist with Hubbs-Sea World Research Institute. Some of her work was published in The Veliger and Limnology and Oceanography.

CLUB NEWS

A SUPPLEMENT TO THE FESTIVUS VOLUME XVIII TO BE PUBLISHED THIS MONTH

The Festivus is publishing a supplement for 1986 (volume 18) which will be sent to all 1986 paid members.

Entitled "A Faunal Study of the Bivalves of San Felipe and Environs, Gulf of California From the Gemmell Collection (1965 to 1976) and written by Joyce Gemmell, Barbara W. Myers and Carole M. Hertz, the paper treats 172 species of bivalve mollusks from the Gemmell Collection, twenty-three of which have not previously been reported from the San Felipe area.

The Supplement of over 70 pages with more than 80 illustrations (photographs, drawings and maps) includes background information on the area as well as an annotated catalogue and bibliography.

The Supplement will be available to non-members and those not members in 1986 at a cost of $8.75 domestic and $9.25 overseas surface mail.

FROM THE MINUTES-SAN DIEGO SHELL CLUB MEETING-15 JANUARY 1987

We were fortunate to have as our guest Sam Hinton, a storyteller of great ability. He entertained us with a presentation which he called "Twenty-eight Years of the Ocean World," which included many anecdotes of the early days of Scripps Institution of Oceanography Aquarium and the people who put it all together. During those 28 years, Sam produced a feature for the San Diego papers called "Ocean World," and we were privileged to examine the original drawings. An interesting aspect of the informative talk was his explanation of the origin of some "marine-type" words such as mussel which means "little jumping mouse." The evening would not have been complete without a song and sure enough, Sam had his trusty guitar and we had a great time singing with him. It was a truly delightful experience and we look forward to having him back with us at a future time.

John Souder invited all to attend the 1987 Christmas party to be held at the 32nd Street Officers' Club on December 5, 1987.

Wes announced that a Botanical Foundation representative is needed to attend the Society meetings. Next meeting is on March 12 at 7:30P.M. A host or hostess is also needed to set out refreshments. The cookies for this meeting were provided by Carole and Jules Hertz and Ginny Herrmann.

Shells are needed for the auction as well as a home to hold it in. Shells may be brought to the meetings or given to a Board member.

DUES ARE NOW DUE.

The winner of the door prize was Lorraine Romer.

Barbara L. Farmer, Secretary

THE AUCTION/POTLUCK

The Club's biggest social event and fund raiser of the year will be held this April and the Club needs a home in which to hold the affair and shells on which to bid. It is the Auction which provides the means to support the Club's projects and activities---The Festivus, donations to scientific publications, participation in the Science Fair, social events and so on.

Please be generous and donate quality shells with as complete collecting data as possible. Bring them to a meeting or contact a Board member to arrange for pickup.

We also need a home!! If you would be willing to host the auction, please contact president Wes Farmer at 448-8697.

THE FESTIVUS

A publication of the San Diego Shell Club

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional.

Meeting date: third Thursday, 7:30 P.M. Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

POLE TO POLE AND THE TROPICS TOO!

Ron McPeak, manager of marine biology at Kelco, will give an illustrated program which will go from topside on a chunk of glacier in the Arctic Ocean to the ship Eltamen in the Antarctic with a stop in the tropics at both coasts of Costa Rica.

Meeting date: March 19, 1987

CONTENTS

BOOK REVIEW

A Guide to the Identification of THE LIVING CORALS
(Scleractinia of Southern California)
By John C. Bythell. 1986
San Diego Society of Natural History Occasional Paper No. 16
40+ pages, 12 plates, 6 text figures
Price: $5.00

Guides to help identify some of the more difficult groups of southern California invertebrates have long been needed. This 40-page guide describes 17 species of stony corals that occur off the coast of California from the intertidal to depths of 600 m.

The guide is compact and provides good information on the morphology and structure of southern California stony corals as well as a glossary of terms used in descriptions. Black and white photographs of cleaned specimens are excellent and provide top and side views of each species. Photographs of living specimens of only five of the 17 species are included in the guide. Presumably the author was unable to obtain living material of deep water species. These photographs unfortunately are of poor quality and do not enable the reader to readily differentiate the species. Color photographs would have helped.

The guide provides a key to contemporary genera. A study of the glossary and photos of cleaned specimens allows the reader to identify dead specimens by using the key and species descriptions. The page layout, however, is confusing because it is difficult to know when one species description ends and another begins.

One additional species could be added to the list of corals from southern California. I discovered a population of *Bathycyathus consagensis* Durham and Barnard, 1952, while diving in shallow water (3 m depth) off the SE end of Santa Catalina Island during 1965. Specimens were collected, sent to Dr. Durham for identification and entered in the invertebrate collection at the Catalina Island Marine Science Center. This species was originally described from Consag Rock in the Gulf of California and is a common subtidal species from the upper Gulf to Cedros Island along the Pacific coast of Baja California.

Appendix A - "A Short Resume of the Phylum Cnidaria with Emphasis on the Sub-Class Hexacorallia" lists classes and orders of Cnidaria with short descriptions. The author erroneously mentions that there are no representatives of Orders Zoanthidea (zoanthids) and Antipatharia (black corals) in California. Several species of zoanthids are common and antipatharians have been collected from diveable depths and very deep water.

Even though there are several errors in this guide and some photography could be improved, I believe the guide will help the student of invertebrate zoology better understand a poorly known group of invertebrates from southern California.

Ronald H. McPeak

AN ABERRANT MOPALIA (POLYPLACOPHORA: MOPALIIDAE)

BY

GEORGE A. HANSELMAN

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Mopalia muscosa (Gould, 1846) is a generally common chiton along the northern Pacific coast of North America. It ranges from northern Baja California northward and westerly to about a third the length of the Alaskan Chain. Its habitat is usually on the tops and sides (and less commonly the bottoms) of weed-covered rocks, at tide levels ranging from mid-lowtide to mid-hightide, with seemingly no preference for or objection to either calm or rough waters. Because of the rough sculpture of its tegmentum and the coarseness of its girdle armament it almost invariably accumulates a heavy coating of moss and dirt both on its plates and interspersed among its girdle setae--sometimes to the point of complete disappearance into its surrounding environment. Like all chitons, its normal complement of plates is eight.

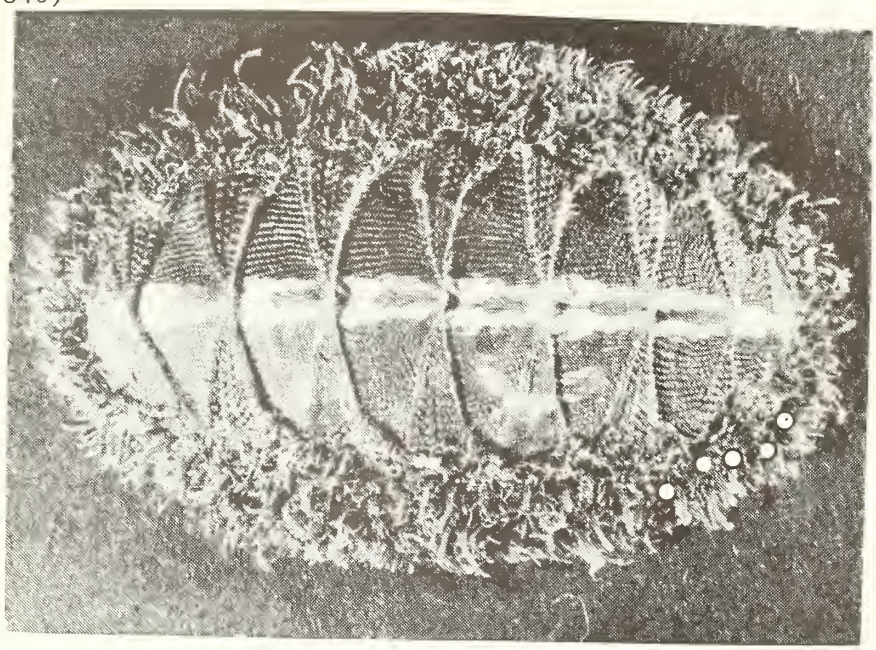


Figure 1. *Mopalia muscosa* (Gould, 1846). 48 x 31 mm, South Puget Sound, Washington. The dots show the position of the platelets.

In cleaning an especially dirty specimen collected some years ago in southern Puget Sound (Washington state), I encountered several small hard lumps apparently adhering tenaciously to the girdle. Inspection under a microscope revealed a startling resemblance between the tops of the lumps and the shell of the chiton. And after being dislodged---for they were actually growing in the girdle--they proved to be of the highest interest indeed: five tiny single platelets, each a small bodyless chiton! See Figures 1 and 2.

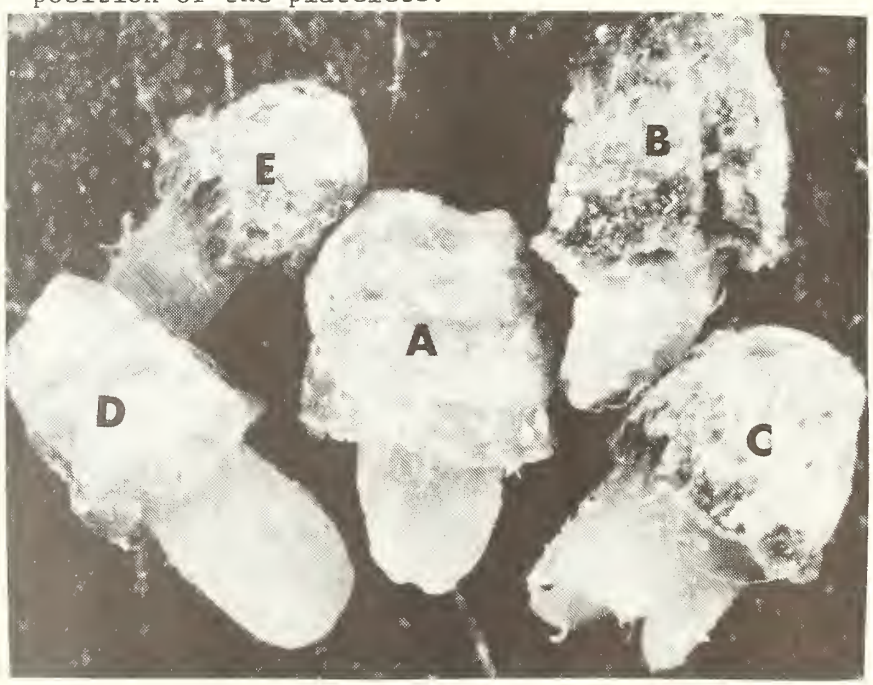


Figure 2. The five platelets found growing in the girdle of *Mopalia muscosa*.

In each case the platelet consists of two distinct parts: (1) an upper portion which projected from the surface of the girdle and which has a covering corresponding to the tegmentum (outer surface) of the host chiton, and (2) a lower portion which was completely embedded in the girdle and which, in color, composition and sculpture corresponds to the insertion-plate portion of the articulamentum (inner shell) of the host. The five platelets were firmly embedded in a line along the left side of plates 7 and 8. Four of the platelets were approximately two-thirds toward the outer edge of the girdle; the fifth was a bit closer to the girdle rim (Figures 1 and 2). All seemed to find the girdle of their host a suitable habitat for further growth, and indeed Platelets A,B and C show evidence of the formation of additional insertion plates.

The nose plate of the host chiton shows a slight scar indicating a bump about halfway through its growth. However no other sign of trauma appears, and the host's insertion plates adjacent to the platelets show no evidence of damage or abnormality.

The host chiton, girdle included, measures 48 mm in length, 31 mm in width, and 9 mm in thickness. Its plates measure 42 x 21 x 7 mm. The platelets measure (in mm):

	Platelet				
	A	B	C	D	E
Length					
Total	1.9	1.6	1.5	1.8	1.4
Tegmentum	1.1	1.1	0.85	1.0	0.8
Articulamentum	0.8	0.5	0.65	0.8	0.6
Width					
Tegmentum	0.88	0.91	0.89	0.74	0.65
Articulamentum	0.55	0.51	0.81	0.54	0.45

Platelet E is shown in detail in Figure 3. Note that the outline of the tegmentum portion is not clear; the platelets are simply too small to attempt to remove the coating of dirt and detritus so typical of *Mopalia muscosa*. However under the microscope the actual surface of the platelets does not differ from the surface of the host itself.

A real puzzler!

My special thanks to Dave Mulliner for translating my original color slides into excellent black and white prints.

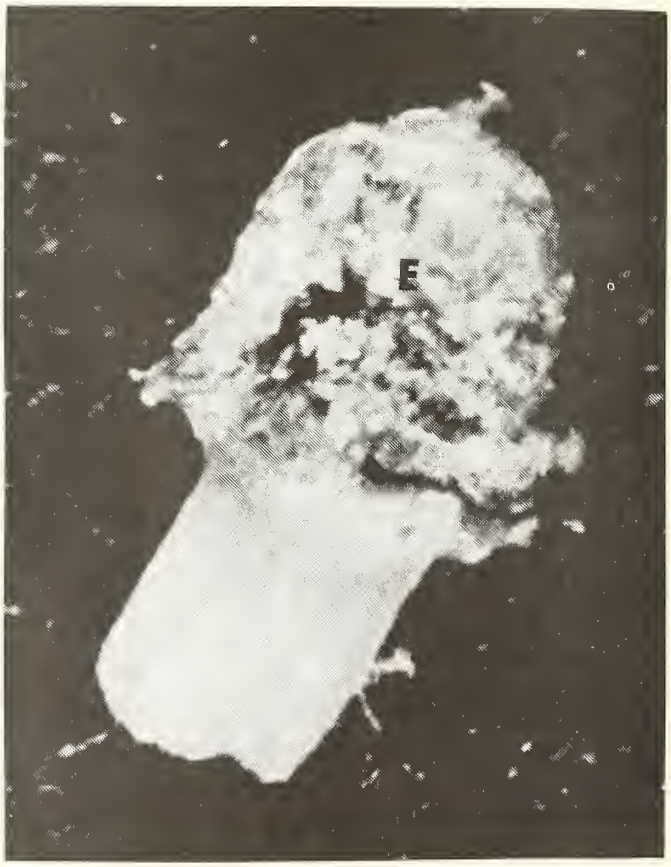


Figure 3. Platelet E

A FIRST REPORT OF THE MARINE HABITATS AND BIOTA OF THE ISLAND OF GRENADA (SOUTHEASTERN CARIBBEAN)

BY

HANS BERTSCH

National University, 9920 S. La Cienega Blvd., Inglewood, California 90301

The marine fauna and flora of the island of Grenada, in the far southeastern Caribbean Sea, are virtually unknown. For example, a literature survey of over 60 Caribbean opisthobranch mollusk species revealed only one species that had been reported from Grenada. Biological studies on Grenada have been primarily summaries of the terrestrial biota. During August 1986, I conducted the first survey of the marine life of this island.

In the preparatory months prior to the expedition I had become very excited about conducting this research since it would present the opportunity of discovering an unknown underwater community. Nearly every organism we saw would represent a first record from the island. There were three major goals to this survey:

1) to document the various subtidal ecosystems 2) to identify some of the prominent benthic and pelagic marine organisms and 3) as a consequence of these findings, to present some suggestions regarding conservation of these precious marine resources to the government of Grenada.

Finally, it was time to meet my team members and to begin our investigation. Accompanying me was a research team of five certified scuba divers: Norris Ela, Jeffrey and Maureen Weiss (all of Florida) and Roy and Pat Smith (from Washington). We assembled from the three corners of the United States on our research vessel, the Gloriamaris (a catamaran owned by Mr. Jeff Hamann and his family from El Cajon, California), in the harbor at St. George's, Grenada.

After a day of acclimation, filling scuba tanks, checking and organizing dive gear, enjoying the steel drum bands and costumed dancers of the Carnival parade, and purchasing food, we left the harbor and began our underwater survey. The 85° water temperature was a shock after my most recent U.S. dive in the 55° water of the La Jolla canyon!

We spent a combined total of over 100 hours underwater, studying the distribution and occurrence of subtidal ecosystems. A few specimens were collected for laboratory identification back in the U.S. at the Los Angeles County Natural History Museum. Subtidal data were recorded underwater with in-situ close-up photography and by note taking on waterproof slates. Obviously these data are incomplete and merely a preliminary contribution to our understanding of the richness of the Grenadian marine environment. A future publication will analyze the opisthobranch fauna that we found.

This report identifies the study sites, habitats and organisms we found on the western and southwestern coasts of the island and is also intended to be a guide for future investigators who may wish to concentrate their studies on specific habitats or organisms.

I. HABITATS

Because of time, logistics, and weather conditions, we were limited as to the locations we could sample. Underwater surveys were conducted at 13 sites along a 25 km portion of the western and southwestern coasts of Grenada. See Map I.

The sites on the southwestern coast (numbers 1-5) were usually shallower than those on the western coast (numbers 6-13). There is a long, shallow platform extending offshore on the southwestern coast, whereas the western coast has deeper water closer to shore (the 10 and 20 fathom isoclines are within easy swimming distance of most of the west coast). The southwestern coast also has deeply indented sandy bays. Erosional material contributes to the heavy silt in this region. Deep

within the bays, currents are minimal, although on the southernmost points there can be strong current and surge.

The following descriptions of the habitats include latitude and longitude for each site (accuracy ±15"), and Los Angeles County Natural History Museum station numbers for some sites. This list can serve as a scuba diving guide for investigators.

A. Southwestern Coast Underwater Habitats

1. Point of FortJeudy, western side (11°59'45"N, 61°42'35"W). Several hundred meters away from the rocks of the point is a sandy bottomed area, covered with *Thalassia* (turtle grass beds). There were large patches of numerous loose rubble rocks (rollable, most were about the size of two hands). Whitish (coral and shell pieces) sand covered the finer black (volcanic erosion) sand that was underneath. It was surgy, with a strong longshore current. The average depth is about 25 feet. (LACM Station #86-193)

2. Northwestern side of Caliveny Island (12°00'N; 61°43'30"W). This sandy bottomed region was covered with fine silt. The sloping channel sides were covered with *Thalassia*, but at about 20 feet depth this gave way to the barren sands. Marine life was impoverished, with some clams and worms (silt/sand burrowers).

3. Outer slope of coral reef, on shoal off south end of Hog Island (11°59'40"N; 61°44'10"W). Some live coral was growing at the top (*Monastraea, Porites,* and brain coral), with lots of broken, dead pieces of coral on the fore slope. There was a heavy siltation covering the substrate (5-25 feet deep).

4. West side of Prickly Point (11°59'20"N; 61°45'35"W). The bottom consisted of small fist-sized rocks, covered with close-cropped algal growth; the strong current may be constant. There are a few isolated coral heads and a few sponges. Although primarily flat, a few slight rolling mounds of shallow bottom can be found on which are some coral heads. The entire region is about 25 feet deep. (LACM Station #86-192)

5. East side of True Blue Point (11°59'45"N; 61°45'50"W). Close to shore are rocks and a few coral heads; about 150 feet from shore begins the typical sandy bottom of the bay, with some *Thalassia* growth (15 feet deep).

B. Western Coast Underwater Habitats

6. Long Point (12°01'35"N; 61°46'30"W). Sloping, silt covered bottom; the point is at the end of a long, sandy beach (Grand Anse), so there is a lot of fine sediment covering everything. In the shallower areas (above 30 feet) there is a small coral community on the exposed boulders. Ths slope drops below 50 feet deep.

7. Shoals west and southwest of harbor entrance of St. George's (12°02'10-30"N; 61°46'00-05"W). These flat, sandy regions lie in ahout 25 feet of water and have intermittent rock outcrops. The water clarity is usually great, often with 60 to 80 feet visibility. The ecosystem consists of massive sponge formations (large vase, urn and upright tube formations) and very large gorgonian colonies. One *Pseudopterogorgia* measured 9 feet in length! This colony was not an exception. (LACM Station #86-189)

8. Grand Mal Bay (12°04'20"N; 61°45'10"W). Just south of the deep water tanker channel there is a fairly well developed coral reef. Typical mound shaped corals abound; there are some sandy channels hetween the rock substrate ridges. A fair diversity of reef fishes can be seen along with scattered colonies of sponges and gorgonians. The area is about 25 to 30 feet deep.

9. South of Moliniere Point (12°04'50"N; 61°45'35"W). This region has an excellent coral reef, with a fore reef dropoff that sharply slopes from 25 to 80 feet deep. It has some of the best developed coral formations that we saw on the island--large, massive growths, clear water, and a diversity of species. (LACM Station #86-188)

10. Beau Sejour (12°05'45"N; 61°45'20"W). The shoreline ends with a sheer, vertical dropoff to 25 feet. On the basalt cliff face are numerous sponge colonies. In front of the cliff, a gently sloping area of small rock boulders or low ridges continues some distance offshore to the sandy region. (LACM Station #86-191)

11. Halifax Bay (12°06'50"N; 61°44'45"W). This bay is the mouth of two rivers, and during the rainy season there is an incredibly large amount of silt and sediment washed into the bay. The sides of the embayment have some coral formations (the center is a silt covered channel), with a fair amount of sponges and gorgonians. Farther north are sandy regions covered with *Halophila baillonis*. Depths range from 10 to 80 feet. (LACM Stations #86-184, #86-185)

12. Black Bay Point (12°08'30"N; 61°45'W). The dark sand bottom extended out as a gentle slope away from the river mouth. Barren, *Thalassia* covered, some sand burrowers; *Isostichopus* and *Cassiopeia* were the prominent invertebrates. Depths to 45 feet. (LACM Station #86-186)

13. In front of basalt columns, north of Black Bay (12°08'31"N; 61°45'W). The land panorama is spectacular, with sharply etched black columns of basalt anchored between the blue water, the green forest, and white billowy clouds in the blue sky. Underwater it is just as spectacular with a very well developed coral reef. The fore reef slopes from 20 to 40 feet deep. There are numerous coral fishes, sponges, gorgonians and other reef dwellers. The sand flat in front has sporadic gorgonians (*Pseudopterogorgia*) and large vase sponges. The area is incredibly beautiful and relatively undisturbed. One of the most memorable underwater Grenadan scenes was here, when a school of several thousand small chromis fish formed a living, flowing curtain between the sloping reef and our divers swimming in midwater. Boaters should exercise care to anchor over the sandy region, so as not to damage the coral growth. (LACM Station #86-187)

II. BIOLOGICAL ASSOCIATIONS

Seeing luxuriant, massive gorgonian growths, huge sponges (a loggerhead sponge measuring over a meter in diameter), and brilliantly colored schools of fish made every dive a kaleidoscopic adventure.

There was the "all-American" crab (about 10 mm) that I found nestled in

a coral crevice. It had a bright red carapace, and a white cream margin in which were bright blue dots. The flatworm *Pseudoceros pardalis* (brown with large cream and yellow dots mottling its dorsal surface) swims by ruffling undulations along its thin, delicately flexible margin. We disturbed *Lima scabra* from its nest to encourage its swimming. This bizarre bivalve has white or red tentacles protruding all around the shell edge and flaps its valves like castanets.

We learned quickly to avoid touching the white fringed fire coral (*Millepora*) (Figure 1) or the pink flesh colored fire worms (Figure 2). We were especially wary when we found the granddaddy of all fireworms, a *Hermodice carunculata* that measured 30 cm long.

A night dive at Halifax Bay rewarded us with the large (its base can be 4 cm in diameter) solitary corallimorpharian anemone, *Pseudocorynactis caribbeorum*. The color pattern is strikingly incredible--pale opaque brownish, with white streaks or patches on the oral disc; the tentacles are colorless, tipped with a vivid orange-red capitate end (den Hartog, 1980)

But the most exciting and intriguing natural history observations were discovering biological interrelationships between various underwater organisms.

We found over 100 *Cyphoma gibbosum* on *Gorgonia* and *Pseudopterogorgia*. The tissue damage done by the feeding snail was readily visible (a darker region that was "scooped out"). Despite the commonness of *C. gibbosum*, we found only four specimens of *C. signatum*.

Cleaning stations were frequent. Two species of shrimp, *Periclimenes pedersoni* and *P. yucatanicus*, were found with two anemones: the ringed anemone *Bartholomea annulata* and the stinging anemone *Lebrunia danae*. Sometimes the arrow crab *Stenorhynchus seticornis*--gangly with brown and gold lengthwise striping and blue tipped chelipeds--was also present. *Periclimenes pedersoni* has two pairs of long white antennae. The body is a transparent clear brownish color, with a central chalk white lengthwise stripe ventrally and a white stripe along each side of the back. The chelipeds are white with small blue-purple

Figure 1. A small colony of the fire coral *Millepora alcicornis*

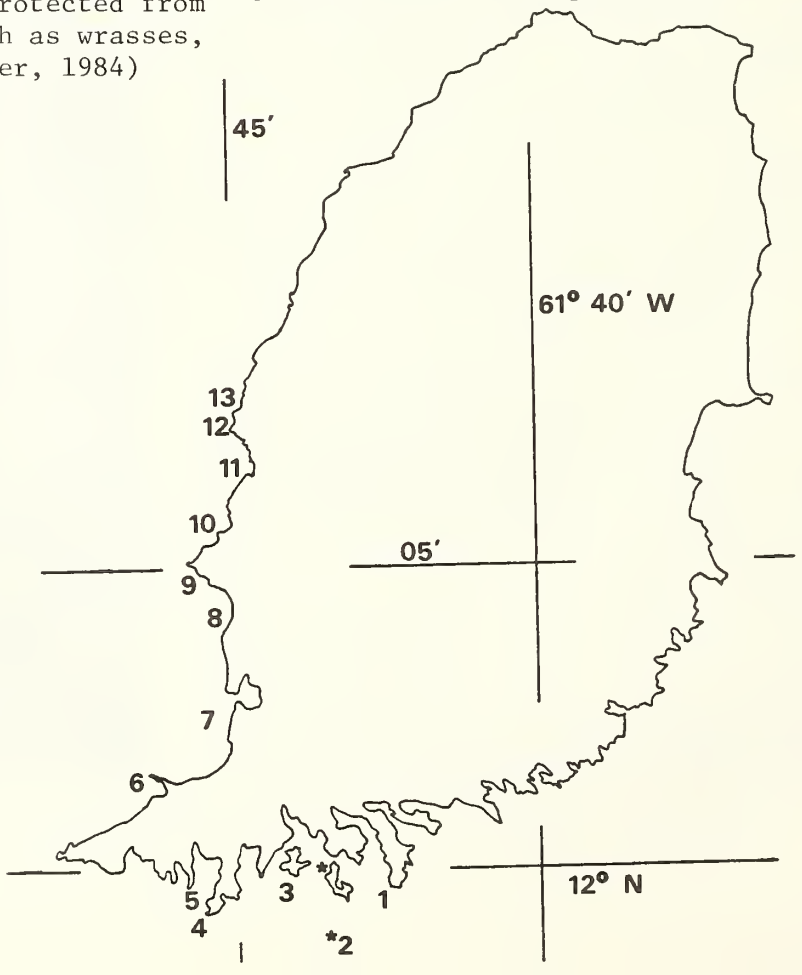
Figure 2. The tube worm *Sabellastarte magnifica*

maculations; the thoracic legs are the same transparent brownish as the body. By contrast, *P. yucatanicus* has a transparent brownish body on which are darker brown maculations. The eye stalks and bases of the antennae are transparent with minute purple dots. The chelipeds and legs are whitish with purple bands. Approach these shrimp slowly, extending a slightly vibrating finger. Then hold your finger motionless alongside the shrimp and the shrimp will jump onto the finger and pick at it (cleaning it) with its chelipeds.

Small, white *Balcis intermedia* occurred ectoparasitically on the large sea cucumber *Isostichopus badionotus* like miniature molluscan remoras!

Living on the surface of the grey sponge *Callyspongia vaginalis* (Figure 3) are hundreds of the yellow orange *Parazoanthus parasiticus* (epizoic zoanthids), and usually several specimens of *Ophiothrix* sp. brittle stars. Hendler (1984) has demonstrated that the relationship is mutualistic for *Ophiothrix lineata* and *Callyspongia vaginalis*. Often one could see the spiney arms of the brittle stars dangling over the top of the rim of the sponge. The anthropomorphic urge to say they are hiding may convey biological insight: inside the sponge the brittlestar is protected from predation by diurnal fishes such as wrasses, parrotfishes and porgies (Hendler, 1984)

Figure 3. The sponge *Callyspongia vaginalis* with the epizoics *Ophiothrix* sp. and *Parazoanthus parasiticus*



Map I. Map of Grenada, showing locations of the 13 collecting sites (numbers correspond to list in text).

III. SPECIES LISTS

Most identifications were accomplished using the following references: Kaplan (1982), Voss (1976), Colin (1978), Abbott (1974), Warmke & Abbott (1961), Randall (1968), and Böhlke & Chaplin (1968). The lack of adequate research space and equipment on Grenada hampered the field work; the majority of the mollusks were identified at the Los Angeles County Natural History Museum.

PORIFERA

Halicilona rubens (Pallas)
Aplysina fistularis (Pallas)
Aplysina lacunosa (Lamarck)
Callyspongia vaginalis (Lamarck)
Ircinia campana (Lamarck)
Niphates digitalis (Lamarck)
Cliona delitrix Pang
Agelas schmidti Wilson
Xestospongia muta (Schmidt)
Tedania ignis (Duchassaing &Michelotti)
Spheciospongia vesparia (Lamarck)

CNIDARIA

Halocordyle disticha (Goldfuss)
Millepora alcicornis (Linnaeus)
Millepora complanata Lamarck
Stylaster roseus (Pallas)
Cassiopeia xamachana (Bigelow)
Bartholomea annulata (Lesueur)
Calliactis tricolor (Lesueur)
Condylactis gigantea (Weinland)
Lebrunia danae (Duchassaing & Michelotti)
Lebrunia coralligens (Wilson)
Pseudocorynactis caribbeorum Den Hartog
Stoichactis helianthus (Ellis)
Ricordia florida (Duchassaing & Michelotti)
Parazoanthus parasiticus (Duchassaing & Michelotti)
Parazoanthus swiftii (Duchassaing & Michelotti)
Palythoa spp.
Zoanthus spp.
Arachnanthus nocturnus
Agaricia agaricites (Linnaeus)
Agaricia lamarcki Milne-Edwards & Haime
Dichocoenia stokesii Milne-Edwards & Haime
Diploria strigosa (Dana)
Eusimilia fastigiata (Pallas)
Monastrea annularis (Ellis & Solander)
Mussa angulosa (Pallas)
Porites furcata Lamarck
Porites porites (Pallas)
Briareum asbestinum (Pallas)
Eunicea spp.
Muricea flexuosa Lamouroux
Plexaurella spp.
Pseudopterogorgia acerosa Pallas
Pseudopterogorgia americana (Gmelin)
Telesto spp.

PLATYHELMINTHES

Pseudoceros pardalis Hyman

ANNELIDA

Spirobranchus giganteus (Pallas)
Sabellastarte magnifica (Shaw)
Loimia medusa (Savigny)
Hermodice carunculata (Pallas)

SIPUNCULA

Phascolosoma cf. *antillarum* Grube & Oersted

MOLLUSCA

Diodora dysoni (Reeve)
Diodora minuta (Lamarck)
Calliostoma javanicum (Gmelin)
Astraea caelata (Gmelin)
Rissoina sp.
Balcis intermedia (Cantraine)
Strombus gigas Linnaeus
Strombus pugilis Linnaeus
Trivia pediculus (Linnaeus)
Trivia suffusa (Gray)
Cypraea cinerea Gmelin
Cypraea zebra Linnaeus
Simnia acicularis (Lamarck)
Cyphoma gibbosum (Linnaeus)
Cyphoma signatum Pilsbry & McGinty
Natica canrena (Linnaeus)
Cassis madagascariensis Lamarck
Cymatium moritinctum caribbaeum Clench & Turner
Charonia variegata (Lamarck) (in midden mound)
Tonna maculosa (Dillwyn)
Murex pomum Gmelin
Coralliophila abbreviata (Lamarck)
Coralliophila caribaea Abbott
Mitrella nitens (C.B. Adams)
Nassarius albus (Say)
Leucozonia nassa (Gmelin)
Latirus angulatus (Röding)
Latirus infundibulus (Gmelin) (female with eggs)
Vexillum hendersoni (Dall)
Vasum capitellum (Linnaeus)
Voluta musica Linnaeus
Persicula pulcherrima (Gaskoin)
Conus ermineus Born (female with eggs)
Conus regius Gmelin
Acanthochitona spiculosa (Reeve)
Ischnochiton sp.
Chlamys benedicti (Verrill & Bush)
Lima scabra (Born)
Laevicardium laevigatum (Linnaeus)
Chione paphia (Linnaeus)

ARTHROPODA

Hippolysmata grabhami (Gordon)
Panulirus argus (Latreille) (rare)
Periclimenes pedersoni Chace (associated with *Bartholomea annulata* and *Lebrunia danae*)
Periclimenes yucatanicus (Ives) (associated with *Bartholomea annulata* and *Lebrunia danae*)
Scyllarides nodifer (Stimpson) (rare)
Stenopus hispidus (Olivier)
Stenorhynchus seticornis (Herbst)

ECHINODERMATA

Ophiothrix suensonii Lütken
Eucidaris tribuloides (Lamarck)
Tripneustes ventricosus (Lamarck)
Lcodia sexiesperforata (Leske)
Meoma ventricosa (Lamarck)
Diadema antillarum (Philippi)
Lytechinus variegatus (Leske)
Lytechinus williamsi Chesher
Holothuria mexicana Ludwig
Holothuria surinamensis Ludwig
Isostichopus badionotus (Selenka)
Nemaster rubiginosa (Pourtales)
Nemaster discoidea (Carpenter)

TUNICATA

Distalpia sp.

VERTEBRATA, OSTEICHTHYES

Synodus saurus (Linnaeus)
Aulostomus maculatus Valenciennes
Myripristis jacobus Cuvier & Valenciennes
Ocyurus chrysurus (Bloch)
Equetus lanceolatus (Linnaeus)
Bothus lunatus (Linnaeus)
Chaetodon capistratus Linnaeus
Chaetodon striatus Linnaeus
Holocanthus tricolor (Bloch)
Pomacanthus paru (Bloch)
Eupomacentrus planifrons (Cuvier & Valenciennes)
Eupomacentrus leucosticus (Müller & Troschel)
Abudefduf saxatilis (Linnaeus)
Chromis cyanea (Poey)
Chromis multilineatus (Guichenot)
Thalassoma bifasciatum (Bloch)
Clepticus parrai (Bloch & Schneider)
Gobiosoma evelynae Böhlke & Robins

PLANTAE

Algae:
Halimeda spp.
Acetabularia crenulata Lamouroux
Udotea flabellum (Ellis & Solander)
Argainvillea nigricans Decaisne
Caulerpa sertularioides (Gmelin)
Valonia ventricosa Agardh

Flowering plants:
Thalassia testudinum Koenig & Sims
Halophila baillonis Ascherson

IV. SUMMARY

Zoogeographically the marine environment of Grenada is typically Caribbean (as expected). However, the lack of published information regarding this island's marine biota made the discovery of even the most common Caribbean organisms significant new information that can be added to our knowledge of the region. In this report I have documented more than 125 species of marine organisms that are now known to occur on Grenada.

This preliminary report has merely hinted at the wealth and beauty of the Grenada marine environment. Conservation of this valuable resource must be actively pursued by the government and people of, and visitors to, Grenada.

It is well known that the oceanic realm is fragile and susceptible to severe depredation by human activities. Grenada is no exception. Despite the abundance of life in many areas, we saw obvious signs of pollution (organic and inorganic), sewage, oil spillage, and over-exploited resources. Most noticeable was the rareness of the conch (*Strombus*) and lobsters (both spiney and slipper, *Panulirus* and *Scyllarides*). Studies should begin immediately on the feasibility of farming these organisms; aquaculture techniques should replace the current "hunter-gatherer" methods.

I hope that the pristine marine habitats and diverse biota of Grenada are preserved so that future investigators and underwater explorers will be able to study and enjoy these beautiful regions, and that the people of Grenada will have a marine resource in future generations.

V. ACKNOWLEDGMENTS

I am especially grateful for the assistance and cheerful disposition of my research team under often confining and trying conditions, and warmly thank Norris T. Ela Jr., Jeffrey and Maureen Weiss, and Roy and Pat Smith. Funding assistance was partially provided through Foundation for Field Research. I also thank the Captain of the Gloriamaris, Mr. Lloyd Wright; Mr. Michael Jessamy of the Grenada Museum; and Dr. James H. McLean, Mr. Gale Sphon, Mr. Clifton C. Coney and Dr. Gordon Hendler of the Los Angeles County Natural History Museum.

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CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - FEBRUARY 19, 1987

Because of a family emergency, our scheduled speaker was unable to present her program and it has been rescheduled for May. But the 40 members and guests present had a great time with an impromptu session. President Wes Farmer encouraged those present to share special memories and some very interesting vignettes were related by various members. Twila Bratcher told us of her early experiences with identification of *Terebra* and her new book, LIVING TEREBRAS OF THE WORLD was introduced. Some of the others who entertained us with interesting and amusing experiences were Bill Romer, Peggy and Bill Dirkson, Doris and George Brosius, Ron McPeak, Jules Hertz, Billee Dilworth Brown and Roland Taylor. It was a lot of fun and we all felt that we knew one another a little bit better.

Mary and Ron McPeak have graciously offered their home for our annual Auction/ Potluck on April 25. Shells are needed!! Please bring your donations to the meeting or arrange to get them to a board member. Board members will be happy to arrange for pickup if necessary.

Suzanne Mathews volunteered to be our hostess. Please assist her by signing up for cookies, etc. A volunteer is still needed to represent the Club at the San Diego Botanical Garden Foundation meetings. This is mandatory for our rental arrangements.

We are looking forward to hosting a wine and cheese reception on Sunday evening June 21 at the WSM annual meeting.

Nola Michel reported that the books have been audited by George Hanselman.

Barbara L Farmer

FOR YOUR INFORMATION

The Western Society of Malacologists (WSM) will hold its annual meeting from June 21-25 on the campus of San Diego State University. In addition to three symposia and contributed papers, there will be evening social events including a wine and cheese reception (hosted by the San Diego Shell Club), auction, banquet and field trips. For further information contact Carole M. Hertz c/o San Diego Natural History Museum, P.O. Box 1390, San Diego, CA 92112 (619-277-6359 home).

The Conchologists of America (COA) will hold its convention from June 23-27 at the Doys Inn at the Arch in downtown St. Louis, Missouri. The convention, hosted by the Greater St. Louis Shell Club will include informative programs, dealers' bourse, auction door prizes and social events. For further information contact Alan Gettleman, 4045 Central Lane, Granite City, IL 62040 (618-931-7374 weekends).

The Jacksonville Shell Show will be held from July 30-August 2 at the Flag Pavilion, Jacksonville Beach, Florida. Contact Allan Walker, 1036 Mantes Ave., Jacksonville, FL 32205 (904-781-1553) for further information.

The American Malacological Union (AMU) annual meeting will be held from July 19-23 at the Marriott's Casa Marina Resort in Key West, Florida. In addition to two symposia, contributed papers and posters, scheduled events include field trips, auction and banquet. For further information contact William G. Lyons, Florida Dep't. Natural Resources, 100 Eighth Ave. S.E., St Petersburg, FL 33701 (813-896-8626).

NOTICE OF NEW PUBLICATIONS

A new journal MALACOLOGY DATA NET (ECOSEARCH SERIES) is announced. Editor Arthur H. Clarke states that the bimonthly publication, at $14.50 per year including postage, will be "devoted to the prompt disemmination of scholarly, innovative and timely information in conchology and malacology" covering marine, freshwater and land mollusks. A sample copy will be available at the March meeting. For subscription send to Ecosearch Inc., 325 E. Bayview, Portland, Texas 78374.

The 72 page illustrated Supplement to volume 18 of The Festivus has been released and made available to all paid 1986 members. Entitled, "A Faunal Study of the Bivalves of San Felipe and Environs, Gulf of California from the Gemmell Collection (1965 to 1976)" and written by Joyce Gemmell, Barbara W. Myers and Carole M. Hertz, the work treats 172 species of bivalves, twenty-three of which have not previously been reported from the San Felipe area. It is available postpaid from The Festivus, publication of the San Diego Shell Club, 3883 Mt. Blackburn Ave., San Diego, CA 92111, U.S.A. at $8.75 domestic and $9.25 overseas surface.

A complimentary copy of the CHAMBERED NAUTILUS NEWSLETTER #47 was received and will be available at the March meeting. The Newsletter "was developed in 1974 to foster collaboration between shell collectors, scientists, and anyone else interested in *Nautilus*, and to serve as a clearing house." A $5.00 voluntary donation is requested to cover mailing costs. For further information write the editors at Dept. Geology, Bryn Mawr College, Bryn Mawr, PA 19010.

COME TO THE AUCTION/POTLUCK

The Club's annual Auction and Potluck will be held at the home of Mary and Ron McPeak (map will be in April issue) on Saturday evening April 25, 1987 with the festivities beginning at 6 P.M. This is the Club's most exciting social event (and only fundraiser). The auction proceeds provide the major portion of the Club's operating funds. Club purchases for the library, donations to scientific publications, participation in the Greater San Diego Science Fair and The Festivus budget depend on the success of the auction. And the success of the auction depends on the generosity of Club members both in their donations to and purchases at the auction.

Please be generous and donate quality specimens with as much collecting data as possible. Bring your donations to the March meeting or arrange for pickup by a board member. Please donate early. The auction committee needs time to prepare the auction list and bag and label the shells.

A signup sheet for the potluck portion of the event will be passed at the March meeting and there will be a followup by the phone committee.

SCHOLARSHIP AWARDS ANNOUNCED

The Santa Barbara Shell Club has chosen two winners of its Sara T. Delaney Scholarship. Victoria Fabry, a doctoral student at the University of California at Santa Barbara will receive $1,000. which she will use to complete her research project, "The contribution of pteropod molluscs in the calcium carbonate cycle of the oceans." The second award recipient, doctoral student Carolyn Declerk of the University of California at Davis, will recieve $400. toward her research on "Morphological and genetic divergences in introduced populations of the Atlantic oyster drill, *Urosalpinx cinerea*."

DUES ARE OVERDUE

If you have not paid your dues, this is your last issue of The Festivus. Dues for 1987 were payable in January. To be listed on the membership roster in the April issue of The Festivus, dues must be recieved by the end of March.

THE FESTIVUS

A publication of the San Diego Shell Club

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional.

Meeting date: third Thursday, 7:30 P.M. Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

COME TO THE AUCTION/POTLUCK - APRIL 25, 1986

See Page 37 and map on last page.

(There is no regular meeting this month.)

CONTENTS

CANTHARUS FRAGARIUS (WOOD, 1828) AT COCOS ISLAND

BY

DONALD R. SHASKY

834 W. Highland Avenue, Redlands, California 92373

On April 23, 1986, a single, perfect live specimen of *Cantharus fragarius* (Wood, 1828) was taken by Dr. Michel Montoya from under a dead coral slab in 17 meters at Roca Sucia, Cocos Islands, Costa Rica (Figure 1). This 26.5 x13.7 mm specimen has a pink protoconch and aperture with dark brown, orange and cream colored bands.

The specific name *fragaria* was introduced by Wood as *Voluta fragaria* on page 11 of the Supplement to the Index Testaceologicus and illustrated on plate 3, figure 2. It is found again on page 31 as *Buccinum fragaria* (*Voluta*). Curiously, the *Voluta* section for the plates is on page 59 and the species is not mentioned there.

It appears that Kiener's species *Turbinella carolinae* proposed in 1841 without locality information is a synonym of *Cantharus fragarius* as is Reeve's *Ricinula bella* described in 1846 from specimens collected by Hugh Cuming at Capul Island, Philippines at low tide.

In addition to *Buccinum, Voluta, Turbinella* and *Ricinula,* this species has been assigned to *Cantharus* (Salisbury, 1983); *Clivipollia* (Wolfe, 1976; Higa, 1977; and Kay, 1979); *Peristernia* (H. & A. Adams, 1853); and *Pollia* (Abbott & Dance, 1982). It also appears close to *Engina* Gray, 1839 based on shell characters. Awaiting radular and/or anatomical studies, I have placed the species provisionally in *Cantharus*.

Figure 1. *Cantharus fragarius* (Wood, 1828). 26.5 x 13.7 mm. Leg. M. Montoya Roca Sucia, Cocos Is., Costa Rica

Cantharus fragarius has been reported from the Maldives, Mauritius, the Philippines, Phoenix and Boston Islands, and Hawaii. This is the first time it has been found in the eastern Pacific.

My appreciation to David K. Mulliner for transferring my color slide into a black and white print.

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FOR YOUR INFORMATION

STUDENT RESEARCH GRANT ANNOUNCED BY THE WESTERN SOCIETY OF MALACOLOGISTS

The Western Society of Malacologists, founded in 1968 to promote the study of malacology and invertebrate zoology, 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. The completed application form and research proposal must be accompanied by an outline of academic background and by a letter from a faculty member or other professional scientist supervising or knowing of the student's work. Deadline for applications and accompanying materials is May 1, 1987. For an application, write to Dr. Vida C. Kenk, WSM Committee on Student Grants, Dept. Biological Sciences, San Jose State University, San Jose, California 95192.

CONCHOLOGISTS OF AMERICA ANNOUNCES TWO GRANTS AWARDED

Two grants were awarded at the 14th Annual Convention of the COA. A $1,000 grant was awarded the the U.S. National Museum, Smithsonian Institution to help defray expenses of graduate student research on the molluscan collection and a $500 grant was awarded to Rudiger Bieler for color plates for his forthcoming monograph on Architectonidae. Requests for 1987 grants must be submitted in writing no later than May 15, 1987 and sent to Richard W. Forbush, Awards Chairman, 1104 Sklar Dr. E., Venice, Florida 33595

PUBLICATION RECEIVED

Volume 2 (no. 2/3:9-19, 6 figs.) of the serial publication Marginella Marginalia was received by the Club. A publication of the Dayton Museum of Natural History, its purpose is the dissemination of information on the Marginellidae. To receive the publication, write to Editor Gary A. Coovert, Dayton Museum of Natural History, 2629 Ridge Ave., Dayton, OH 45414. "Subscription dues are voluntary but encouraged."

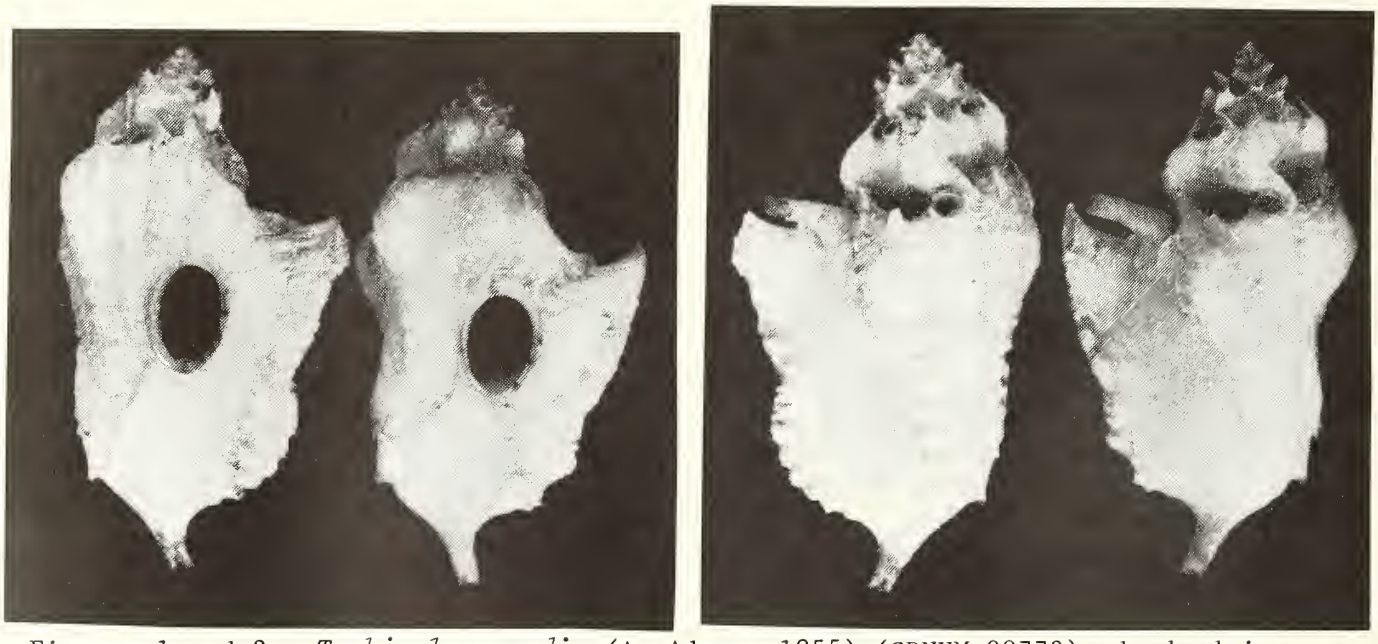
TYPHISOPSIS CORONATUS AND DWARF TYPHISALA GRANDIS AT COSTA RICA

BY

ANTHONY D'ATTILIO

Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

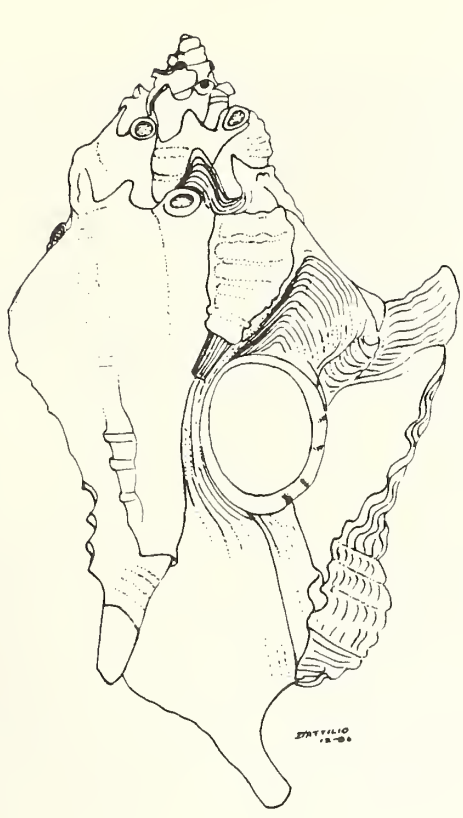
Among other recent donations to the San Diego Natural History Museum by Carol Skoglund of Phoenix, Arizona were two specimens of *Typhisala grandis* (A. Adams, 1855), (SDNHM 90773) dredged off Playas del Coco, Guanacaste, Costa Rica which appear to be fully mature at 13.7 and 12.2 mm L. (Figures 1 and 2). A third example (17.9 mm L) in the Hertz collection was also dredged by the Skoglunds at the same time (Figures 3 and 4).



Figures 1 and 2. *Typhisala grandis* (A. Adams, 1855) (SDNHM 90773), dredged in 24.4-36.6 m (80-120 ft.) on mud bottom, Playas del Coco, Guanacaste, Costa Rica, April 1986. Leg. Carol and Paul Skoglund. 1) apertural view, left=13.7 mm L, right=12.2 mm L 2) dorsal view, left=13.7 mm L, right=12.2 mm L

Each specimen has five whorls and a protoconch which is partially preserved in one specimen (SDNHM 90773) is probably complete between 2½ to 3 whorls. (Figure 5). The specimens show the usual sculpture of transverse cords on the body whorl with intervarical sculpture of spiny-tipped extensions arising from the swollen costae on the body (Figure 6).

The dwarfish specimens from Costa Rica differ only in quantitative morphology. Mature, more typical specimens reach 36 mm in length, are robust and rather quadrangular in overall outline with a large expanded apertural varix. The dwarfish specimens exhibit a prolongation of the apertural varix obliquely and posteriorly. The partition also appears more complexly folded than otherwise noted on large, more typical specimens.



Figures 3 and 4. *Typhisala grandis* (A. Adams, 1855), 17.9 mm L, Hertz collection, Same collecting data as in Figures 1 and 2. 3) apertural view 4) dorsal view

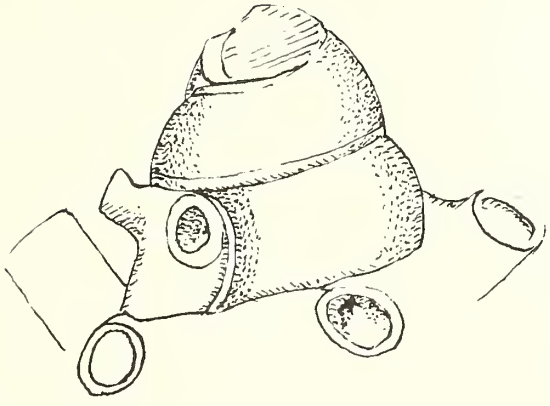


Figure 5. *T. grandis*, protoconch of 17.9 mm L specimen (SDNHM 90773), X50

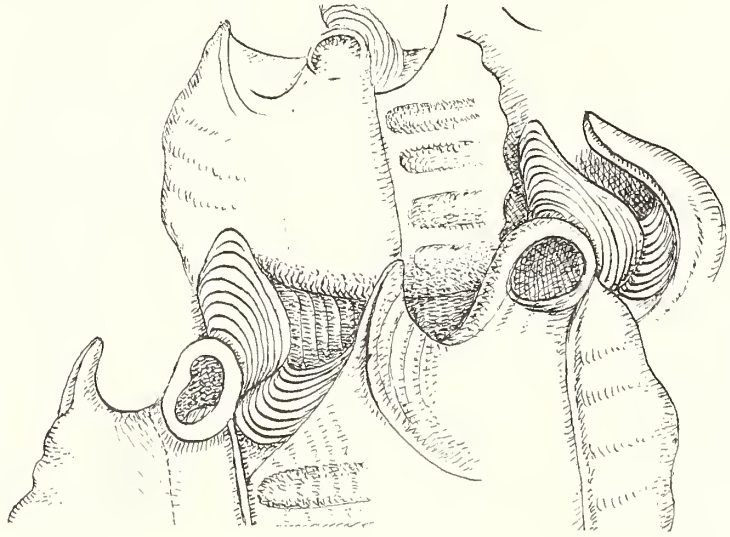
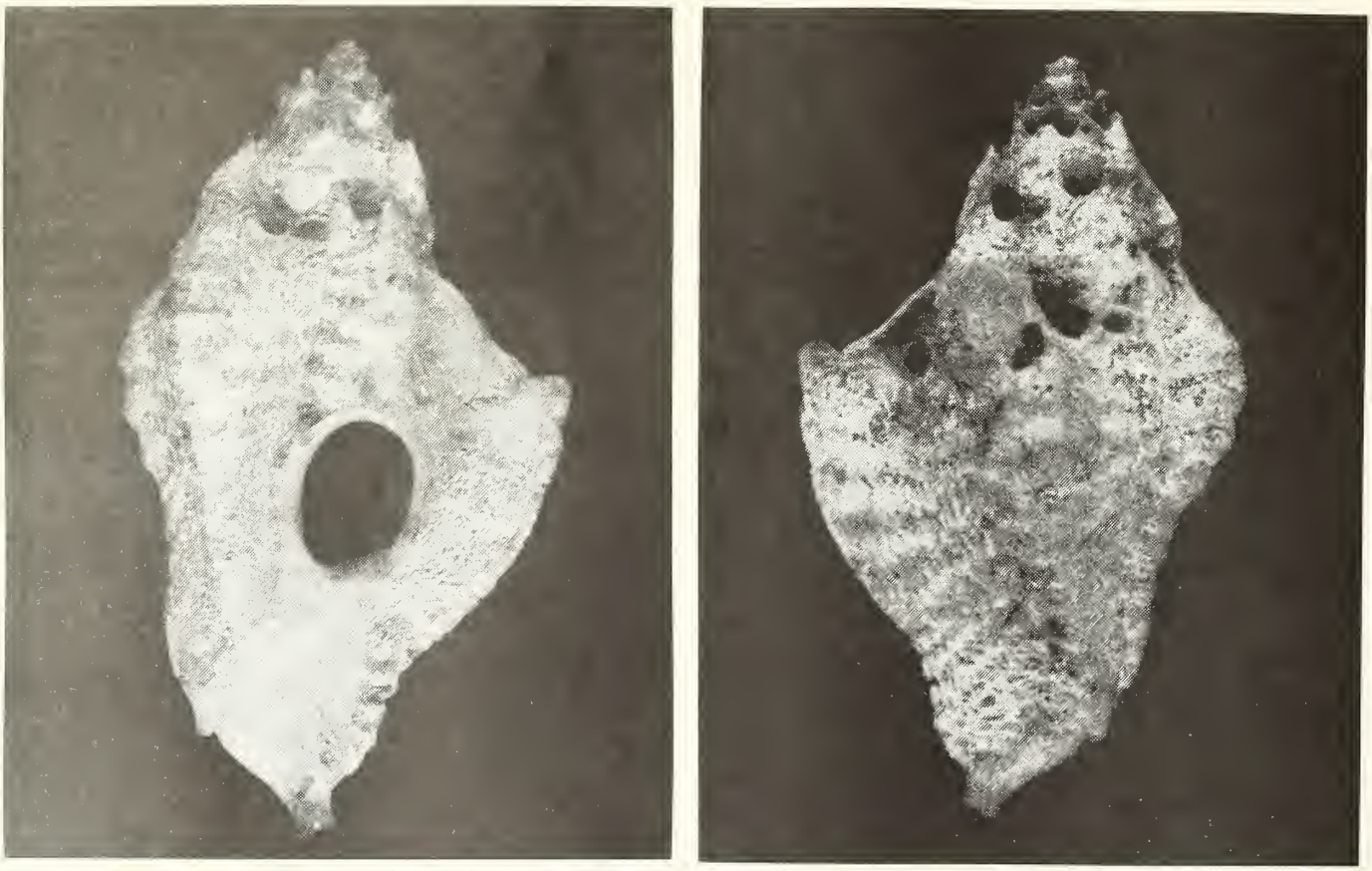


Figure 6. *T. grandis*, detail of spiny tipped extensions arising from the costae on the body, 17.9 mm L specimen (SDNHM 90773), X25

Unlike *Typhisala grandis* specimens of *Typhisopsis coronatus* (Broderip, 1833) which were collected at the same time and in the same locality by the Skoglunds show no dwarfing (Figures 7 and 8). The specimen illustrated is 21.8 mm L. The species reaches approximately 38 mm L at maturity with six to seven whorls.



Figures 7 and 8. *Typhisopsis coronatus* (Broderip, 1833), 21.8 mm L, (SDNHM 91506), dredged in 24.4 to 36.6 m (80-120 ft.) on mud bottom, Playas del Coco, Guanacaste, Costa Rica, April 1986. Leg. Carol and Paul Skoglund. a) apertural view, b) dorsal view

Figure 9 shows the partially preserved protoconchs of two specimens with 5 whorled teleoconchs in the Hertz collection.

While superficially resembling *Typhisala grandis*, the surface of *Typhisopsis coronatus* is sculptured by an extremely irregular lamellate surface (Figures 9 and 10) completely lacking in *Typhisala grandis*, and possibly unique for the typhids. I have only noted this peculiar surface sculpture in the Ocenebrinae species *Poropteron uncinarius* (Lamarck, 1822). The surface of the shell in *T. coronatus* is indented or pitted and uneven lamellae form

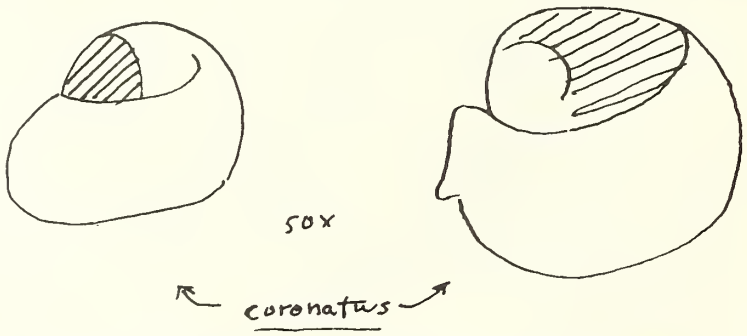


Figure 9. *T. coronatus*, partially preserved protoconchs of two specimens in the Hertz collection dredged by the Skoglunds at the same time as that shown in Figures 7 and 8. Left specimen = 21.2 mm L, right specimen = 20.7 mm L

over this surface. The lamellae are very thin and chipped unevenly at the edges.

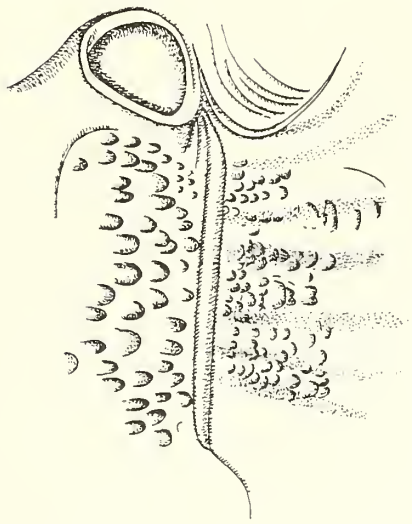


Figure 10. *T. coronatus*, camera lucida drawing shows the entire surface with microsculpture of gouge-like pits.

Figure 11. *T. coronatus*, detail of microsculpture greatly enlarged

ACKNOWLEDGMENTS

My thanks to Carol Skoglund of Phoenix, Arizona for donating the specimens studied to the San Diego Natural History Museum and to Carole and Jules Hertz of San Diego, California for making their specimens available for study. My appreciation also to David K. Mulliner for the excellent photography of these species.

COMMON SHELL NAMES

BY

RUDOLF STOHLER

1584 Milvia Street, Berkeley, California 94709

When attempting to discuss a subject of possible controversial aspects it is best to define terms to be used. In the present instance the term "common name" cries loudly and insistently for such a procedure.

It seems to be inherent in human beings to give names to all parts of their environment. We feel comfortable when we do not use terms such as "that thing." Since there are many human beings around, a particular object may be given as many different names as there are people. Mark Twain in his sketch Adam's Diary tells about the naming of animals by Eve. When Adam asked her why she called a particular animal a "lion" she replied quite logically, "because it looks like a lion." Fortunately for us, Eve did not notice shells, so she did not name them!

It is obvious that confusion is unavoidable if every person calls a particular object by the name he invented regardless of what the other individual calls the same object. This means that different individuals must come to an agreement as to what object is meant by a particular name. That name thus becomes a "common" name, meaning a name that is applied by all members of a community to a particular subject.

But confusion still is possible since different communities of people in different localities may - and in all probability did - agree on a "common name" for the same object already named by the other group. If trading occurs between the two communities, an agreement must be reached as to the name by which the object is to be known. If the daily language of the two groups is very different a "translation" of the names may have to be worked out. Thus, for example, an American "shark" will be known also as a German "Haifisch."

Since it appears that there are more than just a dozen or so different shell species, and also since ardent shell collectors may wish to "trade" with members of many different nationalities, these "common" names have to be translated into many different languages. This makes exchanging shells very cumbersome and hazardous at the same time. If I were exchanging some San Francisco Bay mussels with a Frenchman in Brittany for "moules" and a German in Kiel for "Miesmuscheln," I might get quite upset to get just more *Mytilus edulis*.

Reviewing what we have said so far, it seems that an object - such as a shell - could have dozens or even hundreds of "common" names. But, as the caterpillar in Alice in Wonderland said, "A word means what I want it to mean." My meaning of "common name" is a name by which a particular object is known all over the world. That does not mean, however, that I could drop down in the middle of a busy marketplace anywhere in the world and ask any individual for a *Mercenaria mercenaria* and get anything more than a blank look and a shrug of the shoulder. But among shell collectors it should evoke a look of recognition -- provided my pronunciation is understood.

Through the efforts of an International Commission on Zoological Nomenclature there are precisely such "common names" as I mean. By applying certain rules established by this commision very strictly, eventually all species of animals will have just one name (consisting, to be sure, of two words).

Unfortunately, in spite of these efforts, we still have possible sources for confusion: the ways these names are pronounced. The ancient Romans did not have the foresight to make video tape recordings of their famous orators or even of their successful politicians. And the ancient Greeks were not any smarter in this respect. Thus, we shall never know exactly how we should correctly pronounce the Latin and latinized words. Modern schools throughout the world teach "classical languages;"

that is, they teach vocabularies, grammar and syntax and a sort of pronunciation which usually is heavily colored by the way the language of the particular country is spoken. It is easy to distinguish a French-Latin from an Italian-Latin or an American-Latin. It appears, then, that to bring total harmony and complete mutual understanding into being we must agree not only on a single nomenclature but also on a single way of pronouncing the words.

It would seem that a valiant effort in this direction has been made in several countries by compilations of selected names with a phonetic guide to pronunciation. A pitfall is that, especially in long lists, consistency in phonetic representation is very difficult to maintain and unfortunately, users of such guides tend to overlook the fact that the phonetic equivalents apply only within the language area for which the guide was written. A way out of this difficulty might be the production of tape recordings accompanied by a printed list of the names spoken on the tape. In that way, a collector of molluscan shells could learn to pronounce the names of his treasures in a way that would be understood anywhere. I freely admit that this idea is a dream that will not be fulfilled, at least not for many years. But then, there is no law that regulates dreams - at least, not yet!

CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - MARCH 19, 1987

Ron McPeak entertained an appreciative audience of 41 members and guests with pictures and narration of some of his adventures in the Arctic and Antarctic. These occurred in the 1960s, but the pictures are timeless. For those who were unable to attend, picture Ron in Eskimo garb mushing along with a dog team! We greatly enjoyed sharing Ron's memories.

Several members of the Club had just returned from an exciting trip to the Philippines and Bob Yin promised a program on the trip later in the year. Dave Mulliner exhibited a book he had obtained from the Bishop Museum in Honolulu on the highly valued Niihau shell leis.

Wes Farmer reported that he had found a live Black Murex at Bird Rock in La Jolla, the details to be published in The Festivus.

The Club Auction/Potluck on April 25 will be held again at the home of Mary and Ron McPeak (see map on last page of this issue). If you plan to attend and have not signed up to bring a potluck dish or contributed shells, please contact a Board member to arrange for pickup of shell donation and suggestion for potluck contribution.

Librarian Margaret Mulliner requests the return of Burgess' new cowry book. If you have forgotten to return it, please contact Margaret (488-2701) and arrange for its return. Phil Faulconer is interested in obtaining a shell cabinet. If you have one, new or used, give him a call.

Carole Hertz announced that plans for the WSM annual meeting at SDSU June 21-25 are coming along. Our Club will host a wine and cheese reception on the 21st. If you would like to help, let us know.

The door prize was won by Bill Romer and the cookies were provided by Nola Michel and Carol and Bill Romer.

Barbara L. Farmer

THE AUCTION/POTLUCK - APRIL 25, 1987

The Club's biggest social event and only fundraiser is almost here! Don't miss the fun. Come to the Auction at the home of Mary and Ron McPeak (see map on last page). Festivities begin at 6:00 P.M.

If you have not already donated shells to help support the Club or signed up for your potluck donation, please contact either Bill Romer (278-2389) or Carole Hertz (277-6259). See you there!!

SAN DIEGO SHELL CLUB

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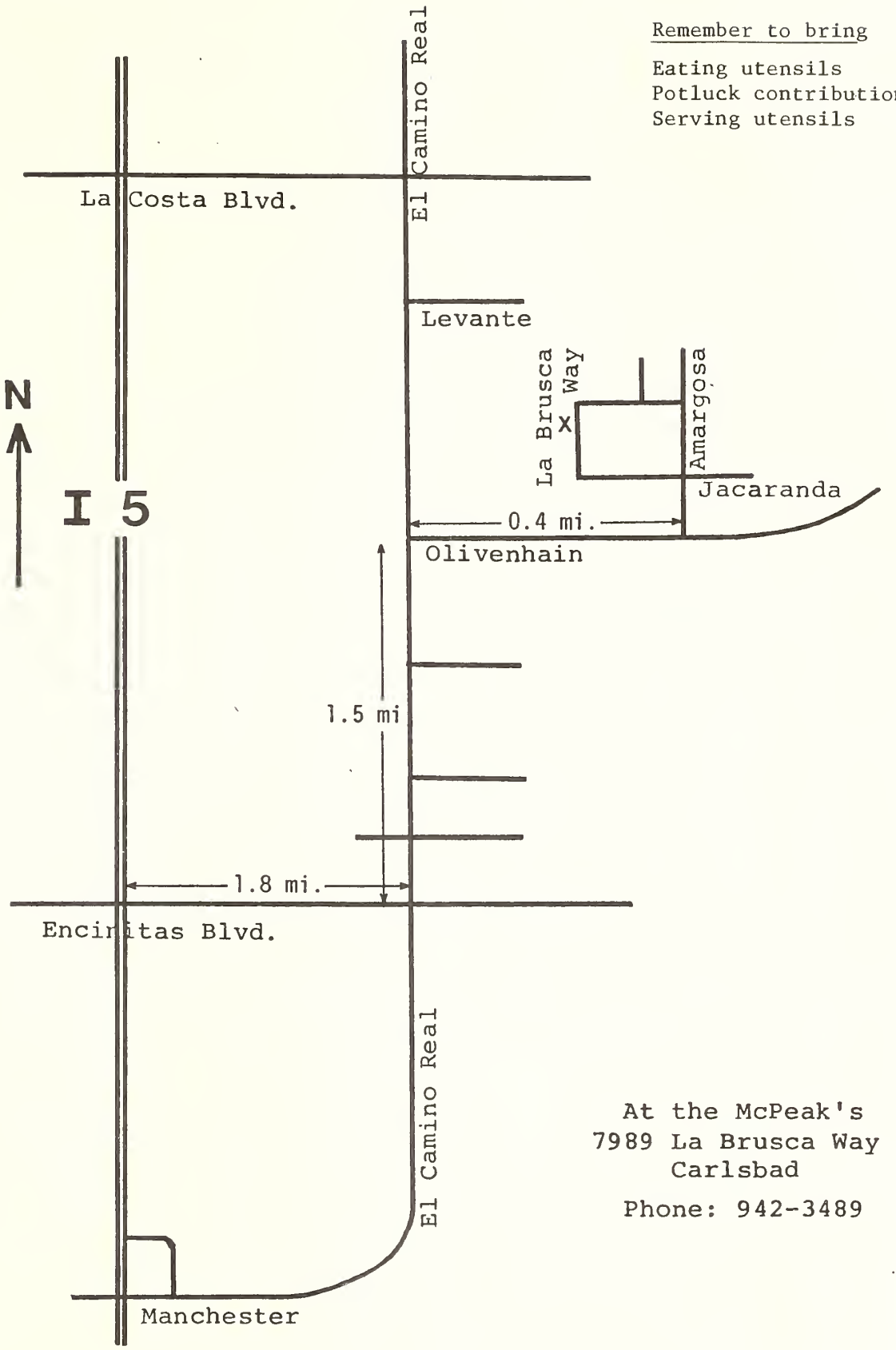
Map for the Auction/Potluck--April 25, 1987
Festivities begin at 6:00 P.M.



Remember to bring

Eating utensils
Potluck contribution
Serving utensils

At the McPeak's
7989 La Brusca Way
Carlsbad

Phone: 942-3489

This map is not to scale

THE FESTIVUS

A publication of the San Diego Shell Club

ISSN: 0738-9388

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional.

Meeting date: third Thursday, 7:30 P.M. Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

Sea Life of San Diego and Baja California
is the title of an illustrated talk to be presented by Wes Farmer, Club President and author of several books on sea life of these areas

Meeting date: May 21, 1987

CONTENTS

CLUB NEWS

THE AUCTION/POTLUCK - April 25, 1987

For the second year in a row, Mary and Ron McPeak were our gracious hosts for the Club's big funraiser and fundraiser. This year as last--it was the best!! Over fifty members and guests enjoyed each others company while imbibing "Dave's punch" and feasting on the delicious potluck contributions. They pored over silent auction items, auction lists and auction specimens until eight o'clock when President Wes Farmer announced that the auction would begin.

The auction contributions were outstanding--two *Conus gloriamaris*, a *Conus dusaveli*, *Cypraea schilderiana*, a "Tony" shell drawing, and a beautiful underwater photograph to name but a few of the special donations. Once underway with Marty Schuler and Carole Hertz, the Club's perennial auctioneers, the bidding was spirited, generous and good natured with much laughter amid the serious bidding. It was great fun.

The auction was a social and financial success thanks to our hosts Mary and Ron, the members who donated (and bid) so generously and those who helped organize the party.

THE CLUB HOSTS A WINE AND CHEESE RECEPTION FOR THE WSM

The Club has volunteered to host a wine and cheese reception at the upcoming annual meeting of the Western Society of Malacologists (WSM). The reception will be from 4:30-6:00 P.M. on Sunday, June 21st in the Activity Center East, adjacent to Tenochca Hall, on the campus of San Diego State University. (Maps will be available).

The reception will provide a cordial beginning to the meeting and will be an opportunity for Club members to meet other amateurs and professionals as well as renew acquaintance with old friends.

The WSM meeting will run from June 21-25 with informative talks during the mornings and afternoons and social events in the evenings, including an "Underwater Night" arranged by Richard Herrmann, a shell and book auction, a banquet at the San Diego Natural History Museum, and field trips on the last day.

If you would like to help with the arrangements for the reception or attend the meeting, please contact Carole Hertz (277-6259).

ANNUAL PLANT SALE OF THE BOTANICAL GARDEN FOUNDATION

The annual plant sale of the Botanical Garden Foundation will be on May 30 and 31 in the patio of the Casa del Prado. All groups meeting there are asked to donate rooted plants for the sale. Bring your donations to Room 104 on Friday, May 29 and please be sure to note that your donation is from the San Diego Shell Club.

Our Club benefits greatly by being able to meet at the Casa del Prado and members are urged to donate plants to benefit the Botanical Garden Foundation. If you have questions concerning donations, contact either June King (296-0574) or Carole Hertz (277-6259).

TOO LATE FOR THE ROSTER

Anderson, Jayne and Mike, 745 1st. St., Suite 102, Encinitas, CA 92024
Bukry, J. David, U.S. Geological Survey, MS-915, 345 Middlefield Rd., Menlo Park CA 94025
Haigh, Betty and Ernest, P.O. Box 2107, Simi Valley, CA 93062
Holiman, Audrey and Wayne, P.O. Box 246, Edinburg, TX 78539
Woods, William L., P.O. Box 231397, San Diego, CA 92123

CHANGE OF ADDRESS

Bertsch, Hans, P.O. Box 25797, Santa Ana, CA 92799

NEW MEMBERS

Hawaiian Malacological Society, P.O. Box 10391, Honolulu, HA 96816
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THYCA CRYSTALLINA FOLLOW-UP

BY

TWILA BRATCHER

8121 Mulholland Terrace, Hollywood, California 90046

While doing research on *Thyca crystallina* (Gould, 1846) for an article in The Festivus (September 1984), I discovered the fascinating fact that the male of the species is almost microscopic and lives on the foot of the female, under the shell.

I remembered this recently when I picked up the vial which had held the *Thyca*. Before tossing it away, I decided to place it under the microscope. There it was, the tiny shell of the male *Thyca* still in place on the dried body of the female (Figure 1).

The shell of the male is thin and translucent, measuring 2.4 mm, almost smooth, but with some predominently spiral sculpture (Figure 2) as opposed to the thicker shell of the female (14.8 mm L) with its beautifully sculptured granular, radiating axial ribs (Figure 3).

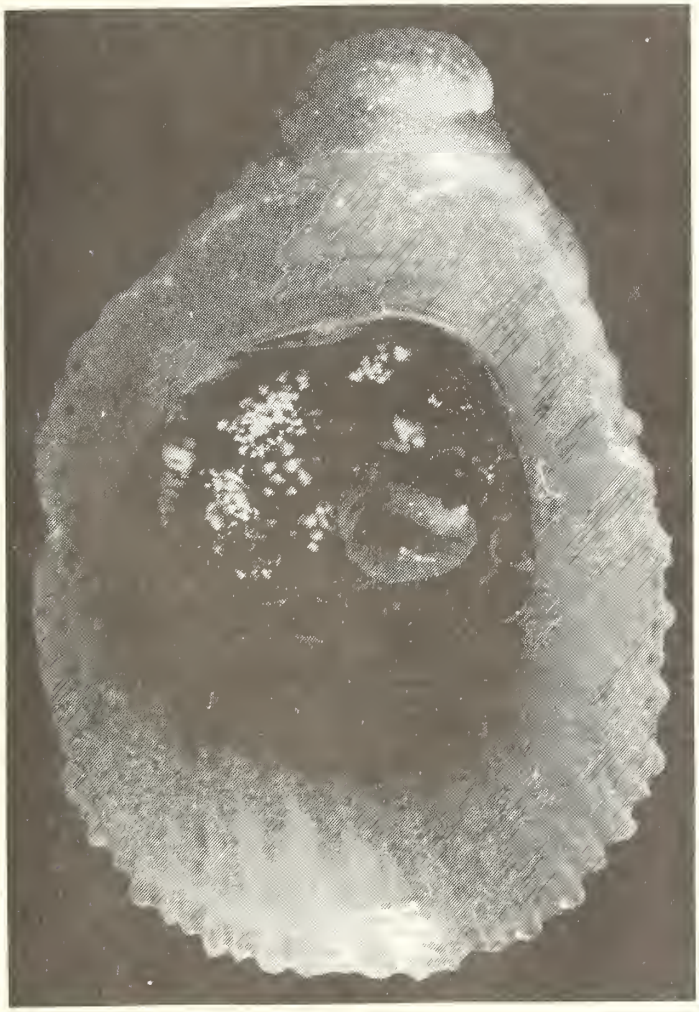

Figure 1. *Thyca crystallina* (Gould, 1846) Shell of female with dried body and male on foot. Female shell--14.8 mm L
Male shell--2.4 mm L

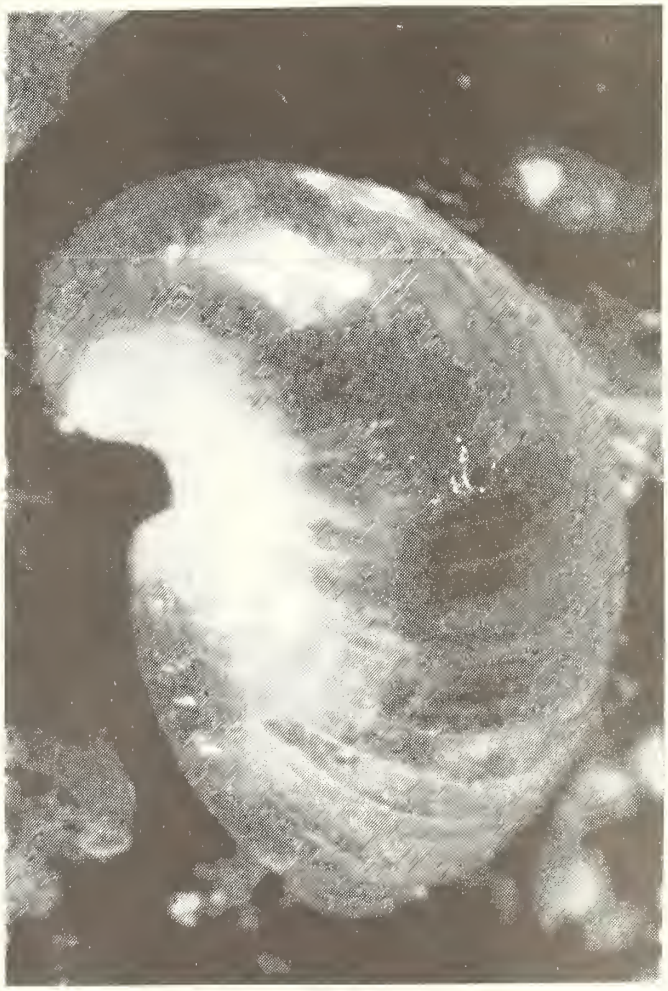

Figure 2. *T. crystallina*, closeup view of male shell, 2.4 mm L
Leg. T. Bratcher, Philippine Is.

Thyca crystallina is parasitic on the blue sea stars *Linckia laevigata* and *L. multiflora* both of Linnaeus. The genus *Thyca* was formerly included in the family Capulidae but was transferred to the Eulimidae by Dr. Alison Kay in 1979 because of its distinctly eulimid protoconch and its parasitic association with echinoderms. Anders Waren (1980), in his revision of the genus *Thyca*, gave five additional reasons for the placement of *Thyca* in the Eulimidae instead of the Capulidae.

Figure 3. *Thyca crystallina*, female shell, right side view, 14.8 mm L

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NEW PUBLICATION RECEIVED

Anatomy, Reproductive Biology, and Phylogeny of the Planaxidae (Cerithiacea: Prosobranchia by Richard S. Houbrick (1987), Smithsonian Contributions to Zoology, no. 445, 57 pages, 27 figures, 6 tables.

This paper discusses in depth the six Recent genera which are recognized by the author as comprising the Planaxidae, a marine group of herbivores inhabiting the intertidal environment which brood their young in specialized brood pouches. Synonymies; conchological, radular and anatomical descriptions; and the life histories and ecology of each genus.

This publication will be available for circulation at the May meeting.

ANNOUNCEMENT OF A NEW PUBLICATION

Nudibranchs of Southern Africa; A Guide to Opisthobranch Molluscs of Southern Africa, by Terrence Gosliner (1987) 136 pages, 268 color plates, paperback. Published by Sea Challengers, Price: $34.95. Announcement forms will be available at the May meeting with further information and order stubs.

THE BLACK MUREX, MURICANTHUS NIGRITUS, FROM BIRD ROCK, LA JOLLA, CALIFORNIA -- FACT OR FICTION?

BY

WESLEY M. FARMER

11061 Lea Terrace Drive, Santee, California 92071

During a low tide nature walk with the San Diego Herpetological Society on February 28, 1987, I found a specimen of the Black Murex, *Muricanthus nigritus* (Philippi, 1845). It was nestled between rocks under a partially submerged rock ledge some four feet long and 1½ feet high about 25 feet from the base of the rip-rap of the shoreline cliff. I commented to the group that this live animal is not usually found here but in the Gulf of California, its more normal distribution. The murex was passed around but not collected.

The next day my daughter Deanna and I went back to the same locality and I found a Black Murex in about the same place as the one the day before. The live murex had two oyster holes drilled partially through the shell on the dorsal side. The shell is 58 mm long with an operculum 20 mm long by 13 mm wide. Figure 1 is of the shell with the operculum held in place by the foot.

The question is: why was the Black Murex in La Jolla? Was it a result of "El Nino"? Was it there because a sympathetic collector from the Gulf of California turned it loose at Bird Rock or a collector scattered about distant collected species into a new habitat? I think that someone returned the shell to this area because a return trip to the Gulf of California was out of the question.

It is not the first time that a tropical species has been found under a San Diego County beach rock. When I was "collecting nudibranchs" many years ago at the tip of Point Loma and looking under rocks for sea life, I found a 100 mm (at least) Tiger Cowry as shiny as the day it must have come from the market place. In retrospect, I think it was slipped under a flat stone in my path by the fellow tidepooler I was with that day.

Occasionally a marine organism has been reported at a certain locality never to be found there again. Many years later a writer will state that it should not be considered part of the animal's current distribution. This suggests that perhaps the ranges of some species fluctuate as a result of an "El Nino" or some wayward pioneering specimen.

That this Black Murex was found at Bird Rock is a fact. How it got there is subject to debate.

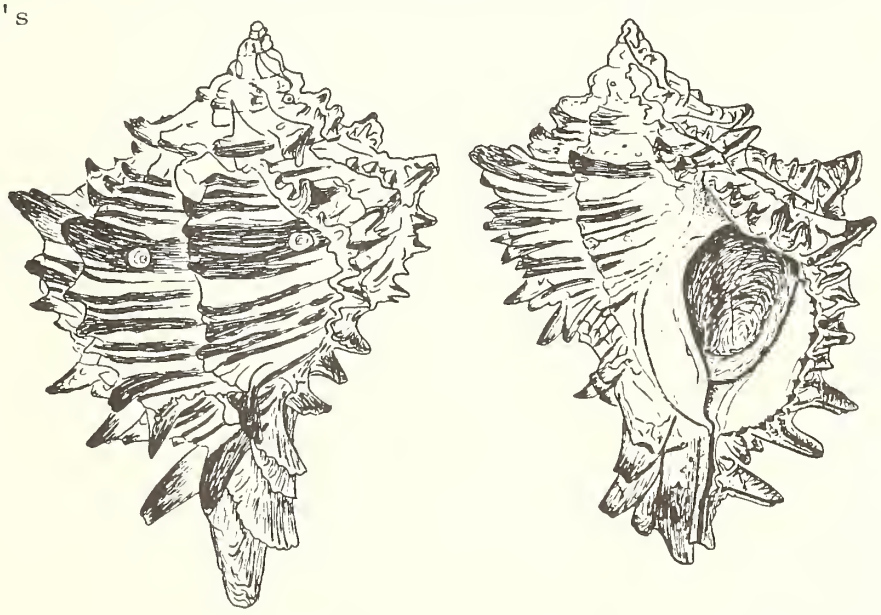

Fig. 1. *Muricanthus nigritus* (Philippi, 1845), 58 mm L

RANGE EXTENSIONS OF SEVERAL PANAMIC MOLLUSKS BASED ON NEW RECORDS MADE IN NICARAGUA. PART I.

BY

MICHEL MONTOYA,* AL LOPEZ** and JULIO LOPEZ**

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ABSTRACT Information on the range extensions of thirteen species of marine mollusks of the Panamic Province is offered: three Bivalvia and ten Gastropoda. The data are based on findings recorded by the authors from the Pacific coast of Nicaragua.

INTRODUCTION

The Pacific coast of Nicaragua has been little explored by malacologists, and the historical accounts of mollusk collecting have been few and far between. However those that have been carried out have resulted in several dozen descriptions of new taxa while type localities such as El Realejo, Corinto, and San Juan del Sur have become notable in Panamic malacology.

The most important collections made on the Pacific coast of Nicaragua have been those of H. Cuming towards the end of the 1820s, of A.S. Oersted in 1846 (Mörch, 1859), H.N. Lowe in 1931 (Lowe, 1932) and the Eastern Pacific Expeditions of the New York Zoological Society carried out in late 1937 (Beebe, 1938).

The authors have collected extensively on the west coast of Nicaragua since 1977, and the data here presented are a small part of their research. The methods of collecting were by beachcombing, wading and shallow diving, and the specimens are held in the collection of the Central American University (UCA) of Managua, Nicaragua.

The identification of the material presented in this paper was verified by Dr. J. McLean of the Los Angeles County Museum of Natural History, Dr. E. Coan of the California Academy of Sciences and Dr. F.R. Bernard of the Canadian Department of Fisheries and Oceans. Voucher specimens analyzed were deposited in the Malacology Section, Los Angeles County Museum of Natural History.

COLLECTION STATIONS

The collecting stations cited in the text are listed below with locality (and the administrative division to which it belongs) and the geographical coordinates.

Santa Julia, Chinandega	13°03'00"N; 87°34'00"W
Aposentillo, Chinandega	12°37'52"N; 87°21'55"W
Aserradores, Chinandega	12°36'27"N; 87°20'23"W
Poneloya, Leon	12°22'50"N; 87°02'49"W
Miramar, Leon	12°09'27"N; 86°45'49"W
Los Playones, Leon	12°07'02"N; 86°44'42"W
Masachapa, Managua	11°47'13"N; 86°31'01"W
La Boquita, Carazo	11°40'40"N; 86°22'30"W
Casares, Carazo	11°39'04"N; 86°21'40"W
Chococente, Carazo	11°32'06"N; 86°11'15"W
Popoyo, Rivas	11°26'40"N; 86°05'00"W
Majagual, Rivas	11°17'52"N; 85°55'00"W
Marsella, Rivas	11°17'06"N; 85°54'14"W
El Toro, Rivas	11°16'30"N; 85°53'59"W
San Juan del Sur, Rivas	11°15'34"N; 85°52'49"W
La Flor, Rivas	11°08'30"N; 85°47'30"W

ACCOUNT OF SPECIES

BIVALVIA
Pectinidae

Pecten (Flabellipecten) berryi Bernard, 1983
Collecting data: El Toro (new southern extension); one single valve, 70 mm
Previous range: Off coast of Sonora, Mexico (Keen, 1971:85)
Observations: This species is *Pecten (Flabellipecten) lunaris* Berry, 1963, not Römer, 1839(Bernard, 1983:68).

Pecten (Oppenheimopecten) perulus Olsson, 1961
Collecting data: Santa Julia (new northern extension), Poneloya, Miramar and Casares; loose valves, to 32 mm
Previous range: Guanico, Panama to Lobitos, Peru (Olsson, 1961:159).

Petricolidae

Petricola (Petricola) lucasana Hertlein and Strong, 1948
Collecting data: Masachapa (new southern extension); one valve, 21 mm
Previous range: Gulf of California from Cabo San Lucas to Punta Peñasco, Sonora, and southward to Oaxaca, Mexico (Keen, 1971:197), 16N-31N (Bernard, 1983).

GASTROPODA
Triviidae

Trivia (Dolichupis) acutidentata (Gaskoin, 1836)
Collecting data: La Boquita (new northern extension), Casares and Chococente; fourteen specimens in drift, to 8 mm
Previous range: Known only from Ecuador (Keen, 1971:486).

Thaididae

Cymia tecta (Wood, 1828)
Collecting data: Aserradores (new northern extension), Los Playones, Masachapa, La Boquita and Chococente; many live specimens on rocks at low tide, to 60 mm
Previous range: Gulf of Nicoya, Costa Rica (Pilsbry and Lowe, 1932:120) to Ecuador (Keen, 1971:552).

Columbellidae

Anachis (Anachis) lyrata (Sowerby, 1832)
Collecting data: Aposentillo (new northern extension), Masachapa and Chococente; many empty shells in drift, to 16 mm
Previous range: San Juan del Sur, Nicaragua to Montijo Bay, Panama (Pilsbry and Lowe, 1932:117)
Observations: Originally described from the tropical eastern Pacific, specimens of this species from the Atlantic coast of Central and South America are indistinguishable from the Pacific examples. The western Atlantic distribution ranges from Cuba and the coast of Central America to Santa Catarina, Brazil (Radwin, 1977:120).

Mitrella lalage Pilsbry and Lowe, 1932
Collecting data: Aserradores, La Boquita, Chococente, El Toro and San Juan del Sur (new southern extension); many live specimens under rocks in tide pools, to 6 mm
Previous range: Southern part of the Gulf of California (Sonora) to Oaxaca, Mexico (Keen, 1971:593)
Observations: These shells have a white diffuse subsutural band.

Nassarina (Zanassarina) whitei (Bartsch, 1928)
Collecting data: Aposentillo (new northern extension), Los Playones, Masachapa, La Boquita, Chococente, Majagual, Marsella and El Toro; some twenty specimens in tide pools on rocks, 6 to 8.1 mm
Previous range: Manabi (Shasky, 1984:29) to Guayaquil, Ecuador (Keen, 1971:596)

Ruthia mazatlanica Shasky, 1970
Collecting data: Masachapa and La Boquita (new southern extension); four specimens in tide pools, crabbed, to 12 mm
Previous range: Mazatlán, Sinaloa and Los Angeles Bay, Jalisco, Mexico (Shasky, 1970:192)

Strombina (Strombina) sinuata (Sowerby, 1875)
Collecting data: Aposentillo (new southern extension); single specimen in tide pool, crabbed, 16.4 mm
Previous range; San Jose, Guatemala and El Salvador, probably Panama (Keen, 1971:601)
Observations: Though crabbed and missing part of the lip close to the anterior canal, the shell surface is in good condition and bears white and light brown maculations.

Nassariidae

Nassarius exilis (Powys, 1835)
Collecting data: Aposentillo (new northern extension), Los Playones, Masachapa, and San Juan del Sur; fourteen empty shells in drift, to 12.8 mm
Previous range: Montijo Bay, Panama (Pilsbry and Lowe, 1932:115) to Paita, Peru (Keen, 1971:606)
Observations: The color of this shell is brown but we have found some gray specimens.

Mitridae

Subcancilla gigantea (Reeve, 1844, *ex* Swainson MS)
Collecting data: Aposentillo (new northern extension), Aserradores, La Boquita, Chococente, Popoyo and La Flor; fifteen empty shells, 43 to 68 mm
Previous range: Panama to Ecuador (Keen, 1971:644).

Cancellariidae

Cancellaria (Narona) mitriformis Sowerby, 1832
Collecting data: Aserradores (new northern extension), Los Playones, Chococente, El Toro and La Flor, live and empty specimens, 10 to 32.3 mm
Previous range: Panama to Peru (Keen, 1971:653)
Observations: The usual color is purple brown, but two gray and one pink specimen were taken.

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THE FESTIVUS

A publication of the San Diego Shell Club

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00
Overseas (surface mail): $12.00
Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111
Single copies of this issue: $5.00. Postage is additional.

Meeting date: third Thursday, 7:30 P.M. Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

DIVING THE NORTHERN COOK ISLANDS

Philip Faulconer, underwater photographer and Club member, will give a slide presentation with accompanying music of the Cook Islands.

Meeting date: 18 June

CONTENTS

CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - MAY 21, 1987

The speaker for the evening was President Wes Farmer, who spoke on sea life in San Diego and Baja California. His slides of tide pools, fish, nudibranchs and Baja beach scenes as well as invertebrate models were enjoyed by the twenty members and guests attending.

The Botanical Garden Foundation requests plant donations for their annual plant sale May 30 and 31. Wes Farmer will attend the next Foundation meeting as our representative. The liability insurance has quadrupled this year and there will be a one-time tenant assessment of $25, plus a yearly room rate of $50.

Outstanding bills from the Club auction should be paid to the San Diego Shell Club and given to treasurer Margaret Mulliner or sent to the Club address.

The door prize shell drawing was won by Larry Buck.

It is requested that each member bring a shell next month for the evening's display. Please bring something unusual or one that you want identified.

Ginny Herrmann, Acting Secretary

RECORDING SECRETARY NEEDED

If you are willing to serve as recording secretary for the remainder of 1987, will you please contact President Wes Farmer (448-8697).

WSM WINE AND CHEESE RECEPTION - JUNE 21, 1987

The Club is hosting a reception for the 20th annual meeting of the Western Society of Malacologists from 4-6 P.M. on Sunday June 21st at the A.C.E. (Activity Center East) adjacent to Tenochca Residence Hall on the campus of San Diego State University. All Club members are invited to attend and meet and welcome members of the WSM. Parking in the high rise across from Tenochca Hall will be available to Club members at no cost during the reception. For further information (and map) contact Carole Hertz (277-6259).

NOTICE OF NEW PUBLICATION

American Malacologists, Inc. announces AN ANNOTATED CHECKLIST OF THE RECENT MARINE GASTROPODA FROM PUERTO RICO by Dr. Edgardo Ortiz-Corps. Price $9.00. This 220 page report was issued in April 1985 as the Sexto Simposio de la Fauna de Puerto Rico y el Caribe. This "thoroughly documented faunal checklist of the Caribbean [in English] ...reports the presence in Puerto Rico of 743 marine gastropods.... This in contrast to the 437 species reported by Warmke and Abbott 25 years ago... . The work includes synonyms, all known references in the literature... biology and recent nomenclatural changes..." Further information and order blank will be available at the June meeting.

Also announced from American Malacologists. the REGISTER OF AMERICAN MALACOLOGISTS, 1986-87. Price $14.00 until Sept. 1, 1987 (regularly $21.00).

Vanikoro acuta (Récluz, 1844)

Vanikoro acuta was described as *Narica acuta* from specimens taken by Hugh Cuming.

Dr. Alison Kay (1979) cites records of this species from Hawaii, the Tuamotus, Lord Hood Island and the Moluccas. I have dredged numerous dead specimens (Figure 3) at Cocos Island, Costa Rica in depths of 100-300 meters. I have taken none alive.

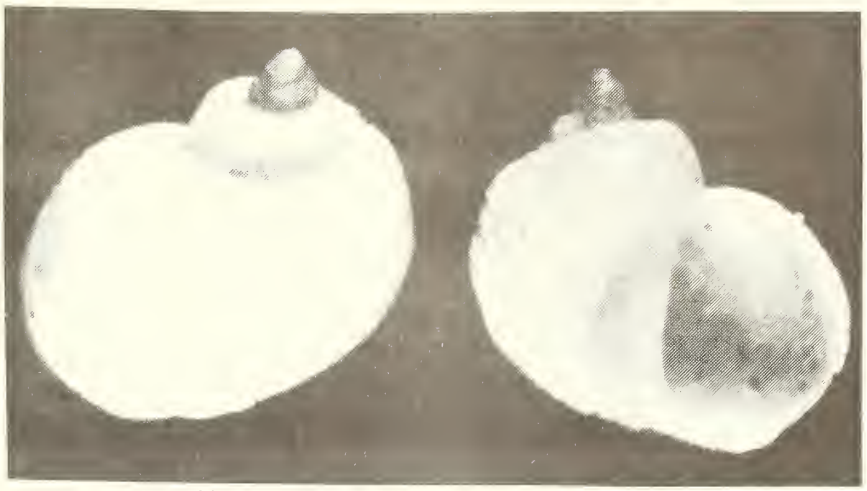

Fig. 3. *Vanikoro acuta*

Amphithalamus inclusis Carpenter, 1864

Amphithalamus inclusis was described from southern California. Subsequently *A. stephensae* Bartsch, 1927, was described from Magdalena Bay, Baja California, Mexico and *A. trosti* Strong and Hertlein, 1939, from Panama. Dr. Winston Ponder (1983) in his review of the genera of Barleeidae, states that the "American species of *Amphithalamus* probably fall into a single complex, being very similar and clearly closely related."

I have found *A. trosti* to be abundant throughout the Panamic province, sometimes finding a thousand specimens on a single dive. I have usually found it in the siftings of algae covered rocks or coral shaken into a collecting pail or bag. I have taken it from the intertidal zone to depths of 33 meters.

Fig. 4. *Amphithalamus inclusis*

In early October 1985, while snorkeling on the north side of Sand Island, Midway Islands, I found two specimens of *A. inclusis* (Figure 4) in siftings from dead coral. This is the first record of this taxon in the Indo-Pacific.

Acknowledgments

My appreciation to David K. Mulliner who made the black and white prints from the original slides taken by Bert Draper.

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UPDATE ON MOLLUSKS WITH INDO-PACIFIC FAUNAL AFFINITIES IN THE TROPICAL EASTERN PACIFIC - PART V

BY

DONALD R. SHASKY

834 W. Highland Avenue, Redlands, California 92373

Three additional species are now added to the list of Indo-Pacific mollusks found in the tropical eastern Pacific and a southern California species is recorded for the first time in the Indo-Pacific.

Streptopinna saccata (Linnaeus, 1758)

Rosewater (1961) in his monograph of the Indo-Pacific Pinnidae gives the distribution of *Streptopinna saccata* as from East Africa to eastern Polynesia. He states that its habitat is under and between rocks in tidepools and in cavities of coral and that it may assume an almost unbelievable degree of contortion.

While diving in 27 meters at Roca Sucia, Cocos Island, Costa Rica, on April 23, 1986, I found a recently dead specimen (Figure 1) wedged between coral slabs. This specimen, 191 x 78 x 1 mm, is minimally contorted and closely resembles the specimen figured by Dr. Rosewater (pl. 171, figs. 1-2) from Keokea, Hilo, Hawaii.

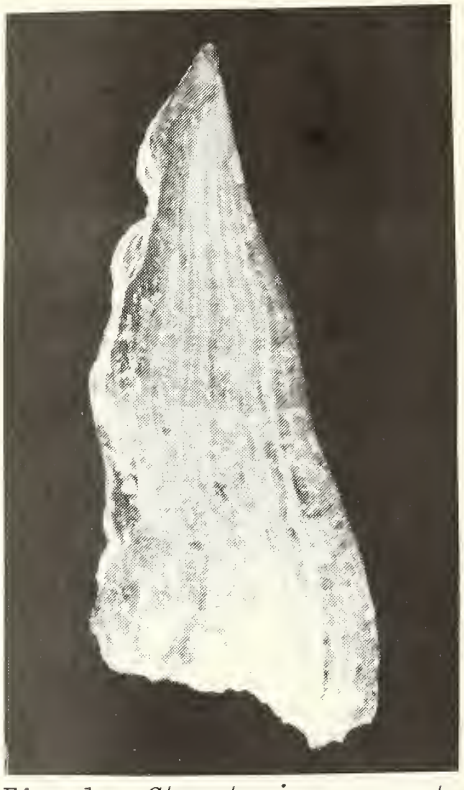

Fig. 1. *Streptopinna saccata*

Herviera gliriella (Melvill and Standen, 1896)

Originally described as *Pyrgulina gliriella* from specimens collected at Lifu (now Lifou) Island, Loyalty Islands, the authors in 1899 proposed the genus *Herviera* with *Pyrgulina gliriella* as the type. In this paper they mentioned that the species was also taken at Uvea Island, Loyalty Islands and from New Caledonia.

Dr. Alison Kay (1979) notes *Herviera gliriella* from the Line and Hawaiian Islands and I have collected the species at Sand Island in the Midway Islands. A figure of an unidentified *Turbonilla* from the Cocos-Keeling Islands in a paper by Dr. Virginia Orr Maes (1967, pl. 19, fig. 3) also appears to be *H. gliriella*.

While SCUBA diving I have collected *H. gliriella* at the following Panamic localities: 1) 8-15 meters, Coastecomate, Jalisco, Mexico, October 1968
2) 13 meters off the S.W. tip of Isla Partida, Gulf of California, Mexico, August 1975
3) 12-17 meters on *Ostrea fisheri* Dall, 1914, at Isla Ballena, Gulf of California, Mexico, October 1982
4)12-37 meters from three sites at Cocos Island, Costa Rica, 1983-85 (Figure 2).

Fig. 2. *Herviera gliriella*

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CORRECTION TO "THYCA CRYSTALLINA FOLLOW-UP"

CORRECTION: In the article THYCA CRYSTALLINA FOLLOW-UP by Twila Bratcher (May 1987) [Festivus XIX(5):40-41, 3 figs.], part of the beginning section was omitted. This beginning section is reprinted correctly below.

"While doing research on *Thyca crystallina* (Gould, 1846) for an article in The Festivus (September 1984), I discovered the fascinating fact that the male of the species is almost microscopic and lives on the foot of the female, under the shell.

I remembered this recently when I picked up the vial which had held the *Thyca*. [The alcohol had long since evaporated and nothing was left in the vial except a small hard brown piece of material a few millimeters in diameter, obviously the dried remains of the body of the *Thyca*.] Before tossing it away, I decided to place it under the microscope. There it was, the tiny shell of the male *Thyca* still in place on the dried body of the female (Figure 1)."

The editor regrets this error and the omission of credit to Bert Draper for the fine photography of the specimens of *Thyca crystallina*. Mrs. Bratcher had written in her original letter, "I felt that even with my macro lens and extension tubes, I would not be able to come up with the pictures of the 2.4 mm shell, so I didn't even try."

RECENT CONTRIBUTIONS TO MALACOLOGY

REVIEWS AND COMMENTS ON TWO NEW SHELL BOOKS

BY

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Recently, two works have been published which are directed to both professional and amateur malacologists. Each are comprehensive treatments of prominent gastropod groups, the olive shells (genus *Oliva*) and the Terebridae. While they have been anticipated by interested students for some time, these books also represent a considerable investment to an individual collector, and so it is important to know if these works are a worthwhile addition to your library.

As a guide to those who have not yet acquired these texts, the following is a detailed discussion of the qualities of each work. These are two separate reviews, but comparisons are inevitable. While these works review groups of approximately the same size, they differ appreciably from each other in quality and format.

ATLAS OF LIVING OLIVE SHELLS OF THE WORLD
By Edward J. Petuch and Dennis M. Sargent. 1986.
Published by Coastal Education and Research Foundation (CERF), P.O. Box 8068, Charlottesville, VA 22906-8068.
253 pages, color plates, black and white figures and maps.
Price is $68.50 plus $2.50 postage.

Technical Description

The ATLAS consists of eight chapters of text, 39 color plates, plus glossary and bibliography. The book size is 5½ by 8 inches, or slightly larger than a field guide. The first five chapters briefly introduce the genus *Oliva*, discuss morphological characters, evolutionary history, ecology, and the higher systematics of the family Olividae. The second chapter on morphology contains a key figure (B) with "outlines of the shapes of the various subgenera of the genus *Oliva*." During identification, the outline of the unknown specimen is to be matched against one of 19 shapes figured, before moving to the discussion of that particular subgenus.

Chapter six discusses zoogeography presenting 32 maps of distributional ranges. The next chapter is a compendium of *Oliva*, including both a list of new taxa and one showing relative abundances of olive species, arranged by subgenera. Chapter eight is the large systematic discussion, arranged alphabetically. Species are figured both dorsally and ventrally in color plates placed at the rear of the text. Captions appear separately. In this review, the authors recognize 144 species, 32 subspecies, and many color forms. There are 300 taxa with associated names, although the authors state that named color forms are not taxonomically significant. As part of this total, the authors contribute ten new subgenera, 28 species and 18 subspecies. In contrast, Ziegler and Porreca (1969) recognized 57 species and 101 forms while Abbott and Wagner's listing in THE STANDARD CATALOG, based on the Burch (1960) list, recognized 234 species.

Discussion

Although both conspicuous and attractive, the olives of the world (in this case, *Oliva*) are often represented in general surveys or regional texts by a few plates and descriptions of the best known species and color forms. Except for Zeigler and Porreca's OLIVE SHELLS OF THE WORLD (1969) most comprehensive surveys date from the

nineteenth century, like the stupendously illustrated works by Duclos from the 1840s.

As the first significant treatment of this genus in almost 20 years, I approached this work with considerable anticipation, cognizant of the wealth of new material now available from throughout the world. However, even as I began to use this work I became very disappointed and frustrated with its inadequacies. It is not my intention to minimize the valuable information here, or to frivolously dismiss the amount of work which has been devoted to this complex and problematic group. Instead I contend that the valuable parts of this ATLAS have been obscured, in some cases eclipsed, by a combination of poor implementation and a lousy format, flaws which were needlessly created.

I reviewed this work evaluating its efficiency as an "atlas." I used a few hundred lots of olives, about 90% self-collected from a variety of localities, reexamining and reconciling each lot with the text. Depending on how one judges the systematics herein, this test collection contained about 70% of the nominal extant taxa. The results of this exercise are organized as responses to the following five basic questions.

1. What type of book is this?

This work is clearly not a monograph of the genus (and is not labeled as such), in spite of numerous taxa being described on three different taxonomic levels. Except for forms new to science, primary type material of known forms is not figured or adequately discussed. Apart from the study collections at the Smithsonian and Delaware, it would appear that the authors never consulted other museum collections but relied only on private holdings. The text is poorly sourced being supported by only a two page bibliography, which lists 43 citations. There is no discussion or illustration of the living animal, its anatomy, or radular characters. A very brief physiological description is included in a two page chapter on ecology.

There is no indication, even in the acknowledgments, that this work was critically reviewed by any other workers or authorities. The text contains spelling and grammatical errors, the index is missing entries and some pages have a sloppy format. This book needed an editor.

Consequently, this work is of limited use to professionals needing source information, apart from the new taxa, and may be a real problem for a curator. One must judge it as an identification manual for the individual shell collector.

2. Is the ATLAS adequately organized as an identification manual?

The physical organization of this book, the placement of species descriptions in relation to illustrations, maps and other information, is the worst of any malacological text of modern times. It is a major failure, a "four finger" book requiring digits to be placed in the index, the illustrations, their captions and the species descriptions. The reader then must flip back and forth. More fingers are required to consult maps and their captions since these sit elsewhere. While many books segregate illustrations from the text, the plates are accompanied by, not isolated from, captions as is the case here. The decision to arrange the text, figures and captions in this manner is unfathomable and absolutely inexcusable.

Added difficulty occurs when trying to examine similar forms of a species complex. Since the taxa are arranged alphabetically, first by subgenus and then internally by species, similar species are mixed in with other forms, appearing on different pages and plates. The authors should have rearranged their material to better facilitate comparative identification, which, after all, is the primary purpose of the text.

3. How adequate are the species descriptions, illustrations and maps?

Looking past the abysmal organization of the book as a whole, the inconsistencies in the systematic presentation can be criticized. The authors use 19 subgenera, 10 of which are new, to arrange the *Oliva*. Inexplicably, only the new subgenera are accompanied by descriptions, the other nine are not. Thus the reader must already be sufficiently familiar with each of the older subgenera to distinguish their

morphological features from those of the "new" groups. The chapter on shell morphology helps in general terms by using 19 drawn outlines, but this remains inadequate without a written comparative analysis. The authors would have greatly improved their presentation by using a subgeneric key.

At the specific level, most descriptions are accompanied by a brief discussion, covering geographic details and a size range. Comparative comments about other similar taxa are intermittently provided.

The illustrations, the responsibility of the junior author, are only successful with the larger specimens. The color register appears poor and the contrast muted on some plates, making it difficult to spot some details. The reproduction is particularly weak with some of the light-colored specimens. It would have been interesting to see the original plates to note if quality was lost during publication.

Distributional maps, presented in the zoogeographical chapter, show ranges of all nominal taxa but not all the subspecies proposed. As with the color plates, map captions do not accompany their subjects.

4. What about the quality of the actual systematics?

How an author taxonomically organizes a group under study is the crux of any systematic review. The choices made either in applying names or erecting new taxa are also the aspects most susceptible to subjective reactions of the reader.

From a historical perspective, probably no group of gastropods, excepting the cones, has been as over identified as the olives. In reviewing the systematic history of the genus, summarized in Ziegler and Porreca but not mentioned in the present work, the actual number of recognized valid taxa has fluctuated widely since the eighteenth century. Lamarck (1811) recognized 62 species, six years later Dillwyn reduced this to 18; later, Reeve (1850) figured 100 species while Marrat (1870-71) figured 220. By 1883, Tryon had reduced this number back to 55, and so on. Obviously this taxonomic instability is nothing new in *Oliva*, thanks to the extreme variability inherent in the group. However the reader should be aware of this historical experience and use that perspective when judging the systematics in the present work, since it is based on the same morphological criteria as earlier studies, ten new subgenera notwithstanding.

With 18 new subspecies, the present ATLAS is easily the best example of trinomialism since Dautzenberg's work (1927). While the use of a subspecific level is perfectly acceptable, the authors do not follow a consistent definition of what separates a subspecies from a nominate taxon. Do we assume that a subspecies exists when a disjunct distribution is an isolating mechanism (a classical definition when applied properly), or when the specimen differs in some physical characteristic like size or color? What then is a form?

At this level the authors' work appears to suffer from a lack of information readily available from public collections. Examples can be cited from both previously described taxa and the authors' contributions. It is reported that *Oliva carneola kwajeleinensis* de Motta, 1985 differs from *carneola* by having two raised bands (physical difference?). It is implied here that this subspecies is a Marshallese form with an attenuated range (geographic difference?), although the text gives one range while the map gives another. Given the extreme variability of this very common species, it is highly unlikely that a subspecific level is legitimate, especially since the form is known from other localities. If in the small holdings of the Santa Barbara Museum there are examples of *kwajeleinensis* from the Philippines, Saipan and Fiji imagine the results from consulting a large Indo-Pacific study collection.

Other examples of weak arguments are those for the proposed subspecies of *Oliva buloui* found in the Solomon Islands. Here the forms, *inscripta* and *stoneorum* differ on the basis of color and physical dimension. They are described as endemic to the Solomons with type localities about 20 miles apart in the middle of a 1,100 mile archipelago. The number of specimens examined is not given. The authors state that both subspecies occur at the southern edge of the range for *buloui s.s.* and are

Discussion

My comments about the LIVING TEREBRA are considerably shorter than those on the ATLAS OF LIVING OLIVES. The superior nature of this work does not need excess verbiage to shape a recommendation. Whereas the value of the ATLAS is obscured by a myriad of deficienceis (and is a collection manager's nightmare), this monograph is the epitome of malacological scholarship and can be enjoyed by both the dedicated amateur and the professional.

The development of this text and its "imminent" arrival had been known by many for some time. Personally, I stopped cataloging *Terebra* three years ago in anticipation of this work. When it finally arrived last winter I greedily consumed it, applying it against every specimen in the house (even ones uncleaned). Unlike my recent experience with olives, there were no disappointments here; now several similar appearing taxa can be easily separated, thanks to detailed descriptions and figures.

This work is very definitely a monographic treatment of the Terebridae. The authors have devoted many years to the effort and have noted in their introduction that all original descriptions since Linnaeus have been evaluated. They have traveled to the museums around the world, 24 institutions are cited, to examine and figure the available types. They have also personally collected taxa in all the major faunal provinces, using a full spectrum of collecting methods. Each species description is comprehensively sourced and supported by a detailed bibliography. Also, unlike the ATLAS OF LIVING OLIVES, the reader is not exposed to a flood of new terebrid taxa. All species discussed in the present work have been previously described in recognized, and accessible, journals.

Functionally the text is arranged to easily access both the written descriptions and their figures. The plates are staggered to allow the text and figures to follow as closely as possible and usually the species description faces the proper illustration.

A great asset of the monograph is the use of detailed figures to highlight diagnostic shell characteristics with either a middle whorl or aperture view shown in close-up, along with a general ventral aspect. The high quality color plates are also a great contribution to the work.

As with any large group of mollusks the *Terebra* have some species complexes which are particularly confusing. In most cases these "trouble" spots are handled very well by the text and detailed figures. In a few instances the reader may remain confused when the authors have not comprehensively compared taxa [i.e. species "A" is different from "B," "B" differs from "C," but how does "A" differ from "C"?], or have made an indistinct qualitative statement ["A" is "larger" than "B"]. This latter descriptive approach succeeds when a large sample is available, but not when the reader has a few sub-adult specimens. The species complexes around *Terebra triseriata* and *undulata* can be cited as examples. The use of small scale dichotomous keys for these complexes would be a possible solution here, a device which Cernohorsky has used in past studies.

Once again the refrain: should you buy this book? This work is an invaluable reference guide to the *Terebra* and should be in every malacological library. Its superb execution as a study of this family could prove a stimulus to increased interest in the *Terebra* by collectors. As the successful product of years of dedication and study, this work can justifiably be a source of great pride to its authors. An unqualified recommendation.

found in "deeper water." Is this an isolating factor? The fact that they can be found throughout the Solomons on dark silt substrates along with the nominate form, is information readily available from local collectors in the region but apparently not to the authors. Again, a more complete record, and better research of sources would have greatly improved the strength of the authors' systematic arguments.

A final example, replete with hazards symptomatic of the whole work, has regional appeal to Panamic collectors. Discussion of the *Oliva spicata* complex is incorporated into a six page essay describing the evolutionary history of the subgenus *Strephona*. There are no references here, implying that this is original research. Shell structure, coloration and geography are used to define the *spicata* complex as seven species, five subspecies and several named color forms. Do not expect many synonyms in this construct. Any coherence in this scheme is obliterated by the alphabetical positioning of these taxa in with other species of *Strephona* from other regions across 30 pages of text and five plates. It is a real mess to sort out and defeats the value of having an introductory essay in the first place.

Finally an extraneous note: I report, with incredulity, that the authors have named four new species in honor of a single individual, Leonard C. Hill of Miami (*hilli, leonardi, leonardhilli,* and *lenhilli*). This must rank as a record of sorts, certainly within a single genus. Given this richness of "immortality," I hope that at least one of these taxa might stand the test of time.

5. Should you buy this book?

Although this volume is an example of great potential squandered by an inexusably poor format and plenty of incomplete scholarship, there is a wealth of information present. For people who maintain a comprehensive malacological library, this work must be automatically included. For serious olive collectors this book is required, for being the most recent source and for the introduction of the taxa. It will be repeatedly cited and used, is spite of itself.

For general collectors who only have a passing interest in olives I suggest the general texts already available, thereby avoiding an additional expenditure and needless aggravation.

LIVING TEREBRAS OF THE WORLD A MONOGRAPH OF THE RECENT TEREBRIDAE OF THE WORLD
By Twila Bratcher and Walter O. Cernohorsky. 1987.
Published by American Malacologists, P.O. Box 1192, Burlington, MA 01803.
240 pages, color, black and white figures.
Price is $54.95 postpaid.

Technical Description

This work can be divided into a preliminary explanatory section which has a review of *Terebra* biology, morphology, ecology, fossil taxa, methods of collecting and cleaning; and the systematics section, in which the species of four genera: *Terebra, Hastula, Duplicaria,* and *Terenella* are described. Concluding sections contain a detailed glossary (defining terminology used in the text), a comprehensive bibliography and an index arranged as an alphabetical list of taxa referenced to species numbers in the text. Synonyms and *nomen dubium* are also cross-referenced. This book is a full-sized 8½ by 11 inches.

There are a variety of figures. The first section has 36 line drawings, black and white photographs or scanning electron micrographs illustrating morphological terminology, protoconchs and radulae. There are six color plates which include a living specimen and about 100 taxa. Figures in the systematics section characterize each of 268 taxa described in the text, mostly by multiple views of primary type material showing detailed aspects. Illustrations usually face the printed description.

Each of the 268 systematic accounts contains a detailed morphological description, a type locality, species distribution, the status and disposition of the type, and a discussion section including comparative observations using similar taxa. Species with similar characteristics and distributions are grouped together to aid comparisons.

COMPARISON OF NAQUETIA ANNANDALEI (PRESTON, 1910) AND NAQUETIA BARCLAYI (REEVE, 1857)

BY

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ABSTRACT

The shell morphology of *Naquetia annandalei* (Preston, 1910) and *N. barclayi* (Reeve, 1857) are compared. The holotype of *N. annandalei* and the lectotype of *N. barclayi* (selected herein) are illustrated. A synonymy for each species based on previous illustrations is given.

For a number of years there has been considerable discussion and confusion concerning the two *Naquetia* species *annandalei* and *barclayi*. More recently greater numbers of *N. annandalei* have been collected in 75 to 100 meters in the Philippine Islands and a more comprehensive look at this species and its morphology is possible as well as a comparison with *N. barclayi*.

Naquetia annandalei (Preston, 1910)

Pteronotus annandalei Preston, 1910, Rec. Indian Mus. 5:118-119, fig. 3

1864. [in 1858-1870]. *Murex trigonulus* Lamarck var.?. Dunker, Novitates Conch. 2:65-66, pl. 22, figs. 3,4

1966. *Naquetia barclayi* (Reeve). D'Attilio, Hawaiian Shell News 14(7):5, figs. 1,2

1968. *Pterynotus (Naquetia) annandalei* (Preston). E.H. Vokes, J. Conch. 26:304, pl. 13, figs. 1,2

1973. *Murex (Latirus) barclayi* (Reeve). Leehman, Hawaiian Shell News 21(1):8, 1 fig.

1976. *Naquetia barclayi* (Reeve). Radwin & D'Attilio, Murex Shells of the World, p. 80, pl. 15, fig. 8

1982. *Naquetia annandalei* (Preston). Abbott & Dance, Compendium of Seashells (frontis.)

1985. *Chicoreus (Naquetia) barclayi* (Reeve). Houart, Xenophora 29:8-9, figs. 1, 1a, 2,3

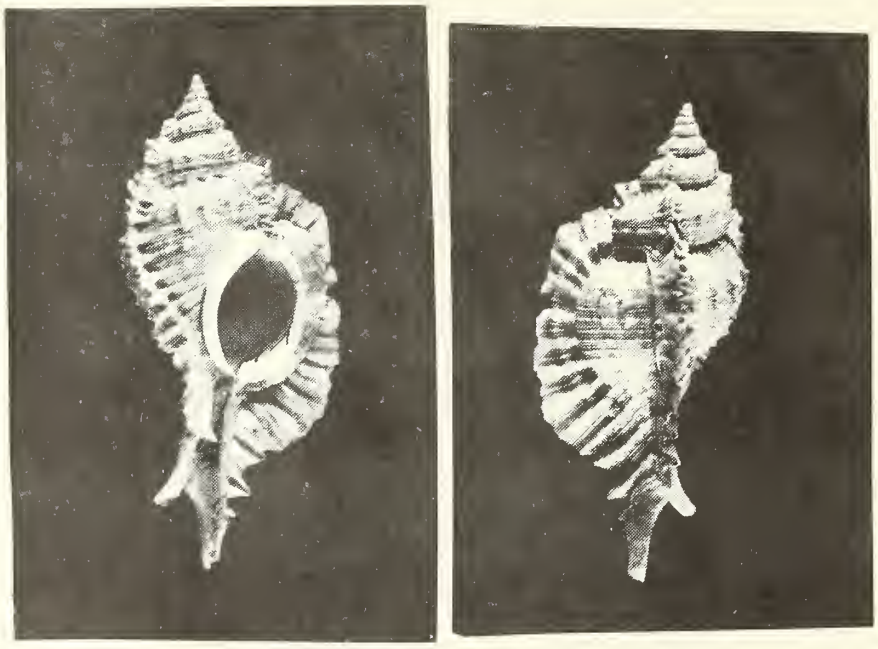
Naquetia annandalei described from the type locality "off Gopalpore" in the Bay of Bengal is fairly common in the Philippine Islands and occasionally in southeastern Japan. It is obtained in approximately 75 to 100 meters in tangle nets in the Philippines.

The species was well figured and described by Preston (1910), who noted "its graceful form combined with the curiously nodulose sculpture." Photographs of the holotype, courtesy of the Zoological Survey of India, are shown here in Figures 1 and 2. The protoconch of a juvenile specimen (19.9 mm L) in the San Diego Natural History Museum collection (SDNHM 92119) (Figure 3) has 3½ rounded whorls.

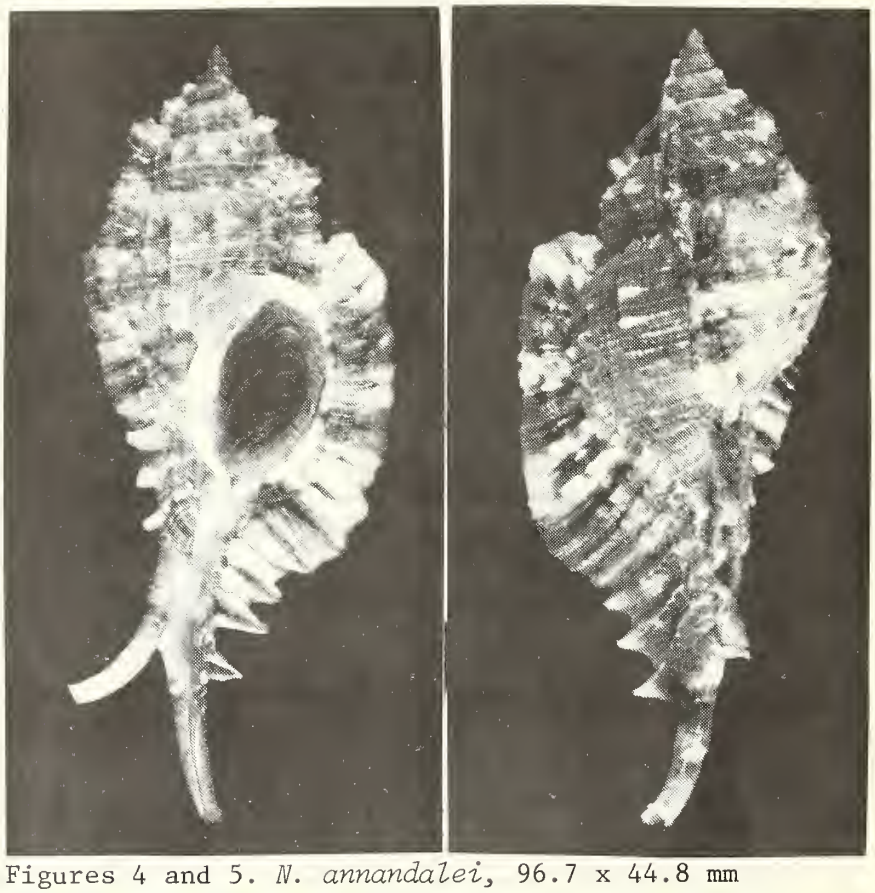
Mature specimens of *N. annandalei* have approximately eight moderately convex postnuclear whorls, usually with three weak to strong costae on the body whorl and a double row of nodes on the shoulder; strongly noded specimens giving the appearance of having more costae. The shell of *N. annandalei* has a long body whorl relative

to the spire, retaining its delicate appearance even at 100 mm length. It has a long, recurved canal and a medium-large ovate aperture. All varices have a fluted flange most prominent at the base of the body whorl and canal (Figures 4 and 5). The body whorl is encircled by extremely fine, delicately nodose spiral cords, the stronger cords sometimes forming heavier knobs where they cross the costae, and others having only the double row of nodes at the shoulder. The entire shell is transversely, microscopically sculptured (Figure 6), giving the shell a sandpaper-like texture referred to by Preston as "almost scabrous."

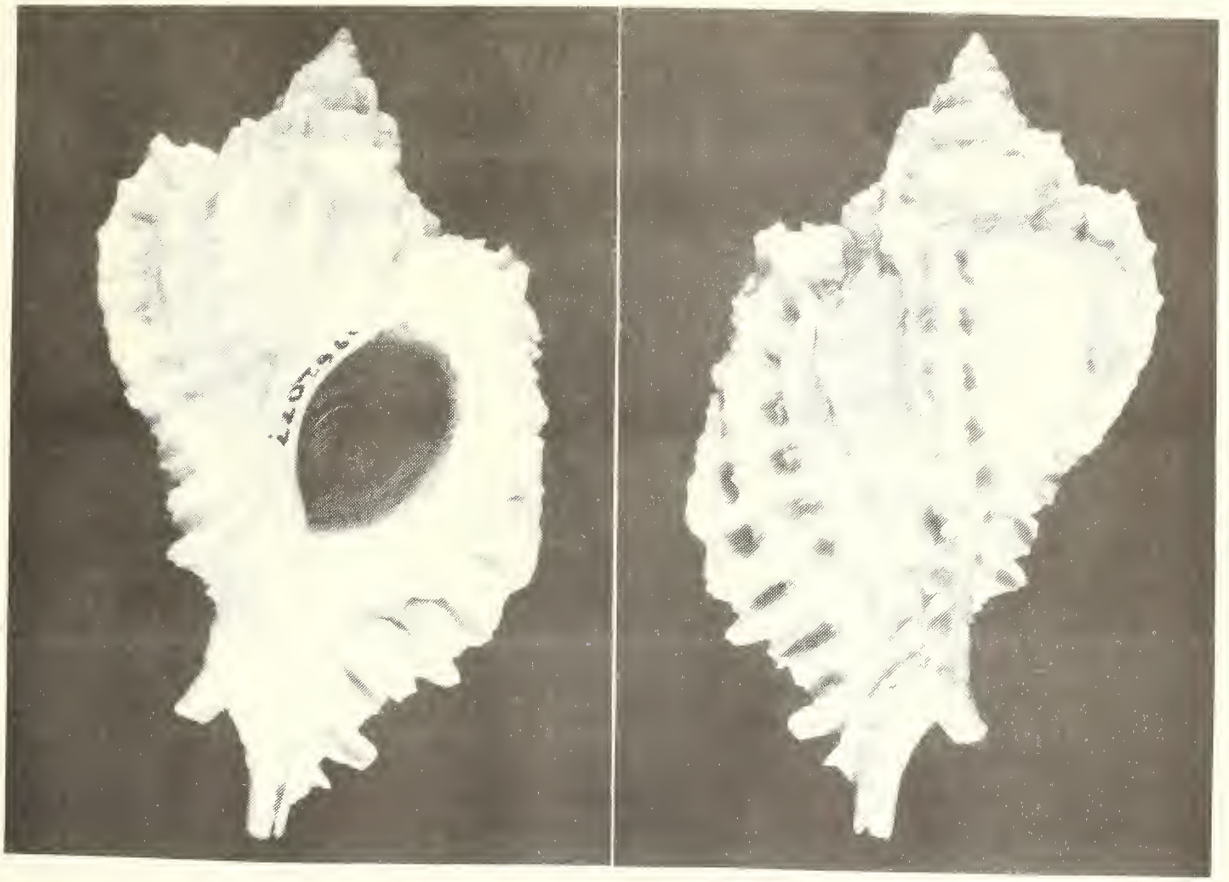
Figure 3. *N. annandalei.* Camera lucida drawing of the protoconch of a 19.9 mm L specimen (SDNHM 92119) showing 3½ rounded whorls. Locality: Philippines Donor: Loyal J. Bibbey



Figures 1 and 2. *Naquetia annandalei* (Preston, 1910). Holotype (ZSI Reg'd. nom. 4708/1, 76.5mm L (per Preston) Type locality: "Off Gopalpore," Bay of Bengal Photos courtesy of Dr. N.V. Subba Rao



Figures 4 and 5. *N. annandalei,* 96.7 x 44.8 mm Glass and Foster collection 84-237. Collected by Philippine fishermen and sold in the markets at Cebu, Philippine Islands.



Figures 7 and 8. *Naquetia barclayi* (Reeve, 1857), lectotype [B.M.(N.H.) reg. no. 196277], 83.1 x ± 51 mm. Type locality: St. Brandon Shoal, off Mauritius (7) apertural view (8) dorsal view. Courtesy Trustees of the British Museum (N.H.)

with a robust and globose form. Of the specimens of *N. annandalei* examined from 19.9 to 104.9 mm L, all retained a slender delicate appearance as in Figures 4 and 5. However the coloring of both species is similar, and examination of the micro-sculpture of the type of *N. barclayi* (Figure 9) shows considerable similarity to that of *N. annandalei* (Figure 6). Camera lucida drawings of the anal sulci of *N. barclayi* and *N. annandalei* (Figures 10 and 11) are included to show their similarity. The sulcus in each is deeply notched and bracketed by a single large node on the columellar side and a paired node on the apertural side.

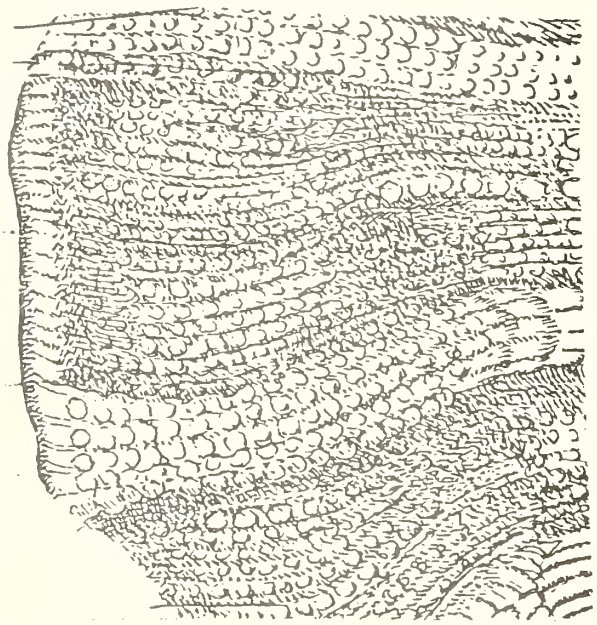


Figure 9. *N. barclayi*. Camera lucida drawing of detail of sculpture at apertural edge of body whorl of lectotype.

Concluding Remarks

Although we have studied many specimens of *N. annandalei*, we have not seen any with the broad globose body whorl and heavy appearance of the lectotype of *N. barclayi*, and we therefore continue to consider them as separate taxa. Future collecting may very well reveal intergrading populations.

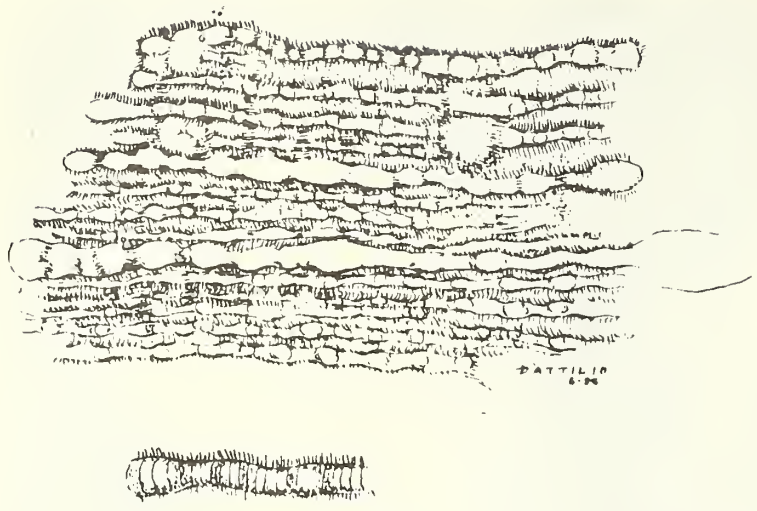


Figure 6. *Naquetia annandalei*, camera lucida drawing of detail of spiral sculpture on body whorl of specimen shown in Figures 4 and 5.

Naquetia barclayi (Reeve, 1857)

Murex barclayi Reeve. Proc. Zool. Soc. London, p. 207, pl. 38, figs. 2a, 2b
1969. *Murex barclayi* Reeve. Dance, Rare Shells, p. 74, pl. 9, figa. a
1973. *Murex barclayi* Reeve. Harasewych, Hawaiian Shell News 21(4):4, figs. 1,2
1976. *Naquetia barclayi* (Reeve). Fair, The Murex Book, p. 24, pl. 14, fig. 172
1982. *Naquetia barclayi* (Reeve). Abbott & Dance, Compendium of Seashells, p. 133 (left bottom)
1985. *Chicoreus (Naquetia) barclayi* (Reeve). Houart, Xenophora 29:9, fig. 4

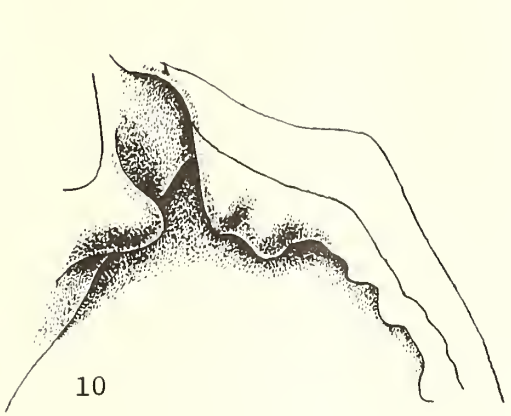
The original description copied from Proc. Zool. Soc. London for 1857 follows:

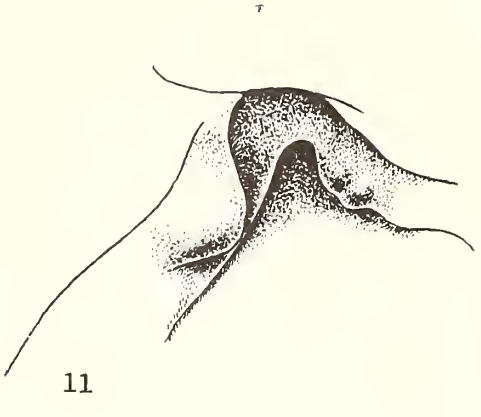
"5. *Murex barclayi. Mur. testa trigono-ovata, canali breviuscula recurva; spira brevi, acuminata; anfractibus transversim tenuissime serrato-liratis et striatis, longitudinaliter trivaricosis, varicibus basin versus conspicue fimbriato-laminatis, interstitiis triseriatim tuberculatis et nodatis; rosaceo-alba, purpurascente et ferrugineo-carneo tincta et maculata.*
Long. 3¼ poll., lat. 1-3/4 poll.
Hab. St. Brandon Shoal, near Mauritius (thrown on shore after a hurricane)
This very beautiful species is very closely allied to a shell in Mr. Cuming's collection, which has been attributed by Mr. Sowerby, in his 'Conchological Illustrations,' to *M. trigonulus*, Lamarck. It is also as closely allied to a shell in the collection of the King of Denmark, which was figured for that species by myself in the 'Conchologia Iconica.' From both, however, it is sufficiently distinct to establish its claim as a new species."

The British Museum (Natural History) syntype [B.M.(N.H.) reg. no. 196277] of *Murex barclayi* (Figures 7 and 8), here designated lectotype, is the same colorful specimen figured by Reeve (1857:209, figs. 2a and 2b). A second syntype collected by Sir David Barclay at the same time (Dance, 1969) but not mentioned in Reeve (1857), was figured by Harasewych (1973). This specimen, housed in the Department of Zoology National Museum of Wales (Trew and Oliver [Rec'd, 1981]) [N.M.W. 155.158.15] is the poorer of the two and is here designated a paralectotype. No further specimens of *Naquetia barclayi* have been reported from the type locality and none have been collected elsewhere.

Discussion

Naquetia annandalei has often been synonymized with *N. barclayi* (Reeve, 1857). To better understand the relationship between *N. annandalei* and *N. barclayi* we borrowed the lectotype of *N. barclayi* from the British Museum (N.H.) reg. no. 196277 (Figures 7 and 8). It differs from *N. annandalei* in its more prominent sculpture





Figures 10 and 11. Detail drawings of anal sulci in *N. barclayi* and *N. annandalei* (10) *N. barclayi*, lectotype (11) *N. annandalei*, specimen shown in Figures 4 and 5

ACKNOWLEDGMENTS

Dr. N.V. Subba Rao of the Zoological Survey of India kindly provided the photographs of the type of *Naquetia annandalei*. The trustees of the British Museum (N.H.) and Ms. Kathie Way generously made the lectotype of *Naquetia barclayi* available to us for study and photography.

Study specimens of *N. annandalei* were made available to us by the following friends: Mr. Charles Glass and Mr. Robert Foster of Santa Barbara, California; Mr. Donald Pisor of San Diego, California; and Mr. Loyal J. Bibbey of Imperial Beach, California.

Mr. David K. Mulliner photographed the lectotype of *N. barclayi* and a specimen of *N. annandalei*. Mrs. Theo Fusby typed the preliminary and final drafts of the manuscript.

THE FESTIVUS

A publication of the San Diego Shell Club

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PROGRAM

MOLLUSCAN HABITATS IN SAN FELIPE, BAJA CALIFORNIA, MEXICO

Joyce Gemmell, longtime Club member who lived in San Felipe for eleven years will give a slide presentation on the beach areas around San Felipe and the mollusks found there. She will also show some "This is how it used to be" slides of the San Felipe area.

Meeting date: 16 July

CONTENTS

CLUB NEWS

FOR YOUR INFORMATION

1) The Club's annual Christmas party will be held on Saturday evening, December 5 at the Admiral Kidd Club. Mark your calendars. There will be further details later.

2) The Club's annual September party needs a garden! If you are willing to host this outdoor party, please contact either Wes Farmer (576-2143) or Bill Romer (278-2389).

3) The book The Living Cowries has not yet been returned to the Club library. Since no loan card was signed, please contact Margaret Mulliner (488-2701) if you have the book.

NEW MEMBERS

Chaney, Barbara, 1633 Posilipo Lane, Santa Barbara, CA 93108
Wu, Shi-Kuei, University of Colorado, Campus Box 315, Boulder, CO 80309

CHANGES OF ADDRESS

Everson, Gene, 500 Nottingham Parkway, Louisville,KY 40222
Farmer, Wesley, 3591 Ruffin Road #226, San Diego, CA 92116, 576-2143

TOO LATE FOR THE ROSTER

Squires, Richard L., 26800 Espuma Drive, Saugus, CA 91350

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - JUNE 18, 1987

Philip Faulconer gave an excellent presentation on diving the Northern Cook Islands. The slide presentation was accompanied by a soundtrack of music played by the islanders. We also learned of the Faulconer's adventure with a not so gracious captain on their trip though the islands.

After the break, the slides from the Club Christmas party and Auction were shown by Dave Mulliner followed by another short slide presentation by the Faulconers. The entire meeting was enjoyed by an unusually large audience.

Once again outstanding bills from the Club auction should be given or sent to Margaret Mulliner. The Botanical Garden Foundation's annual plant sale was a success, thanks to all those who donated plants.

The door prize was won by the Faulconers and the cookies were provided by the Mulliners.

Ian Hamilton, Acting Recording Secretary

BACK ISSUES OF THE FESTIVUS ARE AVAILABLE

1985-1987-- $10.00 per year
1983-1984-- $8.00 per year
1971-1982-- $6.00 per year (1971, 1972, 1977, 1978 have some issues xeroxed)

1978 includes George E. Radwin Memorial Issue, 15 pp., 20 figs., includes bibliography of work of G.E. Radwin
includes A Catalogue of Coralliophilidae by A. D'Attilio, pp. 69-85 (xerox)

1980 includes Seastar Predation on Mollusks in the San Felipe Bay Area by Gemmell, Hertz & Myers, 32 pp., 51 figs.

1983 Supplement: Illustration of the types named by S.S. Berry in his "Leaflets in Malacology." by C.M. Hertz, 42 pp., 92 figs. $6.00 domestic, $6.50 overseas surface mail

1986 Supplement: A faunal study of the bivalves of San Felipe and Environs... by Gemmell, Myers & Hertz, 72 pp., 79 figs. + maps, $8.75 domestic, $9.25 overseas surface mail

MORPHOLOGY OF THE SPINE IN TWO CLOSELY RELATED FAVARTIA SPECIES: FAVARTIA (MUREXIELLA) PELEPILI (D'ATTILIO & BERTSCH, 1980) AND F. (M.) JUDITHAE (D'ATTILIO & BERTSCH, 1980)

BY

ANTHONY D'ATTILIO

Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

The proliferation of newly described species of *Favartia s.s.* and its subgenus *Murexiella* in recent years has made it necessary to study the shell characters revealed under high magnification as well as the gross morphology. The illustrations provided herein were made using a camera lucida attachment to a Wild microscope.

The two species under consideration here were proposed as *Favartia pelepili* and *F. judithae* both of D'Attilio and Bertsch, 1980. Ponder (1972) submerged the genus *Murexiella* Clench & Perez Farfante, 1945 as a subgenus of *Favartia*. I am following Ponder in placing these species in *Favartia* subgenus *Murexiella*. As stated in D'Attilio and Bertsch (1980), species that have long spines connected by varical webbing fall into *Murexiella* and the spine formation of these two species is distinctive, permitting the use of this parameter for species identification.

In *F. (M.) judithae* (Figure 1a-b) the inward side of the spines is folded but not closed and the edges of both sides of the spines are strongly and regularly undulate (Figure 2). There are 2 to 3 tiers of spines forming a flange on the varical swelling. The major spines are broad and intercalated with smaller versions of the same character. The uppermost tier of spines is strongly recurved.

F. (M.) pelepili (Figure 3a-c) has a varical flange which differs from *F. (M.) judithae* in that the forward side of the spines may be open or closed but not undulate (Figure 4a-b); they are longer, more widely spaced and distally branching like antlers. The tiered effect of the flange is less prominent since the two lower tiers of spines are more poorly developed than in *F. (M.) judithae*. In *F. (M.) pelepili* the shoulder spines may be very prominently elongated diagonally and posteriorly to the axis as seen in Figure 3c.

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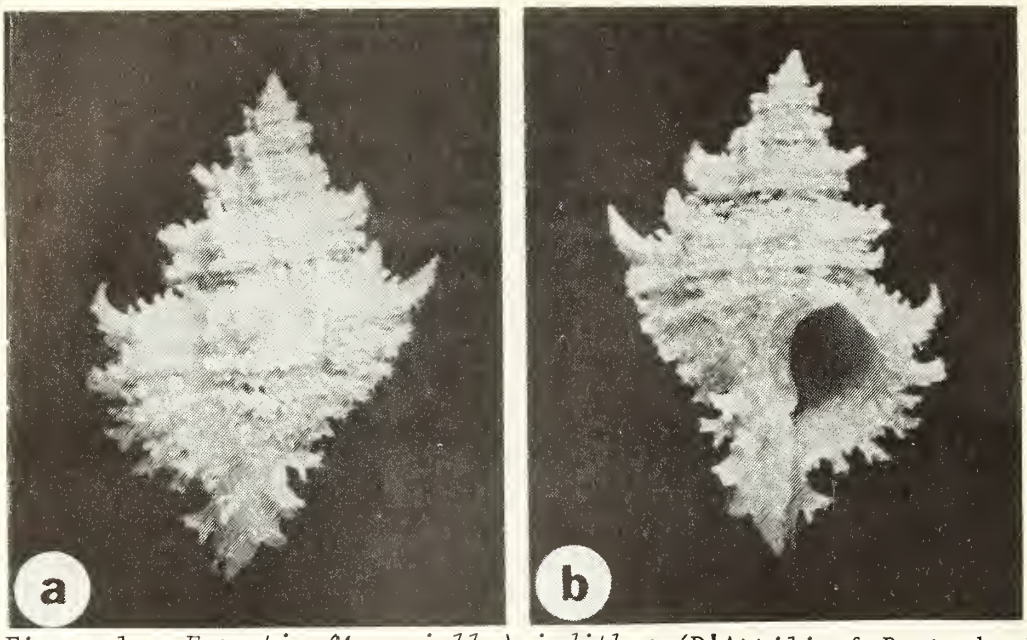

Figure 1. *Favartia (Murexiella) judithae* (D'Attilio & Bertsch, 1980) Holotype (SDNHM 88143 [T.S. 521]. Length: 25 mm. (a) dorsal view (b) apertural view. From D'Attilio & Bertsch (1980).

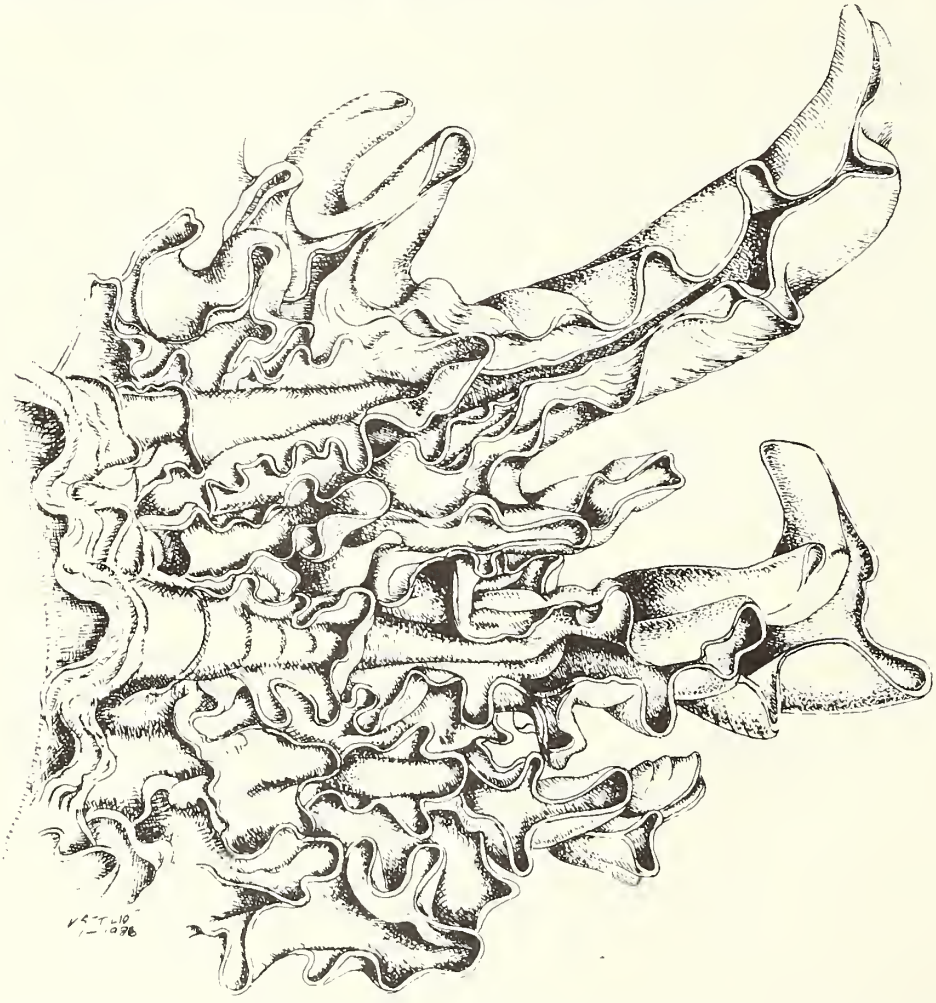

Figure 2. *F. (M.) judithae*, detail of apertural varix of holotype showing the undulate nature of the spines.

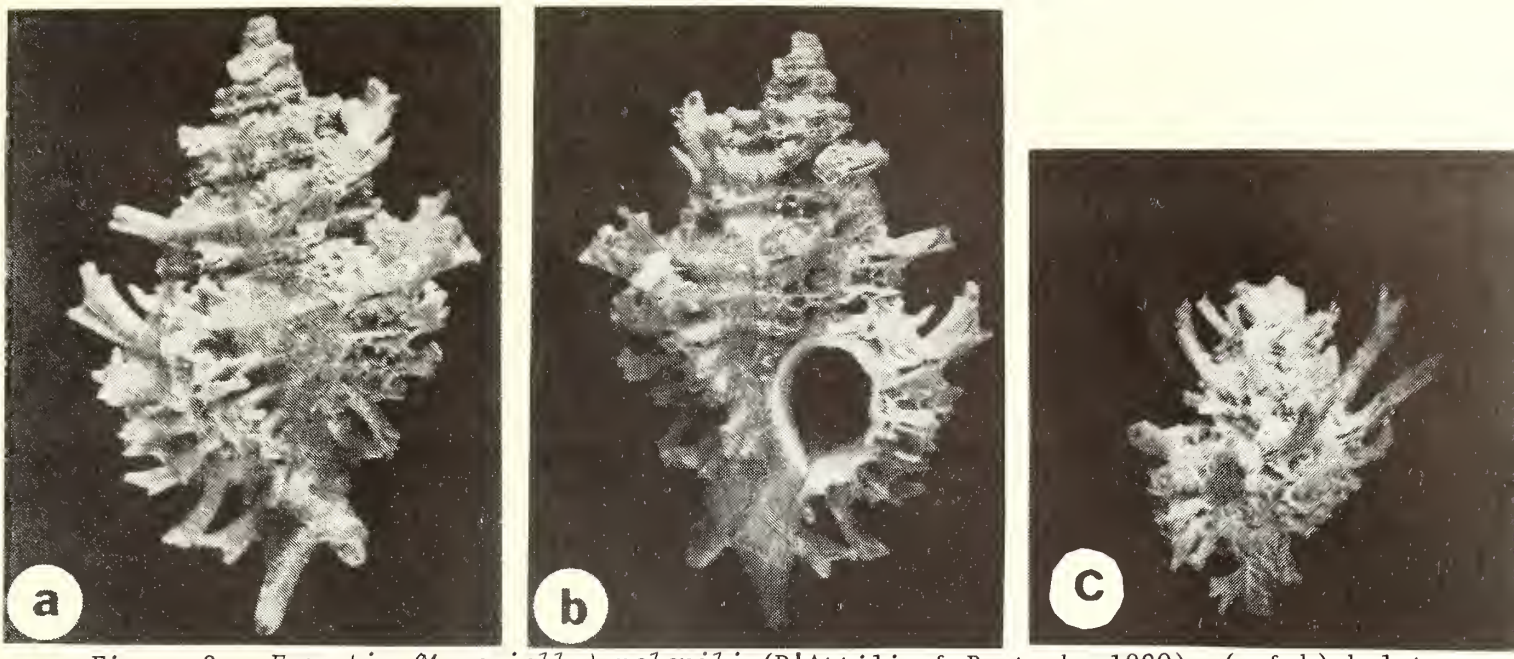

Figure 3. *Favartia (Murexiella) pelepili* (D'Attilio & Bertsch, 1980), (a & b) holotype, (SDNHM 91336 [T.S. 519]), dorsal and apertural views. Length: 31 mm (c) paratype (SDNHM 91337 [T.S. 520]), dorsal view. Length: 18 mm

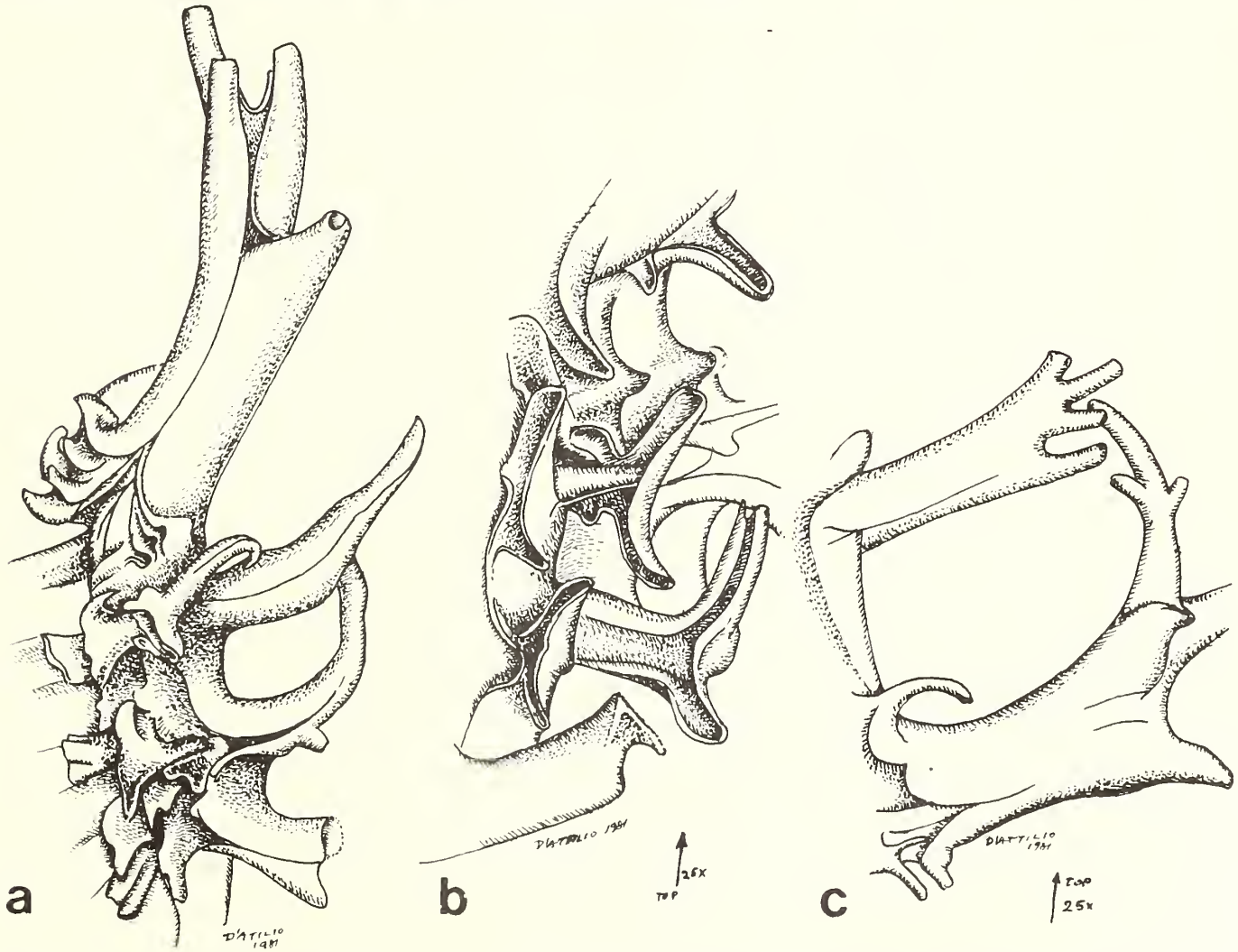

Figure 4. *F. (M.) pelepili*, details of varical flange and spines of holotype. (a) long widely spaced spines of uppermost tier (b) lower tiers of spines (c) elongate spines, branched distally, diagonal and posterior to the axis

THE GENUS OREOHELIX (PULMONATA: OREOHELICIDAE) IN TWO WESTERN CANYONS OF THE BIG HORN MOUNTAINS, WYOMING

BY

DOROTHY E. BEETLE

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Oreohelix was collected by the author in July of 1956, 1957 and 1958 in Ten Sleep and Shell Canyons during a survey of mollusks inhabiting the Big Horn Mountains. These canyons and their tributaries were collected in earlier years by Don W. Walker and Junius Henderson. *O. pygmaea* was described by H.A. Pilsbry from material collected by Walker in White Creek, a tributary of Shell Canyon. *O. pygmaea maculata* and *O. subrudis obscura* were collected and described by Henderson from shells found in Shell and White Creek Canyons. *O. yavapai extremitatis* was collected by both Walker and Henderson in several locations from Shell Canyon. In all, eight species and subspecies or forms have been described from or reported as inhabiting the canyons.

A study of the banding patterns, coloration and height/diameter ratio of *Oreohelix* colonies collected in 1985 and previously, including material in the University of Colorado Museum at Boulder, suggested some of the names should be placed in synonymy.

Description of the Study Area

The Big Horn Mountains curve through north central Wyoming in a north to south direction, gradually decreasing in height at either end. The range averages 40 to 60 miles in width and rises to high peaks of which Cloud's Peak is the tallest at an elevation of 13,165 feet. The high country has extensive exposures of granitic rock where glaciation and erosion have removed the sedimentary overlay. For more than 200 miles both the eastern and western slopes of the Big Horns are faced by predominantly sedimentary escarpments that rise abruptly over 1,000 feet. The escarpments have been carved by creeks into a myriad of short steep canyons, particularly on the western side. Two major western canyons are Ten Sleep Canyon in Washakie County and Shell Canyon in Big Horn County.

Ten Sleep Canyon rises from the Big Horn Basin five miles east of Ten Sleep. From the entrance of the canyon to its head, the elevation rises from 4,500 to 7,500 feet. Its steep slopes and vertical cliffs have been cut by Ten Sleep Creek, a narrow precipitous watercourse. U.S. Highway 16 winds up the canyon some 10 miles.

Shell Canyon is approximately 40 miles north of Ten Sleep Canyon. Like Ten Sleep Canyon, it rises from the Big Horn Basin. Shell Creek drops through the canyon from a height of approximately 7,500 feet at its junction with Cabin Creek. Above this point Shell Creek, like Ten Sleep Creek, becomes a rather placid mountain stream draining small lakes and swampy areas in the high country. U.S. Highway 14 winds along the canyon wall.

The two canyons are similar in topography, geological formation and plant associations. They receive little moisture in the form of rain or snow: Ten Sleep Canyon averages slightly over 8 inches a year and Shell Canyon 6.5 inches. Extremes of temperature occur: summer days can be hot, the nights cool and winters may be severe.

Where it is possible for plants to gain a foothold along the narrow creek banks, there are sparse stands of narrow leaf cottonwood (*Populus angustifolia*) and juniper (*Juniperus virginiana scopularum*). Where the bottom widens, as at the junction of Leigh and Ten Sleep Canyons, river birch (*Betula occidentalis*), chokecherry (*Prunus virginiana*), Rocky Mountain maple (*Acer glabrum*), rose (*Rosa* sp) and service berry (*Amelanchier alnifolia*) appear.

The steep slopes of the canyon have scattered mountain mahogany *(Cercocarpus montanus)*, squawbush *(Rhus trilobata)*, big sagebrush *(Artemesia tridentata)*, as well as juniper, yellow pine *(Pinus ponderosa)* and white pine *(Pinus flexilis)*. The latter, with Douglas fir *(Pseudotsuga menziesii)*, covers shaded and north facing slopes. An occasional spring or seep welling from the cliff base is surrounded by aspen *(Populus tremuloides)*. Aspen groves and moist meadows grow at the head of each canyon.

Materials and Methods

The last week of May 1985, Stephan L. Welty and I collected *Oreohelix* in Ten Sleep and Shell Canyons from their mouths at approximately 4,500 feet to the top of the escarpment at some 7,500 feet. Populations were sampled at creek side, on the steep slopes, at the base of cliffs and in aspen groves at the canyon heads.

Oreohelix was found in isolated colonies wherever suitable habitat existed. Rock faces, talus slopes, single large boulders perched on the slopes, a large fallen cottonwood tree caught two feet above the ground, sparse leaf litter along the creek, groves surrounding springs, all provided suitable habitat. Mollusks associated with *Oreohelix*, vegetation, rock type, exposure and elevation were noted for each colony.

The height and diameter of each shell was measured by vernier calipers and the height/diameter (H/D) ratio and mean of the diameters per colony calculated.

The banding pattern of 1,784 individuals from 54 colonies, including dead shells in the immediate vicinity of a colony, was recorded. The bands were numbered 1-8. Band 1, when present, is a wide light brown band immediately below the suture. Band 2 lies above the periphery and Band 3 at or just below the periphery. Bands 4-8 occur on the base of the shell and may be absent, faint, interrupted or fused. See Figure 1.

A description of the species collected and relevant synonymy is provided. Details of banding pattern, measurement and habitat are given.

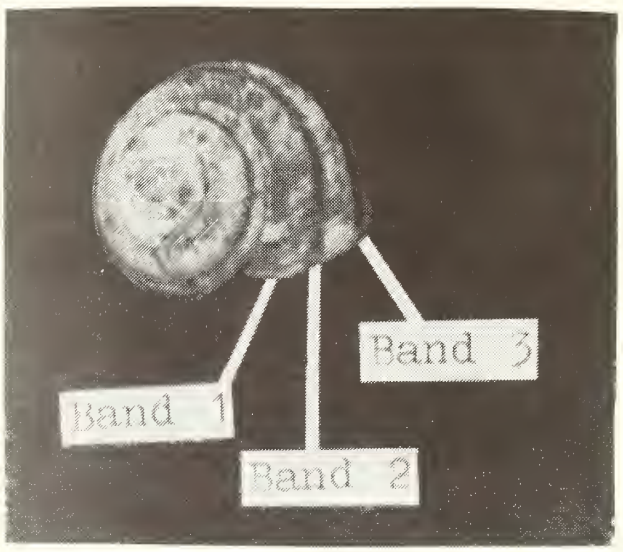

Figure 1. Banding pattern in *Oreohelix*

Descriptions of the Species

Oreohelix pygmaea Pilsbry, 1913 (Figure 2)

Oreohelix pygmaea Pilsbry, 1913:52, pl. 3, figs. 10-12
O. strigosa berryi Pilsbry, 1915:48
O. pygmaea maculata Henderson, 1918:45-47

The shell of *Oreohelix pygmaea* is small, high spired, with convex whorls sculptured with irregular axial striae and some impressed spiral striae. Embryonic whorls are dark brown and finely striated. Shells of 4½-5½ whorls had diameters of 8.4-15.0 mm and heights of 5.8-14.1 mm. Tbe umbilicus is deep and only 1/8-1/6 the shell diameter.

Oreohelix strigosa berryi Pilsbry, 1915, represents the smallest shells of *O. pygmaea*. Collections from Johnson County, Wyoming near the Tyrell Ranger Station and material in the U.C. Museum from Yellowstone National Park had diameters of 7.6-9.5 mm and heights of

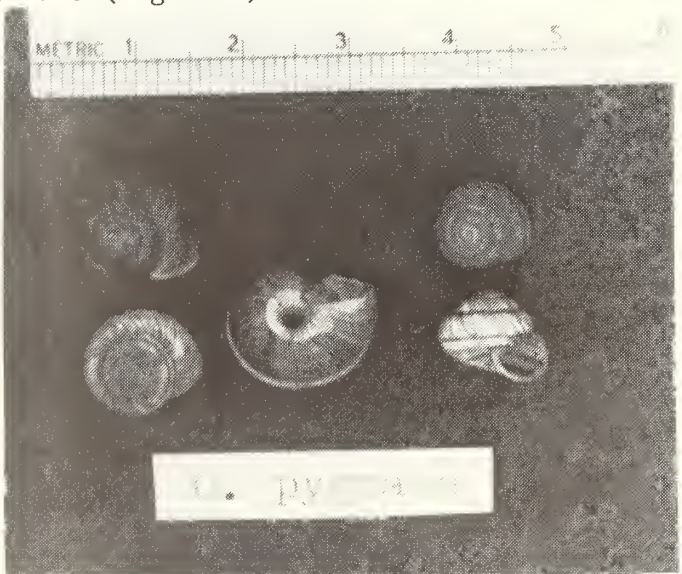

Figure 2. *Oreohelix pygmaea* Pilsbry, 1913

4.9-7.4 mm. Other than size, the shells are as in the species.

Oreohelix pygmaea maculata Henderson, 1918, is merely a dark phase of *O. pygmaea*.

Oreohelix subrudis (Pfeiffer *in* Reeve, 1854) (Figure 3)

Helix subrudis Pfeiffer *in* Reeve, 1854: pl. 198, figs. 1390a,b
Oreohelix subrudis obscura Henderson, 1918:46

Oreohelix subrudis is a high spired shell with moderately convex rather roughly striate whorls; embryonic whorls dark brown. Ground color of the shell is whitish, usually with two brown bands. Umbilicus is nearly 1/3 the shell diameter. Diameter of shells with 4½-5½ whorls was 13.0-21.7 mm; heights were 8.2-16.8 mm.

Oreohelix subrudis obscura Henderson, 1918, is a dark phase of the species.

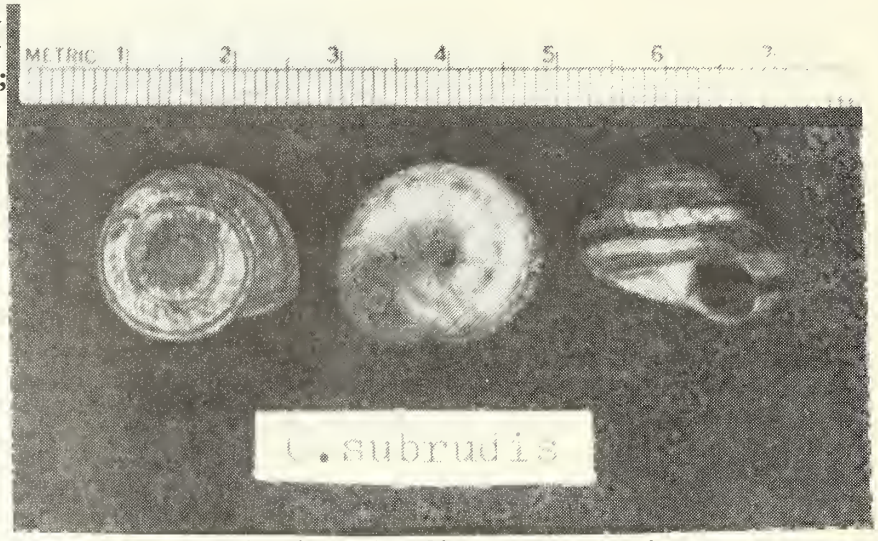

Figure 3. *Oreohelix subrudis* (Pfeiffer *in* Reeve, 1854)

Oreohelix yavapai extremitatis Pilsbry & Ferriss, 1911 (Figure 4)

Oreohelix yavapai extremitatis Pilsbry & Ferriss, 1911:184, pl. 12, figs. 15-21
O. yavapai magnicornu Pilsbry, 1916:141
O. carinifera Beetle, 1961:96; *non O. carinifera* Pilsbry, 1912:89

Oreohelix yavapai extremitatis is a low spired shell with at least the first half of the body whorl acutely carinate. Embryonic whorls are a light tan flesh color; subsequent whorls have a pale tan luster. Diameters of shells with 4½-5½ whorls were 12.7-20.8 mm and heights were 5.1-12.0 mm. The umbilicus is wide, 1/4-1/3 the shell diameter.

Shells with the greatest diameter generally have the last half of the body whorl rounded to the aperture. Those attributed to *O. yavapai magnicornu* Pilsbry, 1916, are represented by these large robust shells with convex whorls. *O. carinifera* Beetle, 1961 is a misidentification based on strongly carinate shells.

Figure 4. *Oreohelix yavapai extremitatis* Pilsbry & Ferriss, 1911

Results

1. Banding. Table 1 summarizes the banding pattern of the three species. One or two narrow brown bands on the upper surface of the shell is a prevalent pattern. The

base often lacks bands but may display multiple fine lines or a single wide band.

Of the 784 shells of *Oreohelix pygmaea* examined, the embryonic whorls were dark brown, except for 29 unbanded ones; 28 of these were opaque white and one entirely a pale yellow. Most shells have bands 1-3. In the dark brown phase, the base is frequently a solid chocolate brown below band 3 to the umbilicus.

The embryonic whorls of 526 *Oreohelix subrudis* were brown except for 20 unbanded ones that were all white. Bands 2 and 3 are usually the darkest. Bands 4-8 are fine basal lines present in some specimens. No shells had the chocolate brown base seen in *O. pygmaea*. Of 19 colonies, 5 were exclusively dark brown shells; 5 a mix of all brown or white shells with varied banding patterns and 9 with only the whitish ground and various combinations of bands.

Shells of *Oreohelix yavapai extremitatis* are distinctive with embryonic whorls a tan flesh color and subsequent whorls with a pale tan luster. The banding pattern is quite uniform. Of 424 shells, only one had bands on the base. Band 3 is always the darkest when present. The shells are not invariably 2-banded. Fifty-nine shells, of a yellowish ground color, lacked bands entirely. Four colonies had some shells with flammulate streaking in addition to bands.

Table 1 shows that 37.37% of the shells of *Oreohelix pygmaea* with bands on the upper surface lacked basal bands and a nearly equal number, 36.48%, had basal bands. Of *O. subrudis*, 42.21% with bands on the upper surface lacked basal bands and 26.61% had bands. Except for one shell, all *O. yavapai extremitatis* lacked basal bands. *O. pygmaea* had a smaller percentage (8.5%) of all brown shells than *O. subrudis* (27.0%).

2. Height and Diameter Comparisons. Shells from 54 colonies of *Oreohelix* were examined. From this the height/diameter (H/D) ratio and mean diameter per colony were calculated. See Table 2.

In a few colonies the largest shells of *Oreohelix pygmaea* overlapped the diameter of small specimens of *O. subrudis*, but the former could be separated by the greater convexity of the whorls, the impressed spiral striae and small umbilicus. *O. subrudis* and *O. yavapai extremitatis* share nearly the same range of diameters, but the low spire, carinate whorls and shell luster of the latter separate them. Figure 5 shows that the three species can be separated by the H/D ratio clearly into distinct species.

Thirteen shells of *Oreohelix pygmaea* had apertures descending in front, resulting in abnormally high-spired shells. One shell of *O. subrudis* had a steeply descending front with the beginning of open coiling.

3. Habitat. In Wyoming, *Oreohelix pygmaea*, with one exception, has been found only in the Big Horn Mountains. It occupies some habitats favored by *O. subrudis*. It was found alive at 10 stations at the base of sedimentary cliffs, in talus and on the steep slopes, primarily under juniper, squawbush and mountain mahogany. It occurred in cottonwood along the river four times. It was present six times in more moist situations of aspen or willow groves, and once under conifers and shrubs along Leigh Creek.

Oreohelix subrudis is the most common species in the study area and, indeed, in Wyoming. It can be found along river banks, both in sparse cottonwood stands or in deep humus of deciduous trees, in aspen, mixed coniferous woods, under sagebrush and other shrubs, on steep slopes under talus and at the base of cliffs. Among 19 colonies, 10 occurred on the steep slopes, in talus and up to the base of cliffs; three in cottonwoods at streamside and two in damp situations under shrubs and conifers and four in aspen.

Oreohelix yavapai extremitatis occupies the driest habitats of the three species. Thirteen colonies occurred at the base of cliffs, in talus or on the steep slopes. Only one colony was found in cottonwoods at the stream.

Discussion

Shells of some species of *Oreohelix* offer a puzzling variation as well as similarity. Live collected shells are often a dull opaque white with two brown bands, although bands may be lacking or accessory bands be present. *O. yavapai extremitatis*

Table 1. Banding patterns of three *Oreohelix* species. Bands 1-2 lie on upper surface of the whorl. Band 3 is at or just below the periphery. Bands 4-8 are on the base of the whorl.

Species	Total of shells and percent	No basal lines, 4-8				With basal lines, 4-8				Shell all brown	Base all brown below Band 3 to umbilicus		
		1-2-3	0-2-3	0-0-3	0-0-0	1-2-3	0-2-3	0-0-3	0-0-0		1-2-3	0-2-3	0-0-3
O. pygmaea	784	49	83	161	24	177	23	86	5	67	45	38	26
	100%	6.25	10.59	20.53	3.06	22.58	2.93	10.97	0.64	8.54	5.74	4.85	3.32
O. subrudis	526	155	60	7	20	132	8	0	2	142	0	0	0
	100%	29.47	11.41	1.33	3.8	25.09	1.52	0	0.38	27.0	0	0	0
O. yavapai extremitatis	424	32	245	87	59	0	1	0	0	0	0	0	0
	100%	7.55	57.78	20.52	13.91	0	0.24	0	0	0	0	0	0

Table 2. Dimensions of three *Oreohelix* species in Ten Sleep and Shell Canyons--all shells 4½ to 5½ whorls.

Species	Number of colonies	Range of individual shell heights in mm	Range of individual shell diameters in mm	Mean diameter per colony in mm	H/D ratio
O. pygmaea	21	5.8-14.1	8.4-15.0	9.4-13.1	0.67-0.81
O. subrudis	19	8.2-16.8	13.0-21.7	14.6-20.3	0.69-0.81
O. yavapai extremitatis	14	5.1-12.0	12.7-20.8	13.9-19.1	0.51-0.66

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Species	Total of shells and percent	No basal lines, 4-8				With basal lines, 4-8				Shell all brown	Base all brown below Band 3 to umbilicus		
		1-2-3	0-2-3	0-0-3	0-0-0	1-2-3	0-2-3	0-0-3	0-0-0		1-2-3	0-2-3	0-0-3
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	100%	6.25	10.59	20.53	3.06	22.58	2.93	10.97	0.64	8.54	5.74	4.85	3.32
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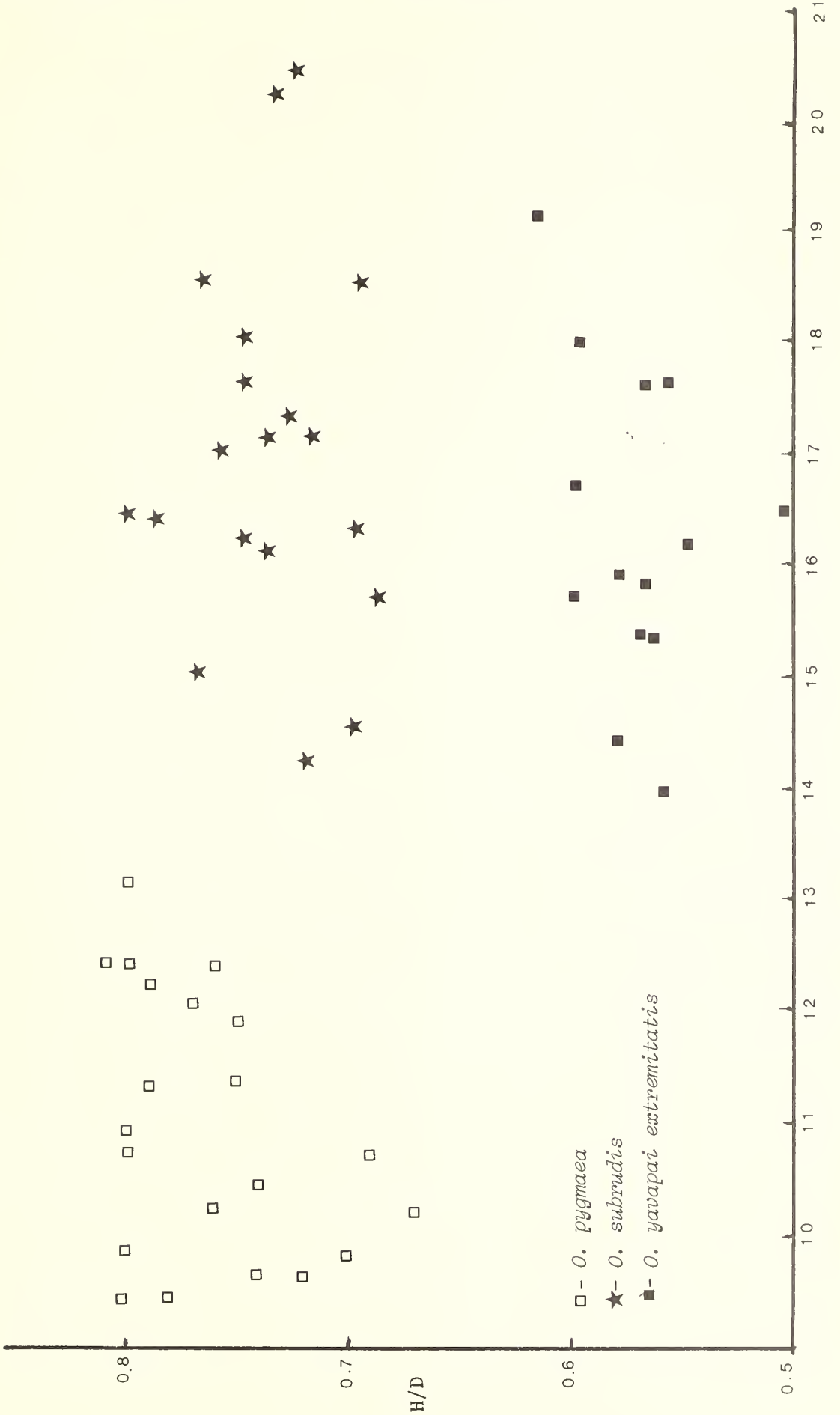

Figure 5. H/D versus shell diameter per colony

had the most uniform banding pattern of the three species. Banding is not regarded as a significant character. Albinos appeared as well as a melanistic phase.

Within a single colony, particularly of *Oreohelix pygmaea* and *O. subrudis*, shells can vary widely in diameter, height of spire, convexity of whorls and width of umbilicus. Extremes within a colony could be designated as different species or subspecies, yet a series of shells can be selected leading from one to the other. Each colony tended to have a prevalent appearance distinct from other colonies. Isolation of colonies would perpetuate differences. Individuals of one species were not found living in colonies with another species.

Variation in shell diameter and height between colonies of the same species probably indicates differences in environmental conditions of moisture and nutrition. Both height and diameter of shells were greater in comparatively moist situations than in exposed ones.

Summation of differences in the height/diameter ratio and shell characters of embryonic whorls, umbilicus and ornamentation indicates only three species (*Oreohelix pygmaea, O. subrudis* and *O. yavapai extremitatis*) occur in Ten Sleep and Shell Canyons. Other species, subspecies or forms previously reported are not distinguishable or are errors of identification.

Acknowledgments

Grateful thanks are extended to Dr. Shi-Kuei Wu for his comments in preparation of this paper and to Stephan L. Welty who assisted in fieldwork. Richard E. Pillmore, my husband, prepared Figure 5 and the photographs.

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A NOTE FROM R. TUCKER ABBOTT

Tom Stewart, an enthusiastic SCUBA diver in our Astronaut Trail Shell Club, has been collecting a new species of *Cyclotheca*, a genus new to the Atlantic, from the outer shells of living *Spondylus americanus*. It is a new species, but we hear that it is being described elsewhere. No males have been found, as yet. I have been working on its variation and anatomy.

THE FESTIVUS

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PROGRAM

RARE AND STRANGE COWRIE RADULAE

Hugh Bradner, Club member who has spent much time studying cowries and their radulae, will give this slide presentation.

A display of shells from Samoa will be presented by the new Mr. and Mrs. Adrian Valli who collected them on their recent honeymoon trip.

Slides of the recent WSM meeting taken by Dave Mulliner will also be shown.

A multiple shell drawing will follow the business meeting (see page 82).

Meeting date: 20 August 1987

CONTENTS

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 Carole 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 mollusk facilities belonging to the San Diego Natural History Museum, despite recent large benevolent gifts, the members of the Americal 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 Americal 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 malacological 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 the 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.

COMPARISONS BETWEEN JOHN EARLE'S EASTER ISLAND COWRIE AND CYPRAEA CERNICA SOWERBY, 1870

BY

HUGH BRADNER

Scripps Institution of Oceanography, La Jolla, California 92093

John Earle has reported finding a new *Cypraea* at SCUBA depths off Easter Island (Hawaiian Shell News 33:1, Jan. 1986). He notes that it has many affinities to *Cypraea cernica* and suggests that it may well turn out to be *C. cernica*. I report here on comparisons between 13 specimens of the Easter Island cowrie and several dozen ordinary *C. cernica* from La Reunion (See Table I).

C. cernica is not a common species; but it has been found in Hawaii, throughout the warm waters of the Central and Western Pacific, and in the Indian Ocean. However, it had not previously been reported from Easter Island. Local oceanic currents and large distances seem to have isolated that island so that the only other two species of *Cypraea* there (*C. caputdraconis* Melvill, 1888 and *C. englerti* Summers & Burgess, 1965) have evolved with very different features than their progenitors. Easter Island and its companion Sala y Gomez are recognized as regions of higher endemicity than any other island or island group in the Indo-Pacific region. (See Rehder, Harald A., 1980, "The Marine Mollusks of Easter Island (Isla de Pascua) and Sala y Gomez," Smiths. Contrib. Zool. 289, 167 pp., 14 pls.)

Earle's cowries cannot be separated from *C. cernica* by shell markings or shape: both have consistent small suffused white spots, white base and dorsal ring of discrete dark brown spots. Both have deltoid shape. The first Easter Island specimen that I examined had coarser teeth than one from La Reunion in the Indian Ocean. However, when all 13 were compared with 54 *C. cernica*, there was not a significant difference in tooth count. Figure 1 shows histograms of reduced labial tooth count for the two populations obtained by the method of Cernohorsky/Schilder (Walter O. Cernohorsky, MARINE SHELLS OF THE PACIFIC, Revised Ed., Pacific Publ. 1971, p. 62) Reduced counts, rather than acutal counts or optical comparison, are necessary because of the nonlinear relation between number of teeth and length of shell. The number of specimens from Easter Island is too small to justify a mathematical statement of likelihood, but it is evident that the two histograms do not indicate any clear difference in coarseness of teeth of the two populations. (For readers who are interested in statistics, relevant numbers are shown in Table 2.)

Earle notes that the mantles of his Easter Island specimens are mottled brown and cream, different from the Hawaiian *C. cernica*, but Burgess (Burgess, C.M., 1985, COWRIES OF THE WORLD, Seacomber Pub., 289 pp.) emphasizes that mantle color is of no specific importance for this species.

Scanning electron microscope photographs were made of radulae from three of the Easter Island specimens and two specimens of *C. cernica* from La Reunion. Photos of each specimen were taken from three different directions in order to look at details of tooth shapes. The first direction is looking directly down at the radula, as is customary for light microscope photos. The second direction is a low angle view, 60 degrees from vertical, looking directly into the teeth. The third direction is at this same low angle, but looking diagonally at about 45 degrees to the ribbon, so that tooth profiles can be studied. Representative pairs of views are shown in the figures. In Figure 2, Easter Island specimen S2 is seen to be similar to *C. cernica* specimen U11 except for, perhaps, elongated tips of the submarginal teeth. Figures 3 and 4 show that the apparent difference can be a result of the teeth being more erect in specimen S2. Figures 3 and 4 compare other specimens from Easter Island vs. *C. cernica*. I show only three of the possible pairings because all specimens

LABIAL TOOTH COUNTS VS SHELL LENGTH

Source	Length (mm)	Count	Reduced Count
Easter Island	33	16	15
	27	16	16
	28.5	18	18
	22.5	16	16
	32	21	20
	25.5	17	17
	29	18	18
	31	18	17
	31	19	18
	28	16	16
	24	17	17
	22	15	15
	22	15	15
Hawaii	23	16	16
(Beach)	31	19	18
	28	18	18
	28	18	18
	27	17	17
	23	16	16
	18	17	19
(Dredged, 30 fm)	21	15	16
	23	18	18
	21	18	19
	20	16	17
	20	15	16
(Dredged, 130 fm)	21	17	18
La Reunion	15	16	19
	15	16	19
	17	16	18
	20	19	20
	20	16	17
New Caledonia	28	19	19
	26	18	18
	33	23	21
	20	16	17
	26	15	15
New Caledonia (cont'd)	22	16	17
	24	17	17
	26	18	18
	22	16	17
	26	18	18
	20	16	17
Mauritius	26	18	18
	24	19	19
	23	17	17
	26	16	16
Japan	24	17	17
	29	19	18
(Rachijo Is.)	23	17	17
Okinawa	23	17	17
	29	21	21
	18	15	17
	26	19	19
	26	18	18
	31	19	18
	29	21	20
N.W. Australia	22	16	17
	23	17	17
	21	17	18
	21	15	16
	24	18	18
	22	16	17
Tuamotu	18	14	16
Noumea	24	16	16
Midway	27	17	17
Marshalls	31	18	18
Unknown	26	19	19

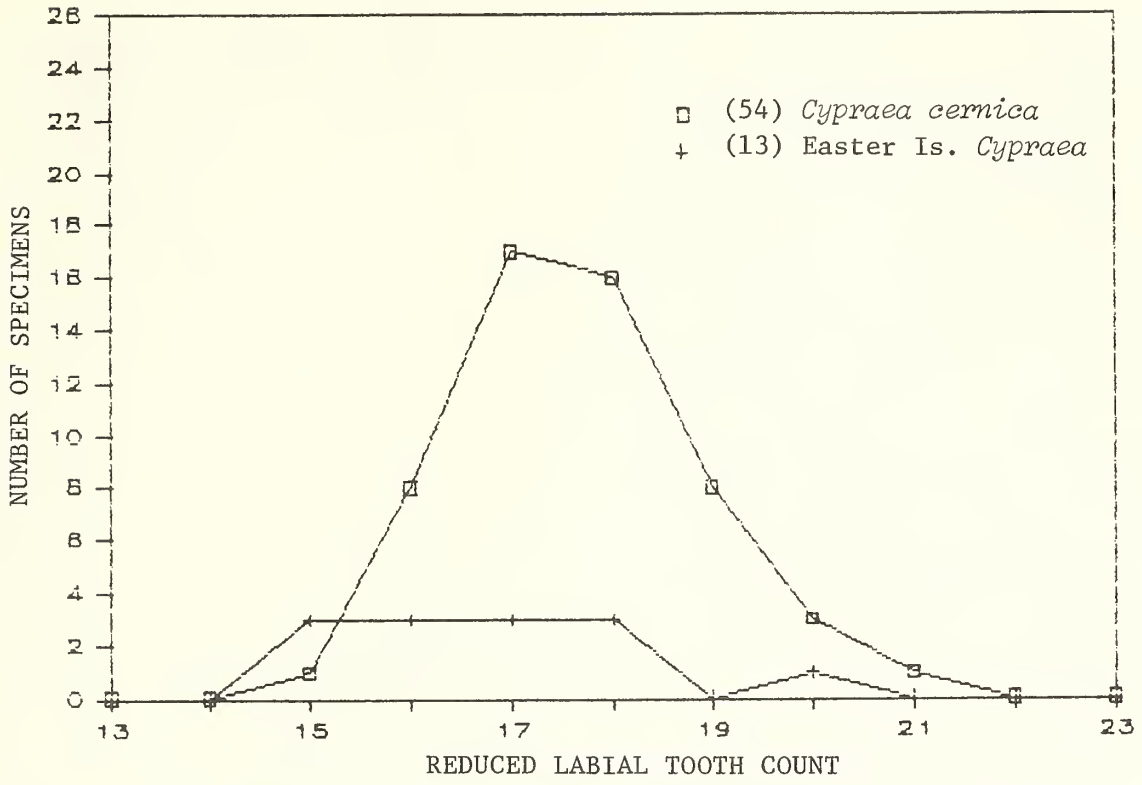


Fig. 1. Histograms of reduced labial tooth count

TABLE 2

STATISTICAL COMPARISON OF LABIAL TOOTH COUNTS

	Easter Is. specimens	*C. cernica* specimens
Mean	16.8	17.7
Std. Deviation	1.48	1.27
Variance	2.19	1.62
Median	17	18

were so similar. Judging from these 5 specimens, *C. cernica* should be classed among the cowrie species that have very little radular variation.

Unless detailed reports of anatomy, or optical microscope tooth studies of basal bracts, show consistent differences between the Easter Island cowrie and *C. cernica*, I conclude that they should not be considered different species. There remains the interesting question of why this species is so stable that it has remained unchanged, while the other two Easter Island cowries have evolved, during long isolation, into such different species.

I am particularly indebted to John Earle and Dr. Maurice Jay for furnishing specimens, and to Dr. C.M. Burgess for helping me make tooth counts on his collection of *C. cernica*. The work was supported by a grant from the Foundation For Ocean Research.

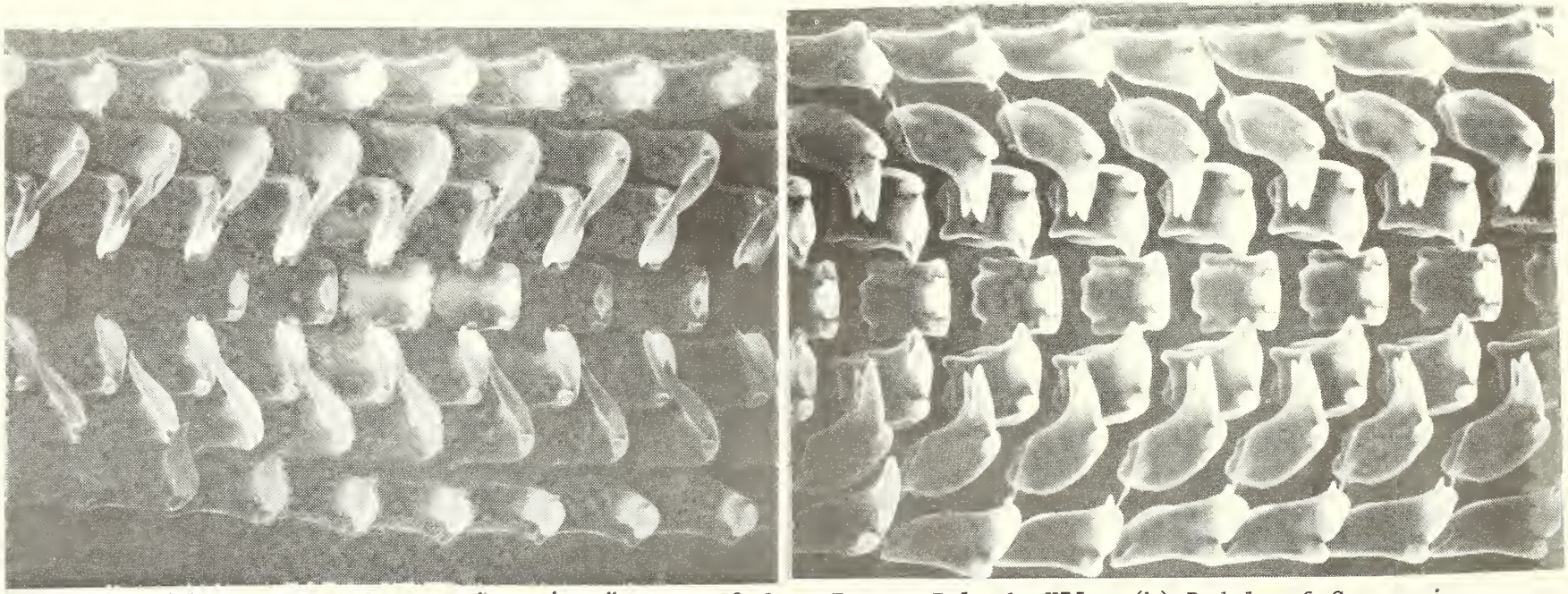


Figure 2. (a) Radula of *Cypraea "cernica,"* spec. S2 from Easter Island. X75. (b) Radula of *C. cernica*, spec. U11, from La Reunion. X200. SEM views of both specimens taken looking directly down at the radula.

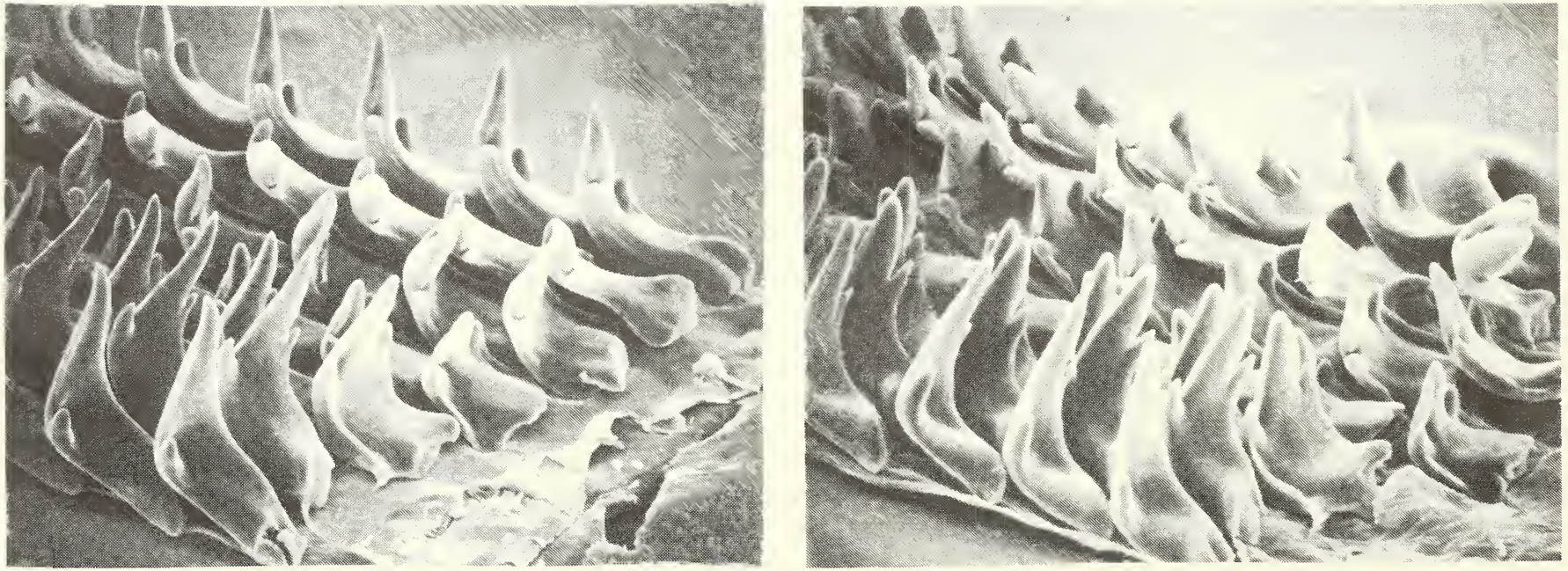
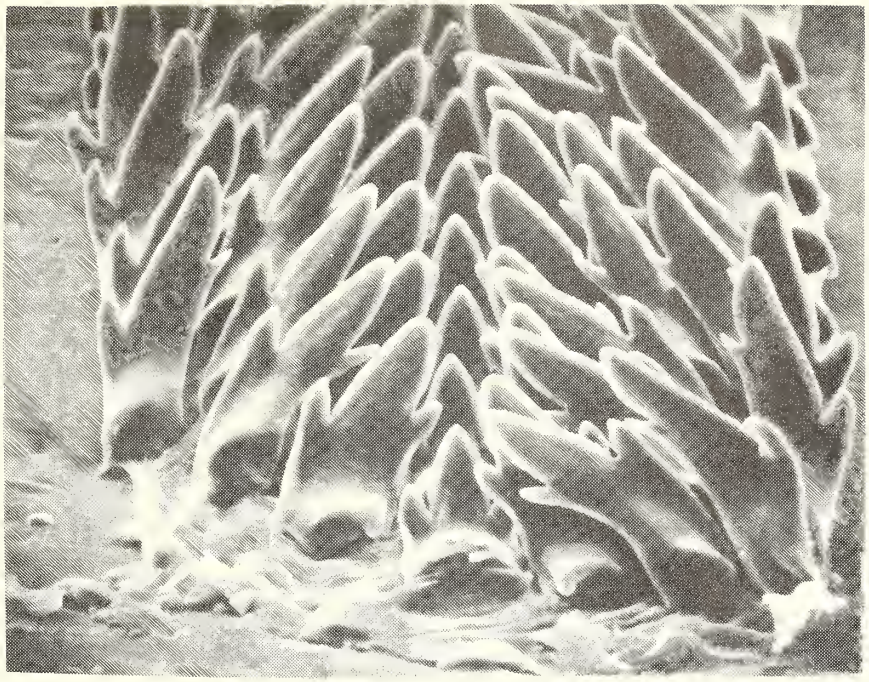


Figure 3. (a) Radula of *C. "cernica,"* spec. 1 from Easter Is., X150. (b) *C. cernica*, spec. T1 from La Reunion, X200.



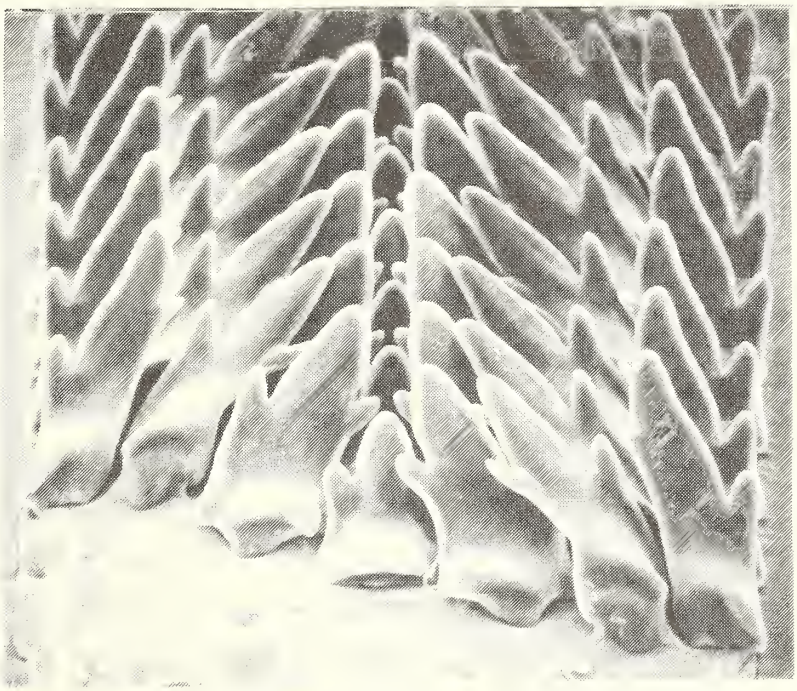


Figure 4. (a) *C. "cernica,"* spec. 2, from Easter Is., X250.
(b) *C. cernica,* spec. U11 from La Reunion. X250.

REPORTS ON TWO NATIONAL MEETINGS

FROM THE WSM MEETING

The Western Society of Malacologists (WSM) held their 20th annual meeting at San Diego State University, San Diego, California from June 21-25, 1987. More than 75 people attended portions of the technical sessions and/or social events. A wine and cheese reception hosted by the San Diego Shell Club started the meeting off on a very pleasant note and there was enough wine and cheese left over for additional servings the next two evenings. Following the first evening's reception was a viewing of slides brought by many of the attendees. Of particular interest were those brought by Joyce Gemmell showing the San Felipe, Baja California area in the 1960s and the road to Gonzaga Bay.

During the next three days, we were privileged to hear many excellent technical papers, review some beautifully prepared exhibits, and get a first hand review of a computer database on marine bivalve mollusks of the world. The latter prepared by Karl W. Flessa and David Jablonski illustrated rapid retrieval of information on geographic distribution of families and genera, number of genera and species within regions, faunal lists, etc. To me and many others who attended the WSM, the highlights of the technical meeting were the two symposia, i.e. (1) Northern Gulf of California: its Molluscan Distributions, Physical Oceanography and Geologic History of the Past 10-12 Million Years organized by Judith Terry Smith and (2) Molluscan Aquaculture organized by David L. Leighton. The latter was a completely new subject for WSM and I heard many comments on how impressive the presentations were and how it is a subject that WSM should continue to cover in future meetings.

The social events were equally impressive. An "Underwater Night" slide show was arranged by San Diego Shell Club member Richard Herrmann and featured slides taken by three prominent underwater photographers. The 1½ hour show was truly marvelous with beautiful slides of mollusks, fish, corals, kelp forest, etc. The third night was a very successful shell and book auction which raised approximately $1100., and the last night we had a well attended banquet at the San Diego Natural History Museum. The banquet started with a cocktail reception during which time attendees could visit the Departments of Marine Invertebrates and Paleontology. Those departments were specially opened so that attendees could talk to the curators and view the collections. The banquet followed with an exceptionally fine catered dinner and then we all went to the museum auditorium where we were introduced to the banquet speaker, Dr. George Somero, Scripps Institution of Oceanography, La Jolla, California. Dr. Somero gave a truly outstanding presentation, "Mollusks Which Live on Sulfide or Natural Gas," covering those mollusks that live in deep water vents as well as those that live in sewage outfalls. The slides of the deep water animals and a description of the latest theory on how they function in such depths were extremely interesting to all.

The meeting ended on the morning of June 25 with a field trip to Hubbs Research Institute arranged by David K. Mulliner. This included an excellent tour of the research laboratories and review of special projects. The meeting was so successful that we are all looking forward to the 1988 meeting .

Jules Hertz

FROM THE COA MEETING

One hundred sixty-five enthusiastic people attended the annual meeting of the COA (Conchologists of America) in St. Louis. There was something for everyone.

The program topics included shelling trips to Indonesia, Melanesia, Palau in Micronesia, Australia and New Zealand, and dredging trips to Panama as well as land shelling in Jamaica. Some of the titilating titles were: Color and Shapes of Shells, Opercula and Apertures, Shells on Stamps, Shells Grown in an Aquarium, What makes a Shell Rare, and Around the World in 80 Dives. The presentation of "My, What Big Teeth You Have or Radula Rhapsody" turned out not to be SEM pictures of radula

teeth but rather pictures of living mollusks using their radulae to obtain food.

Drawings for door prizes of books or specimen shells were held frequently throughout the sessions and there was an exchange of club pins and t-shirts. The Dealers' Bourse was very popular as well. Members gathered each morning for "shell talk" and a continental breakfast in the meeting room before the sessions began.

Outside activities included a prime rib dinner/dance cruise on The Mississippi, a walking tour of the St. Louis waterfront, a ride to the top (630 feet) of the Gateway Arch, and a bus tour of Union Station and the Botanical Gardens. The beautification and urban renewal of downtown St. Louis and the waterfront is impressive. The ornate Union Station has been converted to a hotel and enclosed mall.

The programs, the outside activities, the hospitality of St. Louis and the enthusiasm of the members combined to make a fine meeting

Billee L. Brown

CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - JULY 16, 1987

Joyce Gemmell, who lived in San Felipe for eleven years, presented the slide program, "Molluscan Habitats of San Felipe" giving members a view of the collecting areas from north of San Felipe to San Luis Gonzaga. She also gave information on shells found at particular beaches and had some excellent slides of the beach areas and the mollusks living there; some of the animals shown were spawning.

It was learned at the business meeting that the Club still does not have a garden for the annual September party. Please notify a board member if you can host this party.

The Christmas party will be held on December 5th at the Admiral Kidd Club at the Naval Training Center.

A suggestion was made and after discussion it was decided to have shell drawings at the August meeting. Members are requested to bring one or two duplicate shells from their collections These will then be "drawn" at the meeting in addition to the usual door prize.

A letter was read from Carole Hertz thanking the Club (and the arrangements committee) for the wine and cheese reception at the recent Western Society of Malacologists meeting.

After the business meeting Joyce Gemmell presented a second slide show of life in San Felipe in the 60s and early 70s with pictures of the town and the "road" south to Gonzaga.

Martin Kantor won the door prize and the cookies were provided by Ginny Herrmann and Larry Buck.

Ginny Herrmann, Acting Secretary

PUBLICATIONS RECEIVED

Bibliografia sobre moluscos como plaga en plantas de interes economico [Bibliography on mollusks as pests on plants of economic importance] by A.I. Calderon de Cerdas and A.M. Arias de Guerrero. 1985. Published by CIDIA, 78 pp., some entries with abstracts. To receive a copy, send to Federico Dao, IICA, Apdo. 55-2200 Coronado, Costa Rica.

THE CORALS - CAPTIVATING AND CHARMING GIFT FROM NEPTUNE, by Sadao Kosuge, 1987. Published by Institute of Malacology of Tokyo, Spec. Pub. no. 2, 175 pp., hardcover, 5x7, 16 color pages plus black & white illus., complete text and figure legends in Japanese.

MULTIPLE SHELL DRAWING AT THE AUGUST MEETING

The Club will have a multiple shell drawing at the August meeting. If you can, bring in one or two duplicate shells for the drawing. These shells, on display during the evening, will be drawn one by one at the end of the business meeting. Bill Romer will further explain the procedure at the time.

THE SEPTEMBER PARTY

The Club's annual September party, hopefully to be held on September 26th, is still "gardenless." This is the Club's annual "theme" party and is usually held outdoors in the host family's garden. Final arrangements must be made by the end of the August meeting in order that a theme, menu and entertainment can be set up. If you can host this party, please contact either Wes Farmer (576-2143), Bill Romer (278-2389) or Carole Hertz (277-6259).

NEW MEMBERS

La Grange, Linda and John, 533 N. Rios Ave., Solana Beach, CA 92075 755-7215
Reed, Wayne, 107 Murray St., Chula Vista, CA 92010 691-8766

CHANGE OF ADDRESS

Schuler, Martin, 746 Ash Ave., Chula Vista, CA 92010 426-8987

CROWN POINT SHELL CLUB ANNOUNCES ITS THIRD SHELL SHOW

The Crown Point Shell Club, Crown Point, Indiana, will hold its third shell show from September 18-20 at the Southlake Mall in Merrilville, Indiana. Judges will be Russell Jensen of the Delaware Museum (N.H.) and Gary Coovert of the Dayton Museum (N.H.) and Holly Coovert. Entry blanks for the show can be obtained by writing to Crown Point Shell Collectors Study Group, P.O. Box 462, Crown Point, IN 46307.

THE FESTIVUS

A publication of the San Diego Shell Club

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THE END OF SUMMER FLING

The annual September party will be held on Saturday evening September 26, 1987 at the poolside clubhouse at the home of Wes Farmer. See details on page 92 and the map on the last page.

There will be no regular meeting this month.

CONTENTS

WHITE SNAILS (HELICIDAE) IN SAN DIEGO COUNTY, CALIFORNIA

BY

BARRY ROTH[1], CAROLE M. HERTZ[2], and RICHARD CERUTTI[2]

[1]Museum of Paleontology, University of California, Berkeley, California 94720
[2]San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

With the exception of *Cepaea hortensis* (Müller, 1774) in northeastern North America, the land snail family Helicidae is native to the Old World. However, many of its species are good travelers and have been introduced through human agency to remote parts of the world. Where they have become established, several of these are significant field and garden pests, feeding on crops and fouling shipments of agricultural products.

With its equable climate, California has proven a receptive home to several introduced helicids, including *Helix aspersa* Müller, 1774, *Helix aperta* Born, 1778, *Otala lactea* (Müller, 1774), *Theba pisana* (Müller, 1774), and *Cochlicella barbara* (Linnaeus, 1758) [synonym: *Helix ventrosa* Férussac, 1820] (Hanna, 1966; Roth and Chivers, 1980; Hertz, 1985; Cerutti, 1986a, 1986b). *Theba pisana* was established in San Diego County around 1914 but was thought to have been suppressed by the 1940s; here we report on a recent reinfestation. *Cernuella virgata* (da Costa, 1778) is here reported in California for the first time.

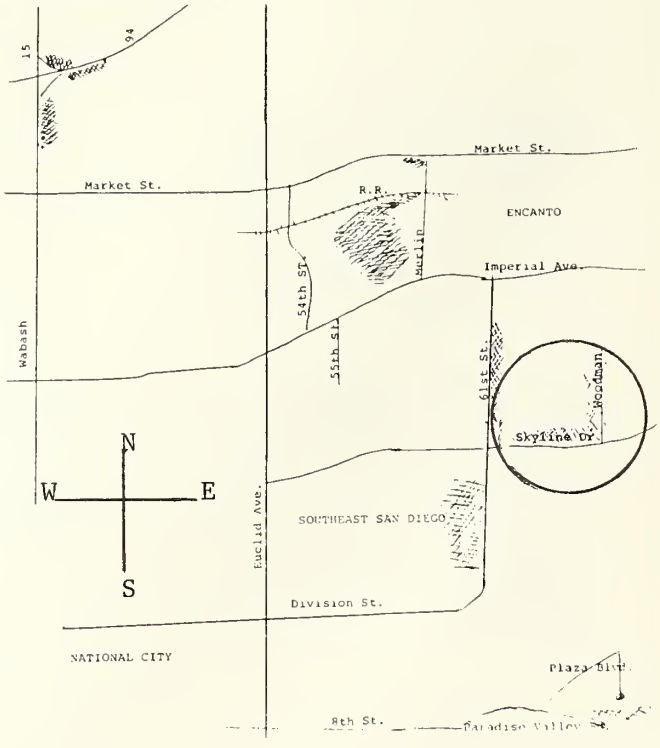
"White snails" is an informal term used by economic malacologists for members of several subfamilies of Helicidae which have in common shells with an opaque whitish color. Baker (1986) has given an excellent summary of their occurrence in Australia and the available information on their biology and control.

1. *Theba pisana* (Müller, 1774)

In 1986 *Theba pisana* was found in abundance at two San Diego County sites. At Woodman Street and Skyline Drive, in southeastern San Diego (Map 1), it was feeding on wild radish (*Raphanus sativus*), the leaves of wild mustard (*Brassica* sp.) (Figure 1) and curly dock (*Rumex crispus*), and rabbit pellets on the ground. In dry weather the snails were found sealed up to ±2 m above the ground on the stems of fennel (Figure 2).

Theba pisana was also abundant at Mission Gorge Road and Fanita Drive, Santee (Map 2). At this site it was most commonly found feeding on the outer cortex of fennel (*Foeniculum vulgare*) stalks (Figure 3) but also on wild radish, wild mustard, and curly dock.

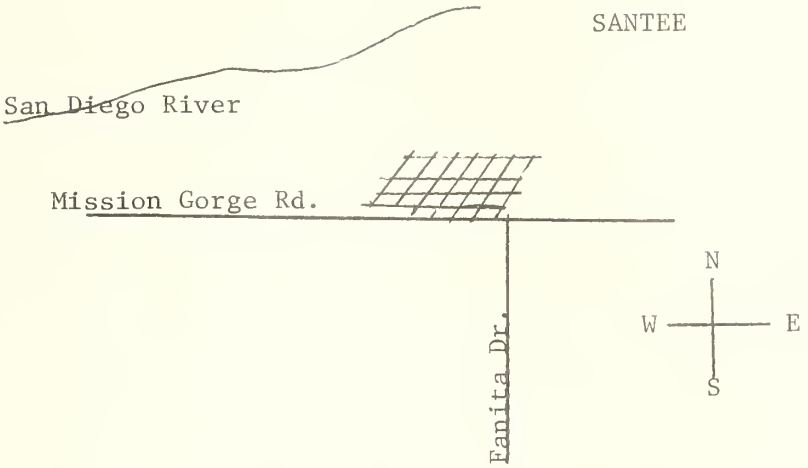
At Santee on January 4, 1987, *T. pisana* was observed laying eggs in depressions in damp, soft soil shortly after a rain. The process appears similar to that in *Otala lactea* (Cerutti, 1986a). After the eggs are laid the



Map 1. Sites of infestations of white snails. (Circled area denotes *T. pisana* sites.)

nests are covered with a thin capping of moist soil. Six nests were noted, with clutches of 29, 37, 40, 43, 52, and 59 eggs.

Infestations in San Diego County in the 1910s and 1930s and in Los Angeles and Orange counties in the 1930s and 1940s were the subject of intense control efforts (Gammon, 1943; Hanna, 1966). Although Gammon (1943) wrote that "the eradication [had] reached a very favorable stage" and Hanna (1966) stated that in 1940 "the task seemed to have been completed," total eradication was never claimed.



Map 2. Site of *Theba pisana* and *Cernuella virgata* infestation.

Figure 1. *Theba pisana* feeding on wild mustard at site shown on Map 1.

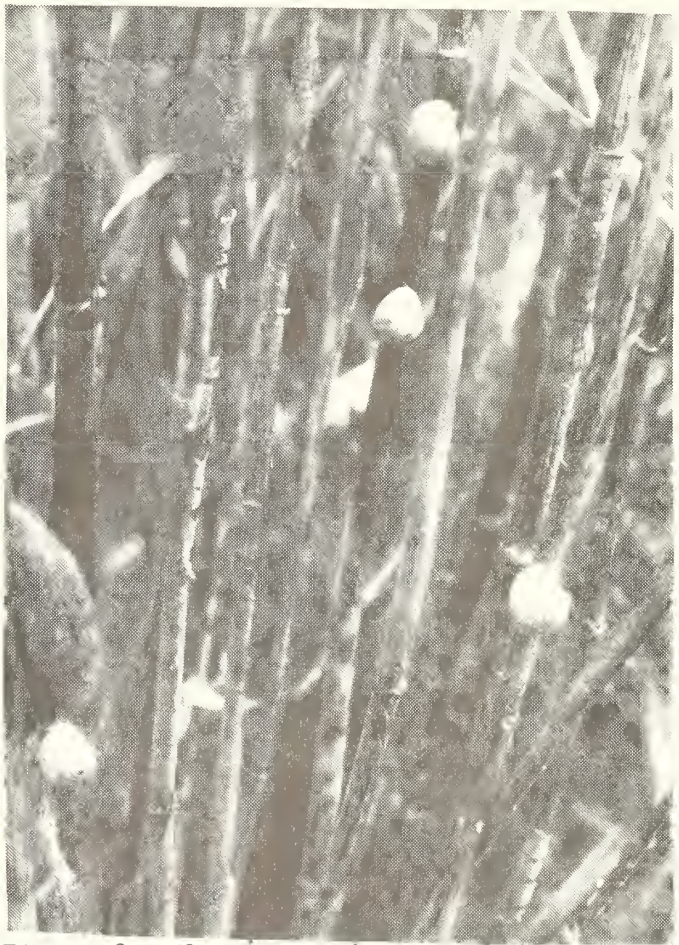


Figure 2. *T. pisana* shown sealed on stems of fennel during dry weather at site shown in Map 1.

Gammon (1943) mentioned four live adults taken out of a clay bank at the Scripps Institution of Oceanography in 1937. He concluded that there was no evidence of reproduction and, since the last time *T. pisana* was found there was in 1927, they apparently had been buried in the bank for some ten years. Now that *T. pisana* is known to have a one- or two-year life cycle (Cowie, 1984), it seems more likely that it was present and reproducing continuously but at low enough levels to escape detection, or else a separate episode of introduction was involved. Either way, the episode demonstrates the difficulties facing control of *T. pisana*.

The native range of *T. pisana* includes the countries around the Mediterranean and along the Atlantic coasts of France, Belgium, the Netherlands, Britain and Ireland (Kerney and Cameron, 1979). It has been introduced to South Africa, the temperate regions of Australia, and oases in Saudi Arabia (Baker, 1986). There are numerous cases of its interception in cargoes at ports in the eastern and Gulf Coast states (Dundee, 1974). It is said to be the most commonly intercepted species of terrestrial snail (Mead, 1971)

Figure 3. *Theba pisana* feeding on the outer cortex of fennel at site shown on Map 2.

Theba pisana is a serious pest of flowers, shrubs, vegetables, pasture and forage crops, citrus, stone fruits, and nut and olive trees (Baker, 1986). It is an intermediate host of nematode parasites of sheep and cattle and has been implicated in the spread of a fungus that damages melons. On the positive side, it is a popular food item, although away from the Mediterranean region, cultural predilections cause it to be utilized only rarely.

2. *Cernuella virgata* (da Costa, 1778)

Six specimens of this helicid were first collected by Cerutti on January 4, 1987, in a sample of over 100 *Theba pisana* from Mission Gorge Road and Fanita Drive, Santee (Map 2). A return survey on February 16, 1987, showed *Cernuella virgata* to be far less common than *T. pisana*, probably amounting to less than two percent of the white snail population at this site. A total of 30 living specimens of *C. virgata* were collected. No specimens of *C. virgata* were found at the Woodman Street site in San Diego.

Cernuella virgata was found feeding on the cortex of fennel, most commonly on wilted or dying stalks; it was not observed to eat the leaves. In dry weather the snails seal to the stalks up to ± 2 m above the ground.

The shells of *Cernuella virgata* and *Theba pisana* are similar in shape and size, but the animal of *C. virgata* is usually black (Figure 4) while that of *T. pisana* is tan. Under a hand lens, the spire of *C. virgata* has prominent, closely set, regular axial ribs that extend from suture to suture. The axial sculpture of *T. pisana* is weaker, more irregular, and strongest just below the suture. *Theba pisana* has

fine, incised spiral grooves, which are absent in *C. virgata*.

This is the first report of *C. virgata* in California. Previously it has been intercepted at ports in eastern and Gulf Coast states, in a wide variety of cargoes originating in Europe and North Africa (Dundee, 1974). It is widely distributed in Mediterranean and western European countries (Kerney and Cameron, 1979) and is established in South Australia, Victoria, and Western Australia (Baker, 1986).

Like *T. pisana*, *C. virgata* is an important agricultural pest where it has become naturalized. In Australia it has been known to comtaminate grain harvests, owing to its habit of climbing cereal stalks (Baker, 1986). The shipments may then be rejected or downgraded by authorities. *Cernuella virgata* also causes damage by feeding on field and ornamental crops and is an intermediate host for various parasites of livestock.

Its native range and its success in temperate parts of Australia suggest that *C. virgata* could find many parts of California habitable.

Figure 4. *Cernuella virgata*, (SDNHM 93338). Photo taken in studio setup.

Acknowledgments

Food plants were identified by Jim Dice, Botany Department, San Diego Natural History Museum. David K. Mulliner took the photograph of *Cernuella virgata*.

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A FURTHER NOTE ON "WHITE SNAILS"

The San Diego Union of August 20, 1987 informed that San Diego County agricultural officials are planning to "firebomb" the white snails to wipe out the infestation threatening the farming industry in the county. Two lots in Oceanside have already been burned and George Opel, Deputy Agricultural Commissioner is quoted as stating they "counted a million of them [dead snails] in one 7½ acre field." This is the method which was used in the La Jolla infestation from 1914 to 1922.

It was stated that the "killer snails" [*Rumina decollata* (Linnaeus, 1758)] were tried first but that though they can control a white snail population, they can not eradicate it. Pesticide control has also been rejected as ineffective since the snails climb the plants and the pesticides fall to the ground.

Continued controlled burning, which also clears out the weeds and underbrush, is planned as the more "natural" means of controlling the white snails although "times have changed and the county has grown, and burning in the more populated areas could be tricky."

COMMENTS ON THE VARIABILITY IN SHELL MORPHOLOGY OF MUREXIELLA PEREGRINA OLIVERA, 1980, WITH HITHERTO UNPUBLISHED ILLUSTRATIONS OF THE RADULA AND PROTOCONCH

BY

ANTHONY D'ATTILIO

Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

In his paper, "A New Species of Muricacean Gastropod" published in The Veliger (Vol. 23(1):19-20, 2 pls.), Dr. Olivera refers to the "great variation seen in different specimens of the species..." illustrating his point with photographs of the dorsal aspects of eight paratypes of *Murexiella peregrina*. However, none of those illustrated have the extreme narrow form with very short spines found on a few specimens I examined recently from among 11 specimens of this species from the Philippines.

For purposes of clarifying these differences in the slenderness of form and the formation of the varical flange, both photographs and camera lucida enlarged drawings are provided. While the narrowness of the shell is the most noticeable difference, the principal difference is demonstrable on the dorsal surface of the shell of both forms. In the broader form, that of the holotype and the specimen shown here in Figure 1, the spiral cords are deeply cut in from the distal edge of the flange to about 2/3 of the surface; the remaining area of the shell up to the preceding varix is nearly smooth with little or no indication of spiral cords (Figure 2).

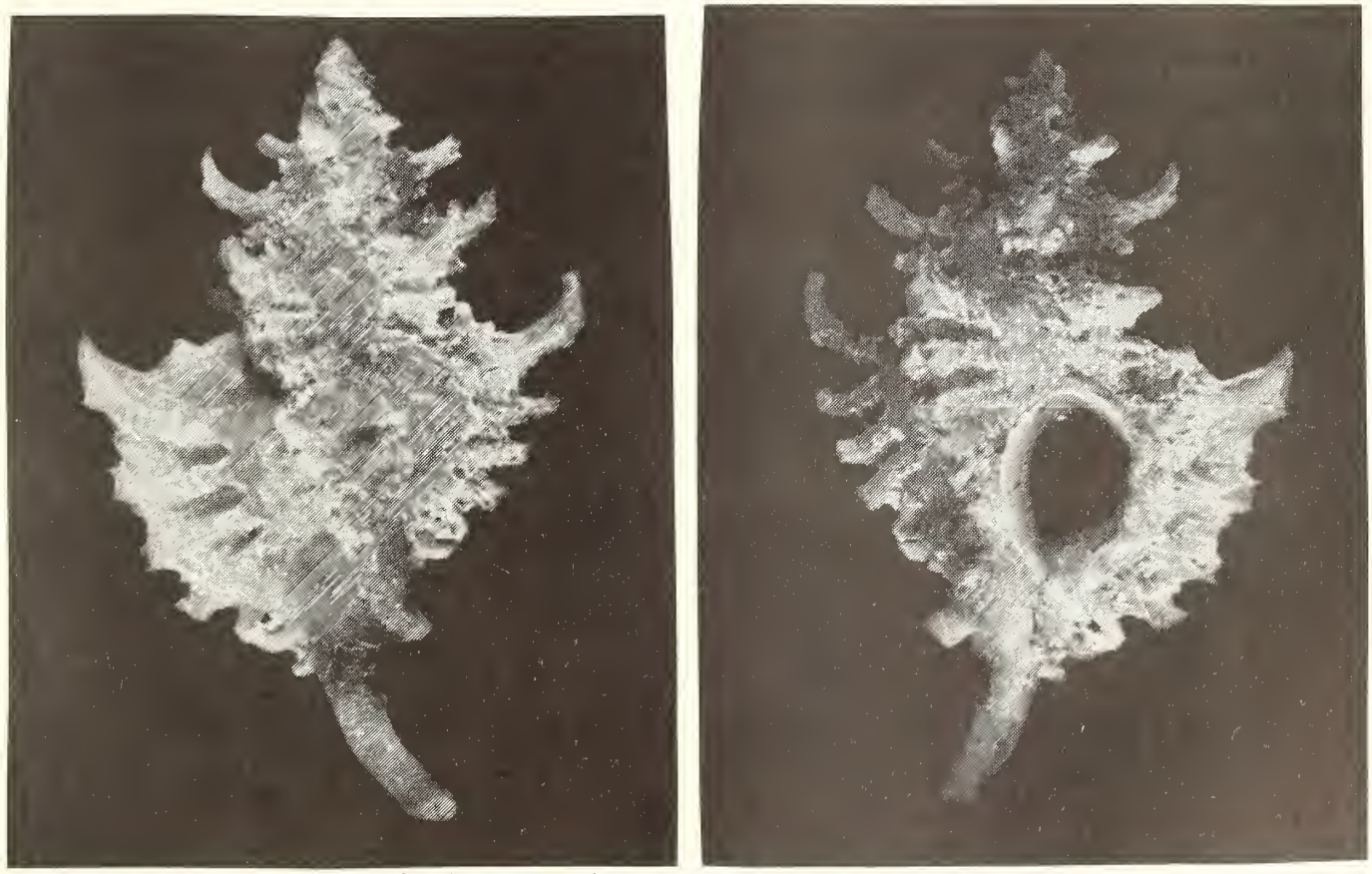


Figure 1a and b. *Murexiella peregrina*, SDNHM 82300, from the Philippine Islands (a) dorsal aspect (b) apertural aspect. Length: 13.1 mm

In specimens with the narrow form, shown here in Figures 3 and 4, the intervarical area exhibits continuous spiral grooves to the preceding varix. In addition, the entire flange and its terminal spinosity is much reduced in size (Figure 4).

The 11 specimens studied by me ranged from 10.1 to 15.9 mm with from 5 to 5½ postnuclear whorls. Figure 5 illustrates the protoconch of 2½ conical, convex whorls. The radula is typically muricopsine with a large strongly projecting central cusp and moderately short strong laterals and smaller intermediate cusps (Figure 6).

Acknowledgments

Mrs. Barbara W. Myers, my associate, extracted and mounted the radula. Messrs. Charles Glass and Robert Foster of Santa Barbara, Mr. Don Pisor and Mr. L.J. Bibbey of San Diego, and Mr. Victor Dan of Manila, Philippine Is., provided comparative material. The photos were taken by Mr. David K. Mulliner. To all of the above I am very grateful.

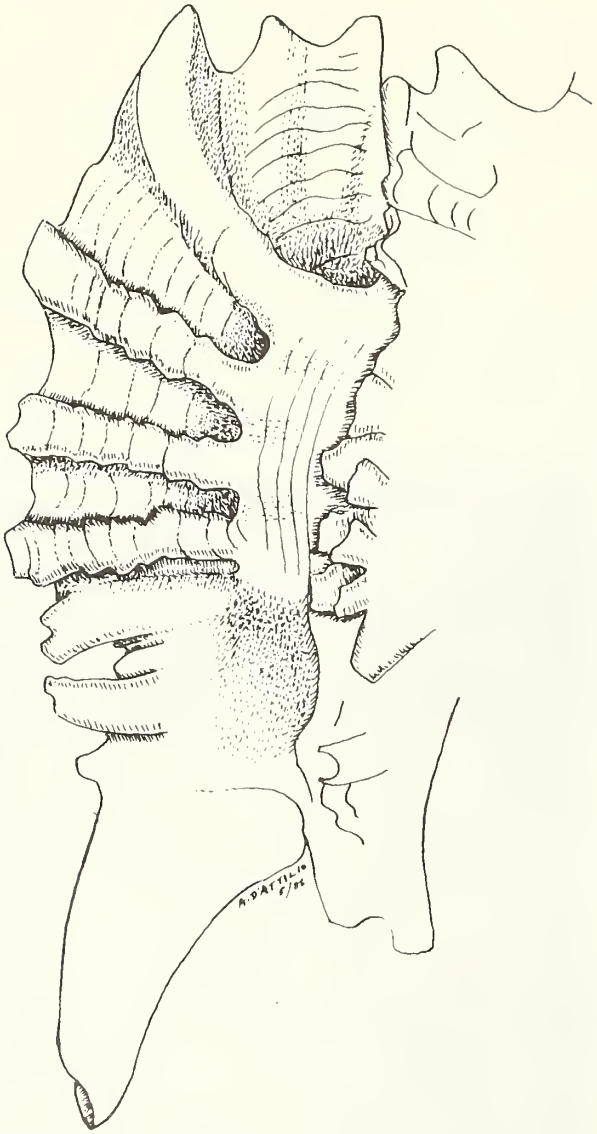


Figure 2. *M. peregrina*, detail of distal edge of flange in specimen showing the broad form, SDNHM 80741.
Camera lucida drawing, greatly reduced.

Figure 3. *M. peregrina*, detail of distal edge of flange in specimen showing the narrow form. Glass and Foster Collection
Camera lucida drawing, greatly reduced.

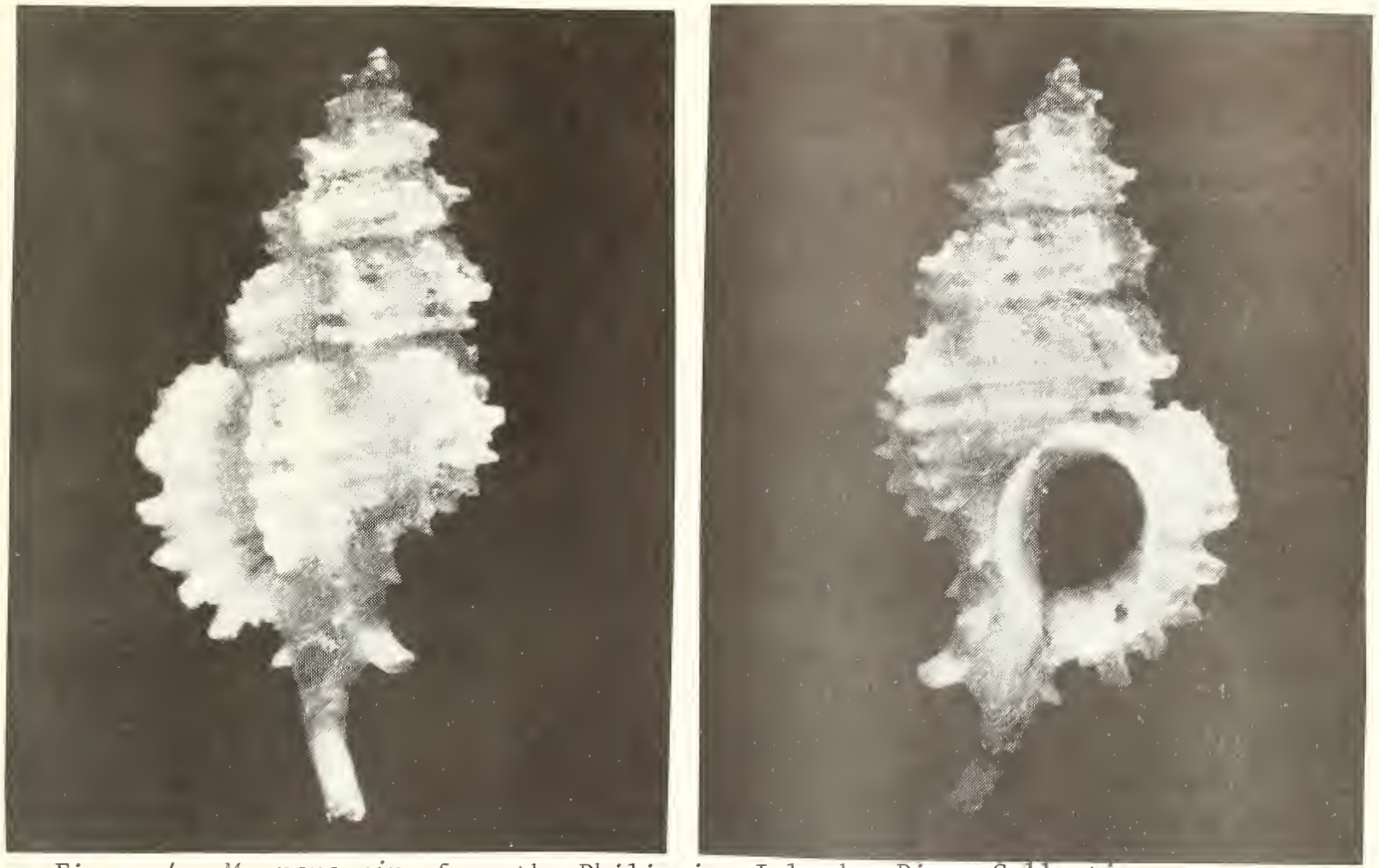


Figure 4. *M. peregrina*, from the Philippine Islands. Pisor Collection (a) dorsal aspect (b) apertural aspect.

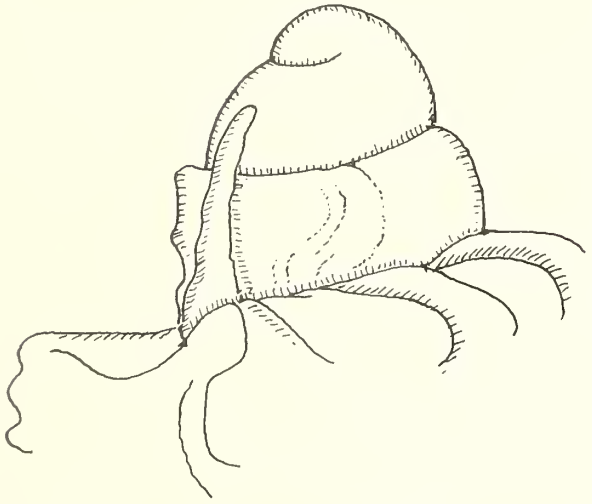


Figure 5. *M. peregrina*, protoconch of SDNHM 80741. X50

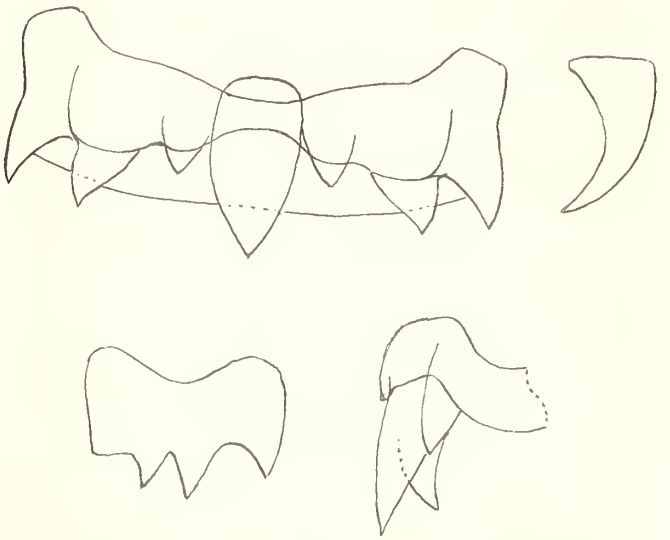


Figure 6. *M. peregrina*, radula of Pisor specimen shown in Figure 4.

CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - AUGUST 20, 1987

Cowry enthusiast Hugh Bradner warmed to his subject as he discussed rare cowries and their radulae. *Cypraea valentia* Perry, 1811; *C. kingae* Rehder & Wilson, 1975; *C. katsuae* Kuroda, 1960; *C. leucodon* Broderip, 1828; *C. guttata* Gmelin, 1791; *C. aurantium* Gmelin, 1791, and others were compared and the differences in the radulae diagnosed. According to Dr. Bradner, one must consider not only the morphology of the central tooth but also the three pairs of lateral teeth. He also showed us a cowry identified as *C. onyx melanesiae* Schilder, 1937, whose radula differed from the usual *C. onyx* but closely resembled the radula of *C. talpa* Linne, 1758. There was a hands-on exhibit of many of these rare cowries which proved to be a great attraction.

Just before the coffee break, and at the request of several members present, Carole Hertz gave a brief summary of the events taking place in the Malacology/Marine Invertebrate Department of the San Diego Natural History Museum. The entire Malacology staff was terminated including Anthony D'Attilio, Acting Curator (who will leave on October 1). Through a generous bequest to the Department by Joshua L. Baily, a longtime friend of malacology, the Museum established the Joshua L Baily Chair of Marine Invertebrates and hired Dr. Richard C. Brusca to fill the position. Although Dr. Brusca has written two books and several papers on the invertebrate fauna of the eastern Pacific his main research interests and expertise are in marine isopods (Phylum Arthropoda). The question left unanswered is the future of malacology at the San Diego Natural History Museum.

The September party "The End of Summer Fling" was discussed. It will be held on Saturday, September 26, 1987 at the home of Wes Farmer. The menu was discussed and a signup sheet passed among the members. [For further information see below and map on last page.]

Dave Mulliner showed slides of the meeting of the Western Society of Malacologists held at SDSU in June. It is always fun to see old friends having a good time.

The shell lottery was a great success and was enthusiastically enjoyed by all. Eight members each brought a shell for the lottery and eight lucky winners went home with a lovely prize.

Sherry Valli and Margenette Yeend brought the delicious cookies for the coffee break and Hugh Bradner won the door prize.

Barbara W. Myers, Acting Secretary

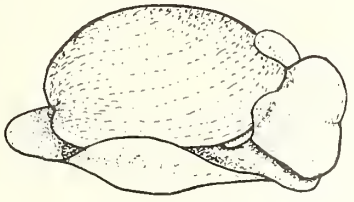
THE END OF SUMMER FLING!

The Club's annual September party will be held at the Club house and poolside at Wes Farmer's home [See map on last page] on Saturday evening September 26. Festivities will begin at 6:00 P.M. (Parking is limited so note alternate parking site across the street as shown on the map.)

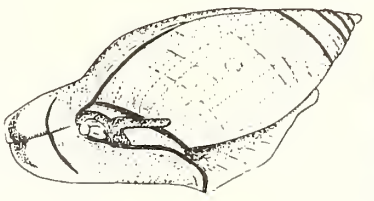
At the September party it is traditional to have a set menu. If you have not yet signed up to bring a food contribution, contact either Wes Farmer (576-1243), Bill Romer (278-2389), or Carole Hertz (277-6359).

Come dressed in your casual best end-of-summer-fling finery (the pool is available). It will be a fun party with music, entertainment and great company. Remember to bring your food contribution and serving and eating utensils. See you there!!

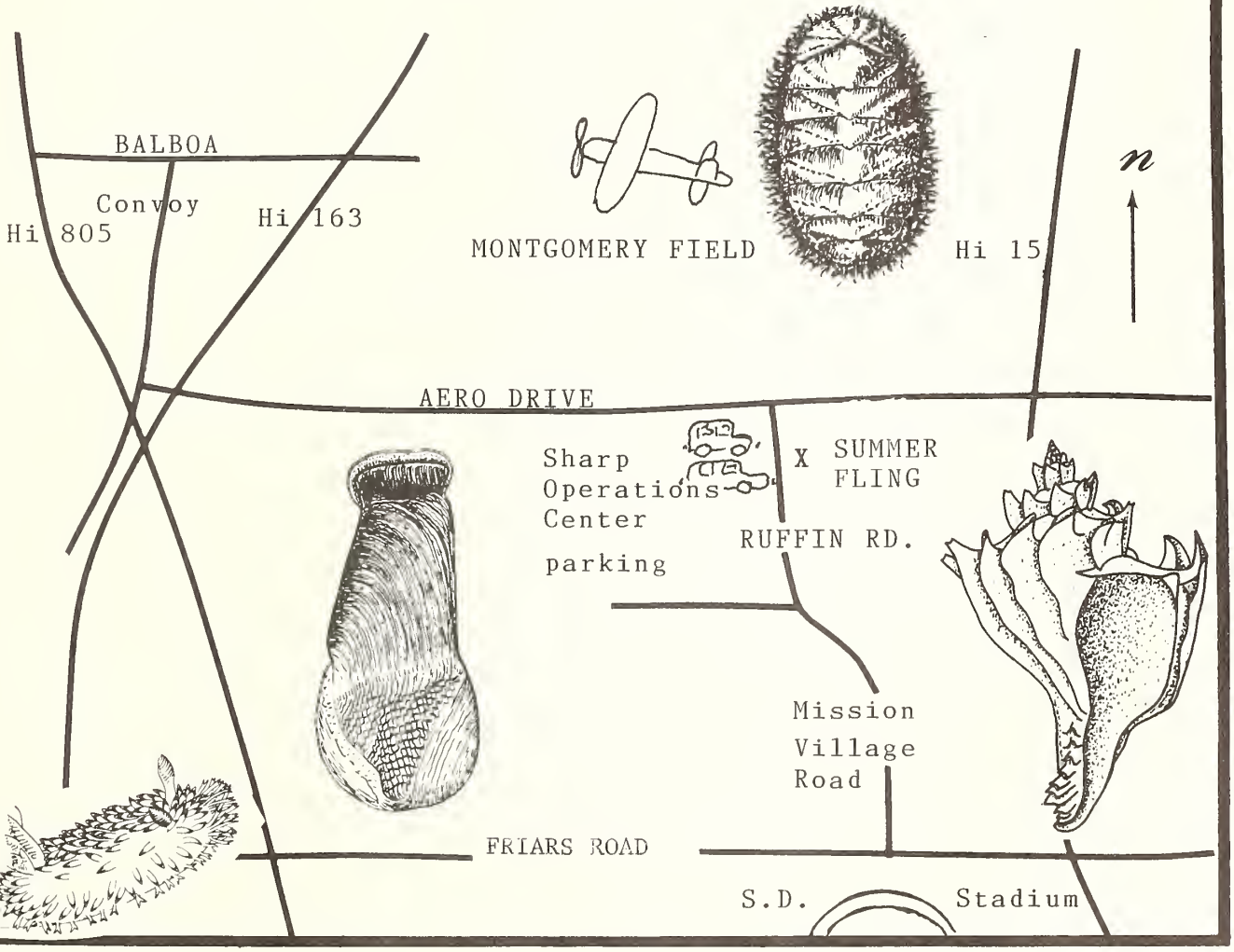
SAN DIEGO SHELL CLUB



SUMMER FLING



September Party directions: from 805: exit onto Balboa, east to Convoy, south to Aero Dr., east to Ruffin Rd., south about a block or two. Clubhouse on East side of street; park at Sharp Operations Center on West side.
From San Diego Stadium on Friars Road: up Mission Village Drive to Ruffin Rd., right turn or north about a half mile, parking on the west side of the street at Sharp Operations Center across from the Clubhouse. Sept. 26.
THE ADDRESS: 3575 Ruffin Rd. at the Summer Hill Clubhouse.
TIME: 6:00 P.M. (Quiet hours start at 10:00, swimming in pool or Jacuzi stops at 11:00)(No glass containers of any kind by the the pool, thank you). HAVE A GOOD TIME!!! Questions:Wes576-2143.



THE FESTIVUS

A publication of the San Diego Shell Club

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00
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Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111
Single copies of this issue: $5.00. Postage is additional.

Meeting date: third Thursday, 7:30 P.M. Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

SAN MIGUEL ISLAND, JEWEL OF THE CHANNEL ISLANDS

Richard Herrmann, Club member and talented underwater photographer will give an above and below the surface look at this area in his slide presentation.

Presentation of the 1988 slate of officers

Multiple shell drawing will follow the business meeting (see page 99).

Meeting date: 15 October 1987

CONTENTS

ENGINA STRONGI PILSBRY AND LOWE, 1932 (BUCCINIDAE); ITS DISTRIBUTION AND DISCOVERY OF POSSIBLE PARATYPES

BY

BARBARA W. MYERS and ANTHONY D'ATTILIO

Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

During our study of the distribution of *Trachypollia lugubris* (C.B. Adams, 1852), we examined specimens from Isla de Guadalupe, Mexico (SDNHM 10050) collected by Carl Hubbs *et al* in 1954. One of the three specimens in this lot was *T. lugubris* while the other two specimens proved to be *Engina strongi* Pilsbry and Lowe, 1932 (now SDNHM 93340).

The largest specimen in the lot, shown in Figure 1, is a fusiform shell with four postnuclear whorls; suture indistinct; body whorl with nine axial ribs and seven major spiral cords, two spiral cords on the canal. The color is ivory-white stained rust on the elevated portion of the cords as they cross the axial ribs. The aperture (Figure 2) is oval with a broadly open siphonal canal. The U-shaped anal sulcus is bracketed by a denticle on the columella and one on the outer lip; outer lip thickened with seven strong rounded denticles; inner lip or columella with five strong nodes. The protoconch (Figure 3) consists of 3½ smooth convex whorls, the final quarter whorl rippled. There is a light brown band circling the whorls of the protoconch.

Engina strongi is not listed among the molluscan species from Isla de Guadalupe by Chace (1958) or Lindberg *et al* (1980). A part of D.R. Lindberg's collection made in 1975 was deposited in the Department of Paleontology, San Diego Natural History Museum and examination of that collection failed to discover any specimens of *E. strongi*.

Pilsbry and Lowe cited Santa Catalina Island, California (in 50 fathoms) as the type locality of *E. strongi*. Few published records of the geographical distribution of this species were found during our research. Burch (1942) dredged specimens from 50 fathoms (91.5 m) on gravel

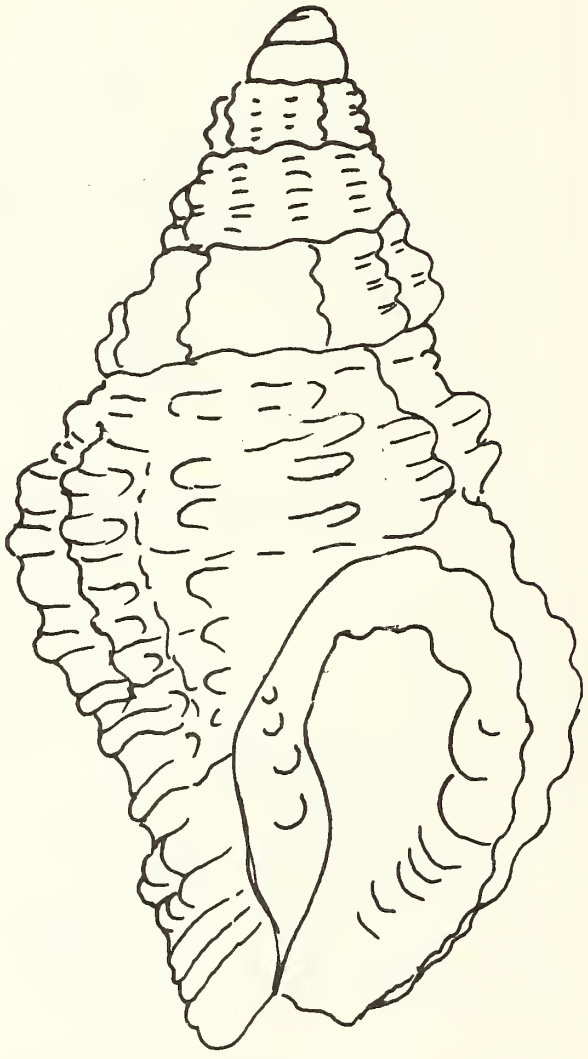

Figure 1. *Engina strongi*, (SDNHM 93340). Camera lucida drawing of 10.1 x 5.5 mm specimen from Isla de Guadalupe.

bottom at Redondo Beach, California and Valentine (1956) listed *E. strongi* from the Pleistocene of Potrero Canyon, Pacific Palisades, California as very rare with less than five specimens found. The species is not cited in the following major publications containing references to the eastern Pacific molluscan fauna: Keen (1971), Abbott (1974) and McLean (1978).

We found four additional lots of *Engina strongi* in the San Diego Natural History Museum malacology collection:

#50646--one specimen from San Diego, California, collected from 23.8 m
50626--four specimens from San Diego, California (dredged)
15654--three specimens from La Jolla, California, among kelp roots
50638--nine specimens from Santa Catalina Island, California in 50 fm. (91.5 m)

The specimens in lot #50638 were collected by H.N. Lowe from the type locality and are possible paratypes. The original description stated that the holotype was deposited in the Academy of Natural Sciences of Philadelphia and that paratypes were in the Lowe collection. Hertz (1986) had negative results locating paratypes of *E. strongi* in other musuem collections *i.e.* Academy of Natural Sciences of Philadelphia, American Museum of Natural History, California Academy of Sciences, Los Angeles County Museum of Natural History, Santa Barbara Museum of Natural History. Since the San Diego Natural History Museum was the final repository of the Lowe collection, it is our belief that these specimens were not recognized at the time they were accessioned into the Museum collection.

Personal communication from James H. McLean, Curator of Malacology, Los Angeles County Museum of Natural History, noted the following: "The LACM collection contains 15 lots of *Engina strongi* from California, including Catalina Island, Tanner Bank, Farnsworth Bank, Anacapa Island, Santa Cruz Island, San Miguel Island, San Clemente Island and with a northern mainland locality record off Pt. Dume. We have 20 lots from Baja California, including Guadalupe, Cedros, San Benito and Natividad Islands. Our southernmost locality is 20 fm off Thurloe Head, Baja California (27°36'S)."

Therefore, to the best of our knowledge, the distribution of *E. strongi* is from Pt. Dume, Los Angeles County, California, to Thurloe Head,

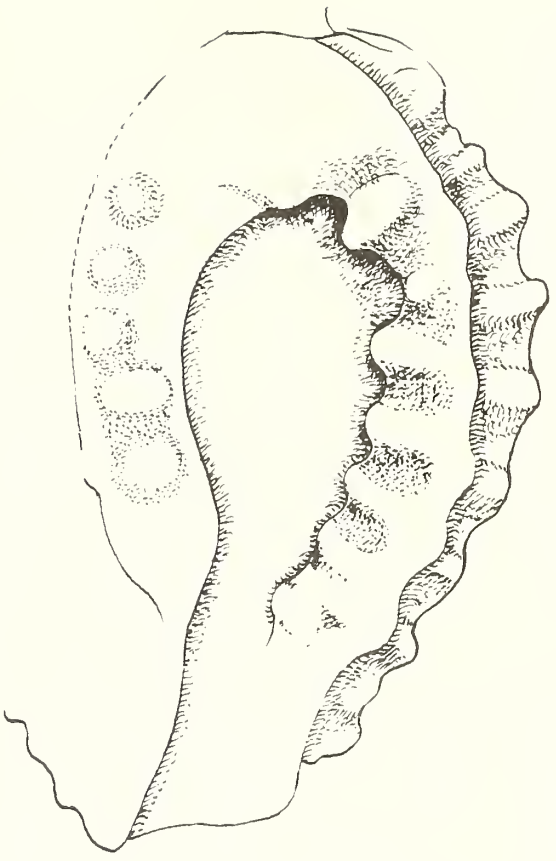

Figure 2. *E. strongi*, camera lucida drawing of specimen in Figure 1, greatly enlarged, showing denticles on the outer lip and nodes on the columella.

Figure 3. *E. strongi*, SDNHM 93340. Camera lucida drawing, greatly enlarged of specimen 8.9 x4.8 mm, showing the protoconch of 3¼ smooth conical whorls.

Baja California, Mexico, and the offshore Islands.

ACKNOWLEDGMENTS

We wish to thank James H. McLean, Curator of Malacology, Los Angeles County Museum (N.H.) for suggesting the identity of the Guadalupe Island specimen as *E. strongi* and further for taking the time to check and make a tally of that institution's collection of specimens of *E. strongi* and their collecting data. We further thank Tom Demere of the Department of Paleontology, San Diego Natural History Museum, for making the Lindberg collection available to us.

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TWO NEW BOOKS ON MOLLUSKS

NUDIBRANCHS OF SOUTHERN AFRICA
By Terrence Gosliner. 1987.
Published by Sea Challengers and Jeff Hamann, Monterey, California
136 pages, 268 color plates, 8X10, softcovered
Price: $34.95

The opisthobranch molluscs have evolved from shelled ancestors 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 spaceous 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!

The information column gives the genus and species of each animal (where known), and a taxonomy section with a few sentences describing distinguishing features or color variation. The natural history section, also brief, mentions habitat, food and egg mass (if known). The last section on occurrence and distribution is interesting because 76 of the species in this book were described elsewhere and are here recorded from southern Africa for the first time.

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. 13-15) 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 discussion 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 opisto-branchs are also found, or are 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, identifying 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

Editor's note: This book will be available for circulation at the October meeting.

NEW CARIBBEAN MOLLUSCAN FAUNAS
By Edward J. Petuch. 1987
Published by Coastal Education and Research Foundation [CERF], Charlottesville, Virginia
154 + 4 pages, 28 + 1 plates, softcovered
Price: $32.50

Despite vitriolic international reviews of previous molluscan works being produced by this private "foundation," this latest publication shows great improvement in the quality of format, editing and illustrations (see Philippe Bouchet, 1987, in Xenophora no. 38; Henry W. Chaney, 1987, in The Festivus, vol. 19, no. 6). The Olive book published last year by CERF had the unique record of 342 spelling mistakes, wrong dates, incorrect authors, upside-down illustrations and switched catalog numbers and figure references. This new paper has a minimum of such careless editorial control, a fact often beyond the correction by authors.

The present work is a symptom of a curious present-day situation in malacology, reminiscent of the 19th century era of Hugh Cuming, the Sowerbys, Reeve and Marrat. Improved methods and an increase in shell collecting, a scarcity of well-trained mollusk taxonomists, and the pressure of commercial seashell interests have brought on the unbridled description of new species. Some, of course, are obviously new good species; but many others are probably ecologic forms, expressions of geographical clines or limited populations in transient isolation.

CERF's new paper is well illustrated by the excellent black-and-white photographs made by Kevan Sunderland, a top Floridian shell collector. This work will be useful to amateurs, and those who must keep up with the literature, because it illustrates many uncommon, previously described Caribbean species, as well as the 109 species and 5 genera newly described. In due course, the latter novelties will be analyzed by others engaged in monographic studies and the valid ones accepted into the scientific literature and new editions of popular guides.

It is not possible in a short review to discuss the status of these new species spanning thirty major families, other than to say that in all likelihood at least ten to twenty of them will prove to be valid when careful study is undertaken. Surely the scientific experts on the Cerithiidae, Muricidae, Trochidae and Pectinidae could have staved off synonyms and other placement errors had this work been reviewed by competent peers prior to publication. One need only compare the recent careful treatment of the genus *Cataegis*, with its anatomical, radular and shell observations (McLean and Quinn, 1987, in The Nautilus, vol. 101, no. 3) to realize the ludicrous nature of the treatment of "*Homalopoma finkli* n. sp." Actually it is in the Trochidae, not the Turbinidae, and unfortuately is a senior synonym of *Cataegis toreuta* McLean

and Quinn, 1987.

One clear case of a remarkable discovery is the appearance in the Miami area of a small parasitic gastropod *Cyclotheca* [*sic*] *pacei* now being found by scuba divers on *Spondylus*, as well as on *Chlamys*. However, *Cyclothyca pacei* (Petuch) is not in the family Capulidae, but rather a new family near the Pyramidelloidea heterogastropods, a fact long known to our colleagues in California and Australia.

I agree with the author, although perhaps not his possible motives, in naming new species after those we wish to honor for their activities in malacology. This adds a bit of history to our nomenclature. The American Malacological Union's committee on vernacular names frowns on this custom and, indeed, usually refuses to translate these easily remembered names into common English names, e.g., Linda's Volute, Harland's Cone, etc. Their objections and fears, however, have some foundation when we see that this author has named 21 new species after Linda Petuch, 11 after Kevan Sunderland and 8 after Robert Pace in the same publication.

The so-called "Caribbean Molluscan Faunas" are really not well-defined faunas, nor faunules as Bartsch would call them, nor newly discovered, nor always newly named. The paper is artificially divided into small areas which are best defined as localized collecting grounds from which the author has been given "strange and new species" by enthusiastic shell collectors and shell dealers. If the reader wishes to track down a new species in his favorite genus, he will have to search throughout six different "faunas" or parts of this geographical maze.

Only time and thorough scientific work will sort out the taxonomic excesses of workers like Maxwell Smith, Paul Bartsch, Edward Petuch and others. This "arrogant" reviewer would like to make the "pronouncement" that almost every shallow-water marine mollusk in the Caribbean has probably been named three or four times, and that even some of Petuch's valid species will themselves receive additional synonyms as amateur taxonomists continue to describe new species. Let us hope that CERF does not continue its practice of encouraging the old disease known as the "mihi itch." *Mihi* was the Latin term used to indicate that these are "my species."

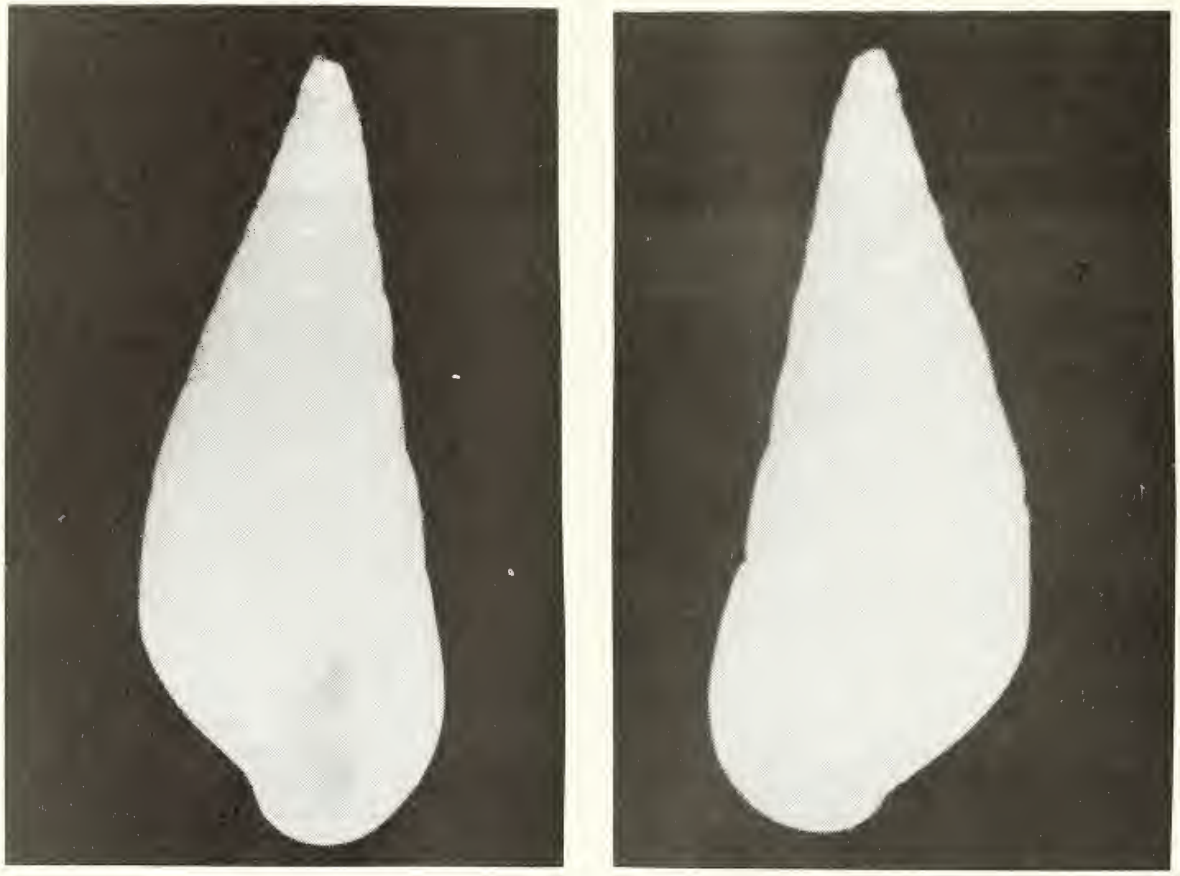
R. Tucker Abbott

UPDATE ON MOLLUSKS WITH INDO-PACIFIC FAUNAL AFFINITIES IN THE TROPICAL EASTERN PACIFIC - VI *

DONALD R. SHASKY

834 West Highland Avenue, Redlands, California 92373

Dr. Anders Waren of Stockholm, Sweden, has examined my Eulimidae from Cocos Island, Costa Rica and has identified two lots of *Balcis ogasawarana* (Pilsbry, 1905) (pers. comm. Waren, 1987). This species was described from the Bonin Islands, southeast of Japan. I collected three specimens on April 14-16, 1983 at Bahia Weston in 1-13 m, under dead coral and one specimen (Figures 1 and 2) on April 19, 1983, in 10-20 m under dead coral off Isla Manuelita. The host is unknown to me.



Figures 1 and 2. *Balcis ogasawarana* (Pilsbry, 1905). Apertural and dorsal views of 4.6 x 1.6 mm specimen taken under dead coral in 10-20 m, Isla Manuelita Cocos Island, Costa Rica, April 19, 1983. D.R. Shasky collection.

I have previously reported finding *Favartia garretti* (Pease, 1869) at Cocos Island and on the West American mainland (Shasky, 1983, 1983a). My identification of this taxon was based on comparison with two worn specimens of *F. garretti* from Hawaii in the San Diego Natural History Museum collection. After collecting two live specimens of *F. garretti* off Oahu, Hawaiian Islands, last fall, it was apparent that the Cocos Island specimens are not conspecific. A manuscript is now in preparation by Anthony D'Attilio and Barbara W. Myers describing the Cocos Island species.

*Adapted from a paper presented to the annual meeting of the Western Society of Malacologists - June 1987

ACKNOWLEDGMENTS

I wish to thank Dr. Anders Waren for examining my Eulimidae and David K. Mulliner for photographing the specimen figured.

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1983a Update on mollusks with Indo-Pacific faunal affinities in the tropical eastern Pacific - II. Festivus XV:109-110.

CLUB NEWS

THE END OF SUMMER FLING

The Club does have great parties! The Clubhouse at Wes Farmer's residence was a perfect spot. Roomy and comfortable with kitchen, billiard room and, just outside, a large swimming pool.

As always, everyone was glad to see each other. The food was delicious and substantial quantities of salad, chicken, baked beans and dessert were consumed. Many lingered at the tables enjoying conversations with new and old friends while others swam and played pool.

Our grateful thanks to our host Wes Farmer for his hospitality.

THE CLUB CHRISTMAS PARTY--DECEMBER 5, 1987

This year the Club's annual Christmas Dinner Party will be held in the Bronze Room at the Admiral Kidd Club. (Map and details will be in the November issue).

The festivities will begin at 6:00 P.M. with no-host cocktails and dinner is planned for 7:00 P.M. (There will be dancing during the evening in the main room).

Two dinner choices are available: Prime rib of beef at $14.70 or Coquilles St. Jacques at $13.60. Both include tossed salad, baked potato, vegetable, and coffee or tea. Tax and tip are included. Our Club provides the dinner wine.

Since the Admiral Kidd Club requires payment in advance, reservations must be received not later than November 19th (the date of the November meeting).

ANOTHER MULTIPLE SHELL DRAWING AT THE OCTOBER MEETING

The multiple shell drawing will be repeated at the October meeting by popular request. Members are asked to bring in one or two duplicate shells for this drawing. The shells will be on display through the evening and will be drawn - one by one - after the business meeting.

THE FESTIVUS

A publication of the San Diego Shell Club

ISSN: 0738-9388

Volume: XIX | November 12, 1987 | Number: 11

MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00
Overseas (surface mail): $12.00
Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111
Single copies of this issue: $5.00. Postage is additional.

Meeting date: third Thursday, 7:30 P.M. Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

HOW GASTROPODS MAKE THEIR SHELLS

Bert Draper, Associate at the Los Angeles County Museum of Natural History and micro-photographer, will give this slide presentation.

Election of Officers

Meeting date: 19 November 1987

CONTENTS

REGARDING THE EASTER ISLAND CYPRAEA CERNICA

BY

HUGH BRADNER

Scripps Institution of Oceanography, La Jolla, California 92093

After my report on *Cypraea cernica* Sowerby, 1870, appeared in The Festivus (Bradner, 1987), Walter Sage of the American Museum of Natural History brought to my attention a paper by J. Senders and P. Martin (Senders and Martin, 1987), in which they conclude that John Earle's Easter Island discovery should be classified as a new subspecies of *Cypraea cernica*. They describe it on the basis of 5 specimens that were furnished by J.P. Lefort of Huahine, French Polynesia; and they name it *C. cernica leforti*. In comparing my 3 specimens from Easter Island with 2 specimens from Okinawa and 4 specimens from La Reunion, I cannot agree with 7 of the 11 "most significant" differences that are cited by Senders and Martin. I understand that H.A. Rehder is studying a larger number of Easter Island specimens, and I suggest that the name *C. cernica leforti* Senders and Martin, 1987, be accepted provisionally pending his report.

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1987. Comparisons between John Earle's Easter Island cowrie and *Cypraea cernica* Sowerby, 1870. Festivus 19(8):75-79, 4 figs., 3 tables (August 13).

SENDERS, JACQUES and PHILIPPE MARTIN
1987. Description d'une nouvelle sous-espece de Cypraeidae en provenance de l'Ile de Paques. Apex 2(1):13-23, 2 pls, (January 2).

CORRECTION TO D.R. SHASKY"S, "UPDATE ON MOLLUSKS WITH INDO-PACIFIC FAUNAL AFFINITIES IN THE TROPICAL EASTERN PACIFIC --VI"

[FESTIVUS 19(10):100]

The illustration in Figures 1 and 2 is of a specimen of *Balcis ogasawarana* (Pilsbry, 1905) 4.4 x1.4 mm from a third lot of two specimens taken by D.R. Shasky in 12 meters (40 ft.) under dead coral at Isla Pájaros, Cocos Island, Costa Rica on March 8, 1984 and April 19, 1983. It was listed on page 100 as a specimen from Isla Manuelita, Cocos Island. It should also be noted that three lots were collected rather than two as stated in the writeup.

IN MEMORIAM

It is with regret that we report the passing of Norval F. Brewer on October 7, 1987 at the age of 78. Our sympathy is extended to his wife, Blanche and his family.

THE SHELL MORPHOLOGY OF THE VARIX IN TWO FAVARTIA SPECIES: FAVARTIA DOROTHYAE EMERSON & D'ATTILIO, 1979, AND F. MUNDA (REEVE, 1849)

BY

ANTHONY D'ATTILIO

Associate, Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

Favartia munda is one of the smaller *Favartia* species, rarely reaching 10 mm in height (Figure 1). The protoconch, not previously figured, consists of 1½ convex whorls (Figure 2). In the apertural view (Figure 1), the leading side of the varical costae are shown to consist of low broadly open spinelike crenulations, approximately three per spine, with depressed lamellose areas between.

The shell is richly sculptured with scabrous cords. A complete growth episode from the outer lip edge to the leading edge of the penultimate varix is shown in Figure 3. The dorsal surface has four scabrous cords separated by deep inter-cord depressions. An enlarged detail is shown in Figure 4. Another cord is on the canal (Figure 3). The cords are composed of a series of ascending, unequal, asymmetrical segments which sometimes appear scale-like. No spiral or axial striae embellish the surface of the four specimens studied here, two from Amiami, Okima, Japan (ex Nat. Sci. Mus., Tokyo) and two from Kii, Japan (ex Akibumi Teramachi collection, now SDNHM 78063) one of which is figured here.

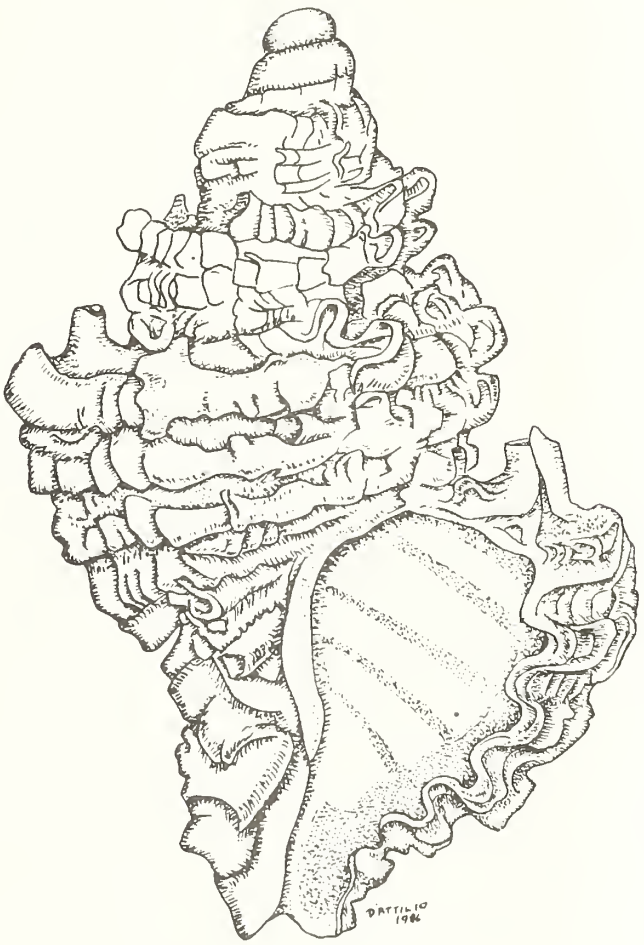

Figure 1. *Favartia munda* (Reeve, 1849) SDNHM 78063, 7.2 mm H, in 9.1 m (5 fm.) off Kii, Japan, apertural view.

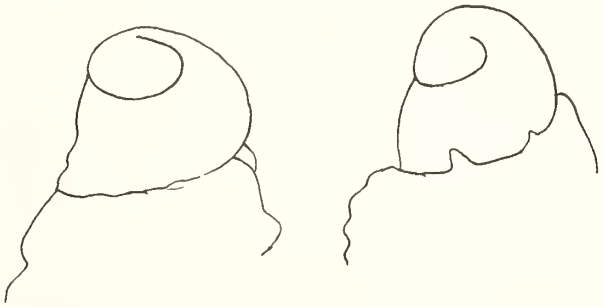

Figure 2. *Favartia munda*, protoconchs of two specimens in SDNHM 78063 at 32.4X.

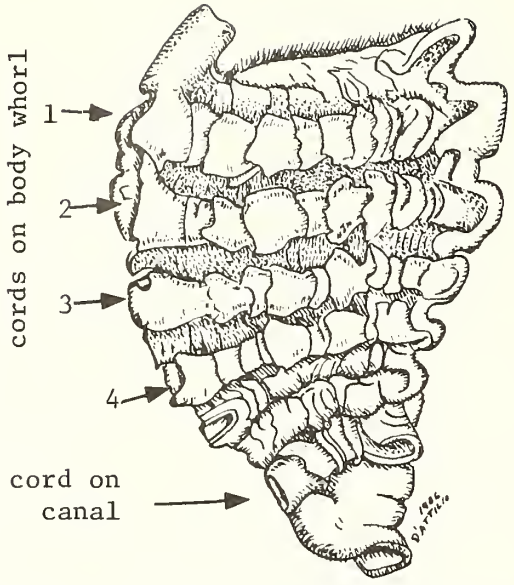

Figure 3. *Eavartia munda*, camera lucida drawing showing dorsal area from lip edge to penultimate varix at 16.6 X.

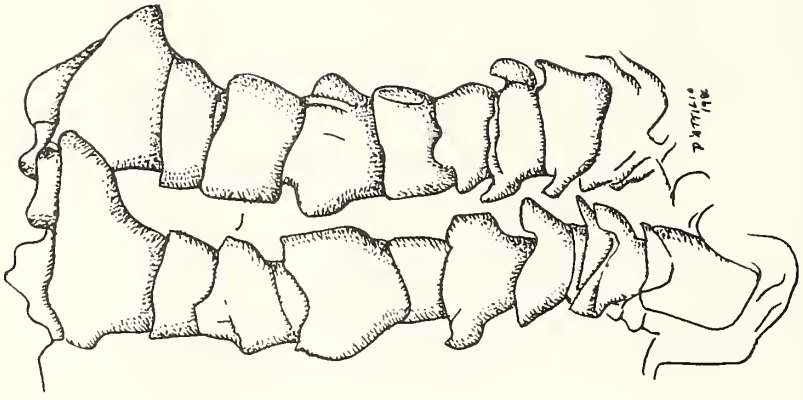

Figure 4. *E. munda*, detail of two scabrous cords on specimen shown in Figure 3 at 32.5X.

Eavartia dorothyae Emerson & D'Attilio, 1979 (Figure 5) attains a height of about 20 mm. See D'Attilio (1980) for discussion of morphology and illustration of the

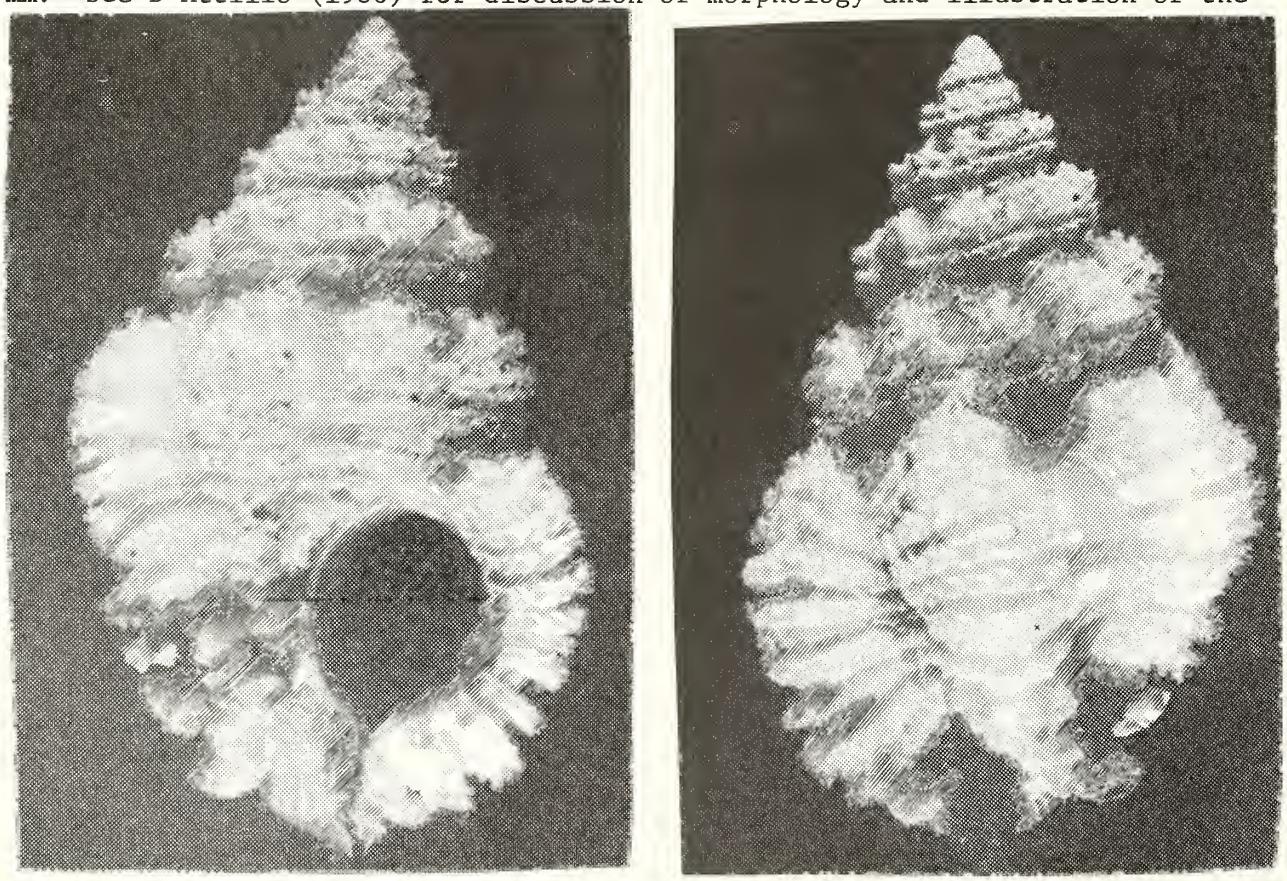

Figure 5. *Eavartia dorothyae* Emerson & D'Attilio, 1979. SDNHM 81718, 15.0 mm H, Punta Engano, Mactan, Philippine Is., in net traps in 119 m (65 fm.), apertural and dorsal views.

protoconch, operculum and radula. There are five weakly sculptured cords on the body whorl and one in the concave area between the body whorl and the canal. The shoulder has a few ephemeral cords distally which project as a spiny ridge (Figure 6). The intervarical area is small with the leading edge of the varical margin almost central. Most of the rich sculpture is found on the leading side of the elevated varices which are distally recurved and scabrously ornamented (Figure 7) and the leading surface of the spinose flange consists of a series of 5 to 7 overlapping, undulate scabrous lamellae per spine shown in detail in Figure 8. The surface can be best thought of as a furbelow drapery. The scale-like lamellae are irregularly connected from spine to spine, but distally the spines are broadly open and their terminations are strongly recurved (Figures 6 and 7).

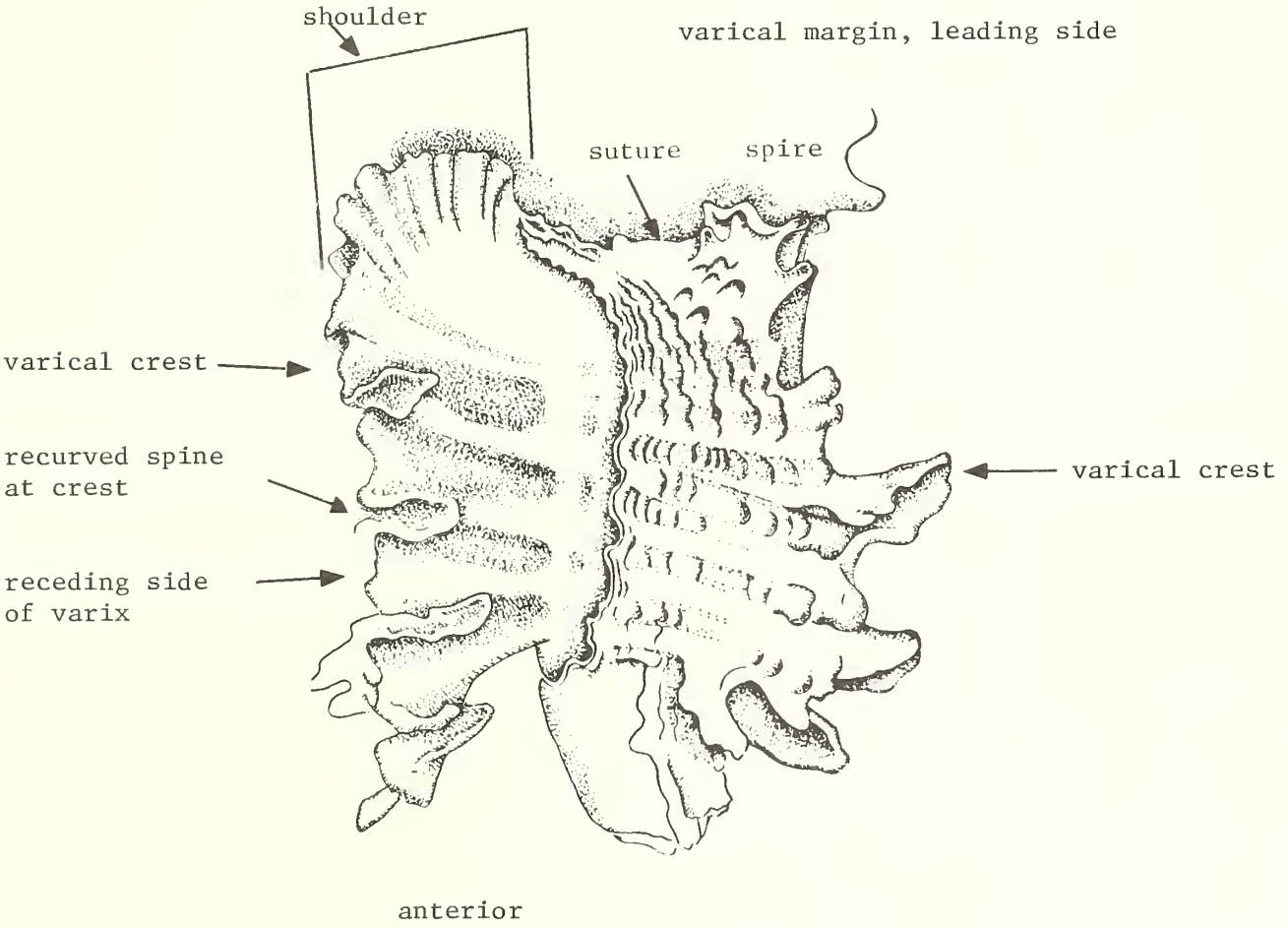

Figure 6. *Favartia dorothyae*, SDNHM 87745, 23.1 mm H, camera lucida drawing of dorsal area showing the area between the crests of two varices at 7.8 X. Note that the varical margin is midway in the small intervarical area.

This species does not differ substantially from the generic type, *Favartia brevicula* (Sowerby, 1834). In the type the spinose flange is more regularly and symmetrically formed and the low spine area is crossed by thick lamellae, each some distance apart lending the shell its sculpture of window-like depressions.

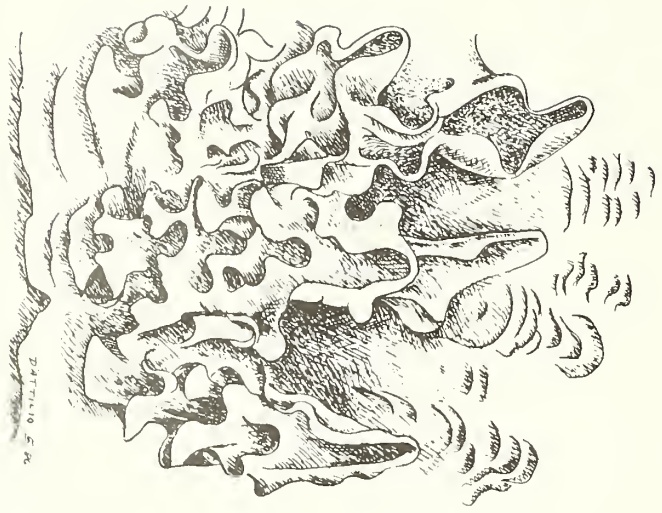

Figure 7. *F. dorothyae*, camera lucida drawing of a portion of the outer lip of the specimen shown in Figure 6, at 16.5 X.

Figure 8. *F. dorothyae*, detail at 32X of spine shown at A on specimen in Figure 7.

LITERATURE CITED

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1979. Six new living species of muricacean gastropods. Nautilus 93(1):1-10, 21 figs.

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1849. Conchologia Iconica, or illustrations of the shells of molluscous animals. *Murex*. London. Suppl., pl. 1.

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1834. The Conchological Illustrations. *Murex*. London. pls. 58-67.

SHELLING IN DIEGO GARCIA, BRITISH INDIAN OCEAN TERRITORY

BY

BILL ROMER

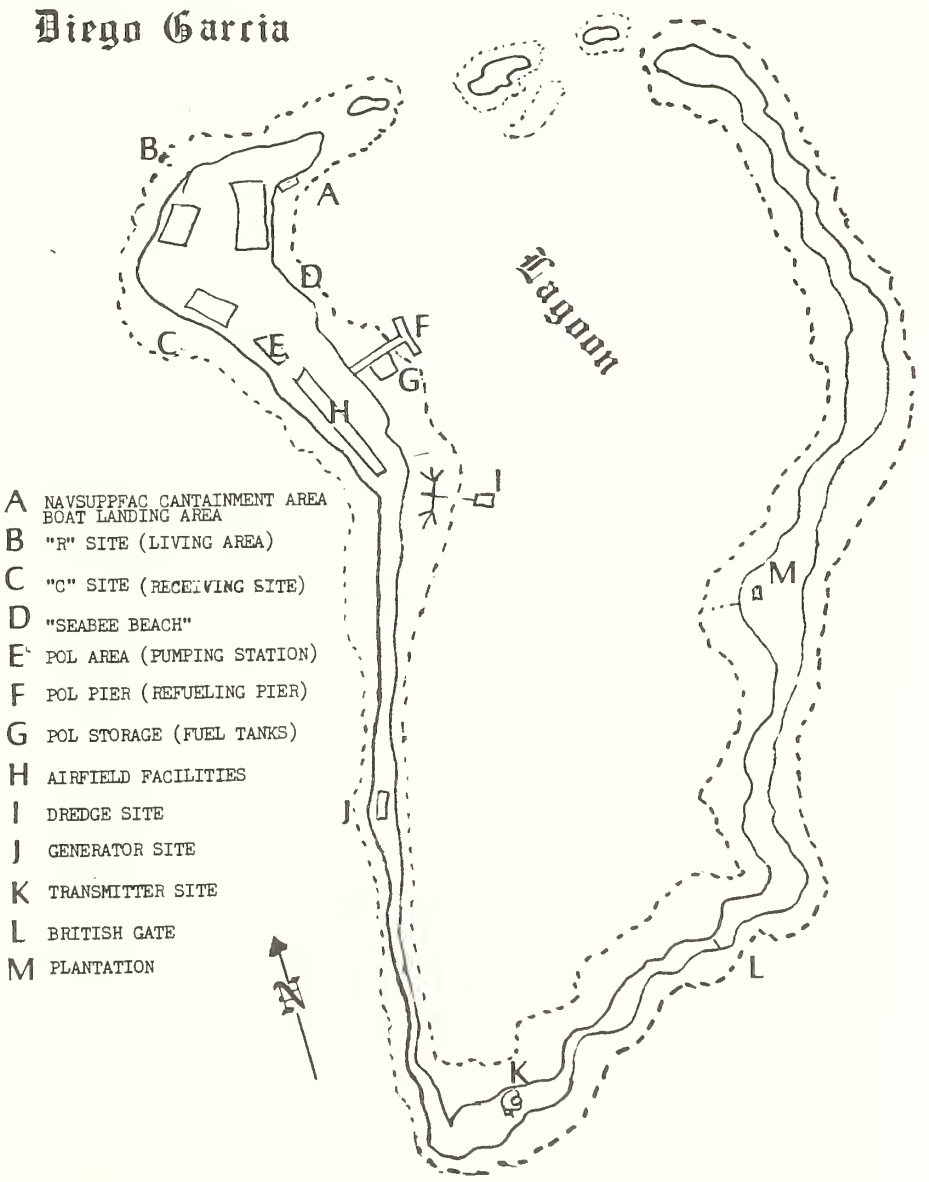
3249 Towser, San Diego, California 92123

As an employee of the U.S. Navy, I had the unique opportunity to visit a remote tropical island. Being assigned to the U.S.S. ACADIA (AD-42) on its first western Pacific deployment, we visited this paradise in March of 1983. This paradise is, of course, Diego Garcia, British Indian Ocean Territory, and we were sent there to provide repair services to our deployed ships cruising in the Indian Ocean.

Diego Garcia is a coral atoll located in the Chagos Archipelago [7°14'20"S; 72°26'E] almost exactly centered in the Indian Ocean. The Island is shaped like a footprint without toes, forming a horseshoe around a very large lagoon (see Map I). The ball of the foot, or main part of the island, is where all the base facilites are located. From there the island runs south approximately 22 miles to the southern tip and then turns north for 21 miles to the far side, or British side of the island. It was on the 22 mile strip of land that most of my collecting took place. The width of the island varies from just over two hundred feet to just under a mile.

Diego Garcia has facilities for refueling and resupplying ships and aircraft of the U.S. Pacific fleet, and has an airstrip capable of handling the biggest cargo planes. Leased from Great Britain, which once used it as a penal colony, Diego Garcia provides a safe haven for ships as well as a rest and recreation area.

Scuba diving was not allowed because there was no decompression chamber available and swimming on the ocean sides of the island was also forbidden. In fact, wading was only



Map I. Diego Garcia, British Indian Ocean Territory

allowed as long as you didn't go deeper than knee-level since there were strong rip currents, coral channels and, most of all, sharks in ankle-deep water. If you didn't watch for the sharks, they would swim between your legs.

That's the bad news, now for the good. Snorkeling and free diving inside the lagoon were permitted from sunrise to sunset. Many a good coral head was there to explore as well as coral rubble and sand. The airstrip and refueling pier (F,G,H) were built by dredging so just digging in the sand in these areas offered many shells. Walking along the beach at the transmitter site (K) was another source of shells and going through the dredge site off-flow (I) many fresh-dead specimens were obtained.

Most of my collecting was limited to weekends and the days I managed to escape from the job. This was ample time, but I would have spent much more time if permitted. The local recreation beach was known as "Seabee Beach" (D) for the Navy Seabee battalion stationed there. It was the best area for collecting, even for a novice like me. This beach was far north of the dredging operations and the water was free from silt. Many species were observed on the coral and rubble in this location. When weather would not permit swimming, I would walk along the miles of beach (K) looking through the sand rubble for shells washed in by the storms or frequent the dredge site and its off-flow areas (I). The dredge was being used to deepen the harbor as well as reclaim land area. Walking through the off-flow areas and digging in the different levels of mud and silt, I obtained many fresh dead specimens. Below is a list of shells I was able to identify. Many bags of worn miters, cerithiums, cowries, moon snails and so on remain yet unidentified, some too worn to ever get named.

Diego Garcia offers some fantastic opportunities for both the novice and the experienced collector, and I had the most fun, after dark or when I could not get to the beach, trying to identify the many varied species I'd collected.

LIST OF SPECIES COLLECTED

(L = live specimens; D = dead collected shells)

SPECIES	SEABEE BEACH (D)	DREDGE SITE (I)	TRANSMITTER SITE (K)	COMMENTS
Tridacna squamosa Lamarck, 1879	L			
Turbo chrysostomus (Linné, 1758)		D		with large hermit crabs
Rhinoclavis vertagus (Linné, 1758			D	
Lambis chiragra (Linné, 1758)	L			snorkeling
L. lambis (Linné, 1758)	L			"
Strombus luhuanus Linné, 1758	L	D	D	"
S. urceus Linné, 1758	L	D		"
Cypraea annulus Linné, 1758	L			"
C. arabica Linné, 1758	L			" dwarfs
C. argus Linné, 1758		D		"
C. asellus Linné, 1758	L			"
C. caputserpentis Linné, 1758	L			
C. carneola Linné, 1758			D	
C. depressa Gray, 1824		D		
C. diluculum Reeve, 1845		D		
C. felina Gmelin, 1791			D	
C. helvola Linné, 1758	L			snorkeling
C. interrupta Gray, 1824		D		"
C. isabella Linné, 1758	L			
C. kieneri Hidalgo, 1906		D		
C. lynx Linné, 1758		D		
C. moneta Linné, 1758	L			two color forms
C. nucleus Linné, 1758		D		
C. quadrimaculata Gray, 1824		D		
C. scurra Gmelin, 1791		D		
C. staphylaea Linné, 1758		D		
C. tigris Linné, 1758	L			snorkeling
C. vitellus Linné, 1758	L	D		+60 mm from (I)
Cypraecassis rufa (Linné, 1758)		D		juvenile,
Charonia tritonis (Linné, 1758)		D		"
Cymatium muricinum (Röding, 1798)		D		
C. rubeculum (Linné, 1758)		D		
C. (Fanularia) undet.		D		

Gyrineum gyrinum (Linné, 1758)			D	
Chicoreus brunneus (Link, 1807)		D		
Nassa francolina (Bruguiere, 1789)		D		
Coralliophila undet.		D		
Engina mendicaria (Linné, 1758)			D	
Columbella undet.		D		
Harpa amouretta Röding, 1798		D		small
Mitra ferruginea Lamarck, 1811		D		
Conus coronatus Gmelin, 1791	L		L	snorkeling
C. ebraeus Linné, 1758	L		L	"
C. nussatella Linné, 1758	L		L	"
C. pulicarius Hwass, 1792	L		L	"
C. lividus Hwass, 1792	L		L	"
C. ?textile Linné, 1758		D		very worn
Aplustrum amplustre (Linné, 1758)	L			snorkeling

BOOK NEWS

NEW PUBLICATION ANNOUNCED BY E.J.BRILL

(P.O. Box 9000, 2300 PA Leiden, The Netherlands)

"*Spondylus*, Spiny Oyster Shells of the World" by Kevin Lamprell (1987), 84 pages, 36 full color plates, clothbound at $18.25 (also published in hard cover with dust jacket, no price given). The announcement states that 95 species are described in detail "supported by superb full-page coloured plates." "...an accurate up-to-date listing of scientific names including author and date of description, plus used synonyms for many species of these spiny oyster shells."

TWO NEW AUDIO SHELL CASSETTES ANNOUNCED BY R. TUCKER ABBOTT

(American Malacologists, P.O. Box 1192, Burlington, MA 01803)

"Exploring Collectible Shells," 90 minute cassette with 64 page all color book at $12.95 and "Say It Right," 35 minute cassette with 280 page, softcover book at $16.95. Add $1.00 postage and handling per cassette.

CLUB NEWS

THE CLUB'S ANNUAL CHRISTMAS DINNER PARTY--DECEMBER 5, 1987

As noted in the October issue, arrangements have been completed for the Club's annual Christmas party. It will be held in the Bronze Room of the Admiral Kidd Club (see map on last page) with no host coctails beginning at 6:00 P.M. and dinner at 7:00 P.M.

Two dinner choices are available: Coquilles San Jacques (a casserole of shrimp, crab, scallops and mushrooms baked in a creamy white sauce with a sprinkling of parmesan cheese) at $13.60 or Prime Rib of Beef (English cut with hot au jus) at $14.70. Both include tossed salad, baked potato, vegetable and coffee or tea. Tax and tip are included and our Club provides complimentary dinner wine.

Reservations must be received not later than November 19th (Club meeting date) since the Admiral Kidd Club requires payment in advance.

Following dinner and the program, the Club will hold its traditional shell gift exchange. Bring your gift wrapped shell to place under the tree. Place data and name inside the package only. On the outside put on the general locale i.e. Pacific, Caribbean, etc. Numbers will be drawn and those bringing a shell gift will choose one from under the tree.

There will be dancing in the main room throughout the evening.

It will be a great party, as always. Come and welcome the season with your friends. Guests are welcome.

NEW MEMBERS

Clark, Roger N., 549 Torrey St., Klamath Falls, OR 97601

Negus, Richard H., 140 Tamarack #2, Carlsbad, CA 92008, 434-9808

FROM THE MINUTES-SAN DIEGO SHELL CLUB MEETING-October 15, 1987

Richard Herrmann presented a slide program entitled, "San Miguel Island, Jewel of the Channel Islands. He presented spectacular underwater and topside slides of the island and surrounding sea life. This northernmost island differs from the other Channel Islands in the influence of cold water currents. Richard showed a variety of fishes, sea stars, anemones and sand animals from this beautiful area.

At the business portion of the meeting the slate of officers for 1988 was presented as follows: President: Bill Romer, Vice President: Bob Yin, Recording Secretary: Wayne Reed, Treasurer: Margaret Mulliner, Editor: Carole Hertz. The position of Corresponding Secretary is still unfilled. Nominations from the floor will be entertained at the November meeting prior to the election of officers.

Bob Yin proposed a two-presentation format for meetings, one formal, longer talk and one less formal speaker after the refreshment break.

The Christmas Party was discussed. The deadline for reservations is November 19. (See above).

The newest business announced was the arrival of Carol and Bill Romer's baby on October 12 at 11:55 P.M.

The delicious cookies were provided by Kay Taylor and Marge Bradner.

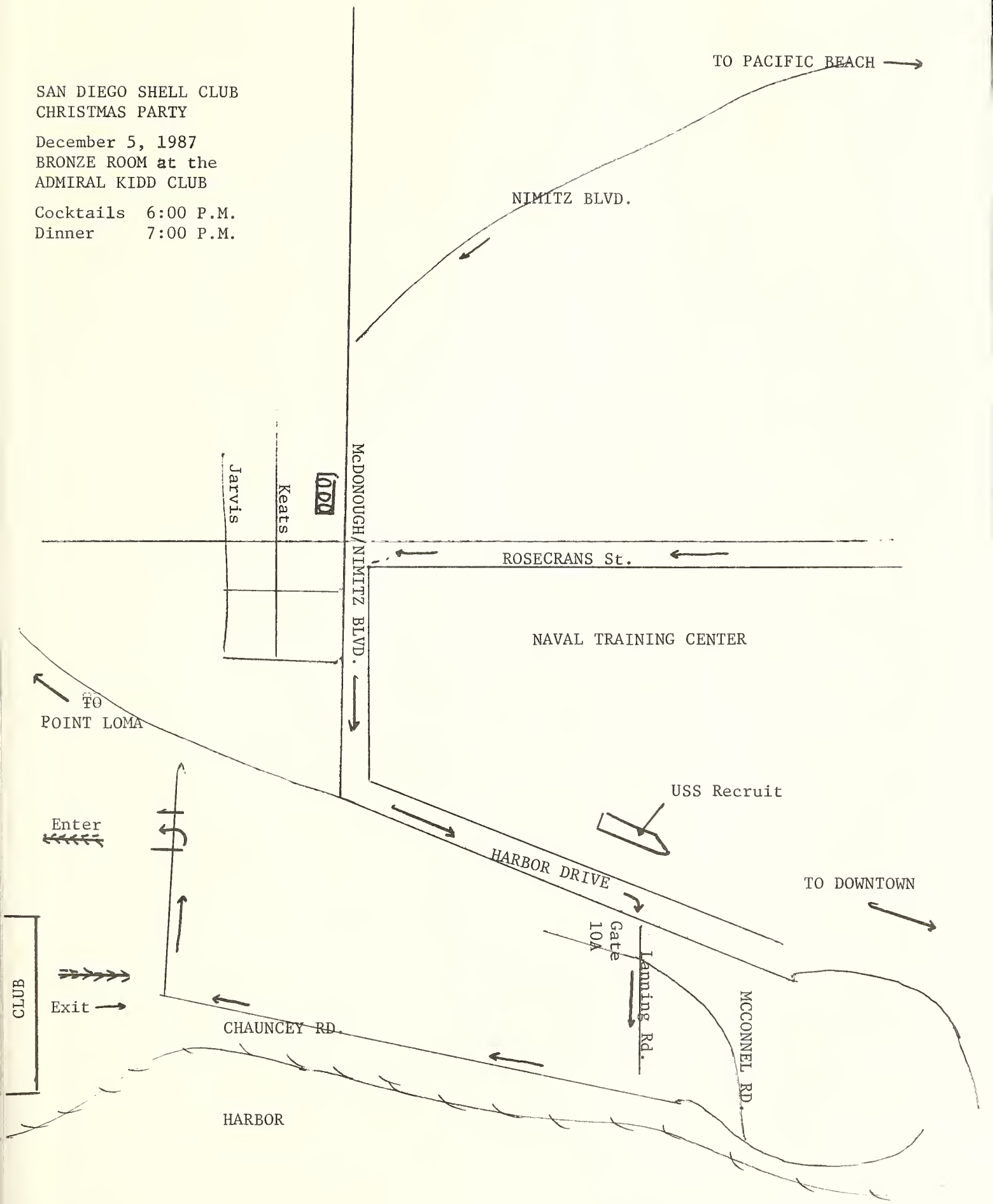
Ginny Herrmann

A SELECTED INDEX TO VOLUME XIX (1987)

SAN DIEGO SHELL CLUB
CHRISTMAS PARTY

December 5, 1987
BRONZE ROOM at the
ADMIRAL KIDD CLUB

Cocktails 6:00 P.M.
Dinner 7:00 P.M.



ISSN: 0738-9388

THE FESTIVUS

A publication of the San Diego Shell Club

Volume: XX | January 14, 1988 | Number: 1

MEMBERSHIP AND SUBSCRIPTION

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Meeting date: third Thursday, 7:30 P.M., Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

"Shell Collecting Through History"

Member Wayne Reed will present this illustrated talk and will discuss early shell collectors and their collections with slides of early engravings and artifacts.

Meeting date: January 21, 1988

CONTENTS

SIMNIA VIDLERI AT ANACAPA ISLAND

BY

RICHARD HERRMANN

7709 Eads Avenue, La Jolla, California 92037

In mid July 1987 a team of biologists on the research vessel Cormorant dived off Anacapa Island, California for five days. The Cormorant is the research vessel of the Channel Islands Research Program (C.I.R.P.), a privately funded program to study the natural history of the waters surrounding the Channel Islands. The goal of this cruise was to look at the dynamics of the urchin and coralline algae dominated areas of the southern coast of East Island.

During a photographic session I noticed relatively large numbers of *Simnia vidleri* (Sowerby, 1881) on the red gorgonian *Lophogorgia chilensis* (Verrill, 1868). See Figure 1. In some cases I saw up to four *S. vidleri* on one gorgonian. Egg masses were present in many cases, often in association with one or two of the animals (Figure 1). In one observation, Peter Haaker of the California Department of Fish and Game reported 10 *Simnia* on a single gorgonian with egg masses present. *Lophogorgia chilensis* is common in the 30-50 foot boulder-reef area that we were studying and is easily spotted in the urchin dominated "barrens" as a result of a lack of leafy algae.

Simnia vidleri is not considered a common gastropod in the Southern California Bight. In personal observations I have seen about four in 1,500 dives. During this period there were certainly large numbers of *S. vidleri* at Anacapa Island. In conversations with others familiar with the biota of Southern California, Anacapa Island was mentioned as the one site where this gastropod was seen in significant numbers.

I thank Dave Mulliner for making the black and white print from my 35 mm color slide.

Figure 1. Two specimens of *Simnia vidleri* on the red gorgonian *Lophogorgia chilensis*. Note the eggs laid on the gorgonian by the upper specimen of *Simnia*.

ON THE SYSTEMATIC POSITION OF MUREX PERMAESTUS HEDLEY, 1915, A MURICOPSINE SPECIES

BY

ANTHONY D'ATTILIO

Associate, Department of Marine Invertebrates, San Diego Natural History Museum
Balboa Park, P.O. Box 1390, San Diego, California 92112

Introduction

The shell of *Murex permaestus* Hedley, 1915, superficially resembles specimens of the Muricinae genus *Naquetia* Jousseaume, 1880 (type species by O.D. *Murex triqueter* Born, 1778). However, examination of the radula of *M. permaestus* shows it to be muricopsine.

The nomenclatural status of *Murex permaestus* Hedley, 1915, was investigated by Cernohorsky (1971) who placed this taxon in the genus *Chicoreus* Montfort, 1810. He concluded that the only known valid name proposed for this poorly known species was that of Hedley. According to Cernohorsky's report on the examination of the lectotype of *Murex capucinus* Lamarck, 1822, that specimen is a large 124.7 mm worn specimen of *Murex torrefactus* Sowerby, 1841. Cernohorsky considered *Murex capucinus* Röding, 1798, because of its nomenclatural problems, to be a *nomen dubium*.

Material Examined (all SDNHM numbers)

10851 (2 spec.) Philippine Is.
78849 (1 spec.) Roebuck Bay, N.W. Australia
24173 (4 spec.) Cape Dan, N. Australia
83007 (2 spec.) N.W. Cape, W. Australia
72074 (2 spec.) Broome, W. Australia
78854 (1 spec.) Buin, Bougainville, New Guinea
82957 (1 spec.) Samar, Philippine Is.
78834 (2 spec.) Zamboanga, Philippine Is.
24177 (4 spec.) Australia
61619 (1 spec.) Santa Cruz, Davao, Philippine Is.
78839 (2 spec.) Zamboanga, Philippine Is.
78851 (1 spec.) Moluccas, Indonesia
78940 (1 spec.) Darwin, N.W. Australia
78835 (3 spec.) Zamboanga, Philippine Is.
41800 (1 spec.) Queensland, Australia
78853 (1 spec.) Zamboanga, Philippine Is.
2490 (1 spec.) Philippine Is.

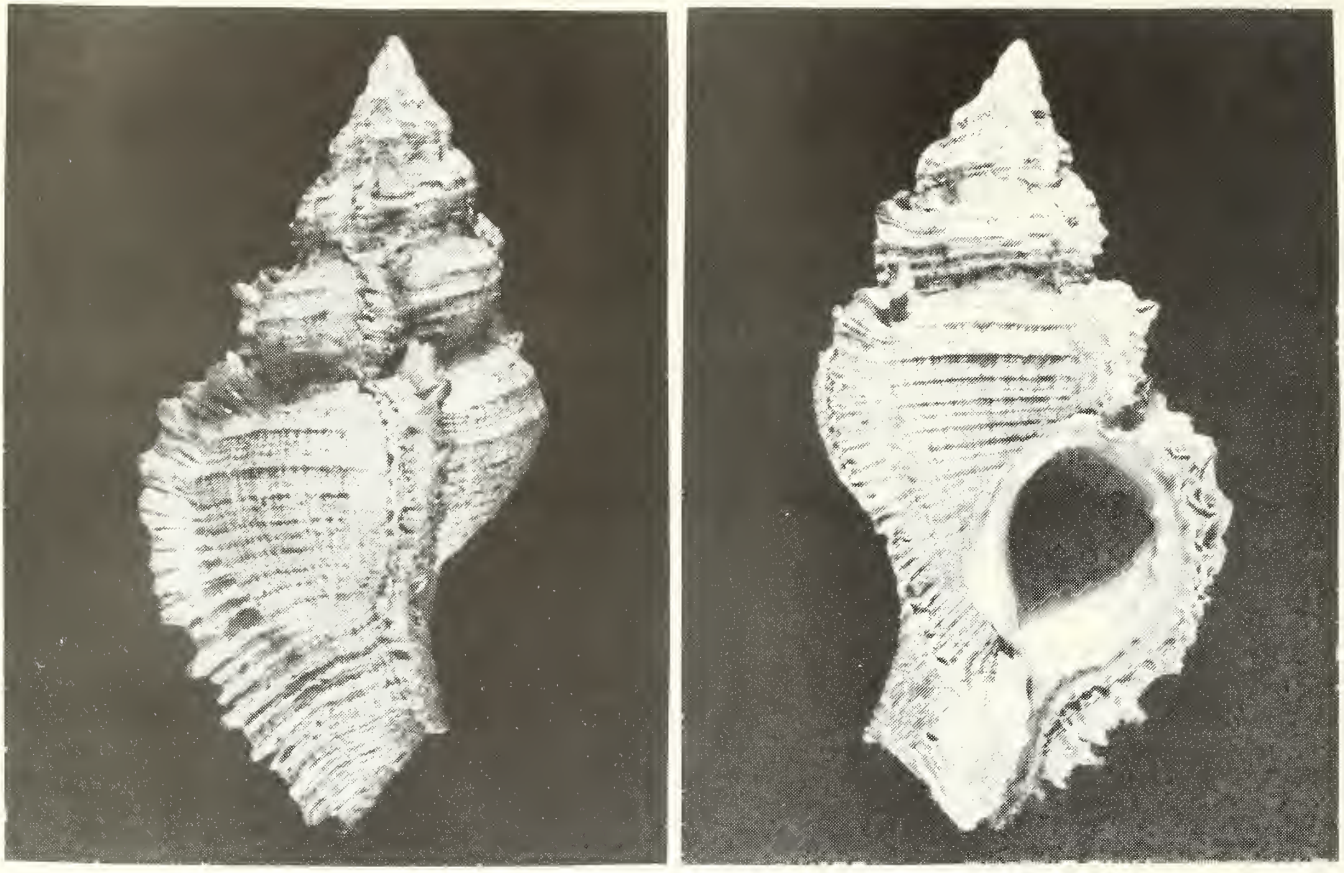
Systematic Account

Murex permaestus Hedley, 1915
Purpura capucinus Röding, 1798, *nom. dub.* [Cernohorsky, 1971]
Naquetia capucinus of authors [*non Murex capucinus* Lamarck, 1823 = *M. torrefactus* Sowerby, 1841]

Discussion

Murex permaestus is well defined in its shell characters but its systematic placement is in doubt. The shell has three varices per whorl, composed of low, sharp, pointed undulating ridges in roughly parallel rows, the earliest broadest and upright followed by two less prominent ridges. At the shoulder the prominent ridge is recurved and the sharp points protracted. The ridges continue along the canal edge. Spiral sculpture is of numerous widely spaced fine nodulose cords with incremental growth lines well defined. In the brown aperture, the outer lip crenulations are raised into lirae and swollen into small knobs. The inner lip is smooth.

A very large specimen (Figures 1 and 2) examined from Zamboanga, Philippine Islands (SDNHM 78834) measures 96.2 x 49.9 mm. More usual specimens are from 32 to 80 mm in length as noted in Radwin and D'Attilio, 1976, and Cernohorsky, 1971. In this large specimen (Figures 1 and 2), the entire shell has a relatively thick white calcitic layer over the brown under-surface. This layer is worn off on the most elevated portions of the surface sculpture. When overcleaned, the shell of this species appears entirely dark brown in color. In young specimens the white coating resembles a thin translucent soapy layer which differs from intriticalx (D'Attilio and Radwin, 1971).

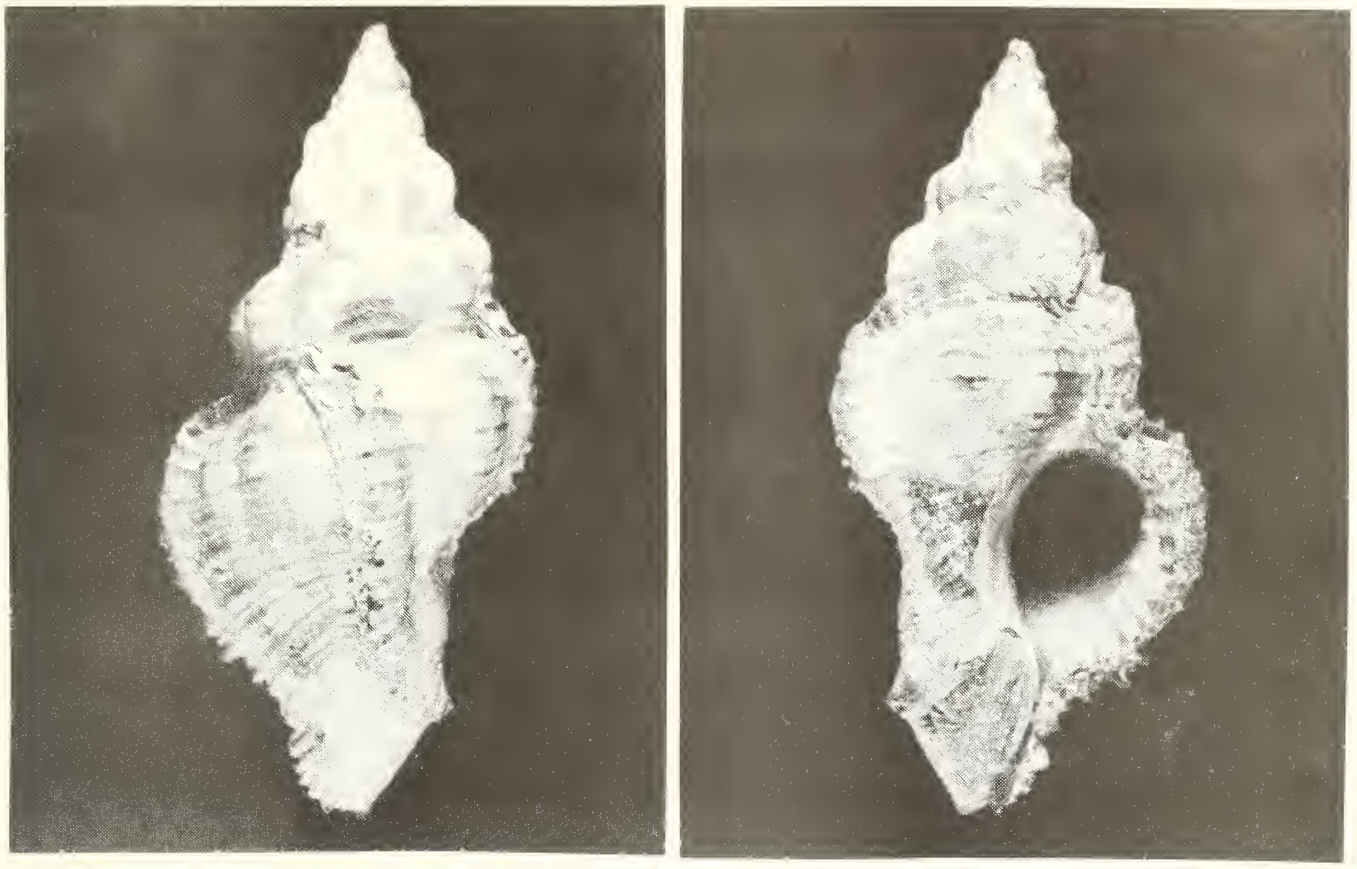


Figures 1 and 2. *Murex permaestus* Hedley, 1915, SDNHM 78834, 96.2 mm L from Zamboanga, Philippine Islands. (1) dorsal view (2) apertural view
Photos: D.K. Mulliner

The radula was obtained from a 51 mm specimen (SDNHM 72074) shown here in Figures 3 and 4. The specimen was taken at Broome, West Australia in the early 1970s by Mr. D. Tietzel. Examination of the radula revealed that it is typical of the subfamily Muricopsinae with the prominent central cusp projecting forward and the two lateral cusps which, large also, project away from the rachidian plate (Figure 5). The Muricinae radula, in contrast, is relatively flattened without arching or forward thrusting cusps on the rachidian plate.

On the basis of the muricopsine radula, placement of this species in *Chicoreus* or *Naquetia* seems untenable. The determination of the systematic position of this species is complicated because on shell morphology it superficially resembles *Naquetia* species, but that genus is in the subfamily Muricinae whereas the radula of *Murex permaestus* is Muricopsinae.

Since there are no known close congeners, the species is probably monotypic.



Figures 3 and 4. *Murex permaestus*, SDNHM 72074, 51.0 mm L, from Broome, West Australia (3) dorsal view (4) apertural view. Photos: D.K. Mulliner

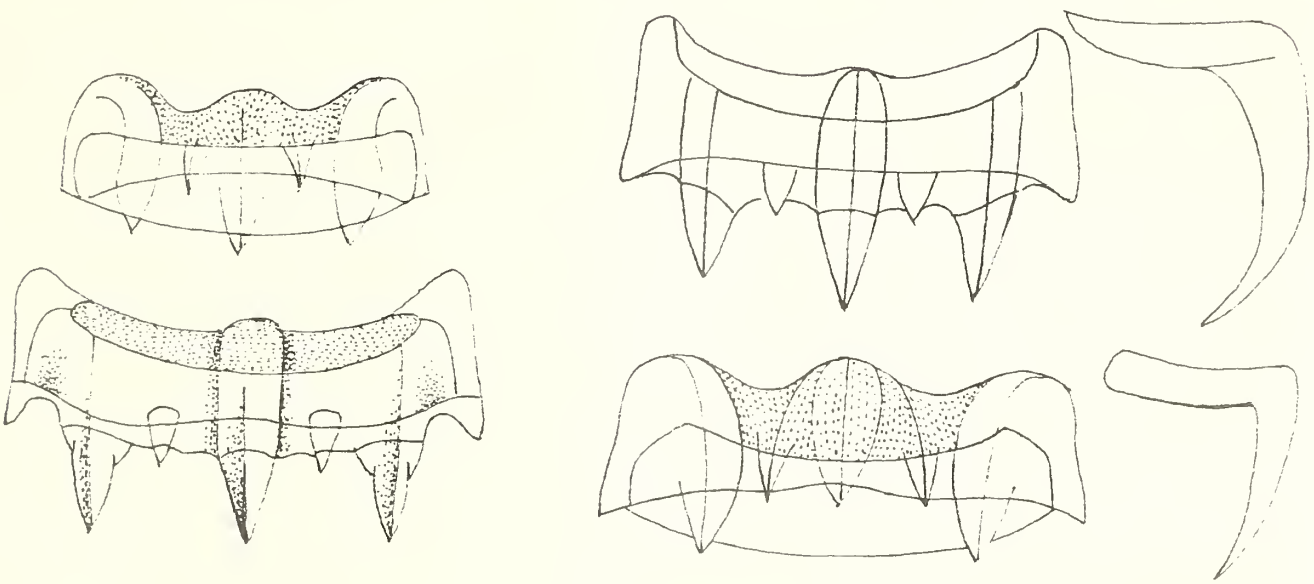


Figure 5. *Murex permaestus*, four views of the radula from specimen SDNHM 72074

ACKNOWLEDGMENTS

I gratefully acknowledge the assistance of David K. Mulliner for the photography. The late George E. Radwin extracted and mounted the radula.

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CLUB NEWS

THE ANNUAL CLUB CHRISTMAS DINNER PARTY

Forty-eight members and guests assembled in the Bronze Room of the Admiral Kidd Club for one of the best Club Christmas parties ever.

The lovely room was enhanced by poinsettias in shells as table decorations arranged by June King and shell candydish favors prepared by Ginny Herrmann as well as the tree with shell and Christmas ornaments brought by Bill Romer.

Following a delicious dinner, Master of Ceremonies Richard Herrmann led the proceedings. The new board was introduced, the old board thanked for its efforts and John Souder, host for the evening, was introduced. All were given a round of applause. Outgoing President Wes Farmer presented "thank you" shell gifts to his board and others who helped him during the year, and Editor Carole Hertz thanked the Club for its support and recognized those whose efforts were essential to The Festivus--Dave Mulliner, Jules Hertz and Barbara Myers. Richard then introduced the program for the evening--mini-slide presentations of places visited by Club members during the year. The many beautiful images were enjoyed by all.

The last and eagerly awaited finale to the proceedings, the shell gift exchange, was great fun as always. A hum of ooohs and aahs could be heard as the gifts chosen from under the tree were unwrapped and their contents revealed.

It was a grand beginning to the holiday season.

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - 19 NOVEMBER 1987

The Club speaker was Bert Draper who gave a fascinating slide presentation entitled "How Gastropods Make Their Shells." He also had a display of sectioned shells to highlight his talk. He discussed shell composition, the role of the mantle and the effects of the environment on the shell.

After the refreshment break with delicious cookies provided by Debbie and Larry Catarius and an unknown donor, there was a brief business meeting.

The election of officers for 1988 was held and the slate of officers was elected by unanimous vote. President Bill Romer, Vice President Bob Yin, Treasurer Margaret Mulliner, Recording Secretary Wayne Reed, Editor Carole Hertz. The board still lacks a corresponding secretary.* The officers will be installed at the Christmas Party. The shell drawing was won by Margaret Mulliner.

Ginny Herrmann, Acting Secretary

* After the Christmas party, Jules Hertz volunteered to be corresponding secretary and this was unanimously approved by the board.

CHANGE OF ADDRESS

Buck, Larry, 2534 Via Pisa, Del Mar, CA 92014, 792-5404

ANNOUNCEMENT OF NEW BOOK

A FIELD GUIDE TO MOLLUSCAN SPAWN, VOL. I by Beatrice E. Winner, 1987. Price: $9.95 + $1.50 shipping, prepaid. "illustrated by many photos of shells, their egg masses and their modes of fertilization and reproduction..." plus general and common name indices. Number of pages or illustrations not given. For further information write to: E.B.M., P.O. Box 14923, North Palm Beach, FL 33408.

THE FESTIVUS

A publication of the San Diego Shell Club

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Volume: XX | February 11, 1988 | Number: 2

MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional

Meeting date: third Thursday, 7:30 P.M., Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

Norbert Wu, a graduate student at Scripps Institution of Oceanography will be our speaker. Mr. Wu was an underwater still photographer with the Cousteau expedition to New Zealand and his photography was on exhibit at the Lawrence Hall of Science in San Francisco. He will present a slide program entitled:

"Life in a Kelp Forest"

Meeting date: February 18, 1988

CONTENTS

EXCERPTS FROM THE 1988 TIDE CALENDAR FOR THE NORTHERN GULF OF CALIFORNIA

The entries listed below will show only periods of low tides of -4.0 feet * and below. The tidal measurements, in this calendar prepared by The Department of Ecology and Evolutionary Biology, University of Arizona, are for Puerto Peñasco and are given in Mountain Standard Time. To correct for San Felipe, subtract one hour from listed times (San Felipe is on Pacific Standard Time). For Bahía de Los Angeles, add 15-30 minutes to calendar predictions (the amplitude at Bahía de Los Angeles is about one-half of calendar measurements). Tides at Santa Rosalia and Guaymas cannot be estimated using this calendar. [Interpretation of tide calendar is approximate.]

February
14. -3.8 at 6:00 P.M.
15. -5.0 at 7:00 P.M.
16. -6.1 at 7:30 P.M.
17. -6.5 at 8:00 P.M.
18. -4.4 at 8:30 A.M.
-6.1 at 8:30 P.M.
19. -4.7 at 9:00 A.M.
-5.0 at 9:00 P.M.
20. -4.1 at 9:30 A.M.

March
15. -4.0 at 6:00 P.M.
16. -3.9 at 6:30 A.M.
-5.9 at 6:30 P.M.
17. -4.9 at 7:00 A.M.
-5.9 at 7:15 P.M.
18. -6.0 at 7:30 A.M.
-4.9 at 7:45 P.M.
19. -5.9 at 8:00 A.M.
-3.9 at 8:30 P.M.
20. -4.3 at 9:00 A.M.

April
2. -4.0 at 8:00 A.M.
3. -3.9 at 8:30 A.M.
4. -3.9 at 8:30 A.M.
14. -4.0 at 7:00 A.M.
-3.9 at 6:45 P.M.
15. -5.0 at 7:00 A.M.
-3.8 at 7:30 P.M.
16. -5.9 at 7:15 A.M.
17. -5.0 at 8:15 A.M.
18. -3.9 at 9:00 A.M.

May
2. -4.0 at 8:00 A.M.
3. -3.8 at 8:30 A.M.
14. -3.9 at 7:00 A.M.
15. -4.1 at 7:30 A.M.
16. -4.0 at 8:00 A.M.

June
29. -4.0 at 8:00 A.M.
30. -4.2 at 8:30 A.M.

July
28. -4.8 at 7:30 A.M.
29. -5.8 at 8:00 A.M.
30. -5.9 at 8:30 A.M.
31. -4.2 at 9:30 A.M.

August
25. -4.0 at 6:30 A.M.
26. -5.5 at 6:50 A.M.
27. -6.0 at 7:15 A.M.
-3.9 at 8:15 P.M.
28. -5.9 at 8:30 A.M.
-4.2 at 9:00 P.M.
29. -4.4 at 9:30 A.M.
-4.0 at 9:30 P.M.

September
23. -3.9 at 6:00 A.M.
24. -4.4 at 6:30 A.M.
-4.1 at 7:00 P.M.
25. -4.9 at 8:00 A.M.
-4.9 at 8:30 P.M.
26. -4.2 at 8:30 A.M.
-4.5 at 8:00 P.M.
27. -4.2 at 9:00 P.M.

October
23. -4.2 at 7:00 P.M.
24. -5.5 at 7:30 P.M.
25. -5.6 at 8:00 P.M.
26. -4.2 at 8:30 P.M.

November
21.. -3.9 at 6:15 P.M.
22. -4.0 at 6:50 P.M.
23. -4.1 at 7:00 P.M.
24. -3.8 at 7:45 P.M.

* Slightly higher tides are listed when in conjunction with a series of -4 foot tides and below.

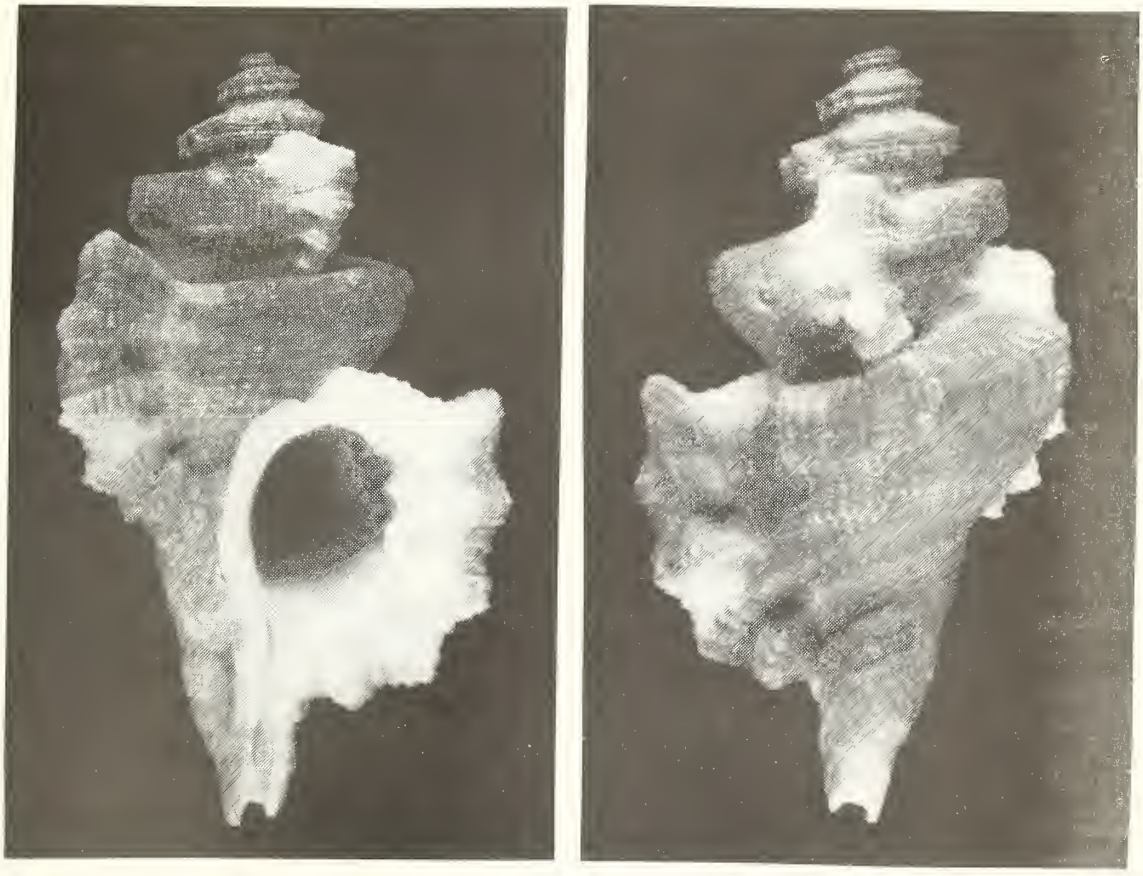
CYMATIUM GIBBOSUM AT PALOS VERDES

BY

LARRY CATARIUS

4173 Galt Street, San Diego, California 92117

On Saturday June 11, 1983, Bob Pike of Buena Park and I were diving in 13.7 meters (45 feet) of water off Palos Verdes, California. We were looking for *Pteropurpura trialata* (Sowerby, 1844) on sand next to rocks when I collected a live, 42.6 mm specimen of *Cymatium gibbosum* (Broderip, 1833) (Figures 1 and 2).



Figures 1 and 2. *Cymatium gibbosum* (Broderip, 1833), apertural and dorsal views. Length: 42.6 mm, Location: Palos Verdes, California in 13.7 m. Photos: D. Mulliner

Upon surfacing, I showed it to Bob and we decided to make a second dive in the same area and look for more. No others were found. Bob took the specimen home and put it in his aquarium where it lived for another three months. It was not observed feeding in the aquarium.

This species has not been reported from this area in recent years. Keen's (1971:508) SEA SHELLS OF TROPICAL WEST AMERICA reports it from Sonora, Mexico to the Galapagos Islands and Peru and *C. adairensis*, a possible subspecies with coarser sculpture, restricted to the northern Gulf of California. However, Dall in 1921 in the USNM BULLETIN 112, page 141, listed the species from "San Pedro and San Diego, California, to Panama."

A NOTE ON THE DISTRIBUTION OF SIRATUS PLICIFEROIDES (KURODA, 1942)

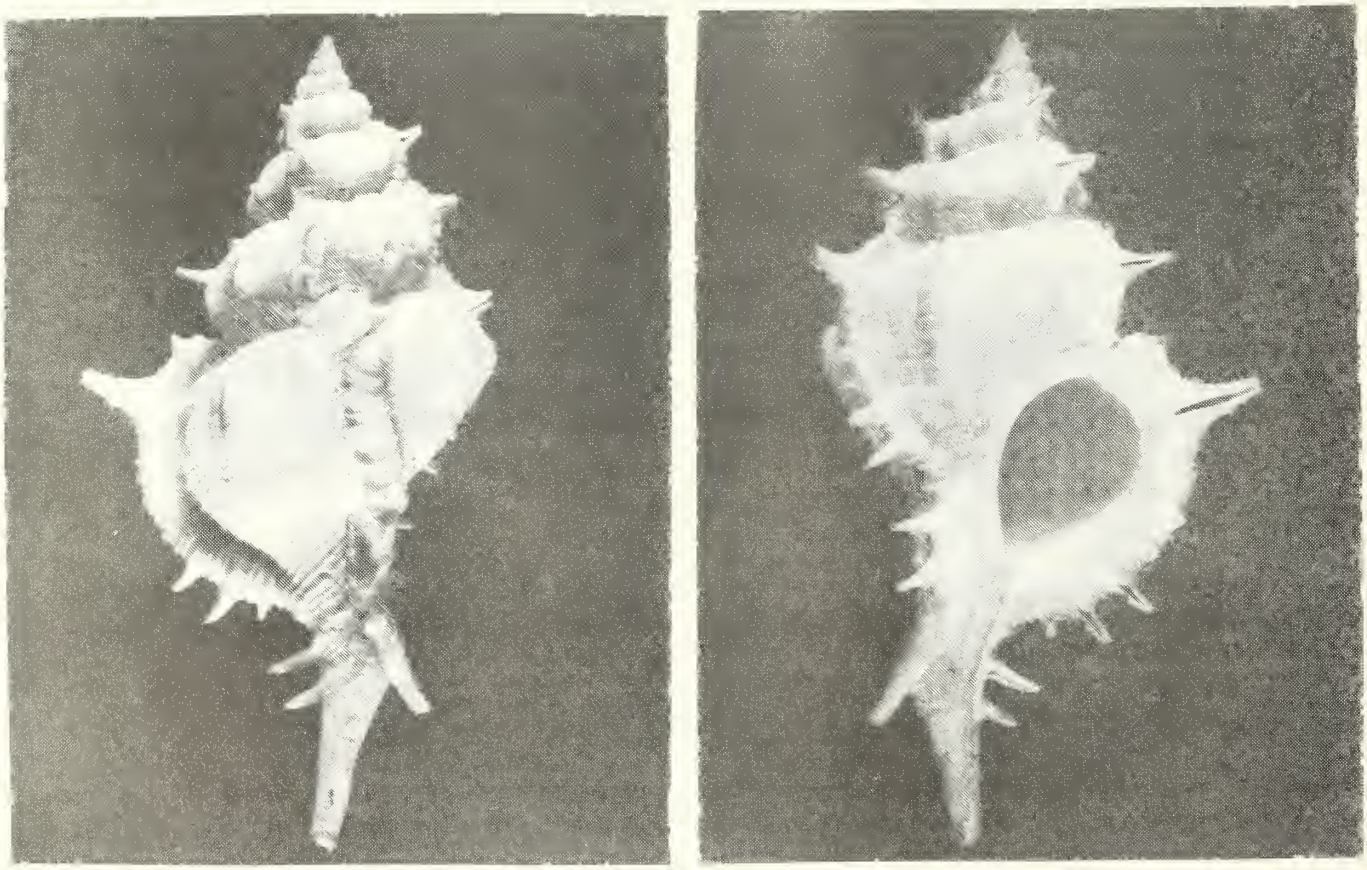
BY

ANTHONY D'ATTILIO and BARBARA W. MYERS

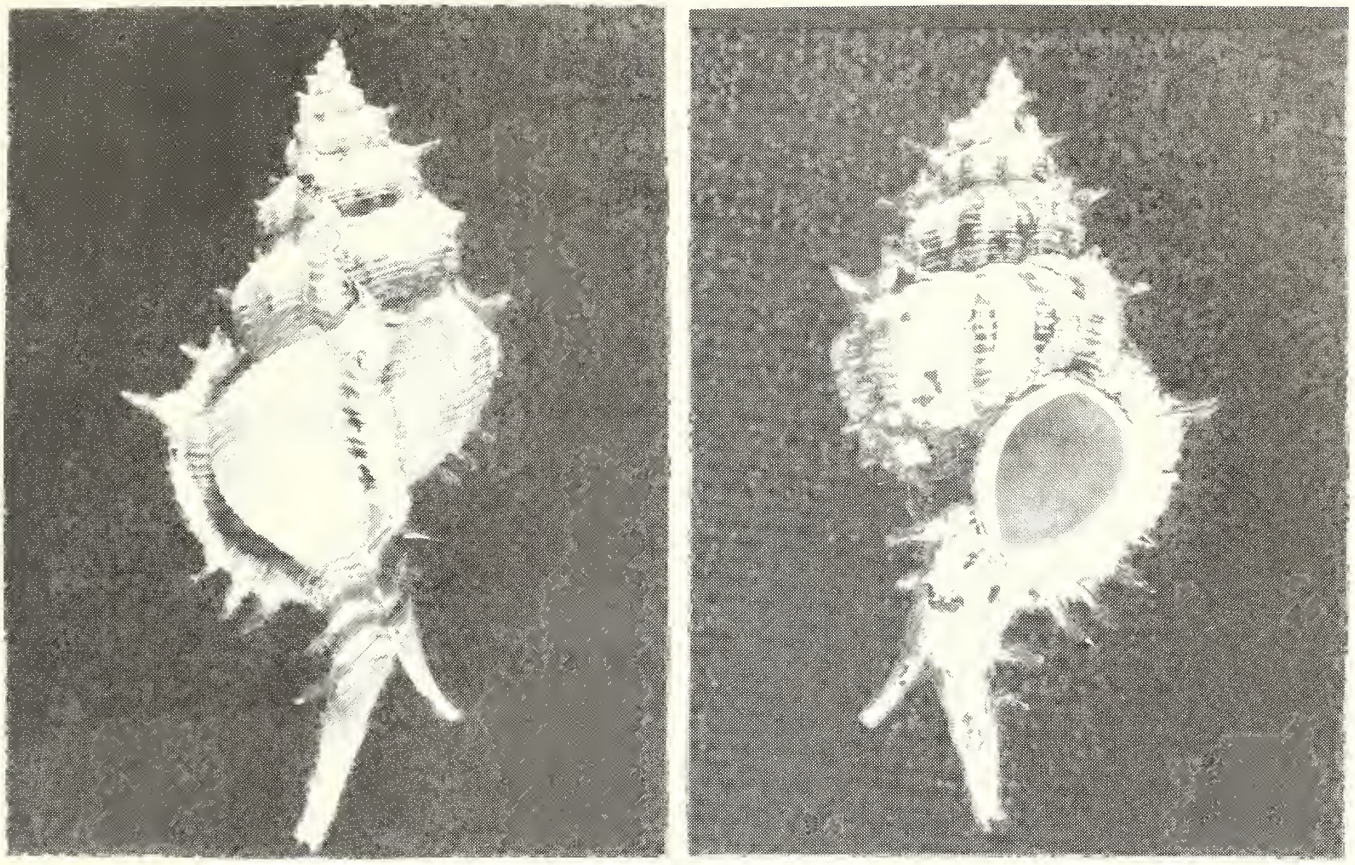
Associates, Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

Siratus pliciferoides (Kuroda, 1942) was first described by Sowerby in 1841 as *Murex pliciferus* [*non* Bivona-Bernardi, 1832]. The shell is large (maximum 130+ mm), fusiform with a moderately long siphonal canal.

Until recently the distribution of *Siratus pliciferoides* has been confined to the northern portion of the western Pacific, *i.e.* Japan, China, Taiwan and the Philippine Islands (Figures 1-4). When Sowerby described *Murex pliciferus*, he gave no type locality for the species. His specimen was from the collection of Hugh Cuming, who often kept collecting data separate from his specimens with the intention of adding the information at a later date (Dance, 1966). We might tentatively establish the Philippine Islands as the type locality since Cuming reached the northern extension of the Philippines on his thrid voyage (Dance, 1966). No evidence has been found that he collected in China, Japan or Taiwan. In addition, the coloration of Sowerby's illustration (Conch. Illus., pl. 195, fig. 101) is more nearly like that of Philippine Island specimens, *i.e.*, with brown stripes rather than the almost dead white of the Japanese shell.



Figures 1 and 2. *Siratus pliciferoides* (Kuroda, 1942). SDNHM 79054, from Kii, Japan. Size: 102.1 x 47.0 mm, dorsal and apertural views Photos: D. Mulliner



Figures 3 and 4. *Siratus pliciferoides*. SDNHM 62005, from Batangas Bay, Philippine Islands, Size: 118.5 x 54.0 mm, dorsal and ventral views. Photos: D. Mulliner

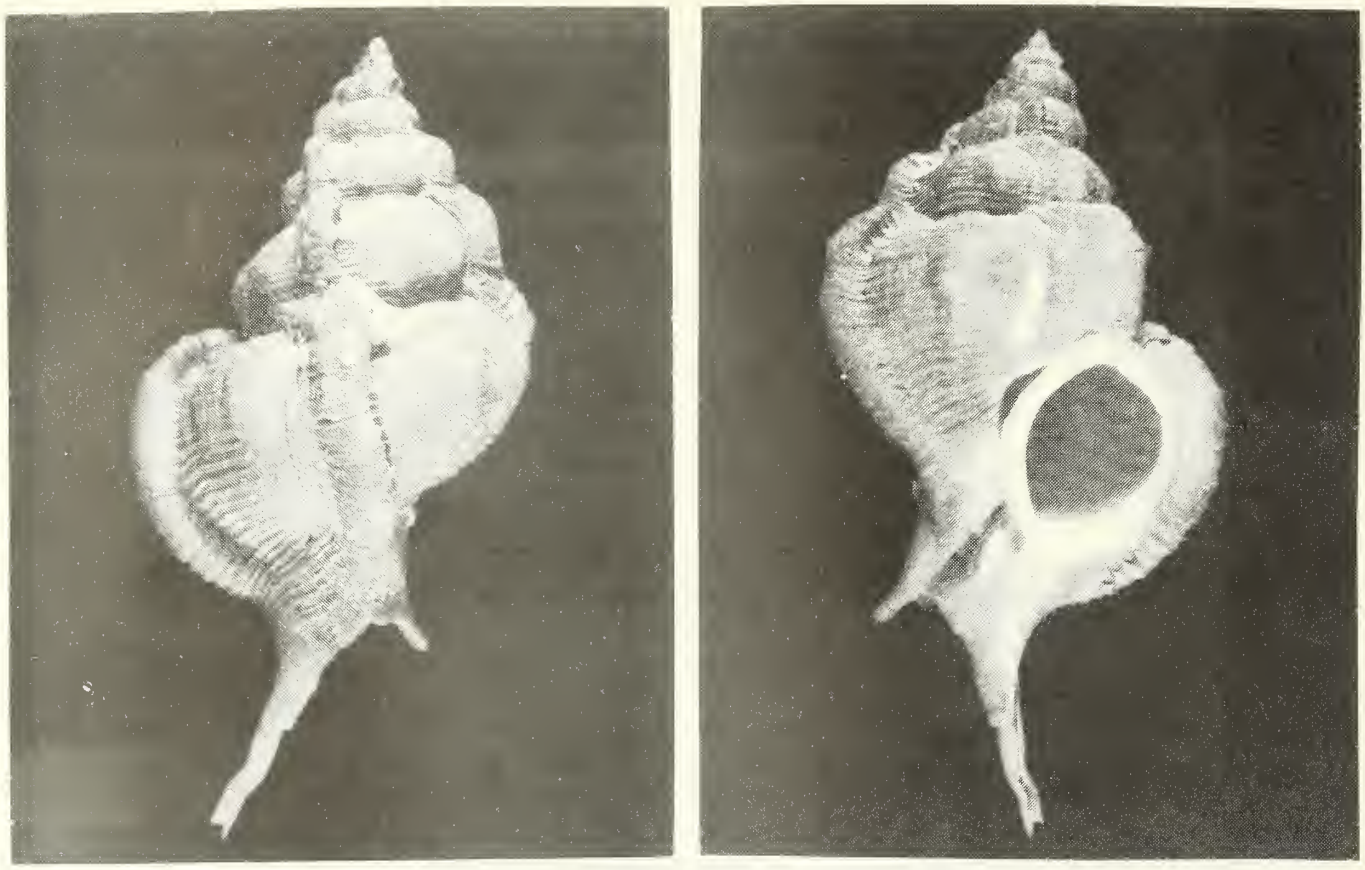
We have specimens in the San Diego Natural History Museum (#85998) collected and donated by Don Pisor that were dredged from 120 m off Russell Island, Solomon Islands, in April 1985 (Figures 5 and 6). Houart (1986) mentions one specimen collected from 200 m off Balade, New Caledonia.

Specimens recently dredged in 500 m off Rowley Shoals, Port Hedland, northwest Australia are in the Charles Glass and Robert Foster collection, and extend the distribution southwest into the Indian Ocean (Figures 7 and 8).

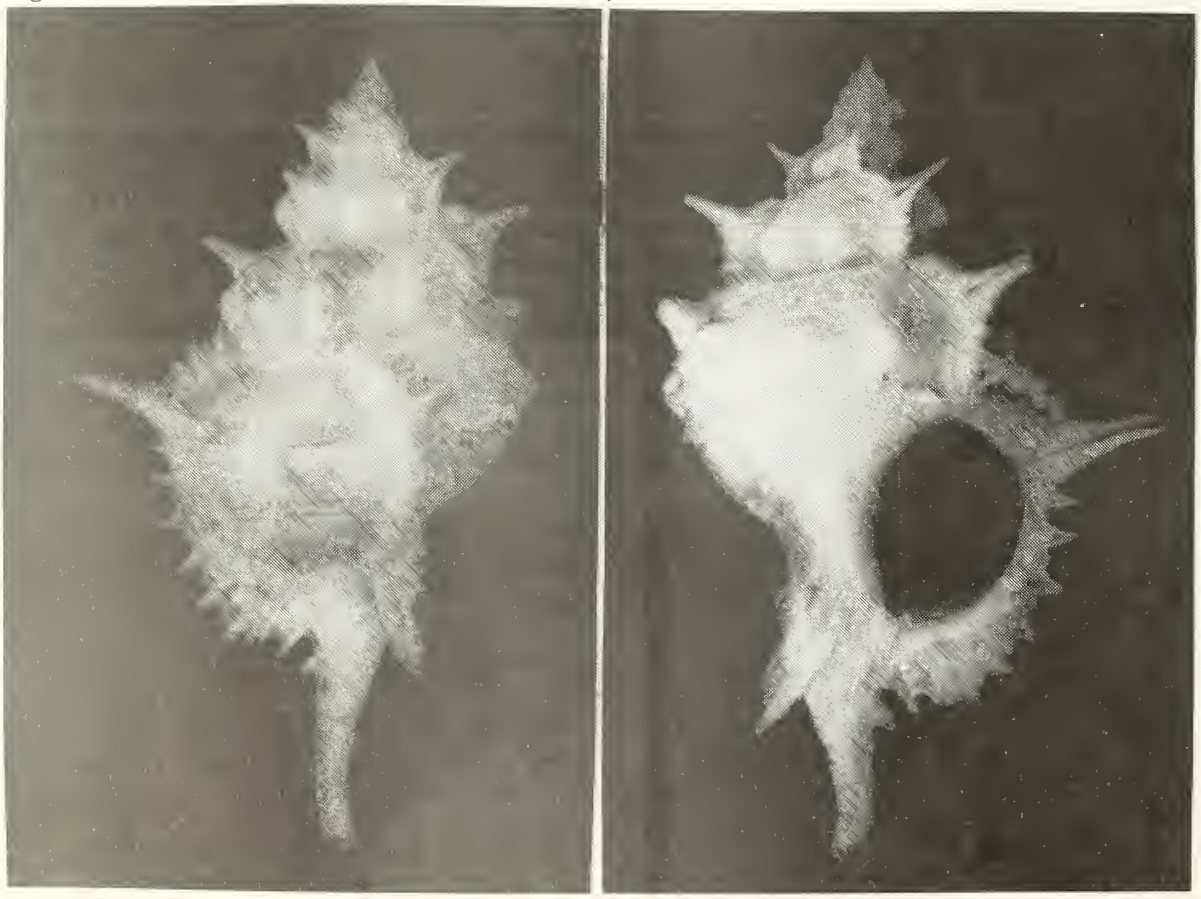
Radwin and D'Attilio (1976) and Houart (1986) placed *Murex (Siratus) propinquus* Kuroda and Azuma, 1961, in the synonymy of *Siratus pliciferoides*, and Houart also synonymized *Siratus hirasei* Shikama, 1973. Without studying type material, we make no comments regarding these taxa.

Over its wide distribtuion the species changes very little in shell morphology. The differences are mainly in the number of varical spines, thickness of the varices and depth of the depressed area on the receding side of the varices. The specimens from the Solomon Islands lack any spination and appear more robust than the specimens from other areas. Mention is made by Sowerby (1879) of a specimen with a "spiniferous webbed appendage above the angle on the varices." Shikama (1973) illustrates *Siratus hirasei* as having a webbed appearance. Figures 7 and 8 from northwest Australia show a webbed flange on the varices of the body whorl. Most frequently the shell is colored white to cream and occasionally two ephemeral rust color bands appear on the body whorl. Some specimens, especially Philippine Island examples, have rust color on the surface of the spiral threads.

Suggestions that *Siratus vicdani* Kosuge, 1980, may represent the immature stages of *S. pliciferoides* cannot be determined without a growth series of *S. pliciferoides*. There appears, nonetheless, to be a close relationship between the two species.



Figures 5 and 6. *S. pliciferoides*. SDNHM 85998, from Russell Island, Solomon Islands, dredged 100-120 m. Size: 103.6 x 51.4 mm, dorsal and ventral views. Photos. D. Mulliner



Figures 7 and 8. *S. pliciferoides*. Glass and Foster collection, 97.2 mm, from northwest Australia, dorsal and apertural views. Photos: C. Glass

ACKNOWLEDGMENTS

We wish to express our gratitude to Charles Glass and Robert Foster of Santa Barbara, California, for the loan of specimens for study and for the photographs used for Figures 7 and 8. We also thank David K. Mulliner of San Diego, California for the other photographs used in this paper, namely Figures 1-6.

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CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - JANUARY 21, 1988

Wayne Reed, the evening's speaker, presented an illustrated talk on "Shell Collecting Through History." He discussed early collectors and their collections with slides of engravings and artifacts from early Pompeii to Victorian times. The collectors included Pliny the Elder, Martin Lister, George Rumphius, Captain Bligh, Hugh Cuming, Edgar Allan Poe and Robert Louis Stevenson. There were many interesting slides including several displays that Wayne put together and had photographed of artifacts and shells that might have been typical of European Renaissance collections.

As part of the business meeting, Jules Hertz read announcements of the upcoming WSM meeting at Sonoma State University, Rohnert Park, California from July 17-21, 1988 and the COA meeting in Ft. Myers, Florida, from July 11-15, 1988.

Larry Buck volunteered his house for the September party and the Christmas party is now set at the Admiral Kidd Club on December 3, 1988. President Bill Romer discussed the April auction and asked for someone to volunteer their house for the evening; he also asked that members start bringing shells for the auction to the next meeting.

Cookies for the evening were provided by Wayne Reed and Margaret Mulliner. The door prize was won by new member, Maria Goldstein.

Jules Hertz, Acting Recording Secretary

NEW MEMBERS

Kim and Don Avilez, 5481 Los Robles, Carlsbad, CA 92008
Maria and Raymond Goldstein, 1183 Loma Portal Dr., El Cajon, CA 92020, 449-9179

NEW PUBLICATION RECEIVED

"List of Publications, 1954-1986, compiled by R.M.C. Thompson. 1987. Division of marine and freshwater science, New Zealand Oceanographic Institute, DSIR. Wellington. 135 pages

DUES ARE DUE

Make checks payable to San Diego Shell Club and mail to Club address. See front page of this issue.

THE ANNUAL AUCTION/POTLUCK

A home is needed for the Club's annual auction which is held on a Saturday evening in April. If you are willing to host this party, please contact either Bill Romer (278-2389) or Carole Hertz (277-6259).

THE ANNUAL CHRISTMAS PARTY --1988

Mark your calendars. The annual Christmas dinner party will be on Saturday evening December 3 at the Admiral Kidd Club. This year it will be held in the New York Room on the main floor facing out on the water.

THE FESTIVUS

A publication of the San Diego Shell Club

ISSN: 0738-9388

Volume: XX | March 10, 1988 | Number: 3

PROGRAM

"SHELL COLLECTING IN NORTHWESTERN AUSTRALIA"

Don Pisor, Club member and local shell dealer who has led many successful tours for shell enthusiasts will present this video program.

Meeting date: March 17, 1988

CONTENTS

A CAUTIONARY NOTE TO EDITORS AND AUTHORS

BY

CAROLE M. HERTZ

In the recent past, two articles have been published, one in LAS CONCHAS (the newsletter of the Pacific Shell Club) and the other in the LOS ANGELES TIMES, which discuss soon-to-be-named new molluscan species. In both, the proposed names are used before the descriptions of these species appear in the scientific literature.

The January 3rd, 1988, issue of LAS CONCHAS, postmarked December 24, 1987, carried an article by Al Lopez entitled, "Two new *Agaronia* species," which gives the names of two new species and briefly discusses them and,in only broad terms, their relationships to previously named species. (The December 24th date would have to be taken as the date of publication.) This article preceded the January 4, 1988, paper in THE VELIGER (vol. 30(3):295-304) by Lopez, Montoya and Lopez, "A review of the genus *Agaronia* (Olividae) in the Panamic province and the description of two new species from Nicaragua."

In the UPI release carried in the LOS ANGELES TIMES of January 2, 1988, Peter Ward of the University of Washington is interviewed concerning a new species of *Nautilus* (pictured in the piece) on display at the Seattle Aquarium. It had been captured by Dr. Ward off Vanuatu, New Hebrides, in December 1987. The article quoted Dr. Ward as stating that he "is thinking of naming the new species *Nautilus vanuatuensis*...."

Using the names of new taxa in this way, prior to their publication in the scientific literature, is an unwise practice on the part of the editors and authors involved. In some cases, such news articles could inadvertently become the "official" publications of the taxa.

According to the Third edition (February 1985) of the INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE, a new species to be "available" (for use as a scientific name) need only fulfill the following requirements [paraphrased]:

(1) be published for the permanent scientific record by a method that assures numerous identical copies that are obtainable, when first issued, free or by purchase;

(2) have a name spelled in Latin letters and used as a valid scientific name when published;

(3) follow the principles of binomial nomenclature; and

(4) be accompanied by a description or definition that states in words characters that are purported to differentiate the taxon

Fortunately, the fourth requirement is not met by the newspaper account of Ward's new *Nautilus*, which has only a photograph, and it is not met by the LAS CONCHAS mention of the new species of *Agaronia*.

Nevertheless, editors, authors, and scientists being interviewed by newspaper writers, must use caution in allowing the names of new taxa to appear in any literature prior to their formal descriptions in scientific journals. If in doubt, such taxa can be discussed in general terms, given informal "common names," or called "new species A."

I thank Dr. Eugene Coan for reading a draft of this article and for offering helpful suggestions.

DETAILED STUDIES OF THE MORPHOLOGY OF THE VARICAL FLANGE IN TWO FAVARTIA SPECIES: FAVARTIA ROSAMIAE AND F. LEONAE

BY

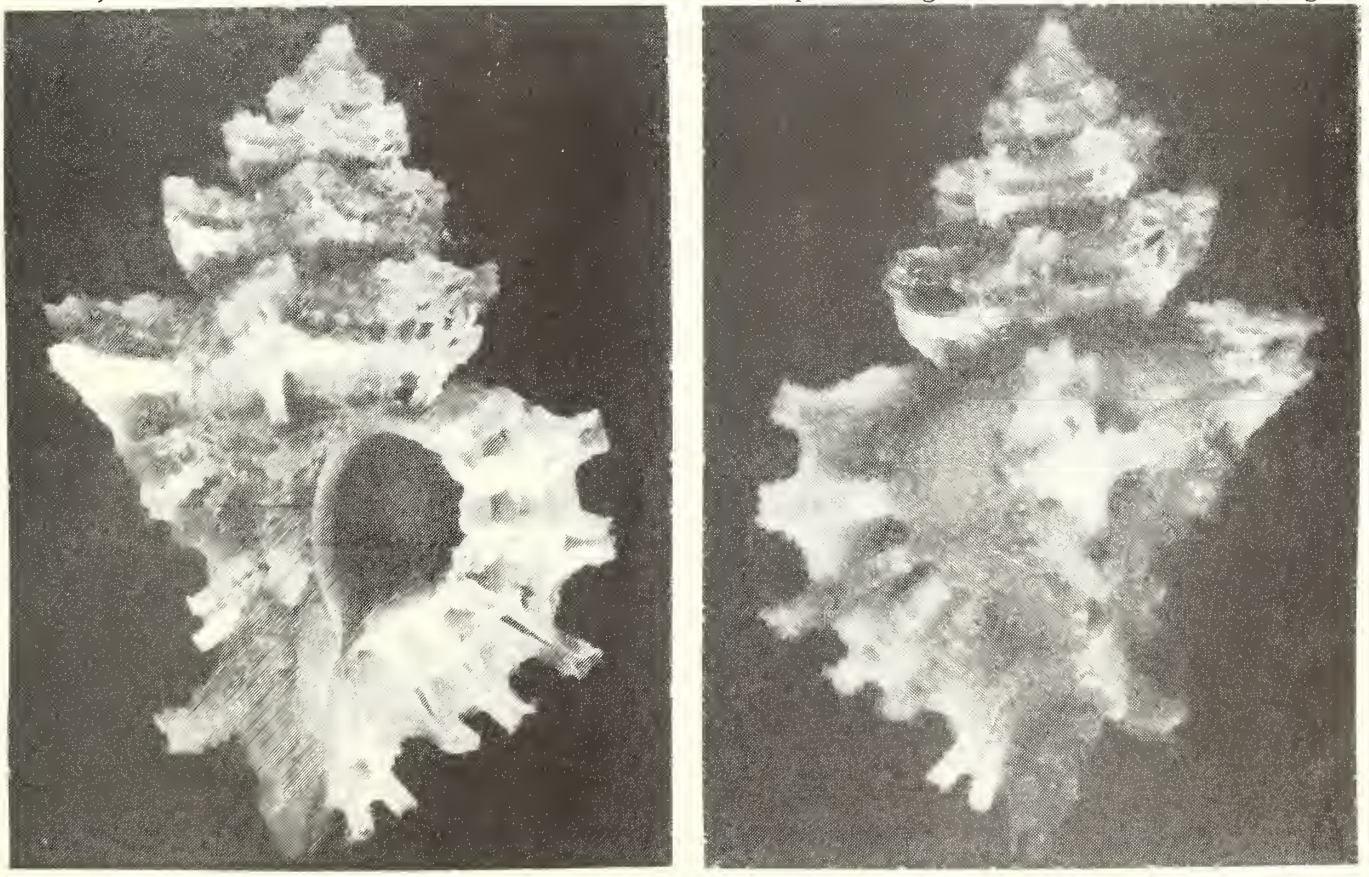
ANTHONY D'ATTILIO

Associate, Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, CA 92112

This second illustrative commentary (see Festivus, Nov. 1987) deals with the microsculpture of two other small *Favartia* species: *Favartia rosamiae* and *F. leonae* both of D'Attilio and Myers, 1985. These two species are of more than passing interest for the complexity in sculptural morphology and because, in their growth to full maturity, their ontogeny undergoes a significant change in the last or mature varix. The body whorl in these species has one less varix than the previous whorls and this type of growth change is atypical of the Muricidae as a whole except for a number of aspelloid species.

The illustration of this microsculpture is achieved by camera lucida drawings for the outline and contours and sufficient shading to further enhance a clearly visual concept of the forms. A further note must be born in mind regarding studies such as these and that is that no two specimens, even in the same breeding population, are ever precisely the same. Genetics, with the uniqueness of the individual, works as clearly with the molluscan shell as it does with higher forms of life.

With the exception of the sculpture following the penultimate varix of the body whorl, *Favartia rosamiae* (Figures 1 and 2) has strong raised scabrous cords on the entire shell with two on the spire and five on the body whorl. After the penultimate varix, the shell lacks the scabrous cords of the preceding intervarical areas (Figure 2).



Figures 1 and 2. *Favartia rosamiae* D'Attilio and Myers, 1985, apertural (1) and dorsal (2) views of Paratype A, SDNHM 85101, 15 mm L, Okinawa Photos: D. Mulliner

The most remarkable feature of the ontogeny of the varices in this species (Figure 3A-3C) is the change from a posteriorly produced flange on the antepenultimate varix (3A) gradually broadening anteriorly on the penultimate varix (3B) until the final varix (3C) when the spinose portions of the entire flange are equally developed.

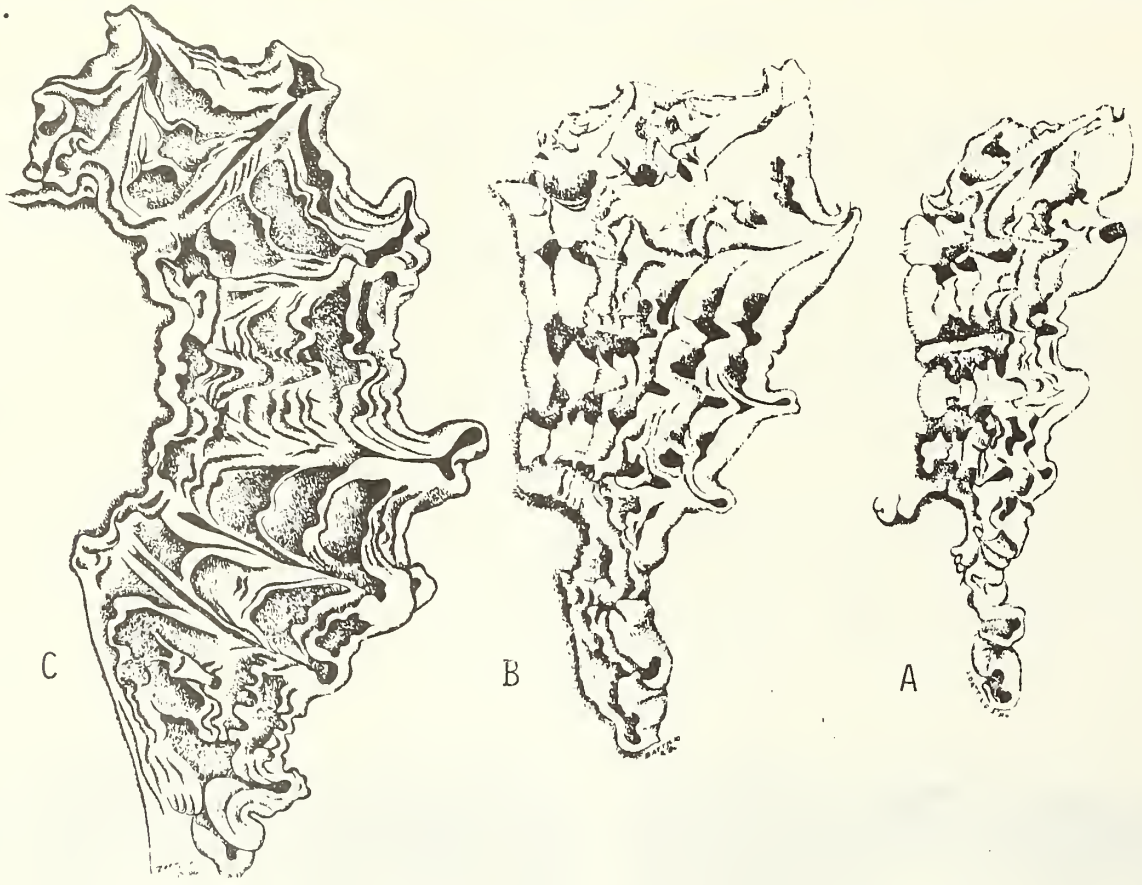
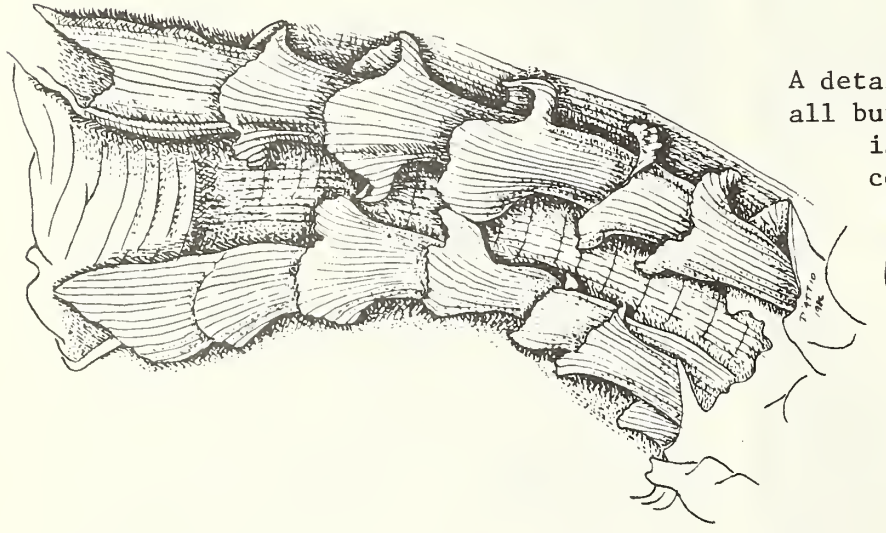


Figure 3A-3C. *Favartia rosamiae*, details of the varices on the body whorl in Paratype A, greatly enlarged (A) antepenultimate varix (B) penultimate varix (C) final varix

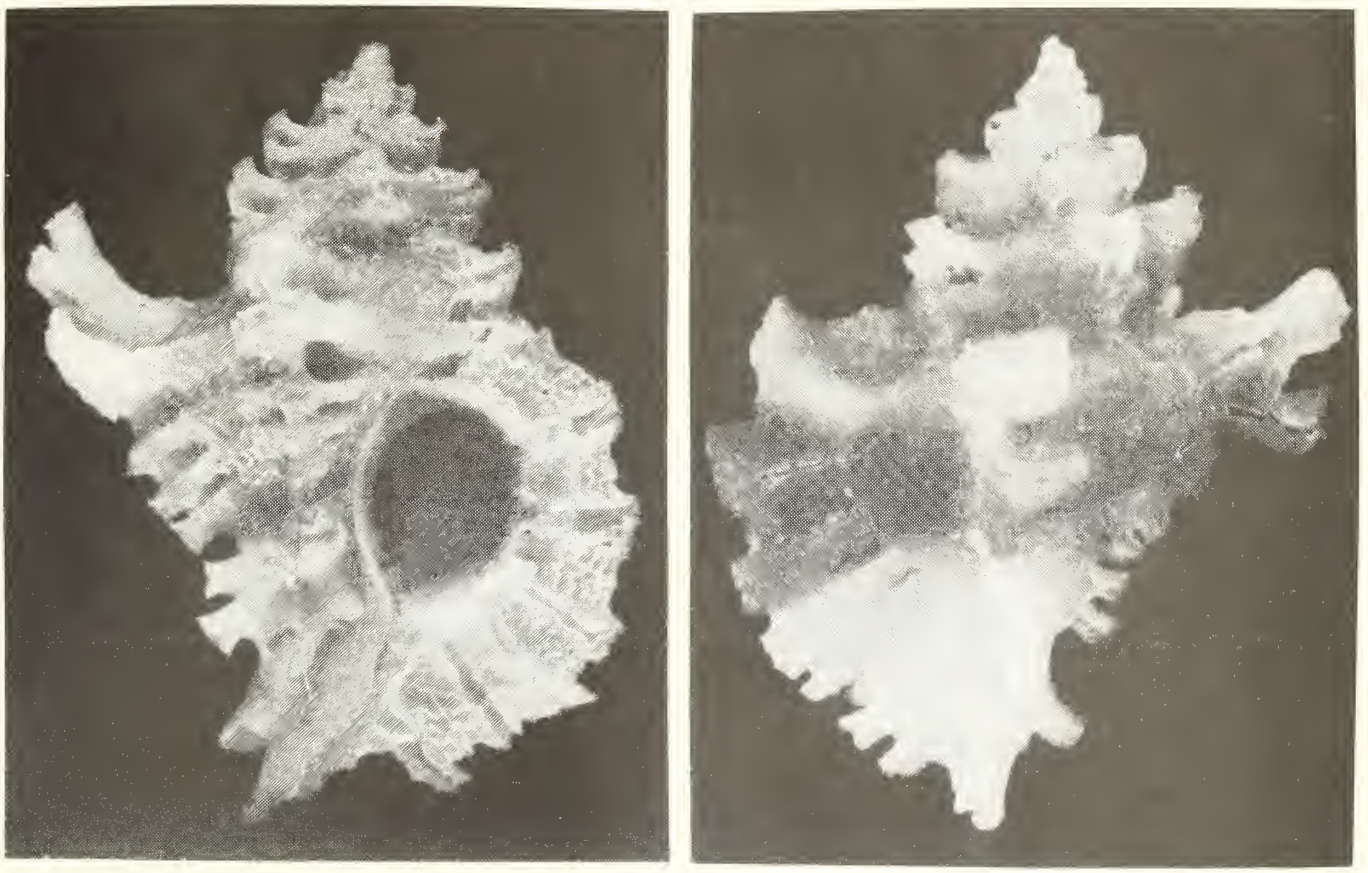


A detail of the scabrous cords of all but the final intervarical area is shown in Figure 4. These cords, appearing to emanate one segment from the other are cut by striae along their length and between the cords additional transverse and growth lines are visible.

Figure 4. *F. rosamiae*, detail of sculpture of shoulder spine and one below on penultimate whorl, greatly enlarged

Favartia leonae (Figures 5 and 6) in its ontogeny parallels that of *F. rosamiae* but lacks its strongly raised squamose cords (Figure 4); the transverse sculpture in *F. leonae* is much reduced. In *F. leonae* the three final varices (Figures 7A-7C) demonstrate an even more remarkable change than *F. rosamiae* in that the posterior spinosity in the antepenultimate (7A) and penultimate (7B) varices is stronger than that of *F. rosamiae* while on the final varix all vestiges of spinosity have disappeared and the anterior portion is replaced by a broad flange (7C). In the apertural view (Figure 5) the unusual change on the final varix may be mistaken for a broken spine.

To my knowledge, these two species, in the elimination of what would be the penultimate varix on the body whorl and the complete change in shell morphology of the final varix, are unusual in the Muricidae.



Figures 5 and 6. *Favartia leonae* D'Attilio and Myers, 1985, apertural (5) and dorsal (6) views of holotype, SDNHM 81638, 14.2 mm L, Okinawa Photos: D. Mulliner

ACKNOWLEDGMENTS

I wish to thank David K. Mulliner for the photography of the two species illustrated herein.

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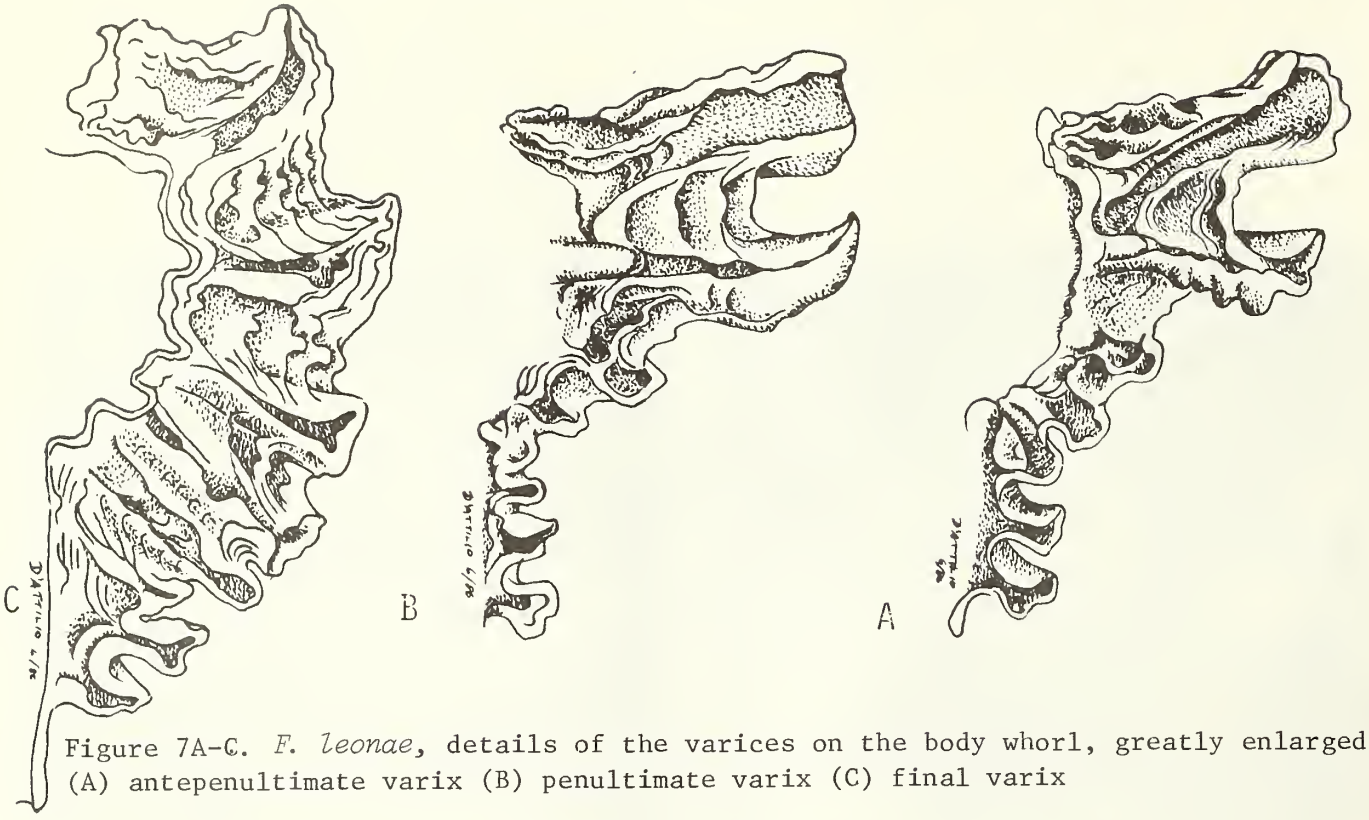

Figure 7A-C. *F. leonae*, details of the varices on the body whorl, greatly enlarged. (A) antepenultimate varix (B) penultimate varix (C) final varix

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STUDENT RESEARCH GRANT IN MALACOLOGY

The Santa Barbara Shell Club announces a single research grant up to $1,000. to support student research in malacology through the Sara T. DeLaney Scholarship. The grant is available to:

- a full time student in a formal graduate degree program (Master's or Doctorate)
- with the thesis or dissertation topic primarily focused on some aspect of eastern Pacific or west American malacology (including North, Central and South America). The research topic may involve marine, land or freshwater mollusks. Research currently in progress or beginning in the 1988-89 academic year will be considered.

Include with each application:(1) a proposal, limited to three pages discussing the research project and detailing work to be aided by this grant and its malacological significance (2) a budget outlining use of the funds (3) a curriculum vitae or resume (4) letter of recommendation from applicant's thesis advisor (5) list of grants and amounts currently being received or anticipated in the 1988-89 academic year. Projects to be considered for funding are: (1) purchase of research materials such as chemicals, photographic supplies, field collecting equipment, dissecting and optical accessories, computer supplies, etc. (2) electron microscope usage fees and mainframe computer time (3) travel costs to visit museums or institutions which have collections or resources vital to the research topic.

Completed applications must be received no later than 1 June 1988. Awards will be announced by 15 August 1988. Send applications to:

Sara T. DeLaney Scholarship, Santa Barbara Shell Club., P.O. Box 30191, Santa Barbara, CA 93130

For further information, contact Paul Scott, (805) 682-4711

AN ARGONAUTA SHELL FOUND IN SAN DIEGO

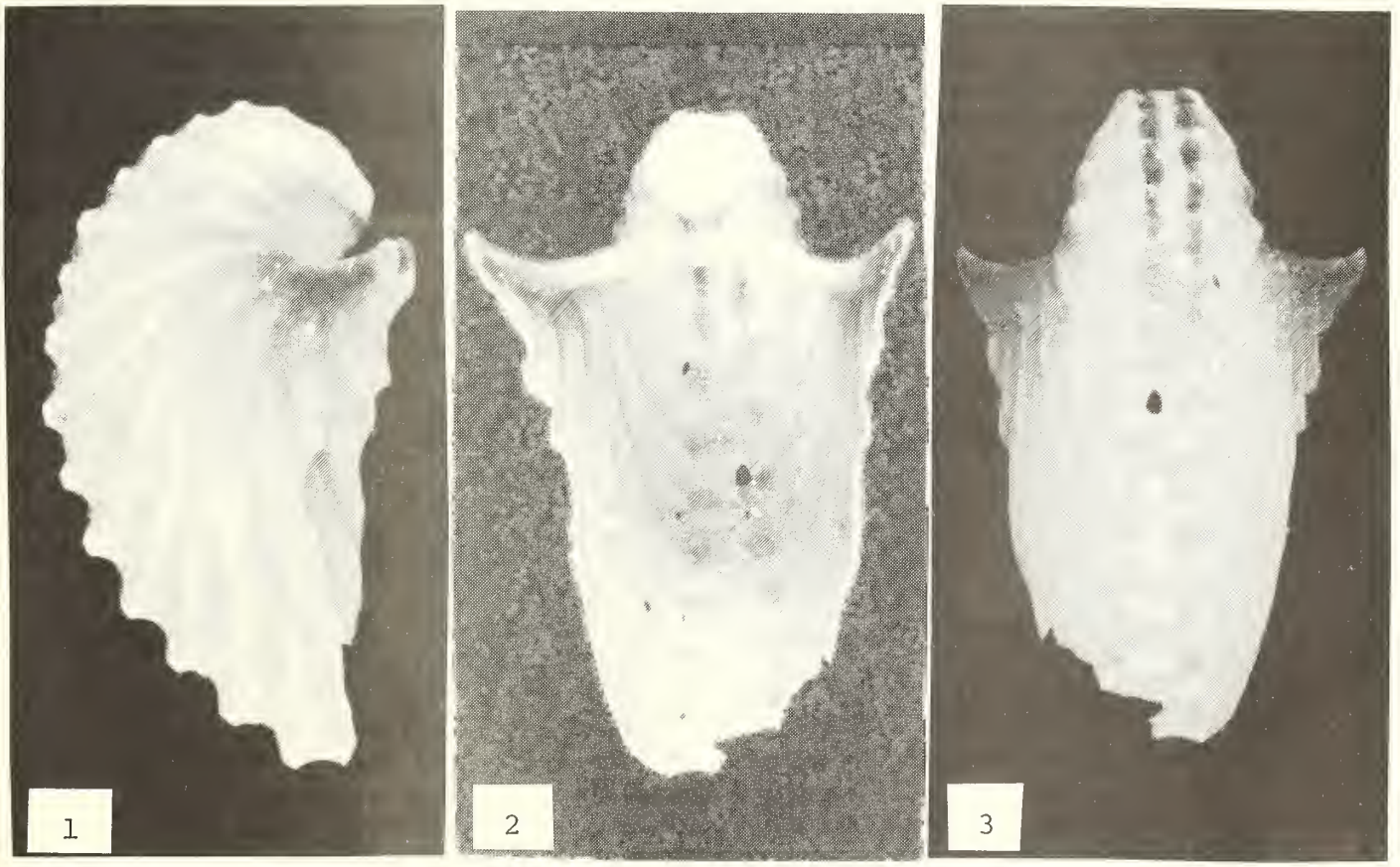
BY

JULES HERTZ

3883 Mt. Blackburn Avenue, San Diego, California 92111

On 20 December 1987, I collected a shell of an *Argonauta* in beach drift at the northwest end of Tourmaline Surfing Beach, Pacific Beach, San Diego, California. The shell, the egg case of a female *Argonauta*, was slightly damaged and measured 27.7 mm in length. In over twenty years of collecting on this particular beach and others in the San Diego area, this is the first time I have found the shell of an *Argonauta*. There had been high tides the previous day and this may have brought the shell in from far offshore.

The shell pictured in Figures 1 to 3 compares well with the drawings of the holotype of *Argonauta cornutus* Conrad, 1854 (= *A. expansus* Dall, 1872) herewith reprinted as Figure 4 and is very similar to the holotype of *A. expansus* figured by Dall (1902) and by Keen (1971). *A. cornutus* is reported from the Gulf of California to Panama. Conrad's original description stated, "...back with interrupted undulations and distant unequal tubercles; whole surface except the umbo minutely papillose. Angle of the lip with a spine nearly at right angles with the length of the shell; surface white and destitute of polish; submargin of sinus and the spine dark purple." The shell found at Pacific Beach differs in several ways



Figures 1-3. An *Argonauta* shell from Pacific Beach, three views (1) side view (2) interior view (3) dorsal view Photos: D.K. Mulliner

from the description of the type of *A. cornutus*. First, the shell is polished both inside and out. In addition, the surface looks smooth externally, although under 10X magnification a very finely papillose surface is apparent. I have a lot of four shells found at Mazatlan, Sinaloa, Mexico which closely matches the original description of *A. cornutus*. Each of the shells in the lot are destitute of polish and even the smallest one, which is approximately the same size as the one from Pacific Beach, has a much more pronounced papillose (granulose) surface. A lot in the San Diego Natural History Museum, SDNHM 22013, contains five shells collected by H.N. Lowe in 1929 at La Paz, Baja California Sur, Mexico and identified as *A. expansa* Dall, 1872. These shells were later identified by S.S. Berry as *A. cornutus*. These shells are approximately 25 to 75 mm in length and are very variable with the smallest shell less papillose, less broad in the keel, less tuberculate and have less black on the tubercules.

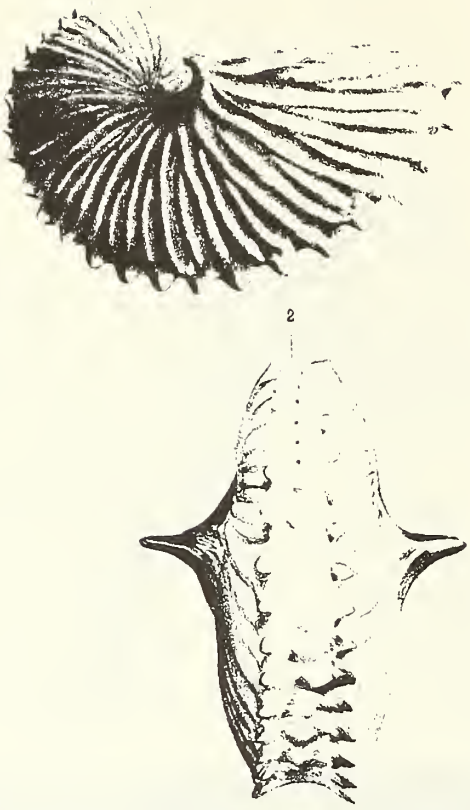


Figure 4. *Argonauta cornutus*, from Conrad, (1854), 2 views

Assuming that the Pacific Beach shell is not *A. cornutus*, then what other possibilities exist? The most likely are *Argonauta nouryi* Lorois, 1852 (= *A. gruneri* Dunker, 1852) and *Argonauta pacificus* Dall, 1869, both possibilities figured by Keen (1971). *A. nouryi* is widespread and ranges on the Pacific west coast from southern California to Peru. The shell is more elliptical than *A. cornutus*, has a wider and more weakly tuberculate keel, and a finely granular texture. A specimen donated to the San Diego Natural History Museum (SDNHM 87759) by Don Pisor and reported from Baja California, Mexico is white, glossy, less tuberculate, more elliptical and shows almost no expansion of the spine projections of the lip. It appears as a more fragile and open shell.

Argonauta pacificus, reported from southern California through the Gulf of California and southward to the Galapagos Islands and Peru, is a shell which looks identical to *Argonauta argo* Linnaeus, 1758, a worldwide species. Dall (1871) discussed in detail many differences in the animals of *A. pacificus* and *A. argo*, although his material was "rather limited." *A. pacificus* is a whitish shell rather compressed at the basal keel, which is narrow, finely tuberculate, and suffused with black. The San Diego Natural History Museum contains lots of *A. pacificus* from Imperial Beach, California (1 shell, #4106), San Pedro, California (2 shells, #22003) and La Paz, Baja California Sur, Mexico (4 shells, #22000). These shells are generally opaque white, finely granular, and have varying degrees of axial expansion in the projections of the lip (varying from approximately 0 to 45 degrees). The lot of *A. pacificus* San Pedro looks identical to a lot of three shells of *A. argo* from Sea Breeze, Florida, both lots having varying degrees of expansion and both lots having pinkish coloration around the lip spine.

The two long axial expansions shown in the figured specimen from Pacific Beach seems to be a variable characteristic within a species and cannot be used to distinguish one species from another. Johnson and Snook (1967) show a drawing of *A. pacificus* with an expanded lip and Abbott (1974) shows a drawing of *A. argo* with long axial expansions almost perpendicular to the axis. Dall (1908) in his summary on

Argonauta stated that "the granulation of the surface is not a specific character" and noted "that young specimens of nearly all the larger forms are for a time distinctly auriculate, but may become simple in the adult stage."

It is doubtful that the single small specimen figured here could ever be identified to a given species. Given the variability within shells of a species, identification would be questionable without knowledge of the animal.

ACKNOWLEDGMENTS

I am indebted to Dave Mulliner for the photographs of the *Argonauta* shell and to the Marine Invertebrate Department of the San Diego Natural History Museum for permission to study their collection.

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CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB - FEBRUARY 18, 1988

Secretary Jules Hertz called the meeting to order and introduced the speaker for the evening, Norbert Wu. Mr. Wu's slide presentation, "Life in a Kelp Forest" began with pictures of silvery schools of anchovies and sardines, tuna, and shots of dolphin and sharks. He linked sea otters with healthier kelp forests and discussed earlier problems with DDT contamination in pelican eggs. There were numerous dramatic closeups in the kelp forest; strawberry anemones, pinstripe shrimp on bat stars, lobsters, flying fish off Santa Barbara, and many other fantastic views in the coastal waters off Monterey and San Diego. Perhaps most memorable were colorful and vivid images of beds of sand dollars, tiny hitchhiking cancer crabs in the bells of jellyfish, and delicate nudibranchs. Norbert also brought along some breathtaking calendars showing some of his best undersea photography, available to those Club members present at a reduced price.

During the business portion of the meeting, Jules read pertinent correspondence and book notices and reminded members that dues are due.

The Christmas party is set for Saturday, December 3rd in the New York Room of the Admiral Kidd Club and the Club Auction/Potluck date is set for April 30th at the home of Wes Farmer. Shells are desperately needed and members were requested to bring them to the next meeting or contact a board member for pickup.

Club member Don Pisor presented a slide program on the Conchologists of America (COA) to better inform Club members of this national organization and encourage the Club to host a COA convention in San Diego in 1989. Following a brief discussion, the members voted to host the convention. It will mean work for the Club; actual expenditures of about $200. and much volunteer help.

Wayne Reed, Recording Secretary

NEW MEMBERS

Bishop, John A., 3026 Treeman, San Diego, CA 92106, 223-6038
Hansen Family, P.O. Box 83914, San Diego, CA 92138, 275-3030, ext 158
Librarie Justus Lipsius, Av. Milcamps 188 B 15, 1040 Brussels, Belgium

THE ANNUAL AUCTION/POTLUCK

The annual auction/potluck will be held on April 30th at the home of Wes Farmer [Map will appear in the April issue] with festivities beginning at 6:00 P.M.

This gala event, the Club's only fundraiser provides the support for The Festivus, our donations to scientific organizations, our social events and library purchases. We invite ALL our members, local and out-of-town, to donate generously to the auction. Members are urged to bring their shell donations to the March meeting or contact a board member for their pickup. For out-of-town members, please send to the Club address. Specimen quality shells, with collecting data when possible, are preferred.

LAST REMINDER THAT DUES ARE DUE

Membership dues for the year 1988 are now overdue. If you have not paid your dues, this will be the last issue of The Festivus which you will receive. To be included on the Club roster, which appears in the April issue, dues must be received by 31 March 1988.

IN MEMORIAM

Word has just reached us that longtime Club member Cliff Ames passed away in his sleep of a heart attack on December 6, 1987. After the death of his first wife, Waneta, Cliff relocated to the midwest where he was raised. It was in Aurora, Missouri that he died. Our sympathy is extended to his wife Cathy.

THE FESTIVUS

A publication of the San Diego Shell Club

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional

Meeting date: third Thursday, 7:30 P.M., Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

COME TO THE AUCTION/POTLUCK!!

Saturday evening, April 30
6:00 P.M.---?
For details see page 34 and map on last page.

There is no regular meeting this month.

CONTENTS

TWO LOOK-ALIKE TURRIDS FROM THE EASTERN PACIFIC: CLATHROMANGELIA FUSCOLIGATA AND MANGELIA RHYSSA

BY

JULES HERTZ

3883 Mt. Blackburn Avenue, San Diego, California 92111

Two small look-alike turrids that can be found off San Diego, California are *Clathromangelia fuscoligata* (Dall, 1871) and *Mangelia rhyssa* Dall, 1919. Type specimens for both species are housed at the National Museum of Natural History, Smithsonian Institution, Washington, D.C. This article will primarily deal with the shell characters of the two species and will refrain from dealing with nomenclatural issues.

Clathromangelia fuscoligata is found from Monterey to San Diego, California. Dall (1871) originally named the species *Daphnella fuscoligata* based on two dead collected specimens from a Monterey beach. The two type specimens are the lectotype (USNM 56088) selected by J. McLean in October 1969 and the paralectotype (USNM 697368, *ex* 56088). Dall's description of *C. fuscoligata* follows.

"Shell fusiform, slender, solid, of four or five whorls; spire half as long as the shell, aperture the same; the latter narrow with no perceptible sinus, and a short open canal; columella and outer lip smooth. Sculpture consisting of strong, revolving, elevated lines, six on the last whorl, crossed by strong, regular, longitudinal costae of about the same size, twelve on the last whorl. These ridges are remarkably uniform, and their intersections produce a very conspicuously regular reticulation. The longitudinal ridges are, perhaps, a little thicker on the convexity of the whorls than above and below. General coloration white, with a reddish brown band between the suture and the first revolving ridge, another between and including the third and fourth ridges, the other revolving ridges being dotted with brown between their intersections with the costae. These intersections, especially on the last whorls, appear somewhat nodulous."

Examination of the type specimens revealed that they were very worn. The paralectotype has an obviously broken protoconch, and the lectotype must have a broken protoconch which is so worn as to appear unbroken but with noticeably fewer whorls. The thickened outer lip of the lectotype with its undulate peristome reflecting the external spiral sculpture is shown in Figure 1. There is no thickened ridge within. Figure 2 shows the worn protoconch of the lectotype.

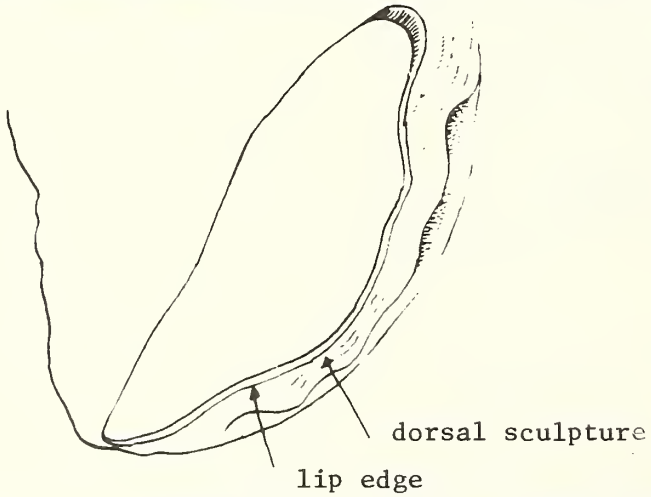

Figure 1. *C. fuscoligata*, lectotype (USNM 56088), outer lip area at 32X

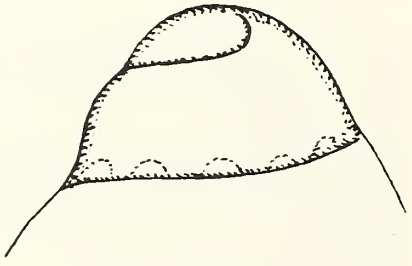

Figure 2. *C. fuscoligata*, worn protoconch of lectotype at 38.5X

A live collected specimen from the northern part of the range (Carmel Submarine Canyon, San Jose Creek Beach, Monterey County) is shown in Figure 3a and b. These show a robust shell with sculpture producing strong square cancellations. The shells found in southern California seem less robust, more slender, but still with strong cancellate sculpture. Figure 4 shows two typical specimens from southern California. A drawing of the protoconch of the specimen from Del Mar, California is shown in Figure 5. McLean (1978) reports *C. fuscoligata* as "not uncommon in gravel under kelp."

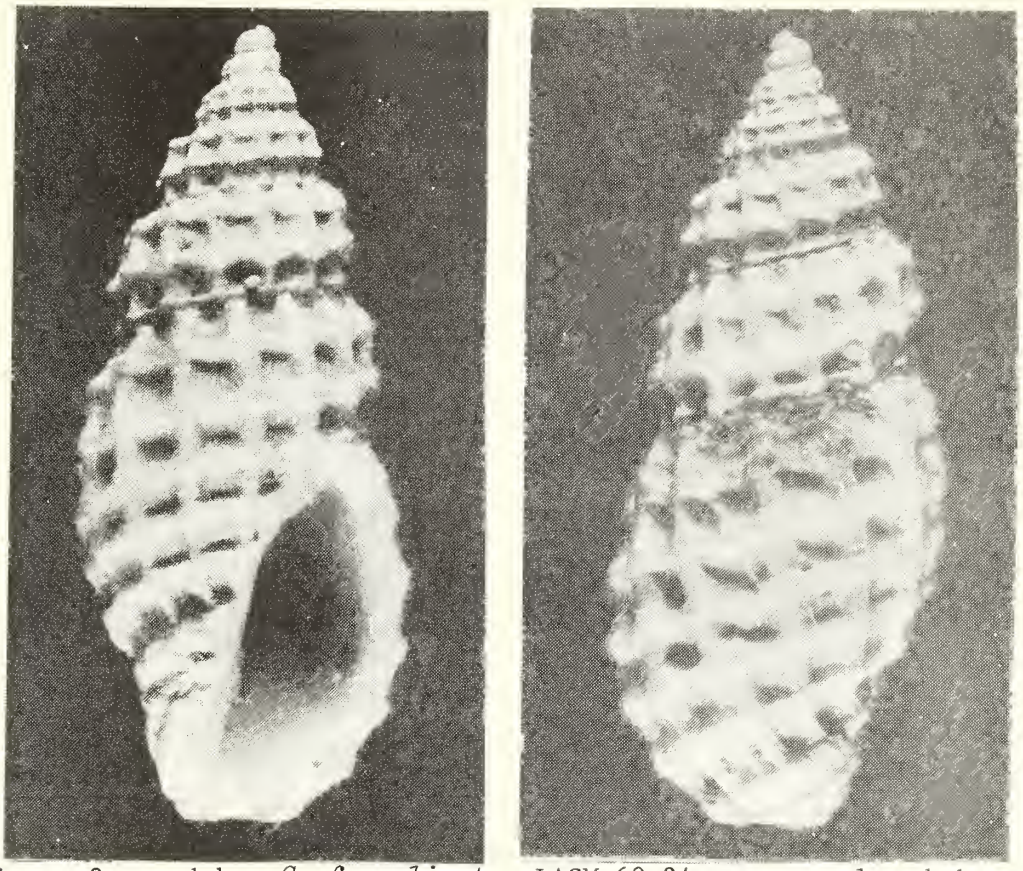

Figure 3 a and b. *C. fuscoligata*, LACM 60-24, apertural and dorsal views of specimen from Carmel Submarine Canyon, San Jose Creek Beach, Montery County, California, collector J.H. McLean, 1960-1964

Photos: D.K. Mulliner

The look-alike species was originally named *Mangilia (Clathromangilia) rhyssa* by Dall (1919). The holotype, USNM 55479, was figured in Dall's original publication, and the original description follows.

"Shell small brownish, coarsely sculptured, with six whorls exclusive of the (lost) nucleus; suture appressed, somewhat constricted, obscure; upper whorls with two prominent cords crossing the ribs without nodulation, the last whorl with six, the spiral sculpture more prominent than the axial, which consists of (on the last whorl 10) straight axial ribs continuous to the base; there are traces of some fine spiral striation; the interstices of the reticulation are deep and squarish; sutural fasciole obscure, the sulcus very shallow, the aperture short with hardly any canal and no denticulations or lirations. Height of shell, 7; of last whorl, 4, diameter, 2 mm."

Dall (1919) listed the distribution as "Gulf of California, Stearns collection," Dall (1921) listed the range as "near San Diego, California." *Mangelia rhyssa* is listed in the Rejected and Indeterminate Species section of Keen's (1971) SEA SHELLS OF TROPICAL WEST AMERICA. This indicates that it is a doubtful Panamic species, but it is recognized as a species occurring in southern California

Figure 4. *C. fuscoligata*, two specimens from southern California. Dorsal view of specimen collected at Del Mar (7.5 mm) and apertural view of specimen collected off Pt. Loma in San Diego (8.3 mm). Both specimens in B.W. Myers collection
Photo: D.K. Mulliner

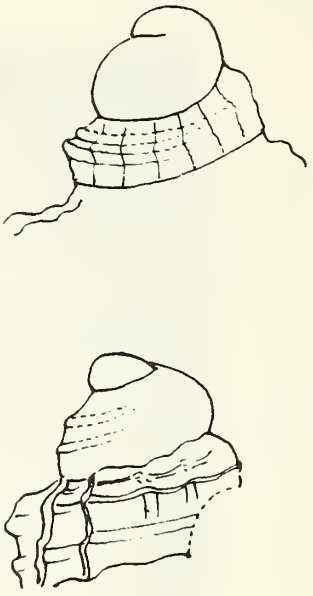

Figure 5. *C. fuscoligata*, two views of the protoconch of specimen from Del Mar shown in Figure 4. at 38.5.

Examination of the type specimen showed it to be a worn, dead collected specimen with the tip of the base worn off. B.W. Myers has a worn specimen from off Point Loma, San Diego, California which looks just like the type. This Pt. Loma specimen was collected along with some fresh specimens that are not worn, and two of these are shown in Figure 6. The shell aperture appears to widen at the base as the species ages. Figure 7 is a camera lucida drawing of the protoconch of one of the specimens in Figure 6.

The protoconchs of *Mangelia rhyssa* and *Clathromangelia fuscoligata* are quite distinctive. For *M. rhyssa* the protoconch consists of approximately 2½ whorls with no clear cut varix demarcating the protoconch from the teleoconch. There are three riblets on the protoconch coalescing towards the apex. The shell is microscopically radially ribbed following the first protoconch whorl. The ribs cross the shoulder and over the cords. The protoconch of *C. fuscoligata* has about 2½ whorls until the first axial ridge of the teleoconch. It has one minor rib above the shoulder angle and one rib below.

Other major differences between the two species are the more slender appearance of *M. rhyssa* and the fact that *M. rhyssa* has a reddish brown shell whereas *C. fuscoligata* has a white shell with brown color blotches.

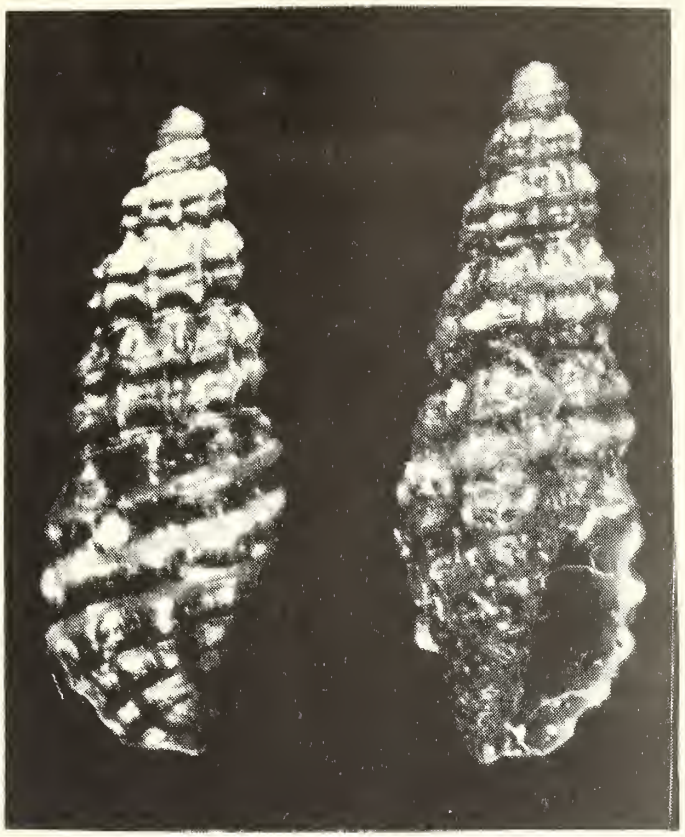

Figure 6. *Mangelia rhyssa*, two specimens from off Pt. Loma, San Diego (5.8 and 6.3 mm), B.W. Myers collection Photo: D.K. Mulliner

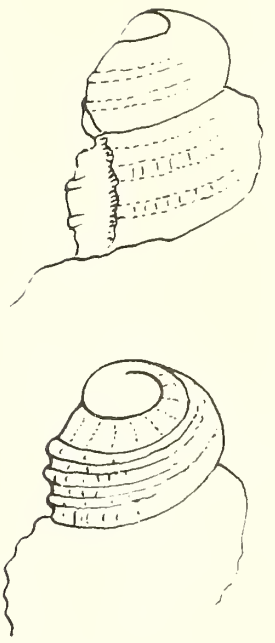

Figure 7. *M. rhyssa*, two views of the protoconch of 6.3 mm specimen shown in Figure 6, at 38.5X

ACKNOWLEDGMENTS

I gratefully acknowledge the camera lucida drawings by Anthony D'Attilio and the fine photographs by David K. Mulliner of the two turrid species. I am indebted to James H. McLean of the Los Angeles County Museum of Natural History for the loan of comparison material and to the late Joseph Rosewater of the National Museum of Natural History, Smithsonian Institution for the loan of the type specimens. I am particularly indebted to Barbara W. Myers for the loan of study material and for her keen observations of the type material.

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MCLEAN, JAMES H.
1978. Marine shells of southern California, revised ed. Science series 24, Los Angeles County Mus. Nat. Hist., Zoology no. 11, 104 pp., 54 figs.

TESKEY COLLECTION ENHANCES FLORIDA RESEARCH (News release from R. Tucker Abbott)

The unique collection of mollusks assembled by Margaret C. Teskey, former Secretary of the American Malacological Union, has recently been donated to the Florida State Museum at the University of Florida in Gainesville. The valuable collection, consisting of many hundreds of minute and shallow-water species with good locality data is now being curated in the research facilities at the Florida State Museum.

Mrs. Teskey, now a resident of Beaverton, Oregon, spent a dozen years in the Florida Keys sampling obscure populations, some located at the now-protected Looe Key. Friends have also rushed to her aid to supply funds for the curating of this valuable resource for future research.

"Our emphasis in the past has been on non-marine mollusks," said Dr. Fred Thompson, Curator at this major Florida museum, "but recent developments are pointing towards a more active role in Florida's rich marine fauna, both living and fossil." The Director of the museum, Dr. Peter Bennett, intends to increase the public's awareness of Florida's marine shells "through new exhibits, the addition of a marine malacologist to the staff and increased cooperation with both amateur and professional mollusk field activities."

NEW LAW TO REGULATE PLASTIC POLLUTION IN THE OCEAN

[News release from "Tidelines" sea grant extension program, University of California, Cooperative Extension, San Diego County excerpted below]

Late in 1987 the United States signed an international treaty called MARPOL to limit pollution in the oceans and passed Public Law 100-220 (U.S. Japan Fishery Agreement) to implement it in the U.S. by December of 1988.

Part of the MARPOL treaty (Annex V.) will prohibit the dumping of plastics at sea and will severely restrict the ability of vessels to dump other types of ship-generated garbage at sea and in U.S. navigable waters. It will apply to all types of watercraft, from the smallest pleasure craft to the largest oceangoing commercial ship and will prohibit the dumping of plastics in all waters and prohibit the dumping of dunnage, lining and packing material which will float within 25 nautical miles and prohibit the dumping of food wastes and all other garbage within 12 nautical miles from land except allowing dumping of food wastes outside 3 nautical miles if they have been ground so they can pass through a 25 mm screen. Adequate shoreside facilities for garbage reception will be required under Annex V.

MOLLUSCHI EDULII DELLE MARCHE
Published by Ufficio Pesca Marittima, Ancona, Italy
Author(s) and publication date not given
44 pages illustrated in color with text entirely in Italian. Softbound

The above is a regional official publication concerning the molluscan food fisheries of the maritime area of Ancona, Italy, situated on the Adriatic Sea and was intended, apparently, to be distributed by their fisheries bureau, the Societa Picena di Malacologia. I received this book in 1987 from Tiziano Cossignani, a visiting malacologist and member of the Societa Picena de Malacologia.

This 44 page book is divided into two sections; the first 26 pages with 32 colored illustrations of very good quality, lists the gastropods and bivalves found in the area with the Latin binomen for each species as well as a brief description, habitat information with notes on where collected, and its gastronomic uses. Included also in this section is an index of the common Italian names for the Latin binomens and a glossary of the technical terms used.

The second section entitled "I Molluschi in Cucina" (mollusks in the kitchen) has 42 recipes with detailed preparation instructions, a bibliography and an index to the species.

In addition to the gastronomic delights to be enjoyed from eating the variety of gastropod and bivalve species, the book is of special interest since most of these species, if not all, have not become scarce or extinct after thousands of years of fishing and collecting. It is good to see our old friends, *Murex trunculus* Linne and *Murex brandaris* Linne still being collected today for food as well as various species of naticids, *Nassarius, Patella, Haliotis, Arca, Donax, Cardium, Ensis* and *Pecten*, and more unusual, species of *Lithophaga* and *Pholas*. This demonstrates the difference between raising or collecting food for subsistence as opposed to subjecting a resource to the pressure of quick profit. It appears that when managed properly, fishing of mollusks over many years does not necessarily lead to species extinction.

This book does not appear to be for sale to the general public. If you wish further information, you might write to Carlo Alberto del Mastro, Assessorato Industria ed Artigianato, Uficio Pesca Maritima, Ancona, Italy.

Anthony D'Attilio

IN MEMORIAM

Bill Gemmell, husband of longtime Club member, Joyce Gemmell, passed away last month at the age of 93 following surgery.

Many longtime Club members have fond memories of visits to Joyce and Bill's home in San Felipe and smile on recalling early morning wild rides with Bill or Joyce at the wheel of the dune buggy as it barreled through the desert to catch a low tide at some remote beach. Our condolences are extended to Joyce.

CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - MARCH 17, 1988

Club President Bill Romer welcomed and introduced the new Club members and then introduced the speaker for the evening, Mr. Don Pisor, who presented a video program entitled,"Shell Collecting in Northwestern Australia and Indonesia."

Don's shell collecting adventures took us to the best collecting areas at king and low tides in the vicinity of Eighty Mile Beach, near Broome, Northwest Australia. Always traveling in two sturdy, cross-country type vehicles, Don put the members in the driver's seat as we got a firsthand look at shell collecting, including the gathering of *Murex stainforthi* and video tape of the rotting, rusting remains of a World War II Catalina Flying Boat in Broome Harbour. Captured in Don's video tour were live, crawling volutes and black olives found on a mile-long sandbar some 200 yards wide. Murex were also recovered in a mangrove swamp. One of the biggest prizes was a giant *Syrinx aruanus*, a species which reaches a length of over two feet. Some 100 miles north of Broome, Don and his group went down sandy roads and located habitats of the giant *Tridacna gigas* and *T. squamosa*.

His Indonesian experiences were revealed with startling video footage of colorful catamaran-outrigger boats, unbelievably beautiful orange and blue sea urchins, and views of olive shells burying themselves in sand within 30 seconds. We visited a number of old temples in the mountains, and rice paddies in the hills. There were Balinese women carrying baskets, and we saw and heard an exotic Balinese dance complete with bells, chimes, dongs and steel drums. We got a look at a huge sculpture of an *Epitonium scalare* (Precious wentletrap) in front of a spectacular shell shop 200 miles north of Bangkok, Thailand. Don mentioned that he found many nice bargains in the shop. Also of great interest was the Phuket Aquarium, and the gold leaf and blue enamel on the temples. The program concluded with a river tour through Bangkok, with merchants eager to sell their wares coming right up to the boats.

After the refreshment break, Bill called for volunteer workers for the COA Convention. We will need a volunteer force to deal with all the various functions of the Convention.

The Club Auction/Potluck is scheduled for April 30th at the condo complex of Wes Farmer. Members were reminded to donate shells.

Wes Farmer asked for volunteers to attend the Botanical Garden Foundation meetings.

The tasty refreshments were provided by June and Bob King and Mella and Herb Webster.

THE 21ST ANNUAL MEETING OF THE WESTERN SOCIETY OF MALACOLOGISTS (WSM)

The 21st annual meeting of the WSM will be held in Darwin Hall on the campus of Sonoma State University on July 17-21, 1988. Contributed papers are welcome on all aspects of molluscan neontology and paleontology, including research on terrestrial, freshwater, and marine mollusks.

Two symposia have been organized, one on the Biogeography and Evolution of the Molluscan Fauna of the Galapagos Islands featuring about 20 speakers on all aspects of Galapagos Mollusca and the second on Molluscan Herbivore/Plant Interactions featuring about 10 speakers.

A mid-meeting field trip is planned to observe and collect living and fossil mollusks at the rocky outer coast at Bodega Head, the protected sand-mud flats of Bodega Harbor, and the Pliocene Wilson Grove Formation and to compare the depositional environments in which Holocene and Pliocene mollusks are found in Sonoma County. The field trip includes a tour of the Bodega Marine Laboratory and the lobster mariculture facility. Other events including an auction, exhibits, and evening social events culminating in a banquet are planned.

THE ANNUAL AUCTION/POTLUCK OF THE SAN DIEGO SHELL CLUB

The Club's biggest social event and only fundraiser is almost here!! Don't miss it. Come to the Auction at the Clubhouse of Wes Farmer's condo complex at 3591 Ruffin Road (see map on last page). Festivities begin at 6:00 P.M.

If you have not already donated shells to help support the Club or signed up for your potluck donation, please contact either Bill Romer (278-2389) or Carole Hertz (277-6259). See you there!!

THE 16TH CONCHOLOGISTS OF AMERICA (COA) CONVENTION

THE 16th COA convention will be held at Fort Myers, Florida from July 11-15, 1988, hosted by the Southwest Florida Conchologists Society. It will be held at the Sheraton Harbor Palace Hotel. Activities will include, among others, programs, tours, auction, trips, Dealers' Bourse, parties and a Christmas in July Banquet with guest speaker, Dr. Emily Vokes. For further information contact Gene Herbert (813) 731-2405 or Al Bridell (813) 472-1637.

HAWAIIAN MALACOLOGICAL SOCIETY SHELL SHOW AND AUCTION

The Hawaiian Malacological Society's first Shell Show in nearly a decade, to be combined with a Shell Auction and Audio-Visual Program has been scheduled for November 11-13 at the Neal Blaisdell Center in central Honolulu. Collectors, dealers, and malacologists worldwide have been invited to participate.

The Auction will feature both rare and medium-expensive shells with proceeds supporting the HMS Scholarship Fund. Half a dozen prestigious trophies will be offered for the Shell Show displays; among them the Smithsonian Institution Award, the Conchologists of America Trophy and a new perpetual Tom Richert Memorial Award for the Shell of the Show. Also included will be Audio-Visual programs.

Details, as they are worked out, are available from the HMS Shell Show Committee P.O. Box 22130, Honolulu, HI 96822 or from Stu Lillico (808) 734-3703.

THE GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR

The Club will again participate in the Science Fair which will take place from April 13-17, 1988 in the Federal Building in Balboa Park. Our Club offers an award to an upper division entrant whose project falls into the area of marine life research. The winner will present an overview of his/her project at a Club meeting at which time the award will be given.

MIDWEST REGIONAL SHELL SHOW, INDIANAPOLIS

The Midwest Regional Shell Show, hosted by the Indianapolis Shell Club, will be held on August 13 and 14, 1988 at the Glendale Shopping Mall, Indianapolis, Indiana. Judging of the scientific displays will be by Jerry Harasewych and Kevin Sunderland. There will be an auction, dinner in honor of the judges, slide show, awards breakfast and a presentation by Dr. Harasewych on "Collecting slit shells by submarine." Following this there will be shells for sale by dealers in attendance and a program by Keven Sunderland on Venezuela. For further information write to Carl Sahlberg, 7826 Camberwood Dr., Indianapolis, IN 46268.

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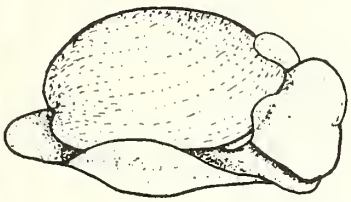
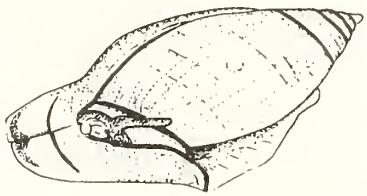
SAN DIEGO SHELL CLUB



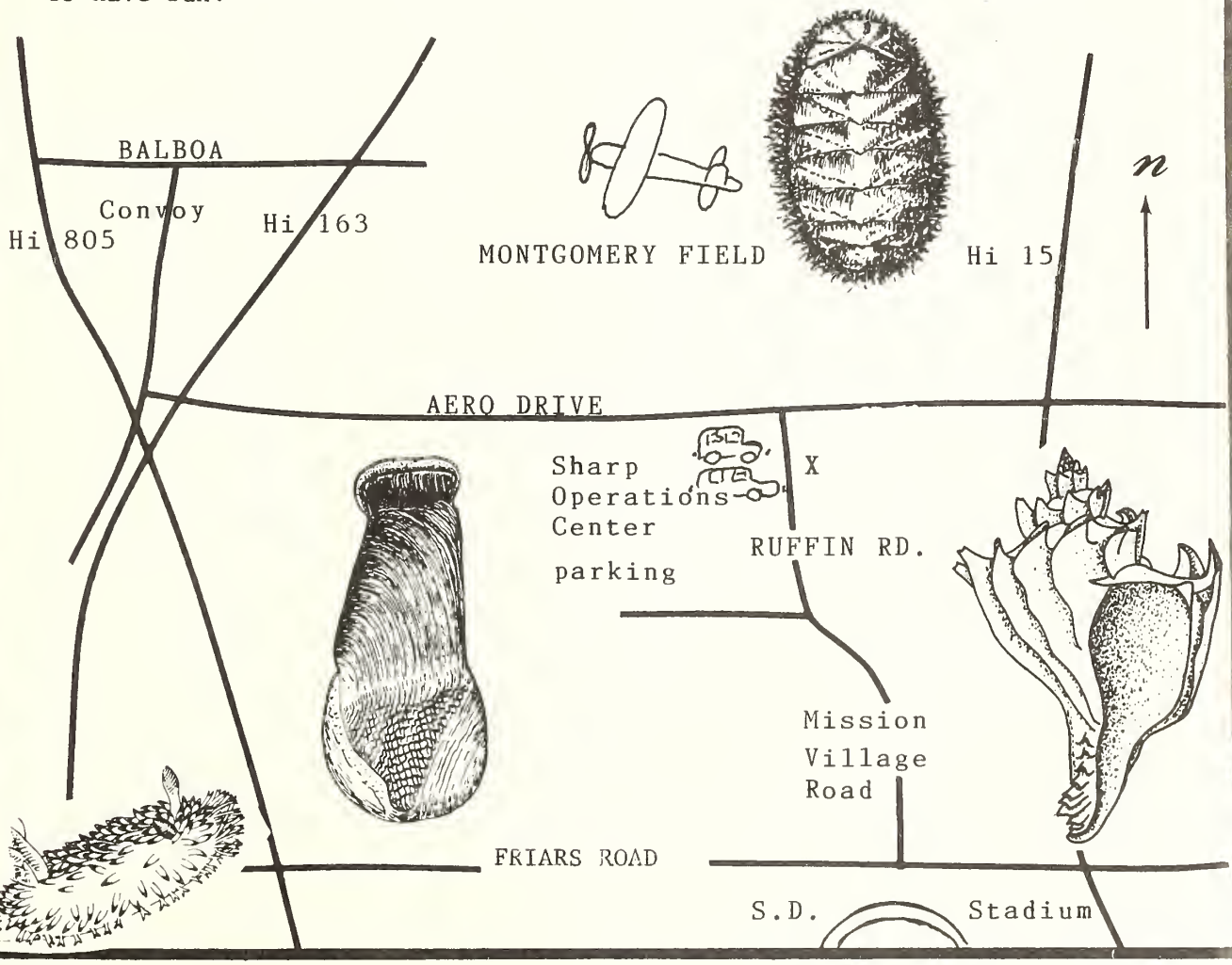
AUCTION/POTLUCK

APRIL 30, 1988



DIRECTIONS TO THE AUCTION: from 805: exit onto Balboa, east to Convoy, south to Aero Dr., east to Ruffin Rd., south about a block or two. Clubhouse on East side of street; park at Sharp Operations Center on West side.
From San Diego Stadium on Friars Road: up Mission Village Drive to Ruffin Rd., right turn or north about a half mile, parking on the west side of the street at Sharp Operations Center across from the Clubhouse.
THE ADDRESS: 3575 Ruffin Rd. at the Summer Hill Clubhouse.
TIME: 6:00 P.M. -???

***REMEMBER TO BRING:** You'll need to bring chairs, your potluck dish with eating utensils. Also bring serving utensils for your dish. And come ready to have fun!



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN: 0738-9388

Volume: XX | May 12, 1988 | Number: 5

PROGRAM

"Diversity of Form in Mollusk Species"

Anthony D'Attilio will discuss the variety of form of the mollusk shell both within and between species. He will illustrate his talk with slides and shells.

MINIPROGRAM

Jeremy Hutsell will talk about shell collecting on Puget Sound and will bring in a display of the shells he collected.

Meeting date: May 19, 1988

CONTENTS

ILLUSTRATED NOTES ON FAVARTIA GARRETTII (PEASE, 1868) FROM HAWAII

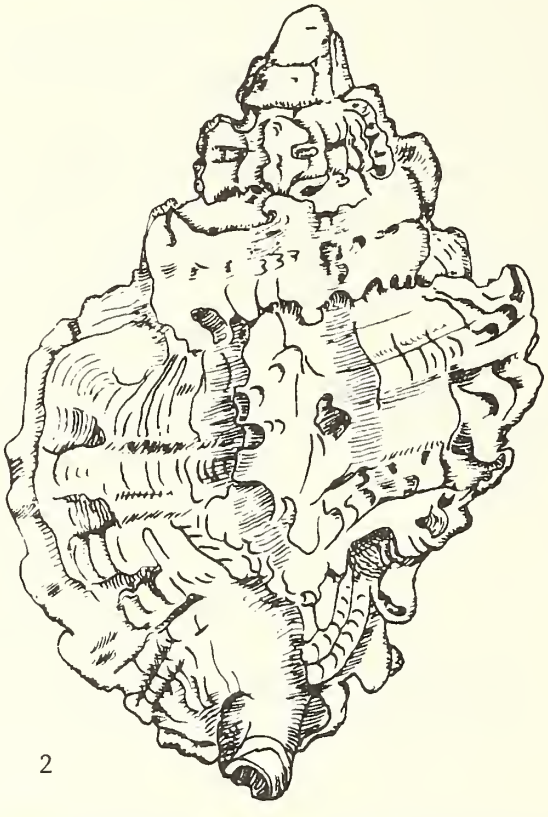
BY

ANTHONY D'ATTILIO

Associate, Department of Marine Invertebrates, San Diego Natural History Museum
Balboa Park, P.O. Box 1390, San Diego California 92112

In this study of the shell morphology of *Favartia garrettii* (Pease, 1868) (Figures 1 and 2), its current specific status is accepted. It will remain for a future review of all the known western Pacific species of *Favartia* to determine the status of *F. garrettii* in relation to its closest congeners.

1



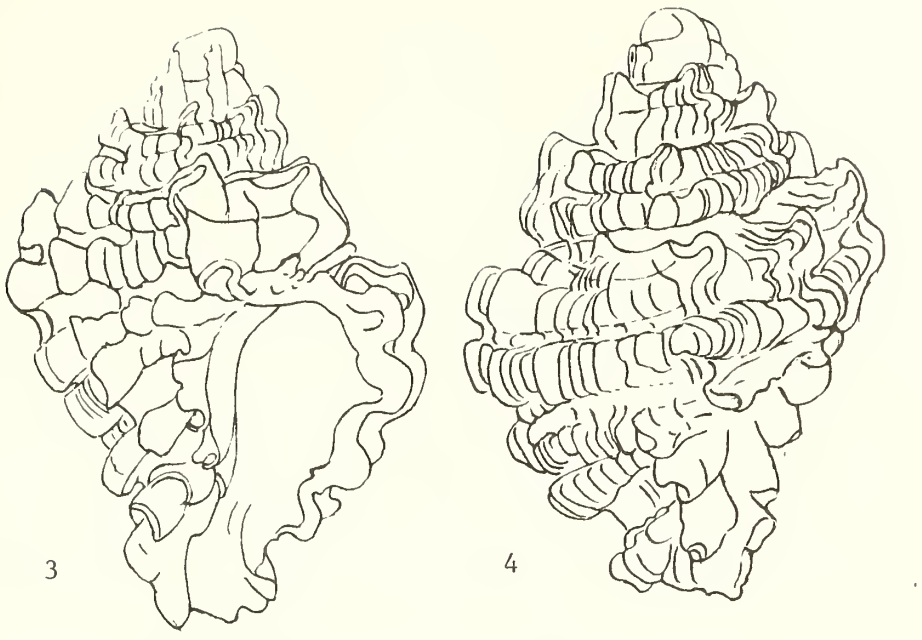
2

Figures 1 and 2. *Favartia garrettii* (Pease, 1868). 6.0 mm L, 22.9 m (75 ft.) under dead coral off Keaau Beach, Oahu, Hawaii, October 2, 1986, leg. D.R. Shasky (1) apertural view (2) dorsal view

Previous study of *F. garrettii* was done (Hertz & D'Attilio, 1979) from an immature specimen (Figures 3 and 4) . The morphology of the closely related *F. munda* (Reeve, 1849) was illustrated in D'Attilio (1987).

Specimens studied for this work in addition to the Hertz specimen are:
SDNHM 3641 (*ex* Fred Baker coll.) 3 specimens, 7.4-12.1 mm L, Hilo, Hawaii, 1913
SDNHM 86956 (*ex* Patrice Marquis coll.), 1 specimen, 11.7 mm L, leg. P. Marquis
SDNHM 76520 (*ex* W.R. Haas coll.) Nawiliwili Harbor, Kauai, beach specimens
Donald R. Shasky coll., 3 specimens, 6.0-7.2 mm L, in 22.9 m, under dead coral off Keaau Beach, Oahu, leg. D.R. Shasky, October 2, 1986.

Favartia garrettii ranges in size from 5 to approximately 12 mm in length. The species is found from intertidal depths (Hertz & D'Attilio, 1979) to 22.9 m (Shasky specimens). The protoconch (Figure 5a-d) of 1½ to 2 whorls is erect and convex. The teleoconch has four whorls in mature specimens. It is distinguished in its ontogeny by a change in the number of varices as well as in their character and a change in the size of the intervarical cords (Figures 6 and 7).



Figures 3 and 4. *F. garrettii* 4+ mm L, north end of Laie Bay, Oahu, H.I., intertidal, under rock, leg. J. Hertz, August 18, 1978, (operculum deeply withdrawn), juvenile specimen of two whorls.

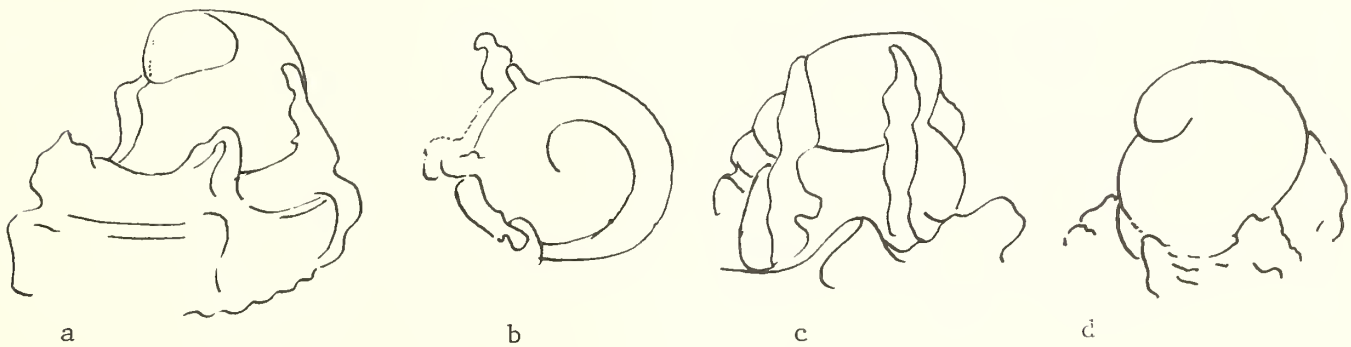
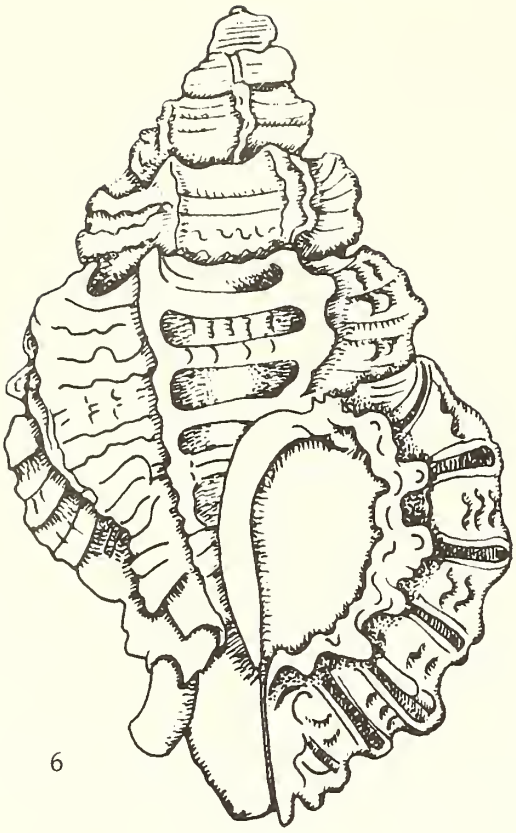


Figure 5a-d. *F. garrettii*, four views of protoconch. (a-c) three views of protoconch of two whorls from Hertz specimen (Figures 3 and 4) (d) protoconch of 1½ whorls from Shasky specimen (Figures 1 and 2)

The first three whorls of the teleoconch have six varices and the body whorl has five. This may be an indication of maturity. Except for the last few varices which are rounded at the shoulder, the varices are drawn out spine-like and turned posteriorly. Although the scabrous cords are well developed on the earlier whorls (Figure 6) and continue on to the body, the last one or two intervarical areas have much diminished cords (Figure 7).



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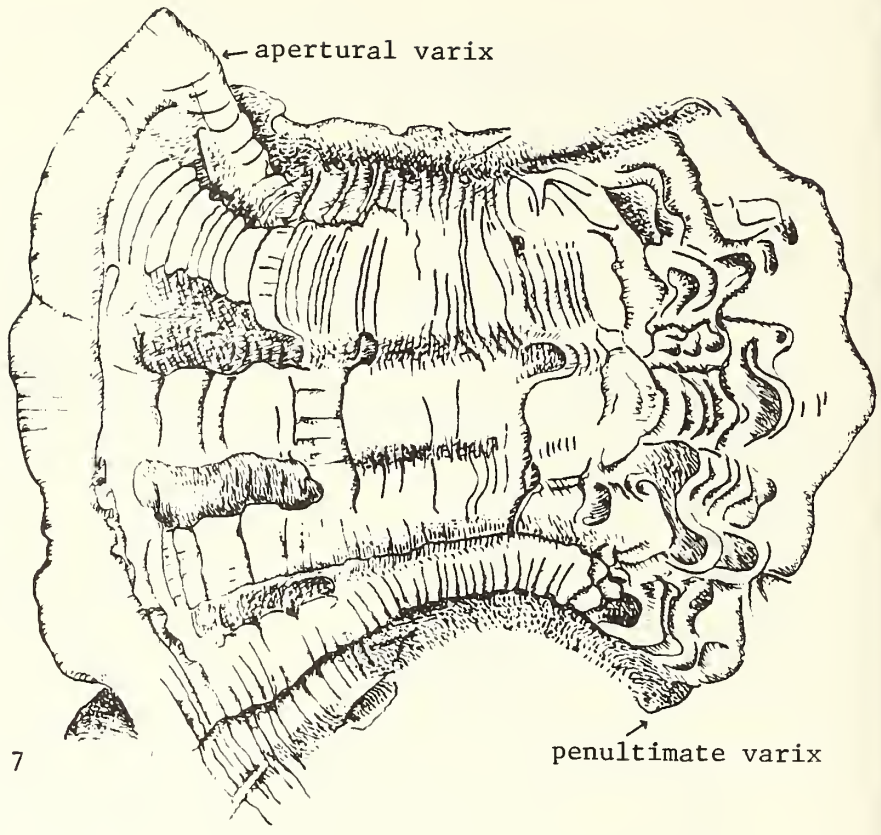

7

Figures 6 and 7. *F. garrettii*, SDNHM 3641, 7.4 mm L, Hilo Hawaii, donor: F. Baker (6) apertural view (7) much enlarged detail of a portion of the final intervarical area of a mature specimen showing the reduction in development of the scabrous cords. Note the deeply excavated embayments remaining on the receding side of the apertural varix.

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A LOOK AT A FEW OF THE BOOKS ON MALACOLOGY FROM JAPAN

BY

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Prior to the 20th century, much of the descriptive work on the Japanese molluscan fauna was accomplished by non-Japanese authors in the scientific journals of the world. The most noteworthy catalogs listing and illustrating Japanese shells were by Dunker (1882), Lischke (1869-1874), Kobelt (1880) and Pilsbry (1895) to name a few, all non-Japanese.

With the turn of the century, the Japanese era of conchological science began and catalogs and studies, as well as descriptive work by Japanese authors, made an appearance. It is some of these publications which we are reviewing in this paper. These books and catalogs not only deal with the mollusks of Japan but also include those from the western Pacific outside of the Japanese faunal province. The early volumes are entirely in Japanese, except for the Latin binomens, and thus create a problem for readers not familiar with the Japanese written language. Numerous new taxa were introduced in these works, a number as manuscript names.

We are limited in our review to the books and catalogs available in our Museum library with the exception of "Illustrations of a Thousand Shells" which is in the library of Donald Pisor of San Diego, California.

THE CONCHOLOGICAL MAGAZINE, editor and publisher Yoichiro Hirase, octavo size, vol. 1, 12 pts., (1907); vol. 2, 12 pts., (1908); vol. 3, 3 pts., (1909); vol. 4, pt. 1, (1910). [Publication ceased with this issue.] Kyoto, Japan.

This was meant to be a monthly magazine, but these volumes apparently constitute the only issues of this publication and cover slightly more than three years. In March 1909 an announcement of suspension of the magazine until May 1910 was made. One final issue in 1910 concluded the publication. Lack of funds was given as the reason for suspending publication. Each monthly edition in Japanese is bound in with its English counterpart, the Japanese portion in reverse as is customary in that language. Thus volume 1, number 1, is in, what we would refer to as, the back of the book. There are numerous line-cut text figures throughout the Japanese text. The black-and-white plates have captions with the binomens in Latin. The English pagination follows our normal practice of going from left to right, but the Japanese text page numbers are reversed, because vertical Japanese sentences are normally written from right to left. The parts are by various authors and new species are validly proposed.

THE ALBUM OF THE HIRASE CONCHOLOGICAL MUSEUM, (a publication by that museum); 1915, no author indicated, no numbering on pages, oblong octavo size. Kyoto, Japan.

A photograph of Mr. Yoichiro Hirase's museum which was located in Kyoto, Japan, shows an impressive two-story rectangular building. This was the first Japanese museum and probably the first in the world devoted entirely to Mollusca and open to the public.

This rare little book is small, bound in traditional Japanese style as accordion pages with a rather fragile silk-cardboard cover. It consists of photographic illustrations with explanatory facing pages in both Japanese and English. It is not a scientific work, but was published as a means of making the public aware of the museum and its contents.

ILLUSTRATIONS OF A THOUSAND SHELLS, by Yoichiro Hirase, 1914-1919, four volumes, octavo size, Kyoto, Japan.

Although this work was meant to encompass ten volumes, financial problems prevented Hirase from publishing more than four. The books were designed to be of aesthetic appeal and the author selected color wood block printing as the technique of

illustration, an art form at which the Japanese excelled. The books are bound in the traditional accordion style. One new species, *Murex hirasei* Dautzenberg, was published as a MS name. This muricid species was never validated by Dautzenberg and because it was published before 1930, the figure and name alone serve to make this binomen valid with the author Hirase, 1915 (D'Attilio, 1981) [Festivus XIII(1):5,6, "A note on the type figure of *Murex hirasei* and its author, Yoichiro Hirase."]

Much of the Hirase collection, including type specimens, is no longer extant, to our knowledge. It was transferred in 1939 to the Research Institute for Natural Resources, Tokyo, and was destroyed by bombs during World War II. However, a part of Hirase's collection of terrestrial mollusks was saved and is now in the Yokosuka City Museum. A catalogue of these mollusks was published in 1983 by K. Maeda, *et al* [Misc. Rept. Yokosuka City Mus. 8:1-60].

A COLLECTION OF JAPANESE SHELLS WITH ILLUSTRATIONS IN NATURAL COLORS by Shintaro Hirase, 1934, 217 pp., octavo size, Tokyo, Japan.

This book by the son of Yoichiro Hirase was intended as a memorial to his father. It consists of 129 color plates illustrating 1,360 species. Legends on the plates are in Japanese, but in separate legends following the plates, the binomens are in Latin with the sizes of the specimens printed in English. Further separate legends to the plates are in Japanese. The index is in both Latin and Japanese. No new taxa were introduced. Although it was to be a two-volume work, the second volume, to be a descriptive part for the illustrated species, was never published.

A revised and enlarged edition of the above was published in 1951 under the title A HANDBOOK OF ILLUSTRATED SHELLS IN NATURAL COLORS FROM JAPANESE ISLANDS AND THEIR ADJACENT TERRITORIES, by Isao Taki, 134 plates plus a 46 page index, Tokyo, Japan. The scientific names as given in the Taki edition were amended on advice of T. Kuroda and K. Oyama. Localities were added by Kuroda, Oyama and Horikoshi. No new taxa were introduced.

CHECK LIST AND BIBLIOGRAPHY OF THE MARINE MOLLUSKS OF JAPAN by T. Kuroda and T. Habe, 1952, 210 pp., large octavo size, Tokyo, Japan.

This book, published in English, is a complete account of the marine mollusks of Japan known up to 1952. Nineteen new species are validly proposed. Sixteen of these names are replacement names and three, *Nassarius hirasei*, *Oliva hirasei* and *Peristernia pilsbryi*, which are not replacement names and have no description, nonetheless, make bibliographic reference to a description, thus validly proposed. *Galeodea echinophorella*, proposed as a new species, has no descriptive text and the bibliographic reference is to a name and figure only. One new genus, *Trifaricardium*, stated to have been proposed in Kuroda (1951) [Illustrated Catalogue of Japanese Shells, No. 13, p. 86] was not validly proposed therein nor is it validly proposed in this book. The remainder of the new genera proposed are without a statement differentiating them from other genera and therefore not validly proposed according to the ICZN (1985) rules for taxa published after 1930.

ILLUSTRATED CATALOGUE OF JAPANESE SHELLS edited by Tokubei Kuroda, 1949-1953 and 1955, vol. 1 [pt. 1 (1949); pts. 2-10 (1950); pts. 11-17 (1951); pts. 18-22 (1952); pts. 23-24 (1953)], vol. 2 [pts. 1-2 (1955), ser. B, pts. 1-24 (1955)], large octavo size, Kyoto, Japan.

New taxa are validly proposed throughout this work. Taxa proposed under the heading, "Nomenclatural notes," which are without descriptions or other remarks differentiating them are not validly proposed according to ICZN (1985). However replacement names in these notes, without description, are validly proposed since they refer to previously described species.

COLOURED ILLUSTRATIONS OF THE SHELLS OF JAPAN by Tetusaki Kira, 1955, 204 pp., 67 pls., octavo size, Osaka, Japan.

This book is divided into two portions. The first consists of 67 plates; each

plate accompanied by a text page with the binomen and family name in Latin and an indication of size; no dates follow the binomens. In the second portion, the text (pages 138-172) is entirely in Japanese with some scattered line illustrations and appears to be comments on the plates. This portion is followed by a separate Latin and Japanese index to genera.

New taxa introduced as manuscript names are by Kira, Kuroda, Kuroda and Habe, Oyama, and Taki. The appearance of these manuscript names seems to indicate that the publication was not meant to be a scientific paper in the full sense. These new binomens in this 1955 edition are not validly proposed since there are no accompanying descriptions, or bibliographic references to such published statements, as required by the ICZN (1985).

COLOURED ILLUSTRATIONS OF THE SHELLS OF JAPAN by Tetusaki Kira, 1959, enlarged and revised edition, 239 pp., 72 pls., octavo size, Osaka, Japan.

This volume contains 71 numbered colored plates and an unnumbered colored frontispiece plate. Text pages are entirely in Japanese and are followed by separate English and Japanese indices to genera. New taxa are again introduced as manuscript names, but in this volume are accompanied by more numerous text pages containing descriptions in Japanese of the new species and, therefore, validly proposed; however, they should be attributed to Kira. Other species listed as new were proposed by other authors prior to 1959. Following is a list of those species.

Gaza sericata Kuroda, MS=Kira, 1959

Pseudastralium henicus gloriosum Kuroda & Habe, MS=Kira, 1959

Bolma ?millegranosa Kuroda & Habe, MS=*Galeoastraea millegranosa* Kuroda & Habe, 1958 *in* Habe, 1958. ["On the radula of Japanese marine gastropods," Venus 20(1):43-60]

Canarium microurceum Kuroda, MS = Kira, 1959

Neverita (Glossaulax) hosoyai Kuroda & Kira, MS=Kira, 1959

Pustularia margarita tetsuakii Kuroda, MS= *P. m. tetsuakii* Kira, 1959. We find no record of publication of this name by Kuroda, although Kira (1962) credits Kuroda with the name.

Erosaria tomlini maturata Kuroda, MS. Although Kira gave the name *E. t. ogasawarensis* Schilder, 1945, *in* Schilder, F.A. & M. Schilder, 1945, ["Westpazifische Cypraeacea von den Forchungsreisen des Prof. Dr. Sixten Bock," Arkiv. for Zoologi 36A(2):1-31] to his figure, pl. 20, #11, in 1962, nonetheless, the name *E. t. maturata* was validly proposed by Kira, 1959.

Semicassis persimilis Kuroda MS = *S. persimilis* Kira, 1959. We find no record of publication of this name by Kuroda. Habe (1961) refers the name to Kira, 1959.

Bursa dunkeri Kuroda, MS = Kira, 1959

Eudolium lineatum inflatum Kuroda & Habe MS = *E. inflatum* Kuroda & Habe, 1952. Replacement name for *E. lineatum* Osima, 1943, *non* Schepman, 1908. [Checklist and bibliography of the Recent Mollusca of Japan. Tokyo, 210 pp.]

Murex kiiensis Kuroda, MS = Kira, 1959

Ceratostoma (Pteropurpura) vespertilio Kuroda, MS = Kira, 1959

Coralliophila pyriformis Kuroda, MS=Kira, 1959

Latiaxis kawamurai Kuroda, MS = Kira, 1959

Babylonia pallida Kuroda, MS = Kira, 1959

Neptunea fukueae Kuroda, MS = Kira, 1959

Buccinum isao-takii Oyama, MS = *B. issaotakii* Kira, 1959

Nassarius (Zeuxis) kiiensis Kuroda, MS = Kira, 1959

Granulifusus kiranus Kuroda, MS = *Granulifusus kiranus* Shuto, 1958 ["Granulifusus from the Miyazaki Group (Paleontological study of Mizazaki Group V)" Trans. Paleo. Soc. Japan 31:253-264, 1 pl.]

Fusinus gemmuliferus Kuroda, MS = Kira, 1959

Fusinus crassiplicatus Kuroda, MS = Kira, 1959

Turrancilla apicalis Isao Taki, MS = Kira, 1959. Although Kira gave the name *T. suavis* Yokoyama, 1926, ["Tertiary mollusks from southern Totomi," J. Pac. Sci. Tokyo, sec. II, 1:313-364, pls. 38-41] to his figure (pl. 32, #2) in 1962, nonetheless, *T. apicalis* was validly proposed by Kira in 1959.

Baryspira urasima Isao Taki, MS = Kira, 1959. Although Kira gave the name *B. hinomotoensis* (Yokoyama, 1922) ["Fossils from the upper Musashino of Kazusa and Simosa," J. Coll. Sci. Tokyo 44, 200 pp., 15 pls.] to his figure (pl. 32, #3) in 1962, nonetheless, *B. urasima* was validly proposed by Kira, 1959.

Oliva hirasei Kuroda, MS = Kira, 1959

Mitra (Cancilla) yagurai Kuroda, MS = Kira, 1959

Daphnella nobilis Kuroda, MS = Kira, 1959

Cadulus (Platyschides) novilunatus Kuroda, MS = Kira, 1959

Entalina majestica Kuroda, MS = Kira, 1959

Dentalium (Episiphon) candelatum Kuroda, MS = Kira, 1959

Dentalium (Pictodentalium) formosum hirasei Kuroda, MS = Kira, 1959

Acila schencki Kuroda, MS = Kira, 1959

Nuculana (Thestyleda?) acinacea Habe, MS = *N. (T.) acinacea* Habe, 1958. ["Report on the Mollusca chiefly collected by the S.S. Soyo Maru..." pt 3, Lamellibranchia. Publ. Seto Mar. Biol. Lab. 6:214-280]

Fragum loochooanum Kuroda, MS = Kira, 1959

Clinocardium uchidai Habe, MS = *C. uchidai* Habe, 1955. ["Fauna of Akkeshi Bay XXI. Pelecypoda and Scaphopoda." Publ. Akkeshi Mar. Biol. Stn. 4:1-31, 7 pls.]

Vasticardium compunctum Kuroda, MS = Kira, 1959

Vasticardium serricostatum Kuroda, MS = *V. okinawaense* Kuroda, 1960. [A catalogue of molluscan fauna of the Okinawa Islands (exclusive of Cephalopoda) 106 pp., 3 pls. Ryukyu Univ.]

Irus ishibashianus Kuroda, MS = *I. ishibashianus* Kuroda & Habe, 1952. [Checklist and bibliography of the Recent Mollusca of Japan. Tokyo, 210 pp. Replacement name for *Venerupis irus* Yokoyama, 1924, *non* Lamarck, 1818]

Solecurtus dunkeri Kuroda, MS = Kira, 1959

Lanceolaria oxyrhyncha cuspidata Kuroda, MS = Kira, 1959

Euhadra roseoapicalis Kuroda, MS = Kira, 1959. *E. brandti roseoapicalis* Kira, 1959 is the name in the 1962 edition.

A CATALOGUE OF THE SHELL-BEARING MOLLUSCA OF OKINOSHIMA, KASHIWAJIMA AND THE ADJACENT AREA (TOSA PROVINCE), SHIKOKU, JAPAN by Masao Azuma, 1960, 102 pp., plus index to genera in Latin and Japanese, large octavo size, published by the author, Nishinomiya City.

This seems to be a checklist of the Mollusca from this part of Japan. However, six new species with English descriptions are validly proposed in the back of the book. The specific and supraspecific taxa are in Latin with author and date. The remainder of the catalogue is in Japanese except that collecting depths are given in English. Five black-and-white plates illustrate a few species including the newly described taxa.

COLOURED ILLUSTRATIONS OF THE SHELLS OF JAPAN II by Tadashige Habe, 1961, 183 pp., 66 color pls., octavo size, Osaka, Japan.

The binomens are in both Latin and Japanese and the only serious fault is the complete lack of publication dates following each taxon. A separate 42 page appendix contains complete descriptions in Japanese of a number of new genera and species. Eleven new genera were all authored by Habe with one exception credited to Kuroda and Habe. However, the many new species all validly proposed in this volume besides being attributed to Habe, are ascribed to Kajiyama and Habe, Kuroda, Abe and Habe, Oyama and Habe, Sakurai and Habe, and Shikama and Habe. *Agatha lepidula* (A. Adams, MS) is described as new. However, this name was validly proposed by A. Adams in 1861 [Ann. Mag. Nat. Hist. ser. 3, vol. 7:299].

SHELLS OF THE WESTERN PACIFIC IN COLOR by Tetsuaki Kira, 1962, 224 pp., 72 pls., large octavo size, Osaka, Japan.

This volume is an English edition of Kira's 1959 book. Although using the same plates, the title has been changed from COLOURED ILLUSTRATIONS OF THE SHELLS OF JAPAN. The numbered frontispiece is incorporated among the plates. With the addition of the frontispiece from the 1959 edition as plate 1, all other plate numbers had to be adjusted and are advanced one number. There are no dates following the binomens. Three new species are described: *Papyriscala bifasciata* Kira and Habe, *Coralliobia akibumii* Kira, and *Mitropifex hirasei* Kira. In this edition the manuscript names from the 1959 edition are correctly ascribed to Kira with the exception of those proposed prior to 1959.

SELECTED SHELLS OF THE WORLD ILLUSTRATED IN COLOURS by T. Shikama and M. Horikoshi, 1963, vol. 1, 154 pp., 102 pls., 211 text figs, large octavo size, Tokyo, Japan.

The text is entirely in Japanese, but the legends for the plates are in Latin, Japanese and English.

SELECTED SHELLS OF THE WORLD ILLUSTRATED IN COLOURS II by T. Shikama, 1964, 212 pp., 70 pls. in color, large octavo size, Tokyo, Japan.

The text portion is in Japanese and is prolifically illustrated with drawings and black-and-white photographs. The remaining pages are devoted to a bibliography and index in English. In these two companion volumes no new taxa were described.

SHELLS OF THE WESTERN PACIFIC IN COLOR, VOL.II by T. Habe, 1964, 223 pp., 66 pls., large octavo size, Osaka, Japan.

This is an English edition of Habe's 1961 book, using the same plates, but excluding the appendix with descriptions of new species. It is meant as a companion volume to Kira (1962). No new taxa are described in this edition.

SHELLS OF THE WORLD IN COLOR, two octavo size volumes. Vol. I by Tadashige Habe and Kiyoshi Ito, 1965, 176 pp., 66 pls., 31 text figs.; vol. II by T. Habe and Sadao Kosuge, 1966, 193 pp., 68 color pls., 2 black-and-white pls., 1 map, Osaka, Japan.

Volume 1 treats the northern Pacific and Volume 2 concerns the tropical Pacific. New taxa which seem to be proposed in each volume were actually described first in the VENUS in Volume 24(1):14-45, July 1965, and in Volume 24(4):312-341, May 1966. The format is similar to the previous volumes of Kira (1959) and Habe (1961). The text is in Japanese and the specific and supraspecific taxa in Latin followed by author and date. Many species have the common name in English. Indices to genera are in both Japanese and Latin.

THE SEA SHELLS OF SAGAMI BAY, Collected by His Majesty, the Emperor of Japan. Described by Tokubei Kuroda, Tadashige Habe and Katura Oyama, 1971, edited by Biological Laboratory Imperial Household, octavo size, Tokyo, Japan.

This work is really two books: the first in Japanese of 741 pages and the second in English of 489 pages. The 121 plates (105 in color, 16 black-and-white) inserted between the Japanese and English versions apply to both books. A number of new taxa, including 30 genera and 104 species, are validly proposed in the text.

CATALOGUE OF MOLLUSCAN TAXA DESCRIBED BY T. HABE DURING 1930-1975, WITH ILLUSTRATIONS OF HITHERTO UNFIGURED SPECIES compiled by T. Inaba and K. Oyama, 1977, large octavo size, 169 pp., 7 pls., Tokyo, Japan.

The catalogue, beginning with page 19, is arranged alphabetically. Besides the index, etc., there is a chronological bibliography [in English and Japanese] of Habe's papers up to 1975. [Plates 1-3 are of previously unfigured species.]

A CATALOGUE OF MOLLUSCA OF WAKAYAMA PREFECTURE, THE PROVINCE OF KII. I. BIVALVIA, SCAPHOPODA AND CEPHALOPODA, based on Kuroda's manuscript, supervised by T. Habe, edited by Y. Koyama, et al, 1981, publication of Seto Mar. Biol. Lab. Spec. Pub. ser. vol. 7, no. 1, 301 pp., 13 pls., large octavo size, Kyoto, Japan.

Although the catalogue is based on Kuroda's manuscript, T. Habe described eleven new species therein. Habe prepared the text on both the Bivalvia and Scaphopoda; the Cephalopoda is by Iwao Taki. The text is in Japanese, Latin and English.

ACKNOWLEDGMENTS

We wish to express our gratitude to Dr. Takashi Okutani, Professor of Invertebrate Zoology, Tokyo University of Fisheries, for critically reviewing the paper and for his helpful comments.

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CLUB NEWS

THE ANNUAL GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR

The Club again participated in the Science Fair. Club judges Ginny Herrmann and Barbara Myers chose as the winning project," A study of Mussel and Barnacle Zonation at Bay Rock Jetties" by Eden J. Estepa, a 17 year old twelfth grader at Mt. Miguel High School.

In addition to the Club's award, Eden also took second place in Zoology in the senior division and won an award from the San Diego Oceans Foundation.

Eden will come to a summer Club meeting and present an overview of her project. At that time she will receive her Club award. Her choice from the books offered is the fourth edition of Barnes' "Invertebrate Zoology."

TOO LATE FOR THE ROSTER

Gill, Eve, 1566 Oramas Road, Santa Barbara, CA 93103

THE FESTIVUS

A publication of the San Diego Shell Club

ISSN: 0738-9388

Volume: XX | June 9, 1988 | Number: 6

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

BRANCHS + Underwater Images of Eastern Pacific Invertebrates

Dr. Marc Chamberlain, local neurosurgeon and award winning underwater photographer will present this illustrated talk. Dr. Chamberlain was San Diego Underwater Photographic Society (SD-UPS) Advanced Underwater Photographer of the year for 1987 and has been a presenter at the last seven or more annual SD-UPS festivals and at the 1987 Western Society of Malacologists annual meeting.

Mini-program: Slides by Dave Mulliner of the last three Club events.

Meeting date: June 16, 1988

CONTENTS

CLUB NEWS

THE ANNUAL SAN DIEGO SHELL CLUB AUCTION/POTLUCK

Auction fever reached an all time high at the Club's annual Auction/Potluck on Saturday evening, April 30th. Through the courtesy of Wes Farmer, the Club was able to hold this noteworthy happening at his Clubhouse. The popularity of this exciting event was reflected in the heightened activity of the bidders, most of whom seemed determined to possess something or anything of the more than 200 specimen shells or shell related items sent to the rap of the gavel. The 200 plus figure does not include the vast array of fascinating shells, books, pictures and printed materials up for bid at the Silent Auction.

Auction material included everything from a *Pleurotomaria africana* to a *Spondylus variegata*, but the item which received the greatest attention and the highest bid was the drawing of *Murex adunca* sold to Larry and Toni Buck.

Attending members and guests indulged in tasty potluck dishes and partook of "Dave's Punch" which helped to make this evening an occasion not soon to be forgotten.

Our appreciation goes to Wes Farmer for hosting this event.

Wayne Reed

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - MAY 19, 1988

President Bill Romer welcomed members and guests to the meeting and announced that Eden Estepa was the Club winner of the Science Fair. She will attend our July meeting to talk about her project, "MUSSELS AND BARNACLES; HOW THEY ARE AFFECTED BY THE ENVIRONMENT." She will receive her award at that time.

Vice President Bob Yin introduced speaker Anthony D'Attilio by saying, "Tony D'Attilio doesn't need any introduction. He is an artist in his own right." He mentioned some of Tony's accomplishments such as his outstanding carved glass eagles in relief on the ceilings of both the Senate Rotunda and House of Representatives in Washington. He noted Tony's interest in sculpture, shape and form which extends to the sculptural diversity of seashells. It is this diversity of nature which was the theme of Tony's talk.

Tony's slide presentation revealed the diversity of mollusks since the dawn of the Cretaceous. Slide after slide, many by Bob Yin, showed the seemingly endless shapes, forms and colors of shells; shells with distinct qualities which have existed as long as 500 million years. It was a fantastic program.

Bill introduced Don Pisor who spoke about the upcoming COA Convention scheduled for June 1989. Don mentioned the need to find a convention site and a volunteer force to fill the following committees: accommodations, decorations, finance, program, publicity, registration, solicitations, party, field trip. The publicity committee will be headed by Mella and Herb Webster. Please contact Don (279-9342) if you will help.

For the mini-program, young Jeremy Rutsell described the enthusiasm of collecting shells of the northwest coast just outside of Seattle on Bay Bridge Island. The knowledgeable young collector explained that the largest number of shells, including over 100 top shells and a large number of *Murex foliatum* were found about a quarter mile offshore near enormous kelp beds. He found many of the *Murex* species feeding on mussels.

Because of the extended length of the meeting, Jeremy had to postpone the slide show portion of his program until a future meeting. We look forward to seeing the visual segment of his presentation.

The meeting concluded with the shell drawing. The winner was Don Avilez.

Wayne Reed

THE ANNUAL SEPTEMBER PARTY

Mark your calendars. The September party, this year with a Mexican theme, will be held on Saturday evening, September 17th in Toni and Larry Buck's garden.

A REPORT OF THE MOLLUSCAN SPECIES IN THE SAN CARLOS RECTANGLE, SONORA, MEXICO, COLLECTED BY FORREST L. AND LEROY H. POORMAN FROM DECEMBER 1953 TO DECEMBER 1983

BY

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In the past 25 years, we have published three papers on molluscan populations at Guaymas, Sonora, Mexico. DuShane & Poorman (1964), was a checklist, including habitats from which the species had been collected; Poorman & Poorman (1979) and Poorman (1982) discussed changing habitats and their effects on the species in the San Carlos area.

"San Carlos" is a name loosely applied to a region about 14 miles west of Guaymas. When we first visited it in 1953, the region included Estero San Carlos, a craggy mountain called Tetas de Cabra, a rocky shoreline, and a few Indian camps. By 1983, there were several trailer parks, stores, a bank, hotels, a marina and many luxurious homes on the hills and promontories. A new golf course was surrounded by new housing. The winter population rose to perhaps 10,000 people, mostly Americans.

Since the time of the first checklist, we have concentrated nearly 20 years of collecting in an area approximately three miles wide and five miles long which we call the Rectangle (Figure 1). About three months each year were spent collecting in this area, including all months except July and August (Poorman & Poorman, 1979). This list is a summary of the molluscan species taken during that period. All specimens were collected by the authors and are presently in our collection.

COLLECTING METHODS

Shore collecting - included turning rocks, sifting sand in tide pools, searching such algae as *Caulerpa* and *Padina*, hunting on the sand flat

Diving - not very rewarding, greater success in bringing algae ashore for inspection

Dredging - very rewarding in depths of 5-120 m (Dredging was done with a 16 inch box dredge and 1,200 feet of line.)

ECOLOGICAL NOTES

The Rectangle was defined to include the following habitats numbered here as they appear on the map in Figure 1.

1. A large estero with many acres of intertidal sandflat at the head; sides of small and then larger rocks leading to a narrow channel; the entrance protected by a rocky headland in 30 m of water; rocky coves along the sides of the estero providing habitats for soft and hard corals

2. A shoreline of small and large rocks leading directly to 20-30 m depth and several small sandy beaches exposed to the main Gulf

3. Offshore from 40-80 m a bottom of small rocks, sand and silt with many empty shells; several rocky outcroppings and ledges rising from the bottom

4. At the south central part of the Rectangle an area several hundred meters across deeper (80-100 m) than the surrounding bottom and containing great quantities of empty shells providing habitats for many species

5. Beyond this depression at the 100 m mark the bottom becoming silty mud with only a few animals

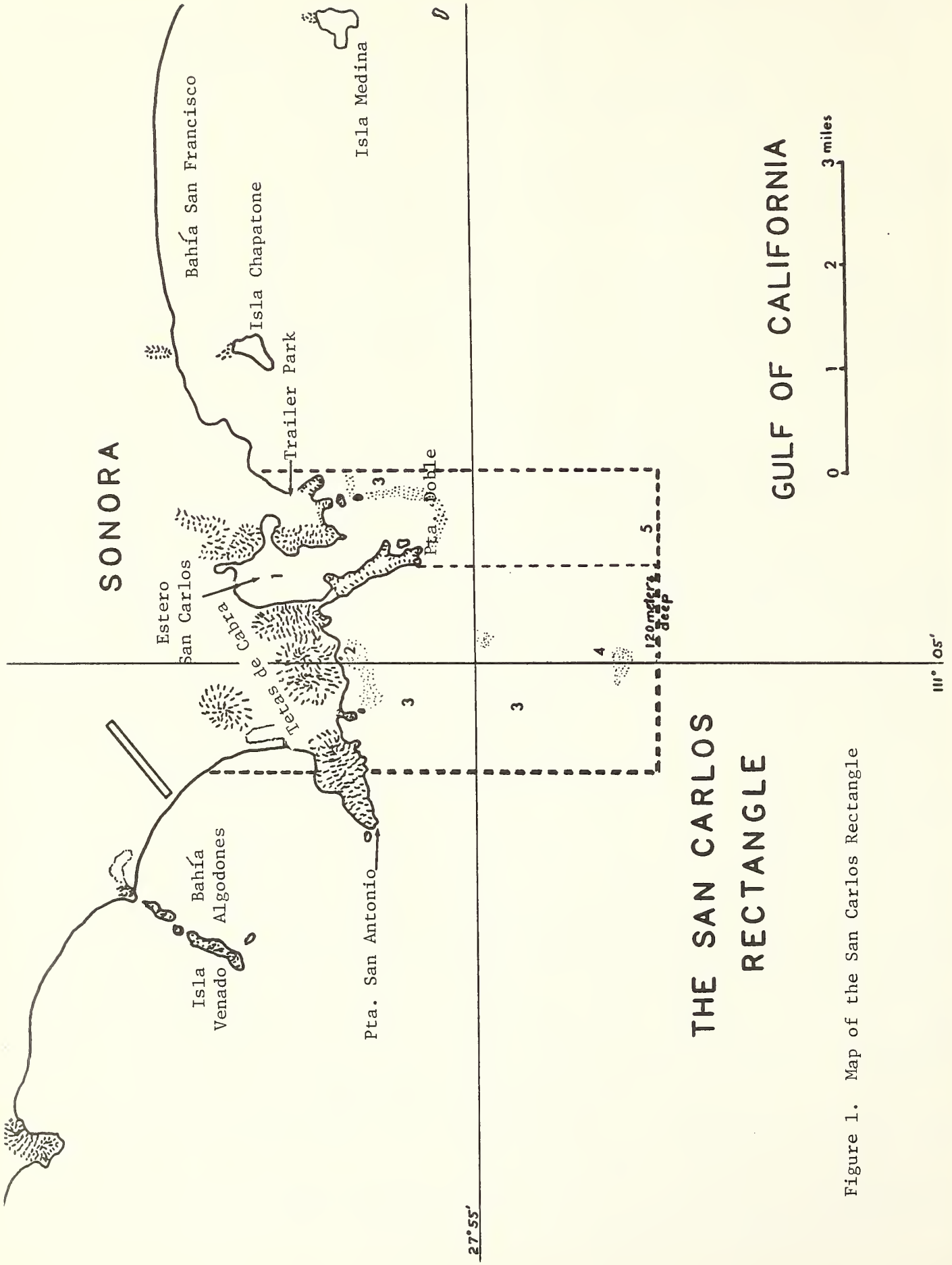

Figure 1. Map of the San Carlos Rectangle

Repeated visits showed the effects of the violent storms and strong tidal currents (6 knots) even 3 miles off the headlands. Rocky reefs were sometimes sanded over only to reappear several years later. The shoreline and the estero were little affected by the currents but did show some deterioration as the area developed.

The estero suffered considerably since 1970 as a result of the development of a marina, the housing around the head, and the dumping of shark carcasses by local fishermen. The odor of H_2S became very strong and etching of the shells increased.

The mean water temperature in this area, as recorded by fishermen, rose about seven degrees in the past 10 years. On our last visit to the region in October and November 1983 we dredged only about ten percent of the molluscan species we had come to expect, each dredge load containing 40-60 specimens. This may have been a result of the change in water temperature. Predation of mollusks, especially offshore by seals, fish, crabs, octopus and starfish, was very evident and almost no juvenile shells were observed. We dredged many crushed, broken and drilled shells--starfish and urchins engulfing live mollusks.

Only two species, *Strombus gracilior* and *Drillia roseola*, were evident in increased numbers everywhere on silt bottom to 40 m depth. The *Strombus* were all juvenile while the *Drillia* were of a range of sizes. Formerly, these species were rare in the dredge samples.

SYSTEMATIC ACCOUNT

The format for the following list is given here:

1. The species number and the scientific name are those used in Keen (1971) with generic and species names updated when possible. Brackets [] indicate source consulted.
2. A small letter after a number indicates that a synonym in Keen (1971) has been elevated to specific rank with the letter representing its placement in that work *e.g.* a=1st, b=2nd etc.
3. A capital letter after a number indicates a species not included in Keen (1971) and is intended to show approximate placement among the hierarchy of species in that book.
4. An asterisk after a number indicates a significant new distributional record.
5. Habitats and dredging depths are given for all species. Unless otherwise noted, specimens were dredged with the abbreviation "dr" for dredged used only when necessary to differentiate between collecting methods.

ACKNOWLEDGMENTS

Carol Skoglund and Carole Hertz kindly helped in updating the entries since Keen (1971).

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MOLLUSCAN SPECIES IN THE SAN CARLOS RECTANGLE

BIVALVIA

3 *Solemya (Petrasma) valvulus* Carpenter, 1864, 35 m on silt
4 *Nucula (Nucula) declivis* Hinds, 1843, 35 m on gravel
5 *N. (N.) exigua* Sowerby, 1833, 35 m on gravel
8 *N. (N.) schenki* Hertlein & Strong, 1940, 35 m on gravel
9 *N. (Ennucula) columbiana* Dall, 1908, 35-100 m on gravel and empty shells
16 *Nuculana (Costelloleda) costellata* (Sowerby, 1833), 20 m on gravel
17 *N. (C.) marella* Hertlein, Hanna & Strong, 1940, 100 m on empty shells
19 *N. (Saccella) acrita* (Dall, 1908), 30-100 m on gravel and empty shells
23 *N. (S.) elenensis* (Sowerby, 1833), 35-90 m on gravel and empty shells
26 *N. (S.) impar* (Pilsbry & Lowe, 1932), 20-40 m on gravel
35* *N. lucasana* Strong & Hertlein, 1937, 100 m on empty shells
39 *Adrana exoptata* (Pilsbry & Lowe, 1932), 30 m in sand
40 *A. penascoensis* (Lowe, 1935), 30 m in sand
64 *Nucinella subdola* (Strong & Hertlein, 1935), 35 m in gravel
66 *Arca (Arca) mutabilis* (Sowerby, 1833), intertidal under rocks
67 *A. (A.) pacifica* (Sowerby, 1833), 20-35 m on sand and gravel
74 *Barbatia (Cucullaearca) reeveana* (Orbigny, 1846), intertidal under rocks
79* *Anadara (Anadara) mazatlanica* (Hertlein & Strong, 1943), 25-90 m on gravel and empty shells
88 *A. (Esmeraraca) reinharti* (Lowe, 1935), 35 m on small rocks

90 *A. (Larkinia) multicostata* (Sowerby, 1833), intertidal; dr 20 m on small rocks
92* *A. (Rasia) formosa* (Sowerby, 1833), 20-50 m on gravel
93 *A. (Scapharca) biangulata* (Sowerby, 1833), 20 m on gravel
99 *Arcopsis solida* (Sowerby, 1833), intertidal under rocks; dr 35 m on small rocks
103 *Noetia (Sheldonella) delgada* (Lowe, 1935), 100 m on empty shells
110 *Glycymeris (Glycymeris) gigantea* (Reeve, 1843), 60 m on small rocks
112 *G. (G.) maculata* (Broderip, 1832), 20 m in sand
116 *G. (Tucetona) multicostata* (Sowerby, 1833), 20 m in sand
117 *G. (T.) strigilata* (Sowerby, 1833), 35 m in gravel
122 *Brachidontes semilaevis* (Menke, 1849), 100 m on *Drillia aerope*
125 *Mytella guyanensis* (Lamarck, 1819), intertidal on rock; dr 20 m on *Spondylus* valve
129* *Septifer zeteki* Hertlein & Strong, 1946, 35 m on small rocks
131 *Crenella divaricata* (Orbigny, 1842) [Gemmell, Hertz, Myers, 1980 for date correction] 35 m on gravel
132 *Gregariella chenui* (Récluz, 1842), 65 m on small rocks
133* *G. coarctata* (Carpenter, 1857), 100 m on empty shells
134* *G. denticulata* (Dall, 1871), 35 m on gravel
135 *Lioberus salvadoricus* (Hertlein & Strong, 1946), 40 m on gravel
143 *Lithophaga (Myoforceps) aristata* (Dillwyn, 1817), intertidal
149 *Modiolus capax* (Conrad, 1837), intertidal on reef; dr 35 m on rocks
151 *M. pseudotulipus* Olsson, 1961, 25 m on small rocks
153 *Amygdalum americanum* Soot-Ryen, 1955, 25 m on silt
161 *Pteria sterna* (Gould, 1851), intertidal under rocks; dr 35-50 m on gorgonians
162 *Pinctada mazatlanica* (Hanley, 1856), on reef at low tide
164 *Isognomon quadratus* (Anton, 1837) [=*I. recognitus* (Mabille, 1895)] [Bernard, 1983], intertidal under rocks; dr 35 m on rocks
167 *Myrakeena angelica* (Rochebrune, 1895) [Harry, 1985], intertidal on rocks; 35 m on rocks
169* *M. conchaphila* (Carpenter, 1857) [*ibid*] 100 m on empty shells
171 *Hyotissa hyotis* (Linne, 1758) [= *Ostrea fischeri* Dall, 1914] [*ibid*] 100 m (1 valve)
173* *Undulostrea megodon* (Hanley, 1846) [*ibid*] 35 m on rocks
174d *Saccostrea palmula* (Carpenter, 1857) [= *O. dalli* Lamy, 1930] [*ibid*] 100 m (2 valves)
175 *Ostrea tubulifera* Dall, 1914, 20 m on empty shells
176 *Pecten (Flabellipecten) berryi* Bernard, 1983 [= *Pecten lunaris* Berry, 1963 not Romer, 1839] [Bernard, 1983] 100 m on empty shells
177 *P. (E.) sericeus* Hinds, 1845, 100 m on empty shells (with *Capulus*)
181 *P. (Oppenheimopecten) vogdesi* Arnold, 1906, 70 m on small rocks and silt (with *Capulus*)
182 *Argopecten circularis* (Sowerby, 1835), 35 m on gravel
183 *Chlamys lowei* (Hertlein, 1935), 35-100 m on gravel and empty shells (with *Capulus*)
187 *Cyclopecten graui* (Knudsen, 1970) [Keen & Coan, 1975] 100 m on empty shells
191* *Delectopecten polyleptus* (Dall, 1908), 35 m on gravel
194 *D. zacae* (Hertlein, 1935), 100 m on empty shells
195 *Leptopecten (Leptopecten) biolleyi* (Hertlein & Strong, 1946), 35-100 m on gravel and empty shells
198 *L. (L.) palmeri* (Dall, 1897), 100 m on empty shells
199* *L. (L.) velero* (Hertlein, 1935), 100 m on empty shells
202* *Lyropecten (Nodipecten) subnodosus* (Sowerby, 1835), 35-60 m on small rocks
204* *Pseudamussium (Peplum) fasciculatum* (Hinds, 1845), 100 m on empty shells
207* *Plicatula inezana* Durham, 1950, 30-100 m on small rocks
208* *P. penicillata* Carpenter, 1857, 20-80 m in empty valves
210 *Spondylus calcifer* Carpenter, 1857, 100 m
212 *S. princeps unicolor* Sowerby, 1847, 35 m
214 *Lima (Lima) tetrica* Gould, 1851, intertidal under rocks in estero; dr 35 m with rocks
217 *L. (Limaria) hemphilli* Hertlein & Strong, 1946, 35 m with rocks
218* *L. (Limatula) similaris* Dall, 1908, 35 m with gravel
219 *L. (Promantellum) pacifica* Orbigny, 1846, intertidal under rocks
221 *Anomia adamas* (Gray, 1850), intertidal under rocks; dr 35 m on small rocks
224* *Placunanomia cumingii* Broderip, 1832, 35 m on small rocks
227* *Pododesmus (Monia) cepio* (Gray, 1850), on pilings in estero
229 *Eucrassatella antillarum* (Reeve, 1842) [= *E. digueti* Lamy, 1917] [Coan, 1984] 35 m on silt
234 *Crassinella pacifica* (C.B. Adams, 1852), 35 m on gravel
236 *Tellidorella cristulata* Berry, 1936, 110 m on sand and silt
237 *Carditamera affinis* (Sowerby, 1833) [Gemmell, Myers & Hertz, 1987] intertidal in estero
239 *Cardites crassicostata* (Sowerby, 1825) [*ibid*] 20-35 m on small rocks
242* *Cyclocardia (Cyclocardia) beebei* (Hertlein, 1958) [Bernard, 1983] 100 m on empty shells
244 *Cardita (Strophocardia) megastropha* (Gray, 1825), 20 m on rocks
269 *Lucina (Callucina) lingualis* Carpenter, 1864, 20 m in sand
270 *L. (C.) prolongata* Carpenter, 1857, 35 m on rocks
271 *L. (Here) excavata* Carpenter, 1857, 100 m on empty shells
272 *L. (Lunisca) centrifuga* (Dall, 1901), 35-100 m on gravel and empty shells
276* *L. (Pleurolucina) cancellaris* Philippi, 1846, 35-100 m on gravel and empty shells
277* *L. (P.) leucocymoides* (Lowe, 1935) 90 m on gravel and empty shells
278 *L. (P.) undatoides* Hertlein & Strong, 1945, 35 m on gravel
280* *Ctena chiquita* (Dall, 1901), 35 m on gravel
281* *C. clarionensis* Hertlein & Strong, 1946, 35 m on gravel
283* *C. galapagana* (Dall, 1901), 35 m on gravel
284 *C. mexicana* (Dall, 1901), 35 m on gravel

285* *Divalinga (Divalinga) eburnea* (Reeve, 1850), 35-60 m on gravel
287* *Miltha xantusi* (Dall, 1905), 90-100 m on empty shells
288 *Pegophysema edentuloides* (Verrill, 1870), 80 m on silt and small rocks
289 *Lucinoma annulata* (Reeve, 1850), 120 m on silt
291* *Diplodonta inezensis* (Hertlein & Strong, 1947), 35 m on silt
292 *D. subquadrata* (Carpenter, 1856) [= *D. suprema* Olsson, 1961][Hertz, Myers & Gemmell, 1982] 35 m in silt [*D. subquadrata*]; 35 m in sand [*D. suprema*]
295 *Kelaniella (Zemysia) parilis* (Conrad, 1848) [= *K. sericata* (Reeve, 1850)][Bernard, 1983] 35 m in silt
296 *Phlyctiderma (Phlyctiderma) discrepans* (Carpenter, 1857), 35 m in gravel
300* *P. (Pegmapex) phoebe* (Berry, 1960), 35 m in gravel
302 *Conchocele excavata* (Dall, 1901) [Bernard, 1983] 20 m in sand
304 *Cymatioa electilis* (Berry, 1963), intertidal
308 *Tryphomyax mexicanus* (Berry, 1959), 20 m in sand
309 *Amerycina colpoica* (Dall, 1913), 20 m in sand
310 *A. cultrata* Keen, 1971, 30 m on silt
311 *Lasaea subviridus* Dall, 1899, intertidal
312 *Kellia suborbicularis* (Montagu, 1803), 60 m on gravel
322 *Solecardia eburnea* Conrad, 1849, 60 m on gravel
324 *Aligena cokeri* Dall, 1909, 20 m in sand
327 *Mysella compressa* (Dall, 1913), 100 m on empty shells
339* *Orobitella zorrita* (Olsson, 1961), 20-30 m in sand
340 *Pythinella sublaevis* (Carpenter, 1857), 35 m in apertures of turrids
342* *Basterotia (Basterotia) peninsularis* (Jordan, 1936), 25 m in sand and gravel
343 *B. (B.) hertleini* Durham, 1950, 30 m in sand
346 *Chama buddiana* C.B. Adams, 1852 [= *C. mexicana* Carpenter, 1857][Hertz, Gemmell and Myers, 1982] intertidal on rocks; dr 35-100 m on rocks and empty shells
348 *C. frondosa* Broderip, 1835, 30 m on small rocks
350 *C. sordida* Broderip, 1835, 35 m on small rocks
351* *C. squamuligera* Pilsbry & Lowe, 1932, intertidal on rocks; 20 m on rocks
353* *Arcinella californica* (Dall, 1903), 35 m on small rocks
357 *Pseudochama janus* (Reeve, 1847), 35 m on small rocks
359 *P. saavedrae* Hertlein & Strong, 1946, 35 m on small rocks
360 *Trachycardium (Trachycardium) consors* (Sowerby, 1833), 30-100 m on silt and empty shells
362 *T. (Dallocardia) senticosum* (Sowerby, 1833), intertidal in mud
365 *T. (Phlogocardia) belcheri* (Broderip & Sowerby, 1829), 35-60 m on silt
366 *Papyridea aspersa* (Sowerby, 1833), 40-60 m on gravel
367 *P. crockeri* Strong & Hertlein, 1937, 100 m on empty shells
369 *Trigoniocardia (Trigoniocardia) granifera* (Broderip & Sowerby, 1829), 35 m on gravel
370 *Americardia biangulata* (Broderip & Sowerby, 1829) [Bernard, 1983] intertidal in estero; 20-35 m in sand and rocks
373 *Lophocardium annettae* (Dall, 1889), 35 m on coarse gravel
376* *Nemocardium (Microcardium) pazianum* (Dall, 1916), 20-100 m on silt and empty shells
377* *Laevicardium clarionense* (Hertlein & Strong, 1947), 35-60 m on sand and gravel
379 *L. elenense* (Sowerby, 1840), 20 m in sand
380 *Periglypta multicostata* (Sowerby, 1835), intertidal in sand around rocks; dr 20 m on small rocks
381 *Ventricolaria isocardia* (Verrill, 1870), 35-80 m on gravel
382* *V. magdalenae* (Dall, 1902), 110 m on silt
383 *Gouldia californica* Dall, 1917, 35-60 m on sand and gravel
391 *Transenella caryonautus* Berry, 1963, 60 m on gravel
394* *T. modesta* (Sowerby, 1835), 20 m in sand
397* *Pitar (Pitar) berryi* Keen, 1971, 35 m in sand
401 *P. (P.) helenae* Olsson, 1961, 20-35 m in sand and silt
403* *P. (P.) perfragilis* Pilsbry & Lowe, 1932, 100 m on empty shells
406 *P. (Hyphantosoma) pollicaris* (Carpenter, 1864), 20 m in sand
414* *P. (Lamelliconcha) frizzelli* Hertlein & Strong, 1948, 35-100 m on gravel and empty shells
421 *P. (Pitarella) catharius* (Dall, 1902), 35-100 m on gravel and empty shells
424 *Megapitaria aurantiaca* (Sowerby, 1831), intertidal in sand around rocks; dr 35 m in gravel
425 *M. squalida* (Sowerby, 1835), 20-35 m in sand and silt
426 *Dosinia dunkeri* (Philippi, 1844), 35-100 m on sand and empty shells
429* *Cyclinella jadisi* Olsson, 1961, 35 m on silt and gravel
434 *C. ulloana* Hertlein & Strong, 1948, 35 m on gravel
439 *Psephidia cymata* Dall, 1913, 35 m on silt and sand
441 *Chione (Chione) compta* (Broderip, 1835), 35 m on sand
444 *C. (?C.) tumens* (Verrill, 1870), intertidal in sand
445 *C. (C.) undatella* (Sowerby, 1835), intertidal in sand
456 *C. (Chionopsis) purpurissata* Dall, 1902, 80 m on gravel
457 *C. (Iliochione) subrugosa* (Wood, 1828), intertidal in sand
460 *C. (Lirophora) mariae* (Orbigny, 1846), 35 m in gravel
463 *C. (Timoclea) squamosa* (Carpenter, 1857), 35 m in gravel
483 *Petricola (Rupellaria) robusta* Sowerby, 1834, beach specimens
497 *Anatina cyprinus* (Wood, 1828), 20-50 m in silt and sand

512 *Tellina (Angulus) coani* Keen, 1971, 30 m in sand
513* *T. (A.) felix* Hanley, 1844, 90 m in silt
515 *T. (A,) hiberna* Hanley, 1844, 35 m in silt
517 *T. (A.) meropsis* Dall, 1900, 20 m in sand
518 *T. (A.) recurvata* Hertlein & Strong, 1949, 35 m in sand
523* *T. (Elliptotellina) pacifica* Dall, 1900, 20-35 m in sand and gravel
529 *T. (Eurytellina) inaequistriata* Donovan, 1802, 35 m in sand
535 *T. (E.) simulans* C.B. Adams, 1852, intertidal; dr 100 m on empty shells
538* *T. (Lyratellina) lyra* Hanley, 1844, 35 m in gravel
539 *T. (L.) lyrica* Pilsbry & Lowe, 1932, 35 m in gravel
540* *T. (Merisca) brevirostris* Deshayes, 1855, 35-100 m on silt and empty shells
546* *T. (Phyllodina) pristiphora* Dall, 1900, 35-90 m on silt and empty shells
551 *T. (Tellinella) cumingii* Hanley, 1844, 35 m on gravel
557 *Leporimetis cognata* (Pilsbry & Vanatta, 1902) [Coan, 1971] 35-100 m on gravel and empty shells
559 *Macoma (Cymatoica) undulata* (Hanley, 1844), 35-100 m on gravel and empty shells
567 *M. (Psammacoma) panamensis spectri* Hertlein & Strong, 1949 [Gemmell, Myers & Hertz, 1984] 35-100 m on gravel and empty shells
568A *M. secta* (Conrad, 1837) 80 m on empty shells (valves)
569 *Psammotreta (Psammotreta) aurora* (Hanley, 1844), 35 m on gravel
598 *Donax punctatostriatus* Hanley, 1843, intertidal in sand
603 *Gari (Gobraeus) helenae* Olsson, 1961, 35 m in gravel
607* *G. (G.) panamensis* Olsson, 1961, 20-35 m in sand
608* *G. (G.) regularis* (Carpenter, 1864), intertidal in sand
609 *Heterodonax pacificus* (Conrad, 1837), intertidal in sand
614 *Solecurtis guaymasensis* Lowe, 1935, 20-35 m in sand
624 *Tagelus (Mesopleura) politus* (Carpenter, 1857), 35 m in silt
626 *Semele californica* (Reeve, 1853 ex A. Adams MS), around octopus burrow in estero
628* *S. craneana* Hertlein & Strong, 1949, 100 m on empty shells
631 *S. formosa* (Sowerby, 1833) [= *S. verruculastra* Keen, 1966] [Coan, 1983] 30-100 m (valves)
633 *S. jovis* (Reeve, 1853), 35-100 m on gravel and empty shells
634 *S. junonia* (Verrill, 1870) [= *S. rosea rosea* (Sowerby, 1833)] [Coan, in press] 20-35 m in gravel
637 *S. pacifica* Dall, 1915, 35 m on gravel
638 *S. pallida* (Sowerby, 1833), 35-100 m on gravel and empty shells
649 *S. sparsilineata* Dall, 1915, 35 m on gravel
650 *S. tortuosa* (C.B. Adams, 1852), 100 m on empty shells
661 *Semelina subquadrata* (Carpenter, 1857), 35 m on gravel
669 *Ensis nitidus* (Clessin, 1888) [=*E. californicus* Dall, 1899] [Bernard, 1983] 20 m in silt
673 *Sphenia luticola* (Valenciennes, 1846 [=*S. fragilis* (H.& A. Adams, 1854)] [*ibid*] 50 m on gravel
676 *Corbula (Caryocorbula) marmorata* Hinds, 1843, 35 m in gravel
678* *C. (C.) nuciformis* Sowerby, 1833, 25 m in gravel
684 *C. (Juliacorbula) bicarinata* Sowerby, 1833, intertidal in estero
687* *C. (J.) ira* Dall, 1908, 100 m on empty shells
692* *C. (Varicorbula) speciosa* Reeve, 1843, 20-35 m in sand
695* *Gastrochaena rugulosa* Sowerby, 1834, diving 20 m on *Spondylus*
710 *Parapholas calva* (Sowerby, 1834), 35 m in large sandstone
733 *Pandora (Pandora) uncifera* Pilsbry & Lowe, 1932, 35-50 m in coarse sand
739 *P. (Pandorella) granulata* Dall, 1915, 35 m in gravel
740* *P. (P.) radiata* Sowerby, 1835, 100 m on empty shells
744 *Entodesma (Entodesma) inflatum* (Conrad, 1837), 20-35 m in silt
746* *E. (Agriodesma) sechuranum* Pilsbry & Olsson, 1935, 20 m in silt
749* *Periploma (Periploma) carpenteri* Dall, 1896, 100 m in silt
762* *Asthenothaerus villosier* Carpenter, 1864, 35 m in silt
764 *Cyathodonta dubiosa* Dall, 1915, 100 m on empty shells
766 *C. undulata* Conrad, 1849, 35-100 m on gravel and empty shells
773 *Cuspidaria panamensis* Dall, 1908, 100 m on empty shells
777 *Cardiomya costata* (Sowerby, 1834), 35 m in sand and gravel
781 *C. lanieri* (Strong & Hertlein, 1937), 110 m in silt
786 *Plectodon scaber* Carpenter, 1864, 80-100 m on empty shells
789 *Verticordia (Verticordia) ornata* (Orbigny, 1846), 35 m in gravel

GASTROPODA

1A *Haliotis walallensis* Stearns, 1899, 100 m on empty shells (1 broken specimen)
5 *Sinezona rimuloides* Carpenter, 1865, 35 m on small rocks
9 *Hemitoma (Montfortia) hermosa* Lowe, 1939, 10-75 m on small rocks
13 *Rimula mexicana* Berry, 1969, 35 m on small rocks
15 *Diodora alta* (C.B. Adams, 1852), 35 m on rocks
16 *D. digueti* (Mabille, 1895), 35 m on rocks
18 *D. inaequalis* (Sowerby, 1835), intertidal under rock
22 *D. pusilla* (Berry, 1959), 35 m on rocks
23 *D. saturnalis* (Carpenter, 1864), 35 m on rocks
25* *Lucapinella callomarginata* (Dall, 1871), intertidal under rock
27 *L. eleanore* McLean, 1967, 20-35 m on small rocks
28 *L. milleri* Berry, 1959, 35 m on rocks

29* *Stromboli beebei* (Hertlein & Strong, 1951), 100 m on empty shells
37* *Fissurella (Cremides) microtrema* Sowerby, 1835, intertidal under rock
38* *F. (C.) nigrocincta* Carpenter, 1856, 20 m on rocks
40 *F. (C.) rubropicta* Pilsbry, 1890, 35 m on small rocks
43* *Leurolepas roseola* McLean, 1970, 35 m on rocks
45 *Collisella acutapex* (Berry, 1960), 20 m on rocks
46 *C. atrata* (Carpenter, 1857), intertidal on rock
51 *C. stanfordiana* (Berry, 1957), intertidal on rock
52 *C. strigatella* (Carpenter, 1864), intertidal on rock
53 *C. strongiana* (Hertlein, 1958), 20 m on rocks
54 *C. turveri* (Hertlein & Strong, 1951), intertidal on rock
54a *C. turveri fayae* (Hertlein, 1958), intertidal on rock
56* *Notoacmaea fascicularis* (Menke, 1851), intertidal on *Padina*
58A *N. ubiquita* Lindberg & McLean, 1981, intertidal on *Padina*
59 *Patelloida semirubida* (Dall, 1914), intertidal; 35 m on rock
73 *Solariella triplostephanus* Dall, 1910, 20-35 m on small rocks
74 *Turcica admirabilis* Berry, 1969, 100 m on empty shells
77 *Calliostoma bonita* Strong, Hanna & Hertlein, 1933, 100 m on empty shell
78 *C. eximium* (Reeve, 1843), 20-35 m on small rocks
85 *C. marshalli* Lowe, 1935, 35 m on small rocks
86 *C. mcleani* Shasky & Campbell, 1964, intertidal; 20-90 m on small rocks and empty shells
88 *C. palmeri* Dall, 1871, 35 m on small rocks
94 *Tegula (Chlorostoma) rugosa* (A. Adams, 1853), intertidal on rock
97 *T. (Agathistoma) corteziana* McLean, 1970, intertidal among rocks
103 *T. (A) mariamadre* Pilsbry & Lowe, 1932, 100 m on empty shells
105 *T. (A.) mariana* Dall, 1919, intertidal; dr 20 m on small rocks
109 *T. (A.) rubroflammulata* (Koch in Philippi, 1843), 35 m on small rocks
122 *Parviturbo concepcionensis* (Lowe, 1935), 35 m on small rocks
124 *P. stearnsii* (Dall, 1918), 20-35 m on small rocks
134 *Arene (Marevalvata) balboai* (Strong & Hertlein, 1939), 20-35 m on small rocks
135 *A. (Otollonia) fricki* (Crosse, 1865), 20-35 m on small rocks
141 *Homalopoma (Panocochlea) clippertonensis* (Hertlein & Emerson, 1953), 100 m on empty shells
144 *Turbo (Callopoma) fluctuosus* Wood, 1828, intertidal
149 *T. (Marmarostoma) squamiger* Reeve, 1843, 20 m among small rocks
157 *Astraea (Uvanilla) unguis* (Wood, 1828), intertidal among rocks
158 *Tricolia cyclostoma* (Carpenter, 1864), 20 m among small rocks
159* *T. diantha* McLean, 1970, 35 m on rocks
164 *T. variegata* (Carpenter, 1864), intertidal; dr 35 m among small rocks
166 *Nerita (Theliostyla) funiculata* Menke, 1851, intertidal among rocks
168 *Theodoxus (Vittoclithon) luteofasciatus* (Miller, 1879)[Keen & Coan, 1975] intertidal on mangrove roots
169 *Phenacolepas malonei* Vanatta, 1912, 20-100 m on small rocks
170 *P. osculans* (C.B. Adams, 1852), intertidal under rocks
180 *Littorina albicarinata* McLean, 1970, in tide pool
181 *L. aspera* Philippi, 1846, 35 m on small rocks
183 *L. modesta* Philippi, 1846, on rocks in splash zone
186* *L. pullata* Carpenter, 1864, intertidal on rocks
194* *Lirobarleeia clarionensis* (Bartsch, 1911) [Draper, 1986] 35 m on gravel
203 *Alvania inconspicua* (C.B. Adams, 1852) [Ponder, 1985] 35 m on rocks
209* *Lirobarleeia perlata* (Mörch, 1860), intertidal under rocks
219* *Amphithalamus trosti* Strong & Hertlein, 1939, 35 m on rocks
240* *Rissoina (Rissoina) alarconi* Hertlein & Strong, 1951, 35 m on coarse gravel
255* *R. (R.) fortis* (C.B. Adams, 1852), intertidal under rocks
273 *R. (R.) woodwardi* Carpenter, 1857, 35 m on gravel
275* *R. (Folinia) ericana* Hertlein & Strong, 1951, 35 m on gravel
276* *Folinia insignis* De Folin, 1867 [= *Rissoina (Folinia)signae* Bartsch, 1915][Ponder, 1985] 35 m on rocks
277* *Acirsa menesthoides* Carpenter, 1864 [=*Rissoina berryi* Baker, Hanna & Strong, 1930] [DuShane, 1974 placed at #667 in Epitoniidae] 35 m on gravel
279* *Lirobarleeia lirata* (Carpenter, 1857) [Draper, 1986 placed at 204A] 35 m on gravel
290* *Vitrinella (Vitrinellops) campylochila* Pilsbry & Olsson, 1952, 100 m on empty shells
305 *Aorotrema humboldti* (Hertlein & Strong, 1951), 35 m on gravel
310 *Cyclostremiscus (Cyclostremiscus) baldridgae* (Bartsch, 1911), 35 m on gravel
311* *C. (C.) bifrontia* (Carpenter, 1857), 35 m on gravel
313* *C. (C.) coronatus* (Carpenter, 1857), 35 m on gravel
317* *C. (C.) gallo* Pilsbry & Olsson, 1945, 35 m on gravel
320 *C. (C.) gordanus* (Hertlein & Strong, 1951), 10-100 m
323* *C. (C.) lowei* (Baker, Hanna & Strong, 1938), 35 m on gravel
326* *C. (C.) nodosus* (Carpenter, 1857), 35 m on small rocks
327* *C. (C.) nummus* Pilsbry & Olsson, 1952, 35 m on small rocks
337 *C. (C.) spiceri* (Baker, Hanna & Strong, 1938), 20 m among small rocks
338* *C. (C.) spiritualis* (Baker, Hanna & Strong, 1938), 20 m among small rocks
341* *C. (C.) tricarinatus* (C.B. Adams, 1852), 35 m on coarse gravel
342 *C. (C.) trigonatus* (Carpenter, 1857), 35 m on coarse gravel
343* *C. (C.) valvatoides* (C.B. Adams, 1852), 35 m on coarse gravel
344* *C. (C.) veleronis* (Strong & Hertlein, 1947), 35 m on coarse gravel
347* *C. (Miralabrum) planospiratus* (Carpenter, 1857), 35 m on coarse gravel

350 *Discopsis (Alleorus) deprellus* (Strong, 1938), 35 m among small rocks
352 *Episcynia medialis* Keen, 1971, 35 m among small rocks
357* *Lydiphnis (Cymatopteryx) strongi* Pilsbry & Olsson, 1952, 35 m among small rocks
360* *Parviturboides decussatus* (Carpenter, 1857), 35 m on rocks
362* *P. monile* (Carpenter, 1857), 35 m on rocks
368* *Solariorbis (Solariorbis) concinnus* (C.B. Adams, 1852), 35 m on rocks
370* *S. (S.) hambachi* (Strong & Hertlein, 1939), 35 m on rocks
371* *S. (S.) hannai* (Strong & Hertlein, 1939), 35 m on rocks
375* *S. (S.) minutus* (C.B. Adams, 1852), 35 m on rocks
376* *S. (S.) narinensis* Pilsbry & Olsson, 1952, 35 m on rocks
377* *S.)S.) pyricallosus* (Carpenter, 1857), 35 m on rocks
383* *S. (Hapalorbis) ditropis* Pilsbry & Olsson, 1952, 35 m on rocks
387* *S. (H.) seminudus* (C.B. Adams, 1852), 35 m on rocks
389 *S. (Systellomphalus) elegans* Pilsbry & Olsson, 1952, 35 m on rocks
393* *Teinostoma (Teinostoma) politum* A. Adams, 1851, intertidal under rock
395* *T. (Esmeralda) concavaxis* Pilsbry & Olsson, 1945, 35 m on rocks
402* *T. (Pseudorotella) ecuadorianum* Pilsbry & Olsson, 1941, 35 m on rocks
403* *T. (P.) herbertianum* Hertlein & Strong, 1951, 35 m on rocks
415* *T. (P.) hemphilli* Strong & Hertlein, 1939, 35 m on rocks
425 *Architectonica (Architectonica) nobilis* Röding, 1798, 35-100 m on small rocks and empty shells
426 *A. (Discotectonica) placentalis* (Hinds, 1844), 100 m on empty shells
427a *Heliacus architae panamensis* Bartsch, 1918 [Robertson, 1975], 35 m on gravel
428 *H. bicanaliculatus* (Valenciennes, 1832), intertidal among anemones
429a *H. caelatus planispira* Pilsbry & Lowe, 1932 [Robertson, 1975] 35 m on small rocks
430 *H. mazatlanicus* Pilsbry & Olsson, 1932, 35 m on small rocks
437 *Turritella clarionensis* Hertlein & Strong, 1951, 100 m among empty shells
438 *T. gonostoma* Valenciennes, 1832, spawning in upper estero
441* *T. mariana* Dall, 1908, 35-40 m on coarse gravel
442* *T. nodulosa* King & Broderip, 1832, 35 m on sand and small rocks
445 *T. rubescens* Reeve, 1849, 35 m on sand and small rocks
446 *T. willetti* McLean, 1970, 20-30 m on small rocks
449 *Vermicularia pellucida eburnea* (Reeve, 1842), intertidal on rock, dr 30 m on rock
451* *Caecum bahiahondaense* Strong & Hertlein, 1939, 35 m on rocks
465* *C. quadratum* Carpenter, 1857, 35 m on rocks
467 *C. semilaeve* Carpenter, 1857, 35 m on rocks
472 *Elephantanellum heptagonum* (Carpenter, 1857), 35 m on small rocks
473 *E. liratocinctum* (Carpenter, 1857), 35 m on small rocks
475* *E. subobsoletum* (Carpenter, 1857), 35 m on small rocks
490 *Modulus catenulatus* (Philippi, 1849), intertidal in mud around mangroves
491 *M. cerodes* (A. Adams, 1851), intertidal around rocks; dr 20-35 m on gravel
492 *M. disculus* (Philippi, 1846), 35 m on gravel
494 *Vermetes (Thylaeodus) indentatus* (Carpenter, 1857), 35 m on rock
495* *Petaloconchus (Macrophragma) complicatus* Dall, 1908, 35 m on rock
497* *P. (M.) innumerabilis* Pilsbry & Olsson, 1935, 35 m on rock
499 *Tripsycha (Tripsycha) tripsycha* (Pilsbry & Lowe, 1932), 40 m on gravel
500 *T. (Eualetes) centiquadra* (Valenciennes, 1846), 100 m on empty shells
503 *Serpulorbis margaritaceus* (Chenu, 1844 *ex* Rousseau, MS), 35 m on rock
505* *Dendropoma lituella* (Mörch, 1861), 50 m on gravel
506 *Cerithium (Ochetoclava) gemmatum* Hinds, 1844, 25 m on coarse gravel
507* *C. (Thericium) adustum* Kiener, 1841, intertidal among rocks
510 *C. (T.) maculosum* Kiener, 1841, intertidal among rocks
515 *C. (T.) stercusmuscarum* Valenciennes, 1833, intertidal among rocks
516 *C. uncinatum* (Gmelin, 1791) 40 m on gravel
517 *Liocerithium judithae* Keen, 1971, intertidal around rocks
522* *Cerithiopsis bristolae* Baker, Hanna & Strong, 1938, 35 m on small rocks
530* *C. guatulcoensis* Hertlein & Strong, 1951, 35 m on small rocks
538* *C. perrini* Hertlein & Strong, 1951, 35 m on small rocks
542 *C. subgloriosa* Baker, Hanna & Strong, 1938, 40 m among rocks
543* *C. tuberculoides* Carpenter, 1857, 35 m on small rocks
555* *Metaxis convexa* (Carpenter, 1857), 40 m on coarse gravel
557 *Seila assimilata* (C.B. Adams, 1852), 35 m on rocks
557A *S. montereyensis* Bartsch, 1907, 35 m on rocks
562 *Alaba supralirata* Carpenter, 1857, 35 m among rocks
572* *Triphora altermata* C.B. Adams, 1852, 35 m among rocks
573 *T. chamberlini* Baker, 1926, 35 m among rocks
575 *T. contrerasi* Baker, 1926, 35 m among rocks
577 *T. dalli* Bartsch, 1907, 35 m among rocks
587 *T. oweni* Baker, 1926, 40 m on coarse gravel
597A *T. bicolor* Bartsch, 1907, 40 m on coarse gravel
601 *Cerithidea albonodosa* Gould & Carpenter, 1857, head of estero around rocks
602 *C. mazatlanica* Carpenter, 1857, upper estero around rocks
603 *C. montagnei* (Orbigny, 1839), upper estero on mangrove roots
607 *Strombus (Strombus) gracilior* Sowerby, 1825, 20-30 m on silt and sand
608 *S. (Lentigo) granulatus* Swainson, 1822, 20-30 m on silt and sand

611 *Epitonium (Asperiscala) acapulcanum* Dall, 1917, 35 m on small rocks
613 *E. (A.) canna* Dall, 1919, intertidal under rocks
616 *E. (A.) emydonesus* Dall, 1917, intertidal under rocks
617 *E. (A.) eutaenium* (Dall, 1917) 35 m on small rocks
620 *E. (A.) huffmani* DuShane & McLean, 1968, intertidal on rocks
623 *E. (A.) lowei* (Dall, 1906), 100 m on empty shells
625 *E. (A.) minuticosta* (De Boury, 1912), 35 m on small rocks
629 *E. (A.) tinctorium* Dall, 1919, intertidal under rock
631 *E. (A.) walkerianum* Hertlein & Strong, 1951, 100 m on empty shells
633 *E. (Cirsotrema) togatum* Hertlein & Strong, 1951, 50-100 m on small rocks and empty shells
634 *E. (C.) vulpinum* (Hinds, 1844), 35-100 m
636 *E. (Hirtoscala) reflexum* (Carpenter, 1856), intertidal under rock
637 *E. (H.) replicatum* (Sowerby, 1844), 35 m on gravel
652* *E. (Nitidiscala) hindsii* (Carpenter, 1856), 35 m on gravel
653* *E. (Asperiscala) obtusum* (Sowerby, 1844) [DuShane, 1974] intertidal on reef
655 *E. (Nitidiscala) politum* (Sowerby, 1844), 100 m on empty shells
661 *E. (N.) willetti* Strong & Hertlein, 1937, 100 m on empty shells
668* *Acirsa murrha* (DuShane, 1970), 100 m on empty shells
670 *Amaea (Scalina) brunneopicta* (Dall, 1908), 20-35 m on coarse gravel
671 *A. (S.) deroyae* DuShane, 1970, 80-100 m on silt and empty shells
672 *A. (S.) ferminiana* (Dall, 1908), 100 m on empty shells
676* *Opalia (Dentiscala) exopleura* (Dall, 1917) [DuShane, 1974] intertidal on reef
678 *O. (D.) crenatoides* (Carpenter, 1864), intertidal on reef
680 *O. (D.) funiculata* (Carpenter, 1857), intertidal on reef
681 *O. (Nodiscala) infrequens* (C.B. Adams, 1852) [= *O. (N.) bullata* Carpenter, 1864] [DuShane, 1974] intertidal on reef
684* *O. (Dentiscala) mexicana* Dall, 1908 [DuShane, 1974] intertidal on reef
686 *O. (Nodiscala) spongiosa* Carpenter, 1864, 20-40 m on coarse gravel
702 *Eulima lapazana* (Bartsch, 1917), 35 m among small rocks
707* *E. townsendi* (Bartsch, 1917), 20-30 m among rocks
721 *Balcis gibba* De Folin, 1867, 40 m on small rocks
728 *B. mexicana* (Bartsch, 1917), 35 m among small rocks
740 *B. yod* (Carpenter, 1857), 35 m among small rocks
747 *Niso (Niso) baueri* Emerson, 1965, 35 m among small rocks
749* *Eulimostraca hipolitensis* (Bartsch, 1917) [Hertz & Hertz, 1982] 35 m among small rocks
752 *Niso (Niso) splendidula* (Sowerby, 1834), 35 m on coarse gravel and small rocks
753 *N. (Neovolusia) excolpa* Bartsch, 1917, 20-100 m among small rocks
766 *Hipponix panamensis* C.B. Adams, 1852, intertidal on rocks; dr 35 m on small rocks
767 *H. pilosus* (Deshayes, 1832), intertidal on rocks
776 *Fossarus lucanus* Dall, 1919, 30 m among rocks
788* *Macromphalina hancocki* (Strong & Hertlein, 1939), 20 m on coarse gravel
796* *M. symmetrica* (Pilsbry & Olsson, 1945), 30 m on coarse gravel
797 *Vanikoro aperta* (Carpenter, 1864), intertidal under rocks; 20 m on coarse gravel
799 *Calyptraea (Calyptraea) conica* Broderip, 1834, 35 m on rocks and shells
806 *Cheilea cepacea* (Broderip, 1834), 35 m on rocks
807 *C. corrugata* (Broderip, 1834), 20 m on small rocks
808 *Crepidula aculeata* (Gmelin, 1791), 35 m on small rocks
809 *C. arenata* (Broderip, 1834), 20 m on coarse gravel
810 *C. excavata* (Broderip, 1834), 35 m on rocks
811 *C. incurva* (Broderip, 1834), intertidal under rocks
814 *C. onyx* Sowerby, 1824, intertidal under rocks
817 *C. striolata* Menke, 1851, 35 m in apertures of empty shells
820 *Crepipatella lingulata* (Gould, 1846) [Keen & Coan, 1975] intertidal on *Padina*
822 *Crucibulum (Crucibulum) lignarium* (Broderip, 1834), intertidal; dr 10-100 m on *Turritella*
823* *C. (C.) monticulus* Berry, 1969, 100 m on small rocks
825 *C. (C.) scutellatum* (Wood, 1828), 35 m on rocks
826 *C. (C.) spinosum* (Sowerby, 1824), 20-35 m on rocks and shells
827 *C. (C.) umbrella* (Deshayes, 1830), intertidal under rock; 20-50 m on rocks
828 *C. (Dispotaea) concameratum* Reeve, 1859, 20-35 m on rocks
832 *Capulus sericeus* J.& R. Burch, 1961, 50-100 m on pectens
835 *Thyca (Bessomia) callista* (Berry, 1959), diving 10 m on *Phatariea unifasciata*
837 *Xenophora robusta* Verrill, 1870, 30-50 m on rocks and gravel
861 *Natica (Naticarius) chemnitzii* (Pfeiffer, 1840) [Marincovich, 1977] intertidal in estero
864* *N. (Glyphepithema) idiopoma* (Pilsbry & Lowe, 1932) [*ibid*] 35 m on sand and silt
866* *N. (N.) scethra* (Dall, 1908) [*ibid*] 35-100 m on small rocks and empty shells
870 *N. (Stigmaulax) broderipiana* Récluz, 1844, 20 m in sand
871* *N. (S.) elenae* Récluz, 1844, 30-90 m in sand
873 *Polinices (Polinices) bifasciatus* (Griffith & Pidgeon, 1834), intertidal in estero; dr 35 m in silt
882 *P. (P.) uber* (Valenciennes, 1832), 20-35 m on sand and silt
893 *Sinum sanctijohannis* (Pilsbry & Lowe, 1932), 100 m in silt
895 *Lamellaria inflata* (C.B. Adams, 1852), intertidal on sponges; dr 35 m
905 *Trivia (Pusula) californiana* (Gray, 1827) 35 m
907 *T. (P.) myrae* Campbell, 1961, 20-35 m
909 *T. (P.) sanguinea* (Sowerby, 1832, *ex* Gray MS), 35 m
910 *T. (P.) solandri* (Sowerby, 1832 , *ex* Gray MS), intertidal; dr 35 m
912 *Hespererato columbella* (Menke, 1847) [Cate, 1977] 20-100 m

919 *Cypraea (Erosaria) albuginosa* Gray, 1825, intertidal under rocks; dr 35 m
922 *C. (Luria) isabellamexicana* Stearns, 1893, intertidal under rock
925 *C. (Macrocypraea) cervinetta* Keiner, 1843, intertidal among rocks in estero
927 *C. (Pseudozonaria) arabicula* (Lamarck, 1811), intertidal under rocks
929 *C. (P.) robertsi* (Hidalgo, 1906), 100 m
933 *C. (Zonaria) annettae* Dall, 1909, intertidal under rocks; dr 24-40 m
935 *Cyphoma emarginatum* (Sowerby, 1830), 50-80 m on gorgonians
936 *Simnia aequalis* (Sowerby, 1832), intertidal on gorgonians; dr 60-100 m on gorgonians
937 *S. avena* (Sowerby, 1832), 40 m on gorgonian
939 *S. rufa* (Sowerby, 1832), intertidal on gorgonian
940 *Jenneria pustulata* (Lightfoot, 1786), intertidal on rocks; dr 20-40 m
947 *Cassis (Levenia) coarctata* Sowerby, 1825, in tide pool; dr 35 m on rocks
948 *C. (Semicassis) centiquadrata* (Valenciennes, 1832), intertidal in sand
950 *Morum (Morum) tuberculosum* (Reeve, 1842, *ex* Sowerby, MS)[Hughes & Emerson, 1987 placed in Harpidae]in tide pools
952 *Ficus ventricosa* (Sowerby, 1825), 100 m on empty shells
954 *Cymatium (Monoplex) amictoideum* (Keen, 1971) [Beu, 1985] 80-100 m on empty shells
956* *C. (M.) parthenopeum keenae* (Beu, 1970), 100 m on empty shells
957 *C. (Turritriton) lignarium* (Broderip, 1833) [Beu, 1985] 100 m on empty shells
961 *C. (T.) gibbosum* (Broderip, 1833), intertidal among rocks; dr 35-100 m on rocks
962 *Distorsio (Distorsio) constricta* (Broderip, 1833) [Beu, 1985] 20-100 m on rocks and empty shells
966 *Bufonia (Marsupina) nana* (Broderip & Sowerby, 1829) [*ibid*] 100 m on empty shells
967 *Crossata californica sonorana* (Berry, 1960) [*ibid*] 100 m on empty shells
969 *Colubraria (Colubraria) lucasensis* Strong & Hertlein, 1937, 100 m on empty shells
972 *C. (C.) siphonata* (Reeve, 1844), 20-35 m on rock and gravel
974 *C. (?Tritonoharpa) xavieri* Campbell, 1961, 130 m (1 empty specimen)
975 *Murex (Murex) elenensis* Dall, 1909, 35 m on sand and rocks
978* *M. (M.) tricoronis* (Berry, 1960) [D'Attilio & Hertz, 1979] 35 m on sand and gravel
979 *Phyllonotus brassica* (Lamarck, 1822) [Radwin & D'Attilio, 1976] 100 m on empty shells
980 *P. erythrostomus* (Swainson, 1831) [*ibid*] 100 m on empty shells
985* *Favartia (Murexiella) diomedaea* (Dall, 1908) [Ponder, 1972] 100 m on empty shells
988 *F. (Murexiella) humilis* (Broderip, 1833) [*ibid*] 35 m on small rocks
990* *F. (M.) lappa* (Broderip, 1833) [*ibid*] 20 m on coarse gravel
991A *F. (M.) mildredae* (Poorman, 1980) [*ibid*] 100 m on empty shells
993 *F. (M.) perita* (Hinds, 1844) [*ibid*] 35 m on sand and small rocks
1001 *Hexaplex (Muricanthus) radix* (Gmelin, 1791) [Vokes, 1982] 35 m on sand and small rocks
1002* *H. (M.) princeps* (Broderip, 1833) [*ibid*] in sand among rocks at mouth of estero
1004 *Muricopsis armatus* (A. Adams, 1854), 20-35 m on coarse gravel
1007 *M. zeteki* Hertlein & Strong, 1951, diving among rocks
1008A *Poiriera (Paziella) advenus* (Poorman, 1980) [Vokes, 1984] 100 m on empty shells
1011 *Purpurellus pinniger* (Broderip, 1833) [Radwin & D'Attilio, 1976] on rock; dr 20-80 m among small rocks
1013* *Aspella (Aspella) pyramidalis* (Broderip, 1833), intertidal under rock
1013A* *A. (A.) pollux* Radwin & D'Attilio, 1976, 90 m among empty shells
1019 *Dermomurex (Trialatella) cunninghamae* (Berry, 1964). 20-35 m on coarse gravel and rocks
1020 *Bizetiella carmen* (Lowe, 1935) [Radwin & D'Attilio, 1976] 25-35 m on coarse gravel
1021 *Attiliosa nodulosa* (A. Adams, 1855) [= *Coralliophila incompta* Berry, 1960] [*ibid*] intertidal; dr 20 m on gravel
1022* *Pascula rufonotata* (Carpenter, 1864), 30 m on gravel
1024a *Eupleura triquetra* (Reeve, 1844), intertidal in estero
1029A *Pygmaepterys poormani* (Radwin & D'Attilio, 1976) [D'Attilio & Myers, 1985] 35-50 m on small rocks with gorgonians
1030 *Phyllocoma scalariformis* (Broderip, 1833), intertidal on rock
1036 *Pteropurpura (Pteropurpura) erinaceoides* (Valenciennes, 1832), intertidal on rocks: dr 35-80 m on rocks
1037 *P. (P.) centrifuga* (Hinds, 1844), 90-100 m on empty shells
1040 *Vitularia salebrosa* (King & Broderip, 1832), intertidal on gorgonians
1041* *Acanthotrophon carduus* (Broderip, 1833), 20-100 m on gravel and empty shells
1043* *A. sorenseni* (Hertlein & Strong, 1951), 100 m on empty shells
1044* *Austrotrophon cerrosensis* (Dall, 1891) [Abbott & Dance, 1982] 100 m on empty shells
1049 *Typhis (Talityphis) latipennis* (Dall, 1919), 80 m on silt
1051 *T. (Typhisopsis) coronatus* (Broderip, 1833), 30-100 m on silt and empty shells
1052 *T. (Typhisala) grandis* (A. Adams, 1855), 35-100 m on silt and empty shells
1058 *Tripterotyphis lowei* (Pilsbry, 1931) [D'Attilio & Hertz, 1984] intertidal under rocks, dr 20-35 m on gravel
1060 *Coralliophila (Coralliophila) macleani* (Shasky, 1970), intertidal on gorgonians
1065* *C. (Pseudomurex) orcuttiana* Dall, 1919, 35-80 m on coarse gravel
1066 *C. (P.) parva* (E.A. Smith, 1877), intertidal among anemones; dr 50 m among small rocks
1068 *Babelomurex hindsii* (Carpenter, 1857) [D'Attilio & Myers, 1984] 20-100 m among rocks and empty shells
1082 *Acanthina angelica* I. Oldroyd, 1918, intertidal on rocks
1088* *Purpura pansa* Gould, 1853, on rocks in splash zone
1093 *Trachypollia lugubris* (C.B. Adams, 1852) 20-40 m among small rocks
1096 *Neorapana tuberculata* (Sowerby, 1835), intertidal among rocks
1099 *Caducifer (Monostiolum) biliratus* (Reeve, 1846), 35-110 m on small rocks and empty shells
1101* *C. (M.) crebristriatus* (Carpenter, 1856), 40-100 m among small rocks and empty shells
1102* *C. (M.) nigrocostatus* (Reeve, 1846), 100 m on empty shells
1104 *Cantharus (Muricantharus) panamicus* (Hertlein & Strong, 1951) [Keen & Coan, 1975] 100 m on empty shells
1106 *C. shaskyi* Berry, 1959, 100 m on empty shells
1115 *C. (Gemophos) sanguinolentus* (Duclos, 1833), intertidal among rocks
1121 *Solenosteira macrospira* Berry, 1957, 35 m among small rocks
1124 *Engina solida* Dall, 1917, 20-35 m on rocks and gravel
1125 *E. jugosa* (C.B. Adams, 1852), 20-35 m on rocks and gravel

611 *Epitonium (Asperiscala) acapulcanum* Dall, 1917, 35 m on small rocks
613 *E. (A.) canna* Dall, 1919, intertidal under rocks
616 *E. (A.) emydonesus* Dall, 1917, intertidal under rocks
617 *E. (A.) eutaenium* (Dall, 1917) 35 m on small rocks
620 *E. (A.) huffmani* DuShane & McLean, 1968, intertidal on rocks
623 *E. (A.) lowei* (Dall, 1906), 100 m on empty shells
625 *E. (A.) minuticosta* (De Boury, 1912), 35 m on small rocks
629 *E. (A.) tinctorium* Dall, 1919, intertidal under rock
631 *E. (A.) walkerianum* Hertlein & Strong, 1951, 100 m on empty shells
633 *E. (Cirsotrema) togatum* Hertlein & Strong, 1951, 50-100 m on small rocks and empty shells
634 *E. (C.) vulpinum* (Hinds, 1844), 35-100 m
636 *E. (Hirtoscala) reflexum* (Carpenter, 1856), intertidal under rock
637 *E. (H.) replicatum* (Sowerby, 1844), 35 m on gravel
652* *E. (Nitidiscala) hindsii* (Carpenter, 1856), 35 m on gravel
653* *E. (Asperiscala) obtusum* (Sowerby, 1844) [DuShane, 1974] intertidal on reef
655 *E. (Nitidiscala) politum* (Sowerby, 1844), 100 m on empty shells
661 *E. (N.) willetti* Strong & Hertlein, 1937, 100 m on empty shells
668* *Acirsa murrha* (DuShane, 1970), 100 m on empty shells
670 *Amaea (Scalina) brunneopicta* (Dall, 1908), 20-35 m on coarse gravel
671 *A. (S.) deroyae* DuShane, 1970, 80-100 m on silt and empty shells
672 *A. (S.) ferminiana* (Dall, 1908), 100 m on empty shells
676* *Opalia (Dentiscala) exopleura* (Dall, 1917) [DuShane, 1974] intertidal on reef
678 *O. (D.) crenatoides* (Carpenter, 1864), intertidal on reef
680 *O. (D.) funiculata* (Carpenter, 1857), intertidal on reef
681 *O. (Nodiscala) infrequens* (C.B. Adams, 1852) [= *O. (N.) bullata* Carpenter, 1864] [DuShane, 1974] intertidal on reef
684* *O. (Dentiscala) mexicana* Dall, 1908 [DuShane, 1974] intertidal on reef
686 *O. (Nodiscala) spongiosa* Carpenter, 1864, 20-40 m on coarse gravel
702 *Eulima lapazana* (Bartsch, 1917), 35 m among small rocks
707* *E. townsendi* (Bartsch, 1917), 20-30 m among rocks
721 *Balcis gibba* De Folin, 1867, 40 m on small rocks
728 *B. mexicana* (Bartsch, 1917), 35 m among small rocks
740 *B. yod* (Carpenter, 1857), 35 m among small rocks
747 *Niso (Niso) baueri* Emerson, 1965, 35 m among small rocks
749* *Eulimostraca hipolitensis* (Bartsch, 1917) [Hertz & Hertz, 1982] 35 m among small rocks
752 *Niso (Niso) splendidula* (Sowerby, 1834), 35 m on coarse gravel and small rocks
753 *N. (Neovolusia) excolpa* Bartsch, 1917, 20-100 m among small rocks
766 *Hipponix panamensis* C.B. Adams, 1852, intertidal on rocks; dr 35 m on small rocks
767 *H. pilosus* (Deshayes, 1832), intertidal on rocks
776 *Fossarus lucanus* Dall, 1919, 30 m among rocks
788* *Macromphalina hancocki* (Strong & Hertlein, 1939), 20 m on coarse gravel
796* *M. symmetrica* (Pilsbry & Olsson, 1945), 30 m on coarse gravel
797 *Vanikoro aperta* (Carpenter, 1864), intertidal under rocks; 20 m on coarse gravel
799 *Calyptraea (Calyptraea) conica* Broderip, 1834, 35 m on rocks and shells
806 *Cheilea cepacea* (Broderip, 1834), 35 m on rocks
807 *C. corrugata* (Broderip, 1834), 20 m on small rocks
808 *Crepidula aculeata* (Gmelin, 1791), 35 m on small rocks
809 *C. arenata* (Broderip, 1834), 20 m on coarse gravel
810 *C. excavata* (Broderip, 1834), 35 m on rocks
811 *C. incurva* (Broderip, 1834), intertidal under rocks
814 *C. onyx* Sowerby, 1824, intertidal under rocks
817 *C. striolata* Menke, 1851, 35 m in apertures of empty shells
820 *Crepipatella lingulata* (Gould, 1846) [Keen & Coan, 1975] intertidal on *Padina*
822 *Crucibulum (Crucibulum) lignarium* (Broderip, 1834), intertidal; dr 10-100 m on *Turritella*
823* *C. (C.) monticulus* Berry, 1969, 100 m on small rocks
825 *C. (C.) scutellatum* (Wood, 1828), 35 m on rocks
826 *C. (C.) spinosum* (Sowerby, 1824), 20-35 m on rocks and shells
827 *C. (C.) umbrella* (Deshayes, 1830), intertidal under rock; 20-50 m on rocks
828 *C. (Dispotaea) concameratum* Reeve, 1859, 20-35 m on rocks
832 *Capulus sericeus* J.& R. Burch, 1961, 50-100 m on pectens
835 *Thyca (Bessomia) callista* (Berry, 1959), diving 10 m on *Phatariea unifasciata*
837 *Xenophora robusta* Verrill, 1870, 30-50 m on rocks and gravel
861 *Natica (Naticarius) chemnitzii* (Pfeiffer, 1840) [Marincovich, 1977] intertidal in estero
864* *N. (Glyphepithema) idiopoma* (Pilsbry & Lowe, 1932) [*ibid*] 35 m on sand and silt
866* *N. (N.) scethra* (Dall, 1908) [*ibid*] 35-100 m on small rocks and empty shells
870 *N. (Stigmaulax) broderipiana* Récluz, 1844, 20 m in sand
871* *N. (S.) elenae* Récluz, 1844, 30-90 m in sand
873 *Polinices (Polinices) bifasciatus* (Griffith & Pidgeon, 1834), intertidal in estero; dr 35 m in silt
882 *P. (P.) uber* (Valenciennes, 1832), 20-35 m on sand and silt
893 *Sinum sanctijohannis* (Pilsbry & Lowe, 1932), 100 m in silt
895 *Lamellaria inflata* (C.B. Adams, 1852), intertidal on sponges; dr 35 m
905 *Trivia (Pusula) californiana* (Gray, 1827) 35 m
907 *T. (P.) myrae* Campbell, 1961, 20-35 m
909 *T. (P.) sanguinea* (Sowerby, 1832, *ex* Gray MS), 35 m
910 *T. (P.) solandri* (Sowerby, 1832 , *ex* Gray MS), intertidal; dr 35 m
912 *Hespererato columbella* (Menke, 1847) [Cate, 1977] 20-100 m

919 *Cypraea (Erosaria) albuginosa* Gray, 1825, intertidal under rocks; dr 35 m
922 *C. (Luria) isabellamexicana* Stearns, 1893, intertidal under rock
925 *C. (Macrocypraea) cervinetta* Keiner, 1843, intertidal among rocks in estero
927 *C. (Pseudozonaria) arabicula* (Lamarck, 1811), intertidal under rocks
929 *C. (P.) robertsi* (Hidalgo, 1906), 100 m
933 *C. (Zonaria) annettae* Dall, 1909, intertidal under rocks; dr 24-40 m
935 *Cyphoma emarginatum* (Sowerby, 1830), 50-80 m on gorgonians
936 *Simnia aequalis* (Sowerby, 1832), intertidal on gorgonians; dr 60-100 m on gorgonians
937 *S. avena* (Sowerby, 1832), 40 m on gorgonian
939 *S. rufa* (Sowerby, 1832), intertidal on gorgonian
940 *Jenneria pustulata* (Lightfoot, 1786), intertidal on rocks; dr 20-40 m
947 *Cassis (Levenia) coarctata* Sowerby, 1825, in tide pool; dr 35 m on rocks
948 *C. (Semicassis) centiquadrata* (Valenciennes, 1832), intertidal in sand
950 *Morum (Morum) tuberculosum* (Reeve, 1842, *ex* Sowerby, MS)[Hughes & Emerson, 1987 placed in Harpidae]in tide pools
952 *Ficus ventricosa* (Sowerby, 1825), 100 m on empty shells
954 *Cymatium (Monoplex) amictoideum* (Keen, 1971) [Beu, 1985] 80-100 m on empty shells
956* *C. (M.) parthenopeum keenae* (Beu, 1970), 100 m on empty shells
957 *C. (Turritriton) lignarium* (Broderip, 1833) [Beu, 1985] 100 m on empty shells
961 *C. (T.) gibbosum* (Broderip, 1833), intertidal among rocks; dr 35-100 m on rocks
962 *Distorsio (Distorsio) constricta* (Broderip, 1833) [Beu, 1985] 20-100 m on rocks and empty shells
966 *Bufonia (Marsupina) nana* (Broderip & Sowerby, 1829) [*ibid*] 100 m on empty shells
967 *Crossata californica sonorana* (Berry, 1960) [*ibid*] 100 m on empty shells
969 *Colubraria (Colubraria) lucasensis* Strong & Hertlein, 1937, 100 m on empty shells
972 *C. (C.) siphonata* (Reeve, 1844), 20-35 m on rock and gravel
974 *C. (?Tritonoharpa) xavieri* Campbell, 1961, 130 m (1 empty specimen)
975 *Murex (Murex) elenensis* Dall, 1909, 35 m on sand and rocks
978* *M. (M.) tricoronis* (Berry, 1960) [D'Attilio & Hertz, 1979] 35 m on sand and gravel
979 *Phyllonotus brassica* (Lamarck, 1822) [Radwin & D'Attilio, 1976] 100 m on empty shells
980 *P. erythrostomus* (Swainson, 1831) [*ibid*] 100 m on empty shells
985* *Favartia (Murexiella) diomedaea* (Dall, 1908) [Ponder, 1972] 100 m on empty shells
988 *F. (Murexiella) humilis* (Broderip, 1833) [*ibid*] 35 m on small rocks
990* *F. (M.) lappa* (Broderip, 1833) [*ibid*] 20 m on coarse gravel
991A *F. (M.) mildredae* (Poorman, 1980) [*ibid*] 100 m on empty shells
993 *F. (M.) perita* (Hinds, 1844) [*ibid*] 35 m on sand and small rocks
1001 *Hexaplex (Muricanthus) radix* (Gmelin, 1791) [Vokes, 1982] 35 m on sand and small rocks
1002* *H. (M.) princeps* (Broderip, 1833) [*ibid*] in sand among rocks at mouth of estero
1004 *Muricopsis armatus* (A. Adams, 1854), 20-35 m on coarse gravel
1007 *M. zeteki* Hertlein & Strong, 1951, diving among rocks
1008A *Poiriera (Paziella) advenus* (Poorman, 1980) [Vokes, 1984] 100 m on empty shells
1011 *Purpurellus pinniger* (Broderip, 1833) [Radwin & D'Attilio, 1976] on rock; dr 20-80 m among small rocks
1013* *Aspella (Aspella) pyramidalis* (Broderip, 1833), intertidal under rock
1013A* *A. (A.) pollux* Radwin & D'Attilio, 1976, 90 m among empty shells
1019 *Dermomurex (Trialatella) cunninghamae* (Berry, 1964). 20-35 m on coarse gravel and rocks
1020 *Bizetiella carmen* (Lowe, 1935) [Radwin & D'Attilio, 1976] 25-35 m on coarse gravel
1021 *Attiliosa nodulosa* (A. Adams, 1855) [= *Coralliophila incompta* Berry, 1960] [*ibid*] intertidal; dr 20 m on gravel
1022* *Pascula rufonotata* (Carpenter, 1864), 30 m on gravel
1024a *Eupleura triquetra* (Reeve, 1844), intertidal in estero
1029A *Pygmaepterys poormani* (Radwin & D'Attilio, 1976) [D'Attilio & Myers, 1985] 35-50 m on small rocks with gorgonians
1030 *Phyllocoma scalariformis* (Broderip, 1833), intertidal on rock
1036 *Pteropurpura (Pteropurpura) erinaceoides* (Valenciennes, 1832), intertidal on rocks: dr 35-80 m on rocks
1037 *P. (P.) centrifuga* (Hinds, 1844), 90-100 m on empty shells
1040 *Vitularia salebrosa* (King & Broderip, 1832), intertidal on gorgonians
1041* *Acanthotrophon carduus* (Broderip, 1833), 20-100 m on gravel and empty shells
1043* *A. sorenseni* (Hertlein & Strong, 1951), 100 m on empty shells
1044* *Austrotrophon cerrosensis* (Dall, 1891) [Abbott & Dance, 1982] 100 m on empty shells
1049 *Typhis (Talityphis) latipennis* (Dall, 1919), 80 m on silt
1051 *T. (Typhisopsis) coronatus* (Broderip, 1833), 30-100 m on silt and empty shells
1052 *T. (Typhisala) grandis* (A. Adams, 1855), 35-100 m on silt and empty shells
1058 *Tripterotyphis lowei* (Pilsbry, 1931) [D'Attilio & Hertz, 1984] intertidal under rocks, dr 20-35 m on gravel
1060 *Coralliophila (Coralliophila) macleani* (Shasky, 1970), intertidal on gorgonians
1065* *C. (Pseudomurex) orcuttiana* Dall, 1919, 35-80 m on coarse gravel
1066 *C. (P.) parva* (E.A. Smith, 1877), intertidal among anemones; dr 50 m among small rocks
1068 *Babelomurex hindsii* (Carpenter, 1857) [D'Attilio & Myers, 1984] 20-100 m among rocks and empty shells
1082 *Acanthina angelica* I. Oldroyd, 1918, intertidal on rocks
1088* *Purpura pansa* Gould, 1853, on rocks in splash zone
1093 *Trachypollia lugubris* (C.B. Adams, 1852) 20-40 m among small rocks
1096 *Neorapana tuberculata* (Sowerby, 1835), intertidal among rocks
1099 *Caducifer (Monostiolum) biliratus* (Reeve, 1846), 35-110 m on small rocks and empty shells
1101* *C. (M.) crebristriatus* (Carpenter, 1856), 40-100 m among small rocks and empty shells
1102* *C. (M.) nigrocostatus* (Reeve, 1846), 100 m on empty shells
1104 *Cantharus (Muricantharus) panamicus* (Hertlein & Strong, 1951) [Keen & Coan, 1975] 100 m on empty shells
1106 *C. shaskyi* Berry, 1959, 100 m on empty shells
1115 *C. (Gemophos) sanguinolentus* (Duclos, 1833), intertidal among rocks
1121 *Solenosteira macrospira* Berry, 1957, 35 m among small rocks
1124 *Engina solida* Dall, 1917, 20-35 m on rocks and gravel
1125 *E. jugosa* (C.B. Adams, 1852), 20-35 m on rocks and gravel

1138 *Phos (Antillophos) veraguensis* Hinds, 1843, 35-70 m on silt and gravel
1142* *P. (Cymatophos) gaudens* Hinds, 1844, 20 m on coarse gravel
1144 *P. (Metaphos) articulatus* Hinds, 1844, 80 m on gravel
1153 *Columbella aureomexicana* (Howard, 1963), intertidal around rocks; dr 40 m on small rocks
1155* *C. fuscata* Sowerby, 1832, intertidal around rocks
1156* *C. haemastoma* Sowerby, 1832, 20-35 m among rocks
1162 *C. strombiformis* Lamarck, 1822, intertidal around rocks
1163A *Aesopus chrystaloides* Carpenter, 1886, 100 m on empty shells
1164 *A. (Ithiaesopus) arestus* Dall, 1919, intertidal under rocks
1175 *Anachis (Costoanachis) coronatus* (Sowerby, 1832), intertidal under rocks; dr 35 m on rocks and gravel
1178 *A. (?C.) fayae* Keen, 1971, intertidal on *Padina*
1195 *A (C.) varia* (Sowerby, 1832), intertidal under rocks
1196 *A. (C.) varicosa* (Gaskoin, 1852), 35 m among small rocks
1197 *A. (C.) vexillum* (Reeve, 1858), intertidal under rocks
1199 *A. (Glyptanachis) hilli* Pilsbry & Lowe, 1932, 35 m among small rocks
1209 *A. (Parvanachis) pygmaea* (Sowerby, 1832), intertidal on rocks
1213 *A. (Zafrona) incerta* (Stearns, 1892), intertidal; dr 20-35 m among small rocks
1221* *Decipifus dictynna* (Dall, 1919), 20 m in gravel
1222 *D. gracilis* McLean, 1959, intertidal under rocks
1232* *Mitrella caulerpae* Keen, 1971, intertidal on *Padina*
1235 *M. dorma* Baker, Hanna & Strong, 1938, intertidal under rocks
1238 *M. granti* Lowe, 1935, intertidal under rocks; dr 35 m among small rocks
1242 *M. millepunctata* (Carpenter, 1864), intertidal on algae; dr 35 m
1247 *Nassarina (Cigclirina) helenae* Keen, 1971, 20-100 m among rocks and shells
1252 *N. (Steironepion) tincta* (Carpenter, 1864), 35 m on gravel
1253 *N. (Zanassarina) anitae* Campbell, 1961, 35-100 m on gravel
1254 *N. (Z.) atella* Pilsbry & Lowe, 1932, intertidal under rocks; dr 60 m on gravel
1261 *Parametaria dupontii* (Kiener, 1849-50), intertidal on rocks; dr 40 m on gravel
1265 *Strombina (Strombina) angularis* (Sowerby, 1832), 80-100 m on silt and empty shells
1270 *S. (S.) dorsata* (Sowerby, 1832), 20 m on sand
1273 *S. (S.) gibberula* (Sowerby, 1832), 20-35 m on gravel
1277 *S. (S.) maculosa* (Sowerby, 1832), 20-100 m on gravel and empty shells
1280 *S. (S.) pavonina* (Hinds, 1844), 100 m on empty shells
1291 *Nassarius nodicinctus* (A. Adams, 1852) [= *N. angulicostis* (Pilsbry & Lowe, 1932)] [Cernohorsky, 1984] 20 m on gravel and rock
1292* *N. catallus* (Dall, 1908), 100 m on empty shells
1293 *N. cerritensis* (Arnold, 1903), 35-100 m on rocks
1295 *N. corpulentus* (C.B. Adams, 1852), 35 m among rocks
1302 *N. guaymasensis* (Pilsbry & Lowe, 1932), 35-100 m on rocks and empty shells
1304 *N. insculptus* (Carpenter, 1864), 100 m on empty shells
1306 *N. miser* (Dall, 1908), 100 m on empty shells
1308* *N. onchodes* (Dall, 1917), 100 m on empty shells
1309 *N. pagodus* (Reeve, 1844), intertidal around rocks
1312* *N. shaskyi* McLean, 1970, 100 m on empty shells
1313 *N. taeniolatus* (Philippi, 1845), 35 m on gravel
1318 *N. (Arcularia) iodes* (Dall, 1917), intertidal under rocks
1319 *N. (A.) luteostoma* (Broderip & Sowerby, 1829), intertidal near mangroves
1321 *N. (A.) tiarula* (Kiener, 1841), intertidal under rocks
1329* *Latirus hemphilli* Hertlein & Strong, 1951, 40 m on small rocks
1331 *L. praestantior* Melvill, 1892, 35 m among rocks
1340 *Falsifusus dupetitthouarsi* (Kiener, 1840), intertidal in sand, dr 100 m on empty shells (juveniles)
1340A *Fusinus turris* (Valenciennes, 1832), 100 m on empty shells
1342 *F. (Aptyxis) cinereus* (Reeve, 1847), intertidal on rocks; dr 35 m
1344 *F. (Barbarofusus) colpoicus* Dall, 1915, 100 m on empty shells
1346 *F. ambustus* (Gould, 1853), 20-35 m on small rocks
1349 *F. panamensis* (Dall, 1908), 100 m on empty shells
1350A *F. sonorae* Poorman, 1981, 100 m on empty shells
1351* *F. zacae* Strong & Hertlein, 1937, 100 m on empty shells
1353 *Lyria (Enaeta) cumingii* (Broderip, 1832), 20-40 m on coarse gravel
1357* *Harpa crenata* Swainson, 1822, 100 m on empty shells
1363 *Oliva (Oliva) polpasta* Duclos, 1833, 35 m in sand
1364 *O. (O.) porphyria* (Linnaeus, 1758), 20 m in sand
1365 *O. (Strephoma) spicata* (Röding, 1798), 20-35 m in sand
1370 *Agaronia testacea* (Lamarck, 1811) 35 m in sand
1377 *Olivella (Olivella) dama* (Wood, 1828 *ex* Mawe,MS), 35 m on gravel and small rock
1383 *O. (O.) steveni* Burch & Campbell, 1963, 20 m in gravel
1387 *O. (Dactylidella) anazora* (Duclos, 1835), intertidal in sand
1397 *Vasum caestus* (Broderip, 1833), 30 m on small rocks
1408 *Volvarina (Volvarina) taeniolata taeniolata* Mörch, 1860, 35 m on rocks
1414* *Granula minor* (C.B. Adams, 1852), 35 m on rocks
1417 *Granulina margaritula* (Carpenter, 1857), 35 m on rocks
1419* *Mitra (Atramitra) belcheri* Hinds, 1843, 80 m on silt and small rocks
1420* *M. (A.) fultoni* E.A. Smith, 1892, on small rocks and corals at 90 m
1421 *M. (A.) swainsonii* Broderip, 1836, 35 m on small rocks
1423 *M. (Mitra) crenata* Broderip, 1836 [Cernohorsky, 1976] 20 m on gravel
1426 *M. (M.) lens* Wood, 1828 [*ibid*] intertidal around rocks
1428 *Subcancilla (Subcancilla) sphoni* Shasky & Campbell, 1964 [*ibid*] 20-35 m
1429 *Mitra (Strigatella) tristis* Broderip, 1836, intertidal under rocks; dr 20 m in gravel
1430 *M. lignaria* Reeve, 1844, 100 m on empty shells
1435 *Subcancilla calodinota* (Berry, 1960), 30-100 m on silt and rock

1436 *S. directa* (Berry, 1960), 65 m on silt
1437 *S. erythrogramma* (Tomlin, 1931), 35-65 m on silt and small rock
1439* *S. gigantea* (Reeve, 1844, *ex* Swainson, MS), 35 m on silt and gravel
1440 *S. hindsii* (Reeve, 1844), 20-35 m on sand
1441 *S. lindsayi* (Berry, 1960), 20 m in sand
1442 *S. malleti* (Petit de la Saussaye, 1852), 25-100 m on sand and empty shells
1443* *S. phorminx* (Berry, 1969), 100 m on empty shells
1444A *S. welkerorum* Whitney, 1977, 80-100 m on small rocks and empty shells
1445 *Thala gratiosa* (Reeve, 1845), intertidal under rocks; dr 35 m
1447* *T. solitaria* (C.B. Adams, 1852), 20 m in coarse gravel
1450* *Cancellaria (Cancellaria) decussata* Sowerby, 1832, 120 m on silt
1451 *C. (C.) gemmulata* Sowerby, 1832, 30 m on coarse gravel
1452 *C. (C.) obesa* Sowerby, 1832, 35 m on silt and small rocks
1455* *C. (C.) ventricosa* Hinds, 1843, 100 m on empty shells
1457 *C. (Agatrix) strongi* Shasky, 1961, 100 m on empty shells
1458* *C. (Aphera) tessellata* Sowerby, 1832, 100 m on empty shells
1460* *C. (Bivetia) indentata* Sowerby, 1832, 25-100 m on small rocks and empty shells
1462 *C. (Bivetiella) pulchra* Sowerby, 1832, 20 m on sand
1465* *C. (Euclia) balboae* Pilsbry, 1931, 30 m on sand
1466 *C. (E.) cassidiformis* Sowerby, 1832, 35 m on gravel
1468 *C. (Massyla) corrugata* Hinds, 1843, 35 m on small rocks (1 dead specimen)
1469A *C. (Narona) cooperi* (Gabb, 1865), 100 m on empty shells (1 broken specimen)
1470* *C. (N.) exopleura* Dall, 1908, 100 m on empty shells
1476* *C. (Sveltia) centrota* Dall, 1896, 100 m on empty shells
1481 *Trigonostoma (Olssonella) campbelli* Shasky, 1961, 20-80 m on silt among rocks
1482 *T. funiculatum* (Hinds, 1843), 100 m on empty shells
1484 *T. (Ventrilia) bullatum* (Sowerby, 1832), 100 m on empty shells
1485* *T. (V.) elegantulum* M. Smith, 1947, 20 m on gravel
1486 *T. (V.) goniostoma* (Sowerby, 1832), 20-40 m on gravel
1489 *Conus (Conus) brunneus* Wood, 1828, intertidal around rocks
1489a *C. (C.) bartschi* Hanna & Strong, 1949, 30-80 m on small rocks
1491* *C. (C.) diadema* Sowerby, 1834, dead in tide pool
1493 *C. (C.) gladiator* Broderip, 1833, intertidal around rocks
1494 *C. (C.) princeps* Linnaeus, 1758, intertidal around rocks; dr 35 m on rocks
1495* *C. (C.) tiaratus* Sowerby, 1833, *ex* Broderip, MS, intertidal in tide pool
1499 *C. (Chelyconus) orion* Broderip, 1833, 35 m on small rocks
1500 *C. (C.) purpurascens* Sowerby, 1833, *ex* Broderip, MS, intertidal around rocks
1501 *C. (C.) vittatus* Hwass in Bruguiere, 1792, 100 m on empty shells
1502 *C. (Cylindrus) dalli* Stearns, 1873, 35 m on small rocks
1504 *C. (?Leptoconus) gradatus* Wood, 1828, *ex* Mawe, MS, 100 m on empty shells
1505 *C. (L.) poormani* Berry, 1968, 100 m on empty shells
1507 *C. (L.) regularis* Sowerby, 1833 [= *C. (L.) recurvus* Broderip, 1833] [Coomans, Moolenbeek & Wils, 1986] 20-35 m on gravel and small rocks [*C. regularis*]; 100 m on empty shells [*C. recurvus*]
1508 *C. (L.) scalaris* Valenciennes, 1832, 100 m on empty shells
1509 *C. (L.) virgatus* Reeve, 1849, intertidal around rocks; dr 20-30 m on small rocks
1510 *C. (L.) archon* Broderip, 1833, 50-100 m on small rocks
1511 *C. (L.) fergusoni* Sowerby, 1873, 100 m on empty shells
1511a *C. (L.) xanthicus* Dall, 1910, 100 m on empty shells
1514 *C. (Stephanoconus) nux* Broderip, 1833, intertidal on rocks
1516 *C. (Ximeniconus) tornatus* Sowerby, 1833, *ex* Broderip, MS, 20 m in sand
1517 *C. (X.) ximenes* Gray, 1839, 80 m on silt and small rocks
1522* *Terebra armillata* Hinds, 1844 [=*T. albocincta* Carpenter, 1857] [Bratcher & Cernohorsky, 1987] 35 m on silt and small rocks [*T. armillata*]; 35 m on gravel [*T. albocincta*]
1524 *T. berryi* Campbell, 1961, 10 m in sand
1528 *T. churea* Campbell, 1964, 35 m on gravel
1529* *T. corintoensis* Pilsbry & Lowe, 1932, 20 m on gravel
1535a *T. guayaquilensis* E.A. Smith, 1880, (1535, left figure), 35 m on gravel
1538c *T. petiveriana* Deshayes, 1857 (large figures right and left), 80 m on silt and small rocks
1547* *T. larvaeformis* Hinds, 1844, 10 m in sand
1548* *T. lucana* Dall, 1908, 100 m on empty shells
1554 *T. ornata* Gray, 1834, 35 m on silt and small rocks
1555* *T. panamensis* Dall, 1908, 20-100 m on gravel and empty shells
1558* *T. puncturosa* Berry, 1959, 35 m on silt and gravel
1560* *T. robusta* Hinds, 1844, 20-100 m on rock and gravel
1564 *T. shyana* Bratcher & Burch, 1970, 35 m on gravel
1565* *T. specillata* Hinds, 1844. [*T. balaenorum* Dall, 1908] [Bratcher & Cernohorsky, 1987] 20 m in sand, 100 m on empty shells [*T. specillata*]; 20 m in sand [*T. balaenorum*]
1566 *T. strigata* Sowerby, 1825, 35 m on silt and small rocks
1571* *T. variegata* Gray, 1834, intertidal in estero; dr 20-35 m on sand and gravel
1574A *Megasurcula ?cooperi* (Arnold, 1903), 100 m on empty shells (3 dead specimens)
1575 *Hormospira maculosa* (Sowerby, 1834), 35 m on gravel
1575A *Ophioderma cancellata* (Carpenter, 1864), 100 m on empty shells
1579 *Calliclava alcmene* (Dall, 1919), 35 m on silt
1595 *Kylix hecuba* (Dall, 1919), 35 m on silt
1599 *K. paziana* (Dall, 1919), 35 m on silt
1605 *Imaclava unimaculata* (Sowerby, 1834), 10-80 m in sand

1615 *Drillia (Drillia) acapulcana* (Lowe, 1935), 20-40 m in sand and gravel
1616 *D. (D.) aerope* (Dall, 1919), 100 m on empty shells
1619 *D. (D.) cunninghamae* McLean & Poorman, 1971, 25-100 m on small rocks and empty shells
1620 *D. (D.) inornata* McLean & Poorman, 1971, 90 m on empty shells
1621 *D. (D.) roseola* (Hertlein & Strong, 1955), 35 m on sand and silt
1623 *D. (D.) tumida* McLean & Poorman, 1971, 20-60 m in sand and small rocks
1626 *D. (Clathrodrillia) berryi* McLean & Poorman, 1971, 100 m on empty shells
1627 *D. (C.) salvadorica* (Hertlein & Strong, 1951), 20-35 m on gravel
1634 *Cerodrillia cybele* (Pilsbry & Lowe, 1932), 20-35 m on gravel
1637 *Splendrillia bratcherae* McLean & Poorman, 1971, 20-100 m on gravel
1640* *Iredalea perfecta* (Pilsbry & Lowe, 1932), 35 m on gravel
1641 *Bellaspira acclivicosta* McLean & Poorman, 1970, 35 m on gravel
1643 *B. melea* Dall, 1919, 10-35 m on gravel
1646 *Gemmula hindsiana* Berry, 1958, 100 m on empty shells
1647 *Polystira nobilis* (Hinds, 1843), 100 m on empty shells
1648 *P. oxytropis* (Sowerby, 1834), 20-35 m on gravel
1649 *P. picta* (Reeve, 1843, *ex* Beck, MS), 35 m on gravel
1654 *Fusiturricula armilda* (Dall, 1908), 100 m on empty shells
1655 *Cochlespira cedonulli* (Reeve, 1843), 20-80 m on empty shells
1656 *Knefastia dalli* Bartsch, 1944, intertidal around rocks; dr 20-80 m on small rocks
1659 *K. olivacea* (Sowerby, 1833), 100 m on empty shells
1661 *K. tuberculifera* (Broderip & Sowerby, 1829), 50 m on small rocks
1662 *K. walkeri* Berry, 1958, 80-100 m on small rocks
1663 *Pyrgospira obeliscus* (Reeve, 1843), 35-90 m in coarse gravel
1676 *Crassispira (Crassispira) maura* (Sowerby, 1834), 60 m on small rocks
1679 *C. (Burchia) unicolor* (Sowerby, 1834), 20 m in gravel
1680 *C. (Crassiclava) cortezi* Shasky & Campbell, 1964, 35 m on gravel and small rocks
1683 *C. (Crassipirella) brujae* Hertlein & Strong, 1951, 80 m on silt and small rocks
1684 *C. (C.) chacei* Hertlein & Strong, 1951, 80 m on silt and small rocks
1685 *C. (C.) discors* (Sowerby, 1834), intertidal; dr 35 m on rock and gravel
1686* *C. (C.) epicasta* Dall, 1919, 35-100 m on silt, rock and empty shells
1687 *C. (C.) rugitecta* (Dall, 1918), 90 m on empty shells
1688 *C. (C.) rustica* (Sowerby, 1834), 35-100 m on small rocks and empty shells
1691 *C. (Dallspira) bifurca* (E.A. Smith, 1888), 20-35 m on coarse gravel
1694 *C. (D.) erigone* Dall, 1919, 35-70 m on silt and small rocks
1697* *C. (Striospira) adana* (Bartsch, 1950), intertidal under rocks; dr 35 m on small rocks
1699 *C. (S.) kluthi* E.K. Jordan, 1936, 20 m on coarse gravel
1701 *C. (S.) tepocana* Dall, 1919, intertidal under rocks; dr 20-30 m on small rocks
1702 *C. (S.) xanti* Hertlein & Strong, 1951, 35 m on small rocks
1706 *C. (monilispira) pluto* Pilsbry & Lowe, 1932, intertidal on rocks
1708* *Hindsiclava andromeda* (Dall, 1919), 100 m on empty shells
1710 *H. militaris* (Reeve, 1843), *ex* Hinds, MS), 35 m on small rocks
1713 *Buchema granulosa* (Sowerby, 1834), intertidal under rocks; dr 20-40 m on small rocks
1714 *Lioglyphostoma ericea* (Hinds, 1843), 35-100 m on rocks and empty shells
1715 *L. rectilabrum* McLean & Poorman, 1971, 100 m on empty shells
1716 *Maesiella hermanita* (Pilsbry & Lowe, 1932), 20-35 m on small rocks
1717 *M. maesae* McLean & Poorman, 1971, 35 m on gravel
1719 *Miraclathurella bicanalifera* (Sowerby, 1834), intertidal under rocks; dr 20 m on gravel
1721* *Carinodrillia adonis* Pilsbry & Lowe, 1932, 35-100 m on rocks and empty shells
1723 *C. dichroa* Pilsbry & Lowe, 1932, 35-100 m on rocks and empty shells
1724 *C. halis* (Dall, 1919), 35-100 m on rocks and empty shells
1725 *C. hexagona* (Sowerby, 1834), 35 m on small rocks
1726 *C. lachrymosa* McLean & Poorman, 1971, 20 m on gravel
1727 *Strictispira ericana* (Hertlein & Strong, 1951), 25-100 m on rocks and empty shells
1731 *Zonulispira grandimaculata* (C.B. Adams, 1852), 35 m on silt and small rocks
1733 *Compsodrillia albonodosa* (Carpenter, 1857), 20 m on gravel
1734 *C. alcestis* (Dall, 1919), 35-100 m on empty shells
1735 *C. bicarinata* (Shasky, 1961), 80-100 m on empty shells
1736 *C. duplicata* (Sowerby, 1834), 30-100 m on empty shells
1737 *C. excentrica* (Sowerby, 1834), 20-35 m on rocks
1739 *C. haliplexa* (Dall, 1919), 20-35 m on gravel
1740* *C. jaculum* (Pilsbry & Lowe, 1932), 20-35 m on silt
1741 *C. olssoni* McLean & Poorman, 1971, 35 m on silt
1742* *C. opaca* McLean & Poorman, 1971, 100 m on empty shells
1743 *C. thestia* (Dall, 1919), 20 m on gravel
1755 *Pilsbryspira (Nymphispira) bacchia* (Dall, 1919), intertidal; dr 20-35 m on gravel
1756 *P. (N.) nymphia* (Pilsbry & Lowe, 1932), intertidal under rocks
1769* *Mitrolumna mitriformis* (Shasky, 1961), 100 m on empty shells
1772* *Cymakra granata* McLean & Poorman, 1971, 100 m on empty shells
1773 *Diptychophlia occata* (Hinds, 1843), 100 m on empty shells
1774 *Clathurella maryae* McLean & Poorman, 1971, 35-100 m on small rocks and empty shells
1776 *C. rigida* (Hinds, 1843), 20-35 m on small rocks
1777 *Nannodiella fraternalis* (Dall, 1919), 20-35 m on gravel
1778 *N. nana* (Dall, 1919), 35 m on gravel

1781 *Glyphostoma (Glyphostoma) neglecta* (Hinds, 1843), 20 m on gravel
1784 *G. (G.) thalassoma* (Dall, 1908), 100 m on empty shells
1785 *G. (Euglyphostoma) candida* (Hinds, 1843), 40-70 m on silt and small rocks
1787* *Strombinoturris crockeri* Hertlein & Strong, 1951, 80-100 m on empty shells
1789 *Kurtziella (Kurtziella) plumbea* (Hinds, 1843), 100 m on empty shells
1791 *K. (Granoturris) antipyrgus* (Pilsbry & Lowe, 1932), 35-100 m on gravel and empty shells
1793 *K. (Kurtzina) cyrene* (Dall, 1919), 20 m on gravel
1798 *Tenaturris merita* (Hinds, 1843), intertidal under rocks; dr 35 m on small rocks
1799 *T. verdensis* (Dall, 1919), 35 m on gravel
1803 *Euclathurella carissima* (Pilsbry & Lowe, 1932), intertidal under rocks
1806 *Platycythara electra* (Dall, 1919), 35 m among rocks
1807 *Thelecythara dushanae* McLean & Poorman, 1971, 20-100 m on gravel and empty shells
1809 *Kurtzia aethra* (Dall, 1919), 20 m on gravel
1810 *K. arteaga* (Dall & Bartsch, 1910), 20-100 m on gravel and empty shells
1813 *K. granulatissima* (Mörch, 1860), 20-35 m on gravel
1816 *Agathotoma (Agathotoma) alcippe* (Dall, 1918), 35-100 m on gravel and empty shells
1819* *A. (A.) neglecta* (C.B. Adams, 1852), 20-35 m on gravel
1822 *A. (Vitricythara) klasmidia* Shasky, 1971, 35 m on gravel
1823 *A. (V.) secalis* Shasky, 1971, 20 m on gravel
1826 *Pyrgocythara emersoni* Shasky, 1971, intertidal under rocks
1829 *P. helena* (Dall, 1919), 35 m on gravel
1830 *P. melita* (Dall, 1919), 20-35 m on gravel
1831 *P. phaethusa* (Dall, 1919), intertidal under rocks
1832 *P. scammoni* (Dall, 1919), intertidal under rocks; dr 35 m on gravel
1835 *Ithycythara penelope* (Dall, 1919), 35 m on gravel
1836* *Daphnella allemani* (Bartsch, 1931), intertidal under rocks
1836A *D. levicallis* Poorman, 1983, 80-100 m on empty shells
1837 *D. bartschi* Dall, 1919, 35 m on gravel
1839 *D. mazatlanica* Pilsbry & Lowe, 1932, intertidal under rocks; dr 35 m on gravel
1840 *D. retusa* McLean & Poorman, 1971, 20-100 m on gravel and empty shells
1843 *Philbertia doris* Dall, 1919, 35-50 m on small rocks
1848 *Microdaphne trichodes* (Dall, 1919), intertidal under rocks
1876* *Pyramidella (Pyramidella) hancocki* Strong & Hertlein, 1939, 20-100 m on gravel and empty shells
1877 *P. (Longchaeus) adamsi* Carpenter, 1864, 35 m on gravel
1879* *P. (L.) conica* C.B. Adams, 1852, 35 m on small rocks
1880* *P. (L.) elenensis* Bartsch, 1924, 40 m on small rocks
1881 *P. (L.) mazatlanica* Dall & Bartsch, 1909, 20-35 m on gravel
1884* *P. (Pharcidella) hastata* (A. Adams in Sowerby, 1854), intertidal under rocks
1887* *P. (P.) panamensis* Dall & Bartsch, 1909, 35 m on gravel
1889 *P. (Voluspa) linearum* Pilsbry & Lowe, 1932, 35 m on gravel
1893 *Iselica ovoidea* (Gould, 1853), 35 m on small rocks
1958* *Odostomia (Egila) lacunata* Carpenter, 1857, 35 m on grave.
1960* *O. (Eulimastoma) dotella* Dall & Bartsch, 1909, 35 m on gravel
1972* *O. (Evalea) tenuis* Carpenter, 1857, 100 m on empty shells
1985* *O. (Ividella) navisa* Dall & Bartsch, 1907, 35 m on empty shells
1988* *O. (I.) ulloana* Strong, 1949, 35 m on gravel
1995* *O. (Menestho) grijalve* Baker, Hanna & Strong, 1928, 35 m on gravel
2010* *O. (Miralda) terebellum* (C.B. Adams, 1852), 35 m on gravel
2016* *O. (Salassia) scalariformis* Carpenter, 1857, 35 m on gravel
2018* *O. (S.) laxa* Dall & Bartsch, 1909, 35 m on gravel
2020 *Peristichia hermosa* (Lowe, 1935), 35 m on gravel
2023* *Triptychus incantatus* (Hertlein & Strong, 1939), 100 m on empty shells
2027* *Turbonilla (Turbonilla) lucana* Dall & Bartsch, 1909, 35 m on small rocks
2028* *T. (T.) prolongata* Carpenter, 1857, 35 m on small rocks
2040* *T. (Chemnitzia) aculeus* (C.B. Adams, 1852), 35 m on small rocks
2041 *T. (C.) aepynota* Dall & Bartsch, 1909, 35 m on small rocks
2044 *T. (C.) kelseyi* Dall & Bartsch, 1909, 35 m on small rocks
2045 *T. (C.) muricata* (Carpenter, 1857), 35 m on small rocks
2050* *T. (C.) sinaloana* Strong, 1949, 35 m on small rocks
2056* *T. (Dunkeria) andrewsi* Dall & Bartsch, 1909, 35 m on small rocks
2066* *T. (D.) sedillina* Dall & Bartsch, 1909, 35 m on small rocks
2068 *T. (Mormula) coyotensis* Baker, Hanna & Strong, 1928, 20-40 m on small rocks
2083 *T. (Ptycheulimella) penascoensis* Lowe, 1935, 20 m on gravel
2088* *T. (Pyrgiscus) amiriana* Hertlein & Strong, 1951, 35 m on gravel
2124* *T. (P.) gruberi* Hertlein & Strong, 1951, 35 m on gravel
2128 *T. (P.) histias* Dall & Bartsch, 1909, 35 m on gravel
2144* *T. (P.) marshalli* Dall & Bartsch, 1909, 35 m on gravel
2162* *T. (P.) striosa* (C.B. Adams, 1852), 35 m on gravel
2175* *T. (P.) ulyssi* Hertlein & Strong, 1951, 35 m on gravel
2216* *T. (Strioturbonilla) pazana* Dall & Bartsch, 1909, 35 m on gravel
2230 *Acteon traskii* Stearns, 1897, 35 m on small rocks
2231A *Rictaxis punctocaelatus* (Carpenter, 1864) [=*R. coronadoensis* Stearns, 1898] [Abbott, 1974] 35m on small rocks [*R. punctocaelatus*]; 100 m on empty shells [*R. coronadoensis*]

2235 *Bulla (Bulla) gouldiana* Pilsbry, 1895, intertidal in estero; dr 35 m on gravel
2236 *B. (B.) punctulata* A. Adams in Sowerby, 1850, intertidal
2239 *Atys casta* Carpenter, 1864, 35 m on gravel
2240 *A. chimera* Baker & Hanna, 1927, 20 m on gravel
2242 *A. liriope* Hertlein & Strong, 1951, 20 m in gravel
2243 *Haminoea angelensis* Baker & Hanna, 1927, 20 m in gravel
2245 *H. virescens* (Sowerby, 1833), intertidal around rocks
2248 *Sulcoretusa paziana* (Dall, 1919), 35 m on gravel
2250 *Volvulella (Volvulella) cylindrica* (Carpenter, 1864), 35 m on gravel
2252 *Woodbridgea williamsi* Berry, 1953, 35 m on gravel
2254A *Chelidonura polyalphos* Gosliner & Williams, 1972, intertidal
2254B *C. evelinae* Marcus, 1955, intertidal
2257 *Acteocina angustior* Baker & Hanna, 1927, 20-40 m in silt
2263 *Cylichna fantasma* (Baker & Hanna, 1927), 35 m on silt
2264 *C. inca* (Dall, 1908), 100 m on empty shells
2277* *Cavolinia tridentata* (Niebuhr, 1775, *ex* Forskål, MS), 35 m on gravel
2278 *C. uncinata* (Rang, 1829), 35 m on gravel
2283* *Diacria quadridentata* (Blainville, 1821, *ex* Lesueur, MS), 35 m on gravel
2285* *Hyalocylis striata* (Rang, 1828), 35 m on gravel
2296 *Aplysia (Neaplysia) californica* Cooper, 1863, intertidal under rocks
2297 *A. (Pruvotaplysia) parvula* Mörch, 1863, intertidal under rocks
2303 *Dolabrifera dolabrifera* (Rang, 1828), intertidal under rocks
2304A *Phyllaplysia padinae* Williams & Gosliner, 1973, intertidal on *Padina*
2305 *Stylocheilus longicauda* (Quoy & Gaimard, 1824), intertidal on algae
2306 *Pleurobranchus areolatum* (Mörch, 1863), intertidal under rocks
2308 *Berthellina citrina* (Ruppell & Leuckart, 1828), intertidal under rocks
2312* *Oxynoe panamensis* Pilsbry & Olsson, 1943, intertidal on *Caulerpa*
2313* *Lobiger souverbii* Fischer, 1857, intertidal on *Caulerpa*
2314A *Ascobulla californica* (Hamatani, 1971), intertidal in sand around *Caulerpa*
2316* *Berthelinia (Edenttellina) chloris* (Dall, 1918), intertidal on *Caulerpa*
2327 *Conualevia mizuna* Marcus & Marcus, 1967, intertidal under rocks
2329A *Chromodoris baumanni* Bertsch, 1970, intertidal under rocks
2331 *C. norrisi* Farmer, 1963, intertidal under rocks
2331A *C. sphoni* (Marcus, 1971) [Bertsch, 1978] 40 m on small rocks
2332 *Chromolaichma sedna* (Marcus & Marcus, 1967) [Bertsch, 1977] 40 m on small rocks
2335 *Hypselodoris californiensis* (Bergh, 1879), intertidal under rocks
2336 *Cadlina evelinae* Ernst Marcus, 1958, intertidal under rocks
2340 *Discodoris mavis* Marcus & Marcus, 1967, intertidal under rocks
2350 *Polycera alabe* Collier & Farmer, 1964, intertidal under rocks
2361 *Doriopsilla janaina* Marcus & Marcus, 1967, intertidal under rocks
2362A *Crosslandia daedali* Poorman & Mulliner, 1981, intertidal on *Padina*
2370 *Melibe leonina* (Gould, 1852), intertidal on *Padina*
2372 *Tritonia pickensi* Marcus & Marcus, 1967, intertidal under rocks
2380 *Coryphella cynara* Marcus & Marcus, 1967, intertidal under rocks
2388A *Spurilla alba* (Risbec, 1928), intertidal under rocks
2388 *S. chromosoma* Cockerell & Eliot, 1905, intertidal under rocks
2389 *Hermissenda crassicornis* (Eschscholtz, in Rathke, 1831), intertidal under rocks
2396 *Onchidella hildae* (Hoffman, 1928), intertidal around rocks
2401* *Melampus (Pira) tabogensis* C.B. Adams, 1852, intertidal
2412 *Pedipes unisulcatus* Cooper, 1866, in sand bank above high tide
2425 *Williamia peltoides* (Carpenter, 1864), intertidal; dr 20 m on gravel

POLYPLACOPHORA

35* *Lepidozona formosa* Ferreira, 1974, 35 m on rocks
36A *L. laurae* Ferreira, 1985, 100 m on empty shells
37 *L. serrata* (Carpenter, 1864), 100 m on empty shells
38 *L. subtilis* Berry, 1956, intertidal under rocks; dr 100 m on empty shells
42 *Chaetopleura unilineata* Leloup, 1954 [="*Chaetopleura mixta* (Dall, 1919)" in Thorpe in Keen, 1971] [Ferreira, 1983] 10-100 m on rocks
42A *C. lanuginosa* (Dall, 1879) [*ibid*] 100 m on empty shells
44 *Lepidochitona beanii* (Carpenter, 1857), 20 m on rocks
45 *Nuttalina crossota* Berry, 1956, intertidal under rocks
48 *Lepidochitona lirulatus* (Berry, 1963), 35 m on rocks

SCAPHOPODA

3 *Dentalium (Dentalium) oerstedii* Mörch, 1860, 20-90 m in silt
4 *D. (D.) vallicolens* Raymond, 1904, 80 m in silt
8 *D. (Graptacme) semipolitum* Broderip & Sowerby, 1829, 20-40 m in silt
11 *D. (Tesseracme) tesseragonum* Sowerby, 1832, 20-35 m in silt
14 *Fustiaria (Laevidentalium) splendida* (Sowerby, 1832), 20-35 m in silt
17 *Siphonodentalium quadrifissatum* (Pilsbry & Sharp, 1898), 100 m on empty shells
18 *Cadulus (Gadila) fusiformis* Pilsbry & Sharp, 1898, 35 m in silt
23 *C. (Polyschides) californicus* Pilsbry & Sharp, 1898, 30 m in silt

THE FESTIVUS

A publication of the San Diego Shell Club

ISSN: 0738-9388

Volume: XX | July 14, 1988 | Number: 7

PROGRAM

"Deep Water Shells of California"

Ralph Ferguson, longtime collector and dealer from Wilmington, California, will present this program featuring trawled species from off this coast.

Meeting date: July 21, 1988

CONTENTS

NOTES ON THE MORPHOLOGY OF FAVARTIA (MUREXIELLA) MARTINI (SHIKAMA, 1977) AND F. (M.) MACTANENSIS (EMERSON & D'ATTILIO, 1979)

BY

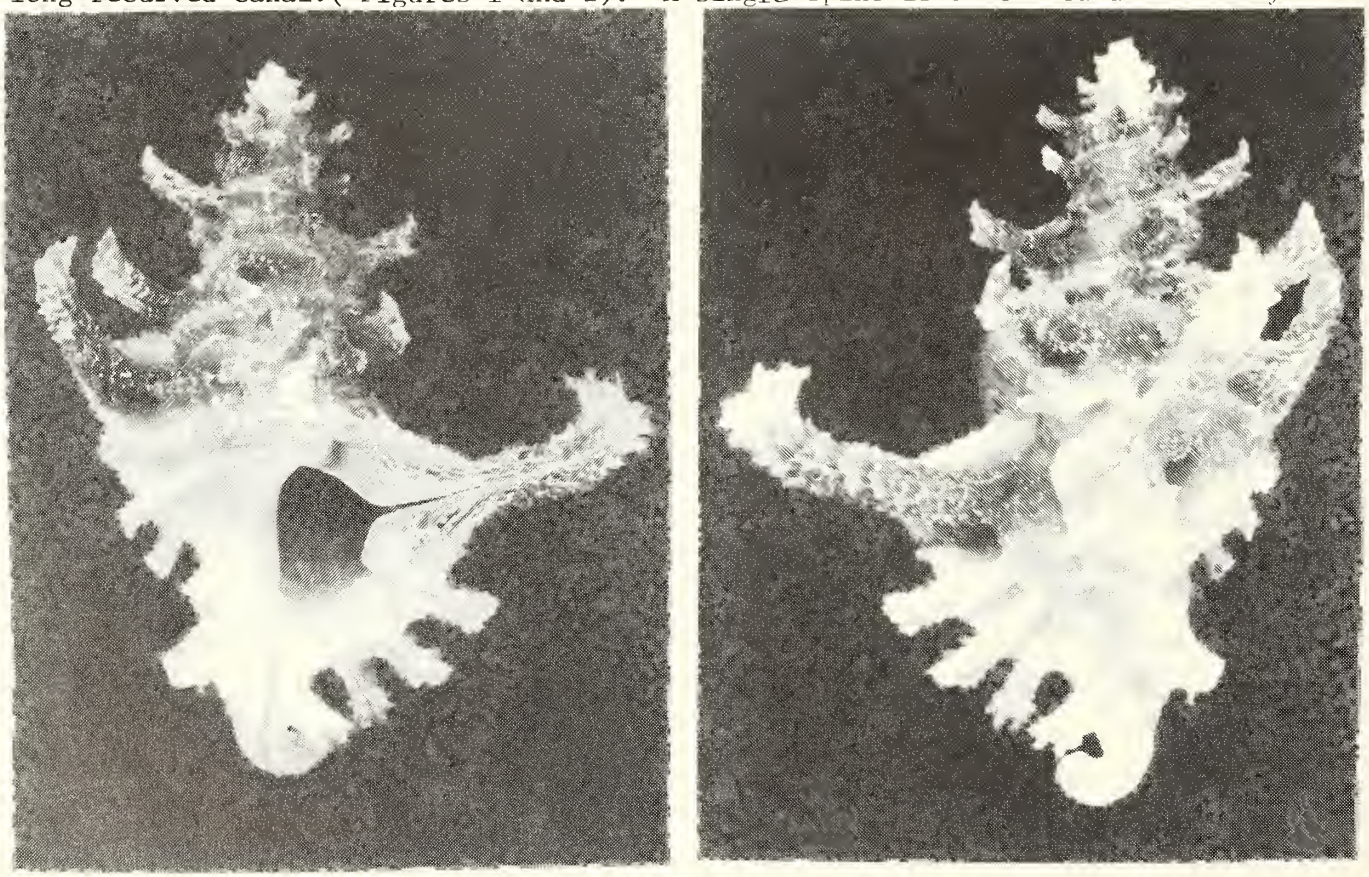
ANTHONY D'ATTILIO

Associate, Department of Marine Invertebrates, San Diego Natural History Museum, P.O. Box 1390, San Diego, California 92112

This paper follows, essentially, the method used in several recently published in treating closely related species in pairs. This simplifies explanations both pictorial and written concerning the differences and similarities of both species.

The two species reviewed in this paper, *Favartia (Murexiella) martini* (Shikama, 1977) and *F. (M.) mactanensis* (Emerson & D'Attilio, 1979), fall within the range of small to medium size for the subgenus. Relatively large species of this subgenus occur in the eastern Pacific where most *Murexiella* have been known since the mid-19th Century. Most of the western Pacific species have been discovered within the last two decades; their discovery made possible by the tangle-net-method of collecting in 100 meters or more. The use of such collecting techniques in the Indian Ocean, especially along the east coast of Africa, will probably reveal other species in this complex.

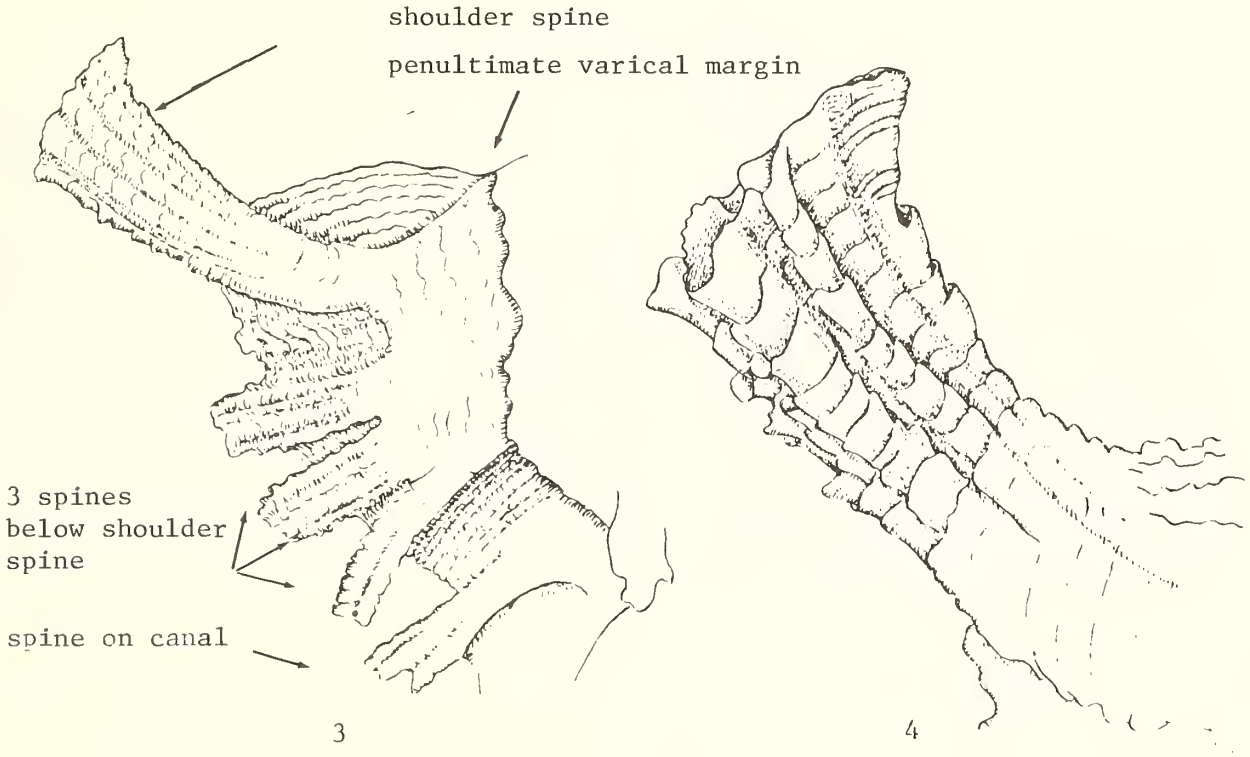
Favartia (Murexiella) martini is easily distinguished from other members of the genus by the long shoulder spine with three secondary spines on the varix and the long recurved canal.(Figures 1 and 2). A single spine is on the canal directly



Figures 1 and 2. *Favartia (Murexiella) martini* (Shikama, 1977). D. Pisor collection. Length (not including canal): 22.5 mm [If canal were straight it would add ±9.6 mm] Maximum diameter (to edges of spines): 20.2 mm Location: Cebu Is., Philippines Is. (1) apertural view (2) dorsal view Photos. D. Mullíner

anterior to the three short spines. The shell has a protoconch of 1½ bulbous whorls and a mature specimen, such as the one shown here, may possess a teleoconch of 7 whorls. This specimen is unusual in having brown spines on the spire and body whorl.

Viewed dorsally (Figures 3 and 4), the varix has a weakly defined, transversely sculptured undulate intervarical area with the shoulder spine and 3 shorter spines strongly longitudinally grooved. Additionally, the entire surface in well-preserved specimens has a low scabrous surface.



Figures 3 and 4. *F. (M.) martini*. SDNHM 92828. Length: 10.6 mm (canal ±8 mm) Location: Philippine Is. Donor: L.J. Bibbey. (3) dorsal view of final varix, greatly enlarged (4) enlarged dorsal view of shoulder spine

Ventrally the varical spines are nearly closed, if not entirely so (Figure 5). As the flange grows out from the aperture, the surface becomes lamellose and folded longitudinally (Figure 6) never becoming as strongly elevated on the three varical spines as on the shoulder spine (Figure 7).

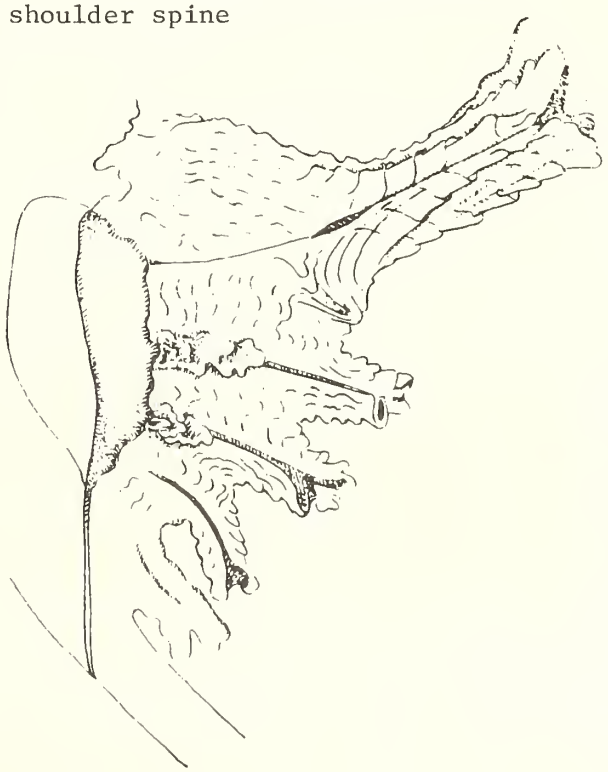


Figure 5. *F. (M.) martini*. SDNHM 92828 Apertural view, greatly enlarged, showing nearly closed varical spines.

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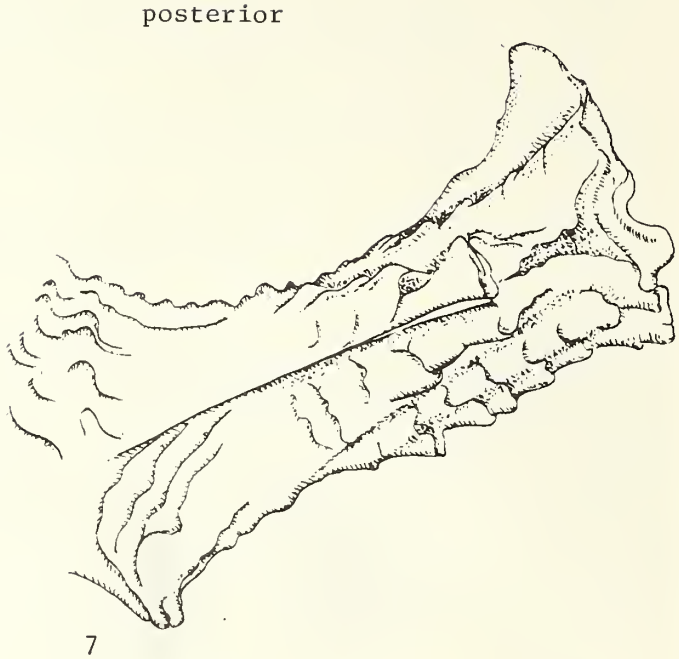

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Figures 6 and 7. *F.(M.) martini*. SDNHM 92828 (6) detail of lamellose folds growing out from the aperture and the 3 spines below the shoulder spine (7) ventral view of shoulder spine, greatly enlarged, showing strongly elevated folds

Study of the micro-characters in *Favartia (Murexiella) mactanensis* (Figures 8 and 9) indicates both similarities and differences from the closely related *F.(M.) martini*.

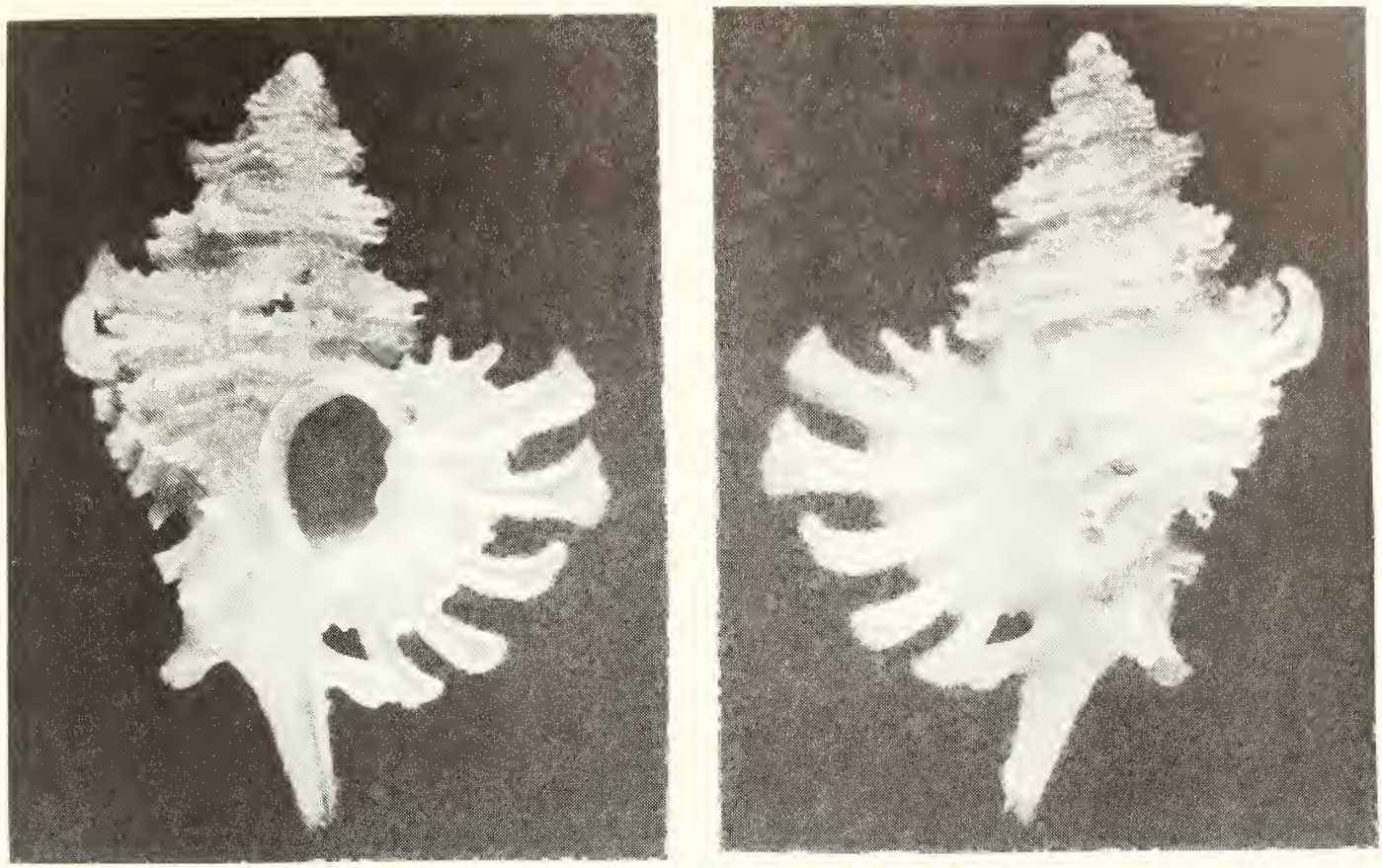
Shell growth begins with strong surface sculpture which diminishes in richness as the shell reaches maturity towards the final varix. On the spire, especially, the strong axial lamellae are undulately raised forming cowl-like scales. This feature diminishes dorsally on the final varix, becoming weakly raised growth lamellae (Figure 10). The surface of the final varix, when not eroded, is also microscopically transversely striate and the shoulder spine is not extensively prolonged as in *F.(M.) martini*.

The ventral surface of the apertural flange (Figure 11) is sculptured with axial and spiral elements. The area closest to the aperture is folded and raised transversely corresponding to the lower portions of the spines. The relatively simple, but not symmetrically formed, spines become twisted and turned upward posteriorly at their crests.

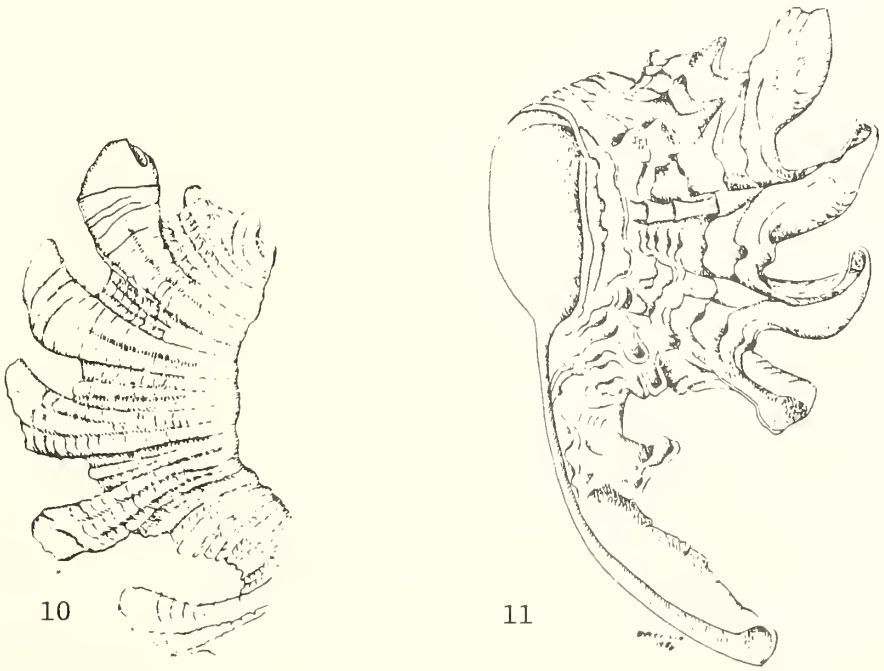
In both *F.(M.) martini* and *F. (M.) mactanensis* the shells change from six varices on the early whorls to five on the mature last varix.

ACKNOWLEDGMENTS

I thank David K. Mulliner for the fine photography and Donald Pisor for the loan of the study specimen.



Figures 8 and 9. *Favartia (Murexiella) mactanensis* (Emerson & D'Attilio, 1979). SDNHM 92087. Length: 12.2 mm. Maximum diameter to edges of spines: 12.6 mm. Location: Philippine Is. Donor: D. Pisor (8) apertural view (9) dorsal view
Photos: D. Mulliner



Figures 10 and 11. *F.(M.) mactanensis*. SDNHM 82301. Length: 19.8 mm. Maximum diameter to edges of spines: 11.8 mm. Location: Cebu, Philippine Is. Donor: V. Dan. (10) Dorsal view of final varix, greatly enlarged, showing weakly raised growth lamellae (11) Ventral surface of apertural flange, greatly enlarged, showing the transverse folds aperturally and the upturned, twisted spines.

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EMERSON, WILLIAM K. and ANTHONY D'ATTILIO
1979. Six new living species of muricacean gastropods. Nautilus 93(1): 1-10, 21 figs.

SHIKAMA, TOKIO
1977. Descriptions of new and noteworthy Gastropoda from western Pacific and Indian Oceans. Sci. Repts., Yokohama Natl. Univ. sect. 2, Biol. & Geol. Sci., no. 24:9-23, pls. 1-5, 2 figs.

LYROPECTEN SUBNODOSUS OFF CEDROS ISLAND

BY

RON H. MCPEAK

KELCO, Division of Merck Inc., P.O. Box 23576
San Diego, California 92123-1718

On February 12, 1988, Keith Ullrich and I were conducting diving surveys off the northern tip of Cedros Island, Baja California, Mexico. During the survey, Keith collected a beautiful live specimen of *Lyropecten subnodosus* (Sowerby, 1835) on the rocky bottom at a depth of 15 meters. The scallop was large, approximately 160 mm in length, and appeared healthy.

This specimen was collected 33 miles north of its reported range, from Scammon's Lagoon on the west coast of Baja California to Peru, in Keen's (1971) SEA SHELLS OF TROPICAL WEST AMERICA.

CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - JUNE 16, 1988

Our speaker for the evening was Marc Chamberlain, neurologist and award winning underwater photographer who presented a kaleidoscope of startling colors in his program BRANCHS + UNDERWATER IMAGES OF EASTERN PACIFIC INVERTEBRATES. He showed slides of invertebrates inhabiting the waters from Vancouver all the way down to Cabo San Lucas, Baja California. Using a Nikonos Three camera, Marc has photographed such intriguing seldom-seen animals as the gorgeous *Dirona alabaster*, which he described as "always a big crowd pleaser." He has photographed many of his invertebrate subjects against the brilliant background of the volcano sponge with the soft reds and oranges.

In concluding a truly marvelous program, Marc showed a slide of his wife, Susan, in diving gear examining a mollusk without a shell, the octopus.

During the coffee break, members and guests had an opportunity to purchase back issues and duplicate publications from the Club library Librarian, Margaret Mulliner announced that the monies collected from the sale of these magazines will be used to bind back issues of THE FESTIVUS.

Linda and John LaGrange and Ginny and Richard Herrmann provided the delicious cookies enjoyed during the break

Following the coffee break, slides of Tony's retirement party at the San Diego Natural History Museum were shown followed by pictures from the 1987 September and Christmas parties. These were enjoyed by all.

Don Pisor briefly mentioned that volunteers for chairmanships for the 1989 COA meeting in San Diego are still needed. If you are willing to help, contact Don at 279-9342

Bill Romer waved the grab bags overhead and Ken Lindahl, with the lucky number, went home with some unexpected treasures. Wayne Reed volunteered to bring cookies to the next meeting.

Wayne Reed

A BRIEF LOOK AT TWO NEW PUBLICATIONS

MARINE FAUNA AND FLORA OF BERMUDA, A SYSTEMATIC GUIDE TO THE IDENTIFICATION OF MARINE ORGANISMS
Editor: Wolfgang Sterrer
Illustrators: Wolfgang Sterrer and Christine Schoepfer-Sterrer
Publisher: John Wiley & Sons, N.Y. 1986
742 pages, 228 black & white plates, 16 color plates, 2 maps, hardbound
Price: $99.95

This new book DOES Bermuda! It covers the plant kingdom from fungi to flowering plants and the animal kingdon from protozoa to mammals (whales). Each section is treated by specialists in the field. The black and white drawings are excellent and the color plates beautifully illustrate groups such as Algae, Porifera, Anthozoa and Decapoda. The color plates of the mollusks are limited, but their illustration in black and white is superior.

For the Mollusca, as well as the other groups, each class is broken into the following sections: Characteristics, Occurrence, Identification, Biology, Development, References and Plates. The molluscan species are listed by their Latin names and authors (no dates) followed by their common names and brief synonymies.

A twenty-three page reference section, a glossary and taxonomic index are included.For those who work with North Atlantic species, this book will be a must. For others, it might be on their wish lists.

TREASURES OF THE TROPICS
By: Rene Catala
Photography by: Rene and Stucki Catala with some exceptions
Publisher: Facts on File Publications, N.Y. 1986
Translated from the French by Enzo Sirna
(First edition OFFRANDES DE LA MER published entirely in French in 1980)
334 pages, 700 full color photographs, large size, hardbound
Price: $50.00

This gorgeous book is by Dr. Rene Catala who established the Biologie Marine (known as the Aquarium Noumea) in Noumea, New Caledonia in 1956 and with his wife, Stucki, managed the aquarium for twenty years. Most of the exquisite photography is of specimens collected by them for the aquarium from an area between five and twenty-two kilometers from the aquarium. The author states that many of the corals and fish survived in the aquarium for the twenty years under their care. It was from material collected for the aquarium that Dr. Catala established, in 1957, that corals flouresce.

The informative text is written in a conversational style easily understood by the non-professional and is referenced with footnotes. The author considers himself a non-specialist and states that there may be taxonomic errors (which there are).

There are over 180 magnificent photographs of mollusks alone, including some with egg masses and photographs of cephalopods hunting. All animals illustrated are identified by their Latin names and the figure legends include short descriptive and/or habitat notes.

This is not your usual cocktail table picture book and one need not be conversant with New Caledonian fauna to appreciate and want to own it. It is an incredible bargain at $50.00.

THE FESTIVUS

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional

Meeting date: third Thursday, 7:30 P.M., Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

WHERE THE COWRIES HIDE

Dr. Hugh Bradner, Club member and cowry specialist who has given several fine programs on cowries and their radulae, will present this popular talk on how to find cowries. His presentation will be illustrated with slides.

Meeting date: August 18, 1988

CONTENTS

FURTHER ON KAAS AND VAN BELLE'S "MONOGRAPH OF LIVING CHITONS"

Volume III of the above-named publication, most evidently the definitive publication in the field of chitons (Mollusca: Polyplacophora), is now available. It is in every way---precision, detail, quality of content and quality of publication---the equal of the first two volumes (see THE FESTIVUS, volume XVIII, no. 3, March 13, 1986), and covers several areas of special interest to those of us who live in the northern eastern Pacific region.

Two innovations appear in this volume. Firstly, this volume is dedicated to the memory of Dr. Antonio J. F. Ferreira, whose tragically early death in 1986 closed a vigorous career of able and knowledgeable research into the Polyplacophora. In a comparatively few years Dr. Ferreira exercised great influence in this field, and termination of his further contributions will be a real loss.

Secondly, the first forty-one pages of this volume are devoted to an updating and expansion of the information presented in the first two volumes of the series. Although those volumes were issued in 1985, they hereby are brought current on additional species published as late as 1986---in itself an excellent indication of the meticulous thoroughness of the work as a whole. It is the stated intention of the authors to continue such updating in further volumes.

Volume III continues coverage of the family Ischnochitonidae Dall, 1899. Two subfamilies are included: subfamily Chaetopleurinae Plate, 1899, with three genera totalling thirty-eight species, and the subfamily Ischnochitoninae Dall, 1889, with three genera totalling sixty-three species. The pattern of coverage retains the excellent format established in the initial volumes, each species being noted as to type species, location of the holotype, the principal synonymy, a thorough description and discussion, a plate averaging over a dozen fine pen-and-ink figures, and a map of the species' geographical distribution. This then amounts, for these two subfamilies alone, to 220 pages of text including 117 plates totalling 1,213 figures, plus 22 maps, a 7-page index, and 14 pages of bibliography. The volume therefore totals 302 pages.

The lowered value of the U.S. dollar in the international market raises the price of this volume to about $65.00 delivered. It is worth the cost. Copies may be ordered from the publisher N.V. Boekhandel en Drukkerij v/h E.J. Brill, Leiden, the Netherlands, through their U.S. agent Expeditors of the Printed Word, P.O. Box 1305, Long Island City, N.Y. 11101. Note that payment (the bill will accompany the delivered book) may be sent to the agent for forwarding to E.J. Brill, but that the check itself should be made out to E.J. Brill rather than to the agent.

If you have not yet subscribed to this publication I recommend that you do so without delay. This is indeed a major publication.

George A. Hanselman

COMPARISON OF TWO FAVARTIA (CARIBIELLA) SPECIES, ONE FROM THE WESTERN ATLANTIC AND ONE FROM THE EASTERN PACIFIC

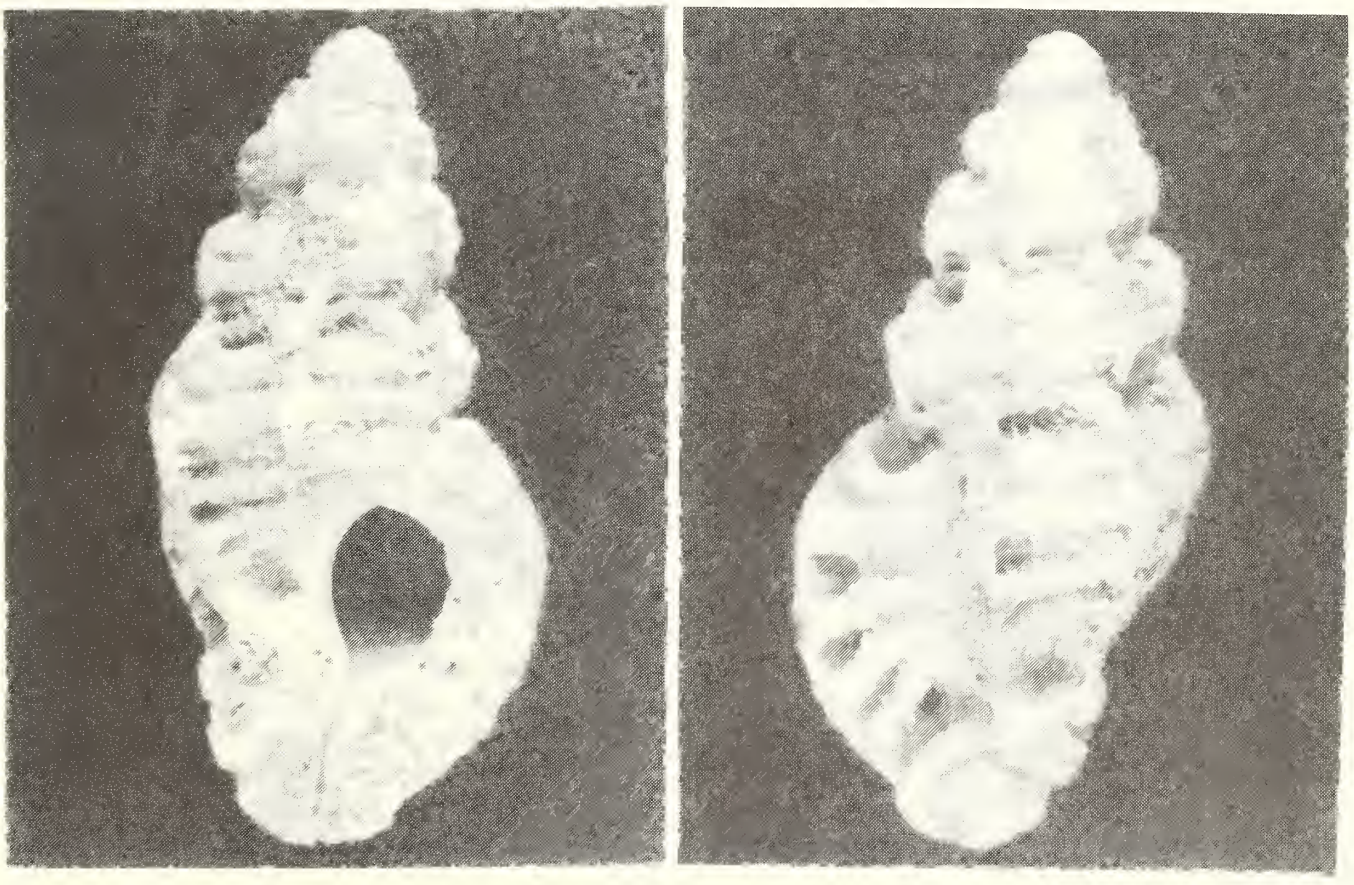
BY

ANTHONY D'ATTILIO

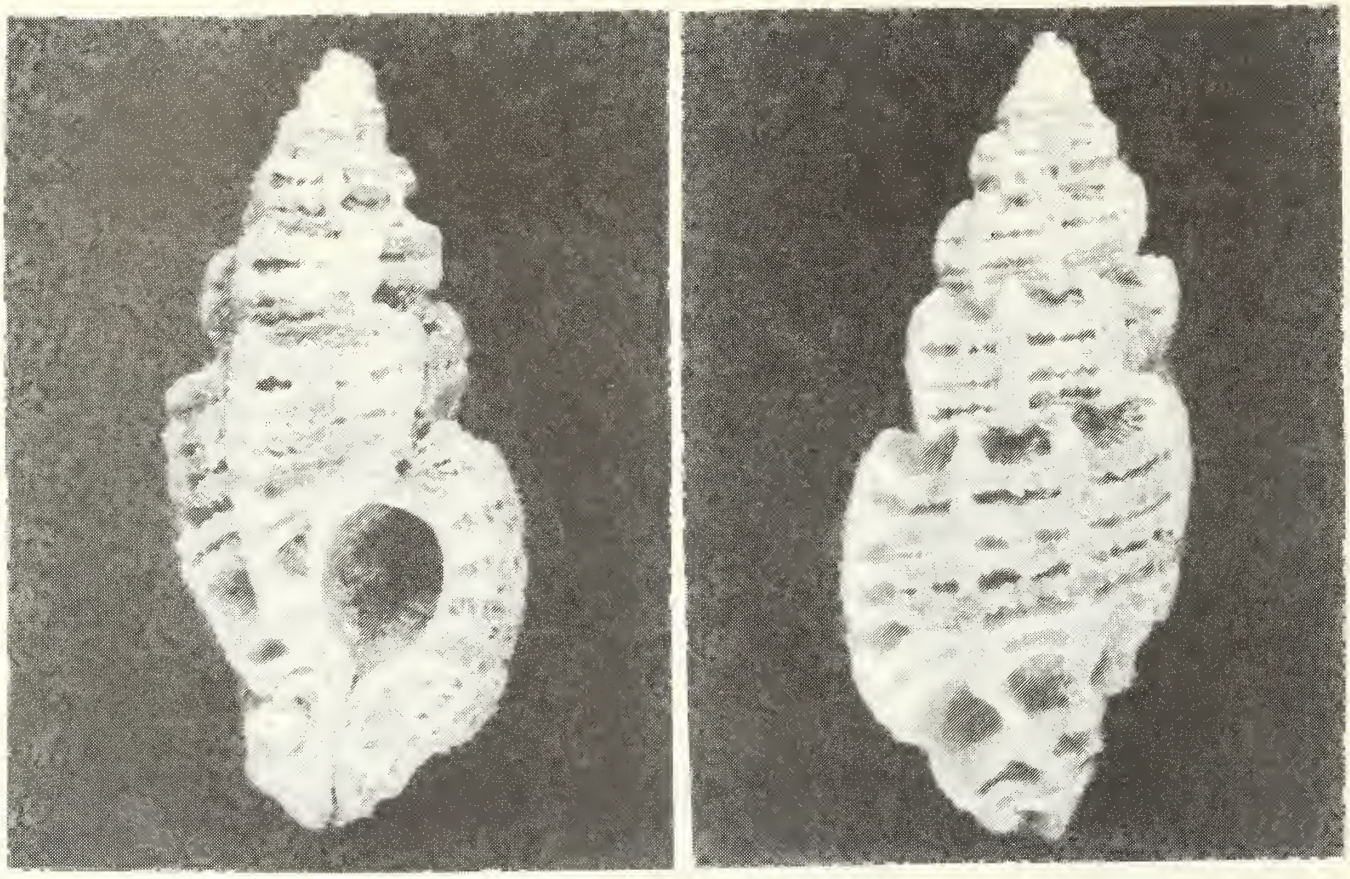
Associate, Department of Marine Invertebrates, San Diego Natural History Museum, P.O. Box 1390, San Diego, California 92112

In this paper a comparison is made to clarify the subtle differences of microscopic detail of form which is present in two small muricids. These differences contribute to the overall visual effect of the shells of these species. The small details, not readily distinguishable without magnification, are of much interest scientifically and aesthetically

The two species under consideration are from both sides of the Panamic land bridge. *Favartia (Caribiella) alveata* (Kiener, 1842) from the western Atlantic, is a relatively shallow water species collected from intertidal to 5 m and widely distributed from Bermuda to Brazil (Figures 1 and 2) and is the type of the subgenus. *Favartia (C.) erosa* (Broderip, 1833) is found over most of the tropical Panamic Province and may also be collected in shallow water (Figures 3 and 4).



Figures 1 and 2. *Favartia (Caribiella) alveata* (Kiener, 1842). SDNHM 42853, Length: 15.2 mm, Loc.: West Indies, ex J.F. Anderson collection. Figured in Radwin & D'Attilio, 1976 (Fig. 92 in a schematic figure as *F. erosa*) (1) apertural view (2) dorsal view. Photos: D.K. Mulliner

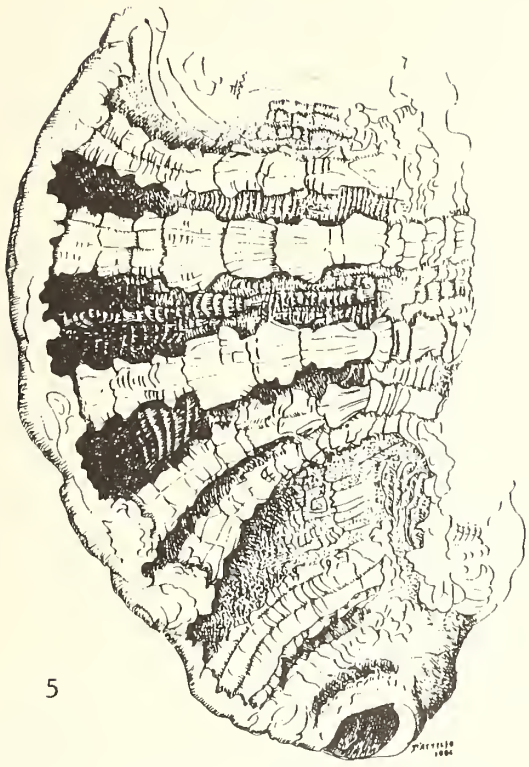


Figures 3 and 4. *Favartia (Caribiella) erosa* (Broderip, 1833). SDNHM 23327 Length: 13.3 mm, Loc.: Mazatlan, Sinaloa, Mexico. Leg. H.N. Lowe, June 1929, ex H.N. Lowe collection (1) apertural view (2) dorsal view. Photos: D.K. Mulliner

The gross morphology of these species has been described in systematic iconographies and in various regional studies as well as in Radwin and D'Attilio's (1976) MUREX SHELLS OF THE WORLD. (Note: Inadvertently, the schematic Figure 92 on Page 148 in Radwin and D'Attilio is wrongly referred to *F.(C.) erosa.* It should read *F.(C.) alveata.)*

Both species have the family character of scabrous cords revolving on each whorl interrupted by their varices. In the Muricinae genus *Favartia* the most common number of spiral cords on the spire is two. On the final or body whorl the number is variable and ranges from 4 to 7 depending on the species.

F. (C.) alveata has 5 cords on the body whorl and two on the broad canal. The apertural varix as well as the one opposite (to the left of the aperture) are largest. This dorso-ventral flattening is one of the characteristics of the subgenus *Caribiella*. Figure 5 shows the final and penultimate varices and the intervarical area between them. A more enlarged detail view of the spiral cords is noted in Figure 6. The scabrous segments of each cord are fluted, raised strongly in relief, bowl-like with scalloped edges, each bowl-form segment narrower at its contact with the one below. These interesting forms, with no two ever exactly alike or mechanically symmetrical, are also finely axially striate (incremental growth lines). Tbe striae continue between the cords in the depressed inter-cord areas.



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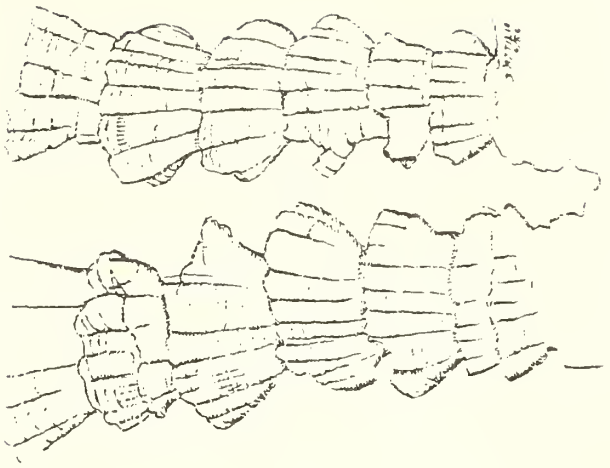

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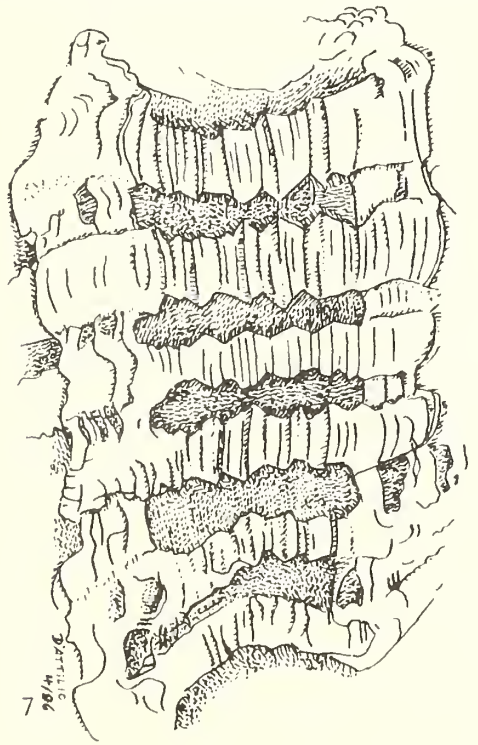
Figures 5 and 6. *F. (C.) alveata.* (5) SDNHM 42853, specimen shown in Figures 1 and 2. Detail of area between the final and penultimate varices. (6) Detail of the spiral cords in a 10.6 mm L specimen from Fortaleza, Brazil in the Roland Houart collection.

Favartia (Caribiella erosa) (Figures 3 and 4) has a more elongate shell with a relatively longer body whorl than *F. (C.) alveata.* It has 6 to 7 cords on the body whorl with an additional 1 or 2 cords on the canal area. The intervarical area on the body whorl is shown in detail in Figure 7 illustrating the form of the 6 cords. A further enlarged detail of part of this same area is shown in Figure 8.



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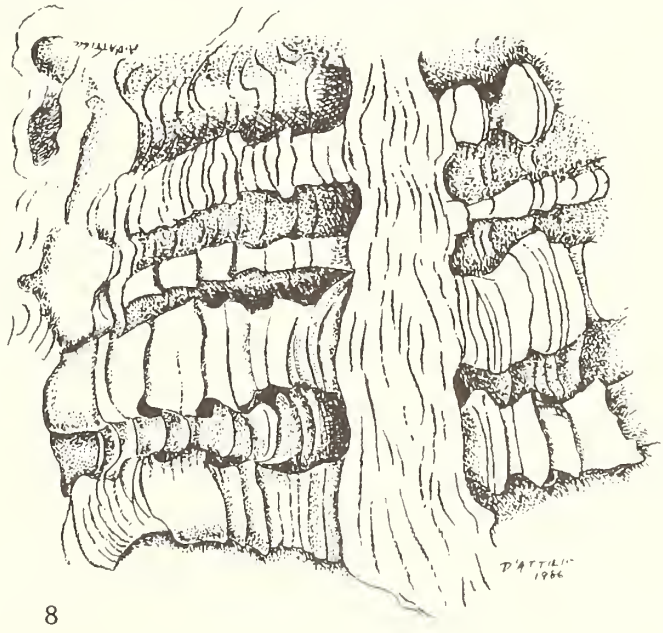

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Figures 7 and 8. *F. (C.) erosa.* SDNHM 23327, specimen shown in Figures 3 and 4. (7) detail of the intervarical area on the body whorl (8) a further enlarged detail of the same area.

Though examined visually (without magnification) the sculpture of the cords appears the same for both species, a microscopic view shows the lack of any bowl-like or cove-formed scales in *F. (C.) erosa*. The sculptural relief of each segment of the cords is very weakly scale-like and distinctly different from that of *F. (C.) alveata*. The weak form of the cord structures results also in the slightly undulate character of the varices in *F. (C.) erosa* in contrast to the more strongly undulate scabrous lamellae of the varices in *F. (C.) alveata*.

ACKNOWLEDGMENTS

Specimens studied for this paper are from the San Diego Natural History Museum collection and the private collections of Rolant Houart of Belgium and Jules and Carole Hertz of San Diego. The photographs were kindly provided by David K. Mulliner.

CLUB NEWS

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - JULY 21, 1988

After President Bill Romer welcomed everyone to the July 21st meeting, Bob Yin introduced the speaker for the evening, Ralph Ferguson, longtime collector (45 years) and dealer from Wilmington, California and president of the Long Beach Shell Club.

Ralph Ferguson's program featured a fascinating show and tell of trawled species from off our coast; a program supercharged with his refreshing sense of humor and ability to tell anecdotes. He held his audience spellbound with an eye-catching array of west coast shell species. Each one came with a story; memories of a young barefoot boy walking the docks in Eureka, exploring crab boats, nets and lobster traps looking for overlooked shells. Ralph told of his obsession for collecting the odd and the unusual such as a sculpturesque glass sponge from 400 fathoms off Crescent City, Oregon and an eight-legged seastar.

During the coffee break, with the cookies provided by Wayne Reed, the audience had the opportunity to examine, close-up, some of the favorites in Ralph's collection.

During the business portion of the meeting, members were reminded that we are still seeking volunteers for committees for the COA meeting in San Diego next year. Interested members should contact Don Pisor (279-9342).

The theme and menu for the September party to be held at the home of Toni and Larry Buck will be Mexican. The party will be held on Saturday evening, September 17th beginning at 6:00 P.M. The menu was outlined and members signed up for their menu contribution. The signup sheet will be passed again at the August meeting.

A mini-program at the very end of the meeting, was presented by Adrian Valli who shared with us some exquisite shell specimens he found at Punta Chivato in Baja California, including an unusually large giant *Fusinus dupetithouarsi*, a magnificent white spindle.

The door prize was won by Barbara Myers.

Wayne Reed, Recording Secretary

EARLY CONCHOLOGISTS IN BAJA CALIFORNIA, MEXICO

BY

HELEN DUSHANE

10512 El Soneto, Whittier, California 90605

We know the exploration of new lands invites the zealous, the rascal, the eccentric, and the amateur, who, by his explorations, hopes to be recognized in the scientific world. The following four men were no exception; one was a zealot, two were rascals, one was an amateur hoping to gain scientific recognition, and all four were eccentrics.

It is common knowledge that the first conchologists on the peninsula of Baja California, Mexico were the Indians who collected mollusks for food and for personal adornment. Few know of the following four men who contributed scientific knowledge of the peninsular molluscan fauna to our literature (DuShane, 1971).

FRANCISCO EUSEBIO KINO

The Jesuit priest, Francisco Eusebio Kino, proved that Baja California was not an island as had been previously thought. He noted that the Pima Indians on the mainland of Mexico used the certain blue, iridescent shells of *Haliotis fulgens* as drinking cups and other useful objects as well as for pendants. They said the shells were obtained through trade with Indians to the west, In 1684, while in the vicinity of Comondu (at approximately 26°03'N; 112°17'W) he observed the aborigines using a certain blue shell he had seen being utilized by the Pimas. When questioned they always pointed to the Pacific Ocean, a trip they stated of several days over high mountains with no mention of a waterway. This information confirmed his conclusion that Alta and Baja California were a continuous land mass, with no water separating them. It was many years before maps were changed to agree with Father Kino's conclusions. His work reflects the earliest historical record of shell collecting on the West Coast. It is a curious fact that not one shell has ever been named to honor his memory (DuShane, 1971).

JOSÉ LONGINOS MARTÍNEZ

In 1786, Charles III of Spain created the Botanical Expedition which carried José Longinos Martínez as naturalist of the Expedition from Mexico City to San Diego, California, by way of Baja California. He began his journey north from Cape San Lucas in 1792 (Baily, 1945). He traveled a route which carried him from mission to mission encumbered with an escort of five military men, pack animals carrying provisions, equipment for the preservation of specimens, and a tent. At most places he had to make camp in the open, preparing any specimens he may have collected during the day, writing letters and making notes in his Journal (Simpson, 1938).

Longinos listed his collection under a heading he called The Three Kingdoms of Nature. To show how scientifically incompetent he was one must read an excerpt from his Journal. "Those animals which might yield some profit are... nacre shells, abalone, (auriculares), mother-of-pearl, for the same; and pearls, which rightfully have the reputation of being abundant along the coast of the gulf as far as the port of San Luis." (The port of San Luis to which he refers is known today as Bahía San Luis Gonzaga.) "Shellfish is very abundant and I have collected more than 300 species." Whether the specimens were collected on the Pacific or on the Gulf of California side of the peninsula Longinos neglects to state, nor does our scientist tell us what he did with the specimens.

In a few of his Journal entries he gives us small insights into the natural wonders he was encountering, but he never tells enough as, "At San Luis [not Bahía San Luis Gonzaga on the Gulf of California side of the peninsula, but Mission San Luis Gonzaga situated in the southern portion of the peninsula] there are... a great vein of caracoles [sea snails] and other petrified products of the sea, agatized and mineralized." Again, "At the latitude of San Ignacio, near the Gulf coast, among some high volcanic hills called Las Virgenes, in the territory that surrounds them, and in the adjacent hills, one finds...caracoles, shells of all descriptions, and petrified marine bodies, so that the diversity of the stones makes the rough and broken character of the country delightful." (Simpson, 1938).

At San Borja (near the Bahía del Los Angeles), on the gulf side of the peninsula, he collected enough shells to send a shipment to the archbishop of Seville. The great conchologists of the nineteenth century had not yet allocated shells into genera and species so it is doubtful if Longinos knew the names of the specimens he sent. In the years since his Expedition, however, two shells have been named for him: *Cardita (Cyclocardia) longino* Baily, 1945, and *Epitonium (Asperiscala) longinosanum* DuShane, 1970.

Longinos died of tuberculosis in Campeche in 1803. We can wish he had left us a complete legacy of knowledge concerning his traveling and collecting in Baja California during this poorly known era.

JANOS XÁNTUS (LOUIS VÉSEY)

Biographies of early field naturalists are extremely rare and that of Janos Xántus is no exception. Born of Greek parents, October 5, 1825, he emigrated to the United States in 1851. Although he rose from obscurity to fame, his failure to keep a diary and his proneness to exaggeration have prevented a precise study of his life and collections. Henry Miller Madden (1949) made the best attempt at ferreting the truth from a welter of conflicting testimony regarding this man. Xantus served in the United States Army under the assumed name of Louis Vésey for a period of more than three years, but Army routine galled him. During his stint in the Army he was recommended to Dr. Spencer Fullerton Baird, then Assistant Secretary of the Smithsonian Institution, as an indefatigable collector of scientific specimens. Through correspondence they formed a close personal friendship.

Baja California was *terra incognita* at that time and Baird was intrigued by Xántus' request to explore the peninsula. One wonders in the face of such obstacles as poor communication, slow travel, lack of reference material, and complete ignorance of certain localities how Xantus came to desire to collect in Baja California. He wrote, " I think there is hardly any spot on the North Americain continent, which would reward more a collector's trouble, as the Vermillion Sea and environs. That Region forms something like a connecting link between the U.S. and Central American zoology, & is almost unknown." (Madden, 1949). Baird suggested that Xántus accept a post in the Coast Survey as an observer of tides in Baja California. This suggestion was agreeable to Xántus who sailed from San Francisco March 14, 1859, on the bark Wilhelm Kirchner. Four days later they reached Guadalupe Island. The captain agreeably landed a boat on the island and the now happy naturalist spent several hours there collecting. This is the first recorded scientific exploration of Guadalupe Island.

Arriving at Cape San Lucas on April 4, 1859, he set up his camp in a remote spot seven miles from the small village of San Lucas, near where Rancho El Tule is now. He immediately began appraising the area from the standpoint of collecting specimens and wrote to Baird with zeal and enthusiasm concerning the general ecology. He regretted not having a camera, being one of the first scientists to realize the value of this aid in recording nature. Probably Xántus ranged no farther than seventy-five miles from his station during the two year stay at the Cape, since his duties with the Coast Survey whould have precluded his traveling further. There were two digressions from this schedule: July and August 1860 when he was at Todos

Santos on the west side of the peninsula, and one trip to Mazatlán in June and July 1861. It is interesting to note that Xántus absented himself from the Cape during the hottest months although he reported that the temperature scarcely changed five or six degrees between summer and winter, but that the wind blew all the time-- a gross exaggeration! That Janos Xántus was an ambitious field collector cannot be doubted. One can only wish he had been more careful in estimating distances since he was inclined to overestimate the distances of his excursions from the Cape, his labels were indefinite and some of the locality names attributed to specimens taken by him have changed over the years.

Eventually the Coast Survey personnel were displeased with the discrepant reports made by Xántus and on July 28, 1861, the station was officially closed. After a conference with Baird in Washington, Xántus returned to his native Hungary.

As an illustration of his arrogance Xántus had his protrait painted wearing the uniform of a lieutenant of the United States Navy. For a man who rebelled at regimentation imposed on him by the Army, it is amazing to find him standing for a portrait in a uniform of a branch of the service he never knew. He died December 13, 1894, at his home in Budapest, Hungary.

Conchology is certainly richer for having the type specimens collected by Xántus housed in the Smithsonian Institution, with duplicates in the Hungarian National Museum, The Royal Hungarian Society of Natural Sciences in Budapest, and the Academy of Natural Sciences, Philadelphia. However, Xántus, as well as Longinos, often made erroneous statements. Each went out of his way to make claims for things seen and distances traveled which no one at that time could refute.

Molluscan Species Named in Honor of Janos Xántus

Miltha xantusi (Dall, 1905). A rare shell, most specimens having been dredged off Cape San Lucas in 30 or more fathoms.

Conus xanthicus Dall, 1910.

Epitonium xantusi Dall, 1917. From Dall's description and notes it appears Xántus collected this species at Cape San Lucas. [Synonym of *Asperiscala acapulcana* (Dall, 1917)].

Cyclostrema xantusi Bartsch, 1907.

Crassispira xanti Hertlein and Strong, 1951. Type locality, Cape San Lucas Bay.

Bulimus xantusi Binney, 1860. (terrestrial mollusk)

Bulimulus veseyianus Dall, 1893. This land shell was named by Dall in honor of Mr. J. Xántus de Vésey. This appears to be the first and only instance of an author using the assumed name of Xántus for a new species.

CHARLES RUSSELL ORCUTT

Born in Vermont April 27, 1864, Charles Russell Orcutt came to San Diego in 1879 as a lad of fifteen years. His father maintained a horticultural nursery on the outskirts of San Diego and Orcutt made his first trips into Baja California with such men as botanists C.C. Parry and C.G. Pringle. Soon the rich molluscan fauna of the outer coast of Baja California began to intrigue the young Orcutt. Even with little education he had an instinctive and searching interest in the natural sciences which led him to explore such places as El Sauzal, Punta Banda, and San Quintín. Motivated by an anxiety to do something that would be important in a scientific way he once went to San Quintín Bay and gathered what is probably the largest collection of fossils that has ever been made from that area and shipped them, at his own expense, to the American Museum of Natural History in New York City.

It was probably through the friendships of Parry and Pringle that he began to realize the need for a scientific journal in conchology. In 1884 he commenced publication of The West American Scientist, and continued it, somewhat sporadically into 1921. It contained about 180 numbers in 22 volumes. A life subscription was ten dollars and yearly subscriptions were one dollar or ten cents an issue. Coan (1966) states that the most nearly complete set of this work is in the library of

The San Diego Society of Natural History. Eugene Coan (1966) did an admirable collation of The West American Scientist; admirable because Orcutt occasionally started a new volume number before the previous one had been completed. Volume XI was started before Volume X was complete, Volume XXI follows Volume XXII. Many issues have no Table of Contents. Sometimes he repeated page numbers in succeeding issues (DuShane, 1971). In addition, the cover of Volume III, no. 32 reads, "Volume IV." (Orcutt, 1887). One of his later numbers was printed on the back of wallpaper. Without apparent warning to his subscribers Orcutt ceased publication of his journal between March 1892 and July 1893, a period of fifteen months.

Not content with publishing one scientific journal, Orcutt extended his efforts to include a periodical he called West American Mollusca, consisting of 13 issues which appeared from 1900 to 1902(?). His California Art and Nature also had articles on mollusks of Baja California and appeared in 1901 and 1902 with 12 issues.

As the years passed, Orcutt became more involved with conchology and less with botany. His place smelled so badly of rotting animals within the shells that the neighbors complained. The later numbers of his journal contain articles of real interest to conchologists. This is particularly true of three lists of mollusks collected in Baja California at Lagoon Head, Santo Domingo Landing, east of Cedros Island (Orcutt, 1900) and of Pleistocene fossil mollusks from San Quintín Bay (Orcutt, 1921) as well as his Magdalena Bay List (Orcutt, 1918).

About this time (1883), he met Henry Hemphill, a bricklayer and amateur conchologist who resided in San Diego and it was natural that they should be drawn to one another. Together they made a trip (1884) to the bed of the Santo Tomas River, about 30 miles south of Ensenada. They collected land snails but Orcutt never published a list of what they obtained.

In 1888 Orcutt explored San Quintín Bay and collected *Acmaea scabra, Chlorostoma funebrales, littorina planaxis, Lottia gigantea* and *Pallochiton lanuginosa* (Orcutt, 1896). Twenty-five years passed before Orcutt told of his experiences on this trip (Orcutt, 1921). "The main portion of the bay is bordered with banks of sand and fossil shells, varied on the ocean side by an ancient lava flow, in places underlaid and overlaid with stratas containing shells...countless thousands of *Haminoea olgae* Dall strewed the beach. Two or three hundred pounds of the fossils were collected and some years later were sent to the American Museum of Natural History (New York City)."

In 1889 Orcutt visited the beach at Santo Tomás and mentioned the collection and sale of abalone by the Chinese. The shells sold at from $25. to $30. a ton and dried abalone meat brought $110. a ton.

Orcutt sometimes went off without even a blanket, eating with Indian groups he encountered and sleeping on the ground. He mentioned that one of the Indians at Todos Santos Bay (Ensenada) was wearing only a pair of red mittens! At one point he mentioned having little for breakfast, no lunch and a supper of griddle cakes and melted pinoche (Orcutt, 1893).

In 1889 Orcutt took a small steamer which landed him at Lagoon Head, approximately 325 miles south of San Diego. Sometimes known as Morro Santo Domingo, just north of Guerrero Negro, it is directly east of Cedros Island. Here he found a few Indian pearl hunters with whom he contrived to take most of his meals, scanty though they were. He reported a menu of:

Breakfast: black coffee, no sugar, tortillas, clams
Dinner: ditto
Supper: ditto. Occasionally a stewed fish varied the diet.

He commented on the abundance of *Pecten aequisculcatus, Venus simillima, Dosinia ponderosa, Laevicardium elatum, Arca* species, *Amiantis callosa, Anomia peruviana, Cypraea spadicea, Choromytilus palliopunctatus* and *Pedipes unisulcata* (Orcutt, 1900).

In 1917 Orcutt took the longest trip of all into Baja California territory. He left San Diego by boat and landed on Magdalena Island where he spent a month collecting some 400 species of mollusks and fossil shells. Dall identified 64 species and described 3 new species (Dall, 1918). He spent one day on nearby Isla Margarita collecting land shells (Orcutt, 1918).

By April 1888, Orcutt had already spoken with some 50 individuals regarding the promotion of a west American museum that would contain the results of research, be a custodian of records and a factor in public education. In The West American Scientist VII, for August he made a plea for his plans, "The little collections, originally displayed on a tea plate, have grown to too large proportions for one pair of hands....The work calls for many hands and greater means to render the greatest results, in benefits to mankind, attainable."

Today, Orcutt's specimens no longer exist as a major collection. Some of the material accessioned under "Orcutt Estate" is at the San Diego Natural History Museum (pers. comm. E.C. Wilson, 1967*). The California Academy of Sciences purchased a small amount and the Museum of Comparative Zoology, Harvard University purchased the Magdalena Bay collection. Most of the material was sold by C.L. Cass, a private collector and dealer. This material has been scattered or lost.

Orcutt died in Haiti in 1929 at the age of 65 years. He retained throughout his lifetime the characteristics of a New Englander, shrewd, thrifty to the point of being penurious, never forgetful of a slight, yet generous to a fault with those he admired or wished to help.

Molluscan Species Named in Honor of Charles Russell Orcutt

Fossils

Coralliochama orcutti White, 1885(?)
Macrocallista orcutti Dall, 1918
Sanguinolaria orcutti (Dall, 1921)

Marine Species

Chlamydoconcha orcutti Dall, 1884
Epitonium orcuttianum Dall, 1917
Caecum orcutti Dall, 1885
Barleeia orcutti Bartsch, 1920
Bankia orcutti Bartsch, 1923
Acmaea triangularis orcutti Pilsbry, 1891
Fusinus (?) orcutti Dall, 1915
Mitra orcutti Dall, 1920
Coralliophila orcuttiana (Dall, 1919)
Odostomia orcutti Bartsch, 1917
Macron orcutti Dall, 1918

Land Species

Epiphragmophora orcutti Dall, 1900
Eucalodium orcutti Dall, 1910
Pupa orcutti Pilsbry, 1891 *(nomena nuda)*
Amnicola orcutti Pilsbry, 1928
Micrarionta harperi orcuttiana Bartsch, 1937
[new name for *Sonorella baileyi orcutti* Bartsch, 1904 not *Epiphragmophora orcutti* Dall, 1900]

Fresh Water Species

Unio orcutti Wright

Molluscan Species Named by Orcutt

Haliotis corrugata var. *diegoensis* Orcutt, 1900
Haliotis cracherodi bonita Orcutt, 1900
Haliotis cracherodi rosea Orcutt, 1900

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*Curator, Invertebrate Paleontology, San Diego Natural History Museum, presently in the same capacity at the Natural History Museum, Los Angeles County.

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A REPORT ON THE ANNUAL MEETING OF THE WESTERN SOCIETY OF MALACOLOGISTS

BY

JULES HERTZ

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The Western Society of Malacologists (WSM) held their 21st annual meeting, July 17-21, 1988, at Sonoma State University, Rohnert Park, California. There were three days of papers including two symposia and assorted contributed papers. The meeting started with a wine and cheese reception sponsored by the Northern California Malacozoological Society followed by an evening slide presentation by Don Shasky and Kirstie Kaiser. Slides were shown of last year's WSM meeting and animal and underwater slides from Cocos Island and the Galapagos Islands.

The first symposium, Biogeography and Evolution of Molluscan Fauna of the Galápagos Islands, included 12 papers on very diverse subjects relating to the Galápagos such as El Niño effects on fishes, paleontological studies, molluscan faunal studies, and some historical aspects of the islands. Jack Stein Grove of the Los Angeles County Museum of Natural History gave an outstanding presentation entitled, "El Niño 1982-83 and New Records of Indo-West Pacific Fishes at the Galápagos." He recorded the first sightings of five species of Indo-West Pacific fishes in the eastern Pacific at the Galápagos following the 1982-83 El Niño. Another extremely interesting paper, presented by Mitchell M. Colgan, University of California, Santa Cruz, was "The Urvina Bay Uplift: Biological and Paleontological Implications." This paper discussed studies of an area along the west-central coast of Isabella Island which was suddenly uplifted in March 1954.

The second day was devoted to the symposium, Molluscan Herbivore-Plant Interactions and to a number of contributed papers. Much of the work presented at the second symposium was part of PhD studies and it was encouraging to hear presentations from this delightful group of young future scientists.

Before the final day of contributed papers, we took a break and went on an extended day of field trips. Starting at 8:30 A.M. we took a short trip to Whittacker Bluffs in the northwestern corner of Marin County where we were shown a small outcrop of rocks from the Late Pliocene belonging to the 'Merced' Formation (now officially known as the Wilson Grove Fm.). After viewing these rocks and some of the items that had been taken from there in the past, the trip continued to Bodega Bay. There we walked on the extensive exposure of sand flats, and were able to dig and screen a number of animals from what appeared to be a muddy desert. This was followed by poking around at the rocky outcropping at Horseshoe Cove adjacent to the Bodega Marine Laboratory and an exciting find by Annette M. Olson of one of the algas on which she was working in Oregon. After a box lunch, the group was given an extensive tour of the Bodega Marine Laboratory and were able to view the R&D activities on aquaculture of lobsters, oysters, and mussels. We then completed the field trip with a tour of the Korbel Champagne Cellars and an evaluation of various champagnes. The latter prepared us for an evening of feverish bidding at the annual WSM auction of molluscan specimens and literature.

Hank Chaney served as auctioneer and did an outstanding job of selling. His storytelling, pleading, and cajoling entertained us all and resulted in some spirited bidding. Even some of the professional got caught up in the excitement of the bidding and provided some of the most humorous and memorable moments. George Kennedy conducted the reprint sale and this added significantly to the evening's entertainment.

The final day of contributed papers covered a variety of both Recent and fossil molluscan subjects. Of particular interest was a paper by Sandra M. Gardner, San Jose State University entitled, "A New Vermetid from Mexico." This described finding of a new species of vermetid on encrusted *Ancistromesus mexicanus*, the giant limpet from Mexico.

In addition to the 36 papers presented, we had some additional evening events which were highly interesting and entertaining. Mr. Dave Nagle from the Sonoma County Sheriff's Department spoke on their diver rescue program accompanied by many interesting slides. A second evening's entertainment was provided by Joe Mueller, a Sonoma State University biology graduate student, who showed spectacular slides of the marine invertebrate fauna from Monterey to Salt Point. The final event was the traditional banquet held at the River Cafe, a beautiful old Victorian home in Petaluma which had been moved to a picturesque setting.

Matt James, of Sonoma State University, the WSM President and organizer of the Galapagos symposium, can be extremely proud of having put together a very fine program of papers and events.

During the meeting there were extensive discussions, formal and informal, concerning the status of the molluscan collection at the San Diego Museum of Natural History. It was announced that the American Malacological Union (AMU) at its annual meeting in Charleston, South Carolina, had passed a resolution to submit a petition to the Board of Trustees of the San Diego Museum of Natural History which urged the Board of Trustees "to honor the bequest of Dr. Joshua L. Baily, Jr., who clearly intended to support mulluscan studies at the San Diego Museum of Natural History." The petition urged the immediate establishment of a Curatorship of Mollusks and recommended that it be known as the Joshua L. Baily Chair of Malacology. The WSM membership approved a similar petition at the Sonoma meeting, and it too is being sent to the Board of Trustees of the San Diego Museum of Natural History. Signees of the two petitions include most of the professional malacologists of the United States.

It was announced that the WSM will have its next meeting in Los Angeles in conjunction with the AMU. It will be held June 25-30, 1989 at the Davidson Conference Center of the University of Southern California. It is being co-chaired by AMU president-elect Dr. James H. McLean and WSM president-elect Dr. Hans Bertsch. Further information can be obtained by writing either Dr. Bertsch or Dr. McLean, Los Angeles County Museum of Natural History, 900 Exposition Blvd., Los Angeles, CA 90007.

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The Festivus is published monthly except December. The publication date appears on the masthead above.

Meeting date: third Thursday, 7:30 P.M., Room 104, Casa Del Prado, Balboa Park

COME TO THE MEXICAN FIESTA

Saturday, September 17th
at the home of Toni and Larry Buck
(See details and map on the last page.)

There will be no regular meeting this month.

CONTENTS

CLUB NEWS

ANNUAL MEETINGS, LOS ANGELES, 25-30 JUNE 1989: THE WESTERN SOCIETY OF MALACOLOGISTS AND THE AMERICAN MALACOLOGICAL UNION

The 55th annual meeting of the AMU and the 22nd annual meeting of the WSM will be a combined meeting, June 25-30, 1989, held in Los Angeles, California, at the Davidson Conference Center of the University of Southern California. Facilities at the Los Angeles County Museum of Natural History will also be used for some of the scheduled events.

Two full days of symposia are planned. One, on Systematics and Evolution of Western North American Land Mollusks, convened by F.G. Hochberg and Barry Roth, and one on Pelagic Gastropods convened by Roger R. Seapy. There will also be a shorter session on Scaphopod Biology convened by Ronald L. Shimek.

One auction is to be held by the WSM. Field trips for collecting marine, land, and fossil mollusks will be arranged.

Registration will be Sunday, June 25 in the lobby of the University Hilton with the presidents' reception that evening at the Los Angeles County Museum of Natural History. Four days are available for symposia and scheduled papers, June 26-29. The annual business meeting and banquet will be Thursday, June 29, with field trips scheduled for Friday, June 30.

There are to be three choices for housing: the University Hilton, the Vagabond Motel, and the University dormitories, all very close to the Davidson Conference Center. A wide selection of restaurants is available in the immediate vicinity and an optional meal package will be offered through the university.

For further information contact AMU president-elect Dr. James H. Mclean, Los Angeles County Museum of Natural History, 900 Exposition Blvd., Los Angeles, CA 90007 (213-744-3377) or WSM president Dr. Hans Bertsch, at the same address (213-372-4436).

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - AUGUST 18, 1988

Bill Romer introduced guest Alan Gettleman, president of Conchologists of America (COA) who said that next year's meeting (to be hosted by our Club) will be the first on the west coast in about eight years. He said that the COA will help the Club in any way it can and will pay all the bills. He added that the COA gives a trophy to any club having a shell show open to other exhibitors.

Dr. Hugh Bradner, our speaker for the evening, talked on the habitats of cowries. He told that cowries are normally associated with corals and most are nocturnal. He showed slides indicating the types of areas to find cypraea. He said that cowries can be carnivorous or herbivorous while many can't make up their minds. Hugh also showed slides of the living animals with their mantles exposed.

Billee Brown brought in a display of blue shells.

After the coffee break, with cookies provided by Marge and Ken Lindahl and Toni and Larry Buck, the September party was discussed.

Billee Brown

NEW MEMBER

Blair Armstrong, 8009 Calle de la Plata, La Jolla, CA 92037, 459-7463

CHANGES OF ADDRESS

Ernest and Elizabeth Haigh, P.O. Box 1180, Palmdale, CA 93550

Instituut Voor Taxonomische Zoologie, Bibliotheek Ned. Malac. Veren. Postbus 4766, 1009 AT, Amsterdam, The Netherlands

John Johnson, H&HS - MATSCo.- 90, ATC School, NATTC, Millington, TN 38054

THE RADULA OF CERATOSTOMA (NEOGASTROPODA: MURICIDAE) IN WEST AMERICA

BY

SHI-KUEI WU

Campus Box 315, University of Colorado Museum, Boulder, Colorado 80309

Ceratostoma foliatum (Gmelin, 1791)

The Foliated Thorn Purpura, *Ceratostoma foliatum*, occurs from Alaska to San Pedro, California, from the shore line down to 64 meters (35 fms) in depth. It is 51 to 76 mm in length, with 3 large, thin, foliaceous varices per whorl which are finely fimbriated on the anterior side. Numerous spiral cords are rather prominent and of various sizes. The siphonal canal is closed, its anterior tip turned up and to the right. The base of the outer lip has a moderately strong spine. The aperture is white and the exterior is white to light brown (Abbott, 1974). For figures, see Abbott's (1974) color Plate 9, Fig. 1937 and Radwin and D'Attilio's (1976) Plate 18, Figs. 1-2.

Three radulae from a lot at the University of Colorado Museum (UCM No. 14110, collected by J. Henderson on 11 July 1925 from Deception Pass, Washington State) were examined. The preparation of radular slides and the radular terminology follow those of Wu (1965).

The measurements of shell length, apertural length, radular length and width of rachidian for three radulae were:

Shell length	Apertural length	Radular length	Rachidian length
78.9 mm	28.2 mm	22 mm	170 mμ
78.9	27.9	23	175
79.2	28.3	24	160

The rachidian is 5-cusped (Figs. 1-3): the central cusp (CC) is long, twice as long as the lateral cusps (LC) from the anterior view (Fig. 1). However, it seems almost equal in length to the lateral cusp from the dorsal view (Fig. 3). The lateral cusps are broad at their base and their tips point outwardly. The medial denticle (MD) is usually single, stout and short, or occasionally split into 2 or 3, near the medial side of the lateral cusp. There are 4-6 lateral denticles (LD), usually 5, and saw- or knob-like. The marginal cusps (MC) are distinct and pointed from the dorsal view. The anterior basal line (ABL) of the rachidian is concave; the posterior marginal angle (PMA) of the base is rather weak and located under the marginal cusp from the dorsal view. The anterior side of the central cusp is slightly projected, forming a slight convexity at the middle.

The lateral tooth is, in general, a sickle form. The shape of the lateral tooth in the folded condition is slightly different from that of the unfolded condition (Fig. 3).

Ceratostoma nuttalli (Conrad, 1837)

The Nuttall's Thorn Purpura, *Ceratostoma nuttalli*, occurs at the littoral shore from Pt. Conception, California to Santa Maria Bay, Baja California, Mexico (Radwin and D'Attilio, 1976). It is 38 to 51 mm in length, similar to *C. foliatum*, but with much more poorly developed varices, and with one prominent, noduled rib between each varix. The spine on the outer lip is usually long and sharp. The exterior is yellowish brown, sometimes spirally banded. The siphonal canal is closed along its length (Abbott, 1974). For figures, see Abbott's (1974) color Plate 9, Fig. 1938 and Radwin and D'Attilio's (1976) Plate 18, Fig. 15. This is the type species of *Ceratostoma* Herrmannsen, 1846, by monotypy.

One radula from a lot at the Los Angeles County Museum (LACM 49-247, collected by R/V Velero IV, on 4 March 1949, from a cove 1.25 miles (2.01 km) south of Cedros Island lighthouse, Cedros Island, Mexico) was examined. The length of this shell was 54.2 mm and the animal was a male. The rachidian width is 125 mμ. The rachidian is 5-cusped (Figs. 4-5): the central cusp is slightly longer than that of the lateral teeth from the anteror view (Fig. 4). However, it seems almost equal in length from the dorsal view (Fig. 5). The lateral cusps are much broader than the central cusp in width at their bases and their tips point directly posteriorly. The medial denticle is single near the base of the lateral tooth and deeply cut. There are 4 saw-like lateral denticles. The marginal cusps are distinct. The base of the rachidian is the same as that of *Ceratostoma foliatum*; however, the posterior marginal angle of the base is extremely strong and pointed, showing as 2 marginal cusps from both anterior and dorsal views (Figs. 4 and 5). The lateral tooth is a generally sickle-shaped tooth.

Discussion

As for the West American faunal constituents of *Ceratostoma*, Radwin and D'Attilio (1976) placed the species *lugubre* (Broderip) which occurs from Magdalena Bay, Baja California, Mexico to Guayaquil, Ecuador in the genus *Ceratostoma*. However, Keen (1958) and Vokes (1984) placed the species in the genus *Ocenebra*. Later Keen (1971) put the species in *Ceratostoma*. Vokes (1984) and Keen (1971) retain *monoceros* (Sowerby) and *unicorne* (Reeve) in the genus *Ceratostoma*. However, *C. unicorne* was considered a synonym of *C. nuttalli* and *C. monoceros* a variety of *C. nuttalli* by Tryon (1880).

This paper describes two species of West American *Ceratostoma* radulae. In general, the basic radular morphology of *C. foliatum* and *C. nuttalli* is similar. The differences between the two species are: (1) the tip direction of the lateral cusps, (2) the lengths and bases of the central cusp and its lateral cusps, and (3) the development of the posterior marginal angle of the base as mentioned earlier in the above radular description. These differences might be due to size and individual variation.

The rachidian morphology of *Ceratostoma nuttalli* described in this paper agrees well with that of Radwin and D'Attilio (1976:114, Fig. 69) Whether the radulae of *C. lugubre*, *C. unicorne* and *C. monoceros*, and those of *Ceratostoma* in the West Pacific, *i.e. C. burnetti* (Adams and Reeve), *C. fournieri* (Crosse), *C. inornatum* (Recluz) and *C. rorifluum* (Adams and Reeve), agree with American *C. foliatum* and *C. nuttalli* remain to be studied.

ACKNOWLEDGMENTS

The author wishes to thank Dr. William K. Emerson and Mr. Walter E. Sage, III, of the American Museum of Natural History, for their suggestions and reading of this manuscript, and Dr. James H. McLean, Mr. C. Clifton Coney and Mr. Gale Sphon of the Los Angeles County Museum of Natural History, for the loan of specimens of *Ceratostoma nuttalli*.

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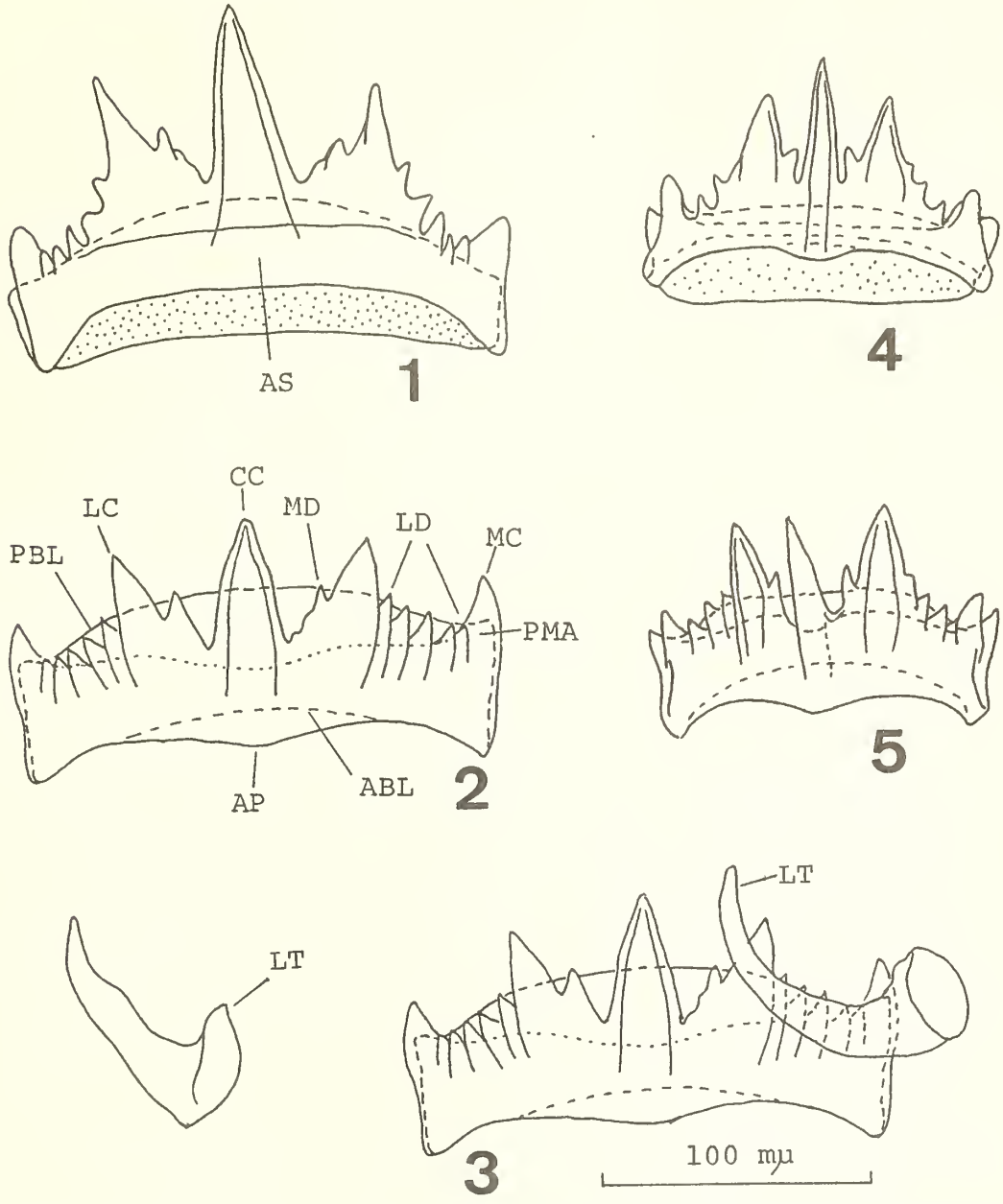


Figures 1 and 2. *Ceratostoma foliatum* (Gmelin, 1791). Camera lucida drawings of a rachidian. (1) anterior view (2) dorsal view.
Figure 3. *C. foliatum*, camera lucida drawing showing dorsal view of rachidian and lateral teeth.
Figures 4 and 5. *Ceratostoma nuttalli* (Conrad, 1837). Camera lucida drawings of a rachidian (4) anterior view (5) dorsal view. Note central cusp slants slightly to the left side.
The scales of Figures 1-5 are at Figure 3.

Abbreviations to the figures: ABL, anterior basal line; AP, anterior projection of central cusp; AS, anterior side of rachidian base; CC, central cusp; LC, lateral cusp; LD, lateral denticle of lateral cusp; LT, lateral tooth; MC, marginal cusp; MD, medial denticle of lateral cusp; PBL, posterior basal line; PMA, posterior marginal angle of base.

WESLEY M. FARMER'S REMARKABLE ART

AN INTRODUCTION BY

WAYNE REED

107 Murray Street, Chula Vista, California 92010

Wes is no stranger to members of the San Diego Shell Club. As our former president, his long-standing involvement has richly rewarded us with his presentations and papers on the colorful kingdom of the opisthobranch. His opisthobranch sculptures in resin are faithful reproductions of these exotic sea slugs.

Wes has a Ph.D from Columbia Pacific University and an M.S. in zoology from Arizona State University. An advanced diver, he has served as Junior Scientist aboard a Scripps Institution of Oceanography research vessel collecting fish and nudibranchs off central Baja California. His numerous books and publications include SEASHORE DISCOVERIES, with over 240 of his line drawings.

Some of Wes' early work can be seen at the San Diego Natural History Museum in a 40-foot underwater diorama depicting the ocean depths. A kelp forest rises from offshore rocks with a representative marine fauna in a resinous world. As a former Curator of Exhibits at the Museum, Wes painstakingly created many of the realistic, lifelike fiberglass fish from molds; a tedious and complex process which few have the patience or talent to attempt. His reproductions of marine life and his sculptures are in museums and private collections in several countries including that of the British Royal Family.

Wes' latest accomplishments include a model of a venomous *Conus textile* attacking its prey (Figure 1) and a living *Nautilus pompilius* (Figure 2).

Figure 1. Model of *Conus textile* Linne, 1758, attacking its prey is embedded in five pounds of polymer.

Figure 2. Model of living *Nautilus pompilius* Linne, 1758, held by Wayne Reed. The sculptured animal can be removed from the shell.

SYNTHETIC SEA LIFE

BY

WESLEY M. FARMER

3591 Ruffin Road #226, San Diego, California 92123

I was introduced to the wonders of sea life by my grandfather and my uncle during my early years. Later, while a student at Roosevelt Junior High, I discovered that some of those in the shop class were working with plexiglass laminations, using color adhesive between the layers and shaping it into heart pendants. It wasn't long before I got the idea of embedding a small seahorse and salamander in Bio Plastic, a material produced by Wards Natural Science Establishment, Inc. in Rochester, New York. A correspondence course at the Southwestern School of Taxidermy resulted in a few other creations such as a bluegill fish mount, a barn owl mount and prepared insects.

My interests in taxidermy found me looking at the exhibits at the San Diego Natural History Museum and asking questions about the methods of preservation and restoration of natural history specimens. By the late 1950s I'd become acquainted with Glen Ives, then a Museum preparator at that institution and we undertook an exhibit for the Museum encompassing about 150 fish species of southern California. The exhibit included a synoptic collection as well as a 40-foot underwater diorama. Our goal was to improve the public's understanding of the adaptations peculiar to the fish fauna.

Before we could begin molding the fishes, we had to decide exactly what we wanted as a final product such as which side would be presented for display as well as what the fish would be "doing" i.e., feeding, turning, conforming to habitat etc. When this had been determined, the fish could be cleaned of its slime by rubbing alum onto the surface (taking care not to rub off the scales and other parts for molding). The slime, if not killed, could give unsatisfactory results in the plaster mold.

Other tedious steps were required in preparing the fishes. Two fins had to be cut away from the body: the pectoral fin on the display side and the pelvic fin on the opposite side. The other fins remained intact. In some instances it was desired to have the mouth open. The oral cavity was quickly filled with thick plaster of paris to avoid deterioration.

We spent hours preparing the fish to be molded using damp paper hand towels, straight pins, plaster of paris, polyethylene pan, and vasoline. Placing the alum-treated fish on damp paper towels and into a container of sand, the fins were pinned in place. Plaster of paris was poured over the fish, and after making sure the solution had settled into all the undercuts, Glen and I waited half an hour to an hour. The mold, after being treated with a thin film of separator and thoroughly dried, was ready for resin and fiber glass. Polyester, epoxy, bioplastics and other resins were used.

Many other factors had to be taken into consideration in applying the fiber glass; the amount of catalyst used in the resin, the temperature, the amount of moisture in the atmosphere, the cutting of the fiber glass cloth, and the continued brushing. Then, there were the finishing touches such as preparing the eyes of clear plexiglass plastic. We used countless color photographs of living specimens as a guide to painting the fish. One of my most successful models was of a large Opah with its colored resins on the fleshy side and a sagittal section on the other side, showing all the bones in place.

Following a move to Arizona, I began creating nudibranch sculptures in polymer resin. I originally made my sea slug sculptures embedded in a resin block such as the one shown in Figure 1. To date I have made over 200 opisthobranch replicas representing species found in the waters of San Diego, the Gulf of California, the Galapagos Islands and Australia.

Though my earliest nudibranch models (made when I was in high school and still on exhibit on the lower floor of the San Diego Natural History Museum) were made of water clay, but my later resin models begin in clay and molds are then made. The hard resinous product comes out of the mold. The number of molds necessary to recreate each animal depends on the complexity of the animal.

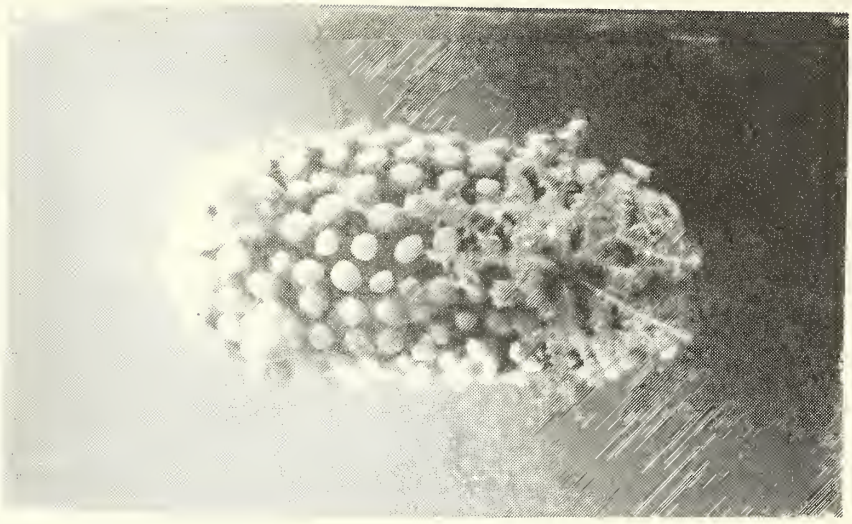


Figure 1. *Anisodoris nobilis* MacFarland, 1905, model in polymer resin. This was an early effort to make resin gills.

Recently I designed and built for Wayne Reed a replica of a living Chambered Nautilus which can be removed from the shell. Since these mollusks are seldom seen alive, Wayne thought the model would make an interesting display and educational showpiece. Fortunately, Sea World of San Diego is one of the few places where this cephalopod is kept in captivity. I made several trips to Sea World to observe and sketch this living fossil swimming in the aquarium. (See Figure 2, p. 89 in this issue.) Many separate molds had to be made to prepare this model. As an example, a separate mold had to be made for each of the of the animal's over 30 tentacles.

Figure 2 is of a model of the animal of *Argonauta argo* Linne, 1758 which I made for Martin Schuler, longtime Club member.

I've always been fascinated with the various materials on the market that can be used for making these replicas. There is a great deal of personal satisfaction in converting glass cloth and liquid polymer resin into a faithful reproduction of a natural wonder. Sculpturing sea life is an exciting challenge.

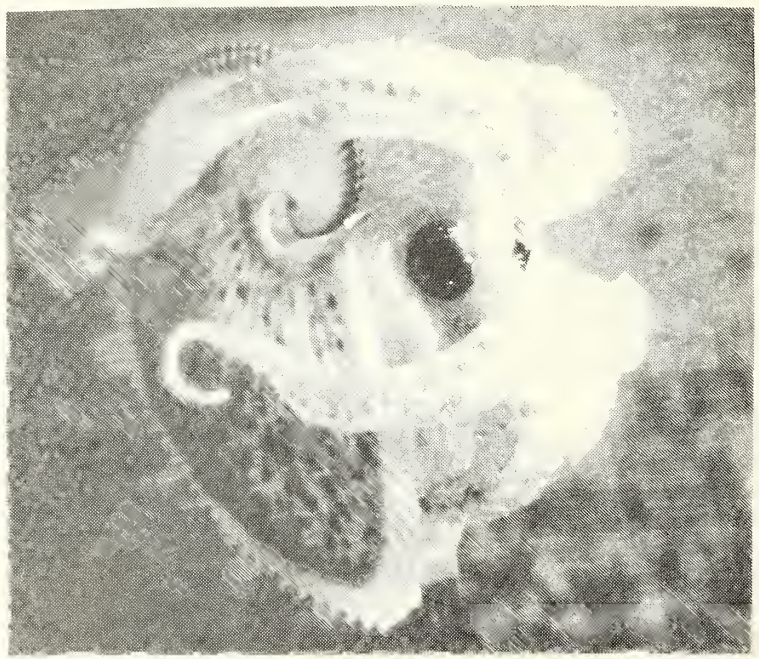
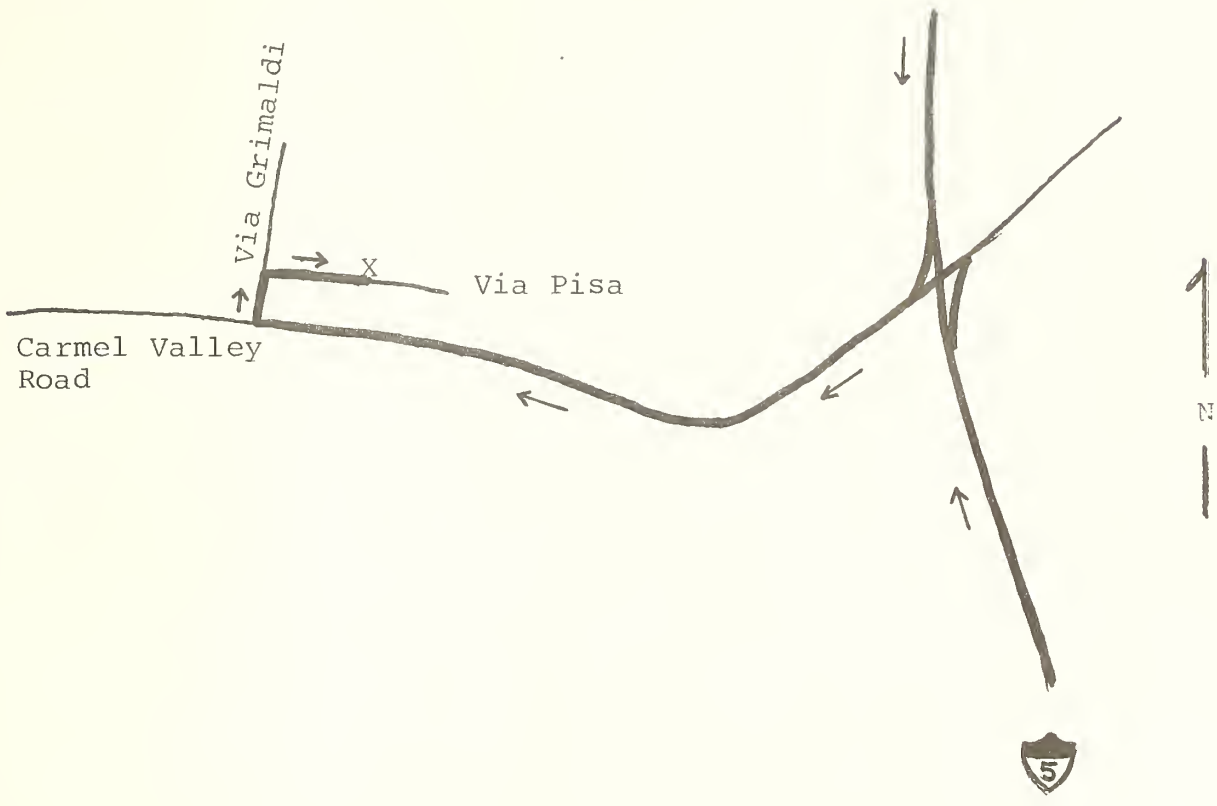


Figure 2. Model of *Argonauta argo* made for Martin Schuler.

I-5 North (or South) to Carmel Valley Road offramp, (Del Mar);
Carmel Valley Road West .6 miles to Via Grimaldi;
Via Grimaldi North 1/2 block to Via Pisa;
Right on Via Pisa, 7th house on left - 2534 Via Pisa

Park anywhere along street. Larry and Toni Buck 792-5404

Thomas Bros. Map 34, B-5



Come to the Mexican Fiesta beginning at 6:00 P.M. on Saturday, September 17th. Come in your best Mexican finery and enjoy a wonderful Mexican dinner complete with Mexican appetizers, green salad, two kinds of enchiladas, beans, Mexican rice and brownies, cheescake and coffee. Beer, wine and soft drinks will be provided by the Club. There will be Mexican music and a piñata will be filled with shells.

It will be a great party with good friends, so if you want to come and have not yet been contacted, call either Larry and Toni Buck (792-5404) or Carole Hertz (277-6259) to find out which menu item you can bring.

For those attending, remember to bring the following: your menu contribution with serving utensil; eating utensils (plates and cups will be provided); and if you can bring a lawn chair, it would be helpful.

¡Hasta la Fiesta Mejicana!

THE FESTIVUS

A publication of the San Diego Shell Club

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MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional

Meeting date: third Thursday, 7:30 P.M., Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

"Waiter, There's a Bug in My Clam"

Craig Cary, graduate student at Scripps Institution of Oceanography will give an illustrated presentation on bivalves containing symbiotic bacteria.

Mini-Program

Carole and Jules Hertz will give a brief slide show on the recent annual meeting of the Western Society of Malacologists

Meeting date: October 20, 1988

CONTENTS

CLUB NEWS

PUBLICATION RECEIVED

THE SJOLIE-HUTSELL GUIDE TO RETAIL PRICES FOR MARINE SHELLS OF THE WEST COAST NORTH AND CENTRAL AMERICA
By Linda L. Sjolie-Hutsell 1988.
Published by Sjolie-Hutsell, P.O. Box 86835, San Diego, CA 92138
76 pages, unpaginated
Price: $14.50

As stated in the introduction, this price guide covers species found from Washington to Panama and "was compiled from a cross-section of mail-order lists sent out by retail specimen dealers and lists prices for fine to gem quality specimens...." The author further notes that an effort was made to ensure current, correct classifications of the entries. Four appendices are included for quick reference to genera within the families. Genera and species are listed alphabetically within families with generalized localities and "relative value" of the entries.

A copy was kindly donated to the Club library by the author and will be available for circulation at the October meeting.

THE CLUB'S ANNUAL CHRISTMAS DINNER PARTY

The Club Christmas party will be on Saturday evening December 3rd at the Admiral Kidd Club in the San Diego Room overlooking the water. Entree choices are:

Roast prime rib of beef with baked potato.....$14.50
Fillet of sole stuffed with crab served with wild rice..... 13.60

The meal includes salad, rolls and butter, green vegetable and coffee or tea. The dinner price includes tax and gratuity and the Club will provide the dinner wine. Paid reservations must be received by the November meeting (November 17). The first fifty reservations will be those accepted.

THE ANNUAL SEPTEMBER PARTY--A MEXICAN FIESTA

It could very well have been a zesty fiesta on a veranda somewhere on the tierra caliente, but in reality it was our Mexican party held at the splendid home of Toni and Larry Buck in Del Mar.

Toni and Larry hosted our annual September party with all the gusto and flavor of Old Mexico. Club members joined together to help create what was undoubtedly one of the best south-of-the-border potlucks this side of the Sierra Madre. Tasty enchiladas, frijoles, tacos, salads, snappy salsas and guacamole dips in conch shells greeted the palates of all those who were lucky enough to attend. The distinctive atmosphere of the evening was made all the more realistic by those who showed up in their Mexican finery. Background party music included five-string guitars, Veracruz trumpets, and the ubiquitous mariachi (in stereo, of course)!

The lighter side of the evening included all those probing swings at a shell-filled pinata. And Larry Buck invited folks inside to see his terrific self-collected shell specimens. The Club thanks the Bucks for their great hospitality.

Wayne Reed

NEW MEMBERS

Anderson, Roland, Seattle Aquarium, Pier 59, Waterfront Park, Seattle, WA 98101
Jackson, Ellen and John, 11448 Rolling Hills Dr., El Cajon, CA 92020

THE ROLE OF THE AMATEUR IN THE DEVELOPMENT OF MALACOLOGY IN THE WESTERN UNITED STATES

BY

EUGENE V. COAN

Research Associate, Department of Invertebrate Zoology,
California Academy of Sciences, Golden Gate Park, San Francisco, California 94118

[a paper delivered to the meeting of the American Malacological Union, Charleston, North Carolina, 20 June 1988, Symposium on the History of Malacology]

The theme I pursue in this talk is that the amateur has played a particularly significant role in the development of the science of malacology on the west coast of the United States, this for a variety of reasons, some unique. I'll outline the reasons for this involvement and its chief personalities. Then, I'll explain why I think that the role of the amateur has declined in recent years, to the detriment of malacology. However, I will also point out that this situation can be improved.

First, there is the matter of definitions. Here, I encompass within the term "amateur" all those who are not paid specifically for their work in malacology. Amateurs thus include some who have had professional-level training but who either had jobs in other fields, or were sufficiently well off not to have to generate income by any occupation. The term "non-professional" might be used, but that term also implies work badly done and that would confuse matters. The term "amateur" picks up this second meaning only when converted to the adjective "amateurish" which I have avoided.

Secondly, I would not argue that the western United States is in any way entirely unique. I am sure that, to some extent, the things I am pointing out are true on the East Coast of the United States, and in Europe, Australia, New Zealand, and elsewhere. However, the situation is sufficiently unique on the West Coast to see clearly some important factors and to draw from them some more universal conclusions.

The reasons I give for the unusual importance of the amateur in West Coast malacology are the fact that the fauna was not encumbered by much earlier and confusing work, that the work on the West Coast remained well grounded in the methodologies of Europe and the East Coast, that there were frequent compilations and handbooks that placed important information in the hands of the public, and that there was a tradition of volunteerism and involvement that characterizes newly settled areas.

The first factor, then, that made a difference was that most of the fauna of this coast and of the eastern Pacific was not described until after 1850. Thus, there were few entanglements with confusing early literature in diverse languages with cryptic descriptions, bad figures, and unobtainable or missing type specimens. This meant that the fauna was a relatively clean slate. (It remains amazing to me to see how long the past continued to plague the present in Europe and elsewhere with endless paragraphs of speculation about what name goes with which species and with continuing taxonomic questions that should have been solved by locating type material, by neotype designations, petitions, or arbitrary but clear choices."

Aside from light touches by a few early voyages, the study of malacology on the West Coast began with the contributions of several key amateurs. The first was the botanist Thomas Nuttall (Figure 1). On his overland trip to the West Coast in 1834-1836, Nuttall collected many marine mollusks and brought them back to the East Coast, where they were named by Timothy Abbott Conrad. We'll call Nuttall the West Coast's first amateur, since his chief interest was botany. He illustrates what has

been one of the most important roles of amateurs--collecting. He brought back shells tied, though with some mix-ups, to particular stations on the West Coast. Most of the types of these taxa are in the British Museum.

The next West Coast amateur was truly unique, for he never visited the West Coast. That was the Reverend Phillip Pearsall Carpenter (Figure 2). His work in malacology began with a purchased collection of mollusks from Mazatlan, Mexico, which he studied in England to provide diversion from his ministerial duties. As time went by, however, his malacological work took an increasing proportion of his life, but almost all of his voluminous work on the marine fauna of the eastern Pacific was undertaken as a hobby, and it came to include three major books and many papers. Almost all of his species are represented by types in the British Museum, the United States National Museum, and the Redpath Museum. Carpenter's work illustrated the painstaking and careful studies that amateurs can conduct. He undertook an amazingly thorough literature search about the fauna of the eastern Pacific and the western United States, used comparative material available in Britain, studied the collections of the USNM, and described many of his new taxa based on suites of specimens, noting variation. His work was of a level equal to the best professionals of his time, and he drew conclusions about biogeography and evolution from it.

Figure 1. Thomas Nuttall

Figure 2. Phillip Pearsall Carpenter

The third major amateur was James Graham Cooper (Figure 3), about whom I prepared a biography a few years ago. He made his living chiefly as a physician. He participated in one of the Railroad Surveys in the 1850s, on which he collected some mollusks along with material of other animals and of plants. He settled in California in the 1860s, working for a while for the California Geological Survey as its zoologist. During this time, he became increasingly interested in malacology, but after the Survey died, his interest had to remain at the amateur level while he earned a living in medicine. He described many taxa from the marine, land, and freshwater faunas, as well

as many fossils, and most of his types are available for study. His career demonstrates how difficult it was for dedicated malacologists to find employment in biology, even a century ago. He persisted in spite of the obstacles--as many others have done since then--to make a major contribution.

I pause from my description of early workers to make a second general point about the character of the work of amateurs on the West Coast fauna. The work of these early malacologists was well grounded in the methodologies of Europe and the East Coast. These men were not reinventing the wheel nor were they taking off on bizarre tangents. They were fairly restrained in proposing new taxa, particularly genera. They saw the relationships to previously described taxa and were as interested in outlining relationships as in demonstrating differences. Taxa were tied to type specimens, with descriptions containing differentiating characters. Moreover, work on fossil and Recent material went on hand in hand.

Figure 3. James Graham Cooper

The next amateur that I would like to feature is Josiah Keep (Figure 4). Although he was a professor at Mills College, he was chiefly a teacher of geology and astronomy, and his work in malacology was as an amateur. His contribution was as a popularizer. The handbooks he published, written in a most engaging manner, were instrumental in interesting the public in malacology. Without them, West American malacology would probably have taken a very different path. He also gave public lectures and a summer marine biology course at Monterey. Such popularizing allowed interested members of the public to believe that science was within their understanding, not the remote territory of high priests.

I will here express my prejudice about what I call the "mystique of the professional," which characterizes many fields, including medicine, law, finance, auto mechanics, and many sciences. This mystique involves maintaining that there is a body of information and technique that is completely beyond the average mortal. Thus, public awareness and participation is undesirable. In the case of such professions as medicine, law, finance, and auto mechanics, the reason is economic. If the public cut through the masquerade, over-paid professionals would have less work. In the case of such sciences as malacology, the excuses are more subtle

Figure 4. Josiah Keep

and have to do with snobbery and the fear that public involvement will mess things up. The exclusionary attitude, however, doesn't help and, in fact, probably makes things worse by promoting uncoordinated, competing activity and the proliferation of inaccurate publications that clutter the literature.

Of course, West Coast malacology had had some less-than-completely-helpful amateurs. I have prepared biographical sketches, bibliographies, and lists of taxa of two amateurs who made extensive collections at least partly for sale. Their publications were not well grounded in science, and the names that they introduced contain a high percentage of synonyms. These were Henry Hemphill (Figure 5), a bricklayer turned professional collector, and Charles Russell Orcutt (Figure 6), collector and magazine editor. Hemphill introduced some 102 names, of which 66% were unavailable or are now regarded as synonyms. None of the names that Orcutt introduced are valid.

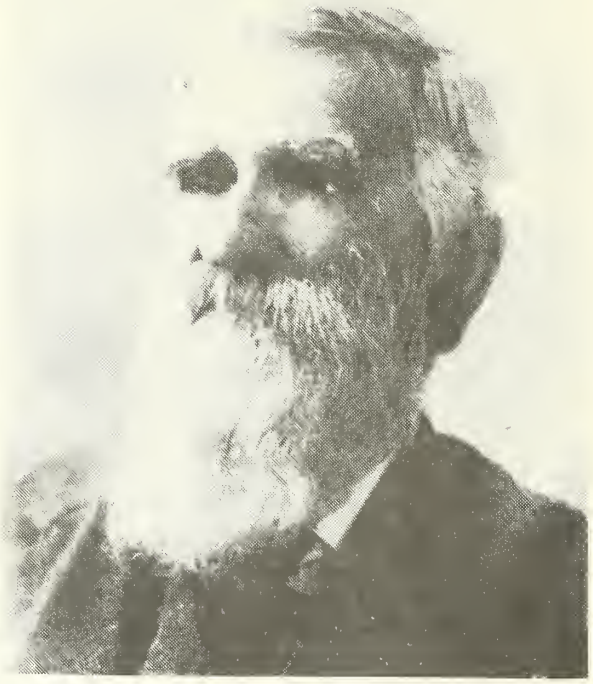

Figure 5. Henry Hemphill

However, their material was mostly well located as to station and was sufficiently extensive to allow a study of variation. It was important in acquisition of West Coast material in institutions throughout the country. This material was relied upon extensively by such professionals as Dall and Pilsbry in their work on the West Coast fauna.

A unique story is that of Ida Oldroyd (Figure 7). She was an amateur in southern California, her husband earning a living in carpentry. She amassed a huge collection, through her own efforts and extensive exchange, and, after her husband retired, she talked Stanford University into acquiring her material, with her as its curator. Her chief contribution, in addition to the collection, was the publication of a set of four volumes that contained original descriptions and new illustrations of the northwest American marine mollusks. Although it was not very carefully or critically prepared, it remained the only comprehensive work on the eastern Pacific fauna for many years. Such major compilations as hers served to put the state of current information in many hands and to stimulate original work.

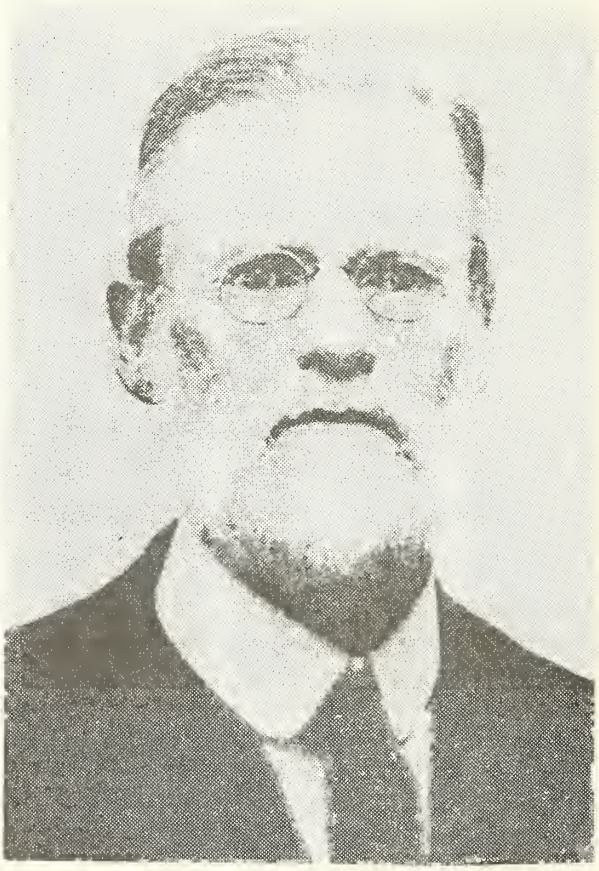

Figure 6. Charles Russell Orcutt

For reasons that I don't fully understand, the amateurs who became involved in the scientific study of malacology on the West Coast have been an unusually productive

bunch. I suspect that this was partly an outgrowth of the custom of sharing and working together that characterizes frontiers generally. For example, some workers started classes for themselves and worked together to produce their own materials. Nothing better illustrates this than the effort of John Q. Burch (Figure 8) in the 1940s to produce a checklist of West Coast mollusks. This effort resulted in a substantive publication that contains much original material and was the product of the combined work of many individuals.

Figure 7. Ida Oldroyd

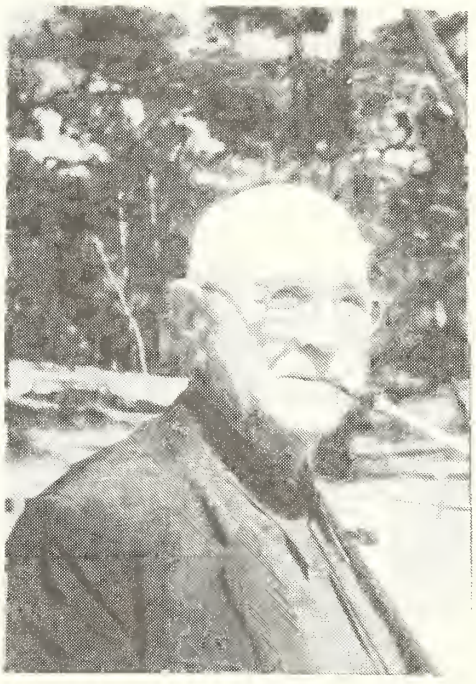

Figure 8. John Q. Burch

Important early workers included: Herbert N. Lowe (Figure 9), a florist, who worked on the fauna of the Panamic province with Pilsbry, and who published some 26 papers and some 167 taxa, most in collaboration with Pilsbry. George Willett (Figure 10), who was variously a policeman, soldier, fisherman, fox farmer, and ornithologist. He published 39 papers and described quite a number of taxa, including several that he collected in southeastern Alaska. A. M. Strong (Figure 11), a mining engineer, published many significant papers and authored quite a number of taxa, many in collaboration with Leo Hertlein. Fred Baker (Figure 12) was a physician, who published a couple of dozen papers. Stillman Berry (Figure 13) of independent means as well as part-time rancher

Figure 9. Herbert N. Lowe

Figure 10. George Willett

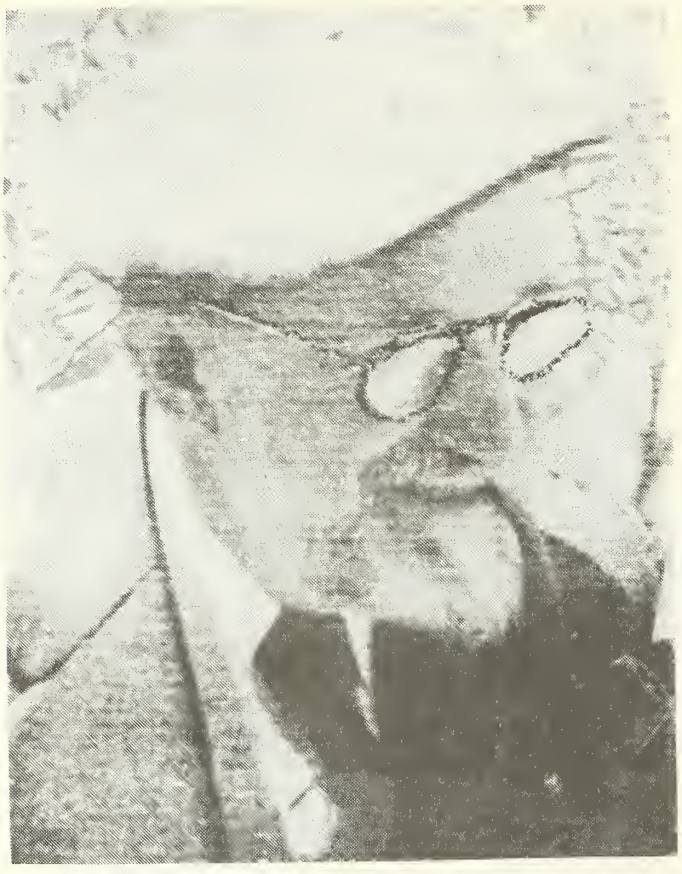

Figure 11. A. M. Strong

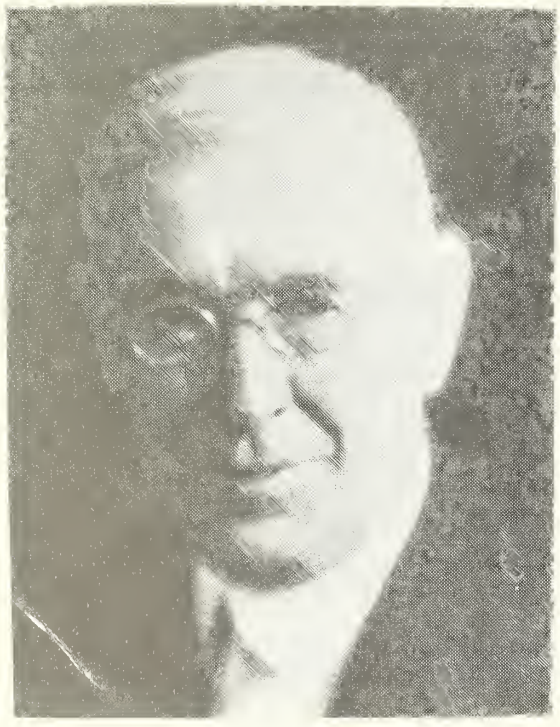

Figure 12. Fred Baker

Figure 13. Stillman Berry

and iris grower, published 209 papers and authored 401 taxa. Wendell Gregg (Figure 14), a physician, published a number of papers on land snails. Allyn Smith (Figure 15) worked most of his life for the phone company and published over 100 papers and many new taxa. Robert Talmadge (Figure 16), who worked for the Pacific Gas & Electric Company as a lineman in the rugged mountains of northwestern California published some 95 papers. Emery and Elsie Chace (Figures 17-18), who had various jobs throughout their lives, he mostly in construction, published some 40 papers. Lorenzo G. Yates (Figure 19), a dentist, and Faye Howard (Figure 20) each published a few articles, but both contributed major scientific collections to the Santa Barbara Museum of Natural History.

Of course, some of this body of work is of high quality, some is not. Some papers are just newsletter notes. Some names are now regarded as synonyms. But, collectively it is a considerable amount of original work.

In more recent years, Myra Keen's book on the tropical eastern Pacific fauna helped to draw many amateurs into malacology, not only because it stimulated collecting in that area but also because it posed many un-

Figure 14. Wendell Gregg

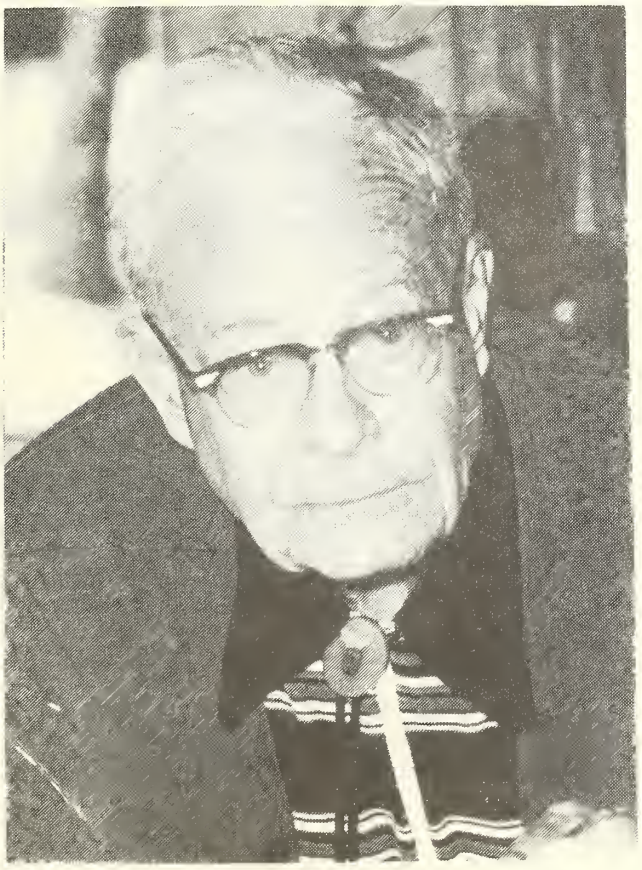

Figure 15. Allyn Smith

Figure 16. Robert Talmadge

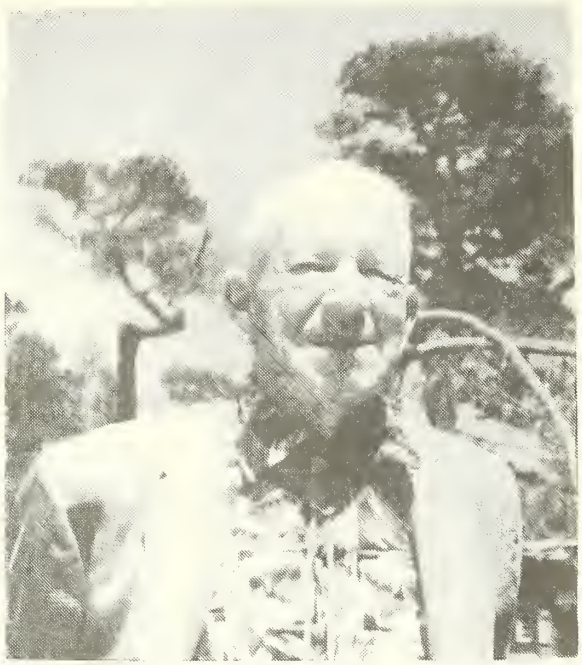

Figure 17. Emery Chace

Figure 18. Elsie Chace

Figure 19. Lorenzo G. Yates

Figure 20. Faye Howard

resolved questions in a way that was approachable by the scholarly non-professional. Other handbooks, such as Jim McLean's pamphlet on the mollusks of southern California, have also helped. As a result, there is a very substantial number of people who went on to make significant contributions through their carefully made collections and their publications, including the recent work of Twila Bratcher on the Terebridae, that of Helen DuShane on the Epitoniidae, the many papers of Don Shasky, LeRoy Poorman, and Carole Hertz on the Panamic fauna, the important collection of Carol Skoglund, the photographic contributions of Bertram Draper and the many contributions of the late Tony Ferreira to the study of chitons.

Several new factors have recently decreased the involvement of amateurs in the science of malacology on the West Coast. Collecting by the public is not permitted in California because of the effect that overcollecting was having on the marine fauna, and this has limited the introduction of young people, drawn by their curiosity about the natural world as well as acquisitiveness, to malacology. In many areas, the marine fauna has been severely depleted because of pollution and habitat destruction. There are shrinking professional resources, with some programs like that at Stanford University shut down completely. With much of the era of descriptive malacology past us, the problems attacked by professionals, and the tools that they use, are more complex. Finally, it has been several years since a major compilation has appeared that poses problems to challenge scholarly amateurs.

Fostering amateur involvement does pay off. It generates collections that may eventually devolve to institutions. With professional interest, the scientific value of these collections can be maximized. Involved amateurs can provide needed financial support for institutions. Amateurs often provide volunteer assistance to museums, almost essential in keeping them going in these days of severely limited budgets. Properly directed, there are volunteer roles for a wide array of persons, from high school students to seasoned, scholarly amateurs. Amateurs, their organizations, and museum volunteers are also important in generating public and political support for institutions. Amateurs are important in helping to disseminate accurate knowledge to the public, and they can provide useful ideas for and assistance in research.

It takes an investment in time, as well as in learning the skills required to adequately manage volunteers and to work with amateurs. The following are a few ideas I've collected from various sources:

(1) Professionals can go out of their way to address public forums, including shell clubs. Their message should be pitched not only to entertain but also to convey the excitement and scientific challenge of the field. Each presentation should include an effort to recruit assistance for their institutions. Learning how to do this well takes some effort. The fascinated high school student of today is tomorrow's professional.

(2) Curators should define a variety of jobs that can be handled by volunteers with different levels of experience and skill. Volunteers cannot be considered slave labor. They seek acceptance, gratitude, companionship, and an opportunity to learn. Writing "volunteer job descriptions" is a useful and educational experience. Time and patience are also needed to train amateurs in curatorial and research methods. A system of museum titles and non-monetary rewards is essential in building skills and maintaining interest.

(3) In everything that professionals and professional-level amateurs write, an effort should be made to explain the basic ideas in a way that nearly everyone can understand, and important unresolved problems should be posed in a manner that challenges the reader.

(4) Although large compilations and handbooks for the public take a considerable effort and may be dissatisfying for perfectionists who want all unsolved problems to be cleared up first, it is important to generate such works from time to time. They handle many questions, promote public knowledge, provide a way to pose

interesting problems for others to work on, and recruit public support.

(5) Professionals should be willing to help amateurs with their publications to ensure their accuracy and to promote their utility. Amateurs and their organizations need to be willing to have such review. Getting a manuscript reviewed critically for the first time can be a traumatic experience, but the benefits of the exercise eventually become clear.

(6) Many professionals reside in a fairly closely defined environment and have never had an opportunity to learn skills in dealing with the public, amateur organizations, and volunteers. These skills can be learned, and it is never too late.

Only by making a conscious effort at the institutional level--in public and private museums and at universities can the involvement of amateurs in malacology be optimized. It is worth the effort, for history shows us that it can pay off. The word "amateur" comes from the Latin word "amator," a lover. Who could have a better reason for engaging in malacology?

ACKNOWLEDGMENTS

I appreciate the help of Donald R. Shasky for providing many of the pictures and David K. Mulliner for preparing black and white prints of most of the photographs.

UPDATE ON MOLLUSKS WITH INDO-PACIFIC FAUNAL AFFINITIES IN THE TROPICAL EASTERN PACIFIC — VIII

BY

DONALD R. SHASKY

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[adapted from a paper presented to the annual meeting of the Western Society of Malacologists, Sonoma State University, July 1988]

This year, I have three species and an additional unidentified juvenile *Peristernia* species to report. Three are from the Galapagos and one from Cocos Island, Costa Rica.

The first is *Tricolia (Hiloa) variabilis* (Pease, 1861). Robert Robertson (1985) considered *T. (H.) variabilis* as the most widespread and abundant *Tricolia* in the Indo-West Pacific. As the name implies, it has a wide range of color patterns, size, and sculpture. Its reported range is from East Africa to Hawaii and French Polynesia. I collected a single specimen from Isla Manuelita, Cocos Island, Costa Rica (Figure 1).

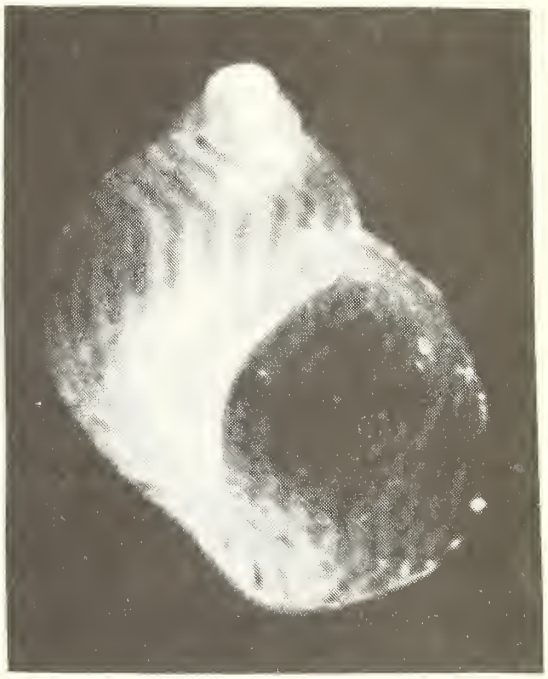

Figure 1. *Tricolia (Hiloa) variabilis* (Pease, 1861). Length: 1.5 mm, taken under dead coral in 13.7 m, Isla Manuelita, Cocos Is., Costa Rica. Leg. D.R. Shasky, Feb. 23, 1988

The second species is *Linatella (Gelagna) succincta* (Linnaeus, 1771). Beu and Cernohorsky (1986) state that the range for this species is from Gabon in West Africa, East Africa, and as far east as Hawaii. While diving in 10-17 meters off Enderby Island, an islet off Floreana Island, Galapagos Islands, I collected a single specimen (Figure 2).

The third species is *Cantharus (Pollia) fumosus* (Dillwyn, 1817). This species is known throughout the Indo-Pacific. I collected two specimens in the Galapagos, one from 10-17 meters off Champion Island and the other in the same depth off Floreana Island (Figure 3).

Illustrated in Figure 4 is what almost certainly is a juvenile specimen of a species of *Peristernia*, a genus previously unknown in the eastern Pacific. I have two specimens of this species, each from a different island in the Galapagos. I am hopeful that someone seeing this illustration will be able to recognize it and supply a name for it.

I thank David K. Mulliner for preparing black and white prints from my slides.

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BEU, ALLEN G. AND WALTER O. CERNOHORSKY
1986. Taxonomy of gastropods of the families Ranellidae (=Cymatiidae) and Bursidae. Part I. Adoption of Ranellidae and review of *Linatella* Gray, 1857. New Zealand Jour. Zool. 13:241-246, 35 figs.

ROBERTSON, ROBERT
1985. Archaegastropod biology and the systematics of the genus *Tricolia* (Trochacea: Trocoliidae) in the Indo-West Pacific. Monog. Marine Mollusca 3:1-103, 96 pls.

Figure 2. *Linatella (Gelagna) succincta* (Linnaeus, 1771). Length: 15.7 mm, taken in 9-15 m under rock, Enderby Is., off Floreana Is., Galapagos Is., Feb. 1988 Leg. D.R. Shasky

Figure 3. *Cantharus (Pollia) fumosus* (Dillwyn, 1817). Length: 7.8 mm, taken in 9-15 m under rock, Champion Is., Galapagos Is., Feb. 1988, Leg. D.R. Shasky

Figure 4. *Peristernia* species. Length: 6.4 mm, taken in 6-12 m, under rock, Floreana Is., Galapagos Is., Feb. 1988, Leg. D.R. Shasky

RECENT FINDINGS OF CHLAMYS HASTATA (SOWERBY, 1843) IN ITS SOUTHERN RANGE LIMIT

BY

G. L. BUCK

2534 Via Pisa, Del Mar, California 92014

The waters off San Diego, California are the southern limit to the geographical range of *Chlamys hastata* (Sowerby, 1843), a pecten usually found in more northerly waters. McLean (1978:69-70) in "Marine Shells of Southern California," gives the distribution as Alaska to San Diego, uncommon, in depths of 60 feet and deeper. I have collected three specimens by scuba in the last several years, all three in the same general area, a rocky habitat. One, a 23 mm brown specimen (Figure 1) was living attached by its byssus under a rock at 95 foot depth. Another 15 mm brown specimen was taken fresh dead at 100 feet (Figure 1), and the last, a 43 mm, beautiful bright orange specimen (Figure 2) was found sandwiched in a crack on a deep water reef at 85 feet along with *Crassadoma gigantea* (Gray, 1825), *Chama arcana* Bernard, 1976, strawberry anemones, sponges and multitudes of other invertebrates--a very fertile area. Incidentally, the orange *C. hastata* was covered with an orange sponge growth which was removed very easily with a short bleach soak and a soft brush.

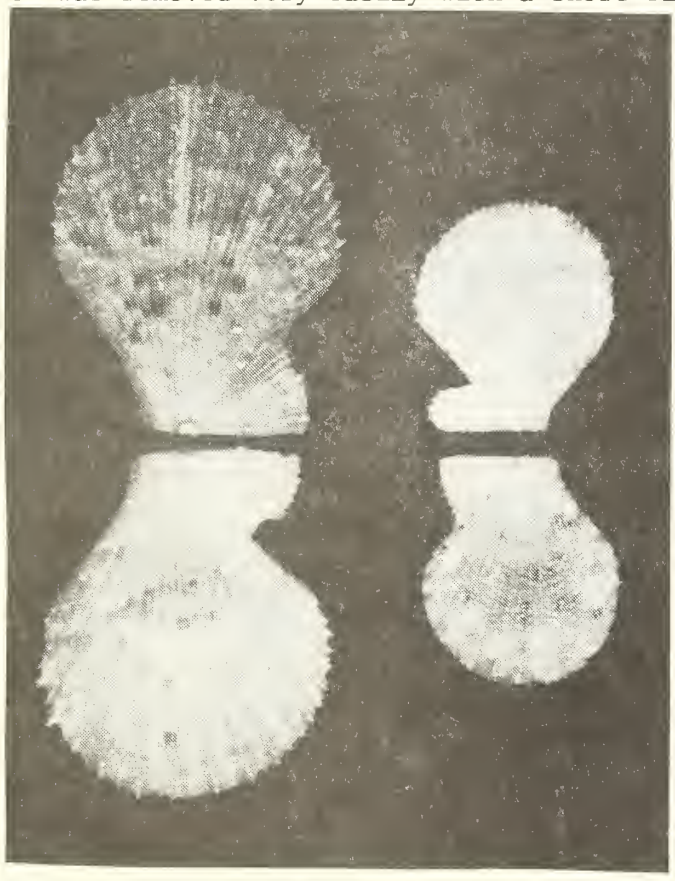

Figure 1. *Chlamys hastata* (Sowerby, 1843), Left: 23 mm in length collected in 95 feet, Right: 15 mm in length, collected empty in 100 feet of water Photo: D.K. Mulliner

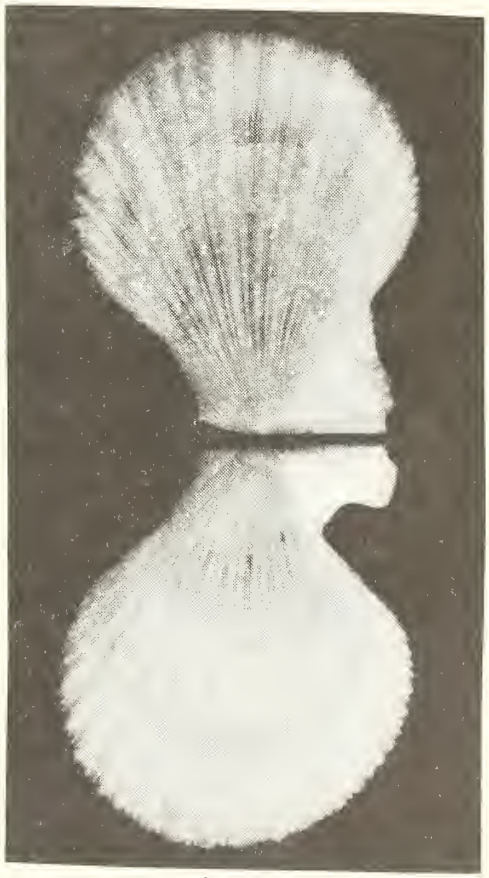

Figure 2. *C. hastata*, 43 mm in length collected in 85 feet of water Photo: D.K. Mulliner

On this same dive I also found my main objective, *Haliotis rufescens* Swainson, 1822, up to 255 mm. Also seen in this area were *H. sorenseni* Bartsch, 1940; *H. assimilis* Dall, 1868; and *H. walallensis* Stearns, 1899; all far from common now and in need of protection.

On subsequent dives in this area during September 1988, Kim Hutsell and I found eight more specimens of *C. hastata*. They were mostly found covered with sponge, attached by byssus on tops of rocks in 90 to 110 feet of water.

I would be interested to find out if others have collected *C. hastata* to the south in Mexican waters off the Santo Tomas area, where cooler California current waters might be more the typical habitat of this temperate water species.

ACKNOWLEDGMENT

I would like to thank Dave Mulliner for photographing the specimens of *C. hastata*.

THE SANTA BARBARA MUSEUM OF NATURAL HISTORY ANNOUNCES A POSITION IN MALACOLOGY

The Santa Barbara Museum of Natural History is seeking a qualified malacologist to fill the new Howard/Berry Endowed Chair of Malacology. The person hired for this full-time position will receive a salary of from $25,000-27,000 (depending on qualifications and experience) plus benefits and will report to the Head of the Department of Invertebrate Zoology.

Candidates are required to have a PhD in biology/zoology with dissertation in malacology or related field of invertebrate zoology with demonstrated capability in malacology research (preferably with specialization in systematics of marine or terrestrial mollusks). Prior experience with fauna of eastern Pacific Ocean or western North America and experience in museum techniques and management of invertebrate collections is required as well as computer and database management skills and proven record or potential for grantsmanship.

The responsibilities of the full-time, regular, exempt position include management of portions of the Museum's mollusk and invertebrate collections; collection based research in malacology and related aspects of systematics and natural history of invertebrates; assisting in routine operation and management of the department; preparing funding proposals to granting agencies for collection support and research programs; participating in public education and exhibition programs, and serving as resource for information to the community at large.

Applications will be reviewed beginning 30 October with the position remaining open until filled.

A letter of application along with resume; names, addresses and telephone numbers of three references; outline of research interests and goals; and sample of published materials should be sent to:

Dr. F.G. Hochberg, Assistant Director
Collections and Research Division
Santa Barbara Museum of Natural History
2559 Puesta del Sol Road
Santa Barbara, CA 93105
(805) 682-4711

THE FESTIVUS

A publication of the San Diego Shell Club

ISSN: 0738-9388

Volume: XX | November 10, 1988 | Number: 11

MEMBERSHIP AND SUBSCRIPTION

Annual dues are payable to San Diego Shell Club. Single member: $10.00; Family membership: $12.00; Overseas (surface mail): $12.00. Address all correspondence to the San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111 Single copies of this issue: $5.00. Postage is additional

Meeting date: third Thursday, 7:30 P.M., Room 104, Casa Del Prado, Balboa Park

The Festivus is published monthly except December. The publication date appears on the masthead above.

PROGRAM

MARINE MOLLUSKS OF THE PLIOCENE OF SAN DIEGO

Mr. Tom Demere, Collections Manager of the Department of Paleontology of the San Diego Natural History Museum, will present an illustrated program on the Pliocene mollusks of the San Diego area in relation to the Recent mollusks. He will discuss recent extinctions and the evolution of mollusks touching on their paleoenvironments and paleoecology. In addition to the slides, Mr. Demere will have display specimens.

MINI-PROGRAM

Carole and Jules Hertz will give a brief slide show on the recent annual meeting of the Western Society of Malacologists

Meeting date: November 17, 1988

CONTENTS

A SUPPLEMENT OF THE FESTIVUS VOLUME XX TO BE PUBLISHED THIS MONTH

THE FESTIVUS is publishing a supplement for 1988 (volume 20) entitled, "An Illustrated Catalogue of the Family Typhidae Cossmann, 1903 (Gastropoda: Muricacea)" by Anthony D'Attilio and Carole M. Hertz containing over 73 pages of information on the family with over 109 drawings by the senior author illustrating shell morphology and radula characters for this group of gastropods.

The paper contains two catalogues enumerating nominal taxa in the Typhidae; one of the described fossil and Recent genera and the other of the fossil and Recent species.

The Supplement will be received by all paid members and will be available to non-members (and those not members in 1988) at a cost of $11.00 domestic, $12.00 overseas surface mail, and $15.50 overseas air mail. To order, send your check to The San Diego Shell Club at the address shown on the cover page of this issue.

CLUB NEWS

THE CLUB'S ANNUAL CHRISTMAS DINNER PARTY -- DECEMBER 3, 1988

As noted in the October issue, arrangements have been completed for the annual Christmas party. It will be held in the San Diego Room of the Admiral Kidd Club (see map on last page) with no host cocktails beginning at 6:00 P.M. and dinner at 7:00 P.M.

Two dinner choices are available: Roast prime rib of beef (English cut with au jus) and baked potato at $14.50 and Fillet of sole stuffed with crab served with wild rice at $13.60. Both include tossed salad, vegetable and coffee or tea. Tax and gratuity are included and our Club provides complimentary dinner wine.

Reservations must be received not later than the November Club meeting (November 17th) and the first fifty reservations are those which can be accepted.

Following dinner and the program, the Club will hold its traditional shell exchange. Bring your gift wrapped shell to place under the tree. Place data and name inside the package only. On the outside put on only the general locale i.e. Pacific, Caribbean, etc. Numbers will be drawn and those bringing a shell gift will choose one from under the tree.

There will be dancing in the main room throughout the evening.

It will be a great party, as usual. So come and welcome in the season with your friends. Guests are welcome.

FROM THE MINUTES - SAN DIEGO SHELL CLUB MEETING - OCTOBER 20, 1988

Craig Cary, a doctoral candidate at Scripps and an accomplished photographer presented the program with the amusing title, "Waiter, There's a Bug in my Clam." It was a five-star presentation. Craig delivered a vivid and comprehensive program on the aquatic life forms and communities which flourish near deep sea hydrothermal vents. Craig's authoritative account of exploratory dives in submersibles some 4,500 meters down in the Marianas Trench was illustrated by a collection of incredible slides revealing an eerie underwater 'moonscape' and sulfide clouds rising from violent submarine hot springs. Club members were treated to rare pictures of biomass communities which thrive in a seemingly hostile and toxic environment. Craig explained that the clams, *Calyptogena magnifica*, are unique bivalves reaching up to 12 inches in length and weighing up to 3½ pounds with highly specialized blood, no gut and no digestive tract. The chemosynthetic bacteria reside within the gills, taking hydrogen sulfide and oxidizing it. When dissected the clams are revealed to contain a tremendous amount of hemoglobin.

During the business portion of the meeting the slate of officers for 1989 was presented: President; Larry Buck, Vice President; Bob Yin, Record. Sec'y; Wayne Reed, Corres. Sec'y; Richard Negus, Treasurer; Margaret Mulliner. Nominations from the floor will be accepted at the November meeting prior to the election of officers.

Margenette and Arthur Yeend and Debbie and Larry Catarius provided the delicious cookies and Sherry Valli won the door prize.

Wayne Reed

DEEP WATER SHELLS FROM OFF ISLA SMITH, BAHÍA DE LOS ANGELES, BAJA CALIFORNIA, MEXICO

BY

CAROL SKOGLUND

3846 E. Highland, Phoenix, Arizona 85018

Bahía de los Angeles, Baja California, Mexico, is located on the Gulf of California. Three major papers have described the area and reported a combined total of 603 species of mollusks.

McLean (1961) listed 405 species taken intertidally by several collectors. Coan (1978) reported 177 identifiable species as a result of 161 samples taken with an orange peel grab at depths to 49 m, including 67 previously reported by McLean. Poorman & Poorman (1978) added 160 species to the known total.

Roy and Forrest Poorman, with Carl and Laura Shy, collected intertidally and by dredging to 30 m. *Chaetopleura shyana* Ferreira, 1983 was collected intertidally at Isla La Pata in the bay by the Shys (Ferreira, 1983) and *Lepidozona stohleri* Ferreira, 1985, was dredged by them at 12 to 36 m (Ferreira, 1985).

In addition, several species of nudibranchs have also been reported from Bahía de los Angeles in the past few years, including *Hypselodoris californiensis* (Bergh, 1879) [Bertsch, 1978]; *Polycerella glandulosa* Behrens & Gosliner, 1988; *Bajaeolis bertschi* Gosliner & Behrens, 1986; and *Tritonia pickensi* Marcus & Marcus, 1967 [Bertsch & Gosliner, 1984].

In May 1980, November 1981 and again in April 1988, my husband Paul and I camped at Punta La Gringa at the northern end of the bay and dredged off nearby Isla Smith. We used a 14-foot aluminum boat and a small dredge made of angle iron and hardware cloth.

In the channel off the northwestern end of Isla Smith (113°34'W, 29°6'N) we found an area of swift currents and 183 m (600 ft.) deep water. The amount of line required for dredging is normally about three times the depth being dredged. At 30.5m (100 ft.), using 300 feet of line, we can feel when the dredge hits the bottom, and there is a "bumping" feel on the line as the boat goes forward to pull the dredge along the bottom. As the water gets deeper and more line is needed, both the stretch in the line and the currents make this "bumping" harder to feel. At 183 meters with all 1,500 feet of line out, "feel" was completely gone. We adopted the method of stopping the boat to let the dredge and line settle to the bottom, then going slowly forward, hoping the dredge was still on the bottom. By repeating this "grab" method we got a small amount of material in the dredge each haul. This was usually less than a cupful of small, very black rocks with traces of mud and a few shells.

The three trips produced a total of 73 species from the 183 meter depth. Forty-two species were live taken. Thirty-one were taken only as empty shells that could have washed in from other areas. Thirteen of the species we took had been previously reported from Bahía de los Angeles. Fourteen species could not be identified. Included in this unusually large number of unidentified species are a *Cyclocardia* that is probably undescribed (fide Coan) (Figure 1), a shell that comes close to being a *Caducifer* but without the distinct posterior notch of that genus (Figure 2) and a *Pseudochama* that doesn't seem to match any of the currently known species (Figure 3). Three of the other unnamed species have also been taken by us in other parts of the Gulf of California. These are the *Crucibulum* (Figure 4), the *Pyramidella* (Figure 5), and the *Rictaxis* (Figure 6).

As a result of this dredging, Ferreira (1984) described *Ischnochiton carolianus*, and the ranges of *Pteropurpura macroptera* (Deshayes, 1839) and *Favartia mildredae* (Poorman, 1980) were extended to Bahía de los Angeles (Skoglund, 1983). Coan (1988) reported *Semele craneana* Hertlein and Strong, 1949 from the same material.

In the systematic account that follows, range extensions are designated by asterisks. *Ventricolaria fordi* (Yates, 1890) (Figure 7) and *Pteropurpura macroptera* (Deshayes, 1839) (Figure 8) are new to the Panamic Province. Ten other species represent range extensions within the Panamic Province. Previously known ranges of these species are included and the author cited. These include *Phenacolepas puntarene* (Figure 9) and *Trophon cf. cerrosensis* (Figure 10). Identifying numbers from Keen (1971) are used where available.

I would like to acknowledge the help of the late Dr. Antonio Ferreira and to thank Dr. Eugene V. Coan and Mrs. Barbara W. Myers for assistance with some of the identifications. Photographs are by Paul Skoglund except for Figure 8 which was taken by Dave Mulliner for a previous paper.

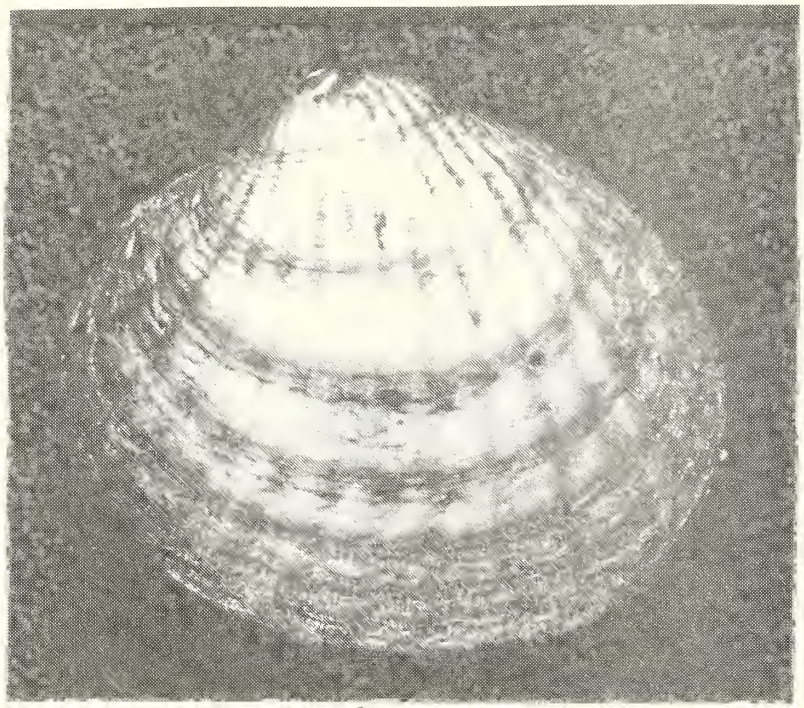

Figure 1. *Cyclocardia* sp. 9 mm

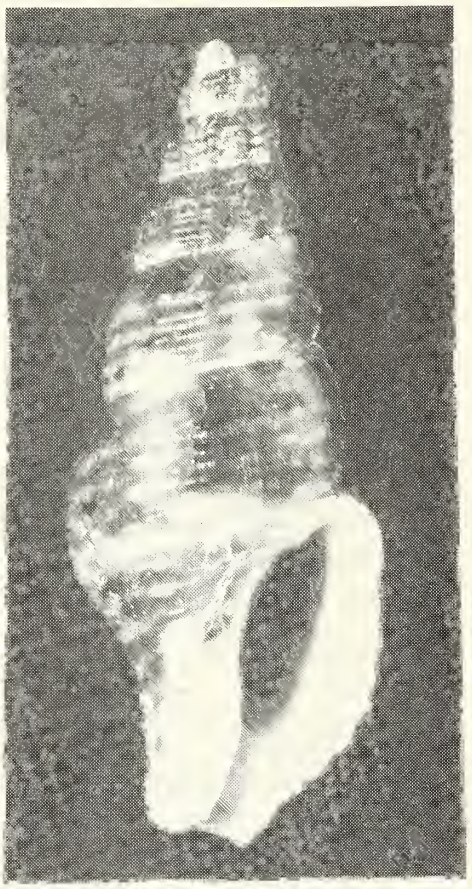

Figure 2. ? *Caducifer* 18 mm

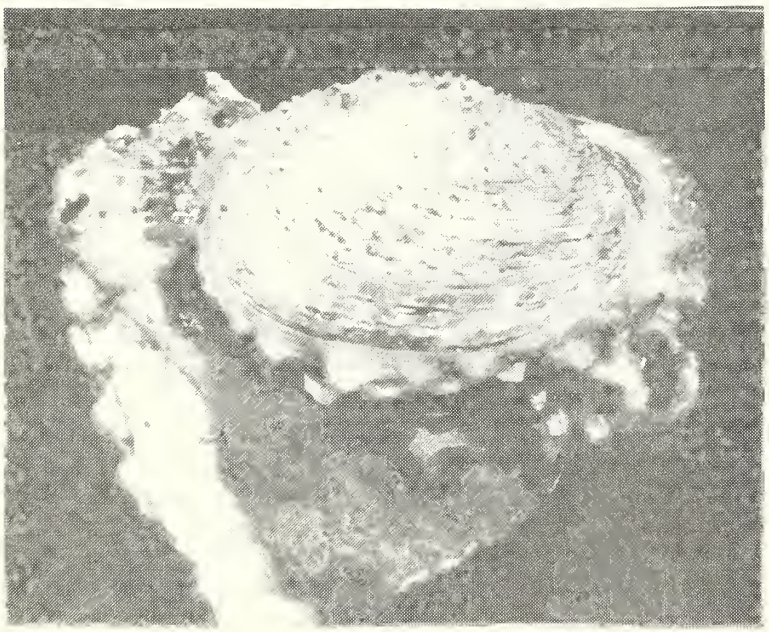

Figure 3. *Pseudochama* sp. 16 mm

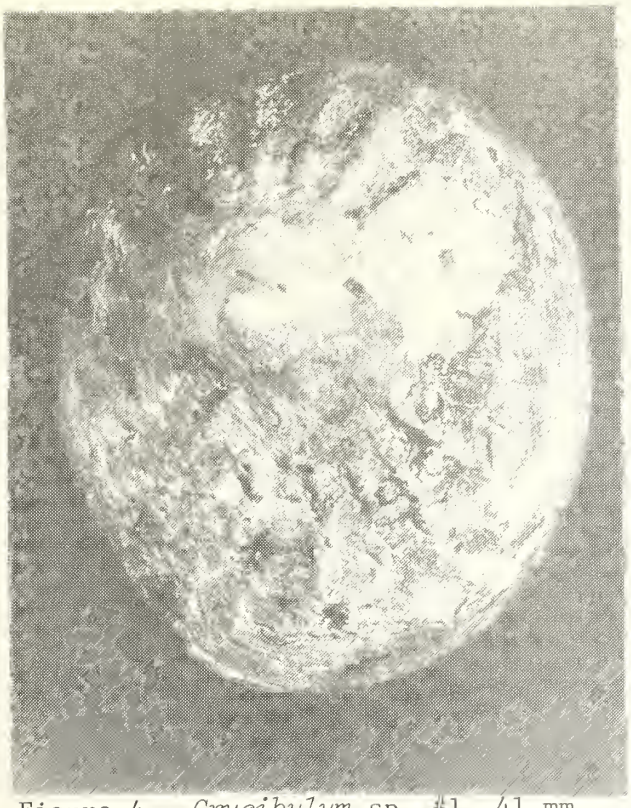

Figure 4. *Crucibulum* sp. #1, 41 mm

Figure 5. *Pyramidella* sp. 13 mm

Figure 6. *Rictaxix* sp. 8.5 mm

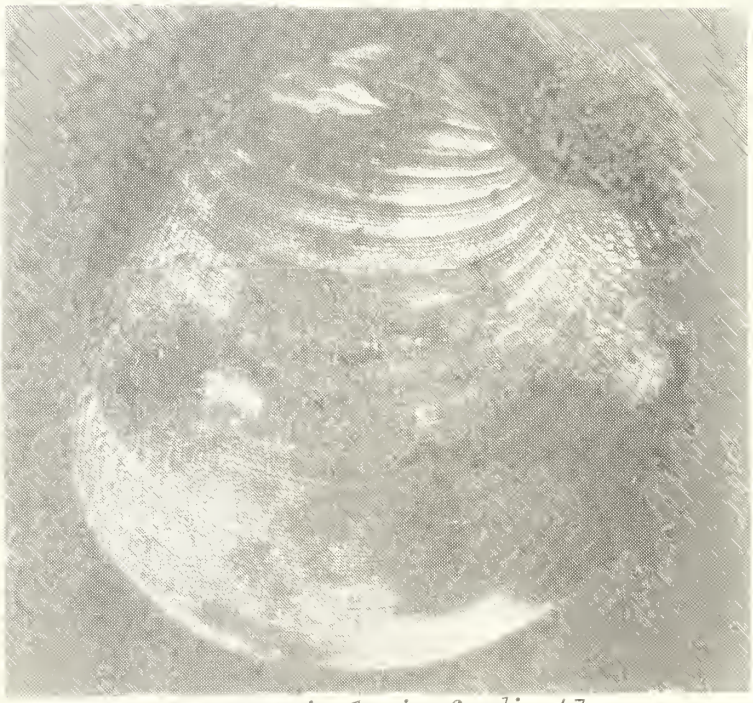

Figure 7. *Ventricolaria fordi*, 47 mm

Figure 8. *Pteropurpura macroptera*, 37 mm
Photo: D. Mulliner

Figure 9. *Phenacolepas puntarene*, 3 mm

Figure 10. *Trophon* cf. *cerrosensis*, 37 mm

BIVALVIA

30	*Nuculana (Thestyleda) hamata* (Carpenter, 1864)	1 valve
117	*Glycymeris cf strigilata*	10 live juveniles
	G. sp. (unidentified)	1 live specimen
137	*Megacrenella columbiana* (Dall, 1897)	1 valve
151	*Modiolus americanus* (Leach, 1815)	1 valve
154	*Amygdalum palladium* (Dall, 1916)	2 live specimens
177	*Pecten sericeus* Hinds, 1845	2 live juveniles
187	*Cyclopecten exquisitus* Grau, 1959	1 live, 4 valves
190	*C. pernomus* (Hertlein, 1935)	1 live, 2 valves
	Also dredged nearby at 14 m	
236	*Tellidorella cristulata* Berry, 1963	1 valve
	Cyclocardia sp. (probably undescribed)	8 live, several valves
277	*Lucina leucocymoides* (Lowe, 1935)	7 valves
*289	*Lucinoma annulata* Reeve, 1850	5 valves
	Range: A northern species that reaches its southern limit in the Gulf of California (Keen, 1971); 33N-60N (Bernard, 1983); off San Carlos Bay, Sonora, Mexico (Poorman & Poorman, 1988)	
291	*Diplodonta inezensis* (Hertlein & Strong, 1947)	5 valves
	Pseudochama sp. (unidentified)	2 live & valves
*	*Ventricolaria fordi* (Yates, 1890)	1 valve
	Range: Monterey Bay, California to Isla San Geronimo, N. Baja California (McLean, 1978)	
*403	*Pitar perfragilis* Pilsbry & Lowe, 1932	18 live specimens
	Range: San Juan del Sur, Nicaragua (Keen, 1971); off San Carlos Bay, Sonora, Mexico (Poorman & Poorman (1988). Also dredged nearby at 14 m	
	Tellina (Merisca) sp. (unidentified)	3 live specimens
*570	*Psammotreta mazatlanica* (Deshayes, 1855)	1 live
	Range: Mazatlán, Sinaloa, Mexico to Ecuador (Keen, 1971)	
628	*Semele craneana* Hertlein & Strong, 1949	1 valve
	Range: Southern end of the Gulf of California and off Isla Clarion (Keen, 1971); 18N-26 N (Bernard, 1983); off San Carlos Bay, Sonora, Mexico (Poorman & Poorman (1988)	
651	*Semele venusta* (Reeve, 1853, *ex* A. Adams MS)	2 live, several valves
	Also dredged nearby at 14 m	
687	*Corbula ira* Dall, 1908	40 live specimens
764	*Cyathodonta cf dubiosa* Dall, 1915 (*fide* Coan)	2 valves
	Bushia n. sp. (Coan *in litt*)	2 specimens, 2 valves
786	*Plectodon scaber* Carpenter, 1864	4 live, 2 dead

GASTROPODA

71	*Solariella peramabilis* Carpenter, 1864	12 live, several dead
* 171	*Phenacolepas puntarene* (Mörch, 1860)	2 live
	Range: Puntarenas, Costa Rica (Keen, 1971)	
420	*Architectonica nobilis* Röding, 1798	1 live, 1 dead juvenile
443	*Turritella cf parkeri* McLean, 1970	15 dead specimens
	Alabina sp. (unidentified)	3 dead
623	*Asperiscala lowei* (Dall, 1906)	1 dead
655	*Nitidiscala politum* (Sowerby, 1844)	2 dead
751	*Niso lomana* Bartsch, 1917	4 live
799	*Calyptraea conica* Broderip, 1834	10 live, 5 dead

806	*Cheilea cepacea* (Broderip, 1834)	1 dead
* 823	*Crucibulum monticulus* Berry, 1969	2 dead
	Range: Mazatlán to the Gulf of Tehuantepec, Mexico (Keen, 1971); off San Carlos Bay, Sonora, Mexico (Poorman & Poorman, 1988)	
	Crucibulum sp. 1 (unidentified)	2 dead
	Crucibulum sp. 2 (unidentified)	1 dead
877	*Polinices intemeratus* (Philippi, 1853)	9 live
	Also dredged nearby at 14 m	
954	*Cymatium corrugatum amictum*(Reeve, 1844)	2 dead juveniles
*	*Favartia (Murexiella) mildredae* (Poorman, 1980)	1 live
	Range: Guaymas, Sonora, Mexico (Poorman, 1980)	
1037	*Pteropurpura centrifuga* (Hinds, 1844)	1 live, 1 dead
*	*P. macroptera* (Deshayes, 1839)	1 live
	Range: Monterey, California to Bahía Todos Santos, outer coast of Baja California (McLean 1978)	
*1044	*Trophon (Austrotrophon) cf cerrosensis* Dall, 1891	1 live
	Range: off Isla Cedros, Baja California to Acapulco, Mexico (Keen, 1971)	
	?Caducifer sp. (unidentified)	1 live, 2 dead
1273	*Strombina (Sincola) gibberula* (Sowerby, 1832)	1 live
	Nassarius sp. (unidentified)	3 dead
	Fusinus turris Valenciennes, 1832	1 live
1344	*Fusinus (Barbarofusus) colpoicus* Dall, 1915	9 live, 6 dead
*	*Fusinus sonorae* Poorman, 1981	1 dead
	Range: Guaymas, Sonora area and Isla Partida, Baja California (Poorman, 1981)	
1457	*Agatrix strongi* (Shasky, 1961)	1 live
1602	*Kylix zacae* Hertlein & Strong, 1951	2 live, 5 dead
1626	*Drillia berryi* McLean & Poorman, 1971	5 live
1643	*Bellaspira melea* Dall, 1919	4 live
	Also dredged nearby in 24 m	
1647	*Polystira nobilis* (Hinds, 1843)	8 live, 3 dead
1655	*Cochlespira cedonulli* (Reeve, 1843)	1 dead
1714	*Lioglyphostoma ericea* (Hinds, 1843)	1 live, 2 dead
1769	*Mitrolumna mitriformis* (Shasky, 1961)	1 live
1784	*Glyphostoma thalassoma* (Dall, 1908)	4 live, 5 dead
1785	*G. candida* (Hinds, 1843)	1 live, 4 dead
	Also dredged nearby in 24 m	
	Pyramidella (Pharcidella) sp. (unidentified)	3 live
	Iselica sp. (unidentified)	3 live
2230	*Acteon traskii* Stearns, 1897	2 dead
*	*Rictaxis* sp. (unidentified)	1 dead
*2262	*Cylichna atahualpa* (Dall, 1908)	1 dead
	Range: Gulf of Panama (Keen, 1971)	

POLYPLACOPHORA

	Leptochiton nexus Carpenter, 1864	4 live
	Ischnochiton carolianus Ferreira, 1984	4 live
	Lepidozona stohleri Ferriera, 1985	2 live
	L. sp. (unidentified)	2 live

SCAPHOPODA

3	*Dentalium oerstedii* Mörch, 1860	20 dead
9	*Tesseracme hancocki* (Emerson, 1956)	2 dead
	Also found nearby in 14 m	
17	*Siphonodentalium quadrifissatum* (Pilsbry & Sharp, 1898)	10 dead
	Graptacme sp. (unidentified)	2 dead

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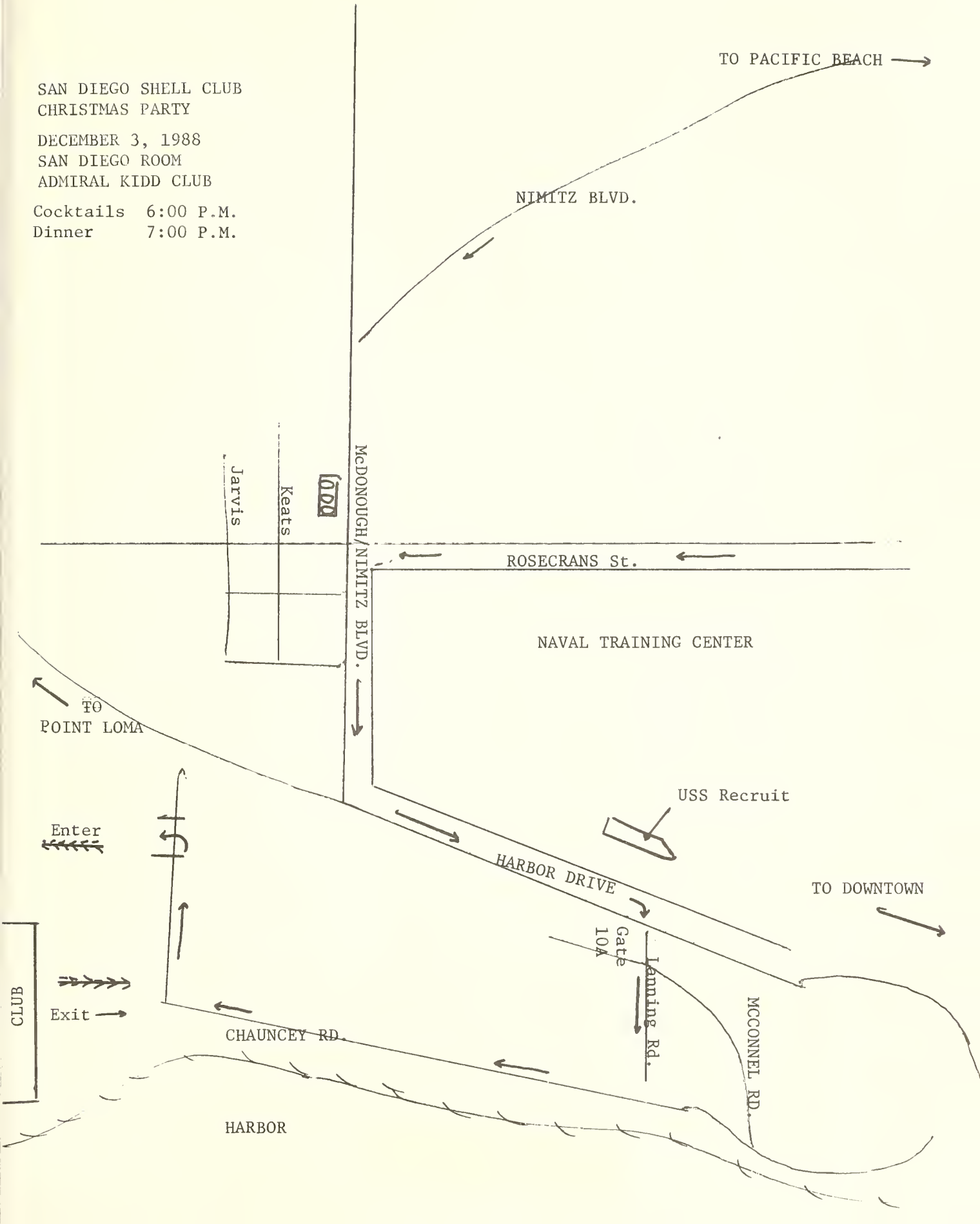
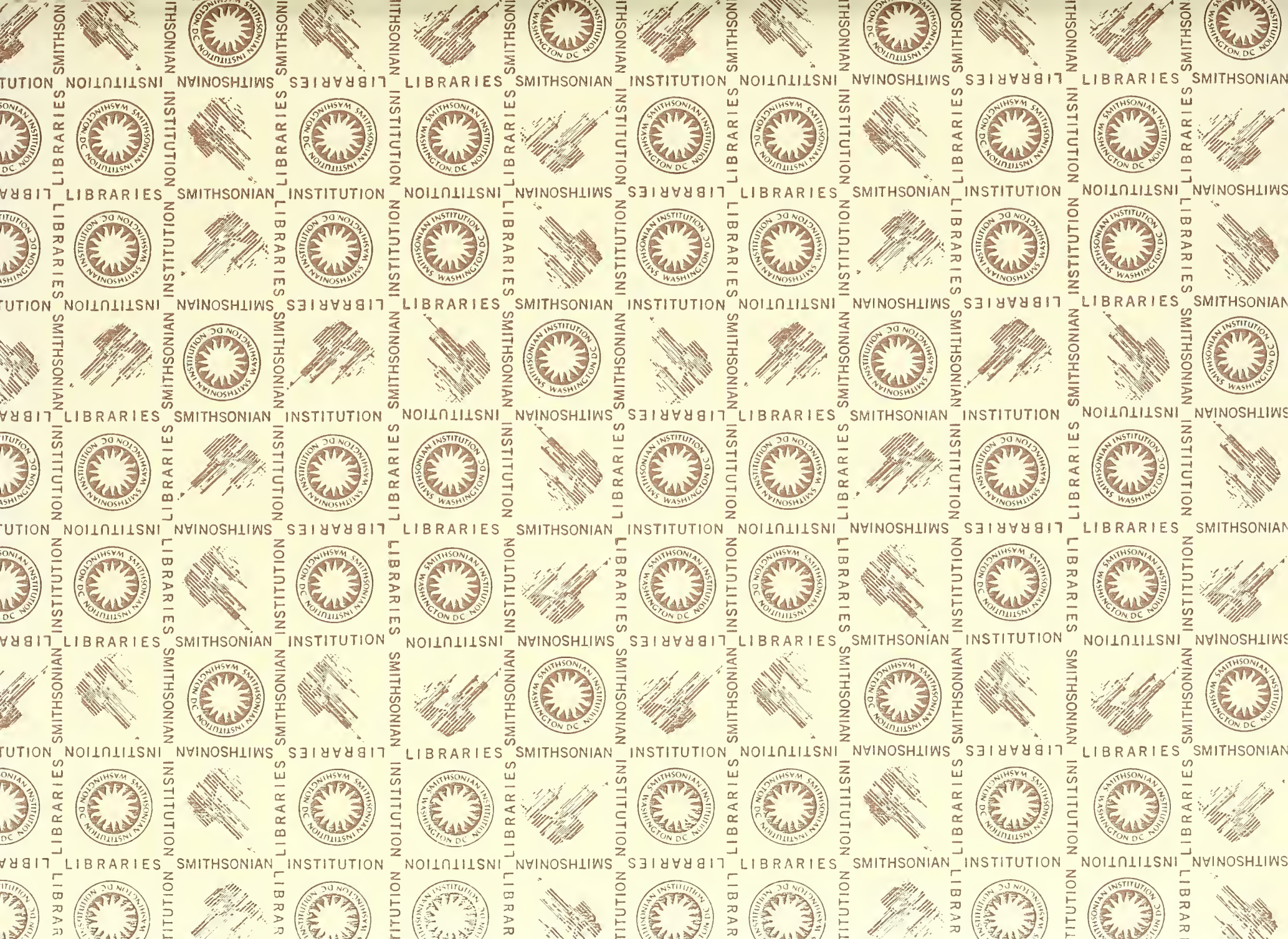
A SELECTED INDEX TO VOLUME XX (1988)

SAN DIEGO SHELL CLUB
CHRISTMAS PARTY

DECEMBER 3, 1988
SAN DIEGO ROOM
ADMIRAL KIDD CLUB

Cocktails 6:00 P.M.
Dinner 7:00 P.M.

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