



The Marine Mollusks of  
Easter Island (Isla de Pascua)  
and Sala y Gómez

HARALD A. REHDER

SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 289

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## ABSTRACT

Rehder, Harald A. The Marine Mollusks of Easter Island (Isla de Pascua) and Sala y Gómez. *Smithsonian Contributions to Zoology*, number 289, 167 pages, 15 figures, 14 plates, 1 table, 1980.—As the result of the study of over 7000 specimens, about half of them personally collected during two weeks on Easter Island and the remainder borrowed from or examined in museums and other institutions, the presence of 133 species of marine and halophilic mollusks is recorded from Easter Island. Only three species (all common on Easter Island) are recorded from Sala y Gómez. Of these 133 species, 18 are identified only to genus or family because they are represented by material too insufficient or too imperfect on which to base a description, or because their taxonomy is still under study. There are 48 endemic species, a 42 percent endemism, which would seem to justify Schilder's proposal of a distinct Rapanian biogeographical province for Easter Island and Sala y Gómez. The faunal relationships are primarily closest to Hawaii and secondarily to Pitcairn-Rapa-Kermadec-northern New Zealand, a pattern that may point to these three areas—Hawaii, Easter Island, and Pitcairn-Kermadec—as relicts of a former, more widely distributed fauna. Following the introductory, descriptive, and analytical sections, the 133 species, assigned to 65 families, are recorded or described. The majority of species are figured. Forty species and two subspecies are described as new, and three new genera are proposed.

An addendum presents revisions occasioned by the appearance of a paper that includes significant new knowledge of the mollusks of Hawaii.

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# Contents

	<i>Page</i>
Introduction .....	1
Acknowledgments .....	3
History of Knowledge of Molluscan Fauna .....	4
Materials Studied .....	6
Ecological Observations .....	8
Easter Island .....	8
Sala y Gómez .....	10
Faunal Analysis .....	11
Endemicity .....	12
Relationships .....	12
Account of Species .....	15
Class POLYPLACOPHORA .....	16
Family MOPALIIDAE Dall, 1889 .....	16
Class GASTROPODA .....	16
Family FISSURELLIDAE Fleming, 1822 .....	16
Family TROCHIDAE Rafinesque, 1815 .....	18
Family STOMATELLIDAE Gray, 1850 .....	20
Family NERITIDAE Lamarck, 1812 .....	21
Family LITTORINIDAE Gray, 1840 .....	25
Family RISSOIDAE Gray, 1847 .....	26
Family ASSIMINEIDAE H. and A. Adams, 1856 .....	30
Family ORBITESTELLIDAE Iredale, 1917 .....	31
Family CAECIDAE Gray, 1850 .....	31
Family ARCHITECTONICIDAE Gray, 1850 .....	32
Family DIASTOMIDAE Cossman, 1985 .....	33
Family CERITHIIDAE Fleming, 1822 .....	34
Family CERITHIOPSIDAE H. and A. Adams, 1854 .....	40
Family TRIPHORIDAE Gray, 1847 .....	41
Family VERMETIDAE Rafinesque, 1815 .....	47
Family PLANAXIDAE Gray, 1850 .....	48
Family EPITONIIDAE Berry, 1910 (1812) .....	51
Family JANTHINIDAE Leach, 1823 .....	52
Family EULIMIDAE Philippi, 1853 .....	53
Family STILIFERIDAE H. and A. Adams, 1853 .....	57
Family HIPPONICIDAE Troschel, 1861 .....	58
Family CREPIDULIDAE Fleming, 1822 .....	61
Family FOSSARIDAE Troschel, 1861 .....	62
Family STROMBIDAE Rafinesque, 1815 .....	63
Family NATICIDAE Forbes, 1838 .....	64
Family TRIVIDAE Troschel, 1863 .....	66
Family CYPRAEIDAE Rafinesque, 1815 .....	66



	<i>Page</i>
Family CASSIDAE Latreille, 1825 .....	68
Family MURICIDAE Rafinesque, 1815 .....	69
Family CORALIOPHILIDAE Chenu, 1859 .....	75
Family COLUMBELLIDAE Swainson, 1840 .....	76
Family BUCCINIDAE Rafinesque, 1815 .....	80
Family NASSARIIDAE Iredale, 1916 (1840) .....	82
Family MITRIDAE Swainson, 1831 .....	83
Family MARGINELLIDAE Fleming, 1828 .....	85
Family TURRIDAE Swainson, 1840 .....	86
Family CONIDAE Rafinesque, 1815 .....	90
Family TEREBRIDAE Mörch, 1852 .....	92
Family PYRAMIDELLIDAE Gray, 1840 .....	94
Family RETUSIDAE Thiele, 1926 .....	95
Family SMARAGDINELLIDAE Thiele, 1925 .....	96
Family SIPHONARIIDAE Gray, 1840 .....	97
Family TRIMUSCULIDAE Burch, 1945 (1840) .....	98
Family ELLOBIIDAE H. and A. Adams, 1855 (1824) .....	100
Family JULIIDAE Dall, 1898 (1871) .....	102
Family APLYSIIDAE Rafinesque, 1815 (1809) .....	103
Family NOTARCHIDAE Eales and Engel, 1935 .....	103
Family UMBRACULIDAE Dall, 1889 .....	104
Family PLEUROBRANCHIDAE Menke, 1828 (1822) .....	105
Family DORIDIDAE Rafinesque, 1815 .....	106
Class BIVALVIA .....	106
Family NUCULIDAE Gray, 1824 .....	106
Family ARCIDAE Lamarck, 1809 .....	106
Family MYTILIDAE Rafinesque, 1815 .....	107
Family MALLEIDAE Lamarck, 1819 .....	108
Family PECTINIDAE Rafinesque, 1815 .....	109
Family LIMIDAE Rafinesque, 1815 .....	109
Family LUCINIDAE Fleming, 1828 .....	110
Family LASAEIDAE Gray, 1847 .....	111
Family CHAMIDAE Lamarck, 1809 .....	112
Family SEMELIDAE Stoliczka, 1870 (1825) .....	112
Family TELLINIDAE Blainville, 1814 .....	113
Family HIATELLIDAE Gray, 1824 .....	113
Family TEREDINIDAE Rafinesque, 1815 .....	114
Class CEPHALOPODA .....	114
Family OCTOPODIDAE Rafinesque, 1815 .....	114
Species Advectitious or Erroneously Ascribed to Easter Island .....	115
Family TROCHIDAE Rafinesque, 1815 .....	115
Family LITTORINIDAE Gray, 1840 .....	115
Family NASSARIIDAE Iredale, 1916 .....	115
Family ARCIDAE Lamarck, 1809 .....	115
Family PECTINIDAE Rafinesque, 1815 .....	116
Addendum .....	117
Literature Cited .....	118
Plates .....	133
Index .....	158

# The Marine Mollusks of Easter Island (Isla de Pascua) and Sala y Gómez

*Harald A. Rehder*

## Introduction

Since 1957 I have been involved in a study of the littoral marine mollusks of Polynesia. Although I have given an outline of my research project in several previous papers (Rehder, 1964; 1971; 1974) I feel it is well to summarize here the main aspects of my study since they introduce the reasons for selecting Easter Island and Sala y Gómez as the object of my first report in depth on the Polynesian fauna.

When I started this study I chose as the geographic framework for the Polynesian fauna Schilder's "Polynesian Region" (Schilder, 1938-1939:219-220); I follow Powell (1958:360) in calling Schilder's regions "provinces" and in using the term "region" for what Schilder called provinces. In Schilder's original proposal this Polynesian Province was described as forming a roughly triangular area with Kingman Reef at the northern apex, Easter Island as the eastern point, and with the western apex situated southwest of Rarotonga in the Cook Islands. It was seen as comprising, therefore, the southern and northern Cook Islands, the Society Islands, the Tuamotu Islands, the Gambier Islands, the Austral (or Tubuai) Islands, Rapa, the four Pitcairn Islands (Pitcairn, Oeno, Henderson, and Ducie), Easter Island, the Marquesas Islands, and the Line Islands.

In 1965 Schilder published a revised classification of

his zoogeographic regions (Schilder, 1965:171-177) in which he considerably emended the boundaries of the Polynesian Province, extending the province in a northwesterly direction to include Howland Island, Baker Island, the Tokelau Islands, and the Phoenix Islands, and separating Easter Island off as a distinct Rapanuian Province. Johnston Island, which he retained in the Polynesian Province, should in my opinion be assigned to the Hawaiian Province. As modified by all of these emendations, this province covers an oval area stretching for 4000 miles from Howland Island in the northwest to Ducie Atoll in the southeast (Figure 1). Schilder proposed 10 subprovinces for this area.

In essence, the object of my study of the Polynesian fauna is to test the validity of the Polynesian Province as a biogeographical concept. To all appearances Schilder based his classification solely on data obtained from one family of mollusks, the Cypraeidae. I am attempting to determine how well Schilder's provinces and subprovinces are substantiated by distributional data from all families of mollusks, as well as from some other groups of marine invertebrates and fish. Does the marine fauna of the Polynesian Province differ fundamentally from that of adjoining provinces, and are there any marked faunal differences between islands or groups of islands within this province? Is Schilder correct in adding Howland Island, Baker Island, the Phoenix Islands and the Tokelau Islands to the Polynesian Province, as he does in the revised version of his tropical zoogeographical provinces

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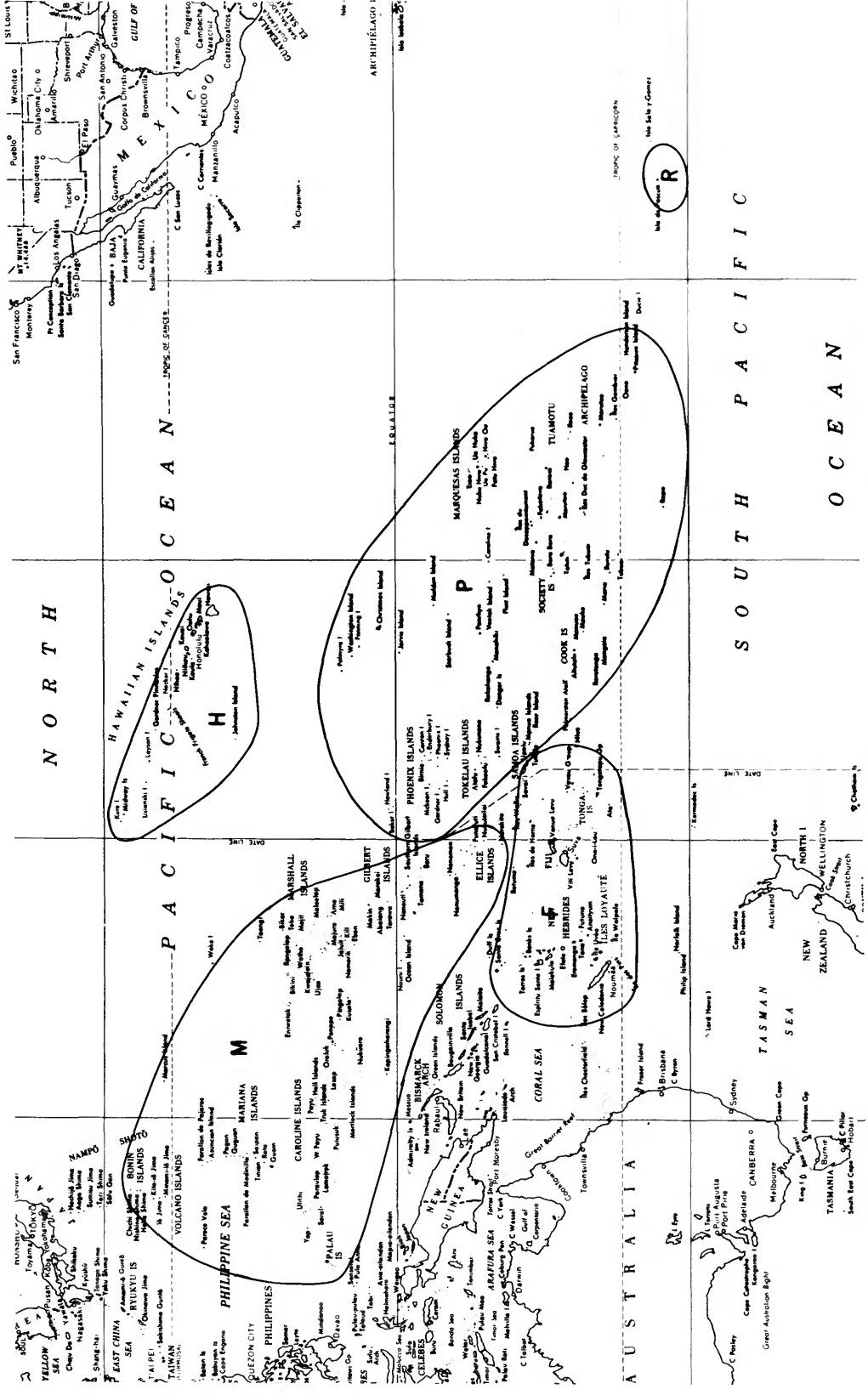


Figure 1.—Biogeographical provinces in the tropical central Pacific (M = Micronesian; H = Hawaiian; P = Polynesian; F = Fijian; after Schilder, 1965).



(Schilder, 1965:175), or is their fauna more closely related to that of Micronesia? Does the Polynesian Province contain a "subtorrid" element, the Rarotongan Province of Dana (1853:1572), which comprises the southern Cook Islands, Austral Islands, Gambier Islands, and Pitcairn Islands? Is the Rapanuian Province of Schilder (1965:175), created for Easter Island, a valid one? This paper is addressed specifically to the last question but by extension it is related to the larger complex of issues.

Easter Island as the easternmost outpost of the Indo-Pacific Region is of particular interest because of its extremely isolated position, its temperate climate, the cool waters surrounding it, and the reduced coral growth found there. In spite of these factors it has long been known that the island harbors a marine fauna that has unquestionably an Indo-Pacific affinity although its typical tropical element is noticeably attenuated.

As mentioned above, Schilder has proposed a distinct province for Easter Island. Briggs in his book *Marine Zoogeography* has an interesting section on Easter Island (Briggs, 1974:30-32), pointing out the paucity of our knowledge of the invertebrate marine fauna of this island. It may be interesting to note the last paragraph of his remarks.

Since the shelf fauna of Easter Island is still so poorly known, it is almost impossible to estimate the overall extent of endemism. In the fishes, there are obviously many endemics, possibly 30 to 40 per cent of the total fish fauna. When the entire marine fauna of Easter Island and Sala y Gómez becomes reasonably well known, it will be most interesting to compare it with that of Hawaii. Will the endemism be greater or less? How many of the nonendemics are shared? Are there parallel evolutionary trends? Someday, we may have answers to such questions.

This paper, which focuses on the molluscan fauna of the two islands and analyzes in particular the littoral component of this fauna, provides information useful in addressing these questions.

ACKNOWLEDGMENTS.—On the way to a two-week stay on Easter Island I spent several days in Santiago, Chile. Here, through the courtesy of Dr. Nibaldo Bahamonde N., research chief of the Sección de Hidrobiología, Museo Nacional de Historia Natural (at the time of our visit acting director of the museum), and Sra. María Codoceo R., researcher in charge of the Laboratorio de Malacología, I was able to study the material from Easter Island that was pres-

ent in the collection of the museum. I was permitted to take with me as a loan those specimens needing more critical study.

To Dr. Patricio Sanchez, Laboratorio de Zoología, Universidad Católica de Chile, I am indebted for many kindnesses in transporting us about the city, arranging meetings with other biologists, and providing us with alcohol and formalin for our field trip.

With Dr. Gabriel Henríquez of the Instituto de Fomento Pesquero, just returned from a visit to Easter Island, I was able to discuss the island and to receive from him the name of Sr. Gerardo Velasco on Easter Island.

Before we left for Easter Island I had corresponded with Dr. William P. Mulloy, professor of archeology at the University of Wyoming and an outstanding authority on Easter Island, with regard to our visit. He was to be on the island at the same time we were, supervising another phase of his work in restoring the ancient monuments, and he kindly arranged for us to stay in the private home of Sr. Martín Rapa Pua, where he would be living. Dr. Mulloy's untimely death in early 1978 is a great loss to his friends and colleagues.

On Easter Island we would not have been able to accomplish what we did had it not been for Sr. Gerardo Velasco, at the time director of the Easter Island office of the Corporación de Fomento de la Producción, Chile (CORFO). He put a truck and driver at our disposal and in this way we were able to reach easily all important and accessible parts of the island. For the kind and generous hospitality of Sr. Velasco and his charming wife, Margarita Tepano, we are sincerely grateful.

To Benito Alarcón Fuenzalida and his wife, Esperanza Pakarati, we owe much of our collecting success. Sr. Alarcón has been gathering shells for some time, using many of the cowries and Planaxidae for making shell jewelry to sell to the tourists, but he also retains in his home a collection of various species he has found. He not only made collections for us but he and his wife accompanied us on most of our collecting trips to various parts of the island.

In addition to those individuals thanked in the section "Materials Studied," I wish to express my indebtedness and warm thanks to the following staff members of various institutions for their cooperation in the loan of specimens gathered on previous expedi-

tions or collected by visiting scientists or local inhabitants: the late Dr. Leo G. Hertlein, California Academy of Sciences, San Francisco; Drs. Robert Robertson, George M. Davis, and Horace G. Richards, and Ms. Gail Specht Corey, Academy of Natural Sciences, Philadelphia; Dr. E. Alison Kay University of Hawaii and Bernice P. Bishop Museum, Honolulu; Dr. I. McTaggart Cowan, Department of Zoology, University of British Columbia, Vancouver; Dr. Bengt Hubendick and Miss Birgitta Hansson, Naturhistoriska Museet, Göteborg; Drs. W. Adam and J. Van Goetham, Institut Royal des Sciences Naturelles, Brussels; Dr. Bernard Métivier, Museum National d'Histoire Naturelle, Paris; Drs. José Stuardo and Tomás Cekalovic K., Instituto de Biología, Universidad de Concepción, Chile (the present address for Dr. Stuardo is Departamento de Oceanología, Estación de Biología Marina, Universidad de Chile, Casilla 13-D, Viña del Mar, Chile).

From Professor M. E. Vinogradov, P. P. Shirshov Institute of Oceanology, Academy of Sciences, USSR, Moscow, I received information about the visit of the oceanographic vessel *Dimitry Mendeleev* to Sala y Gómez in August 1972, and he very generously sent me specimens of two of the species collected during that visit. Mr. I. Melnikov of the same institution sent me a sketch map of Sala y Gómez along with information gathered during his visit there on that occasion and kindly gave me permission to use his data in this paper.

A number of my colleagues in this country and abroad have been of assistance to me by furnishing photographs of holotypes or syntypes, by the loan of critical type material, and by the verification of provisionally identified specimens sent to them: Dr. E. Binder, Muséum d'Histoire Naturelle, Geneva; Dr. John D. Taylor and Ms. Katherine M. Way, British Museum (Natural History), London; Dr. R. Kilius, Zoologisches Museum, Humboldt-Universität, Berlin, D.D.R.; Dr. R. Duff, Canterbury Museum, Christchurch, New Zealand; Mr. Walter O. Cernohorsky, Auckland Institute and Museum, Auckland, New Zealand; Dr. Winston E. Ponder, Australian Museum, Sydney, Australia; Dr. Kenneth J. Boss, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

To Dr. E. Alison Kay, University of Hawaii, I express my gratitude for critically examining the Ver-

metidae that we collected on Easter Island, and to Dr. Michael M. Hadfield, University of Hawaii, I am indebted for their subsequent description.

Dr. Gilbert T. Voss, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, has kindly described the species of *Octopus* sent him for identification.

To Dr. Alan Kohn, University of Washington, I am grateful for giving me the benefit of his specialized knowledge of the genus *Conus* in connection with the description of a new subspecies in that genus.

Dr. Peter E. Baker, Department of Earth Sciences, the University of Leeds, Leeds, England, gave me the benefit of his knowledge of the geology of Easter Island in the course of our correspondence, and I acknowledge the help received not only from his letters but also from his publications on the subject.

I am grateful to Miss Cathy Lamb, who prepared, under the general direction of Carolyn Bartlett Gast, the maps reproduced in this paper.

To many of my colleagues at the National Museum of Natural History, Smithsonian Institution, I am grateful for allowing me to trouble them with problems of nomenclature or systematics. In this respect I am particularly indebted to Drs. Joseph Rosewater, Harry S. Ladd, R. S. Houbbrick, and Thomas R. Waller.

Special thanks go to Mrs. Barbara Spann, editor in the Series Section of the Smithsonian Institution Press, who worked so hard and thoroughly on the manuscript to bring it into final shape for the printer.

Finally, my warm thanks go to my wife, Lois, who not only typed the manuscript but also carefully and critically edited it before it was submitted to the publisher. Her assistance and support in my recent field trips to Polynesia, particularly during the two weeks we were on Easter Island, is gratefully acknowledged.

#### History of Knowledge of Molluscan Fauna

Neither the discoverer of Easter Island, Jacob Roggeveen, nor any of the earlier visitors to the island, such as James Cook (1774) and La Perouse (1786), make any mention of the marine life in their reports, although it is possible that specimens were collected during the visits of Cook and La Perouse since it is known that biological collections were made on these voyages.

The first mollusk to be recorded from Easter Island is *Nerita (Heminerita) morio* (Sowerby 1833), the description of it having been presented at a meeting of the Zoological Society of London on 11 December 1832, as part of a presentation of descriptions of new species collected by Hugh Cuming on the west coasts of Central and South America and in Polynesia. The Polynesian material was collected by Cuming during the voyage of his vessel *Discoverer* to Polynesia for the purpose of collecting specimens of plants and marine life. Through the kindness of Mr. S. Peter Dance I have received a copy of part of the journal that Cuming kept during this trip and from this it is apparent that he spent part of two days at Easter Island, the 27th and 28th of November 1827 (not the 28th and 29th, as he wrote later to Hooker, *vide* St. John, 1940:86). He did not land on the island, and the only shells he obtained from the natives were "a few nerites exterior—black with yellow mouth."

Two years earlier Captain F. W. Beechey in H.M.S. *Blossom* had visited Easter Island and spent parts of two days, 17 and 18 November 1825, there. Although mollusks were collected on this voyage, no shells from Easter Island are mentioned in Gray and Sowerby's account of the mollusks (Gray and Sowerby, 1839), and it is doubtful if anyone of the landing party had an opportunity to collect because of the difficulties encountered with the natives (Beechey, 1831:40–59).

From 1832 until 1908 there is no record of any other species from Easter Island unless one considers here the description in 1888 of the endemic *Cypraea caputdraconis* Melvill. Incongruously, this species was recorded by Melvill (Melvill, 1888:214) as having been collected in Hong Kong by Hungerford; how it came into the latter's hands is unknown.

From 18 to 31 December 1886, the U.S.S. *Mohican* visited Easter Island. In the accounts published by paymaster William J. Thomson and the surgeon George H. Cooke, mention is made of the fishing for lobsters by the natives and the use of "shell fish" as food (Cooke, 1899:720) as well as the presence of mollusks found in caves and in the remains of the houses on Orongo (Thomson, 1891:458).

The first published list of mollusks from Easter Island is that given by Dall in his report on the mollusks collected during the voyage of the U.S. Bureau of Fisheries vessel *Albatross* in 1904–1905, while on an

oceanographical voyage in eastern Pacific waters under the direction of Alexander Agassiz (Dall, 1908a:437).

The *Albatross* spent six full days at the island, anchoring in Cook's Bay (Hanga Roa) 15 December 1904 at 5:30 PM and departing early on the morning of 22 December; during their stay they anchored for awhile also in La Perouse Bay. Among the biological materials were 29 species of mollusks, of which three were described by Dall as new species. Another species (of the opisthobranchiate genus *Dolabella*) was described by MacFarland in 1918.

In April 1911 Francisco Fuentes, botanist at the Museo Nacional in Santiago, Chile, went to Easter Island on the corvette *Baquedano* to undertake a scientific survey. Because of unfavorable weather conditions his marine collecting was severely limited, and in his published report he lists only 11 marine species of mollusks (Fuentes, 1914:316–317). Of these species—the list of which was reprinted by Knoche (1925:152)—two are synonyms of other names on the list so that the total number of species gathered was 9; of these, only one had not been listed by Dall.

The next scientific collecting to be carried out on Easter Island was by the Swedish Pacific Expedition in 1916–1917 under the direction of C. Skottsberg. Twenty-one littoral species were collected by the zoologist of the expedition, K. Bäckström, and these were reported on by Odhner (1922:247–249), with one new species included.

In 1934 the Franco-Belgian Mission to Easter Island spent five months on the island, from 27 July 1934 to 2 January 1935. The expedition was mainly an archeological one but biological specimens were also collected, mostly by A. Metraux. Thirty-five species of mollusks were listed by Lamy (1936), who in his later paper (Lamy 1938) gave a more detailed account of the species, preceding it by a list of the species given earlier by Dall and Odhner and pointing out that 18 of the 35 species collected on the Franco-Belgian Expedition had not been recorded from Easter Island before. In 1949 a species of the family Stiliferidae, parasitic on holothurians and collected on this expedition, was described by Mandahl-Barth (1949:147–148).

Between the years 1960 and 1965 three new species were described by Summers and Burgess (1965) and by Hertlein (1960, 1962) based on material collected

by Father Sebastian Englert, beloved padre of the people of Easter Island from 1935 to 1968. The bulk of these collections were sent to collectors in the United States and are now in the California Academy of Sciences. A complete list of mollusks known from Easter Island, based largely on this material, was published by Paul H. Steele in 1957.

The well-known archeological expedition to Easter Island led by Thor Heyerdahl, which spent five months on the island from 27 October 1955 to 6 April 1956, brought back some zoological material, but according to the curator of the Zoological Museum of the University of Oslo (pers. comm.), no mollusks have been found among this material.

Recently the presence of *Robillardia cernica* E. A. Smith, 1889, parasitic on a sea urchin, has been reported by Gooding and Lützen (1973). These specimens were collected by Richard U. Gooding on Easter Island in January 1971.

The number of known valid species from Easter Island on record at the time that this study was initiated was 68. Of these, eight were identified (Steele, 1957) only to genus. Steele lists 73 marine species but many of these are synonyms.

### Materials Studied

The collection reported on by Dall in 1908 has been in the National Museum of Natural History for over 70 years.

Through the cooperation of the respective authorities in the Naturhistoriska Museet in Göteborg, Sweden, and the Muséum National d'Histoire Naturelle in Paris, I have been able to examine certain critical specimens from the material reported on by Odhner in 1922 and by Lamy in 1936 and 1938. The Director of the Institut Royal des Sciences Naturelles in Brussels has sent me for study the specimens of mollusks brought back by the *Mercator*, the Belgian schoolship that transported the members of the Franco-Belgian Archeological Expedition in 1935.

In May 1958 the Soviet Research Vessel *Ob* on its return from the Antarctic stopped for a day at Easter Island, and a small collection of mollusks was made by Dr. V. Koltun and P. Pasternak. Through the kindness of Dr. O. A. Scarlato and Dr. A. Golikov of the Zoological Institute of the Academy of Science of the

USSR, I was able to study this material, amounting to about 170 specimens.

From the California Academy of Sciences I have received the mollusks sent to Mr. Paul Steele and Mr. Ray Summers by Father Sebastian Englert and donated by Mrs. Katherine Steele and Mr. Summers to the Academy. The Academy of Natural Sciences of Philadelphia has allowed me to borrow all the specimens collected on Easter Island by Dr. Horace G. Richards and Dr. David L. Govoni in August 1968.

Within the last 12 years, two scientific expeditions have been made to Easter Island in the course of which some attention was paid to the collection of mollusks.

During the 1964–1965 Canadian Medical Expedition to Easter Island, from 30 December 1964 to 5 February 1965, Dr. Ian E. Efford collected 34 lots of mollusks, comprising about 150 specimens. This material, now in the Zoology Department of the University of British Columbia, has been made available to me for study.

In January–February 1969 Dr. John E. Randall and his associates, in the course of an ichthyological expedition, made a collection of mollusks that is now in the Bernice P. Bishop Museum in Honolulu. This collection, comprising some 40 lots and 150 specimens, has also been generously sent me on loan. A popular account of this expedition has been published by Randall (1970).

From Dr. José E. Stuardo, at the time professor at the Universidad de Concepción, Chile, I received for study 10 lots of mollusks collected by Sr. Pellissier in July 1957.

On 21 August 1972 the Russian oceanographic vessel *Dimitry Mendeleev* visited Sala y Gómez and not only landed some men, one of whom, Mr. J. Melnikov, collected some mollusks on this rocky island, but also did some dredging. Through the kindness of Professor M. Vinogradov of the P. O. Shirshov Institute of Oceanology, Moscow, I not only received information on the three species of mollusks collected during this visit but I have also had access to specimens of two of the species donated by him.

During a trip that my wife and I made to Easter Island in late 1974 I had the opportunity to examine the collection of mollusks at the Museo Nacional de Historia Natural in Santiago, Chile. Here I identified and recorded all material from Easter Island and



with the permission of the acting director, Dr. Nibaldo Bahamonde, was able to borrow all specimens that needed more critical study. The total Easter Island material in the Museo Nacional that I have examined amounts to 160 lots, or about 1400 specimens.

In April and May 1977, Dr. Alan Kohn of the Department of Zoology, University of Washington, spent three weeks on Easter Island, studying the feeding habits of *Conus* and some of the other carnivorous gastropods. He collected other mollusks as well, amounting to 28 specimens, which he generously donated to the National Museum of Natural History.

In addition, there are a few lots of Easter Island mollusks in the collections of the National Museum of Natural History, Smithsonian Institution, received from various other individuals.

By far the largest part of the material on which this study is based was collected by me in 1974 on Easter Island with the help of my wife and local assistants. From 20 October to 4 November we made collections totaling 440 lots, or 3480 specimens, at numerous localities in all accessible parts of the island. A list of the stations at which collections (in NMNH) were made follows:

- E-1 21 Oct, afternoon; Hanga Piko: in irregular tide pools of rough, rocky coast with strong wave action. H. A. and L. C. Rehder.
- E-2 21 Oct, night; Hanga Piko: same as E-1. B. Alarcón.
- E-3 22 Oct, morning; Hanga Piko: same as E-1. B. Alarcón.
- E-4 22 Oct, afternoon; Hanga Piko: same as E-1. B. Alarcón.
- E-5 22 Oct; N of Hanga Piko: in tide pools near hotel. B. Alarcón.
- E-6 22 Oct; S side of Hanga Piko: tide pools at Te Raa Raa. B. Alarcón.
- E-7 22 Oct; same as E-6: gift of B. Alarcón.
- E-8 23 Oct; La Perouse Cove, La Perouse Bay: under rocks at shoreline, and in tide pools on and under rocks and in crevices. H. A. and L. C. Rehder, B. Alarcón.
- E-9 23 Oct; Hanga Omiti, E of La Perouse Cove: under rocks near shore. B. Alarcón.
- E-9A 23 Oct; Hanga Omiti: dead valves of *Chama* found near shore. H. A. Rehder.
- E-10 23 Oct; Hanga Papara, second cove E of La Perouse Cove: under rocks in 1-2 ft and on rocks near shore. B. and E. Alarcón.
- E-10A 23 Oct; Hanga Papara: in sand patch among rocks above tide line. H. A. and L. C. Rehder and B. Alarcón.
- E-11 23 Oct; Te Peka Peka, cove W of La Perouse Cove: in tide pools with thin sandy bottom, and on rocks above tide level. H. A. and L. C. Rehder.
- E-12 23 Oct; Ovahe: goose barnacles and *Arca* sp. on pumice stone on beach. H. A. Rehder.
- E-13 23 Oct; Anakena: on rocks E of beach. B. Alarcón.
- E-14 24 Oct; small cove N of hotel, Hanga Roa: on rocks at shoreline and in shallow water. H. A. and L. C. Rehder.
- E-15 24, 28 Oct; Apina Nui, large tide pool in front of hotel, Hanga Roa: on and under rocks in 10 to 18 in depth. H. A. and L. C. Rehder.
- E-16 25 Oct; Te Pu and Kava, near Ana Kai Tangata, Mataverí: on rocks and in tide pools well above water level. H. A. and L. C. Rehder.
- E-17 26 Oct; Hanga Tee, Vaihu: in narrow tide pools between rocky ridges and on rocks under stones and on sandy algal bottom. H. A. and L. C. Rehder.
- E-18 26 Oct; Haka Ea, E of Hanga Tee, Vaihu: under stones along shoreline and in rocky tide pools. B. Alarcón.
- E-18A 26 Oct; same as E-18: dead shells from sand above tide level. H. A. Rehder.
- E-19 26 Oct; Papa Tutai Moa, W of Hanga Tee, Vaihu: along shore in front of ahu. B. Alarcón.
- E-20 26 Oct; Hanga Tee, Vaihu: dead shells from small sand patch above tide level in corner of small cove. H. A. Rehder.
- E-21 26 Oct, night; Hanga Piko: in rocky tide pools. B. Alarcón.
- E-22 26 Oct, night; Hanga Nui, Hotuiti: in rocky tide pools. Martin Rapu Pua.
- E-23 27 Oct; Hanga Piko: in shallow tide pool, on sandy bottom. H. A. Rehder.
- E-24 28 Oct; small cove, N of Hanga Kioe, Tahai: in tide pools and on rocks. H. A. and L. C. Rehder.
- E-25 28 Oct; cove between ahu at Hanga Kioe and Ahu Ko Te Riku: in tide pools. H. A. and L. C. Rehder.
- E-26 28 Oct; Hanga Piko: in tide pools. B. Alarcón.
- E-27 30 Oct; Onetea, Hotuiti: in shallow tide pools, and on rocks at W end. H. A. and L. C. Rehder and B. Alarcón.
- E-27A 30 Oct; Onetea, Hotuiti: in patch of sand above high tide level. H. A. Rehder.
- E-28 30 Oct; Otuu, rocky point at E end of Hanga Nui, Hotuiti: on rocks at shore line. B. and E. Alarcón.
- E-29 30 Oct; Hanga Tuu Hata, Hotuiti: in tide pools along rocky ledge. B. and E. Alarcón.
- E-30 31 Oct; Haka Ea, E of Hanga Tee, Vaihu: under rocks and in sand. B. Alarcón.
- E-31 1 Nov; Hanga Poukura: in tide pools. H. A. and L. C. Rehder.
- E-32 1 Nov; Akahanga: in tide pools, under rocks. H. A. and L. C. Rehder.
- E-33 1 Nov; Mata Uuuri, SW of Hanga Nui, Hotuiti: in large tide pools. H. A. and L. C. Rehder.
- E-34 2 Nov; Ovahe: on rocks at either side and in center of small beach. H. A. and L. C. Rehder.
- E-35 2 Nov; Anakena: on rocks and in tide pools, W side of beach. H. A. and L. C. Rehder.



- E-35A 2 Nov; Anakena: 2 species of Terebridae in sand just below tide line. H. A. and L. C. Rehder and native children.
- E-35B 2 Nov; Anakena: dead shells from beach drift. H. A. Rehder.
- E-36 2 Nov; Hanga Piko: *Cypraea englerti*, gift of Esteban Pakarati.
- E-36A 2 Nov; wharf at Hanga Roa: *Melanella* sp., gift of Esteban Pakarati.
- E-37 2 Nov, night; Hanga Piko: tide pool, *Octopus rapanui* Voss. B. Alarcón.

The principal localities cited in this station list, as well as other place names mentioned in this report, are indicated on the accompanying maps (Figures 1-3). Some stations are identified on Figure 2 by number rather than by place name.

Adding the material collected personally in 1974 to that studied at or borrowed from other institutions, I have been able to examine over 7000 specimens from Easter Island in the preparation of this paper.

### Ecological Observations

EASTER ISLAND.—Together with the rocky satellite Sala y Gómez, Easter Island is the most isolated island in the Pacific Ocean. Situated in latitude  $27^{\circ}10'S$ , the island lies 2230 miles west of the coast of Chile, almost equidistant from Antofagasta and Valparaiso. The nearest land to the east is the island of Mas Afuera, now known as Isla Alejandro Selkirk, in the Juan Fernandez Islands 1720 miles away, and 1250 miles to the west is the uninhabited atoll Ducie Island, with Pitcairn Island 290 miles farther to the west.

Easter Island (Figure 2) has an outline close to that of a right triangle with the hypotenuse running in an ENE-WSW direction and measuring 23 kilometers; the other two sides are about 16 kilometers in length, and the island measures 13 kilometers at its widest place. Its area is estimated to be approximately 106 square kilometers or 45 square miles.

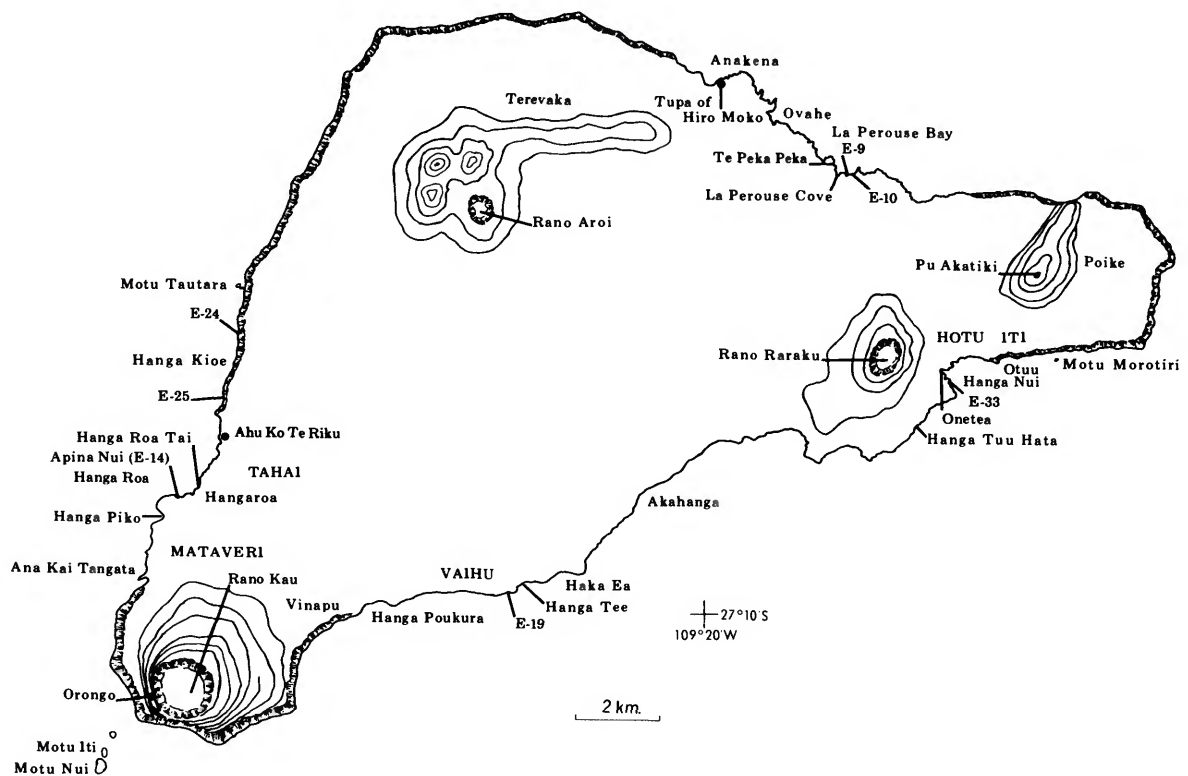


FIGURE 2.—Map of Easter Island. (From U.S. Navy H. O. Chart 1119.)

At or near each of the three angles of this triangle lies an extinct volcanic peak with the land in between being rather rolling with scattered hills, most of the hills representing volcanic tuff cones and many possessing craters at or near their summit. The surface of the island is thickly strewn with rocks of all sizes and much of the landscape is grass covered with only scattered shrubs and small trees—occasionally groves of trees, mostly introduced eucalyptus. The soil is generally of a reddish color, indicating its lateritic nature.

The coast line is very irregular and rocky with only two principal sandy beaches, Anakena and Ovahe, both on the north coast. Cobble beaches are found in some of the shallow bays. At the southwestern angle the seaward slopes of Rano Kau form cliffs rising steeply from the sea, and high cliffs are found also at the eastern point around Maunga Vai a Heva at Poike. Tide pools of various sizes and depths are found everywhere in this rocky, sharply dissected coast, as well as numerous cobble beaches at the head of shallow bays.

This volcanic island lies near the summit of the East Pacific Rise, close to where it is crossed by the Easter fracture zone and the associated Sala y Gómez Ridge, and where it is joined by the South Chile Ridge. The island lies near the juncture of three of the earth's plates and is therefore in an area of geophysical instability and considerable past and possible future volcanic activity (Herron, 1972). According to Baker (Baker et al., 1974:86) a date of 3 million years has been assigned to some early rocks at the eastern end of the island, while another flow has been dated at 300,000 years. Clark and Dymond (1977:43) give the age of the older Poike volcanics as 2.5 million years. The youngest flow found, located near the middle of the western side, "is probably of the order of a few thousand years old" (Baker, in litt., 1976). The most recent papers on the geology of Easter Island have been those by Baker (Baker, 1967; Baker et al., 1974).

The climate is equable with generally mild days and often cool nights, with the mean temperature varying between 23°C (73°F) in February to 17°C (62°F) in July and the daily temperature varying between 27°C (80°F) and 19°C (66°F) in February and between 20°C (68°F) and 15°C (59°F) in July. From October to April the weather is dominated by

the prevailing southeast trade winds; from May to September the island is subject to much unsettled weather, considerable rain, and occasional strong winds from the west.

The irregular and strongly dissected volcanic rocky shore line has many tide pools, some almost or wholly separated from the ocean, others more or less open to the sea by irregular channels or narrow passages (Plates 1, 2). Here, at or near the water's edge, but also on cobblestones at the water's edge, are found *Nerita morio* and *N. lirellata*. In crevices and in the round holes made by echinoderms as well as on the open faces of the rocks, *Plaxiphora mercatoris* occurs in moderate abundance. In empty echinoderm holes one finds occasionally *Cypraea caputdraconis*. Higher up on the rocks and on rocky platforms occasionally wet by spray, *Nodilittorina pyramidalis pascua* is very abundant in places; sometimes they are found in shallow, warmwater pools on these platforms, especially in the juvenile stage. Specimens of *Planaxis (Hinea) akuana* are very common under and around cobblestones at the edge of the water; farther up away from the water, *Melampus pascus* can be found under rocks and debris.

The tide pools contain the richest variety of life and generally include a rather luxuriant flora of mostly brown algae, as well as occasional coral colonies, hydroids, etc. On the submerged rocks *Antisabia imbricata*, *A. foliacea*, and *Pilosabia trigona* are very abundant, particularly the first species. Two species of Vermetidae, *Dendropoma* sp. and *Serpulorbis* sp. are common on the rocks and the two species of *Nerita* are frequently found in the tide pools. On the bottom, especially where it is covered by a thin sandy layer more or less bound together by filamentous algae, *Conus miliaris pascuensis*, *Mitra (Strigatella) flavocingulata*, *Cypraea caputdraconis*, and *Strombus maculatus* are found. In crevices and under loose stones numerous forms such as *Euchelus (Herpetopoma) alarconi* and small species of such families as Columbellidae, Cerithiidae, and Rissoidae are found. Collecting at night in tide pools yields, not infrequently, *Cypraea englerti*. The numerous small and minute species found in pockets of sand among the rocks above high tide level indicate the variety of small species that are to be found in these tide pools.

The largest of the two sandy beaches on the island is located at Anakena, a gently curving stretch of

mixed volcanic and calcareous sand about 200 meters in extent bounded by rocky shore line with tide pools. Here, burrowing intertidally in the sand, live the terebrid species *Acuminia venosa* and *Egentelaria stylata*.

**SALA Y GÓMEZ.**—This barren, volcanic islet, “the subaerial peak of a very large seamount” (Fisher and Norris, 1960:499), lies 415 kilometers (257 miles) east of Easter Island. Both are situated on the Sala y Gómez Ridge, “a broad zone of high topography and scattered seamounts extending east-southeast from the East Pacific Rise” (Clark and Dymond, 1977:29) and situated on the Nazca plate. According to the latter authors the rocks of Sala y Gómez are about the same age as the oldest dated volcanics on Easter Island.

Since its discovery in 1793 by the Spanish commander whose name now identifies it, the islet has rarely been visited. In 1825 Captain Beechey, on his way to Easter Island, briefly visited Sala y Gómez without landing there. He says that “its extent [is] much less than has been stated. It is scarcely more than a heap of rugged stones (Beechey, 1831:36). In 1875 the Chilean naval vessel *O’Higgins* with R. A. Philippi on board made a stop at Sala y Gómez, a visit of which Philippi published an account (Philippi, 1876). In 1935 the schoolship *General Baquedano* went to the island and of this occasion we have a short popular account by H. Falke (1941). More recently, geological papers have been published based on data gathered on visits made during two oceanographic cruises (Fisher and Norris, 1960; Clark and Dymond, 1977). Robert F. Norris has published a popular account of the first of these visits made in January 1958 in the *Spencer F. Baird* during the University of California–International Geophysical Year Downwind Expedition (Norris, 1960). During a visit of the Russian oceanographic vessel *Dimitry Mendeleev* to Sala y Gómez on 21 August 1972, several crew and staff members landed on the islet. Dr. I. A. Melnikov of the Institute of Oceanology, Academy of Sciences of the USSR, Moscow, has kindly furnished me with information and photographs of this visit. Based on these sources I have brought together the following description of Sala y Gómez.

The shape of the islet (Figure 3) is roughly crescentic or more accurately “saddle-bag-shaped” (Fisher

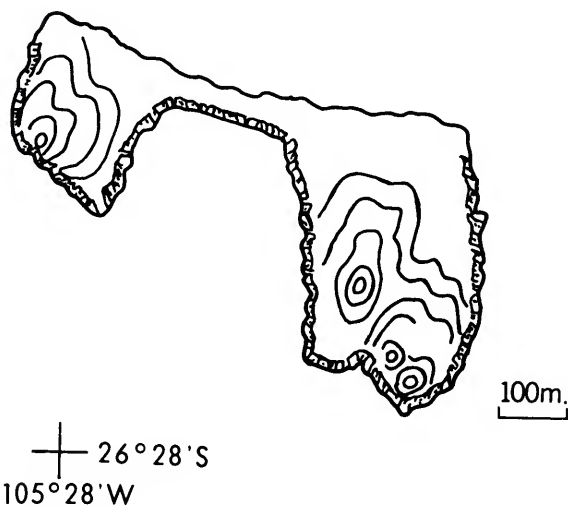


FIGURE 3.—Map of Sala y Gómez. (From U.S. Navy H. O. Chart 1119.)

and Norris, 1960:500), a little over 700 meters (somewhat less than half a mile) long; it varies in width from 50 meters near the center to 400 meters at the eastern end. The maximum elevations are reached on the southern shores of the eastern and western parts of this “doublet” islet where according to the sketch made by Melnikov, the elevations are about 20 meters. Fisher and Norris estimate the maximum elevations to be 15 or 16 meters; Norris (1960:20) says that the highest point is about 20 meters. The narrow neck of land connecting the eastern and western parts rises to only a few meters above sea level. From these elevations the land slopes gradually to sea level on the north coast, forming there a rather broad platform subject to tidal action, its shoreline and surface very irregular and rough, with many tide pools and numerous surge channels. (Figures 4, 5).

In his description of the islet, Falke (1941:150) says that it lacks any vegetation due, without doubt, to the fact that because of its small size and low elevation it is subject to partial flooding and spray action during heavy seas and storms; Melnikov (in litt.) says that at the time of his visit the interior of the islet was wet from the spray. Norris (1960:25), however, says that his party found plants that were



FIGURE 4.—North coast of Sala y Gómez. (Photo furnished by I. Melnikov.)

infrequent and confined to sheltered pockets in the higher parts of the island. The most abundant plant was *Portulaca oleracea*, with a plant resembling the sand verbena (*Abronia* species) somewhat less common; this latter species may be *Boerhavia repens*. At the time of their visit the blue-faced booby, *Sula dactylatra*, was nesting and abundant, and the blue-gray noddy, *Procelsterna caerulea*, was also present in numbers.

A submarine shelf extends out from the islet in a northeasterly and southwesterly direction for several kilometers and reaches at its outer edge a depth of about 120 meters.

The deep embayment on the south side is shallow, reaching, according to Falke (1941:147), a depth of 12 meters, its bottom covered with volcanic rubble mixed with fine coral sand that bears a rich invertebrate fauna; Falke notes particularly the *Octocorallia*.

As a rule *Nerita morio* was found by Melnikov on the loose rocks and volcanic base rock, and specimens of *Cypraea caputdraconis* were found in crevices and

in holes made by sea urchins, often occupying the hole jointly with the urchin. Coral colonies are present in the tide pools and channels. The ecology as well as the marine fauna must be very similar to that of Easter Island.

#### Faunal Analysis

At the time of preparing this report, 68 species of mollusks were known from Easter Island. In this paper 133 species are recognized as occurring on the island, an increase of 95%. Ten of these are identified only to family or genus because the material available for study is worn, imperfect or insufficient for a positive identification. Six others are doubtfully compared with species either because of the paucity of material or the worn condition of material collected in beach drift, or because they belong to groups that need considerable critical revisionary work before acceptable identifications can be made. Finally, two species, members of the family Ver-





FIGURE 5.—Rubble-strewn platform, north coast of Sala y Gómez, with frigate bird, *Fregata minor*. (Photo furnished by I. Melnikov.)

metidae, are under study and will be described as new in a forthcoming paper by an authority on the family. Of the 115 fully identified and named species, 40 species and two subspecies are described here as new, and in addition I am proposing three new genera.

For the following faunal analysis I exclude from the 115 named species the three pelagic species of the family Janthinidae, but add the two species of Vermetidae being described as new endemic species by Hadfield (in prep.), and the unidentified species of *Rangitotoa* which is distinct from its congener found in New Zealand and Rapa.

**ENDEMICITY.**—Of the 115 littoral species of mollusks under consideration, 48 species (or subspecies), or 42%, are endemic. This is a high percentage of endemicity, to my knowledge higher than that attributed to any other island or island group in the Indo-Pacific region. The mollusks of the Kermadec Islands

show an endemicity of 34% (Dell, 1957:500), and 20% of the mollusks of the Hawaiian Islands have been estimated to be endemic (Kay, 1967:101). From my studies of the mollusks of the Marquesas Islands (Rehder, 1968:32), I estimate that the endemicity of that as yet only partially studied fauna will turn out to be about 20%. It should be realized, of course, that when the micromollusks of the Hawaiian Islands, Pitcairn Islands, Rapa, Austral Islands, and Tuamotus Islands, are better known, the comparative degree of endemicity in the Easter Island fauna may change.

In the shore fishes Randall (1976:56,60) gives the percentage of endemicity for Easter Island and the Hawaiian Islands as 27.3% and 29% respectively. Of the six species of scleractinian corals known to date from Easter Island, two, or 33% are endemic (Wells, 1972). Similarly, two of the six species of Asterozoa (Echinodermata) are endemic (Devaney, 1973). In the echinoids, one out of seven known species (Fell, 1974), or 14%, is endemic. Among the Crustacea, in the Decapoda Macrura, two of the seven species (Holthuis, 1972) are endemic, a rate of 28%. Of the 22 brachyuran crabs (Garth, 1973, and in litt), three, or 13½%, are apparently endemic. Of the four barnacles (W. Newman, in litt), two, or 50%, are endemic. Admittedly, the percentages of endemicity given for these small faunal representations are hardly significant in themselves, but when considered in conjunction with those for the larger faunal elements they do show a general trend or situation.

In view of the isolated location of Easter Island, the high endemicity found in the marine mollusks there is not surprising. With the fishes, corals, echinoderms, and three groups of crustaceans also showing endemicities that range from 14% to 50%, the proposal of a distinct biogeographic province for Easter Island, as Schilder has suggested (1965:175), appears to be justified. These percentages are well above the 10% figure that Briggs (1974:16) uses as a criterion for the validity of a biogeographic province.

**RELATIONSHIPS.**—To make the relationships of the Easter Island fauna more readily apparent I have outlined them in the accompanying table (Table 1), where I have separated the endemic species from the non-endemic ones, followed by a combined summary of all species.



TABLE 1.—Relationships of Easter Island species with other faunal areas

Faunal Areas	No. of Species	Percent
<b>Endemic Species</b>		
Pitcairn, Rapa, Kermadecs, New Zealand	11	34
Hawaii	9	28.25
Indo-Pacific	5	15.5
Western Pacific	4	12.5
Polynesia and Micronesia	2	6.5
Hawaii and Western Pacific	<u>1</u>	<u>3.25</u>
	<u>32</u>	<u>100</u>
<b>Non-endemic Species</b>		
Found throughout Indo-Pacific Region	23	34.5
Shared with Hawaii alone	10	15
Shared with Hawaii and Pitcairn, Rapa, etc.	2	3
Shared with Pitcairn, Rapa, Kermadecs, etc.	10	15
Found in Western Pacific	9	13.5
Shared with Polynesia and Micronesia only	7	10
Shared with Hawaii, Polynesia, and Micronesia	<u>6</u>	<u>9</u>
	<u>67</u>	<u>100</u>
<b>Summary of Relationships</b>		
Indo-Pacific	28	24.5
Western Pacific	13	16
Pitcairn, Rapa, Kermadecs	21	21.25
Hawaii alone	19	19
Hawaii and Pitcairn - Kermadecs	2	2.25
Hawaii, Polynesia, and Micronesia	6	7.5
Hawaii and Western Pacific	1	1
Polynesia and Micronesia	<u>9</u>	<u>8.5</u>
	<u>99</u>	<u>100</u>

In preparing this table I have omitted those species that at the present time show no apparent biogeographical relationship with any of the other faunal areas. These species number 16 which means that the

biogeographical analysis outlined below and presented in Table 1 is based on 99 species or 86% of the 115 Easter Island species under consideration. Most of the omitted 16 are new species belonging to families of

small species whose collecting and critical study in the tropical Pacific have until now been largely neglected. Future studies of the Polynesian and Micronesian members of such families as the Cerithiopsidae and Triphoridae and the subfamilies Mangeliinae and Daphnellinae of the Turridae may help clarify the relationships of the Easter Island species of these groups. If future studies should discover either the presence of these presently endemic species elsewhere, or relatives of these species in other areas, I feel it very likely that these newly revealed relationships will fit fairly close to the same general pattern as disclosed below.

In this analysis I restrict the term Western Pacific to the area from Cocos-Keeling Island, Malaysia, and Indonesia north to southern Japan and east to the Samoan Islands and Tonga, excluding the Marianas, Caroline, and Marshall Islands, which comprise Micronesia.

Twenty-three, or 34.5%, of the non-endemic species are widely distributed in the Indo-Pacific Region. Of these 23 species, however, 14, or 61%, should be considered rare on Easter Island as only one to six specimens of each of these species are known to have been found there. It appears that many, if not most, of the species abundant on the coral reefs of the central Pacific find the shore of Easter Island inhospitable both because of the paucity of coral reefs and the presence of cooler waters.

As is evident from the table, the closest relationships of the Easter Island fauna lie with the fauna of Hawaii on the one hand and on the other hand with those of the islands that lie along the southern edge of the tropical Pacific—the Pitcairn Islands, Rapa, and the Austral Islands in southeastern Polynesia, Kermadec Islands, and northern New Zealand. This double relationship is mirrored in the distribution of the genus *Neothais* shown in Figure 9. As can be seen from the last group of figures in Table 1, 42.5% of the Easter Island species are either shared only with the Hawaiian Islands and/or the Pitcairn-Rapa-Kermadec Islands, or are most closely related to species from those areas.

It is difficult to account at first glance for these relationships. Between Easter Island and Hawaii lie both of the Equatorial Currents and the intervening Equatorial Countercurrent, cutting across any present-day lines of communication. The surface currents

in that part of the southern Pacific flow in a generally westerly direction away from Easter Island toward Polynesia. This would seem effectively to prevent much, if any, dispersal or recruitment of species from Polynesia and more westerly islands like the Kermadec Islands.

The relationship of the Easter Island fauna with that of the Pitcairn Islands and Rapa, as well as the Kermadec Islands and the northern part of North Island, New Zealand, is an interesting one and is illustrated by the distributional maps of a number of species, Figures 6–9. Several workers have discussed the biogeographical relationships of the Kermadec Islands (Dell, 1957; Powell, 1961) and the island group has been considered a distinct province (Briggs, 1974:136), but its faunal connections with islands lying to the east have hitherto gone unmentioned because of a lack of knowledge of the faunas of Easter Island, Rapa, and the Pitcairn Islands. Later workers have ignored the proposal made by Dana in 1853, already referred to in my introduction, that a distinct “Rarotongan Province” for the islands from Pitcairn to the Southern Cook Islands be recognized. Somewhat emended and extended, Dana’s province would be exemplified, with the omission of Easter Island (which constitutes a distinct province), by the geographic range shown on the map in Figure 7, and might be termed a Pitcairn-Kermadec “Province.” It is interesting to note that a faunal relationship between Easter Island, the Pitcairn Islands, and Rapa is seen also in the fishes. Cressy and Randall (1978:773) list seven species that illustrate this relationship.

The Easter Island faunal relationships, demonstrated by the distribution of *Neothais* (Figure 9), may demonstrate the existence of a past fauna inhabiting the central Pacific. This could well have been when many of the submarine mountain ranges, seamounts, and guyots present now in the central Pacific were at or near the surface and some 25 degrees to the southeast of their present location (Ladd, 1960:148; Ladd, Newman, and Sohl, 1974:518). The surface currents may consequently have been quite different from those now in existence. Subsequently, with the submergence of the islands and the northwestward movement of the Pacific Plate, the possible directional changes of the currents and the invasion of new species from the west would have

displaced many of the older elements and the relicts of the older fauna would have become isolated and evolved independently. Thus, the faunal resemblances seem to be explained better by the theory of vicariance rather than by that of dispersal from a center of origin. Vicariance is understood to mean the idea that related species have evolved within the distributional range of an ancestral species by their isolation from the ancestral species because of the occurrence of barriers of one kind or another.

### Account of Species

In the following portion of the report I include every identifiable species reported to occur on the island as well as specimens identified only to genus or family. It is hoped that the mention of material in the latter category will alert future investigators of the fauna to the fact that such forms are present and that further attention should be given to them. For the convenience of taxonomists I include in the generic and subgeneric references not only the original citation but reference to one or more recent treatments of the group, where relevant. Also, in all cases I give the accepted type-species designation.

Under the species heading I give not only the original reference, but all references citing the presence of that species on Easter Island. I also refer whenever possible to descriptions and figures in two recent works on Indo-Pacific mollusks, those of Cernohorsky (1971b, 1972a) and Salvat and Rives (1975). In the citation of original descriptions I indicate in square brackets the type-locality whenever possible; the absence of a type-locality means that either the provenance of the species was unknown to the original describer or the locality given was so broad and general as to be virtually meaningless.

The material listed and measurements given are of Easter Island specimens unless otherwise indicated.

I provide a figure of most of those species that have not been figured in the two recent books cited above or in any other readily available faunistic paper. Unless otherwise indicated, the specimens figured are from Easter Island.

For those species previously described and known I give a brief diagnosis pointing out the principal distinguishing characters; in those instances where the species was poorly known or was described from im-

mature or imperfect specimens I expand the diagnosis. Species described here as new carry both a diagnosis and a more detailed description.

In the course of identifying some of the species and allocating them to the proper genus or subgenus, I encountered questions in taxonomy and systematics that, although lying outside of the immediate subject area of this report, are, in my judgment, matters whose clarification is of importance to workers in the Indo-Pacific fauna. In these instances, therefore, I have expanded my remarks to take such matters into account.

In certain aspects of the classification used, I tend to be conservative. The proposal, as suggested by Kosuge (1966) and Climo (1975) that certain super families such as the Architectonicacea, Triphoracea, and Epitoniacea be included in a suborder Heterogastropoda and placed possibly in the Opisthobranchia is, in many respects, intriguing; however, I feel that much more morphological study needs to be carried out before such a move can satisfactorily be approved.

The following abbreviations for institutions are used in this paper:

AMS	Australian Museum, Sydney
ANSP	Academy of Natural Sciences, Philadelphia
BM (NH)	British Museum (Natural History), London
BIBM	Bernice P. Bishop Museum, Honolulu
CAS	California Academy of Sciences, San Francisco
GM	Göteborg Museum, Göteborg
IRSNB	Institut Royal des Sciences Naturelles de Belgique, Brussels
MCZ	Museum of Comparative Zoology, Cambridge, Massachusetts
MHNP	Museum National d'Histoire Naturelle, Paris
MNSH	Museo Nacional de Historia Natural, Sección Hidrobiología, Santiago, Chile
NMNH	National Museum of Natural History, Smithsonian Institution, Washington
NRS	Naturhistoriska Riksmuseum, Stockholm
UBC	University of British Columbia, Museum of Zoology, Vancouver
UCC	Universidad de Concepción, Concepción, Chile.
UMML	University of Miami School of Marine and Atmospheric Science, Miami
USNM	United States National Museum collections (in the National Museum of Natural History, Smithsonian Institution, Washington)
ZIL	Zoological Institute, Academy of Science, Leningrad
ZMC	Zoological Museum, Copenhagen

## Class POLYPLACOPHORA

## Family MOPALIIDAE Dall, 1889

Genus *Plaxiphora* Gray, 1847Subgenus *Mercatora* Leloup, 1942

*Plaxiphora*, subgenus *Mercatora* Leloup, 1942:43.—A. G. Smith, 1960:163. [Type-species: *Plaxiphora mercatoris* Leloup, 1936; original designation.]

*Plaxiphora (Mercatora) mercatoris* Leloup, 1936

## PLATE 4: FIGURE 1

*Acanthopleura brevispinosa* Sowerby.—Lamy, 1936:267; 1938:133.—Steele, 1957:111. [Not *Acanthopleura brevispinosa* Sowerby, 1840.]

*Plaxiphora (Poneroplax) mercatoris* Leloup, 1936:1–6, figs. 1–9 [Easter Island].

*Plaxiphora (Mercatora) mercatoris* Leloup.—Leloup, 1942:40, fig. 18J.

DIAGNOSIS.—A rather large, somewhat depressed species, up to 55 mm long and 35 mm wide, the surface of the valves usually worn and obliterating the sculpture; young specimens bluish green in color with the valves covered with irregular, flattened, subgranulose, zigzag ridges. The girdle is covered with irregular, bluntly pointed spines that have a chitinous base and a calcareous upper part, the tip reddish brown.

RANGE.—Easter Island.

HABITAT.—In holes, depressions, or crevices, on rocks near tide line down to 60 feet, and on rocks in tide pools.

MATERIAL.—20 specimens from stas E-5, E-18, E-27, E-28, E-31, E-34, E-35; 2 specimens on rocks in 60 ft (18 m), off Motu Tautara, 7 Feb 1969, J. E. Randall, BPBM 206963; 3 specimens, tide pool, between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 206947; 1 specimen, tide pool, between Hanga Roa and Hanga Piko, J. E. Randall, USNM 756791; 4 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200458; 1 specimen Hanga Piko, 1958, R. Vargas D., MNSH 200459; 4 specimens, Jan 1961, S. Englert, USNM 631949; 5 specimens, 1 July 1957, J. Pellisier, UCC.

MEASUREMENTS (mm).—Measurements estimated for USNM 756279, a dried partly enrolled shell.

length width height

USNM 756791	39.37	20.28	6.11
USNM 756279	60	35	10

REMARKS.—This endemic loricata, the only one known from Easter Island, is relatively abundant near the water line and in tide pools. It grows to a larger size than the 31 mm given by Leloup (1936:3) for his largest specimen, as the measurements of a dried shell given above show.

It seems most closely related to species of the subgenera *Guildingia* Dall, 1882, and *Maorichiton* Iredale, 1914, from New Zealand and the Kermadec Islands.

## Class GASTROPODA

## Family FISSURELLIDAE Fleming, 1822

## Subfamily EMARGINULINAE Gray, 1834

Genus *Emarginula* Lamarck, 1801

*Emarginula* Lamarck, 1801:69.—Pilsbry, 1891:248.—Thiele, 1913:45.—Wenz, 1938:175. [Type-species: *Emarginula conica* Lamarck, 1801 (= *Patella fissura* Linné, 1758); monotypy.]

*Emarginula velascoi*, new species

## PLATE 4: FIGURES 2, 3

*Emarginula concinna* A. Adams.—Couturier, 1907:172.—Dautzenberg and Bouge, 1933:414. [Not *Emarginula concinna* A. Adams, 1852.]

*Emarginula* sp.—Steele, 1957:113.

DIAGNOSIS.—Shell small, white, broadly oval, rather elevated, apex posteriorly directed and about ¼ of total length from posterior margin, strongly cancellated by axial ribs and concentric lirae. Somewhat smaller, more elevated, and with finer cancellation than *E. subclathrata* Pilsbry, 1890, from the central Pacific.

RANGE.—Easter Island, Tuamotus, and Gambier Islands.

DESCRIPTION.—Shell rather small, 2.7 to 6 mm in length, broadly oval, moderately elevated with apex involute, directed posteriorly and situated at about ¼ of the total length from the posterior margin (in larger specimens occasionally more anteriorly located,



in smaller ones closer to the posterior edge). Exterior white, sculptured with 21 to 24 rather strong axial ribs and numerous, somewhat more slender concentric ridges, which near the apex and often at the sides of the upper half of the selenizone are fine and crowded but on the rest of the shell are stronger and more distant, forming nodes where they intersect the axial ribs and resulting in a pattern of deep squarish pits. The selenizone is elevated between two narrow ribs and sculptured with a series of rather crowded, curved, or roundish nodes; the sinus is narrow and moderately deep, measuring about 1/5 of the total length of the shell.

**MATERIAL.**—Holotype: sta E-10A, USNM 756019. Paratypes: 7 specimens from stas E-27A and E-30; 9 specimens, 1958, R. Vargas D., MNSH 200381; 2 specimens, S. Englert, CAS 58391, 58392; 37 specimens from 7 stations on Raroia and Makatea in the Tuamotus and 19 specimens from Aukena in the Gambier Islands, all in NMNH.

**MEASUREMENTS (mm).—**

	<i>length</i>	<i>width</i>	<i>height</i>
USNM 756019 holotype	4.91	3.55	1.83
USNM 756207 paratype	5.95	4.70	2.32
USNM 756207 paratype	4.85	3.62	1.56
USNM 756207 paratype	2.70	1.85	0.90

**REMARKS.**—As mentioned above, this species is closest to *Emarginula subclathrata* Pilsbry, 1890. Pilsbry proposed this taxon for the figure that Sowerby in 1866 had given for *E. clathrata* Pease, 1863, as he felt that the Sowerby figure depicted a shell different, shorter, and broader than what might properly be included in *E. clathrata* Pease. Kay, however, examined Sowerby's specimen (Kay 1965:75) and found that it falls well within the range of variability of the Pease species. Since Pease's name is preoccupied by *Emarginula clathrata* Deshayes, 1824, and *E. clathrata* Adams and Reeve, 1850, Pilsbry's name can be used for Pease's species, and the name *E. peasei* Thiele, 1915 is unnecessary.

I have been able to examine the specimen designated as holotype of *Emarginula concinna* A. Adams, 1852, to which Couturier referred his material from the Tuamotus (Couturier, 1907:172). This specimen agrees with the figure given by Adams and Sowerby (1863:212, pl. 246: figs. 34, 39, 40), and has 25 radiating ribs, not 12 as mentioned in the original description account, which may represent the number on one side only. Pilsbry (1890-1891:257) is prob-

ably correct in stating that *Emarginula concinna* A. Adams may be a synonym of *E. elongata* Costa, 1829 (not of *E. cancellata* Philippi, 1836). I have compared the holotype with specimens of *E. elongata* from the Mediterranean and can find no essential differences.

*Emarginula elongata* Costa is larger, more elevated, with more numerous radiating ribs, 28-33 in number, than this new species.

**ETYMOLOGY.**—This species is dedicated to Sr. Gerardo Velasco, who in 1974 was director of the Agencia Isla de Pascua of the Corporación de Fomento de la Producción (CORFO) of Chile. Without his generous assistance we would not have been able to accomplish as much as we did during our stay on Easter Island.

**Genus *Zeidora* A. Adams, 1860**

*Zeidora* A. Adams, 1860:301-302.—Thiele, 1913:41.—Wenz, 1938:174.—Habe, 1951b:112. [Type-species: *Zeidora calceolina* A. Adams, 1860; monotypy.]

***Zeidora bahamondei*, new species**

**PLATE 4: FIGURES 4, 5**

**DIAGNOSIS.**—Shell of moderate size, with cancellate sculpture, broader, lower, and more convex than *Z. reticulata* A. Adams, 1862, and *Z. calceolina* A. Adams, 1860, with the sides more flattened out and the posterior margin broader with a shallow sinus under the projecting apex.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell small to moderate size, to 5.2 mm in length; whitish, subtranslucent; broadly oval in outline with the sides subparallel and the posterior margin sinuous and convex on each side of the projecting median apex, slit at the anterior end rather broad; selenizone with distinct, slightly raised margins and subregular curved ribs marking former posterior termini of the sinus; rest of surface with axial and concentric riblets resulting in a regular cancellate sculpture, the axial riblets diverging from the selenizone.

**MATERIAL.**—Holotype: Vaihu, 1958, R. Vargas D., MNSH 200403. Paratype: type-locality, MNSH 200402.



MEASUREMENTS (mm).—Anterior end of MNSH 200402 broken, affecting length measurement.

	length	width	height
MNSH 200403 holotype	5.18	3.14	1.25
MNSH 200402 paratype	4.2	2.9	1.2

REMARKS.—Unfortunately only two not quite perfect specimens of this interesting species were found in the collection of the Museo Nacional de Historia Natural in Santiago. It is the first known representative of this genus from the central Pacific; no specimens of *Zeidora* have turned up in the extensive collections made in Polynesia and Hawaii. It is very different from *Z. flabellum* Dall, 1896, from off Clarion Island, off the Mexican coast.

ETYMOLOGY.—This species is dedicated to Dr. Nibaldo Bahamonde N., who at the time of our visit to Chile was acting director of the Museo Nacional de Historia Natural in Santiago, and whose kindness and cooperation made our visit in Santiago both pleasant and profitable.

#### Subfamily DIODORINAE Wenz, 1938

##### Genus *Diodora* Gray, 1821

*Diodora* Gray, 1821:233.—Wenz, 1938:182.—Keen, 1960:1230. [Type-species: *Patella apertura* Montagu, 1803 (= *Patella graeca* Linné, 1758); monotypy.]

##### *Diodora granifera* (Pease, 1861)

PLATE 4: FIGURES 6, 7

*Fissurella granifera* Pease, 1861:244 [Sandwich Islands].—Sowerby, 1862:199, pl. 7: fig. 165.—Kay, 1965:70, pl. 12: figs. 3, 4.

*Fissurella* sp.—Dall, 1908a:437.—Steele, 1957:112.

*Glyphis foveolata* (Garrett).—Odhner, 1922:248.—Steele, 1957:112. [Not *Fissurella foveolata* Garrett, 1872.]

*Diadora* [sic] *granifera* Pease—Edmondson, 1933:146, figs. 71b, d.

*Glyphis exquisita* (Reeve).—Lamy, 1936:268; 1938:141.—Steele, 1957:112. [Not *Fissurella exquisita* Reeve, 1850.]

DIAGNOSIS.—Shell small (usually up to 8.8 mm in length, but occasionally reaching 13 mm), broadly oval, radial sculpture predominant over the concentric sculpture, more or less finely cancellate, whitish and usually irregularly blotched or rayed with grayish green, gray, or brown. More finely sculptured and less

strongly cancellate than *D. foveolata* (Garrett) from Fiji.

RANGE.—Hawaiian Islands, Society Islands, Tuamotus, Gambier Islands, and Easter Island.

MATERIAL.—22 specimens from stas E-10A, E-17, E-18A, E-20, E-27A, E-30; 2 specimens, in large tide pool, Apina Nui, W of Hanga Roa, Apr 1977, A. J. Kohn, USNM 769721; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204073; 27 specimens, 1958, R. Vargas D., MNSH 200401; 3 specimens, Aug 1968, H. G. Richards, ANSP 321081; 4 specimens, S. Englert, CAS; 1 specimen, S. Englert, CAS.

MEASUREMENTS (mm).—

	length	width	height
USNM 756018	8.86	5.80	3.42
USNM 756020	8.60	6.30	4.35
USNM 756075	8.30	6.13	4.08
USNM 756112	6.50	4.44	2.68

REMARKS.—Although the specimens of this species from Easter Island differ in color, being blotched and rayed with brown rather than grayish green, I can find no other basic difference in shape or sculpture on which to separate them. The sculpture in *D. granifera* does show some variation in the relative strength of the radial and concentric components and in the nature of the resulting reticulation. The older specimens tend to have a more convex posterior slope and a more or less arcuate base.

#### Family TROCHIDAE Rafinesque, 1815

##### Genus *Euchelus* Philippi, 1847

##### Subgenus *Herpetopoma* Pilsbry, 1890

*Euchelus*, subgenus *Herpetopoma* Pilsbry, 1890:430. [Type-species: *Euchelus scabriusculus* Angas, 1867; original designation.]

REMARKS.—This group was proposed as a section of *Euchelus* by Pilsbry principally on the basis of the species possessing a multispiral operculum, as opposed to the paucispiral operculum of *Euchelus*. Although this difference is usually considered a taxonomically basic one, I am not prepared to raise *Herpetopoma* to generic rank on this character alone, as has been done by some workers in Australia and New Zealand (Iredale and McMichael, 1962:32; Powell, 1976:82); further study of the radula and other anatomical characters is needed to corroborate the

justification of such a separation. I therefore follow Wenz (1938:274) and Keen (1960b:1250) in considering it a subgenus of *Euchelus*, as the other shell characters in the two groups are very similar.

I should point out that the date of *Herpetopoma* should be 1890 and not 1889 as given by Wenz and Keen (Clench and Turner, 1962:65, 167).

### *Euchelus (Herpetopoma) alarconi*, new species

PLATE 4: FIGURE 8

*Euchelus foveolatus* A. Adams.—Odhner, 1922:248.—Steele, 1957:112. [Not *Euchelus foveolatus* A. Adams, 1853.]

*Euchelus gemmatus* (Gould).—Lamy, 1936:268; 1938:141.—Steele, 1957:112. [Not *Trochus gemmatus* Gould, 1852.]

DIAGNOSIS.—A small species, depressed-globose-conic, white, spotted with dark brown (reddish in dead shells), resembling *E. (H.) gemmatus* (Gould) from the Hawaiian Islands but more broadly conic and lacking the funicle-like cord entering the umbilicus.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, adult specimens measuring from 3.6 to 5.1 mm in width, with a broadly conic spire and rounded whorls. Protoconch planorboid, smooth, 1¼ whorls; postnuclear whorls (in holotype) 4¼ in number, first half of first postnuclear whorl with strong prosocline, prosoclyt ribs, which in the second half become gradually weaker as they are crossed by two increasingly stronger spiral cords giving the whorl a biangulate appearance; at the end of the first postnuclear whorl, a subsutural cord begins to become evident and on the second postnuclear whorl the cords become increasingly nodose, with the axial ribs in the interspaces that connect the conspicuous round nodes increasing in strength, giving the whorl a clathrate appearance; on the third postnuclear whorl an additional spiral cord arises between the subsutural cord and the one below it, and shortly thereafter another spiral cord arises between the suprasutural cord and the one above, so that the penultimate whorl has 5 nodose spiral cords. Last whorl evenly convex, with 10 spiral cords, the ones on the base with increasingly low knobs and obscure axial ribs in the interspaces. The moderately

narrow umbilicus deep and bordered by a weakly nodulose ridge. Ground color of shell white with the nodes colored brown or blackish brown in groups of from two to four nodes, with white nodes in between; this often gives the shells an irregular, axially strigate appearance; in dead shells the color maculations become reddish. Aperture suboblong, columella lip straight, perpendicular, with a broad tooth at the base and a deep notch between it and a prominent tooth on the basal lip; outer lip evenly arcuate, reflected, with 7 long, palatal folds, and 7 smaller alternating folds near the outer end of the long folds; some obscure irregular nodes may be present on the lower portion of the columellar callus and the adaxial part of the reflected lip. Operculum thin, horny, circular, obscurely multispiral.

HABITAT.—In rocky tidepools crawling on algae-covered rocks and under stones.

MATERIAL.—Holotype: sta E-27, USNM 756195. Paratypes: 170 specimens from stas E-1, E-10A, E-13, E-17, E-18A, E-27A, E-30A, E-31; 1 specimen, in large tide pool, Apina Nui, W of Hanga Roa, Apr 1977, A. J. Kohn USNM 769720; 1 specimen, beach drift, Hanga Piko, 1 Jul 1917, K. Bäckström, GM Moll. 12013; 38 specimens, 1958, R. Vargas D., NMSH 200428; 9 specimens, Aug 1968, H. G. Richards, ANSP 321082; 11 specimens, Oct 1968, P. C. McCoy, ANSP 315539; 50 specimens, S. Englert, CAS 58394-58457; 1 specimen, S. Englert, CAS 58393.

#### MEASUREMENTS (mm).—

		width	height
CAS 58394	paratype	5.10	5.20
USNM 756195	holotype	4.95	4.84
USNM 755995	paratype	4.80	4.40
USNM 755005	paratype	3.60	3.80

REMARKS.—This species is very distinct from *E. foveolatus* A. Adams, 1853 (*E. angulatus* Pease, 1867, is a junior synonym), a relatively abundant species in Polynesia, which is the type-species of the subgenus *Vaceuchelus* Iredale, 1929, characterized by the absence of a tooth and notch at the base of the columella. *Euchelus alarconi* is most closely related to *E. gemmatus* (Gould, 1852), from the Hawaiian Islands, but this species is more elevated and globose and has a narrow ridge ascending into the umbilicus.

ETYMOLOGY.—Named for Benito Alarcón F., amateur conchologist, who was our guide and collecting assistant during our stay on Easter Island.

## Family STOMATELLIDAE Gray, 1850

### Genus *Stomatella* Lamarck, 1816

*Stomatella* Lamarck, 1816:10, pl. 450. [Type-species: *Patella lutea* Linné, 1758 (= *Stomatella auricula* Lamarck, 1816); Anton, 1839.]

*Gena* Gray, 1850:90. [Type-species: *Stomatella nigra* Quoy and Gaimard, 1834; Thiele, 1924.] [Not *Gena* Gray in sensu Pilsbry, 1890.]

*Gena*, subgenus *Plocamotis* Fischer, 1885:840. [Type-species: *Gena laevis* Pease, 1868; original designation.]

REMARKS.—Keen (1960b:1263) places *Gena* Gray, 1850, as a subgenus under *Stomatella*, separating it from the nominate subgenus on the character of possessing a striate last whorl. This is incorrect, however, as *Stomatella nigra* Quoy and Gaimard, 1834, the type-species of *Gena*, has, according to Quoy and Gaimard, a basically smooth body whorl with 6 or 7 longitudinal striae on the right or columellar edge. This sculptural character is found also in *S. auricula* Lamarck, the type-species of *Stomatella*, of which *Gena* therefore becomes a junior synonym.

In his description of the type of *Stomatella auricula* Lamarck, Mermod (1963:137–138) says that the last whorl shows under magnification 28 fine and spaced grooves. As Lamarck and later authors describe this species as smooth, I was anxious to determine the precise nature of the sculpture of the holotype. Through the kindness of Dr. E. Binder of the museum in Geneva I have been able to examine photographs showing the sculpture of the last whorl and spire considerably magnified. These photographs show that the early half of the body whorl does have distinct grooves, which, however, become obscure on the latter half of the whorl, making the shell appear smooth to the naked eye.

*Plocamotis* Fischer, 1885, was proposed as a subgenus of *Gena* based on distinctive characters of the external characters of the animal as shown by Pease for his *Gena laevis* (1868b:283, pl. 23: fig. 28). Hedley, however, gives a drawing of the living animal of *Gena strigosa* A. Adams (Hedley, 1916:703–704, pl. 46: fig. 11) that shows the same paired epipodial cirrhi and mantle lobes acting as siphons that Pease had in his figure and that Fischer judged distinctive enough to warrant the erection of his subgenus *Plocamotis*. Hedley comments that Fischer was probably misled by A. Adams' defective sketch that showed

neither the cirrhi nor mantle lobes of the animal of *G. planulata* (H. and A. Adams, 1853–1854, pl. 50: figs. 2, 2a) and states that *Plocamotis* is an absolute synonym of *Gena*. Until a more critical comparative study is made of these characters in the species with a smooth last whorl, I follow Keen (Keen 1960b:1263) in considering *Plocamotis* to be a junior synonym of *Stomatella*.

### *Stomatella esperanzae*, new species

PLATE 4: FIGURES 9–11

*Gena varia* A. Adams.—Odhner, 1922:248.—Steele, 1957: 112. [Not *Gena varia* A. Adams, 1850.]

DIAGNOSIS.—This species is smaller on the average than *Stomatella auricula* Lamarck and *S. varia* (A. Adams), less elongate, more convex and elevated, and of a predominantly brownish or reddish color, with irregular radially oriented spots of white, or mottled with white and dark red brown in an irregular, axial zigzag pattern.

RANGE.—Easter Island.

DESCRIPTION.—Shell of small to moderate size, 3.5 to slightly over 8 mm in length, elongate ovate, rather strongly convex; spire moderately elevated, protoconch and early post nuclear whorls worn, whorls  $3\frac{1}{2}$  to  $3\frac{3}{4}$  in number, rapidly increasing, older shells becoming more elongate, the protoconch being situated at  $\frac{1}{5}$  of the total length in smaller shells, and at  $\frac{1}{10}$  of the total length in the largest specimen; body whorl descends strongly at the aperture. Sculpture in penultimate whorl consisting of pronounced spiral lirae with a strong one on the slightly angulate shoulder and a stronger one at the periphery just at the suture. These 2 strong cords rapidly decrease in strength on the last whorl as do the other lirae on the upper part of the whorl, becoming broad and flat so that the sculpture on the dorsal surface consists of distant grooves, crossed by strong axial folds, strongest below the suture; the grooves become obscure toward the aperture, especially in larger specimens. On the ventral side, between the columella and the periphery the spiral lirae are strong and keel-like. Color in fresh specimens from scarlet to reddish brown, with irregular white splotches usually with a dark margin anteriorly, the spots sometimes arranged in a spiral pattern. Aperture broadly ovate, somewhat oblique,

posteriorly acute, internally reddish, covered with a thin nacreous layer. Columella arcuate, rather broad, white.

**HABITAT.**—All our material unfortunately was collected dead either in sand or under rocks. The species probably lives in the tide pools under rocks and in the algal growth on the rocks.

**MATERIAL.**—Holotype: sta E-30, USNM 756113. Paratypes: 7 specimens, stas E-27, E-30; 3 specimens, beach drift, Hanga Piko, 1 Jul 1917, K. Bäckström, GM Moll. 11914; 40 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200430; 2 specimens, Aug 1968, H. G. Richards, ANSP 312080; 2 specimens, S. Englert, CAS 58459, 58460; 1 specimen, S. Englert, ANSP 222425.

**MEASUREMENTS (mm).**—Length and width measured on the longest axis; height measured with the shell resting on a plane surface.

	<i>length</i>	<i>width</i>	<i>height</i>
USNM 756113 holotype	6.05	3.65	2.35
ANSP 321080 paratype	8.40	4.80	2.80
USNM 756770 paratype	8.20	4.80	2.85
USNM 756770 paratype	7.15	4.35	2.50
USNM 756770 paratype	5.40	3.40	1.95
USNM 756770 paratype	4.40	2.70	1.60
USNM 756770 paratype	4.10	2.75	1.50

**REMARKS.**—A relatively small species that differs from related and similar species in having a broader, higher, more convex shell, with a higher spire, and more pronounced sculpture on the spire, and in being predominantly reddish brown in color.

It seems most closely related to *S. laevis* (Pease) found in the Polynesian and Micronesian provinces.

**ETYMOLOGY.**—Named for Esperanza Pakarati de Alarcón, who with her husband, Benito Alarcón, accompanied us on several of our trips around the island and assisted materially in our collecting efforts.

#### Family NERITIDAE Lamarck, 1812

First used in the vernacular form "Néritacées" (Lamarck, 1812:117).

#### Genus *Nerita* Linné, 1758

#### Subgenus *Heminerita* Martens, 1887

*Nerita*, subgenus *Heminerita* Martens, 1887:9; 1889:125. —Crosse, 1892:98. [Type-species: *Nerita pica* Gould, 1859 [not *Nerita pica* Gmelin, 1791] (= *Nerita japonica*

Dunker, 1861); monotypy.]

*Nerita*, subgenus *Puperita* Gray, section *Heminerita* Martens.—Baker, 1923:163.

**DIAGNOSIS.**—Shell with low, rounded spire, black or black with white maculations, smoothish or with low spiral lirae. Columellar area smooth; columellar lip slightly sinuate, without teeth, or with only one or two obscure low broad projections in center; inside of outer lip smooth. Operculum finely granose, with lateral apophysis flattened, spatulate.

**REMARKS.**—H. B. Baker has generally been followed in assigning this group as a section or subgenus of *Puperita* Gray, 1857 (Baker, 1923:163; Thiele, 1929:73; Wenz, 1938:421). Baker considered *Puperita* a subgenus of *Nerita*. He based the allocation of *Heminerita* largely on the nature of the radula. He was not able to examine, however, a radula of the type-species *N. japonica* Dunker, but figured instead as representative of this species a radula of *Nerita rudis* Pease, 1867, from Ponape, which he considered to be a synonym of *N. japonica*; this conclusion appears to be questionable. *Nerita rudis* Pease is more likely to be related to, or a synonym of, *Nerita bensoni* Recluz, 1850.

Baker included under *Heminerita*, in addition to the type-species, the species *N. bensoni* Recluz, 1850, and *N. amoena* Gould, 1847.

Both of these last two species, however, should be placed under *Puperita*, the operculum of *N. bensoni* agreeing closely with that of *P. pupa* (Linné) in possessing two peg-like apophyses; furthermore the central area of the edge of the inner lip of both species is minutely denticulate, a situation not found in *N. japonica*.

Two years after his introduction of *Heminerita*, Martens added the species *Neritina morio* Sowerby, 1833, to his hitherto monotypic group. This species has been placed by most workers in the subgenus *Melanerita* Martens, 1889, whose type-species, designated by Crosse (1892:98), is *Nerita yoldii* Recluz, 1845. Other members of the subgenus *Melanerita* have often been cited as the type in line with Baker's citation of *Nerita nigra* Martens (ex Gray), 1888, as type-species. This latter species is a mixture of two distinct species: *Nerita atramentosa* Reeve, 1855 (+ *N. melanotragus* E. A. Smith, 1884) from Australian waters, and *N. saturata* Hutton, 1884, from New Zealand and the Kermadecs. *Melanerita* differs



from *Heminerita* in having the interior of the outer lip denticulate, not smooth.

Species assigned at the present time to *Heminerita* are: *Nerita japonica* Dunker, 1861, from Japan; *N. morio* (Sowerby, 1833), southeastern Polynesia; *N. lirellata*, new species, from Easter Island, and probably *N. insculpta* Recluz, 1841, from the western Pacific.

*Nerita (Heminerita) morio* (Sowerby, 1833)

FIGURE 6; PLATE 4: FIGURES 12, 13

*Neritina morio* Sowerby, 1833b:201–202 [Ducie and Easter Islands: type-locality here restricted to Easter Island].—Reeve, 1855 (in 1855–1856), pl. 9: sp. 43.

*Nerita haneti* Recluz, 1841:181 [Marquesas].

*Nerita neritinoidea* Reeve, 1855, pl. 5: species 21, fig. 17.

*Nerita morio* (Sowerby).—Martens, 1888:104, pl. 13: figs. 19, 20.—Odhner, 1922:248 [in part].—Steele, 1957:112.

*Nerita (Heminerita) morio* (Sowerby).—Martens, 1889:129.

*Nerita (Odontostoma) morio* (Sowerby).—Lamy, 1936:268; 1938:141.

DIAGNOSIS.—This stout black species is characterized by its low, dome-shaped spire, which in larger specimens may appear moderately elevated because of the downward flexure of the last whorl at the aperture. The penultimate whorl is marked by fine irregularly and more or less distantly spaced incised lirae, which on the latter half of the body whorl may become obscure furrows.

RANGE.—From Easter Island and Sala y Gómez westward in a narrow band through the Pitcairn Islands and Rapa to the Gambier and Austral Islands (Figure 6). Recluz gives the Marquesas Islands as the type-locality of *Nerita haneti*, but extensive collecting on Nuku Hiva and other islands in the group has not turned up this species.

HABITAT.—On and under rocks in tide pools, and on rocks at water's edge and in wave-surge area.

MATERIAL.—About 600 specimens from stas E-1, E-2, E-4, E-8, E-9, E-10, E-11, E-14, E-15, E-16, E-17, E-18, E-24, E-27, E-27A, E-28, E-29, E-33, E-34; 9 specimens, in tide pool zone, between Hanga Roa and Hanga Piko, 1–2

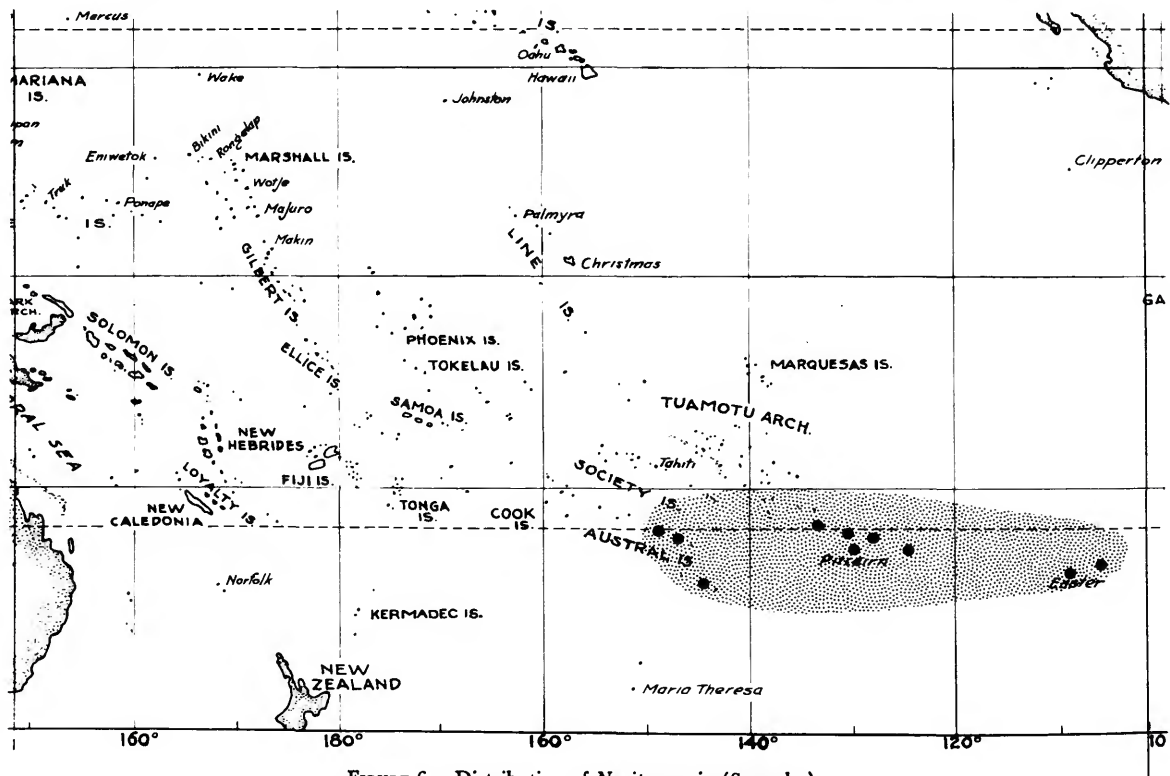


FIGURE 6.—Distribution of *Nerita morio* (Sowerby).



ft (0.3–0.6 m) above sea level, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206937; 20 specimens, along shore and in tide pools, 0–6 in (0–15 cm) depth, between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206939; 1 specimen, in tide pool, between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 206948; 1 specimen, tide pool, S end of Hanga Roa, J. E. Randall, BPBM 206968; 6 specimens, Hanga Piko, 31 Dec 1964, I. Efford, UBC 6317a; 71 specimens, Vinapu, above tide line on rocks, 25 Jan 1965, I. Efford, UBC 6328; 5 specimens, Vaihu, 3 Jan 1965, I. Efford, UBC 6537; 3 specimens, Hotuiti, 8 Aug 1972, M. Villarroel, USNM 708442; 28 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 4 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200281; 2 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200357, 200280; 24 specimens, 1958, R. Vargas D., MNSH 200286; 11 specimens, May 1960, L. Perez, MNSH 200285; 1 specimen, 1954, Prof. Baeza, MNSH 200269; 3 specimens, H. Cuming, (? syntypes), USNM 104268; 6 specimens, Dec 1904, USBF Str. *Albatross*, USNM 610451; 11 specimens, S. Englert, CAS; 1 specimen, S. Englert, CAS; 186 specimens, Aug 1968, H. G. Richards, ANSP 321105; 95 specimens, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317405; 28 specimens, 1 Jul 1957, J. Pellisier, UCC.

From Sala y Gómez: 2 specimens, on stones in intertidal zone, 21 Aug 1972, I. Melnikov, USNM 766830.

#### MEASUREMENTS (mm).—

	width	height
USNM 751557	18.66	18.03
USNM 751557	18.55	17.98
USNM 751557	19.20	17.35
USNM 751557	16.42	15.63
USNM 751557	13.22	13.13

REMARKS.—Martens (1888–1889:104–106) was the first to determine the correct synonymy of this species as delineated above.

In most papers on the mollusks of Easter Island *N. morio* and the following new species *N. lirellata* have been lumped together; e.g., the material identified as *N. atrata* Reeve by Dall (1908a:437) consisted of 18 specimens of *N. lirellata*, new species, and three of *N. morio* (Sowerby). Dr. Bengt Hubendick (in litt.) informs me that the material reported on by Odhner (1922:248) and listed as *Nerita morio* (Sowerby) contains both species. In the material collected by Father Englert, sent to me by the California Academy of Sciences, and reported on by Steele (1957:112), both species were mixed and identified as *N. morio*.

*Nerita morio* differs most noticeably from *N. lirellata* in lacking the pronounced spiral grooves and

ridges found on the latter, in possessing a more or less shiny surface, not dull as in *N. lirellata*, and in the columella lip having several weak teeth, rather than only one; the exterior of the operculum is tinged more or less extensively with orange and is not uniformly gray. There is no apparent ecological separation of the two species; on two occasions I found both species on the same rock in about equal proportions. Occasionally, however, I did find a segregation of these species. In Hanga Papara *N. morio* was found on rocks at the shore line down to 1 ft (0.3 m), while *N. lirellata* was found under rocks in 2 to 3 ft (0.6 to 0.9 m) of water.

Through the kindness of Dr. John D. Taylor of the British Museum, I have had the opportunity of examining a syntype each of *Neritina morio* Sowerby, BM(NH) Moll 1967689, and *Nerita neritinoidea* Reeve, BM(NH) Moll 197541, and was able to confirm their identity with *Nerita haneti* Recluz, a conclusion at which I had already arrived from the examination of specimens of *Nerita morio* from Easter Island sent to Isaac Lea by Hugh Cuming, the original collector.

Cernohorsky (1972a:49) in his remarks under *Nerita picea* Recluz, 1841, mentions that *N. morio* has been recorded from Indonesia by Adam and Leloup (1938:55). I have been able to examine these specimens through the courtesy of Dr. W. Adam and Dr. J. Van Goetham and find that they are not *N. morio* but belong to an as yet undetermined species. I have at the same time studied material of what was identified as *N. picea* from Indonesia by Adam and Leloup (1938:55) and find that they are *N. ocellata* Le Guillou, 1841; *Nerita picea* is restricted to the Hawaiian Islands. *Nerita carbonaria* Philippi, 1844, which Cernohorsky (1972a:49) puts in the synonymy of *N. morio*, is a nomen dubium and must remain as such for the present until Philippi's type can be located.

#### *Nerita (Heminerita) lirellata*, new species

PLATE 4: FIGURES 14, 15

- Nerita atrata* Reeve.—Dall, 1908a:437 [in part].—Steele, 1957:112. [Not *Nerita atrata* Reeve, 1855.]  
*Nerita morio* (Sowerby).—Odhner, 1922:248 [in part]. [Not *Neritina morio* Sowerby, 1833.]  
*Nerita (Peloronta) atrata* Reeve (ex Chemnitz).—Lamy, 1936:268; 1938:141.

**DIAGNOSIS.**—From the closely related *Nerita morio* (Sowerby), this species differs in having a dull exterior surface sculptured with regular spiral furrows and ridges, a lower spire, a columellar lip with only one very obscure tooth, and an operculum whose calcareous part is more minutely granulose and almost uniformly gray rather than orange with blackish margin.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell rather large reaching a size of 23.5 mm in width, transversely broadly oval, paucispiral with a low spire, externally dull black, with a worn white apex, a columellar area suffused with orange, and aperture bluish gray within. Protoconch about  $1\frac{1}{2}$  whorls, worn, (probably low dome-shaped, glassy, yellowish, as in *N. morio*); postnuclear whorls about  $1\frac{3}{4}$  in holotype, sculptured by spiral, rather evenly spaced spiral ridges, occasionally with very fine spiral lirae in the interspaces; in body whorl the spiral ridges become rather broad and rounded; aperture large, patulous, suborbicular; outer lip evenly rounded except near posterior end, where it is slightly bowed by the down-flexure of the outer lip; internal edge black, minutely crenulate; a smooth white thickened callus is present at a short distance within the aperture, beyond which the interior is pale bluish gray. Columellar lip slightly angled near middle with one very low obscure toothlike projection in center; columellar area broad, smooth, orange yellow except for narrow whitish areas near upper and lower ends of the columellar lip edge; the basal part of the outer edge of the columella area is bounded by the continuation of the outer lip, while apicad there is a tongue-like extension of the orange columellar area to the end of the outer lip; the columellar glaze covers a part of the body whorl between the end of the outer lip. Operculum rather narrowly ovate, upper end narrowed, columellar edge somewhat sinuate, outer and basal edge with a chitinous margin that is colored reddish orange on the inner edge; exterior finely granulose, granulation weaker along outer edge, bluish gray in color, internally with a rib at the basal end and a flat, curved apophysis with broad truncate end, strengthened externally by a strut projecting from the inner edge.

**HABITAT.**—Similar to that of *N. morio*, namely on rocks in tide pools and at water's edge as well as in wave-surge areas.

**MATERIAL.**—Holotype: sta E-10, USNM 756795. Paratypes: About 160 specimens from stas E-4, E-8, E-10, E-14, E-18, E-19, E-24, E-27, E-28, E-29, E-33, E-34; 1 specimen, tide pool between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 206953; 2 specimens, Hotuiti, 8 Aug 1972, M. Villarroel, USNM 708441; 18 specimens, Hanga Roa, 5 Feb 1965, I. Efford, UBC 6321; 3 specimens, in tide pool, Hanga Piko, 31 Dec 1964, I. Efford, UBC 6317; 1 specimen, Hanga Piko, 1958, R. Vargas D., MNSH 200299; 18 specimens, Dec 1904, USBF Str. *Albatross*, USNM 204059; 31 specimens, Aug 1958, H. G. Richards and D. L. Govoni, ANSP 339949; 2 specimens, Aug 1958, H. G. Richards and D. L. Govoni, USNM 756794; 3 specimens, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 339950; 10 specimens, 1 July 1957, J. Peltier, UCC.

**MEASUREMENTS (mm).**—

	<i>width</i>	<i>height</i>
USNM 756795 holotype	22.5	21.2
USNM 756287 paratype	21.78	20.6
USNM 756287 paratype	17.24	16.68
USNM 756046 paratype	13.0	12.96

**REMARKS.**—The differences between this species and the closely related *N. morio* (Sowerby) have been discussed in the diagnosis above and in the remarks under *N. morio*. A fact worth commenting on is the scarcity of young and immature specimens of *N. lirellata*; the great preponderance of such specimens found in and under rocks in tide pools and at the water's edge were of *N. morio*. It may be that the young of *N. lirellata* inhabit a different ecological niche.

**ETYMOLOGY.**—From the Latin *lirellata* (furnished with fine lirae).

**Subgenus *Ritena* Gray, 1858**

*Nerita*, subgenus *Ritena* Gray, 1858:93.—Troschel, 1878: 185, 186. [Type-species: *Nerita plicata* Linné, 1758; monotypy.]

**DIAGNOSIS.**—This subgenus is considered at the present time to be monotypic. The species is characterized by possessing an operculum that is slightly concave and whose exterior is smooth and somewhat granulose on the outer edge and not delimited as a distinct raised band as implied by Gray (1858:93). The parietal area is convex and rugose, and the columellar lip possesses three strong plica-like teeth; there are 3 to 5 moderately strong teeth between 2 large teeth on the inside of the outer lip.

***Nerita (Ritena) plicata* Linné, 1758**

*Nerita plicata* Linné, 1758:779.—Steele, 1957:112.—Salvat and Rives, 1975:51, 81, 90–91, 260, fig. 26.  
*Nerita (Ritena) plicata* Linné.—Gray, 1858:93.—Cernohorsky, 1972a:50, pl. 11: figs. 6, 6a.  
*Nerita (Pila) plicata* Linné.—Lamy, 1936:268; 1938:140.

**DIAGNOSIS.**—A well-known, easily recognized shell, characterized by its rounded, subglobular shape, whitish to grayish color, often maculated with black, its sculpture of strong spiral ridges, 3 strong teeth on the columella, and by its convex rugose columellar area.

**RANGE.**—Throughout the Indo-Pacific region, from East Africa to Clipperton and Easter Island.

**HABITAT.**—On rocks above water level.

**MATERIAL.**—2 specimens from stas E-4 and E-27; 1 specimen, on rocks, Hanga Roa, 5 Feb 1969, J. E. Randall, BPBM 206961; 2 specimens, Motu Iti, 1958, R. Vargas D., MNSH 200256; 3 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200258; 2 specimens, 1958, R. Vargas D., MNSH 200257; 1 specimen, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317408; 1 specimen, S. Englert, CAS.

**MEASUREMENTS (mm).—**

		<i>width</i>	<i>height</i>
USNM	751560	20.78	22.94
ANSP	317408	18.21	18.85
USNM	756199	11.55	12.35

**REMARKS.**—This species, though very abundant elsewhere in Polynesia, is moderately rare here, as I have seen only the 12 specimens listed above.

**Family LITTORINIDAE Gray, 1840****Genus *Nodilittorina* Martens, 1897**

*Littorina*, subgenus *Nodilittorina* Martens, 1897:204. [Type-species: *Littorina pyramidalis* Quoy and Gaimard, 1833; Abbott, 1954.]

*Nodilittorina* Martens.—Abbott, 1954:450–451.—Rosewater, 1970:481.

***Nodilittorina pyramidalis pascua* Rosewater, 1970****PLATE 5: FIGURE 1**

*Tectarius pyramidalis* (Quoy and Gaimard).—Dall, 1908a:437. [Not *Littorina pyramidalis* Quoy and Gaimard, 1833.]

*Littorina undulata?* var.—Fuentes, 1914:316.

*Tectarius nodulosus* (Gmelin).—Odhner, 1922:248.—Steele, 1957:112 [Not *Trochus nodulosus* Gmelin, 1791.]

*Tectarium pyramidale* (Quoy and Gaimard).—Lamy, 1936:267; 1938:138.

*Nodilittorina pyramidalis pascua* Rosewater, 1970:484, pl. 370: figs. 10–13 [Easter Island].

**DIAGNOSIS.**—A sharply conical shell, bluish gray to dark gray in color with nodulosely ribbed whorls, the body whorl strongly angulate. It differs from typical *N. pyramidalis* (Quoy and Gaimard) in being strongly ribbed instead of possessing two spiral rows of nodules.

**RANGE.**—Easter Island and Pitcairn, Oeno, and Henderson in the Pitcairn group.

**HABITAT.**—Found on rock shores well above the high tide line; also occasionally on rocks in shallow, warmwater pools. It often occurs in great numbers; I have seen literally thousands of them living crowded together on some of the rocky platforms on Pitcairn.

**MATERIAL.**—Holotype: Oct 1968, P. C. McCoy, USNM 679290. About 450 specimens from stas E-1, E-4, E-8, E-11, E-14, E-15, E-16, E-17, E-18, E-18A, E-28, E-29, E-31, E-33, E-34, E-35; 9 specimens, Hanga Piko, 31 Dec 1964, I. Efford, UBC 6315; 64 specimens, above tide line, Vinapu, 25 Jan 1965, I. Efford, UBC 6329; 24 specimens, Hanga Roa, 5 Feb 1964, I. Efford, UBC 6342; 6 specimens, Hanga Nui, 8 Aug 1972, M. Villarroel, USNM 708435; 64 specimens, in tide pool zone, between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206938; 6 specimens, shore and tide pools, between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206940; 5 specimens, tide pool, S end Hanga Roa, J. E. Randall, BPBM 206969; 1 specimen, tide pool between Hanga Roa and Hanga Piko, 26 Jan 1969; J. E. Randall, BPBM 206954; 50 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 4 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200324, 200321; 1 specimen, Hanga Roa, 1958, R. Vargas D., MNSH 200323; 5 specimens, Motu Nui, 1958, R. Vargas D., MNSH 200322; 30 specimens, 1958, R. Vargas D., MNSH 200325; 3 specimens, 9 Apr 1956, Y. Valencia D., MNSH 200298; 6 specimens, Oct 1964, *La Railleuse*, USNM 683886; 79 specimens, 1 Jul 1957, J. Pellisier, UCC; 3 specimens, S. Englert, CAS; 13 specimens, S. Englert, CAS; 8 specimens, Dec 1904, USBF Str. *Albatross*, USNM 204062; 24 specimens, Oct 1968, P. C. McCoy, USNM 679291; 1 specimen, Tupa at Hiramoko (archeological site), near Anakena Bay, 1955–1956, W. Mulloy, USNM 758551.

From Pitcairn Islands: 2 lots, Oeno; 9 lots (many specimens), Pitcairn, NMNH.

## MEASUREMENTS (mm).—

		<i>width</i>	<i>height</i>
USNM 679290	holotype	9.8	12.96
USNM 758551		12.2	17.85
USNM 756082		10.07	14.59
USNM 756082		9.3	12.56
USNM 756082		7.5	11.3
USNM 756082		7.0	10.0

REMARKS.—A rather distinct subspecies, well characterized by Rosewater. Some of the specimens from Oeno, an atoll lying 65 miles northwest of Pitcairn, are intermediate between the typical form and the subspecies.

The large individual (USNM 758551) whose measurements, given above, exceed any listed by Rosewater in his original description, was found in an archeological site near Anakena Bay.

## Family RISSOIDAE Gray, 1847

## Subfamily RISSOININAE Stoliczka, 1898

Genus *Rissoina* Orbigny, 1840Subgenus *Rissolina* Gould, 1861

*Rissoina*, subgenus *Rissolina* Gould, 1861:401. [Type-species: *Rissoina plicatula* Gould, 1861; Nevill, 1885.]

REMARKS.—The classification of the species formerly included in the genus *Rissoina* sensu lato has been the subject of a number of papers in recent years (Coan, 1964; Voorwinde, 1966; Ponder, 1967). These papers show a wide diversity of opinions on the supergeneric arrangement of this group. Ponder, for example, considers that *Rissolina* Gould should for the present be placed in the synonymy of *Rissoina*, while Voorwinde proposes a distinct family Rissolinidae for *Rissolina* and *Schwartziella* Nevill without giving a reason for this decision. Coan retained the group as a subgenus of *Rissoina*.

I retain *Rissolina* as a subgenus of *Rissoina* largely on the basis of the presence of a basal cord around the broad anterior canal. Unfortunately, neither the protoconch nor the operculum are known for *Rissoina plicatula* Gould, the type-species of *Rissolina*. An examination of numerous specimens of species that would fall within *Rissolina* reveals the presence of at least four types of protoconchs: deviated paucispiral,

conical multispiral, paucispiral with broad flattened first whorl, and dome-like paucispiral. Very little information is available on the exact nature of the protoconch of most species, and judging from the figures given by Kosuge (1965:149–151), it is possible that the characters of the protoconch may be used to help distinguish subgenera and genera in the subfamily.

For the present, however, I am placing *R. turricula* and its subspecies in the subgenus *Rissolina*.

*Rissoina (Rissolina) turricula engleri*,  
new subspecies

PLATE 5: FIGURE 6

*Rissoina plicata* A. Adams.—Iredale, 1910:71.—Oliver, 1915:520. [Not *Rissoina plicata* A. Adams, 1852.]  
*Rissoina angasi* Pease.—Oliver, 1915:520. [Not *Rissoina angasi* Pease, 1872.]  
*Rissoina plicatula* (Gould).—Odhner, 1922:248.—Steele, 1957:112. [Not *Rissoina plicatula* Gould, 1861.]  
*Rissoina turricula* Pease.—Lamy, 1936:267; 1938:139.—Steele, 1957:112. [Not *Rissoina turricula* Pease, 1860.]

DIAGNOSIS.—This subspecies differs from the nominate form, found in the Hawaiian Islands, by its larger size and in possessing more numerous spiral striae.

RANGE.—Easter Island and the Kermadec Islands.

DESCRIPTION.—Shell from about 4 to 5.5 mm in length, white to pale straw color, elongate-conic, with moderately convex whorls that number about  $8\frac{1}{4}$  in the holotype, and are made to appear obtusely angulate below the suture by the angulate ribs. Protoconch consisting of slightly less than  $1\frac{1}{2}$  smooth whorls, the early portion deviated at approximately  $40^\circ$ ; first post-nuclear whorl with axial ribs crossed by a pronounced cord at the shoulder and with fine spiral striae below, the cord becoming obsolete in the last part of this first whorl; following whorls with strong axial ribs (16 in penultimate whorl) more or less obtusely angled at the shoulder and crossed by fine spiral striae (about 22 to 27 in the penultimate whorl); rather obscure microscopic growth lines cross the spiral striae; at the base of the body whorl the axial ribs are conspicuously angulate, particularly near the aperture, the ribs becoming more slender between the angulation and the strong basal cord, which is spirally liriate; near the aperture the narrow and rather sharp axial ribs give the channel between the basal angulation and the



basal cord a strongly fenestrate appearance. Aperture ovate with a broad anterior canal; inner lip with a narrow marginate callus; outer lip thickened externally, often with a broad varix.

**HABITAT.**—Under stones in tide pools; abundant in drift in sand patches above high tide line.

**MATERIAL.**—Holotype: sta E-10A, USNM 755993. Paratypes: about 415 specimens from stas E-10A, E-11, E-18A, E-27A, E-29, E-30, E-31; 9 specimens, in sand, Hanga Piko, 1 Jul 1917, K. Bäckström, GM Moll. 11902; 2 specimens, tide pool, E end of Hanga Roa, J. E. Randall, BPBM 206970; 40 specimens, Aug 1968, H. G. Richards, ANSP 321085; 1 specimen, Onetea, Hanga Nui, 27 Apr 1977, A. J. Kohn, USNM 769724; 1 specimen, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317399; 10 specimens, Oct 1968, P. McCoy, ANSP 315545; 19 specimens, S. Englert, USNM 657472; about 125 specimens, S. Englert, CAS 58461-58576; 1 specimen, S. Englert, CAS 58577; 56 specimens, 1958, R. Vargas D., MNSH 200344; 3 specimens, Jan-Feb 1969, J. E. Randall, BPBM 206977.

**MEASUREMENTS.**—Holotype, USNM 755993: width, 1.95 mm; height, 4.72 mm. Paratypes: the height of 38 specimens from USNM 75166 was measured and found to vary from 4.2 to 5.5 mm, the average height being 4.87 mm.

**REMARKS.**—As mentioned above this subspecies differs from typical *R. turricula* in being larger in size and having more numerous spiral striae on the whorls. Nine lots of *R. turricula* from the Hawaiian Islands were examined, and the largest specimen in each lot was measured; these specimens ranged from 3.58 to 4.67 mm in height and the average height was 3.93. The average height of the *R. turricula englerti* is therefore almost 1 mm, or 24%, greater than that of the typical Hawaiian subspecies.

Iredale and McMichael (1962:39) state that *Rissoina turricula* Angas, 1867 (and by inference *R. turricula* Pease, 1861) is preoccupied by *R. turricula* Eichwald, 1830. This last specific name, however, was used in conjunction with the name *Rissoa* and not *Rissoina*, which was not yet in existence.

On the basis of my examination of specimens received by the National Museum of Natural History from Oliver, the material from the Kermadec Islands that he listed (1915:520) as *Rissoina angasi* Pease, appears to consist of examples of the new subspecies. True *Rissoina angasi* Pease, from New South Wales, Australia, lacks the fine spiral striae found in *R. turricula*. Also, specimens from the Kermadecs identified

by Iredale (1910:71) as *Rissoina plicata* A. Adams properly belong to the new subspecies. *Rissoina plicata* A. Adams, described originally from the Philippines, is a shorter, stouter species with what appears to be a depressed, dome-like protoconch.

**ETYMOLOGY.**—This subspecies is named for Father Sebastian Englert, parish priest on Easter Island for many years, whose extensive collections of shells sent to this country have been of great help in the preparation of this report.

### Genus *Zebina* H. and A. Adams, 1854

*Rissoina*, subgenus *Zebina* H. and A. Adams, 1854:328. [Type-species: *Rissoina semiglabrata* A. Adams, 1854; here designated.]

*Zebina* H. and A. Adams.—Ponder, 1967:216.

**REMARKS.**—The type-species of this genus has long been considered to be *Rissoina coronata* Schwartz von Mohrenstern (ex Recluz), 1860. This name was, however, obviously a nomen nudum at the time that H. and A. Adams included it under their new subgenus, and thus is not available as a type-species. The species here chosen is one of two included in the original list that are assignable to *Zebina* as presently restricted. *Rissoina curta* Sowerby was also a nomen nudum at the time that *Zebina* was proposed and is close to if not synonymous with *Zebina tridentata* (Michaud, 1830). The other species listed by the Adams brothers fall under *Zebina (Iopsis)* and *Rissoina (Zebinella)*.

Dalaguete, the type-locality for *Z. semiglabrata* (A. Adams) is in Cebu, Philippines, not Cuba as stated by Schwartz von Mohrenstern (1860:104) and Weinkauff (1881:44).

### *Zebina tridentata crassilabrum* (Garrett, 1857), new combination

PLATE 5: FIGURE 7

*Rissoa tridentata* Michaud.—Odhner, 1922:248.—Steele, 1957:112. [Not *Rissoa tridentata* Michaud, 1830.]

*Rissoa crassilabrum* Garrett, 1857:102 [Hilo, Hawaii].

*Rissoina (Zebina) tridentata* Michaud.—Weinkauff, 1881:45.

**DIAGNOSIS.**—Both the typical species and the subspecies are characterized by possessing a fairly stout, acutely conical, glossy, smooth shell, occasionally with

some axial riblets on the early postnuclear whorls. The thickened outer lip bears three denticles on the lower half. The subspecies is smaller and more slender, generally measuring from 4 to 8 mm in height.

RANGE.—Hawaii and Easter Island.

MATERIAL.—22 specimens from stas E-10A, E-18A, E-20, E-27A, E-28; 1 specimen, tide pool between Hanga Roa and Hanga Piko, 0-8 in (0-20 cm) deep, 26 Jan 1969, J. E. Randall, BPBM 206955; 1 specimen, drift above high tide line, 25 Jan 1965, I. Efford, UBC 6326; 1 specimen, J. E. Randall, BPBM 206976; about 60 specimens, S. Englert, CAS 37061; 5 specimens, H. G. Richards, ANSP 321084; 9 specimens, R. Vargas D., MNSH 200408.

MEASUREMENTS (mm).—

	width	height
USNM 756231	2.46	4.80
USNM 756231	2.11	4.36
USNM 756231	1.97	3.78

REMARKS.—I had first considered *Zebina crassilabrum* (Garrett, 1857) to be a synonym of *Z. tridentata* (Michaud, 1830), but the rather obvious smaller size and more slender outline of the form from Hawaii and Easter Island and the separated geographical ranges of the two subspecies have lead me to consider them to be subspecifically distinct. Typical *Zebina tridentata* is found from the western Indian Ocean to southern Japan and Samoa and Tonga. This species is unknown from Micronesia and Polynesia.

Genus *Isseliella* Weinkauff, 1881

*Isselia* Schmeltz (ex Semper), 1874:104. [This name is invalid as the monotypic type-species is a nomen nudum.] [Not *Isselia* Bourguignat, 1877.]

*Rissoina*, subgenus *Isseliella* Weinkauff (ex Nevill), 1881: 61.—Nevill, 1885:98.—Maes, 1967:110. [Type-species: *Rissoina mirabilis* Weinkauff (ex Dunker), 1881; original designation.]

*Zebina*, subgenus *Isselia* Schmeltz.—Wenz, 1939:624. [Not *Isselia* Bourguignat, 1877.]

*Isseliella* Weinkauff.—Ponder, 1967:217.

REMARKS.—Using the invalid name *Isselia*, Wenz (1939:624) considered this group to be a subgenus of *Zebina* H. and A. Adams, 1854, while Maes (1967:110) used it as a subgenus of *Rissoina*. I follow Ponder (1967:217) in giving it generic status. This author is correct in using the name "*Isseliella* 'Nevill' Weinkauff, 1881," since the first use of *Isselia* by Schmeltz

in 1874 is invalid, as it was published without a diagnosis in connection with a specific name that was a nomen nudum. In 1877 Bourguignat had used the name *Isselia* in a valid sense for a different species group and subsequently Weinkauff used Nevill's manuscript name *Isseliella* for *Isselia* Schmeltz, 1874.

*Isseliella chiltoni* (Oliver, 1915)

PLATE 5: FIGURES 2-5

*Isselia chiltoni* Oliver, 1915:520, pl. 10: fig. 12 [Sunday Island, Kermadecs].

DIAGNOSIS.—Shell small, about 3 mm in height, elongate ovate, spire whorls clathrately sculptured, and basally and subsuturally angulate with deep sutures, grayish white and glassy when fresh; protoconch of 1½ smooth, convex whorls, first whorl slightly tilted; teleoconch of 4¼ whorls, first with distant axial ribs and an increasingly prominent basal keel and an upper subsutural angulation, which in later whorls becomes a nodose spiral cord; in the antepenultimate and penultimate whorls a third intermediate cord is usually added and occasionally a fourth, resulting in these whorls having a strongly clathrate sculpture of rather distant axial ribs and spiral cords; in last whorl axial ribs may become obscure, leaving spiral cords nodose; base of last whorl with spiral cords, but the clathrate sculpture may continue on the base. Aperture ovate, inner lip gently arcuate, with rather strong callus, the basal portion with a more or less pronounced projection at the rather broad anterior siphonal canal; outer lip with strong and broad external varix, internal either without teeth or with 4 strong separated denticles, the upper one the largest.

RANGE.—Kermadec Islands and Easter Island.

MATERIAL.—13 specimens, sta E-27A, USNM 756260.

MEASUREMENTS (mm).—

	width	height
USNM 756260	1.73	3.58
USNM 756260	1.65	3.19
USNM 756260	1.52	2.99
USNM 756260	1.51	2.94

REMARKS.—The thirteen specimens collected on Easter Island are unfortunately all dead and more or less worn and show considerable variation in details and strength of the clathrate sculpture. The holotype

of *I. chiltoni* (Plate 5: figure 2) from the Kermadec Islands sent me on loan through the kindness of Dr. R. Duff, director of the Canterbury Museums, shows an inconspicuous clathrate sculpture but this is partly due to the freshness of the specimen. The type also shows a greatly reduced denticulation on the inner lip, but this is found also in a specimen from Easter Island (Plate 5: figure 4), although all the others show strong denticles. Because of the variation shown in the specimens from Easter Island and because of the overall similarity in shell characters with *I. chiltoni*, I am assigning my specimens to the species from the Kermadec Islands, although with some doubt. I have seen only the holotype of the latter, and Oliver in his description does not comment on the variation nor does he mention the presence of denticles on the inner lip.

A related species occurs in the Hawaiian Islands, as I have seen one specimen found in sand from Maunaloa Beach, Oahu. This specimen is a more slender shell, with 4 spiral cords on the spire whorls.

#### Genus *Merelina* Iredale, 1915

*Merelina* Iredale, 1915:449.—Wenz, 1939:618.—Ponder, 1967:213. [Type-species: *Rissoa cheilostoma* Tenison-Woods, 1877; original designation.]

#### Subgenus *Merelina* Iredale, 1915

#### *Merelina (Merelina) longinqua*, new species

PLATE 5: FIGURE 10

DIAGNOSIS.—A minute whitish shell with two nodose spiral keels and three spiral cords on the base of the last whorl. Shorter, stouter, and with nodes more blunt and sculpture less clathrate than in *M. cheilostoma* (Tenison-Woods).

RANGE.—Easter Island.

DESCRIPTION.—Shell minute, from about 1.8 to 2 mm in height, ovate, glassy, yellowish white in color. Protoconch of  $1\frac{1}{4}$  whorls, first portion slightly deviated, possessing two or three somewhat obscure spiral cords, the lowermost very weak, the uppermost forming a blunt carina resulting in a flattened sutural ramp. Postnuclear whorls  $3\frac{1}{2}$  in number, convex, angulate by two spiral cords, which are the continuation

of the two uppermost cords of the protoconch; in the first postnuclear whorl the spiral cords are crossed by about 16 axial ribs that form nodes at the intersections and give this whorl a clathrate appearance; in later whorls the axial ribs become more obscure and the clathrate appearance disappears, the last whorls bearing 2 nodose spiral cords; a subsutural cord begins obscurely in the first postnuclear whorl and gradually increases in strength, forming a low, rather broad cord on the last whorl; on the base of the last whorl are 3 spiral cords. Aperture broadly ovate, posteriorly somewhat acuminate, outer lip thickened, basal part and columellar lip forming a continuous curve with the moderately thick parietal callus.

MATERIAL.—Holotype: sta E-27A, USNM 766829. Paratypes: 22 specimens from type-locality, USNM 756258.

#### MEASUREMENTS (mm).—

	width	height
USNM 766829 holotype	1.03	2.01
USNM 756258 paratype	1.00	1.96
USNM 756258 paratype	1.03	1.93
USNM 756258 paratype	0.99	1.88
USNM 758258 paratype	0.96	1.83

REMARKS.—This species is closest in size and general shape to material from the Kermadec Islands listed by Oliver (1915:519) as *Merelina pisinna* Melvill and Standen, but the sculpture is not as strongly clathrate, with the axial element less pronounced. It should be mentioned that Oliver's Kermadec specimens are not identifiable as Melvill and Standen's species, which was described from Lifu in the Loyalty Islands (Melvill and Standen, 1896:305, pl. 11: fig. 60); the Kermadec Islands material probably needs to be described as a new species. Ladd (1966:63) has recorded *M. pisinna* as occurring in the Miocene of the Marshall Islands, and an examination of this material corroborates the identification with the Loyalty Island species.

The genus *Merelina* is concentrated in the Australian-Neozelanic region and most of its species are more slender, the sculpture distinctly clathrate, and the spiral lirae on the protoconch finer and more numerous. I have seen one or more undescribed species of *Merelina* from Hawaii, but these all have the usual clathrate sculpture.

ETYMOLOGY.—From the Latin *longinqua* (outlying) referring to the occurrence of the species at the

border of the Polynesian Region, far from the main area of distribution of the genus.

### Subgenus *Mereliniopsis* Ponder, 1967

*Merelina*, subgenus *Mereliniopsis* Ponder, 1967:214. [Type-species: *Merelina queenslandica* Laseron, 1956; original designation.]

DIAGNOSIS.—This subgenus differs from typical *Merelina* in possessing a smooth protoconch.

### *Merelina (Mereliniopsis) crassula*, new species

PLATE 5: FIGURE 9

DIAGNOSIS.—A small, short, stout species, smaller and broader than the type-species and the other species from Queensland assigned to this subgenus by Ponder, with a relatively larger aperture and thicker lip.

RANGE.—Easter Island.

DESCRIPTION.—Shell very small, from about 1.2 to 1.55 mm in length, ovate, thick-shelled, white, holotype consisting of 4¾ whorls; protoconch of 1¾ whorls, smooth, earliest whorl deviated and partly submerged; first postnuclear whorl with 2 spiral cords and fine, rather distant axial riblets that form nodes where they cross the spiral cords, the nodes on the lower cord strongest and with weak subsutural nodes present; these subsutural nodes rapidly become larger and on the second postnuclear whorl the subsutural row of nodes becomes more distant from the suture, forming a third spiral cord; sculpture on last 2 whorls strongly and regularly clathrate; base of last whorl with 4 simple spiral cords. Aperture holostomatous, oval, outer and basal lip greatly thickened and inner edge marginate, parietal lip moderately heavy.

RANGE.—Easter Island.

MATERIAL.—Holotype: sta E-27A, USNM 767026. Paratypes: 9 specimens, sta E-27A, USNM 756259. 1 specimen, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317400.

#### MEASUREMENTS (mm).—

	width	height
USNM 767026 holotype	0.85	1.54
USNM 756259 paratype	0.68	1.18

REMARKS.—*Rissoina granulosa* Pease, 1862, from Hawaii is a member of the subgenus *Mereliniopsis*,

but is larger, more elongate, and with somewhat finer sculpture than the present species. I have seen no specimens of this subgenus from French Polynesia.

ETYMOLOGY.—From the Latin *crassa* (stout) plus *ula* (suffix denoting smallness).

### Family ASSIMINEIDAE H. and A. Adams, 1856

#### Genus *Assiminea* Fleming, 1828

*Assiminea* Fleming, 1828:275.—Wenz, 1939:631.—Abbott, 1958:213–233. [Type-species: *Assiminea grayana* Fleming (ex Leach), 1828; monotypy.]

#### *Assiminea vulgaris* (Webster, 1905)

PLATE 5: FIGURE 8

*Rissoia vulgaris* Webster, 1905:277 [Waipipi, New Zealand].  
*Assiminea nitida* (Pease).—Oliver, 1915:522. [Not *Hydrocena nitida* Pease, 1864.]  
*Assiminea vulgaris* (Webster).—Powell, 1933:146–147.

DIAGNOSIS.—Shell small, 1.75 to almost 3 mm in height, moderately elevated-turbiniform, imperforate, with about 5 smooth, evenly convex whorls, an impressed suture, and a very fine line at some distance below the suture; light yellowish brown to moderate orange in color; aperture rather broadly ovate, outer lip evenly arcuate, thickened and somewhat effuse at columella and covering the narrow umbilical perforation.

RANGE.—Northern New Zealand, Kermadec Islands, and Easter Island.

MATERIAL.—About 125 specimens from stas E-20 and E-27A. 3 specimens, 1958, R. Vargas D., MNSH 200382.

New Zealand: 12 specimens, Rangitoto Island, Auckland Harbour, C. R. Laws, USNM 681032.

Kermadec Islands: 30 specimens, W. R. Oliver, USNM 214793.

#### MEASUREMENTS (mm).—

	width	height
USNM 756237 Easter Island	1.85	2.94
USNM 756237 Easter Island	1.86	2.75
USNM 756237 Easter Island	1.74	2.57
USNM 681032 New Zealand	1.61	2.31
USNM 756237 Easter Island	1.40	1.98
USNM 681032 New Zealand	1.32	1.90
USNM 756237 Easter Island	1.25	1.82



REMARKS.—An analysis of the measurements of about 25 specimens from both northern New Zealand (Rangitoto Island, Auckland Harbour) and Easter Island shows that although the specimens from Easter Island appear to reach a larger size, there is a wide area of overlap and the height/width measurements fall in a virtually straight line. I can find no differences in form and general appearance between specimens from the three localities cited above.

#### Family ORBITESTELLIDAE Iredale, 1917

##### Genus *Orbitestella* Iredale, 1917

*Orbitestella* Iredale, 1917:327.—Wenz 1939:648.—Ponder, 1967:222. [Type-species: *Cyclostrema bastowi* Gatliff 1916; Iredale, 1917.]

REMARKS.—Iredale placed the family near the Cyclostrematidae, while Thiele (1929:177) and Wenz placed the genus doubtfully in the Omalogyridae. Ponder has shown that the family belongs in the Rissoacea.

##### *Orbitestella toreuma* Powell, 1930

###### PLATE 5: FIGURE 16

*Orbitestella toreuma* Powell, 1930:542, pl. 88: figs. 16, 17 [Mangonui, New Zealand].

DIAGNOSIS.—Shell minute, maximum diameter from 0.65 to 0.75 mm, opaque, white or glassy, discoidal, whorls 3 to 3½, with sunken spire, last whorl with 2 carinae at edge, upper one extending somewhat beyond lower one so that the flat periphery of the shell slants slightly inward, umbilicus moderately broad; sculpture on upper surface on whorls consists of short, broad, rather crowded nodose axial ribs tapering at their culmination at a precarinal sulcus, upper carina strongly nodose in early whorls, the nodes becoming less conspicuous in last part of last whorl; carinal nodes continue on the peripheral intercarinal surface as prosocline ribs ending as low nodes on the lower carinae and on the convex base of last whorl as low and rather broad prosoclyt ribs; umbilicus about ⅓ to ¼ of major diameter; aperture subquadrate.

RANGE.—Northern New Zealand and Easter Island.

MATERIAL.—1 specimen from sta E-27, USNM 756212.

MEASUREMENTS (mm).—USNM 756212: width 0.65, height 0.26.

REMARKS.—A single, bleached specimen of this minute species was found in beach drift. Although it differs in some minor respects from the original figure given by Powell and from specimens examined from New Zealand, in overall characters it is so close to the New Zealand species that I hesitate to give it a distinctive name on the basis of one dead specimen.

Unfortunately, this minute specimen was lost in the course of preparing it for photographing; I am figuring a shell from New Zealand.

#### Family CAECIDAE Gray, 1850

##### Genus *Caecum* Fleming, 1813

*Caecum* Fleming, 1813:67.—Wenz, 1939:682. [Type-species: *Dentalium trachea* Montagu, 1803 (= *Dentalium im-perforatum* Kanmacher, 1798); Gray, 1847.]

##### *Caecum* cf. *solitarium* Oliver, 1915

###### PLATE 5: FIGURE 11

*Caecum solitarium* Oliver, 1915:523, pl. 10: fig. 18 [Sunday Island, Kermadecs].

DIAGNOSIS.—Shell small, 2.4 to 2.7 mm in length, glassy, grayish-white to whitish, slender, gently curved, diameter at posterior end only slightly smaller than at anterior end, where the aperture is slightly constricted and somewhat opaque above the aperture; the sculpture consists of fine, rather crowded, subobscure (worn?) annular riblets that gradually and slightly increase in strength toward the aperture; septum exerted, subquadrate with a slightly convex surface inclined from an elevated edge at the right dorsal sector to the edge of the posterior rim of the shell at the left ventral sector.

RANGE.—Kermadec Islands (and Easter Island?).

MATERIAL.—1 specimen from sta E-27A, USNM 756269.

MEASUREMENTS (mm).—USNM 756269: length, 2.42; diameter at anterior end, 0.4

REMARKS.—The single specimen found in beach drift appears to be somewhat worn, but in general form, size, and sculpture it appears to be close to *Caecum solitarium* Oliver, 1915, from the Kermadec

Islands. Judging from the Easter Island shell, the regular growth lines that Oliver mentions in his description appear to be fine annular ribs, and thus the species belongs in the typical subgenus *Caecum*. The anterior end of the specimen was unfortunately broken while the shell was being measured.

***Caecum amydroglyptum*, new species**

PLATE 5: FIGURE 12

DIAGNOSIS.—A small, curved, and rather evenly cylindrical shell with a low, dome-shaped septum and somewhat distantly spaced annular ribs that are most prominent at the anterior and posterior ends of the shell and are crossed by microscopic wavy longitudinal striae.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, from 1.3 to 1.7 mm in length, curved, rather evenly cylindrical with the anterior end in fully grown specimens slightly swollen above the aperture; glassy grayish white to light orange yellow in color; sculpture consists of rather strong, somewhat distantly spaced annular ribs that become more or less obscure in the middle part of the shell, with microscopic, longitudinal wavy striae that are obscure at the anterior and posterior ends; septum, low, dome-shaped.

MATERIAL.—Holotype: sta E-27A, USNM 757977. Paratype: type-locality, USNM 757978.

MEASUREMENTS (mm).—

	<i>length</i>
USNM 757977 holotype	1.67
USNM 757978 paratype	1.28

REMARKS.—I have been unable to identify this species with any published taxon, nor have I found any specimens resembling the species among the large amount of material collected in Polynesia by my colleagues and by me. Were it not for the annular ribbing this Easter Island species could have been placed in the genus *Brochina* Gray, 1857, which has a similar dome-shaped septum but a smooth shell. A distinct subgenus may be required for this species, since *Caecum* sensu stricto has a septum with a prominent digitate process.

ETYMOLOGY.—From the Greek *amydros* (indistinct) plus *glyptos* (engraved), referring to the microscopic longitudinal striae.

Family ARCHITECTONICIDAE Gray, 1850

Genus *Heliacus* Orbigny, 1842

*Heliacus* Orbigny, 1842:68. [Type-species: *Heliacus herberti* Deshayes, 1830 [error for *H. herberti* Deshayes, 1830] (= *Trochus cylindraceus* Gmelin, 1791); monotypy.]  
*Torinia* Gray, 1842:60; 1847b:151. [Type-species: *Trochus cylindraceus* Gmelin, 1791; Gray, 1847.]

***Heliacus codoceoae*, new species**

PLATE 5: FIGURES 13-15

*Torinia dorsuosa* Hinds.—Lamy, 1936:267; 1938:139. [Not *Torinia dorsuosa* Hinds, 1844.]

DIAGNOSIS.—A relatively small species, from 5 to 8.8 mm in diameter, depressed, and usually rather flattened; whorls with 5 spiral rows of flattened nodules and periphery of last whorl with 2 nodulose cords with a fine nodulose cord in between. Umbilicus deep, with bottom very broad, clearly showing protoconch and early whorls. Closest to *H. sterkii* (Pilsbry and Vanatta, 1908) but shell generally flatter with umbilicus broader and flat at bottom, showing the entire large anastrophic protoconch and first teleoconch whorl, and with a finer nodulose cord between peripheral cords.

RANGE.—Easter Island.

DESCRIPTION.—Shell relatively small, from 5 to 8.8 mm in breadth, depressed and rather flattened; protoconch anastrophic, clearly visible at bottom of umbilicus, rather large, flattened, consisting of 3/8 smooth, glassy white whorls, aperture of protoconch marked by a narrow rounded rib that is inconspicuous on dorsal side; teleoconch consists in holotype of 3/4 whorls, reddish brown mottled with white, the first half whorl with 4 irregularly subnodulose spiral cords, later whorls with more conspicuous axial grooves that result in the spiral rows of nodes becoming more sharply delimited and squarish; the outermost or suprasutural cord is the largest with relatively large, rounded nodes, the inner or subsutural cord is smaller but also with rounded nodes, and the 3 cords in between are subequal with more flattened nodes and generally of a grayish purplish pink mottled with white; the large suprasutural or peripheral cord has the nodes whitish interspersed with pairs of reddish brown nodes. Periphery biangulate with a small nodu-

lose cord between the 2 large cords. Base flattened with 3 or 4 spiral rows of flattened squarish nodes, mottled with grayish purplish pink, and 2 broader, whitish nodulose cords, the nodes not separated by axial grooves; the inner broad basal cord with a nodulose edge bordering the deep umbilicus as it descends to the base of the umbilicus, which at the bottom is broad, showing the entire anastrophic protoconch and the first whorl of the teleoconch; umbilical wall of whorls with a slightly nodulose spiral cord. Aperture round, inner lip reflexed with a weak shallow groove at the umbilical spiral cord. Operculum unknown.

HABITAT.—Unknown.

MATERIAL.—Holotype: Easter Island, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 321078. Paratypes: 6 specimens from stas E-10, E-18A, E-27A, and E-30; 1 specimen, 1934, A. Metraux, MHNP; 8 specimens, 1958, R. Vargas D., MNSH 200332; 1 specimen, MNSH 200331; 5 specimens, S. Englert, CAS 58578-58582; 1 specimen, S. Englert, CAS 58583.

MEASUREMENTS (mm).—

	width	height
USNM 756163 paratype	8.74	4.50
ANSP 321078 holotype	7.24	3.58
MNHP paratype	7.00	3.45
USNM 756010 paratype	5.16	2.70

REMARKS.—As has been mentioned above this species seems to be closest to *H. sterkii* (Pilsbry and Vanatta) from Hawaii but differs markedly in the umbilicus—that of the Easter Island species being rather straight-sided and broader at the bottom, while that of *H. sterkii* narrows more rapidly toward the bottom.

ETYMOLOGY.—This species is named for Maria Codoceo R., in appreciation of her assistance during our visit to the Museo Nacional de Historia Natural in Santiago, Chile. At the time of our visit she was in charge of the Laboratory of Malacology in the museum.

Family DIASTOMIDAE Cossmann, 1895

Genus *Cerithidium* Monterosato, 1884

*Cerithidium* Monterosato, 1884:123.—Thiele, 1929:209.—Wenz, 1940:751. [Type-species: *Cerithidium submamillatum* Rayneval and Ponzi, 1864 (= *Turritella? pusilla* Jeffreys, 1856); Cossmann, 1906.]

REMARKS.—Indo-Pacific members of this genus have been placed in *Bittium* by Watson and *Obtortio* by Hedley (1899:412-414), Laseron (1950:281-282), and Ladd (1972:27-29), but the presence of varices, the more or less angulate and not rounded early whorls, and an outer lip that is not rounded but more or less angulate and occasionally subeffuse at the junction with the columella distinguishes this genus from the latter. From *Bittium* the species of *Cerithidium* differ in the absence of a well-defined anterior siphonal canal.

Gründel has recently (Gründel, 1976b:51) given *Cerithidium* subgeneric status under *Bittium*, which he places in the family Procerithiidae, a family he had earlier (Gründel, 1976a:75) synonymized with the Diastomidae; in his later paper he appears to maintain them as distinct families whose mutual limits are still in doubt (Gründel, 1976b:42). Houbriek, in a recent discussion of the genus *Bittium* (Houbriek, 1977:101-105) maintains, on the other hand, that this genus is a typical member of the Cerithiidae and is closely related to *Cerithium*.

Besides the species assigned to *Cerithidium* in this report, I feel that the following should be placed in this genus: *Bittium perparvulum* Watson 1886, which the author compares with *Cerithidium pusillum* (Jeffreys), *Obtortio vulnerata* Hedley, 1909, and *Obtortio varicosa* Laseron, 1956; *Obtortio dancei* Ladd, 1972, possibly belongs here also.

For the present I propose to follow Wenz (1940:751) in including the genus *Cerithidium* along with *Alabina* Dall, *Finella* A. Adams, and *Scaliola* A. Adams in the Diastomidae. *Alabina* Dall, 1902, appears to be distinct, characterized by its perforate umbilicus and thinner, more elongate-conical shell. *Obtortio* Hedley, 1899, is probably, however, a synonym of *Finella* A. Adams, 1860.

*Cerithidium actinium*, new species

PLATE 5: FIGURES 17, 18

DIAGNOSIS.—A small, elongate-pyramidal species, from 2 to 5 mm in length, glassy when fresh, whitish when long dead, the lower part of the whorls angulate, where low, broad axial ribs are crossed by 2 spiral cords that are nodose on the ribs, the nodes white in

fresh specimens; 2 or 3 more or less strong varices are present.

RANGE.—Hawaiian Islands and Easter Island.

DESCRIPTION.—Shell small, generally about 2 to 2.25 mm in length but reaching almost 5 mm, glassy, white when long dead, narrowly elongate-pyramidal; protoconch broadly mammillate-conical, of about 2¼ smooth, rounded whorls; postnuclear whorls 8+, first 3 with 2 or 3 fine spiral lirae on lower half of whorls, the last 5 whorls angulate at the periphery, the uppermost spiral lira prominent and angulately nodose on the broad, low axial ribs that begin appearing on about the fourth postnuclear whorl; the nodes white in fresh, glassy specimens; the next lower spiral lira is somewhat less prominent, and also nodulose, and the lowest lira is a fine suprasutural cord; several stout, often whitish varices are present on the last 3 whorls. Aperture ovate, outer lip broken in specimens available, but probably thin and rounded; junction of parietal and columellar lip somewhat angulate, latter with a weak flexure and somewhat angulate and slightly effuse at the juncture with the basal portion of the outer lip; an adult though worn specimen shows what looks like a narrow, rather vertical siphonal fasciole separated from the columellar lip by a weak, narrow fissure.

MATERIAL.—Holotype: in 33–50 fathoms (59.4–90.0 m), off Waikiki, Oahu, Hawaii, D. Thaanum, USNM 339456. Paratype: type-locality, USNM 767085.

Paratypes from Easter Island: 1 specimen, sta E-27A, USNM 756213; 1 specimen, Aug 1958, H. G. Richards, ANSP 321099.

MEASUREMENTS (mm).—Height measurement of USNM 756213 affected by broken base and outer lip.

	width	height
USNM 339456 holotype, Hawaii	0.95	2.15
USNM 767085 paratype, Hawaii	0.74	2.04
USNM 756213 paratype, Easter Island	1.24	2.97
ANSP 321099 paratype, Easter Island	1.66	4.86

REMARKS.—Both Easter Island specimens of this species that I have seen are dead and partially broken or rather worn, as well as considerably larger than the Hawaiian shells. However, the sculpture, shape of the whorls, nature of the peristome, and presence of varices, leads me to assign them to this Hawaiian species, which has long been in our collection bearing one of Dall's manuscript names. This species is one of many species described by Dall in his manuscript of

Hawaiian marine mollusks that was unfortunately never published. Additional and fresh material from Easter Island may show that specimens from there represent a large race distinct from the Hawaiian material.

ETYMOLOGY.—From the Greek *aktinos* (ray, beam); Dall's reason for choosing this name is not clear.

### Family CERITHIIDAE Fleming, 1822

#### Genus *Cerithium* Bruguière, 1789

*Cerithium* Bruguière, 1789:15; 1792:467.—Houbrick, 1973:104–106. [Type-species: *Cerithium adansonii* Bruguière, 1792; International Commission on Zoological Nomenclature, Opinion 1109, 1978.]

#### Subgenus *Cerithium* Bruguière, 1789

REMARKS.—The following two species I am assigning to *Cerithium* sensu stricto as they resemble the type-species in possessing a moderately long, slightly recurved anterior siphonal canal and a strong parietal ridge.

#### *Cerithium (Cerithium) rubus* Deshayes, 1843

PLATE 6: FIGURES 1, 2

*Rubus*, Martyn, 1786, pl. 58 [Tonga]. [Nonbinomial.]  
*Murex sinensis* var *e* Gmelin, 1791:3542.  
*Murex serratus* Wood, 1818:132; 1825:132, pl. 28: fig. 158. [Not *Cerithium serratum* Bruguière, 1792.]  
*Cerithium adansonii* Bruguière.—Kiener, 1841:9, pl. 4: fig. 4.—Sowerby, 1855:858, pl. 178: fig. 45; 1865, pl. 2: sp. 11. [Not *Cerithium adansonii* Bruguière, 1792.]  
*Cerithium rubus* Deshayes (ex Martyn), 1843:310. [Not *Cerithium rubus* in sensu Sowerby, 1855 and later authors.]  
*Cerithium tuberculiferum* Pease, 1869:76–77 [Paumotu].—Kobelt, 1893:100–101, pl. 20: figs. 3, 4.—Salvat and Rives, 1975:268, fig. 59.

DIAGNOSIS.—A rather large species measuring up to 51 mm in length, elongately conical, varying from rather narrow to slightly obese in outline. The species is characterized by possessing many unequal rows of acute nodes that are especially prominent on the latter half of the last whorl and give the shell a strongly spinose appearance.

RANGE.—From Line Islands, Tokelau Islands, Rose Atoll in the Samoan Group, Northern Cook Islands,



and Palmerston Island east and southeast to Easter Island; not found in the Southern Cook Islands, larger islands of the Society Islands, or Marquesas.

**HABITAT.**—Generally on coral reef flats on coral atolls; in Easter Island in tide pools on a thin alga-sand bottom.

**MATERIAL.**—7 specimens from sta E-1, E-18, E-23; 2 specimens, Hango Piko, 1975, B. Alarcón, USNM 769732.

**MEASUREMENTS (mm).**—

	<i>length</i>	<i>width</i>
USNM 769732	41.41	21.90
USNM 751572	37.28	19.10
USNM 756100	36.03	17.96
USNM 756100	35.54	20.74
USNM 756100	34.05	20.00

**REMARKS.**—This species appears to be restricted to the Polynesian Province, and in the western and central part of its range it is found only on the low coral atolls and islands. Thus it is found on Rose Atoll, 85 miles east of Tutuila, but not on the islands of the Samoan Group; it is present in the Northern Cook Islands and Palmerston Atoll but not in the Southern Cook Islands; it is found on Bellingshausen Atoll but not in any of the larger Society Islands, although very abundant in the Tuamotus. In the Gambier Islands the species is absent from the high volcanic islands but present on the surrounding barrier reef. Only in the eastern end of its range, on Pitcairn and Eastern Island, is *C. rubus* found in tide pools on volcanic islands.

Most closely related is an apparently unnamed species that coexists with *C. rubus* in certain localities in Polynesia and is found also in Micronesia from the Marianas to the Phoenix Islands. This species is characterized by generally having a somewhat broader shell with a more convex spire and by the nodulose sculpture reduced, particularly below the spinose nodes on the spire and on the ventral surface of the last whorl. Only studies in the field and a more critical study of more material will reveal whether this is a distinct species.

More distantly related is *Cerithium mutatum* Sowerby, 1834, a larger, more coarsely nodulose species with a strongly projecting lower lip at the anterior canal and a deep notch between the lower end of the abapertural varix and the base of the columellar lip.

*Cerithium mutatum*, which ranges from the Philip-

pinas and Ryukyus to the Tuamotus, has been confused by some authors with *Cerithium echinatum* Lamarck, a species found principally in the Indian Ocean but reaching the Ryukyus and Caroline Islands. Tryon (1887:124) has placed the present species in the synonymy of *C. echinatum* Lamarck, but the latter is a different species. It also has a projecting lower end of the outer lip, but the whorls of the spire are made strongly angulate by the strong pointed nodes and the whorls of the spire and the ventral side of the last whorl are strongly grooved with the spiral nodulation reduced.

This species has recently been called *C. tuberculiferum* Pease, but Deshayes' name was proposed 26 years earlier and is without question synonymous. The name is based on Martyn's name, and the first four references that Deshayes gives are to Martyn or later citations referring to Martyn. The latter's figure of his *Rubus* represents without question the present species, though it is not known to occur in the Friendly Islands (Tonga).

***Cerithium (Cerithium) columna* Sowerby, 1834**

*Cerithium columna* Sowerby, 1834b:3, fig. 7.—Cernohorsky, 1972a:63, pl. 14: figs. 1, 1a [not 1b].—Salvat and Rives, 1975:268, fig. 60.

**DIAGNOSIS.**—A variable shell, ranging from 14 to 47.5 mm in height, characterized by possessing broad, angulate nodes on the spire, the apices of which are connected by a rather strong spiral cord, giving the whorls an angulate appearance; the shell is strongly spirally sculptured, white, usually irregularly spotted with dark reddish brown, with a strong varix opposite the aperture, which is broadly ovate with a strongly arched, slightly effuse outer lip and a moderately long, somewhat curved anterior canal.

**RANGE.**—Entire Indo-Pacific region from East Africa and Red Sea to Hawaii and Easter Island.

**HABITAT.**—On coral reef flats or shallow tide pools generally on thin sandy layer, which may often be bound by algal filaments.

**MATERIAL.**—1 specimen, near Vaihu, 3 May 1977, A. J. Kohn, USNM 769729.

**MEASUREMENTS (mm).**—USNM 769729: width, 10.38; height, 20.51.

**REMARKS.**—This species varies not only in size (as

indicated above) and in form (from short and broad to elongately slender) but also in the strength and number of the angulated nodes. Some of the forms with very much reduced axial sculpture that have been assigned to this species do not, however, in my estimation belong in *C. columna*.

***Cerithium (Cerithium) sandwichense*  
Sowerby, 1865**

PLATE 6: FIGURE 3

*Cerithium sandwichense* Sowerby, 1865, pl. 6: sp. 37; 1866b, pl. 290: fig. 305 [Sandwich Islands].

*Cerithium sandwichense* Sowerby.—Tryon, 1887:127, pl. 22: fig. 58.

*Cerithium sandvicense* Sowerby.—Kobelt, 1895:184, pl. 34: figs. 4, 5.

*Cerithium* sp.—Salvat and Rives, 1975:269, fig. 62.

DIAGNOSIS.—Shell of moderate size, reaching 41 mm in length but usually between 15 and 32 mm, varying in shape from broadly to elongately ovate, white or yellowish white, the whorls marked with pronounced low ribs, crossed by crowded unequal lirae, sometimes bifid, separated by deep canaliculate interspaces; the ribs are appressed at the suture where the whorls sometimes are subsuturally obscurely margined; the last whorl usually has a varix opposite the aperture; a moderately long anterior canal is slightly bent back.

RANGE.—Tahiti, Gambier Islands, Pitcairn Islands, Easter Island.

HABITAT.—On sand in reef flats and tide pools, and in deeper water in lagoons.

MATERIAL.—1 specimen, S of Hanga Kioe, Tahai (sta E-25); 1 specimen, Hango Piko, 1975, B Alarcón, USNM 769731.

MEASUREMENTS (mm).—Aperture of USNM 668774 incomplete, affecting width measurement.

	length	width
USNM 769731 Easter Island	35.50	18.52
USNM 638103 Gambier Islands	41.15	15.93
USNM 731588 Pitcairn Island	30.80	12.65
USNM 726337 Gambier Islands	21.15	11.50
USNM 668774 Tahiti	15.00	7.2

REMARKS.—This species has apparently not been recognized since its description, as both Tryon and

Kobelt copy Sowerby's description and figures. As is obvious from its distribution as given above, its name is a misnomer as it is not found in Hawaii but occurs in eastern Polynesia.

It appears to be common living on coral in deeper water, as fragments of this species were frequently found in the gut of two of the common coral-grazing fish, *Coris aygula* Lacépède and *Diodon hystrix* Linné.

Reeve died (18 November 1865) while volume 15 of the *Conchologia Iconica* was in preparation. According to the catalogue of the Library of the British Museum (Natural History) (1913:1663), G. B. Sowerby II, who continued the work, is to be credited with the "portion of the work [that] begins with the 'Monograph of the genus *Pyramidella*' in Vol. XV." This part includes the genus *Cerithium*, and the names of the new species proposed in this work should therefore bear Sowerby's name as author and not Reeve's name.

**Subgenus *Thericium* Monterosato, 1890**

*Cerithium*, subgenus *Thericium* Monterosato, 1890:163.—Houbrick, 1974:38. [Type-species: *Cerithium vulgatum* Bruguière, 1789; original designation.]

REMARKS.—The most recent discussion of this subgenus is that of Houbrick (1974:38-39). I am assigning the following three species to this subgenus on the basis of their overall agreement in shell characters with the species of the Atlantic and Eastern Pacific generally assigned to this group. This allocation will need to be confirmed by a comparative study of the anatomy of the species involved.

***Cerithium (Thericium) atromarginatum*  
Dautzenberg and Bouge, 1933**

*Cerithium maculosum* Mighels, 1845:22 [Oahu].—Sowerby, 1865, pl. 14: sp. 97.—Kobelt, 1895:199, pl. 35: figs. 18, 19. [Not *Cerithium maculosum* Kiener, 1841.]

*Cerithium nassoides* Sowerby, 1855:875, pl. 183: figs. 200, 201 [Sandwich Islands]; 1865, pl. 12: sp. 83.—Kobelt, 1898:216, pl. 38: figs 10, 11. [Not *Cerithium nassoides* Grateloup, 1832.]

*Cerithium atromarginatum* Dautzenberg and Bouge (ex Vignal), 1933:304-305; [new name for *C. maculosum* Mighels, 1845, and *C. nassoides* Sowerby, 1855, both preoccupied].—Lamy, 1936:267; 1938:137.—Steele, 1957:112.—Tinker, 1958:36, figs.

*Cerithium (Conocerithium) atromarginatum* Dautzenberg and Bouge.—Maes, 1967:113, pl. 6: fig. L.

*Cerithium bavayi* Vignal.—Cernohorsky, 1972a:69, pl. 15: fig. 9 [in part, left-hand figure only].—Salvat and Rives, 1975:270, fig. 68. [Not *Cerithium bavayi* Vignal, 1902 (= *Cerithium egenum* Gould, 1849).]

DIAGNOSIS.—A small, rather stout species with the spire comprising about 60% of the total length; the whorls have an angulately nodose periphery and are nodulose subsuturally, sculptured overall with rather smooth crowded spiral lirae; there is a rather large reddish brown spot at the upper end of the outer lip and pale to darker reddish brown spots frequently present on the subsutural margin and occasional irregular, axial, reddish brown strigations on the last whorl. *Cerithium egenum* Gould differs in being more slender, with a higher spire, and the spiral lirae minutely granulose with groups of finer lirae between coarser ones. There is no reddish brown spot on the upper end of the outer lip and the spotting is stronger on the base of the last whorl.

RANGE.—Indo-Pacific region from East Africa to Hawaii and Easter Island.

HABITAT.—On sandy bottom in tide pools on Easter Island; on coral reefs in sand-covered shallow pools near or under coral rocks.

MATERIAL.—3 specimens from stas E-11, E-25; 1 specimen, Te Raa Raa, S of Hango Piko, B. Alarcón, USNM 751614; 1 specimen, La Perouse Bay, 1958, R. Vargas D., MNSH 200336; 1 specimen, 1934, A. Metraux MNHN.

MEASUREMENTS (mm).—

	length	width
USNM 751614	14.58	6.73
USNM 756184	12.02	6.10
USNM 756184	11.20	4.77
MNHN	8.20	3.90

REMARKS.—This species has recently been confused with *Cerithium egenum* Gould, 1849, but as I have pointed out above, the latter species is more slender, with a higher spire and a different spiral sculpture and color pattern. Cernohorsky (1972a:69, pl. 15: fig. 9) has with some doubt synonymized these two species, and has figured both of them, the left-hand figure representing *C. atromarginatum* and the right hand one *C. egenum*.

The Easter Island specimens are darker in coloration than most specimens from other localities.

*Cerithium (Thericium) egenum* Gould, 1849

PLATE 6: FIGURE 4

*Cerithium egenum* Gould, 1849:121 [Wilson's Island = Manihi]; 1852:151, pl. 10: fig. 171.

*Cerithium bavayi* Vignal, 1902:304, pl. 8: figs. 7, 8 [New Caledonia]. [Not *Cerithium bavayi* Vignal in sensu Salvat and Rives, 1975 (= *Cerithium atromarginatum* Dautzenberg and Bouge, 1933).]

*Cerithium (Conocerithium) bavayi* Vignal.—Cernohorsky, 1972a:69, pl. 15: fig. 9 [in part, right-hand figure only].

*Cerithium (Conocerithium) egenum* Gould.—Maes, 1967: 113, pl. 6: fig. K.—Ladd, 1972:39, pl. 9: figs. 9, 10.

DIAGNOSIS.—A small, slender shell, reaching 11.8 mm in length, whorls more or less angulately nodose at the periphery, and with spiral sculpture consisting of distant fine unequal spiral lirae, the intervals with a number of very fine, microscopic lirae; the lower part of the whorls marked by more or less axial chestnut brown markings.

RANGE.—Cocos Keeling Atoll and Ryukyu Islands, east through New Caledonia and Micronesia to Hawaii, Pitcairn, and Easter Island.

HABITAT.—In shallow water on sandy bottom near and under rock and coral, on reef flats and rocky tide pools.

MATERIAL.—3 specimens from stas E-15, E-25, E-30; 1 specimen, S. Englert, CAS.

MEASUREMENTS (mm).—

	length	width
USNM 756849	12.47	5.24
USNM 751603	10.40	4.60
USNM 756126	8.35	3.82

REMARKS.—Maes (1967:113) appears to be the first to have recognized that *C. egenum* Gould represents this species. The holotype is a somewhat faded shell, and although in his description Gould mentions the presence of faint brownish markings on the base, his figure does not show this color pattern; also the figure of the shell is too broad. This has made it difficult for later authors to correctly identify the species. A careful examination of the holotype (USNM 5571) shows that brown axial markings are present on the spire as well as on the base, a fact not mentioned by Gould. The discrepancy between the original diagnosis and figure of this species and the specimen labeled as type, probably by Carpenter, raises the possibility that the specimen in question is not the shell described

by Gould. There is no question in my mind, however, that this specimen represents Gould's *C. egenum* as this species varies considerably in coloration as well as in the strength of the axial sculpture.

Gould states that Couthouy collected this new species on Wilson's Island (the present name is Manihi in the Tuamotus). The type-locality is therefore not Wilson Island or Ifalik in the Caroline Islands, as has been stated by Ladd (1972:39). This atoll was not visited by the two vessels of the Exploring Expedition that passed through the Caroline Islands a year after Couthouy left the Expedition.

*Cerithium (Thericium) leptocharactum*,  
new species

PLATE 6: FIGURES 5-7

DIAGNOSIS.—A shell of medium size, 13 to 15 mm in length, yellowish brown in color and more or less mottled with white, characterized by the peripheral nodes on the angulate axial ribs and the subsutural spiral rows of nodules being white, and the entire surface of the whorls being densely sculptured by very fine spiral lirations; the axial ribs and larger spiral sculpture are somewhat variable in the last two whorls; the aperture may be pink or white.

RANGE.—Easter Island.

DESCRIPTION.—Shell of medium size, elongate-turriculate, with axially and angulately ribbed whorls, 13 to 18 mm in length, yellowish brown in color with the nodes on the axial ribs and nodules on the spiral lirae white, with occasional dark reddish brown spots between the white nodules, or the shell may be whitish with rather distant, narrow reddish brown axial strigations. Protoconch in specimen absent or worn with last whorl convex and apparently smooth;  $8\frac{3}{4}$  postnuclear whorls in holotype, early ones with about 10 low axial ribs, crossed by very fine, crowded, unequal spiral lirae separated by deep narrow grooves; the axial ribs become increasingly stronger and more angulate at the periphery; at or just before the beginning of the antepenultimate whorl, a spiral row of subsutural nodes arises to which a second row may be added; on the last whorl the angulate peripheral row of nodes usually diminishes in strength, becoming a low series of nodules, and additional spiral rows of nodules may be present, varying in strength in individ-

ual specimens. The aperture is ovate with a somewhat flaring convex outer lip and a rather deep adapical channel with a strong parietal toothlike ridge; in the type the aperture is of pink color, medium pink on the columella, slightly deeper at the base, and light pink on the inside of the outer lip; the adult paratype has a white aperture with no trace of pink, and the immature paratype has the columellar area pink.

HABITAT.—Probably on sandy substrate in tide pools near and under rocks.

MATERIAL.—Holotype: sta E-6, USNM 756335. Paratypes: 2 specimens from stas E-6, E-18a.

MEASUREMENTS (mm).—

	length	width
USNM 756335 holotype	18.00	7.96
USNM 751613 paratype	13.07	5.74

REMARKS.—At first glance (Plate 6: figures 5-7), the three specimens of this species before me appear to be so different in certain aspects of the sculpture and coloration as to represent different species. However, all have the distinctive dense and very fine spiral sculpture and very similar early whorls. It is only in the last 2 whorls that the sculpture between the suture and the peripheral angle becomes divergent. The immature specimen (USNM 756160) is the most distinctive of all in shape and sculpture, and it is with some hesitation that I assign it to this species.

ETYMOLOGY.—From the Greek *leptos* (fine) plus *charaktos* (engraved), alluding to the presence of fine engraved lines.

Genus *Clypeomorus* Jousseau, 1888

*Clypeomorus* Jousseau, 1888:171.—Cernohorsky, 1972a: 70-72. [Type-species: *Clypeomorus clypeomorus* Jousseau, 1888; original designation.]

DIAGNOSIS.—This genus is now used for a group of small to moderate sized species from the Indo-Pacific, usually broadly ovate with strong axial and spiral sculpture, an externally varicose and internally thickened and denticulate outer lip, and an open siphonal notch, with a very short, indistinct canal.

A determination of the limits of this genus must await a comparative study of the anatomy of species resembling the type.



*Clypeomorus brevis* (Quoy and Gaimard, 1834)

*Strombus rugosus* Wood, 1828:13, pl. 4: *Strombus* fig. 10.  
*Cerithium rugosum* [sic] Wood, 1828:34, pl. 4: *Strombus* fig. 10. [Not *Cerithium rugosum* Lamarck, 1804.]  
*Cerithium breve* Quoy and Gaimard, 1834:116, pl. 54: figs. 9–12 [Tongatapu].  
*Cerithium musiva* Rousseau (ex Hombron and Jacquinot), 1854:104, pl. 24: figs. 23–24 [Samoa].  
*Cerithium patiens* Bayle, 1880:249. [New name for "*Cerithium rugosum*" Wood, 1828, preoccupied by *Cerithium rugosum* Lamarck, 1804.]  
*Clypeomorus brevis* (Quoy and Gaimard).—Cernohorsky, 1972a:70, pl. 16: figs. 6–7.—Salvat and Rives, 1975:270, fig. 69.

DIAGNOSIS.—This common species, rather variable in size (from about 11 to 28 mm in length) and in sculptural details, is basically a broadly ovate to ovate-conic shell with strong axial and spiral sculpture, forming beads at the intersections, with fine spiral incised lines between the beaded spiral cords; varices are irregularly present. There is a strong varix immediately behind the outer lip, which is thickened and denticulate internally. Within the aperture at the narrow, acute, rather obscure posterior notch a marked parietal ridge is present; the anterior siphonal notch is deep and rounded, terminating in a short indistinct canal. In color it is whitish, usually mottled on the nodules with black or dark red brown.

RANGE.—From the Ryukyus, through Micronesia and south to Wallis Islands and Samoan Islands, and east through Polynesia to Easter Island.

HABITAT.—Found in very shallow water on fringing reefs near shore in lagoons, often partly out of water.

MATERIAL.—1 specimen, dead, beachworm, Oct 1968, P. McCoy, ANSP 315542.

MEASUREMENTS (mm).—Width, 6.82; height, 12.92.

REMARKS.—This species seems to exhibit a tendency toward dwarfism, as I have seen numerous lots of small specimens that in form, sculpture, and overall color pattern cannot be separated from the typical large specimens. I have seen such colonies of small specimens from the Marshall Islands and the Tuamotus, where the reduced size is probably due either to less favorable conditions or to increased salinity—or a combination of both.

The species appears to be rare in Fiji and Western and American Samoa.

Genus *Argyropeza* Melvill and Standen, 1901

*Argyropeza* Melvill and Standen, 1901:371.—Thiele, 1929:212.—Wenz, 1939:757. [Type-species: *Argyropeza divina* Melvill and Standen, 1901; monotypy.]

DIAGNOSIS.—This genus of small deep-water cerithiids is characterized by its small size, slender shape, 2 or 3 spiral rows of nodules that are axially aligned and, most especially, by a row of minute axially elongate nodules below the suture in the early postnuclear whorls.

I assign the following species to this genus on the authority of my colleague Dr. R. S. Houbrick.

[After this paper went to press Dr. Houbrick received from the British Museum (Natural History) a photograph of the holotype of *Bittium leucocephalum* Watson. This photograph demonstrates that although Watson's species should be assigned to *Argyropeza*, the Easter Islands specimens identified here as *A. leucocephala* do not belong in *Argyropeza* but should, for the present, be included in the genus *Cerithidium* (see page 33) as *Cerithidium* species.]

*Argyropeza leucocephala* (Watson, 1886), new combination

PLATE 5: FIGURE 19

*Bittium leucocephalum* Watson, 1886:558, pl. 38: fig. 7 [Honolulu, Oahu, Hawaii].

DIAGNOSIS.—A small species between 2.25 and 2.75 mm in length, elongate, the whorls convex, ribbed, those on the spire with 4 spiral cords that are nodulose on the ribs, giving the whorls a subclathrate sculpture, the suprasutural one frequently subnodulose or without nodules; protoconch whitish in color, early postnuclear whorls reddish brown, later whorls grayish or pale yellow or white (bleached), occasionally spotted with dark grayish olive.

RANGE.—Hawaiian Islands and Easter Island.

MATERIAL.—6 specimens from sta E-27a, USNM 756276.

MEASUREMENTS (mm).—Measurements of holotype converted to metric from original description.

		width	height
BM(NH)	holotype, Hawaii	1.12	2.72
USNM 362379	Hawaii	1.00	2.44
USNM 362379	Hawaii	1.02	2.32
USNM 756276	Easter Island	0.91	2.24

REMARKS.—Although Watson fails to mention the varices in his description, his general description and figure of this species agree very closely with the Easter Island specimens, except that his type is somewhat larger. *Bittium perparvulum* Watson, 1886, is very close to this species. This was recorded from five different stations—in Torres Strait, Tonga, and Hawaii—and until we know where the holotype came from, we cannot properly discuss the relationships of the species as it is possible that more than one form may be contained in the type series.

**Family CERITHIOPSIDAE H. and A. Adams,  
1854**

**Genus *Cerithiopsis* Forbes and Hanley, 1851**

*Cerithiopsis* Forbes and Hanley, 1851:364.—Wenz, 1940: 773–774.—Marshall, 1978:82–83. [Type-species: *Murex tubercularis* Montagu, 1803; monotypy.]

REMARKS.—An excellent study of the Cerithiopsidae, dealing mainly with the New Zealand species but including a new classification of the family, has recently been published by B. A. Marshall (1978).

***Cerithiopsis powelli* Marshall, 1978**

PLATE 6: FIGURE 8

*Cerithiopsis powelli* Marshall, 1978:84, figs. 2, 3i, 4A–D, 13A,B,D [Kapo Wairua, Spirits Bay, New Zealand].

DIAGNOSIS.—A relatively small species, 3.2 to 5 mm in height, orange yellow to reddish brown in color, slender, subulate with a conical, multispiral protoconch of 4 to 5 whorls that appear smooth but with last 2 whorls minutely and irregularly granulose, later whorls with 3 subequal spiral rows of prominent nodules, last whorl with the nodules in subsutural spiral cord becoming larger and with a slightly nodulose keel above the base, which is smooth; siphonal fasciole broad, smooth, columellar lip narrow, marginate.

RANGE.—Northern New Zealand and Easter Island.

MATERIAL.—R. Vargas D., MNSH 200387; 2 specimens, R. Vargas D., MNSH 200389; 7 specimens, sta E–27A, USNM 756217.

MEASUREMENTS (mm).—

	width	height
MNSH 200387	1.35	4.93
MNSH 200389	1.50	4.93
MNSH 200389	1.45	4.57
USNM 756217	1.15	3.15

REMARKS.—This species was originally described in manuscript by me as a new species, but the receipt from Dr. Bruce Marshall of a specimen of his *C. powelli*, and the appearance of his paper (Marshall, 1978), showed that the Easter Island specimens must be assigned to the New Zealand species.

***Cerithiopsis aquilum*, new species**

PLATE 6: FIGURE 9

DIAGNOSIS.—Somewhat similar to preceding species but broader, dark red brown in color with uppermost spiral cord very small and subsutural in earliest post-nuclear whorls, and with an extra spiral cord on the base of the last whorl above the siphonal fasciole.

RANGE.—Easter Island.

DESCRIPTION.—Shell elongate, subulate, deep reddish brown; protoconch lacking in all specimens (one has part of the last whorl remaining, which is smooth, light brown with a reddish brown subsutural color zone) but probably conical and multispiral; earliest postnuclear whorls with 2 strong nodulose spiral cords and a very fine cord, closely approximated to the upper cord, and with its nodes confluent with the nodes of that cord; approximately at the start of the antepenultimate whorl this fine cord increases in size and its nodes become larger and separated from those of the middle cord, so that the last and penultimate whorls have 3 subequal spiral rows of nodules connected axially by low, broad riblets; near the aperture these nodules become crowded and somewhat axially elongated; the last whorl has a rather broad sub-nodulose cord at the upper part of the base and a low cord, sometimes marked with low irregular growth striae, above the somewhat twisted siphonal fasciole; aperture subquadrate, siphonal canal deep.

MATERIAL.—Holotype: Easter Island, R. Vargas D.,

MNSH 200388. Paratypes: 2 specimens, R. Vargas D., MNSH 200468; 5 specimens, sta E-27A, USNM 756219.

MEASUREMENTS (mm).—

	<i>width</i>	<i>height</i>
MNSH 200388 holotype	1.70	4.95
USNM 756219 paratype	1.67	4.55
MNSH 200468 paratype	1.39	3.98

REMARKS.—The differences between this and the preceding species are summarized in the diagnosis given above.

Until the protoconch of this species can be studied, it must be assigned to *Cerithiopsis* with some doubt.

ETYMOLOGY.—From the Latin *aquilum* (dark-colored), referring to its deep color.

**Genus *Cyrbasia* Harris and Burrows, 1891**

**Subgenus *Joculator* Hedley, 1909**

*Joculator* Hedley, 1909:442.—Laseron, 1956:167. [Type-species: *Joculator ridicula* Watson, 1886; original designation.]

*Cyrbasia*, subgenus *Joculator* Hedley.—Wenz, 1940:770.

REMARKS.—I follow Wenz in making *Joculator* a subgenus of the Eocene genus *Cyrbasia*. In general shape, sculpture, and nature of protoconch they are very similar; the only difference is in the presence of a produced siphonal canal in *Cyrbasia*.

*Horologica* Laseron, 1956, may turn out to be a synonym of *Joculator* or at most a sibling subgenus of *Cyrbasia*.

***Cyrbasia (Joculator) species***

REMARKS.—Four specimens belonging to this subgenus were found in drift sand at sta E-27A. All are without the apical whorls and protoconch and have the apertural region either broken or entirely missing. Until fresh material is available, it is impossible definitely to identify these specimens. Two species seem to be represented that resemble to some degree two undescribed species from Hawaii, one that is close to *Cyrbasia (Joculator) turrigera* (Watson, 1886) from off Honolulu, Oahu.

**Family TRIPHORIDAE Gray, 1947**

**Subfamily INIFORINAE Kosuge, 1966**

**Genus *Iniforis* Jousseau, 1884**

*Iniforis* Jousseau 1884a:235.—Kosuge 1966:315. [Type-species: *Iniforis malvaceus* Jousseau, 1884a; original designation.]

***Iniforis limitaris*, new species**

PLATE 6: FIGURE 10

DIAGNOSIS.—Close to *Iniforis jousseauiei* (Her-  
vier, 1898) from Lifu, Loyalty Islands, but it is uni-  
formly brown in color and not white with brown  
on the base and in the sutures; the posterior canal is  
not as produced.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, 4.2 mm long and nar-  
rowly elongate to short and fusiform, yellowish brown  
in color, the protoconch also yellowish brown  
with the early postnuclear whorls paler, and with a  
red brown streak on either side of the posterior canal.  
Protoconch consisting of 3 whorls marked by axial  
riblets, the last whorl with an obscure peripheral keel;  
postnuclear whorls  $10\frac{1}{4}$ , with 2 rows of nodules or  
beads, the upper row in the early whorls with smaller  
nodules, but in later whorls the beads in the 2 rows  
become subequal; the rows of beads on the last whorl  
terminate at the posterior canal; base of body whorl  
with 2 somewhat nodose keels, the upper one larger.  
Aperture subquadrate, slightly extended; posterior  
siphon a closed tube, fairly short, extended backward  
away from aperture.

MATERIAL.—Holotype: sta E-27A, USNM 756215. Para-  
types: 1 specimen, sta E-27A, USNM 756771; 1 specimen,  
[no definite locality], 1974, H. A. Rehder, USNM 756772.

MEASUREMENTS (mm).—

	<i>width</i>	<i>height</i>
USNM 756215 holotype	1.30	4.20
USNM 756772 paratype	1.14	2.70

REMARKS.—Although I have seen only three speci-  
mens, this material reveals well the characters of pro-  
toconch and aperture. The two adult specimens differ

markedly in size and form but their agreement in the characters of sculpture and color lead me to consider them conspecific.

ETYMOLOGY.—From the Latin *limitaris* (on the border), referring to the species occurring on the eastern border of the Indo-Pacific region.

### Subfamily TRIPHORINAE Gray, 1847

#### Genus *Triphora* Blainville, 1828

*Triphora* Blainville, 1828:344.—Kosuge, 1966:316. [Type-species: *Triphora gemmata* Blainville, 1828 (= *Cerithium tristoma* Blainville, 1825).]

REMARKS.—The genus *Notosinister* Finlay, 1927, has been placed in the synonymy of *Triphora* by Kosuge, but this allocation is based on a study of the radula and operculum of a Japanese species assigned by Kosuge to that genus. Until these characters are examined for the type-species of the Neozelanic *Notosinister*, I feel that the latter should remain as a distinct genus.

This is all the more advisable as the true characters of *Triphora* Blainville in the restricted sense seem to have been misunderstood by recent workers. Kosuge (1966:316) characterizes this genus as possessing anterior and posterior canals in the form of a narrow groove and slit respectively. Blainville in his diagnosis states that his new genus is characterized by 3 distinct orifices and that the anterior tube as well as the posterior sinus are closed. Until specimens of the type-species of *Triphora*, *T. gemmata* Blainville, (= *Cerithium tristoma* Blainville, 1825) can be examined, the true nature of the genus will be in doubt. For the present I follow Kosuge in his characterization of the genus.

Some of the species described below, namely those with 2 rows of beads on all or most of the whorls, I had originally assigned to *Mastonia* Hinds, 1843, following Kosuge in his characterization of that genus (Kosuge, 1966:315). Through the courtesy of Dr. John E. Taylor and Ms. Katherine M. Way I have seen a fine photograph of the holotype of *Triphoris vulpinus* Hinds, 1843, the type-species of *Mastonia*. The type shows the sculpture to consist of 3 spiral keels on each whorl, showing nodules only on the early whorls. These characters do not agree at all with Kosuge's concept of the genus, which is based on that

of Joussemaune (1884a:237), who cites *Triphoris ruber* Hinds as type-species.

Although Kosuge has made a very commendable start on the elucidation of the classification of the Triphoridae, further studies are needed on the correlation of the characters of the radula and operculum with those of the aperture and the sculpture. For this reason the following new species should be considered to belong to the genus *Triphora*, as the latter is understood in the broad sense.

#### *Triphora leucathema*, new species

PLATE 6: FIGURE 12

DIAGNOSIS.—A slender, acuminate species distinctive because of the pale pinkish-white color of the uppermost and smallest of the three spiral rows of nodules, contrasting strongly with the pale brownish orange of the other two rows, and because of the dark brown color of the base of the last whorl.

RANGE.—Easter Island.

DESCRIPTION.—Shell of medium size (holotype with 12 whorls and lacking protoconch is 6.25 mm in length), slender, pale, light to moderate orange yellow with the uppermost spiral row of nodules a contrasting pale pinkish white. Protoconch of 4½ whorls, first whorl smooth, following ones with 2 obscure spiral keels that become stronger and are crossed by fine slender axial riblets. Postnuclear whorls 12, early whorls with 2 subequal rows of nodules connected by a narrow spiral ridge, and a narrower subsutural cord, pale pinkish white in color, which is nodulose with the individual nodules low and elongate; the 3 series of nodules gradually increase in size but the nodules on the upper subsutural row never become as broad or as prominent as the others; there are broad, low axial ribs connecting the nodules of the 3 rows. The base of the body whorl is made strongly angulate by a strong, slightly nodulose keel separated from the other rows of nodules by a white interspace; this keel is the continuation of the obscure keel seen above the suture in the whorls of the spire; below this basal keel is a prominent keel that is deep reddish brown in color as is the remainder of the base, the rather short anterior siphonal canal, and the columellar lip callus. Aperture subquadrangular, the anterior canal narrowly open and the posterior sinus angular, moderately deep outer lip thin, showing externally some intercalated low



spiral rows of nodules and a reddish brown spot below the posterior sinus.

**MATERIAL.**—Holotype: sta E-10A, USNM 756003. Paratypes: 1 specimen from sta E-10A, USNM 757780; 1 specimen, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 339948; 2 specimens, 1958, R. Vargas D., MNSH 200385, 200415.

**MEASUREMENTS (mm).**—Holotype, USNM 756003: width, 1.72; height, 6.25.

**REMARKS.**—I have been unable to find any other species that resembles this distinctively colored shell in both color and sculpture. In color it is like *Triphora albovittata* Hedley, 1903, from New South Wales, but in that species the white row of nodules is stronger with large nodules, the whorls in the protoconch have only one keel, and the color of the base is lighter.

**ETYMOLOGY.**—From the Greek *leukos* (white) plus *kathema* (necklace or collar).

### *Triphora vargasi*, new species

PLATE 6: FIGURE 11

**DIAGNOSIS.**—A rather large species, over 11 mm long, light yellowish brown, elongate with lower half slightly convex, distinguished by having the axial sculpture predominant over the spiral sculpture, except in the earliest postnuclear whorls, where it is equal, with 2 rows of nodules in the early whorls and 3 rows in the last 3 whorls.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell rather large, 10.45 mm long (protoconch and earliest postnuclear whorls of holotype missing, with 11½ whorls remaining), light yellowish brown in color, sculpture in earliest remaining postnuclear whorl consisting of 2 comparatively widely separated spiral rows of relatively large nodules connected vertically and horizontally by narrower ribs and spiral cords, resulting in a fenestrate sculpture; there is also a narrow spiral supersutural cord; the upper spiral cord very soon becomes obsolete, the broad low axial ridges remaining prominent, with the lower spiral cord discernible as a low narrow ridge between the large nodules and the supersutural cord becoming rather prominent; on the whorl before the antepenultimate one an obscure narrow spiral cord appears in the center of the interspace, forming low

nodes where it crosses the axial ridges between the rows of nodules and gradually increasing in size until on the penultimate and last whorls the nodules become almost equal in size to those of the other 2 rows, resulting in 3 rows of subequal to equal nodules on the last 2 whorls; on the base the supersutural cord of the last whorl becomes a row of nodules below which are 2 nodulose cords and a low ridge around the base of the anterior siphon. Aperture subquadrate with columellar basal and outer, lips straight, and parietal wall at a 50° angle; posterior sinus broad; the anterior siphonal canal narrowed to a slit at the aperture by a projecting flexure of the outer lip at its juncture with the canal.

**MATERIAL.**—Holotype: Easter Island, R. Vargas Diaz, MNSH 200384.

**MEASUREMENTS (mm).**—Holotype: height, 10.45; width, 2.97.

**REMARKS.**—Although I have seen only the holotype and it lacks the protoconch and probably the earliest postnuclear whorls (if complete it is estimated that the type would have measured 12.5 mm in length), the distinct nature of the sculpture combined with its size have induced me to describe the shell. I have seen nothing resembling it in our extensive collection of Triphoridae from the Indo-Pacific and Polynesia in particular. Most of this material has been critically studied and identified by Dr. Sadao Kosuge.

**ETYMOLOGY.**—This species is named for Dr. R. Vargas D., whose collection made on Easter Island in 1958 is in the Museo Nacional de Historia Natural in Santiago, Chile.

### *Triphora aporema*, new species

PLATE 6: FIGURE 13

*Triforis levukensis* (Watson).—Lamy, 1936:267; 1938:138. —Steele, 1957:112. [Not *Cerithium (Triforis) levukensis* Watson, 1886.]

**DIAGNOSIS.**—A species showing considerable variation but characterized by its red brown color, the early postnuclear whorls with 2 rows of rounded beads or nodules with an intercalated ridge in the following whorls becoming on the last whorls a third row of beads; the upper row of beads usually large, white or yellowish white, the intermediate row also often whit-

ish, with ground color of the area between the upper and lower rows generally darker in color than the rest of the shell.

RANGE.—Easter Island.

DESCRIPTION.—Shell of moderate size, 5 to 7 mm in length, from narrowly elongate to fusiform and moderately inflated, protoconch pale to light orange yellow, remainder of shell light reddish brown to dark reddish brown, the darker color found particularly in the interspace between the upper and lower row of nodules; the nodules, especially the upper and middle rows, white to light orange yellow. Protoconch about 4 whorls, early ones smooth, weakly angulate, last  $2\frac{1}{4}$  with axial riblets crossing 2 spiral keels. Postnuclear whorls about 11 in holotype; first  $1\frac{1}{2}$  whorls marked by two nodulose keels, a strong peripheral one and a weaker subsutural one; in the following whorls the keels become two spiral series of beadlike nodules separated by a rather wide interspace; in whorl 7 a narrow keel appears below the upper row of nodules, which in the following whorl begins to bear elongate nodules lined up under those of the upper row; these nodules in the penultimate whorl begin to become more rounded and finally become as large as those of the lower row; the last whorl has an additional row of nodules and below it at the angle of the base a slightly nodulose keel. Aperture roundly subquadrate, lip slightly expanded, U-shaped; a marked posterior sinus is present below the suture, its mouth narrowed to a slit by a projection of the lip approaching the thickened edge of the parietal callus; at the columella a similar projection of the lip is subadnate to the columellar margin of the thereby closed, retrorsely directed anterior canal.

MATERIAL.—Holotype: Easter Island, Aug 1968, H. G. Richards, ANSP 321077. Paratypes: 7 specimens from stas E-10A, E-18A, E-27A, E-30; 5 specimens, Aug 1968, H. G. Richards, ANSP 342289; 4 specimens, Oct 1968, P. C. McCoy, ANSP 315553; 1 specimen, 1934, A. Métraux, MHNP; 11 specimens, R. Vargas D., MNSH 200380; 1 specimen, S. Englert, CAS 58585; 2 specimens, Hanga Piko, 1 Jul 1917, K. Bäckström, GM Moll. 21-3719.

MEASUREMENTS (mm).—

	<i>width</i>	<i>height</i>
ANSP 321077 holotype	2.12	6.67
ANSP 315553 paratype	2.27	7.13
USNM 756006 paratype	2.28	7.10
ANSP 315553 paratype	2.50	6.82
MNSH 200380 paratype	1.82	4.95

REMARKS.—This species is one of the most commonly found on Easter Island and one of the most variable. Its outstanding characters are the presence of white or pale yellow orange nodules, particularly on the upper and intermediate rows of the later whorls, that contrast generally with the dark color of the intervening areas. The shape varies from elongate and rather slender to moderately inflated.

ETYMOLOGY.—From the Greek *aporema* (a matter of doubt, a question), referring to the difficulty in determining its limits of variability and its qualification as a distinct species.

### *Triphora loisae*, new species

PLATE 6: FIGURE 14

*Triphora* sp. Dall, 1908a:437.

DIAGNOSIS.—A shell of moderate size, about 7 mm long with 2 rows of nodules on each whorl, uniform brownish orange or with rows of nodules brownish orange and the interspace with narrow nodulose keel and sutural area purplish pink; the former have occasional white nodules. Nearest to *T. lamberti* Hervier, 1898, but more slender, the nodules smaller and more numerous and with the white nodules on the brownish orange rows more sparse.

RANGE.—Easter Island.

DESCRIPTION.—Shell of moderate size, specimens without protoconch measuring 5.8 to 7.7 mm in length; uniform brownish orange to reddish brown, or brownish orange with the interspace between the 2 rows of nodules and the sutural area purplish pink, and with occasional white nodules, usually single but occasionally as doublets in the upper row; near the margin of the outer lip the pink areas become noticeably paler; holotype with  $10\frac{1}{4}$  postnuclear whorls; protoconch lacking in all specimens; earliest postnuclear whorls with the upper row of nodules smaller and the lower nodules of the row larger and higher, the nodules in the 2 rows connected by low axial ribs; the suture deep, rather wide, and somewhat angulate, the nodules of the lower row buttressed below by a short, stout rib; in later postnuclear whorls, the suture becomes relatively more shallow, and the area between the series of nodules as well as the sutural area shows fine spiral threads; in the seventh postnuclear whorl a spiral ridge becomes evident below the upper row of

nodules and increases in strength, while the axial ribs gradually become broader and lower and near the last whorl rather obscure; on the base 2 spiral ridges develop below the lower row of nodules and become increasingly nodulose toward the edge of the outer lip; a low ridge surrounds the anterior canal. Aperture basally rounded, ovate, with an acute angle at the rather deep posterior sinus; the anterior canal flexed backward, almost closed but showing a very narrow slit that ends between the upturned end of the basal lip and a strong projection of the columellar lip.

**MATERIAL.**—Holotype: sta E-10A, USNM 756778. Paratypes: 6 specimens from stas E-10A, E-30; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204068.

**MEASUREMENTS (mm).—**

	<i>width</i>	<i>height</i>
USNM 756778 holotype	2.32	6.30
USNM 756004 paratype	2.95	7.73
USNM 756004 paratype	2.71	7.68
USNM 756005 paratype	2.61	6.70
USNM 756129 paratype	2.45	6.60
USNM 204068 paratype	2.47	5.80

**REMARKS.**—This species is unusual in having two color forms—one of a uniform brownish orange to reddish brown, and the other with the two series of nodules brownish orange and the interspace and sutural area purplish pink; in all other aspects of form and sculpture the specimens are indistinguishable.

An as yet unnamed subspecies exists in the Tuamotus of which I have seen 11 specimens, none fully adult and fresh. This form is more slender, the interspace between the two brownish rows of nodules is always pink, and the sutural area narrower and shallower and always brown with a slender sutural ridge.

As mentioned in the diagnosis, *T. loisae* appears to be related to *T. lamberti* Hervier from Lifu in the Loyalty Islands, the Ryukyus, and the Philippines, but it is quite distinct.

**ETYMOLOGY.**—This species is dedicated to my wife, Lois, who was of great help to me during the two weeks we spent collecting on Easter Island.

***Triphora exomilisca*, new species**

PLATE 6: FIGURE 15

**DIAGNOSIS.**—A small, rather slender shell, about 3 mm long, brownish, with two series of nodules rather

large on early whorls, with low axial riblets between, and an intermediate series arising on the penultimate whorl and gradually increasing in size.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell rather small, about 3 mm in length, slender, spire gently convex, reddish brown in color. Protoconch reddish brown, 4½ whorls, first 1¼ whorls smooth, dome-shaped, next whorl with an increasingly prominent suprasutural spiral keel and axial riblets that increase in strength; a second keel above the other one arises in the third whorl, and in the last half of the protoconch the axial riblets are rather prominent over the 2 low spiral keels. The earliest postnuclear whorls show 2 spiral nodulose keels, the lower one stronger than the upper with obscure axial riblets between the keels, and with a deep, rather broad sutural area; on the later whorls the nodules become larger, the low and broad axial riblets become rather prominent; on the penultimate whorl a spiral series of very small nodules on a low keel originates just under the upper series, the nodules rapidly increasing in size until on the last whorl the intermediate series of nodules is only slightly smaller than the other series; on the base are 2 series of nodulose keels, the upper one larger than the other, and around the anterior canal is a low broad ridge. Aperture suborbicularly ovate, outer lip convex, rounded, slightly effuse, inner edge slightly adnate to columellar callus, but leaving a very narrow slit of the anterior canal; anterior siphon rather short, bent slightly backward; posterior sinus rather deep and rounded, its mouth narrowed by a projecting tongue of the outer lip and the upper end of the parietal callus.

**MATERIAL.**—Holotype: sta E-27A, USNM 756779. Paratypes: 2 specimens from sta E-27A, USNM 756275.

**MEASUREMENTS (mm).**—USNM 756275 decollate specimen, affecting height measurement.

	<i>width</i>	<i>height</i>
USNM 756779 holotype	1.05	2.90
USNM 756275 paratype	1.15	3.00

**REMARKS.**—This small species is quite distinctive, and I have found nothing like it in either our collections from Polynesia and the Indo-Pacific in general or in the literature.

**ETYMOLOGY.**—From the Greek *exomilos* (strange or foreign) plus *iskos* (a diminutive suffix).

*Triphora eucharis*, new species

PLATE 6: FIGURE 16

*Triphora levukensis* Watson.—Odhner, 1922:248, pl. 8: fig. 6. [Not *Cerithium (Triforis) levukensis* Watson, 1886.]

DIAGNOSIS.—Shell elongately fusiform, sides gently convex, up to about 8 mm in height, 3 rows of beads in all but the earliest postnuclear whorls. Resembles most closely *T. aporema*, new species, but with 3 rows of beads in most whorls, the beads more equal, the upper row smaller, and the darker central area of the whorls not as pronounced.

RANGE.—Easter Island.

DESCRIPTION.—Shell moderately small, reaching a little over 8 mm in height, elongate, sides slightly convex, generally pale, with early postnuclear whorls light reddish brown, this color in later whorls restricted to central row of beads that may become grayish yellowish pink, upper row of beads white, lower row pale yellowish pink, base sometimes light brown. Protoconch lacking in all specimens; postnuclear whorls 10 to 11, earliest whorls with 2 rows of nodules with interconnecting axial ribs, the nodules soon becoming larger and beadlike and the axial ribs gradually more obscure; the 6 or 7 last postnuclear whorls have an intercalated median row of beads, starting as elongate nodules where the narrow spiral keel crosses the low axial ribs, and rapidly increasing in size but never becoming as large as in the upper and lower rows; base with 2 strong nodulose keels, and a third weaker keel just above the short anterior canal; on the last part of body whorl near aperture the nodules become axially elongated on crowded slender riblets. Aperture subquadrate, apertural end of anterior canal narrowed to a fine slit by a projection of the outer lip, rest of canal closed; posterior canal a moderately deep sinus.

MATERIAL.—Holotype: Easter Island, Oct 1968, P. C. McCoy, ANSP 339946. Paratypes: 1 specimen from sta E-10A, USNM 756007; 2 specimens, Hanga Piko, 1 Jul 1917, K. Bäckström, GM Moll. 11966; 3 specimens, 1958, R. Vargas D., MNSH 200410; 1 specimen, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 339947; 1 specimen, S. Englert, CAS 58584.

## MEASUREMENTS (mm).—

	<i>width</i>	<i>height</i>
ANSP 339946 holotype	2.50	7.95
ANSP 339947 paratype	2.48	7.05
MNSH 200410 paratype	2.32	7.03
MNSH 200410 paratype	2.05	6.43

REMARKS.—I hesitated for some time before describing this species, as all the specimens lacked the protoconch, and because it seemed to be fairly close to *T. aporema*, described above. However, because all the specimens examined agreed in possessing three rows of subequal beadlike nodules in the last 5 or 6 whorls, and because all had the same general shape and coloration, I decided to give it a name.

ETYMOLOGY.—From the Greek *eucharis* (charming, agreeable).

## Subfamily METAXIINAE Marshall, 1977

Genus *Metaxia* Monterosato, 1884

*Metaxia* Monterosato, 1884:125.—Wenz, 1940:774.—Keen, 1958:304; 1971:415.—Marshall, 1977:111. [Type-species: *Cerithium rugulosum* Monterosato (ex Sowerby), 1884, [not *Cerithium rugulosum* C. B. Adams, 1850] (= *Murex metaxa* Chiaje, 1828); Cossmann, 1906.]

REMARKS.—Monterosato lists "*Cerithium rugulosum* Sowerby, 1850," as the first of two species placed under his new genus, noting that he based this identification on a type in the Hanley collection. Sowerby, (1855:879), however, credits the name *C. rugulosum* to C. B. Adams, who described the species from Jamaica (C. B. Adams, 1850:121). Sowerby states that he has seen a white specimen from Jamaica and a brown one in the Hanley collection from Algiers. The latter is the one that Monterosato saw. It defines the species *Cerithium rugulosum* Monterosato, 1884 (= *Murex metaxa* Chiaje) on which he based his genus *Metaxia*. The species *C. rugulosum* C. B. Adams, 1850, is also a *Metaxia* but not identical with the type-species. The protoconch of a specimen of the Adams' species from off Cape Fear, North Carolina, is different from that given for "*Cerithiopsis (Metaxia) rugulosa* Sowerby" (= *Metaxia metaxa*) by Richter and Thorson (1975:133, pl. 6: figs. 37, 38) but resembles rather closely the protoconch of *M. kermadecensis* Marshall, 1977 (Marshall, 1977:116, fig. 2F).

Originally proposed as a genus, *Metaxia* has frequently been ranked as a section or subgenus of *Cerithiopsis*; recently Keen (1958:304; 1971:415) has used it as a genus. Marshall has recently shown that *Metaxia* is a dextral member of the Triphoridae and has erected a distinct subfamily for it (Marshall, 1977:111).



*Metaxia polynesica*, new species

PLATE 7: FIGURE 1

DIAGNOSIS.—Shell relatively small, 4.7 mm in length, slender, subulate, yellowish brown irregularly maculated with white, with a probably typical *Metaxia* protoconch of 3 rounded or subangulate whorls, the wavy spiral lirae on the first whorl not apparent under the binocular, last 2 with angular axial riblets; postnuclear whorls convex with 4 strongly nodulose spiral cords and a smaller, slightly subnodulose suprasutural cord; columellar straight, aperture subquadrate.

RANGE.—Easter Island.

DESCRIPTION.—Shell relatively small, from 4.4 to 4.7 mm in length, slender, subulate, with convex, spirally sculptured whorls, the early ones subangulate at the periphery; protoconch mamillate-pupoid, of 3½ orange yellow whorls, the first 1½ whorls probably with typical minute wavy spiral lirae, the last two with rather close axial riblets and subangulate at the periphery; postnuclear whorls 9½ in holotype, first 1 to 1½ whorls white, later ones mottled with brown, orange yellow and white, the peripheral row of nodules often whitish; earliest postnuclear whorls with 4 spiral keels, the peripheral one strongest and nodulose as is the weaker one below it, while the 2 upper ones are weak, the subsutural one a smooth spiral cord; the axial riblets are weak in the early whorls but in later whorls connect the nodules on the spiral cords; in later whorls the 4 spiral cords retain their relative strength with the 2 upper cords becoming increasingly nodulose, and a fine suprasutural cord appears, becoming quite prominent on the last whorls of the teleconch, which have a strongly reticulate appearance due to the increase in strength of the axial riblets; the suprasutural keel makes the last whorl strongly angulate, with a smooth base and a slightly curved reddish-brown columellar lip; aperture subquadrate, strongly angulate at the juncture of the outer lip and the base; siphonal notch rather broad.

MATERIAL.—Holotype: Easter Island, 1958, R. Vargas D., MNSH 200413. Paratypes: 2 specimens, 1958, R. Vargas D., MNSH 200389; 1 specimen, 1958, R. Vargas D., USNM 758002; 3 specimens, sta E-27A, USNM 756216.

MEASUREMENTS (mm).—

	width	height
MNSH 200413 holotype	1.20	4.60
USNM 758002 paratype	1.18	4.58
MNSH 200389 paratype	1.08	4.45
MNSH 200389 paratype	1.10	4.33

REMARKS.—This species is most closely related to *M. kermadecensis* Marshall, 1977, but differs in sculptural details. It is less closely similar to the other species of *Metaxia* known so far from the Pacific—*M. exalta* (Powell, 1930) from North Island, New Zealand, and *M. fuscoapicata* Thiele, 1930, from Western Australia.

ETYMOLOGY.—Name refers to its being found in Polynesia.

## Family VERMETIDAE Rafinesque, 1815

REMARKS.—The specimens of the following three species were sent to Dr. Michael G. Hadfield of the University of Hawaii, who for several years has been carrying out a study of the Vermetidae of the central and southern tropical Pacific. He has furnished me with the identifications and many of the comments I have made and is preparing a paper on the Easter Island species in which the two unnamed species will be described as new.

Genus *Dendropoma* Mörch, 1861

*Siphonium*, section *Dendropoma* Mörch, 1861:153.—Keen, 1961:189, 198. [Type-species: *Siphonium* (*Dendropoma*) *lituella* Mörch, 1861; Keen, 1961.]

*Dendropoma platypus* (Mörch, 1861)

PLATE 7: FIGURES 2, 3

*Siphonium* (*Stoa*) *platypus* Mörch, 1861:157.  
*Dendropoma platypus* (Mörch).—Keen, 1961:207.—Hadfield, Kay et al., 1972:84, figs. 5, 6.

DIAGNOSIS.—Shell solitary, of medium size. Coiled shell usually up to 20 mm in diameter, with diameter of the usually circular aperture about 5–7 mm; white or mottled with brown, surface with wavy axial riblets, and occasionally with a keel on the dorsal surface.

RANGE.—Hawaiian Islands, Marshall Islands, and Easter Island.

HABITAT.—Solitary, coiled on rock in tide pools or completely or partially imbedded in coral or shell.

**MATERIAL.**—1 specimen, Apr 1977, A. J. Kohn, USNM 769730; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204071.

**MEASUREMENTS (mm).**—

	<i>maximum</i> <i>shell</i> <i>diameter</i>	<i>aperture</i> <i>diameter</i>
USNM 769730	16.20	5.20
USNM 204071	15.50	4.30

**REMARKS.**—In writing the brief diagnosis above I have made use of the description of this species in the paper by Hadfield, Kay et al. (1972:84–85).

***Dendropoma* species**

**REMARKS.**—Five lots of this new endemic species, all in the USNM collections, were collected at various stations on Easter Island, where it is very abundant encrusting rocky surfaces in tide pools. This small, dark brown species belongs to the group of *Dendropoma gregarium* Hadfield and Kay, 1972, *D. psaroccephalum* Hadfield and Kay, 1972, and *D. rhysoconcha* Hadfield and Kay, 1972, all of Hawaii, and *D. lamellosum* Hutton, 1873, from New Zealand. It most closely approaches the Hawaiian *D. psaroccephalum*.

**Genus *Serpulorbis* Sassi, 1827**

*Serpulorbis* Sassi, 1827:482.—Keen 1961:190, 194. [Type-species: *Serpulorbis polyphragma* Sassi, 1827 (= *Serpula arenaria* Linne, 1758); monotypy.]

***Serpulorbis* species**

**REMARKS.**—A relatively large and solitary species, yellowish white or white, coiling upon itself with the aperture raised above the coils, and lacking distinctive sculpture. It is represented by four specimens from near Hanga Piko and Hanga Paukura, 2 of which are in the USNM collections, 1 in BPBM, and 1 in UBC.

According to Hadfield (pers. comm.) this probably represents a new endemic species but its relationships cannot be determined until more Indo-Pacific species of *Serpulorbis* are examined. The members of this species vary considerably in form according to their habitat. The nature of the protoconch seems to be a character useful in distinguishing species.

**Family PLANAXIDAE Gray, 1850**

**Genus *Planaxis* Lamarck, 1822**

**Subgenus *Angiola* Dall, 1926**

*Planaxis*, subgenus, *Angiola* Dall, 1926:64. [Type-species: *Angiola perscelida* [sic] Dall, 1926; original designation.]

**REMARKS.**—*Angiola* Dall may be used as a subgenus for the small species of *Planaxis* such as *P. fasciatus* Pease, *P. zonatus* A. Adams, *P. lineatus* (Da Costa). The type-species *A. perscelida* Dall [sic], described from southern Kyushu, Japan, is undoubtedly the same as *P. inepta* Gould, 1861, whose type-locality is Kikaiga-Shima, 200 miles south of Kyushu. Both should probably be synonymized under *P. zonatus* A. Adams, 1851.

Proposed as a subgenus of *Planaxis*, *Angiola* was listed with a query as a section of *Planaxis*, subgenus *Supplanaxis* Thiele, 1929, by Thiele (1929:204), and as a subgenus of *Planaxis* near *Supplanaxis* by Wenz (1940:722), again with a query. The shell has very little similarity to that of *P. nucleus* Lamarck, the type-species of *Supplanaxis*.

The radula of *P. perscelida* was very insufficiently described by Dall, and indeed the teeth on the radula slide used by Dall are not well separated and thus are difficult to discern clearly. The median appears to have 2 small denticles on each side of the central cusp, while the admedians have 2 denticles on the outer side and one on the inner side of the major cusp. The marginals are long and slender, widened at the curved cutting edge, which is narrow and is not visibly denticulate; this is quite different from the situation in the marginals of the other species of *Planaxis* whose radular characters are known, where the marginals are strongly denticulate.

***Planaxis (Angiola) fasciatus* Pease, 1868**

**PLATE 7: FIGURE 5**

*Planaxis fasciata* Pease, 1868c:102, pl. 12: fig. 17 [Paumotus].

*Planaxis fasciatus* Pease.—Dautzenberg and Bouge, 1933:323.

*Planaxis lineolatus* Gould, 1849:118; 1852:203-204, pl. 15: figs. 251, 251a.—Dautzenberg and Bouge, 1933:324. [Not *Planaxis lineolatus* Risso, 1826.]

*Planaxis lineatus* (Da Costa).—Cernohorsky, 1972a:59 [in

part], pl. 12: fig. 18a.—Salvat and Rives, 1975:267, fig. 54. [Not *Buccinum lineatum* Da Costa, 1778.]

**DIAGNOSIS.**—A small ovate-acuminate species, up to 11 mm in height, basically grayish yellow to light yellow with narrow reddish-brown spiral bands or lines; smooth except for spiral grooves on base and spiral lirae on earliest whorls; outer lip somewhat effuse, thickened and denticulate within.

**RANGE.**—Niuafoou and Samoan Islands eastward through Cook Islands and Polynesia to Easter Island.

**HABITAT.**—Under rocks in shallow water on reefs, along shore, and in tide pools.

**MATERIAL.**—1 specimen, Sta E-1, USNM 751547.

**MEASUREMENTS (mm).**—Length, 7.0; width, 3.45.

**REMARKS.**—Specimens of this species, very abundant in Polynesia, have been recently called *Planaxis lineatus* (Da Costa), a species restricted to the warm shores on both sides of the Atlantic. The Atlantic species, although similar in aspect, differs in the broader

spiral bands and in the heavier denticulation on the inside of the outer lip.

*Planaxis fasciatus* is more closely related to *P. zonatus* A. Adams, 1851, described from the Philippines, which seems to be the earliest name for the dominant western Pacific form. This is usually a more slender species with only 2 narrow color bands on the last whorl and with stronger spiral sculpture on the spire, although both shape and sculpture are somewhat variable. In certain areas in Melanesia, as in the Loyalty Islands and Samoa, both *P. zonatus* and *P. fasciatus* seem to occur together.

The single specimen we found at Easter Island is not quite mature.

**Subgenus *Hinea* Gray, 1847**

FIGURE 7

*Hinia* Gray (ex Leach), 1847a:269. [Not *Planaxis*, subgenus *Hinia* Gray, 1847, in family Nassina.]

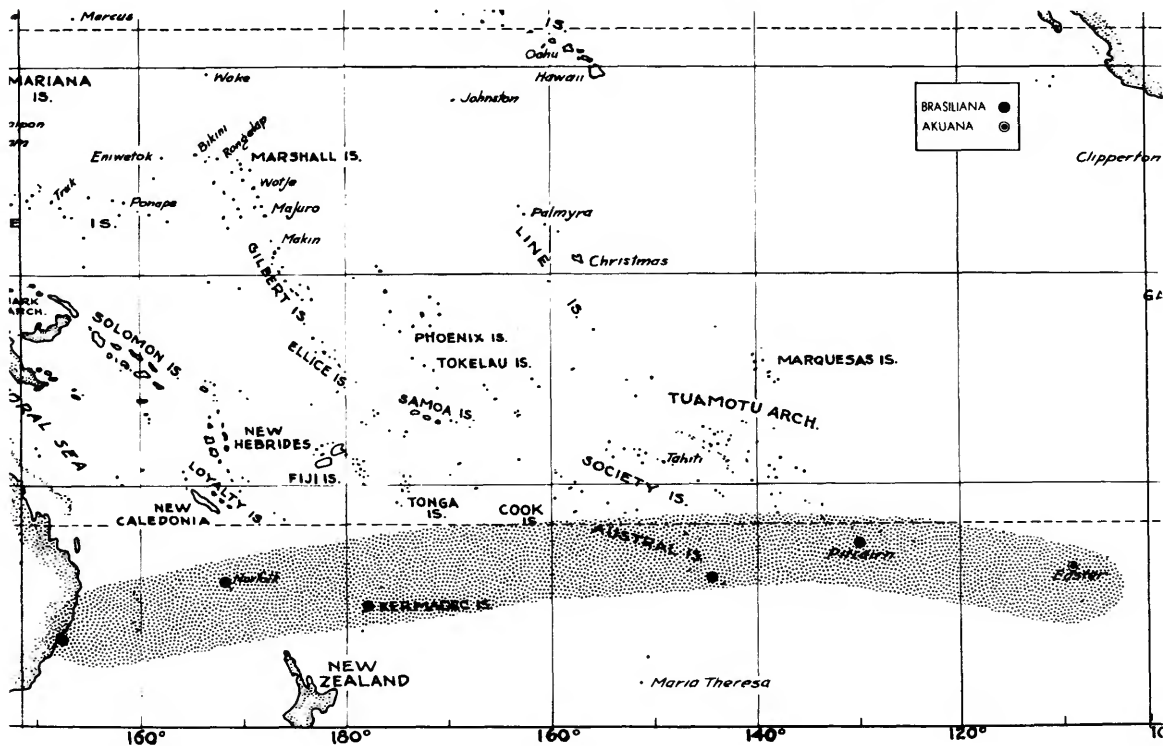


FIGURE 7.—Distribution of the species of *Planaxis*, subgenus *Hinea*.

*Planaxis*, subgenus *Hinea* Gray (ex Leach), 1847b:138.—H. and A. Adams, 1854:323. [Type-species: *Planaxis mollis* Sowerby, 1823 (= *Planaxis brasiliana* Lamarck, 1822); original designation.]

REMARKS.—The original source of the name *Hinea*, which Gray credits to Leach, 1817, is a manuscript list, "Classification of the British Mollusca by W. E. Leach, M.D.," circulated, in several editions, by the author among malacologists. This list, of which the first edition is dated 1816, was not validly published until 1847 when Gray reproduced a copy of the 1816 edition (Gray, 1847a). Gray here says that he is "inclined . . . to regard them as published and having priority from 1818." He, however, cites most of these Leach names as of 1817 or 1819 (Gray, 1847b).

In Gray's edition of Leach's list the name is spelled *Hinia* (Gray, 1847a:269) and the genus contains three species, of which the first two are now placed in the genus *Hinia* Gray, 1847, in the Nassariidae; the third is listed by Gray as "*laevigata*. *Planaxis mollis* Sow." The date of this use of *Hinia* is October 1847. A month later Gray designated *Buccinum reticulatum* Linné as the type-species of "*Hinia* Leach MSS. 1817" (Gray, 1847b:139), and for *Planaxis mollis* he proposed the subgeneric name "*Hinea*, Leach MSS. 1817" (Gray, 1847b:138). Obviously both these names are variants of the same name, but as Gray considered them distinct, placing the latter under *Planaxis* Lamarck, 1822 (not *Planaxis* Risso, 1826), in the family Purpurina, and the former under *Planaxis* Risso, 1826 (not *Planaxis* Lamarck, 1822), in the family Nassina, they can validly coexist, though based on the same name.

The name *Hinea* was considered by Gray as probably a synonym of *Planaxis* Lamarck, 1822 although he made a separate entry for it and, following Leach's lead, designated a type-species different from that of *Planaxis*. He thought further investigation might prove it to be distinct. H. and A. Adams (1854:323) considered it a subgenus of *Planaxis*, an arrangement that has subsequently been generally followed, although some workers in New Zealand and Australia give it generic ranking. The radula, as described and figured by Thiele (1929:204), is distinct from that found in typical *Planaxis* in having a broader and lower rachidian with a large multidenticate triangular central cusp and in the lateral teeth possessing a relatively small principal cusp and numerous

smaller cusps. The shell is more weakly spiral sulcate, and the sculpture of the early postnuclear whorls is relatively smooth.

### *Planaxis (Hinea) akuana*, new species

PLATE 7: FIGURE 5

*Planaxis mollis* Sowerby.—Dall, 1908a:437.—Fuentes, 1914:316.—Odhner, 1922:248.—Lamy, 1936:267; 1938:138.—Steele, 1957:112. [Not *Planaxis mollis* Sowerby, 1823, (= *Planaxis brasiliana* Lamarck, 1822).]

DIAGNOSIS.—Similar to *Planaxis (Hinea) brasiliana* Lamarck, 1822, but with a smooth interior of the outer lip, moderately thickened and without lirae, and with a vertically elongate dark chestnut spot on the inner edge of the columellar lip. The periostracum is darker, moderate brown instead of moderate yellow.

RANGE.—Easter Island.

DESCRIPTION.—Shell heavy, of medium size for family, 6.3 to 18.0 mm in length, 3.7 to 9 mm in diameter, elongately ovate-conic; spire acute, with whorls only slightly convex, suture adpressed. Color, when fresh, whitish to dark straw-yellow, with a pale subsutural zone, covered by a rather thick, moderate brown periostracum, which when dry forms irregular cracks at the edges and occasionally curls up subsequently in thin strips resembling coarse bristles; the basal part of the spire whorls, especially the early postnuclear whorls, are often bluish purple. Protoconch, dome-shaped, of one smooth whorl, the earliest part of which is broken and seems to show remnants of a chitinous shell; the first postnuclear whorl has two deep spiral grooves, dividing the whorl into three rounded lirae, which gradually flatten and broaden as the grooves become less deep; on the last whorl the spiral grooves are indistinct to absent, except at the anterior portion around the base of the columella, where they are generally more pronounced. The holotype has 7½ postnuclear whorls, of which the last whorl is bluntly angulate at the periphery, with the suture angled sharply downward at the aperture, causing the outer lip to become thickened and inflected at the upper end. Aperture ovate, outer lip thick, roundly beveled, smooth; inner lip gently arched, with a distinct, margined callus, which is broadened over the base of the columellar



neck; siphonal notch narrow, moderately deep. The interior of the aperture is white to moderate pink, with an elongate, reddish brown spot on the inside of the columellar lip; edge of outer lip and columella from pale yellow to brown. Operculum oval with a terminal nucleus.

**HABITAT.**—Under rocks in tide pools and from tide line to a short distance above.

**MATERIAL.**—Holotype: sta E-9, USNM 756793. Paratypes: about 1600 specimens from stas E-1, E-4, E-8, E-9, E-10, E-11, E-14, E-15, E-18, E-25, E-27, E-31, E-32, E-34; 25 specimens, Hanga Nui, 8 Aug 1972, M. Villarroel, USNM 708436; 1 specimen, in tide pool, S end of Hanga Roa, Jan-Feb 1969, J. E. Randall, BPBM 206972; 60 specimens, in tide pools between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206941; 1 specimen, Haka Ea, Vaihu, 1 May 1977, A. J. Kohn, USNM 769726; 40 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 1 specimen, in tide pool, Hanga Piko, 31 Dec 1964, I Efford, UBC 6318; 35 specimens, above tide line, Vinapu, 25 Jan 1965, I. Efford, UBC 6327; 2 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200288; 35 specimens, 1958, R. Vargas D., MNSH 200262; 32 specimens, 9 Apr 1956, Y. Valencia D., MNSH 200263, 200264, 200265; 9 specimens, 1954, Prof. Baeza, MNSH 200312; 2 specimens, S. Englert, USNM 633990; 62 specimens, Dec 1904, USBF Str. *Albatross*, USNM 204070; 6 specimens, Oct 1964, *La Railleuse*, USNM 683888; 48 specimens, S. Englert, USNM 657474; 41 specimens, Oct 1968, P. C. McCoy, ANSP 315562; 2 specimens, S. Englert, ANSP 222421; 6 specimens, S. Englert, ANSP 301654; 62 specimens, S. Englert, CAS 58587-58648; 1 specimen, S. Englert, CAS 58586; 1 specimen, I. Efford, UBS 6348.

**MEASUREMENTS (mm).—**

	length	width
USNM 756793 holotype	15.65	8.50
USNM 755974 paratype	18.00	8.95
USNM 751558 paratype	16.70	8.75
USNM 751558 paratype	13.02	6.80
USNM 751558 paratype	10.68	5.74
USNM 751558 paratype	9.46	5.15

**REMARKS.**—This is one of the most abundant species, found in tide pools and under rocks along the shore. It is obviously closely related to *Planaxis (Hinea) brasiliana* Lamarck, 1822, a species found in Australia from southeastern South Australia to southern Queensland, the northern part of North Island, New Zealand (Powell, 1971:209), and on Lord Howe, Norfolk, Kermadec, and Pitcairn Isands. Specimens from Pitcairn Island have been given the name *P. pigra* Forbes, 1852, but they differ only in

averaging somewhat smaller in size. Dead shells of a similar small size, labeled as coming from Bundaberg, northern Queensland, are in the Australian Museum. Its presence as a living species in this tropical area needs to be confirmed.

Several specimens of *Planaxis (Hinea) brasiliana* have been collected in a late Pleistocene deposit at Peppermint Grove near Perth, Western Australia (G. W. Kendrick, in litt.).

The present geographic range of species of the subgenus *Hinea* (Figure 7) is an example of what I have called the Easter-Kermadec "Province." The addition of the Pleistocene specimens mentioned above would extend this range westward another 1200 miles.

**ETYMOLOGY.**—Derived from the Pascuense *aku aku* (an ancestral spirit).

**Family EPITONIIDAE Berry, 1910 (1812)**

**REMARKS.**—Lamarck was the first to propose a family based on the genus *Epitonium*, using the vernacular form "Scalariens" (Lamarck, 1812:117).

**Genus Epitonium Röding, 1798**

*Epitonium* Röding, 1798:91. [Type-species: *Turbo scalaris* Linné, 1758; Suter, 1913.]

**Subgenus Gyroscala de Boury, 1887**

*Scala*, subgenus *Gyroscala* de Boury, 1887:15. [Type-species: *Scala commutata* Monterosato, 1877(= *Scala lamellosum* Lamarck, 1822); original designation.]

***Epitonium (Gyroscala) pyramis* Tinker, 1952**

**PLATE 7: FIGURE 8**

*Scalaria perplexa* Pease, 1868b:288 [Hawaii]. [Not *Scalaria perplexa* Deshayes (ex Pease), 1863:60, pl. 8: fig. 1.]

*Epitonium pyramis* Tinker (ex Dall), 1952:106, figs. [Hawaii]; 1958:28, figs.

**DIAGNOSIS.**—A moderately large species, from about 9 to 30 mm in height, with very convex whorls and a deeply impressed suture, the last whorl with a basal disk; the whorls are smooth except for occasional microscopic spiral grooves on the last whorl, and a dark purplish brown band is generally present

just below the suture; occasionally the whorls are irregularly suffused with brown; the whorls are crossed by between 10 to 13 (average 11.5) erect, somewhat reflexed axial lamellae, whose edge is smooth and slightly thickened and whose posterior end is rounded and is generally joined to the base of the comparable lamella of the preceding whorl.

RANGE.—Hawaiian Islands and Easter Island.

MATERIAL.—6 specimens from stas E-10A, E-13, E-21, E-30, E35; 5 specimens, Anakena, 1958, R. Vargas D., MNSH 200426; 18 specimens, 1958, R. Vargas D., MNSH 200427; 1 specimen, Jan 1965, I. Efford, UBC 6350; 4 specimens, S. Englert, CAS; 2 specimens, S. Englert, CAS.

MEASUREMENTS (mm).—

	width	height
UBC 6350	7.60	16.82
USNM 756109	6.50	14.35
USNM 756060	6.80	14.30
USNM 751582	6.15	13.93

REMARKS.—The trivial name of this species is based on a manuscript name of Dall's that was communicated to some of the Hawaiian collectors and that was cited by Tinker in his "Pacific Sea Shells" (Tinker 1952:106; 1958:38). His use of the name must, according to the *International Code of Zoological Nomenclature*, be considered as validating the name *E. pyramis*.

Pease proposed the name *Scalaria perplexa* for this Hawaiian species and published a description in 1868 (Pease, 1868b:288). Some years previous Deshayes must have seen a manuscript copy of the description or been sent a specimen so labeled by Pease, as in his paper on the mollusks of Réunion, published in 1863, he uses Pease's name for specimens from this Indian Ocean Island (Deshayes, 1863:60); he is in error in stating that Pease published a description of it in the *Proceedings of the Zoological Society of London* for 1860.

Deshayes' *Scalaria perplexa* is, however, different from the Hawaiian species, and for this reason Dall gave the latter a new name in his unpublished manuscript on Hawaiian marine shells. It is most readily differentiated by its more convex whorls, more deeply impressed suture, and its generally broader aspect. I have restricted Deshayes' name to species from the Indian Ocean and southern Japan, Ryukyus, and Micronesia to New Caledonia. I have seen no specimens belonging to either *S. perplexa* Deshayes or

*E. pyramis* Tinker from any locality in the southeastern tropical Pacific.

Kilburn (1972:407) has placed *S. perplexa* Pease (= *E. pyramis* Tinker) and by inference *S. perplexa* Deshayes (ex Pease), in the synonymy of *Epitonium lamellosum* (Lamarck, 1822). I, however, consider the latter species as distinct and restricted to both sides of the Atlantic. It has fewer number of lamellae and is generally a more slender species.

*Epitonium (Gyroscala) torquatum* (Fenaux, 1943), from the Line Islands and French Polynesia differs in being more broadly pyramidal, smaller, with fewer whorls, and fewer but relatively larger lamellae.

## Family JANTHINIDAE Leach, 1823

### Genus *Janthina* Röding, 1798

*Janthina* Röding, 1798:85.—Lamarck, 1822a:204. [Type-species: *Helix janthina* Gmelin, 1791 (= *Helix janthina* Linné, 1758); tautonymy.]

*Janthina* Lamarck.—Reeve, 1858b, pl. 1.—Laursen, 1953:15.

### Subgenus *Janthina* Röding, 1798

#### *Janthina janthina* (Linné, 1758)

*Helix janthina* Linné, 1758:772.

*Janthina violacea* Röding, 1798:75.—Hinton, 1972:4, pl. 2: fig. 18.

*Janthina fragilis* Lamarck, 1801:89.—Lamy, 1936:268; 1938:140.

*Janthina communis* Lamarck, 1822a:206.—Dall, 1908a:437.—Steele, 1957:112.

*Janthina janthina* (Linné).—Laursen, 1953:15–22, figs. 14–21, pl. 1: fig. 1.

*Janthina janthina* (Linné).—Cernohorsky, 1972a:197, pl. 3: fig. 8.

*Janthina ianthina* (Linné).—Salvat and Rives, 1975:273, fig. 77.

DIAGNOSIS.—This common and circumtropical species is readily distinguished by its relatively large size, bluntly angulate periphery, and conical spire, varying from depressed to rather elevated.

RANGE.—A pelagic species found in tropical and subtropical waters and occasionally washed ashore in temperate waters.

MATERIAL.—3 specimens, Anakena Bay, 1934, NEB "Mercator" IRSNB; 8 specimens, 1958, R. Vargas D., MNSH

200460; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204065.

MEASUREMENTS (mm).—USNM 204065: width, 13.8; height, 9.5.

#### Subgenus *Iodina* Mörch, 1860

*Janthina*, subgenus *Iodina* Mörch, 1860:282. [Type-species: *Janthina exigua* Lamarck, 1816; Cossmann, 1925.]

#### *Janthina (Iodina) umbilicata* Orbigny, 1840

##### PLATE 7: FIGURE 7

*Janthina umbilicata* Orbigny, 1840:414.

*Janthina umbilicata* Orbigny.—Laursen, 1953:26–27, figs. 26–29.

DIAGNOSIS.—A rather small species, reaching 15 mm in height, rather globose with elevated spire, the last whorl with a distinct anal fasciole at the periphery, formed by the acute anal sinus on the outerlip; the surface is sculptured with fine, crowded striae, angulately opisthocyrt.

RANGE.—Worldwide in most tropical and subtropical waters.

MATERIALS.—1 specimen, sta E–30, USNM 756110.

MEASUREMENTS (mm).—Width, 7.75; height, 9.63.

REMARKS.—This pelagic species is much less abundant than the previous species and appears to be more restricted to warmer waters than its relative *Janthina exigua* Lamarck, 1816.

#### Genus *Recluzia* Petit, 1853

*Recluzia* Petit, 1853:117. [Type-species: *Recluzia jehennei* Petit, 1853; Cossmann, 1925.]

#### *Recluzia lutea* (Bennett, 1840)

##### PLATE 7: FIGURE 6

*Janthina lutea* Bennett, 1840:63, 298.

*Recluzia rollandiana* Petit, 1853:119, pl. 5: fig. 12.

*Limnaea palmeri* Dall, 1871:135.

*Recluzia lutea* (Bennett).—Powell, 1924:285.

*Recluzia palmeri* (Dall).—Dall, 1925:25, pl. 17: fig. 8.

DIAGNOSIS.—Of the few species known of this genus of pelagic snails characterized by thin, brown-

ish, broadly ovate to elongately ovate, high-spired shells with convex whorls, this species is characterized by possessing a moderately high conical spire. *Recluzia jehennei* Petit, 1853, from the Red Sea is broadly ovate with a low spire, and *R. johnii* (Holten, 1802), of which *R. hargravesi* Cox, 1870, is a synonym, has a high elongate spire.

RANGE.—So far as I know, this species is known only from the Pacific Ocean. I have seen specimens from the Kermadecs, the Cook Islands, Easter Island, and the Pacific coast of Mexico.

MATERIAL.—1 specimen, Anakena, 1958, R. Vargas D., MNSH 200337.

REMARKS.—The Easter Island shell is imperfect, the earliest whorls and the last whorl being broken off; the estimated length of the complete shell is about 17 mm. I have, therefore, figured a specimen from the Kermadec Islands.

#### Family EULIMIDAE Philippi, 1853

REMARKS.—With the resurrection of *Eulima* Risso, 1826, as a distinct genus, replacing the names *Leios-traca* H. and A. Adams, 1853, and *Strombiformis* of authors, not Da Costa, 1778, the family name reverts to the long-used family name Eulimidae. This has been done by Keen (1971:443).

#### Genus *Melanella* Bowdich, 1822

*Melanella* Bowdich, 1822:27. [Type-species: *Melanella dufrenoyi*, Bowdich, 1822; monotypy.]

DIAGNOSIS.—This genus contains species that are solid, opaque white, rather broad, curved or straight, and with distinct axial scars that denote previous positions of the outer lip.

#### *Melanella cumingi* (A. Adams, 1854)

##### PLATE 7: FIGURE 9

*Eulima major* var.—Sowerby, 1834:1 [in part], fig. 1 [Tahiti].  
*Eulima cumingii* A. Adams, 1854a:277 [Lord Hood's Island (= *S. Marutea* in the Tuamotu Islands)]; 1854b: 798, pl. 149: fig. 26.—Sowerby, 1866a, pl. 1: sp. 8.—Dall, 1908a:437.—Lamy, 1936:268; 1938:140.—Steele, 1957: 112.

*Melanella cumingi medipacifica* Pilsbry, 1917:221, pl. 14: figs. 4, 4a [Hawaii].

*Eulima major* Sowerby.—Salvat and Rives, 1975:273, fig. 80 [center]. [Not *E. major* Sowerby, 1834.]

DIAGNOSIS.—This large opaque white *Melanella* is characterized by its straight form, not curved or slightly tortuous near the apex, only slightly sinuous outer lip, and by the straight, impressed, linear labial scars being irregularly situated on the spire whorls and not aligned in any way.

RANGE.—Throughout the Indo-Pacific region, from East Africa to Hawaii and Easter Island.

HABITAT.—Parasitic at Easter Island on the holothurian *Actinopyga difficilis* (Semper).

MATERIAL.—5 specimens from stas E-4, E-5, E-18, E-35, E-36A; 9 specimens, near dock, Hanga Roa, B. Alarcón, USNM 756347; 12 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200396; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204063; 1 specimen, 2 Feb 1965, I. Efford, UBC 6346; 2 specimens, Jan 1965, I. Efford, UBC 6349; 2 specimens, 1958, W. J. Eyerdam, USNM 633989; 2 specimens, 1952-1956, S. Englert, ANSP 222408; 4 specimens, Oct 1968, P. C. McCoy, ANSP 315557; 1 specimen, Oct 1968, P. C. McCoy, ANSP 315556; 30 specimens, S. Englert, CAS; 4 specimens, S. Englert, CAS; 1 specimen, May 1960, L. Perez, MNSH 200455; 2 specimens, 1954, Prof. Baeza, MNSH 200453.

MEASUREMENTS (mm).—

	width	height
CAS	8.75	28.42
USNM 751588	8.11	27.19
USNM 751590	8.00	26.96
USNM 633989	8.52	26.89
USNM 756058	6.67	20.10

REMARKS.—The subspecies *M. cumingi medipacifica* Pilsbry, 1917, is said to be less robust than typical *M. cumingi*, which allegedly has a narrower aperture. Specimens from the Tuamotus, however, are indistinguishable from Hawaiian shells, and I believe that the original drawing has the angularity of the last whorl exaggerated. I consider, therefore, Pilsbry's subspecies to be synonymous with the typical form.

*Melanella pisinna*, new species

PLATE 7: FIGURES 10, 11

DIAGNOSIS.—A small, elongate-pyramidal shell, the last whorl varying somewhat in width, with the pronounced labial scars on the right side approxi-

mately aligned although slightly offset to the right adapically; the suture is angulately depressed at its juncture with the labial scars.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, 6.3 to 7.7 mm in length, glossy smooth, white-opaque or subtranslucent, elongate-pyramidal, more or less arcuate, last whorl relatively broad, usually evenly convex, though occasionally subangulate. Protoconch missing in all specimens; 8 to 10 postnuclear whorls, slightly convex, suture weakly impressed, and descending at each labial scar and ascending again, forming a marked and broad V-shaped notch at this juncture. Subsutural band rather broad; labial scar fairly straight, slightly arched forward in lower part; labial scars found on right side of shell and each subsequent one generally advanced over previous one; whorls slightly swollen in front of each scar. Outer lip descendent at suture and arched forward.

HABITAT.—Not known but probably parasitic on holothurians.

MATERIAL.—Holotype: sta E-30, USNM 756117. Paratype: sta E-30, USNM 766571.

MEASUREMENTS (mm).—

	width	height
USNM 756117 holotype	3.26	6.68
CAS 58649 paratype	4.68	7.68
CAS 58650 paratype	3.46	7.10
USNM 756148 paratype	3.28	6.90
USNM 766571 paratype	2.80	6.27

REMARKS.—I hesitate to describe a new species of *Melanella* from the Indo-Pacific region, but I am unable to assign these specimens to any known species. They have some resemblance to *Melanella modicella* A. Adams, 1854, from Cebu, Philippines, and *M. yamazii* (Habe, 1952) from Honshu, Japan, but are broader and have fewer whorls with a less acuminate spire.

The measurements of the last three specimens above are representative of seven other specimens that I assign to this species with doubt; they are all characterized by having a broader last whorl giving them a more broadly elongate-pyramidal form. In all other shell characters these specimens resemble the typical form. These broader forms are represented by the following material: 1 specimen, sta E-18A,



USNM 756148; 7 specimens, S. Englert, CAS 58649-59656.

ETYMOLOGY.—From the Latin *pisinna* (small), in reference to its dwarfed appearance.

### Genus *Balcis* Gray, 1847

*Balcis* Gray (ex Leach), 1847a:271. [Type-species: *Helix polita* Montagu, 1803 (= *Turbo politus* Linné, 1758); monotypy.]

DIAGNOSIS.—Shells of this genus are generally smaller, more slender and thinner than in *Melanella*, with the labial scars obscure.

#### *Balcis aciculata* (Pease, 1860), new combination

PLATE 7: FIGURE 12

*Eulima aciculata* Pease, 1860c:438 [Sandwich Islands].—Sowerby, 1866a, pl. 5: figs. 36a, 36b.—Kay, 1965:66, pl. 9: fig. 2.

DIAGNOSIS.—This species reaches almost 10 mm in height, is opaque white, slender-acuminate, with a relatively long, narrow body whorl.

RANGE.—Hawaiian Islands, Cook Islands, Tuamotus, Easter Island.

HABITAT.—Parasitic on holothurians.

MATERIAL.—2 specimens, S. Englert, CAS.

Hawaii: 7 specimens, Honolulu, Oahu, D. Thaanum, USNM 339222.

MEASUREMENTS (mm).—

	diam.	height
CAS	2.42	7.00
CAS	2.08	5.20

REMARKS.—This species differs from *B. acicula* (Gould, 1849), of which *B. vitrea* (A. Adams, 1854a) may be a synonym, in being opaque white and not vitreous and translucent, in the last whorl being more slender, and in the outer lip not being as strongly arched forward as in *B. acicula*.

I am figuring a specimen from Hawaii as the Easter Island specimens are not suitable for an illustration.

#### Genus *Hemiliostraca* Pilsbry, 1917, new status

*Subularia* Monterosato.—Bartsch, 1917:134.—Pilsbry, 1917:228. [Not *Subularia* Monterosato, 1884.]

*Subularia*, subgenus *Hemiliostraca* Pilsbry, 1917:228. [Type-species: *Leiostraca distorta* Pease, 1860; monotypy.]

REMARKS.—Pilsbry proposed *Hemiliostraca* as a section of *Subularia* for those species possessing a curved shell, without color markings. Dr. Anders Warén informs me, however, that an examination of the syntypes of the type-species *Leiostraca distorta* Pease on which Pilsbry based his observations shows that these are beach specimens that reveal faint traces of color markings. Because it appears to me to be inadvisable to separate species solely on the basis of possessing straight or curved shells, I am uniting both of Pilsbry's groups.

Pilsbry's *Subularia*, based on Bartsch's concept of the genus, is not *Subularia* Monterosato, 1884, which was a replacement name for *Leiostraca* H. and A. Adams, 1854, whose type-species was designated by Bucquoy, Dautzenberg, and Dollfus in 1888 as *Turbo subulata* Donovan. This makes *Leiostraca* and *Subularia* Monterosato synonyms of *Eulima* Risso, 1826.

#### *Hemiliostraca bahamondei*, new species

PLATE 7: FIGURE 13

DIAGNOSIS.—A small shell, characterized by its conspicuously curved shape, dark coloring, relatively numerous whorls, and conspicuous false suture.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, 2.3 to 4.6 mm in height, elongately and acuminate pupiform, with about 9¼ translucent whorls in largest specimen. Protoconch dome-shaped, smooth, whitish, of 2¼ whorls. Post-nuclear whorls 7, suture very indistinct, labial scars somewhat more prominent, smooth, glassy, translucent, early ones brownish orange, later ones with irregular broad blotches or bands of brownish orange, last whorl large, comprising over half of total length of shell, whitish translucent with a rather broad brownish orange band below the false suture (translucent whitish above, below the true suture) and a narrow band of the same color below the broader one; a broad, brownish orange blotch midway immediately to the left of the columellar lip continues in an attenuated form to halfway to the outer lip edge, and a small brownish orange spot is present at the base of the columellar and bottom of the anteriorly rounded apertural lip. Outer lip thin, sinuous, con-

tinuous with the rounded base and with an angulation of the left side that continues to almost half the height of the last whorl; base of apertural side of last whorl compressed. Columellar lip flattened, a longitudinal angle separating it from a flattened, somewhat concave columellar callus that is bordered on the left by the angulation of the continuation of the apertural lip.

HABITAT.—Unknown.

MATERIAL.—Holotype: Easter Island, USNM 766572 (ex Museo Nacional de Historia Natural, Santiago). Paratypes: 1 specimen, MNSH 200466; 3 specimens sta E-27A, USNM 756271.

MEASUREMENTS (mm).—

	width	height
USNM 766572 holotype	1.29	3.75
MNSH 200466 paratype	1.36	4.56
USNM 756271 paratype	0.90	2.32

REMARKS.—This distinctive species differs from the typical *H. distorta* (Pease, 1860), known from Hawaii and southern Japan, by its smaller size, darker coloration, and relatively greater number of whorls. A specimen of *H. distorta*, measuring 6.1 mm in length, has one less whorl than the paratype measuring 4.56 mm.

Unfortunately the largest specimens of this new species have no definite locality.

ETYMOLOGY.—This new species is dedicated to Dr. Nibaldo Bahamonde, acting director of the Museo Nacional de Historia Natural in Santiago, Chile, through whose kindness and cooperation I was able to examine the collection of Easter Island mollusks in the museum, and take with me on loan those specimens that needed more critical study.

#### *Hemiliostraca* species

REMARKS.—A broken and beachworn specimen, picked out of drift sand at sta E-27A appears to belong to one of the rectilinear species of *Hemiliostraca*. It is, however, more strongly colored than either *H. metcalfei* (A. Adams, 1853), or *H. perspicua* (Oliver, 1915) from the Kermadecs. It is mentioned here only to point out that at least one other species of this genus is to be found on Easter Island.

#### Genus *Vitreolina* Monterosato, 1884

*Vitreolina* Monterosato, 1884:100. [Type-species: *Helix incurva* Renier, 1804; Bucquoy, Dautzenberg, and Dollfus, 1898.]

DIAGNOSIS.—This genus comprises small vitreous or translucent shells that are usually less than 5 mm in height. They are curved, have the labial scars in a line, and are more compressed dorsoventrally than *Melanella*, *Balcis*, and *Eulima* but lack the flattened area near the aperture found in *Hemiliostraca*.

#### *Vitreolina wareni*, new species

PLATE 7: FIGURES 14, 15

DIAGNOSIS.—A small, curved species with a rather broad base but more slender than any Indo-Pacific species known to me.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, 3.28 to 4.1 mm in height, slightly curved, especially in earlier whorls, consisting of 9¼ smooth, whitish, translucent, not opaque, whorls; protoconch not distinctly delimited, consisting of about 3 glassy whorls, first whorl dome-like; suture obscure, strongly appressed, with rather broad margin between it and false suture, labial scars sinuous, alined in opisthocline direction except in earliest 2 whorls, where they are irregular; whorls weakly convex, last whorl convex, not angulate; aperture ovate, posteriorly acuminate, outer lip sinuate and rather strongly prosocyrtylly arched.

HABITAT.—Unknown.

MATERIAL.—Holotype: S. Englert, CAS 59676. Paratypes: 2 specimens, S. Englert, CAS 58657, 58658; 1 specimen, S. Englert, USNM 766700.

MEASUREMENTS (mm).—

	width	height
CAS 59676 holotype	1.55	3.95
CAS 58657 paratype	1.68	4.10
USNM 766700 paratype	1.52	3.69
CAS 58658 paratype	1.39	3.28

REMARKS.—The species of *Vitreolina* of the Indo-Pacific are poorly known. The only authoritatively identified Indo-Pacific species of *Vitreolina* found by Dr. Anders Warén in the collection of the National

Museum of Natural History were *Eulima recurva* Boettger, 1893, from the Philippines, *Strombiformis langfordi* Dall, 1925, from Japan, and the following South African species of Bartsch: *Melanella iota*, *M. carifa*, *M. icafra*, and *M. cijara*. All of these are more slender than *V. wareni* besides differing in other characters. It is very possible that more species belonging to *Vitreolina* will be found described as *Eulima*.

ETYMOLOGY.—This species is named for Anders Warén of Göteborg, Sweden, who is undertaking a comprehensive study of this family, and who aided me in identifying my Easter Island material.

#### Family STILIFERIDAE H. and A. Adams, 1853

##### *Mucronalia?* *angulata* Mandahl-Barth, 1949

PLATE 7: FIGURES 17, 18

*Mucronalia angulata* Mandahl-Barth, 1949:147-148, pl. 8 [Easter Island].

DIAGNOSIS.—Small, 4.3 mm in length, rather broadly turbinate, smooth, irregularly translucent and opaque white, which is often in axial streaks; the early whorls decollate and the later whorls strongly angulate and tabulate, forming a narrow horizontal sutural shelf; aperture basally broadly rounded, posteriorly obtusely angulate, outer lip narrowly thickened and slightly effuse, columellar lip thickened, parietal wall with a callus, operculum thin, glassy.

RANGE.—Easter Island.

HABITAT.—Found in a small cavity on the right ventral radius of a holothurian—*Holothuria cinerascens* (Brandt, 1835).

MATERIAL.—2 specimens, holotype and paratype, 1934, A. Metraux MHNP.

MEASUREMENTS (mm).—

	width	height
MHNP holotype	2.84	4.33
MHNP paratype	2.71	4.29

REMARKS.—Through the kindness of Dr. Philippe Bouchet I have been able to examine and figure the types of this species. Mandahl-Barth was able to examine only a portion of the soft parts that remained on the tegument of the host when the specimens were removed; the shells are now without soft parts. This enabled him to note the presence of an operculum

and a pseudopallium, characters that led him to assign his new species to *Mucronalia*. The decollate apex and general form of shell of this genus, however, are completely different, and I feel sure that this species does not belong in that genus. It has some aspects that bring to mind the Melanellidae, but the presence of a pseudopallium seems to rule out this allocation. Until more material is gathered and a critical study is made of the whole animal, I leave it in the Stiliferidae with some doubt.

##### *Luetzenia*, new genus

*Robillardia* E. A. Smith.—Gooding and Lützen, 1973:3-4. [Not *Robillardia* E. A. Smith, 1889.]

DIAGNOSIS.—Shell small, 2 to 10 mm in width (males considerably smaller than females), with a mucronate apex of 2½ smooth, whitish, opaque whorls, and a broad, subglobose, thin adult shell of 3½ whorls, the last 3 whorls smooth, glassy, transparent, with microscopic crowded growth lines; an operculum is absent. A well-developed creeping foot and head are present, from the sides of which conspicuous folds of skin arise that cover most of the shell; an acrembolic proboscis with a proboscis gland is present.

TYPE-SPECIES.—*Luetzenia goodingi*, new species.

HABITAT.—In the rectum of the echinoid *Echinometra insularis* H. L. Clark, 1912, and endoparasitic also in *Echinometra mathaei* (Blainville, 1825).

REMARKS.—To the genus *Robillardia* E. A. Smith, 1889, Gooding and Lützen referred specimens I identify as *Luetzenia goodingi*. *Robillardia* was based on a single shell found on an echinoid on Mauritius (Smith 1889:270-271). The shell was described as glassy and of a depressed-helicoid shape with a short spire and with spiral lirae and grooves on the whorls. An enlarged photograph of the fragile and now damaged holotype clearly shows the depressed form ascribed to the shell and portrayed in the simple outline drawing accompanying the original description of the type-species *R. cernica* E. A. Smith, 1889; it also shows the spiral lirae and grooves in the shell. Unfortunately the early whorls are broken, but according to Smith's description and figure the spire was short, quite different from the mucronate spire of *L. goodingi* from Easter Island. An unnamed

species that may belong in *Robillardia* was figured by Mortensen (1939:18); it was found in galls in the test of the echinoid *Prionocidaris pistellaris* (Lamarck) from Delagoa Bay, Mozambique. The shell has the same shape as Smith's *R. cernica* and apparently has similar spiral sculpture but possesses an erect mucronate protoconch.

The shape of the shell and sculpture of the ectoparasitic shell described by Smith are thus quite different from these characters of the shell of the endoparasitic species from Easter Island, and I have been led to propose a distinct generic taxon for the latter. From genera with a shell shape generally similar to that of *Luetzenia* the latter differs in the absence of a pseudopallium, the presence of extensive and elaborate skin folds over the shell, and the presence of an acrembolic proboscis with a proboscis gland.

ETYMOLOGY.—Named for Dr. Jørgen Lützen, the leading investigator of the Stiliferidae and Peleneeridae, on whose description of the Easter Island species under discussion I have leaned heavily for this and the following diagnoses and discussions.

#### *Luetzenia goodingi*, new species

PLATE 7: FIGURE 16

*Robillardia cernica* E. A. Smith.—Gooding and Lützen, 1973:4–6. [Not *Robillardia cernica* E. A. Smith, 1889.]

DIAGNOSIS.—Same as for genus.

RANGE.—Easter Island, Gulf of Aqaba, and Amboina, Indonesia.

HABITAT.—Endoparasitic in the echinoid *Echinometra insularis* H. L. Clark, 1912, from Easter Island, and *E. mathaei* (Blainville, 1825) from Gulf of Aqaba and Amboina.

MATERIAL.—Gooding and Lützen's description is based on about 79 males and females from Easter Island, deposited as specimens without shells, and serial sections in ZMC, NMNH, AMS, and MNSH. I have seen no shells of this species.

REMARKS.—As this species has been described and figured in detail by Gooding and Lützen (1973) I have not felt it necessary to give a description here. The diagnosis given above for this monotypic genus and the figure on Plate 7: figure 16, copied from

the original publication, should help in identifying this rare and minute species.

ETYMOLOGY.—Named for Dr. Richard V. Gooding, collector of the specimens on which this study largely was based and coauthor with Jørgen Lützen of the paper in which they first were mentioned.

#### Family HIPPONICIDAE Troschel, 1861

REMARKS.—In studying the species of this family found on Easter Island I have consulted particularly the papers by Morrison (1965) and Cowan (1974).

I agree with Morrison and Cowan that *Sabia* Reeve, 1842, should be considered a distinct genus. It should probably be removed from the Hipponicidae and placed in the Capulidae as suggested by Cernohorsky (1968:276), although later (1972a:88) Cernohorsky placed the type-species of *Sabia*, *S. conica* Schumacher, 1817, in the genus *Hipponix*.

Morrison (1965:34) states that the characters of the protoconch and early postnuclear whorls of the type-species of *Hipponix* DeFrance, 1819, are not known. This is not really true as Deshayes (1861:269) states that *Patella retortella* Lamarck, 1803, is the young stage of *Hipponix cornucopiae* (Lamarck, 1803), the type-species of *Hipponix*, and there is no reason to doubt the correctness of this statement. The original description of *P. retortella* Lamarck and the figure of it given by Deshayes (1824–1837, pl. 2: figs. 17, 18) show that we are dealing with a small (Lamarck gives the size as 3 or 4 mm), smooth, cap-shaped shell of about 1½ rapidly enlarging whorls. Deshayes' figure shows a typical *retortella* shell as the protoconch of a juvenile *H. cornucopiae* with its finely striate lamellae. This protoconch, although smooth like those of many of the living species, differs enough in its uncoiled nature to warrant the genus *Hipponix* being separated generically from the living forms. Contrary to Dell's belief (Dell, 1964:57) that *Hipponix cornucopiae* does not secrete a plate, it seems certain from the statements of DeFrance (1819:216–217) and Deshayes (1861:266) that there is such a plate in this fossil species.

The most recent papers dealing with the classification of this family are those of Morrison (1965) and Cowan (1974). Morrison recognizes six genera in this family, differentiating them largely on the basis of the characters of the protoconch. Of these *Sabia*



Reeve should probably be removed, as I have mentioned above, to the Capulidae, and the species of *Hipponix* Defrance are, as far as is known, found only as fossils. Of the remaining four genera two are represented in the Easter Island fauna and will be discussed below. I must, however, here state that the use of the shape and sculpture of the protoconch as the sole or principal basis of generic allocation needs further critical study. As I point out below under *Antisabia foliacea*, I have found in that species specimens with a neritoid, spirally lirated protoconch and others with a smooth, more helicoid protoconch. I have found the same situation in one lot of juvenile specimens of *A. antiquata* Linné, 1758, from Guadeloupe, French West Indies. For the present, however, I am following the classification suggested by Morrison in the paper cited above.

#### Genus *Antisabia* Iredale, 1937

*Antisabia* Iredale, 1937:253.—Morrison, 1965:34.—Cowan, 1974:378. [Type-species: *Hipponix foliacea* Quoy and Gaimard, 1835; original designation.]

REMARKS.—This is the group that Cowan (1974:378) thinks should be known as *Malluvium*, Melvill, 1906, because of the similarity in the larval shells of the species assigned to these groups. I feel, however, that *Malluvium* is separable from *Antisabia* on the basis of species of the former group living in relatively deep water and possessing a relatively large, smooth, helicoid protoconch set at right angles to the plane of the adult shell, which is smooth except for growth lines.

An examination of specimens of *A. foliacea* from various localities, whose adult shells are indistinguishable from each other, has shown that two forms of protoconchs are present: a depressed neritoid shell with three or four strong lirae, and a smooth, more helicoid protoconch. Quoy and Gaimard's original description and figures of the young of "*H. foliacea*" (Quoy and Gaimard, 1835:439, pl. 72: figs. 45, 46) depict a strongly lirated protoconch, and specimens that I have examined from Guam (the type-locality), Luzon, Philippines, and Raroia in the Tuamotus have this type of a protoconch. On the other hand specimens from other localities from the western Indian Ocean to Hawaii and Easter Island have a

smooth, more helicoid protoconch. The presence of these two types of protoconchs in what otherwise appears to be one species, *A. foliacea*, is the reason that Cowan questioned Morrison's statement that *A. foliacea* has a lirated neritoid protoconch (Cowan, 1974:378).

As pointed out above, a parallel situation exists in the Western Atlantic species *A. antiquata* Linné, 1767. Whether the presence of two distinct protoconchs in one species indicates two different phylogenetic lineages or a case of intraspecific dimorphism only further study can determine.

#### *Antisabia foliacea* (Quoy and Gaimard, 1835)

PLATE 8: FIGURES 1, 2

*Hipponix foliacea* Quoy and Gaimard, 1835:439, pl. 72: figs. 41–46 [Guam, Marianas].

*Hipponix antiquatus* Linné.—Dall, 1908a:437.—Steele, 1957:112. [Not *Hipponix antiquatus* Linné, 1767.]

*Hipponyx antiquatus* Linné.—Lamy, 1936:267; 1938:139.—Salvat and Rives, 1975:281, fig. 98. [Not *Hipponix antiquatus* Linné, 1767.]

DIAGNOSIS.—This species is easily recognizable by its strong, crowded, irregular concentric lamellae sculptured by broad, low, subobscure ribs, and a generally strongly eccentric apex. The interior is whitish and the margin in adult shells is finely and densely lamellose and finely radiately sculptured. A conspicuous shelly plate, closely adherent to the substrate is secreted by the foot.

RANGE.—Throughout the Indo-Pacific region, from East Africa to the Hawaiian Islands and Easter Island.

HABITAT.—Abundant on rocks in tide pools.

MATERIAL.—About 45 specimens from stas E-1, E-8, E-10A, E-11, E-15, E-18A, E-25, E-27, E-27A, E-32; 7 specimens, Hanga Nui, 8 Jan 1965, I. Efford, UBC 6311; 1 specimen, tide pool, between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 206957; 1 specimen, tide pool, S end Hanga Roa, J. E. Randall, BPBM 206973; 8 specimens, Hotu Iti, 8 Aug 1972, M. Villarroel, USNM 708438; 5 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 10 specimens, Hanga Roa, 1958, R. Vargas D., MNSH; 15 specimens, R. Vargas D., MNSH 200440; 21 specimens, Dec 1904, USBF Str. *Albatross*, USNM 204053; 26 specimens, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317414; 1 specimen, S. Englert, ANSP 222407a; 12 specimens, S. Englert, CAS.

## MEASUREMENTS (mm).—

	max. diam.	min. diam.	height
USNM 204053	22.00	16.90	9.67
USNM 204053	14.16	12.40	8.52
USNM 204053	12.68	11.57	4.88
USNM 204053	9.13	8.42	3.85

REMARKS.—This species varies somewhat in the distance between the concentric foliaceous lamellae and in the strength and fineness of the radial sculpture on the lamellae.

One of the specimens collected by the USBF Str. *Albatross* is the largest I have seen of this species; it is of highly irregular growth, with the apex extending well beyond the anterior margin, and measures overall 29.5 mm in length and 12 mm in height.

In sculpture and general form this species is very close to the Atlantic *A. antiquata* (Linné, 1767), and indeed some specimens from the Indo-Pacific are indistinguishable from others from the Caribbean. There is therefore some justification for the use of Linné's name for the Indo-Pacific species as has been done by some authors. Pending, however, a critical study of the species of this group, the need for which has been stressed above, I am retaining the name *A. foliacea* for our species.

***Antisabia imbricata* (Gould, 1846),  
new combination**

PLATE 8: FIGURES 3, 4

- Hipponix imbricata* Gould, 1846:161 [Sandwich Islands]; 1852:379, pl. 32: figs. 490a-c.  
*Hipponyx radiata* Sowerby (ex Gray), 1835:5 [Panama; Galapagos]. [Not *Hipponyx radiata* Blainville, 1824.]  
*Hipponyx grayanus* Menke, 1853:115.—Odhner, 1922:248. [New name for *Hipponyx radiata* Sowerby (ex Gray), 1835, preoccupied by *Hipponyx radiata* Blainville, 1824.]  
*Hipponix grayanus* Menke.—Dall, 1908a:437.—Steele, 1957:112.

DIAGNOSIS.—This species is characterized by its rather round or oval shape, strong radial riblets made nodulose and imbricate by the concentric growth lines, broad internal margin marked by a compact, crowded series of very fine lamellae with scalloped edges; the interior in fresh specimens is generally reddish brown to deep brown and occasionally blackish red as well as white. The protoconch is depressed helicoid, paucispiral, and smooth.

RANGE.—Hawaiian Islands, Easter Island, and the Panamic region from the Gulf of California to the Galapagos Islands and Ecuador.

HABITAT.—Abundant on rocks in tide pools, occasionally on living shells.

MATERIAL.—About 130 specimens from stas E-1, E-4, E-11, E-16, E-17, E-18; E-18A, E-32; 10 specimens, on shore and in tide pools, between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206942; 5 specimens, tide pool, between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 200956; 42 specimens, tide pool, Hanga Piko, 31 Dec 1964, I. Efford, UBC 6341; 1 specimen, Hanga Nui, 8 Jan 1965, I. Efford, UBC 6311a; 2 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 15 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200301; 12 specimens, 1965, I. Efford, UBC; 6 specimens, from fish stomach, 1965, I. Efford, UBC 6333; 7 specimens, Aug 1968, H. G. Richards, ANSP 321073, 321074; 6 specimens, 1 Jul 1957, J. Pellissier, UCC; 12 specimens, S. Englert, CAS.

## MEASUREMENTS (mm).—

	max. diam.	min. diam.	height
USNM 204054	15.27	14.82	7.40
USNM 204054	14.41	13.58	7.49
USNM 204054	10.65	10.44	6.15
USNM 204054	8.50	7.00	4.12

REMARKS.—I am unable to separate the Panamic *Antisabia grayana* (Menke) from *A. imbricata* found in the Hawaiian Islands and on Easter Island. If this synonymization is verified by critical biological and morphological studies, this and the following species, *Pilosabia trigona*, would be two of the few instances of the same species being well established on both sides of the East Pacific Barrier.

It is very possible that *Antisabia costellata* (Carpenter, 1856), living on both sides of the Atlantic will prove to be also synonymous with *A. imbricata* (Gould).

Morrison (1965:34) has assigned this species to the genus *Cochlear* Mörch (ex Fischer), 1877, but the species of this group have a different protoconch. The smooth protoconch of the present species is like the smooth protoconch of *Antisabia foliacea* (Quoy and Gaimard) and *A. antiquata* (Linné). For that reason, and until a more critical study of the genus *Antisabia* is undertaken, I feel that *A. imbricata* should remain in that genus.

Three small individuals of *A. imbricata* were found on the ventral side of a specimen of *Neothais nesiotis*

Dall, one just above the posterior end of the aperture and two in the upper part of the pseudumbilicus. This is the only occurrence of members of this genus on other shells that I have encountered.

### Genus *Pilosabia* Iredale, 1929

*Pilosabia* Iredale, 1929:277, 294.—Morrison, 1965:34.—Cowan, 1974:378. [Type-species: *Pileopsis pilosus* Deshayes, 1832 (= *Patella trigona* Gmelin, 1791); original designation.]

**DIAGNOSIS.**—A genus characterized by its strong radical riblets made nodulose by the concentric growth lines, giving it a cancellate appearance; a brown periostracum is present, which is strongly and hispidly fimbriate on the lower part of the shell. The shell is elongately triangular in a vertical antero-posterior cross section, with the apex anteriorly situated. The interior is white with usually a reddish brown area near the posterior margin. The protoconch is helicoid, globose, rather elevated, smooth, and of about  $2\frac{1}{4}$  whorls.

This genus seems to comprise only the following species.

### *Pilosabia trigona* (Gmelin, 1791)

PLATE 8: FIGURES 5, 6

*Patella trigona* Gmelin, 1791:3714.

*Pileopsis pilosus* Deshayes, 1832a, pl. 9.

*Hipponyx barbata* Sowerby, 1835:5 [Tubuai, Austral Islands].—Odhner, 1922:248.—Lamy, 1936:267; 1938:139.

*Hipponyx barbatus* Sowerby.—Dall, 1908a:437.—Steele, 1957:112.

*Hipponyx pilosus* (Deshayes).—Salvat and Rives, 1975:281, fig. 99.

**DIAGNOSIS.**—The characters of the species have been adequately summarized above under the generic name.

**RANGE.**—From South Africa eastward to the Hawaiian Islands and Easter Island, and on the Pacific coast of the Americas from Baja California, Mexico, to Ecuador and the Galapagos Islands.

**HABITAT.**—On rocks in tide pools.

**MATERIAL.**—43 specimens from stas E-8, E-10A, E-11, E-18A, E-27A, E-32, E-35, E-35B; 6 specimens, La Perouse Bay, 10 Aug 1972, M. Villarroel, USNM 708437; 10 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 1 specimen, Vaihu, 1958, R. Vargas D.,

MNSH 200447; 9 specimens, Hanga Piko, R. Vargas D., MNSH 200456, 200457; 3 specimens, Anakena, 30 Jan 1973, L. P. Wunsch, MNSH; 28 specimens, Dec 1904, USBF Str. *Albatross*, USNM 204055; 1 specimen, Aug 1968, H. G. Richards, ANSP 321073a; 1 specimen, 1 Jul 1967, J. Pellisier, UCC; 3 specimens, 1952-1956, S. Englert, ANSP 222407; 1 specimen, S. Englert, CAS; 1 specimen, Jan 1965, I. Efford, UBC 6352.

### MEASUREMENTS (mm).—

	max. diam.	height
USNM 755966	20.21	7.22
USNM 755966	19.34	9.05
USNM 755966	17.15	7.87
USNM 755966	12.46	4.40

**REMARKS.**—The only other species that *P. trigona* may be confused with is *Antisabia imbricata* (Gould), which is more round or broadly oval in outline, not as elevated, with a coarser sculpture with the ribs more distant, the periostracum not as hispidly fimbriate, a darker reddish brown interior, and a margin that is finely and densely lamellose.

I am unable to differentiate validly the Panamic specimens of this species from those of the Indo-Pacific region.

### Family CREPIDULIDAE Fleming, 1822

**REMARKS.**—I have been unable to find any valid basis for dividing this family into two subfamilies—Calyptraeinae and Crepidulinae. Fleming's family name is two years earlier than Calyptraeidae Blainville, 1824.

### Genus *Cheilea* Modeer, 1793

*Cheilea* Modeer, 1793:110, 111. [Type-species: *Patella equestris* Linné, 1758; Woodring, 1928.]

### *Cheilea equestris* (Linné, 1758)

*Patella equestris* Linné, 1758:780.

*Cheilea equestris* (Linné).—Dall, 1908a:437.—Steele, 1957:112.—Cernohorsky, 1972a:89, pl. 22: fig. 2.—Salvat and Rives, 1975:282, fig. 102.

**DIAGNOSIS.**—White, conical, cap-shaped, often of irregular form, and with an irregularly rugose concentric sculpture, crossed by very fine longitudinal striae. The interior bears an erect and flat, curved

process, free standing from under the apex. The shell may reach a diameter of 45 mm, and when fresh it has a light yellow periostracum.

RANGE.—Throughout the Indo-Pacific region, from the western Indian Ocean to the Tuamotus, and Easter Island.

MATERIAL.—1 specimen, sta E-27A, USNM 766694; 3 specimens, Dec 1904, USBF Str. *Albatross*, USNM 204052.

MEASUREMENTS (mm).—

	width	height
USNM 204052	16.5	7.6
USNM 204052	14.0	5.5
USNM 204052	13.1	5.8

REMARKS.—The above four, somewhat beachworn specimens are the only representatives of this rather common Indo-Pacific species that I have seen from Easter Island. The Caribbean shells, often listed under the name "*equestris*," represent another species, characterized by a different, coarser, longitudinal sculpture.

Family FOSSARIDAE Troschel, 1861

Genus *Fossarus* Philippi, 1841

*Fossarus* Philippi, 1841:47. [Type-species: *Fossarus adansonii* Philippi, 1841; tautonymy (*Le Fossar*, Adanson, 1758, in synonymy).]

*Fossarus multicostratus* Pease, 1860

PLATE 8: FIGURES 7-10

*Fossarus multicostratus* Pease, 1860b:398 [Sandwich Islands].

—Kay, 1965:38, pl. 6: figs. 1, 2.

*Fossarus ecphora* Pilsbry, 1921b:375 [Haleiwa, Oahu, Hawaii].

DIAGNOSIS.—Shell small, reaching 6 mm in length, broadly oval, subturbiniform to depressed turbiniform, white, spire low conical to depressed conical. Protoconch pupoid, corneous, of about 3½ whorls, axially and spirally sculptured, lost in most adult shells; postnuclear whorls with strong spiral cords with weaker ones in between; on the spire whorls the strongest cord is at the shoulder with the peripheral cord just visible above the suture, while on the last

whorl the peripheral cord is usually strongest although in some specimens (form *ecphora*) the shoulder cord is almost or equally as strong; the number and strength of the principal cords is rather variable, varying from 3 to 13; in the interspace are fine cords of varying strength, with irregular axial threads representing growth lines. Aperture large, broadly semicircular and sometimes subeffuse, outer lip grooved and somewhat scalloped at the spiral cord endings, columella gently concave with columellar lip rather broad basally, truncate with a weak tooth and a retrorse groove at the base; umbilicus varying from narrow to rather wide.

RANGE.—Hawaiian Islands and Easter Island.

MATERIAL.—8 specimens, stas E-10A, E-23, E-27A, E-30; 1 specimen, in large tide pool, Apina Nui, W of Hanga Roa, Apr 1977, A. J. Kohn, USNM 769719; 5 specimen, Vaihu, 1958, R. Vargas D., MNSH 200399; 1 specimen, Hangarua, 1958, R. Vargas D., MNSH 200405; 4 specimens, S. Englert, CAS.

MEASUREMENTS (mm).—

	width	height
MNSH 200399	5.36	6.14
MNSH 200399	5.61	5.22
MNSH 200399	4.57	5.03
USNM 751574	4.71	4.66
MNSH 200399	3.44	3.54

REMARKS.—The examination of a considerable number of specimens from Hawaii and Easter Island has led me to the conclusion that this species is a very variable one and that *Fossarus ecphora* Pilsbry, 1921, represents merely a form with very strong spiral cords. As figures 7-10 of plate 8 show, a gradation in the character of the spiral cords, shape of shell, and umbilical size can be found, often in specimens from one locality. Figure 9 is very similar to the holotype of *F. ecphora* except that it is considerably larger.

Dr. Joseph Rosewater has informed me (pers. comm.) that a similar wide range of variation occurs in the specimens of *Fossarus ambiguus* (Linné) found on Ascension Island.

Through the kindness of the authorities of the British Museum I have been furnished with photographs of the hitherto unfigured *Fossarus cumingii* A. Adams, 1855, from an unknown locality. It is possible that this species represents an intermediate form



in the *multicostatus-ecphora* complex, and thus would be an earlier name for the species. The shell, however, appears to be a slightly abnormal one with the aperture disjunct. A critical comparison of the holotype with a series of specimens of the Hawaiian-Easter Island species should resolve this question.

### Family STROMBIDAE Rafinesque, 1815

#### Genus *Strombus* Linné, 1758

##### Subgenus *Canarium* Schumacher, 1817

*Canarium* Schumacher, 1817:219. [Type-species: *Canarium ustulatum* Schumacher, 1817 (= *Strombus urceus* Linné, 1758); monotypy.]

##### *Strombus (Canarium) maculatus* Sowerby, 1842

*Strombus maculatus* Sowerby (ex Nuttall), 1842:30, pl. 7: fig. 53 [Sandwich Islands].—Dall, 1908a:437.—Steele, 1957:112.—Salvat and Rives, 1975:275, fig. 85.

*Strombus (Canarium) maculatus* Sowerby.—Lamy, 1936:267; 1938:131, 137.—Abbott, 1960:75–77, pl. 20: figs. 13, 14.—Cernohorsky, 1972a:75, pl. 19: fig. 14.

**DIAGNOSIS.**—A well-known species characterized by the smooth body whorl with rounded shoulder, the pale base color with reddish brown markings, and the smooth central portion of the white columella.

**RANGE.**—Micronesia and Polynesia, from the Palau Islands to Hawaii, and Cook Islands to Easter Island.

**HABITAT.**—In tide pools on sand, which is often bound together by algae forming a thin matlike covering of the hard substrate.

**MATERIAL.**—56 specimens from stas E-1, E-2, E-4, E-11, E-17, E-18, E-23, E-25, E-28, E-32, E-33, E-35; 1 specimen, in tide pool between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206943; 1 specimen, in tide pool, between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 206950; 1 specimen, in large tide pool, Apina Nui, W of Hanga Roa, Apr 1977, A. J. Kohn, USNM 769714; 9 specimens, Hanga Roa, 28 Jan 1965, I. Efford, UBC 6323; 1 specimen, Hanga Roa, 5 Feb 1965, I. Efford, UBC 6339; 1 specimen, Hanga Roa, 25 Jan 1965, I. Efford, UBC 6340; 2 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200252; 1 specimen, La Perouse Bay, 1958, R. Vargas D., MNSH 200290; 2 specimens, Anakena, 1958, R. Vargas D., MNSH 200329; 9 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200251; 6 speci-

mens, Vaihu, 1958, R. Vargas D., MNSH 200255; 5 specimens, 1958, R. Vargas D., 200330; 1 specimen, 1954, Prof. Baeza, MNSH 200238; 3 specimens, Dec 1904, USBF Str. *Albatross*, USNM 204064; 2 specimens, S. Englert, CAS.

#### MEASUREMENTS (mm).—

	width	height
USNM 756071	17.47	32.00
USNM 756101	13.53	25.26
USNM 756101	11.07	21.15
USNM 756027	7.40	15.13

**REMARKS.**—The examination of 100 specimens from Easter Island has enabled me to substantiate Abbott's statement that a distinct form is present on Easter Island (Abbott, 1960:76). All the specimens I have seen show to a greater or lesser degree the narrow irregular and occasionally medially interrupted axial streaks of dark chestnut brown. Because in its other features, however, I can find no constant differences from those of typical *S. maculatus* I am considering it to be merely a geographically isolated color form. Abbott is in error in believing that the name *S. floridus depauperatus* Dautzenberg and Bouge, 1933, proposed for specimens from the northern Tuamotus (Dautzenberg and Bouge, 1933:296), can be applied to this color form. The 5 transverse bands of reddish brown spots of which these authors speak are spirally oriented and not axial as Abbott states; we have specimens from Tikehau Atoll, near Makatea Island (the type-locality) that faintly show these spiral rows of spots.

The distribution of this species is interesting in that throughout most of its range as far as is known to me, it is generally found on atolls, coral islands (Guam, Baker Island), and on barrier reefs of high islands (Raevavae, Isles Gambier, Aitutaki). Otherwise, except for one dead specimen from Huahine that may of course have come from the barrier reef, it is not known from any of the volcanic islands of the Cook Islands, the Society Islands, and the Marquesas. Only at the eastern edge of its range does it inhabit the shores of the volcanic islands of the Hawaiian group and Easter Island. It would make a most interesting project to undertake a comparative study of the bionomics of two populations of this species—one from Enewetak, for example, and the other from Oahu—and determine if there are any differences in their biology.

## Family NATICIDAE Forbes, 1838

## Subfamily NATICINAE Forbes, 1838

Genus *Natica* Scopoli, 1777

*Natica* Scopoli, 1777:392.—Cernohorsky, 1971b:173.—Kilburn, 1976:831. [Type-species: *Natica vitellus* Lamarck, 1822 (= *Nerita vitellus* Linné, 1758); Harris, 1897.]

*Natica* Lamarck, 1822a:195.—Anton, 1839:30–32. [Type-species: *Natica vitellus* Lamarck, 1822 (= *Nerita vitellus* Linné, 1758); Anton, 1839.] [Not *Natica* Lamarck, 1799.]

REMARKS.—Cernohorsky (1971b:173) is in error in stating that no type designation was made by Anton for *Natica*. Anton (1839:30–32) included many species under *Natica* Lamarck, a genus he divided into six sections. In the fourth section, entitled "*vitellus*," the species *vitellus* is recorded in capital letters, and is thus Anton's type of *Natica* Lamarck, 1822. Because neither Anton nor Lamarck mention Scopoli, Woodring's doubts as to the validity of this type designation for *Natica* Scopoli seem justified (Woodring, 1957:84) and it is better to use Harris' designation even though no change in the generic concept would be involved in using Anton's designation.

*Natica ochrostigmata*, new species

PLATE 8: FIGURES 13–15

*Natica*, cf. *N. sagittifera* Recluz.—Steele, 1957:112. [Not *Natica sagittifera* Recluz, 1852.]

DIAGNOSIS.—Shell rather small, 8 to 16.8 mm in height, globose with a low spire, pinkish gray to grayish white with a white area around the umbilicus and with 3 spiral series of pale, rather large, irregular, distant, and more or less sagittate spots of pale orange brown; umbilicus moderately narrow, with the funicle almost filling the umbilicus and ending in an elongate umbilical callus separated from the parietal callus by a deep roundly curved sinus and with a deep and narrow furrow between the callus and the basal umbilical margin. Operculum with two low, approximated marginal ribs.

RANGE.—Hawaiian Islands, Easter Island, Cook Islands, and Western Samoa.

DESCRIPTION.—Shell of medium to small size, 8 to 16.8 mm in height, globose with a low spire. Protoconch low, domelike, consisting of about 3½ smooth whorls, the first 1 to 1½ whorls yellowish with a dark chestnut line marking the periphery, rest of whorls brownish orange in fresh shells, whitish in faded ones. Apertural line of demarcation slightly depressed. Teleoconch of 2½ whorls in holotype, whorls of spire marked by strong proscocline axial grooves from suture, grooves that become more crowded and irregular in last whorl; color of spire whorls a moderate yellowish pink that gradually becomes paler in later whorls to pale orange yellow, with a whitish circumumbilical area; the last 2 whorls have an increasingly broad subsutural white band, and the early whorls have rather faint reddish brown irregular axial streaks that in the last whorl break up into 2 spiral series of sagittiform spots on a whitish zone and a third series of short opisthocline streaks above the whitish basal area. The umbilicus is rather narrow and almost filled by the narrowly elongate semielliptical callus with a moderately deep, broad, rounded sinus where it joins the parietal callus; a deep furrow separates the lower end of the callus from the basal umbilical margin. Aperture semicircular; operculum with exterior white, smooth, with 2 low and rather broad ribs at the outer edge separated from each other by a very fine, narrow suture that suddenly broadens at the terminus of the ribs, where the latter become acuminate.

HABITAT.—Living Hawaiian specimens have been dredged in 10 fathoms (18 m) on a sand and coral bottom.

MATERIAL.—Holotype: In 8–24 m, off Launiupoko, Maui, Hawaii, 1918, D. B. Langford and D. Thaanum, USNM 339159.

Paratypes: *Hawaii*: 1 specimen, off Launiupoko, Maui, 1918, D. B. Langford and D. Thaanum, USNM 768947; 3 specimens, in 8–24 m, off Mala Bay, Maui, 1918, D. B. Langford and D. Thaanum, USNM 339158; 2 specimens, in 50–100 m, off Waikiki, Oahu, 1916, D. B. Langford, USNM 339156; 3 specimens in 20 m, off Waikiki, Oahu, 1950, R/V *Pele*, USNM 768948; 3 specimens, Honolulu, F. Stearns, USNM 333433; 1 specimen, sand bar, Midway Island, 1930, P. S. Galtsoff, USNM 428488; 2 specimens, in 60 m, lee shelf, Kure Isl, 21 Sep 1968, H. S. Ladd, USNM 709296.

*Line Islands*: 1 specimen, Palmyra Atoll, 1922, D. Thaanum, USNM 348484.

*Cook Islands*: 1 specimen, reef, northern tip Aitutaki

Atoll, Feb 1962, R. M. Foster, R. Ostheimer, ANSP 278183; 1 specimen, in 1–2 feet (0.3–0.7 m), in coarse sand and boulders, North Motutoa Isl, NW Rarotonga, 16 Mar 1962, Clarke, Foster, Miller, Ostheimer, ANSP 278528.

*Western Samoa*: 1 specimen, W side of Vailele Bay, Upolu, Feb–Mar 1955, A. J. Ostheimer, ANSP 198340.

*Easter Island*: 1 specimen, sta E–10A, USNM 756011; 1 specimen, sta E–27A, USNM 756255; 1 specimen, Oct 1968, P. McCoy, ANSP 315551; 5 specimens, 1958, R. Vargas D., MNSH 200378.

#### MEASUREMENTS (mm).—

	width	height
USNM 339159 holotype Maui, Hawaii	15.15	16.10
USNM 709335 paratype Kure, Hawaii	15.70	16.84
USNM 339158 paratype Maui, Hawaii	14.08	14.80
USNM 768948 paratype Oahu, Hawaii	9.65	10.85
ANSP 278528 paratype Rarotonga, Cook Islands	17.75	18.95
MNSH 200378 paratype Easter Island	7.32	7.95

REMARKS.—This rather uncommon species, found only in moderately deep waters, has been identified by collectors as *Natica sagittifera* Recluz, 1852, described from a specimen of unknown provenance. That species, however, has 4 spiral rows of rather crowded markings and a callus that is relatively smaller and less elongate than that of *N. sagittifera*. It is much closer to *Natica cernica* Jousseaume, 1874, as interpreted by Kilburn (1976:832–833, figs. 1a, 1b); this Indian Ocean species has a somewhat higher spire, the last whorl descends more sharply at the aperture, and the operculum, although also possessing two marginal ribs, is different in that the ribs are higher, narrower, and less flattened, with a groove in front of the two ribs separating them from the rest of the flat surface of the operculum. Kilburn's interpretation is confirmed by my examination of specimens from Mauritius (the type-locality) and Cocos-Keeling that I assign to *N. cernica*. *Natica lemniscata* Philippi, 1853, to which specimens of *N. cernica* and *N. ochrostigmata* have been referred, is different, having 4 spiral rows of fairly closely approximated spots.

ETYMOLOGY.—From the Greek *ochros* (pale) plus

*stigmata* (marks) referring to the rather obscure spiral markings.

### Subfamily POLINICINAE Gray, 1847

#### Genus *Mamilla* Schumacher, 1817

*Mamilla* Schumacher, 1817: 58, 190. [Type-species: *Mamilla fasciata* Schumacher, 1817 (= *Albula mammata* Röding, 1798); monotypy.]

REMARKS.—The type-species, described from the Nicobar Islands, may prove to be only a variety of *Mamilla melanostoma* Gmelin, 1791. I have seen only two worn beach specimens from Goa, India. It is not the *Polinices mammatus* (Röding) described and figured by Cernohorsky (1972a:101, pl. 27: fig. 2); his description and figure represents *Mamilla fibrosa* (Souleyet, 1852) (+ *Natica filosa* Reeve, 1855 [not *N. filosa* Philippi, 1845] and *N. sebae* Reeve, 1855 [not *N. sebae* Recluz, 1844]).

#### *Mamilla simiae* (Deshayes, 1838)

##### PLATE 8: FIGURES 11, 12

*Natica simiae* Deshayes, 1838:652 [New Zealand].

*Polinices sebae* Souleyet [sic].—Dall, 1908a:437 [Not *Natica sebae* Recluz, 1844.]

*Polinices sebae* Souleyet [sic].—Steele, 1957:112.

*Polinices (Mamilla) simiae* (Deshayes).—Cernohorsky, 1972a:102, pl. 27: fig. 2.

DIAGNOSIS.—A shell of moderate size, reaching about 30 mm in length, broadly oval, fairly solid, with very large last whorl and large, semicircular aperture. The exterior is smooth, shiny with obscure, crowded, microscopic, somewhat wavy, spiral grooves and very fine irregular growth lines. The last whorl is marked by a rather narrow subsutural white band and a broader peripheral white band lightly maculated with pale reddish brown; the remainder of the whorl is more strongly marked by reddish brown markings, which are more densely concentrated below the subsutural band and above and below the peripheral band. The elongate callus is dark brown, often with a pale area near the center. The umbilical area is tinged with brown.

RANGE.—East Africa to Hawaii and Easter Island.

**MATERIAL.**—3 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200450; 1 specimen, 1958, R. Vargas D., MNSH 200379; 1 fragment, Dec 1904, USBF Str. *Albatross*, USNM 204056; 3 specimens, S. Englert, CAS.

**MEASUREMENTS (mm).—**

	diam.	height
CAS	19.45	24.20
CAS	17.50	22.00

**REMARKS.**—This species can be readily differentiated from *M. melanostoma* Gmelin, 1791, by its usually smaller size, broader outline, less glossy exterior, and stronger color pattern.

The relative abundance of this species in the Hawaiian and Kermadec Islands, in both of which groups the species is the most abundant of any of the Polinicinae, is another interesting aspect of the zoogeographic relationship of Easter Island.

**Family TRIVIIDAE Troschel, 1863**

**Genus *Trivirostra* Jousseume, 1884**

*Trivirostra* Jousseume, 1884c:415; 1884d:100. [Type-species: *Cypraea scabriuscula* Gray, 1827; Roberts, 1885.]

**REMARKS.**—I use the generic name *Trivirostra* instead of *Trivia* Broderip, 1837, for the following species, as Schilder has found sufficient basic differences in members of the subfamily Triviinae to warrant a separation into several tribes, including the Triviini and Pusulini (Schilder, 1936:106). I follow Schilder in using the generic name *Trivirostra* for most of the Indo-Pacific species. Further critical studies are desirable, however, to substantiate Schilder's separation of the Pusulini group into seven genera and subgenera (Schilder and Schilder, 1971:18–22).

***Trivirostra* cf. *pellucidula* (Reeve), 1846,  
and *edgari shawi* Schilder, 1933**

*Cypraea pellucidula* Reeve, 1846 [in 1845–1846], pl 26: sp. 153.—Gaskoin, 1846:23 [South Pacific.]

*Trivirostra edgari shawi* Schilder, 1933:290–292 [Hawaii].

*Trivia oryza scabriuscula* (Gray).—Steele, 1957:112. [Not *Cypraea scabriuscula* Gray, 1829.]

**REMARKS.**—A small, white globose ovate species,

from 5 to 7.5 mm in length, posteriorly rounded and subrostrate, anteriorly subrostrate with a broad, shallow sinus, strongly ribbed, largest specimens with about 57 to 64 ribs reaching the dorsal edges, which are rounded and not marginate; a shallow dorsal groove may or may not be present; when present ribs are interrupted there; some ribs bifurcate or are intercalated on the dorsal sides. Aperture widened anteriorly, with 19 to 23 teeth on the columellar lip, 21 to 26 teeth on the outer lip; columellar furrow rather broad anteriorly.

There appear to be two species represented among the six specimens from Easter Island that I have been able to examine, and I have with some doubt referred these two forms to the taxa given in the heading above. They are at first glance very similar, and indeed have been united in lots I have seen of these same two species from Hawaii and French Polynesia. *Trivirostra pellucidula* (Reeve) is described, however, as lacking a dorsal furrow and with less rostrate ends than *T. edgari shawi* Schilder, which has a dorsal furrow.

Although Schilder has done a great deal of trail-blazing work in elucidating the classification of this family (Schilder, 1933, 1971), he did not carry it to the same degree of completion as he did the Cypraeidae. Much of his writings on the Triviidae is difficult to use because of the brevity of his keys and his use of rather cryptic abbreviations and symbols. The critical examination of the types of the species described by older authors and their elucidation and illustration is a basic necessity to an understanding of the species of not only *Trivirostra* but the other genera of the family.

**Family CYPRAEIDAE Rafinesque, 1815**

**Genus *Cypraea* Linné, 1758**

**REMARKS.**—I follow Kay (1960, and earlier) in placing most of the species of the subfamily Cypraeinae in the genus *Cypraea*. Future critical morphological studies along the lines of those initiated by Kay may lead to a separation of a few more subgenera in addition to *Lyncina* Troschel, 1863 (Kay, 1963).



*Cypraea caputdraconis* Melvill, 1888

## PLATE 9: FIGURES 1, 2

- Cypraea caput draconis* Melvill, 1888:214, pl. 1: fig. 1, pl. 2: fig. 1a [Hong Kong].—Odhner, 1922:248.  
*Cypraea caput-draconis* Melvill.—Dall, 1908a:437.—Lamy, 1936:267; 1938:137.  
*Cypraea caputdraconis* Melvill.—Steele, 1957:112.—Burgess, 1970:178–179, pl. 12: fig. I.—Summers, 1975:8.  
*Cypraea (Aricia) caput-serpentis* Linné.—Riveros-Zuñiga, 1951:154–156. [Not *Cypraea caputserpentis* Linné, 1758.]  
*Erosaria caputdraconis* (Melvill).—Cernohorsky, 1971b:78, fig. 56.

**DIAGNOSIS.**—This relative of *Cypraea caputserpentis* Linné, 1758, differs from that species in its generally more elongate and higher shell, deeper color, with a uniformly dark brown base, the interstices between the white apertural teeth dark brown; the dorsum is uniformly covered with small white spots and lacks the irregular larger white flecks found in *C. caputserpentis*.

**RANGE.**—Easter Island and Sala y Gómez.

**HABITAT.**—Under rocks in 2–3 ft (0.6–0.9 m), along rock shoreline and in tide pools; also in holes and crevices at or just below tide line.

**MATERIAL.**—115 specimens, from stas E-4, E-8, E-10, E-18, E-19, E-27, E-28, E-29, E-31, E-32; 5 specimens, Hanga Nui, 1974, B. Alarcón, USNM 756346; 2 specimens, in tide pools at night, Hanga Piko, E. Pakarati, USNM 751585; 7 specimens, Hanga Nui, B. Alarcón, USNM 756345; 3 specimens, tide pools, Ana Kai Tangata, E of Hanga Piko, B. Alarcón, USNM 756338; 2 specimens, Hanga Tuu Hata, B. Alarcón, USNM 756349; 6 specimens, Poike, B. Alarcón, USNM 756340; 3 specimens, La Perouse Bay, 10 Aug 1972, M. Villarroel, USNM 708439; 2 specimens, on rocks at tide line, Hanga Roa, 5 Feb 1969, J. E. Randall, BPBM 296962; 6 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 9 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200305, 200240, 200243; 4 specimens, Ore Makimaki, 1958, R. Vargas D., MNSH 200245; 1 specimen, Ovahe, 1958, R. Vargas D., MNSH 200248; 14 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200246, 200247, 200251; 2 specimens, Sep 1957, R. Vargas D., MNSH 200230; 26 specimens, 1958, R. Vargas D., MNSH 200232; 2 specimens, March 1952, C. Muñoz, MNSH 200242; 2 specimens, May 1960, L. Pérez, MNSH 200239; 1 specimen, 1938–39, C. Cobo, MNSH 200238; 3 specimens, R. A. Philippi, MNSH 200237; 11 specimens, 1 Jul 1957; J. Pellisier, UCC; 17 specimens, Dec 1904, USBF Str. *Albatross*, USNM 184180.

From Sala y Gómez: 3 specimens, in depressions made by sea urchins, near tide line, 21 Aug 1972, J. Melnikov, USNM 755129.

## MEASUREMENTS (mm).—

	length	width	height
USNM 756338	42.31	26.01	19.21
USNM 756349	40.73	26.97	20.04
USNM 756340	39.57	27.00	18.67
USNM 756340	38.68	27.20	19.38
USNM 756340	38.50	27.66	18.93
USNM 756340	38.40	26.83	18.36
USNM 756340	37.70	26.35	18.09
USNM 756340	36.70	27.32	18.25
USNM 756345	18.45	13.01	8.85
USNM 756345	18.09	13.32	9.37
USNM 756345	17.78	14.14	8.95
USNM 756345	17.41	12.25	7.84
USNM 756345	16.74	11.31	7.76
USNM 756345	15.75	11.33	7.98
USNM 756345	15.74	11.20	8.01

**REMARKS.**—This is one of the species that is very abundant on the rocks and in tide pools at or near the tide line. It is quite variable in size as the above table of measurements shows, a locality at Hanga Nui (USNM 756345) having what appears to be a dwarf race.

As is well known this species is most closely related to *C. caputserpentis* Linné, differing from it by the generally darker colored dorsum with smaller white spots, the dark base coarser with less numerous teeth with dark interstices.

I have seen specimens of this species in great numbers on the tables of vendors on the streets of Paapeete, Tahiti, both as individual shells and fashioned into ornaments; undoubtedly they are brought in on the weekly plane from Easter Island.

*Cypraea englerti* Summers and Burgess, 1965

## PLATE 9: FIGURES 3, 4

*Cypraea englerti* Summers and Burgess, 1965:41–42, pl. 4: figs. 1–1 [Easter Island].—Burgess, 1970:38, pl. 1: fig. D.—Thomas, 1975:1.—Summers, 1975:8.

**DIAGNOSIS.**—Resembling *Cypraea caputdraconis* Melvill from Easter Island in overall coloration and color pattern, but that species is usually larger, with a strongly angular, flangelike columellar and labial callus, lacks the dorsal line of *C. englerti*, and has a more deeply colored base with much coarser teeth. *Cypraea englerti* is most closely related to *C. kingae* Rehder and Wilson, 1975, from Pitcairn Island, possessing the same general form, a sublenticular trans-

verse profile, convex base, rather angular and sharply delineated lateral margins of base and dorsum with marginal pitting at both ends, and a well-developed fossula. The Easter Island species, however, is larger, with the general coloration of *C. caputdraconis*, a base of gray reddish brown and not white, and has teeth that are somewhat coarser.

Unfortunately no detailed notes or photographs were taken of living animals, but the general coloration of the foot and mantle is scarlet.

RANGE.—Easter Island and Sala y Gómez.

HABITAT.—In deeper water and in crevices during day, at night crawling on rocks in tidepools.

MATERIAL.—25 specimens in tide pools at night, Hanga Piko, 1974, B. Alarcón, USNM 751586; 7 specimens from stas E-21, E-22; 2 specimens in tide pools at night, gift of Elena Haoa, USNM 751570; 1 specimen, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL.

MEASUREMENTS.—Thirty-six specimens were measured with the following results: length from 18.30 to 27.13 mm, average 22.5 mm; width from 13.11 to 19.15 mm, average 16.5 mm; height from 9.80 to 14.5 mm, average 12.1 mm; columellar teeth from 14 to 19, average 18.75; fossular denticles from 4 to 7.

REMARKS.—This species was considered one of the rare species of cowries, and when I began writing up the fauna only about five specimens were known. During my visit to Easter Island I saw over a hundred specimens collected by local inhabitants during recent years and now that they know how to obtain the species, it has become rather well known to collectors.

I have been informed by Prof. M. E. Vinogradov (in litt.) that on the occasion of the visit of the Russian oceanographic vessel *Dmitry Mendeleev* to Sala y Gómez on 21 August 1972 two specimens of this species were brought up in a dredge from 60 to 70 meters on pieces of dead coral.

As has been mentioned in the diagnosis, this species is most closely related to *C. kingae* Rehder and Wilson, 1975, from Pitcairn Island. The latter, however, is smaller, has a different and lighter dorsal color pattern, and a white rather than a grayish-reddish-brown base. The columellar and labial teeth are larger and more distantly spaced in *C. engleri* and the columellar teeth average fewer in number, 16 as opposed to 18 for *C. kingae*, while the labial teeth in *C. engleri* are on the average only slightly less nu-

merous. The fossular denticles are generally more numerous in *C. engleri*, averaging slightly over 5, while in *C. kingae* the average number is about 3.5; the fossula is broader in *C. kingae*.

#### Family CASSIDAE Latreille, 1825

REMARKS.—The family name was originally proposed by Latreille as Cassiditae, the correct form of which is Cassidae. Because of homonymy of this name with a family-group name in Insecta, based on a similar generic name, the International Commission on Zoological Nomenclature has ruled in Opinion 1023, (Melville, 1974) that the family name in Mollusca should be Cassidae, as already used by Abbott (1968) and others.

#### Genus *Casmaria* H. and A. Adams, 1853

*Semicassis*, subgenus *Casmaria* H. and A. Adams, 1853:216. [Type-species: *Buccinum vibex* Linné, 1758 (= *Buccinum erinacea* Linné, 1758); Harris, 1897.]

#### *Casmaria ponderosa perryi* (Iredale, 1912)

FIGURE 8; PLATE 10: FIGURE 1

*Cassis vibex* (Linné).—Dall, 1908a:437.—Steele, 1957:112. [Not *Buccinum vibex* Linné, 1758.]

*Cassidea perryi* Iredale, 1912:227, pl. 9: fig. 17 [Kermadec Islands].

*Casmaria ponderosa perryi* (Iredale).—Abbott, 1968:201, pl. 187.

DIAGNOSIS.—This subspecies is well described by Abbott (1968). It resembles the subspecies *nipponensis* Abbott, 1968, in possessing a tan or gray-brown ground color, and 5 more or less obscure spiral bands of irregular brown splotches. There are, however, no prickles on the lower part of the outer lip.

RANGE.—Southeastern Australia (southern Queensland and northern New South Wales); Great Barrier Island, North Island, New Zealand; Kermadec Islands; Easter Island.

MATERIAL.—1 specimen, Te Raa Raa, south side Hanga Piko, B. Alarcón, USNM 756337; 1 specimen, Hanga Roa, 1958, R. Vagas D., MNSH 200461; 1 specimen, USBF Str. *Albatross*, USNM 204058.

REMARKS.—The occurrence of this rather rare subspecies at Easter Island was based previously on

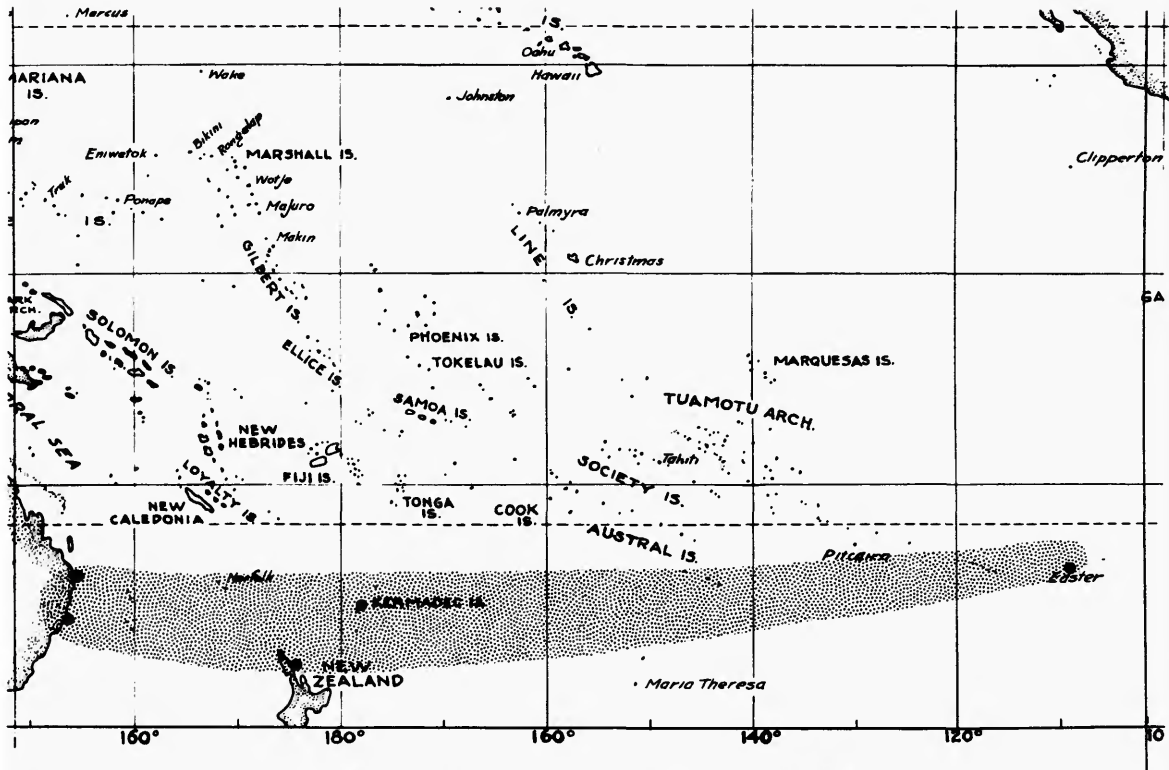


FIGURE 8.—Distribution of *Casmaria ponderosa perryi* (Iredale).

a fragment of the apertural portion of the last whorl collected during the visit of the *Albatross* to Easter Island in 1907. It was substantiated by the finding of a fresh living specimen by Sr. Benito Alarcón, and by the presence of a specimen from Hanga Roa in the Museo Nacional de Historia Natural in Santiago. This specimen has a thickened variciform lip, 8 mm thick, which is strongly banded and golden yellow in color at the edge; there is also a spot of yellow on the base of the columella.

#### Family MURICIDAE Rafinesque, 1815

REMARKS.—Abbott (1974:171) gives Da Costa, 1776, as the author of the family. Da Costa's work of 1776, *Elements of Conchology*, is, however, a non-binominal work and unavailable for nomenclatorial purposes, and in his publication of 1778, *British Conchology*, the family name is given in the vernacular as "Family of Murices" and thus is also unavailable.

#### Subfamily THAIDINAE Suter, 1909

#### Genus *Drupa* Röding, 1798

*Drupa* Röding, 1798:55.—Emerson and Cernohorsky, 1973: 14. [Type-species: *Drupa morum* Röding, 1798; Rovoreto, 1899.]

#### *Drupa morum* Röding, 1798

*Drupa morum* Röding, 1798:55.—Cernohorsky, 1971b:132, pl. 29: fig. 176.—Hinton, 1972:40, pl. 20: fig. 16.—Emerson and Cernohorsky, 1973:15–17, pl. 2: figs. 1–3, pls. 10, 11 [Type-locality designated: Java, Indonesia].—Salvat and Rives, 1975:314, fig. 203.

DIAGNOSIS.—A large member of the genus, characterized by its purple aperture and 2 strong compound teeth on the inside of the outer lip.

RANGE.—Throughout the Indo-Pacific region from East Africa to Clipperton and Easter Island.

HABITAT.—In shallow water on coral reef flats or on rocks near tide line.

**MATERIAL.**—1 specimen, on rocks at Poike, B. Alarcón, USNM 756341.

**MEASUREMENTS.**—The Easter Island specimen measures 34.4 mm in length and 27.6 in width.

**REMARKS.**—An abundant species on coral reef flats and rocks in the central-tropical Pacific, it is rare on Easter Island, as I have seen only one specimen from this locality.

### *Drupa ricinus* (Linné, 1758)

*Murex ricinus* Linné, 1758:750.

*Sistrum ricinus* (Linné).—Steele, 1957:112.

*Drupa ricinus* (Linné).—Cernohorsky, 1971b:132, pl. 29: fig. 177.—Hinton, 1972:40, pl. 20: fig. 18.—Emerson and Cernohorsky, 1973:19–23, pl. 2: figs. 6–8, 11, pls. 14–16 [type-locality designated: Ceylon].—Salvat and Rives, 1975:315, fig. 205.

**DIAGNOSIS.**—Another well-known species characterized by its acutely nodose shell and its white, strongly denticulate aperture, sometimes with an encircling yellow or orange line. It is smaller than *D. morum*, with longer, more spinose nodes on the body whorl.

**RANGE.**—Over the entire Indo-Pacific region, from East Africa to Clipperton and Easter Island. It has also been found in the Panamic Province, in the Galapagos Islands.

**HABITAT.**—The same as the preceding species, on reef flats and on rocks at tide line.

**MATERIAL.**—1 specimen, Ore Maki Maki, 1958, R. Vargas D., MNSH 200448; 1 specimen, Hanga Piko, 1958; R. Vargas D., MNSH 200431; 1 specimen, S. Englert, CAS.

**MEASUREMENTS** (mm).—Easter Island, CAS: length, 30.0; width, 25.8.

**REMARKS.**—Another species of *Drupa* that is very abundant throughout the tropical Pacific but is extremely rare on Easter Island.

### Genus *Morula* Schumacher, 1817

*Morula* Schumacher, 1817:227. [Type-species: *Morula papillosa* Schumacher, 1817 (= *Drupa uva* Röding, 1798); monotypy.]

### *Morula uva* (Röding, 1798)

*Drupa uva* Röding, 1798:56.

*Ricinula nodus* Lamarck, 1816:2, pl. 395: fig. 6.

*Morula papillosa* Schumacher, 1817:227.

*Ricinula morus* Lamarck, 1822b:352 [Ile de France].

*Sistrum morus* (Lamarck).—Steele, 1957:112.

*Morula uva* (Röding).—Cernohorsky, 1972a:127, pl. 36: fig. 3.—Salvat and Rives, 1975:78, 317, fig. 215.

**DIAGNOSIS.**—A species abundant in the Indo-Pacific region, characterized by its broadly oval shape, the 5 spiral series of black nodes on a white base with a single fine scabrous lira between the series of nodes, and by the bright purple to violet aperture with 2 large teeth in the center of the inside of the outer lip, the upper one being the larger.

**RANGE.**—The entire Indo-Pacific region, from the western Indian Ocean to Hawaii, Clipperton, and Easter Island. It has also been recorded from Guadalupe Island in the Panamic Province.

**HABITAT.**—In tide pools, and on reef flats behind the algal ridge and in sheltered areas.

**MATERIAL.**—3 specimens, sta E-4; 1 specimen, between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206944; 1 specimen, 1958, R. Vargas D., MNSH 200462.

### MEASUREMENTS (mm).—

	width	height
USNM 751567	11.23	17.28
USNM 751567	10.35	16.15
USNM 751567	11.00	15.84

### *Morula praecipua*, new species

PLATE 9: FIGURE 5

*Sistrum* cf. *concatenata* Lamarck.—Steele, 1957:112.

**DIAGNOSIS.**—Resembling at first glance *Morula uva* Röding in general shape and purple aperture but averaging somewhat smaller with a higher spire, the nodules smaller, the spiral series being separated by 3 to 4 scabrous lirae rather than one; aperture broader, with 4 subequal denticles on inside of outer lip, the upper one slightly larger; columellar lip with a strong central fold that continues over the parietal callus; the columellar lip has a distinct angle at the base, whereas in *M. uva* the columellar lip continues straight or curves only slightly into the anterior canal.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell of medium size for genus, up



to 16 mm in length, ovate to elongate-ovate, color when fresh a reddish brown with black or brownish-black nodes arranged in spiral rows. Protoconch trochoid,  $4\frac{1}{4}$  whorls, of which the early whorls are pale orange yellow, the later ones reddish brown, last 2 whorls showing fine axial riblets on the appressed subsutural margin. Postnuclear whorls about 5 in holotype (early whorls rather worn in adults), first half whorl with a sutural and median row of nodes connected by low spiral and axial ridges forming a clathrate sculpture and with fine irregular axial growth lines between nodes; in later whorls the spiral connecting ridges become obscure, the axial ridges become angular ribs, and a series of 3 or 4 narrow lirae are present above and below the median series of nodes. The last whorl has 5 spiral rows of nodes with 3 or 4 narrow lirae between each row; the last  $1\frac{1}{2}$  to 2 whorls in adult specimens have an irregular, crowded lamellar and fimbriate sculpture between the nodes over the entire whorl that is, however, usually obscured by a calcareous incrustation. Aperture elongate-ovate, terminating in an open, rather wide and short canal; moderate reddish purple in color in fresh specimens. Outer lip arcuate, internal edge may show the black nodes through the shell; interior of outer lip with 4 subequal white denticles, the upper one usually slightly larger; a more or less prominent whitish parietal ridge is present at the juncture of the outer lip with the parietal wall; the columellar lip with a prominent fold in the center and concavely arcuate above and below; another angle is present at its juncture with anterior siphonal canal, which is bent slightly to the left; the midcolumellar fold is continued onto the columellar callus, and to the left of the angle at the juncture with the anterior canal is another more or less prominent node; the anal fasciole is conspicuous and surrounds a moderately broad pseudumbilicus. Operculum broadly oval, dark colored, typically Thaidine, with a laterally located nucleus.

**HABITAT.**—In tide pools on alga-covered rocks and in sheltered crevices.

**MATERIAL.**—Holotype: sta E-5, USNM 751592. Paratypes: 6 specimens from stas E-4, E-5, E-16, E-17, E-18, E-31; 4 specimens between Hanga Nui and Hanga Tuuhata, B. Alarcón, USNM 756344; 2 specimens, juveniles, S. Engert, CAS 58659, 58660.

**MEASUREMENTS (mm).—**

	length	width
USNM 751592 holotype	16.00	10.51
USNM 756344 paratype	16.62	9.28
USNM 756344 paratype	15.33	10.14
USNM 756344 paratype	14.45	9.00
USNM 756801 paratype	15.64	8.90
USNM 756079 paratype	14.20	8.49

**REMARKS.**—*Morula praecipua* appears to be more common on Easter Island than *M. uva*, which is the only species with which it might be confused. It differs markedly, however, in the nature of the sculpture and the characters of the columellar lip and the denticulation on the inner lip.

Radwin and D'Attilio (1972:324) state that the protoconch of *Morula uva* consists of approximately 2 whorls, but juvenile specimens of this species from Polynesia that I have examined had a conical protoconch of  $4\frac{1}{4}$  whorls. These whorls are smooth and show no sign of the axial sculpture seen in the protoconch of *M. praecipua*.

**ETYMOLOGY.**—From the Latin *praecipua* (distinguished, extraordinary).

**Genus *Neothais* Iredale, 1912**

**FIGURE 9**

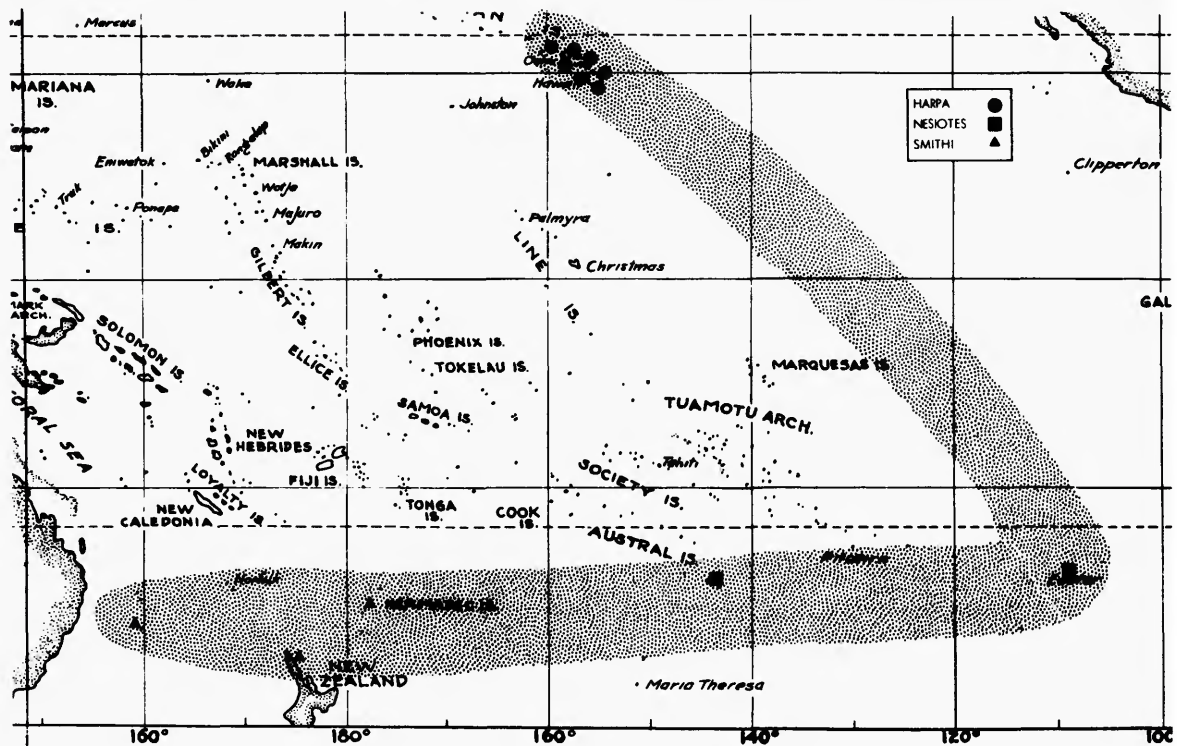
*Neothais* Iredale, 1912:223. [Type-species: *Purpura smithi* Brazier, 1889; original designation.]

*Morula*, subgenus *Neothais* Iredale.—Powell, 1976:99.

**REMARKS.**—This genus contains in addition to the type-species, which occurs in the Kermadecs, northern New Zealand and Lord Howe Island, two other species: *N. nesiotis* (Dall) from Easter Island and Rapa, and *N. harpa* (Conrad) from Hawaii. These three species agree in the general appearance of the shell and in possessing a rather distinctive radula (Emerson and Cernohorsky, 1973:7, pl. 5; and Plate 3; figure 1 this paper).

*Agnewia* Tenison-Woods, 1878, has a very similar radula (Plate 3: figure 2) and may turn out to be subgenerically related to *Neothais*, differing in possessing rather strong lirae within the outer lip. Pending a more detailed and comparative morphological study of the species of these two superspecific taxa I am keeping them as distinct genera.

The distributional range of this genus (Figure 9) extends along the eastern and southern edge of the

FIGURE 9.—Distribution of species of *Neothais*.

tropical Indo-Pacific region and as intimated earlier may represent the remnant of an earlier more widely spread fauna. Another member of this relict faunula may be *Barbatia (Hawaiarca) alii* Dall, Bartsch and Rehder, 1938, known from Hawaii and the Kermadec Islands (Powell, 1961).

This group has no close relationship with *Morula*, although the radulae are superficially similar, and therefore *Neothais* cannot be considered a subgenus of the former as Powell states (Powell, 1976:99). The species *Purpura chaidea* Duclos, 1832, and *Morula (Oppomorus) palmeri* Powell, 1967, which Powell places in *Neothais*, belong respectively to *Drupella* and to a presently indeterminable group.

***Neothais nesiotes* (Dall, 1908),  
new combination**

PLATE 3: FIGURE 1; PLATE 9: FIGURES 6–10

*Thais nesiotes* Dall, 1908a:311, 437 [Easter Island].—Steele 1857:112.

*Purpura (Polytropha) scobina* Quoy and Gaimard.—Lamy, 1938:136.—Steele, 1957:112. [Not *Purpura scobina* Quoy and Gaimard, 1833.]

DIAGNOSIS.—Shell rather broadly ovate, of medium size, about 15 to 26 mm in height. Protoconch a brown sinusigerid larval shell of  $4\frac{3}{4}$  whorls, the first  $1\frac{1}{4}$  smooth, the subsequent ones sculptured with a subsutural nodulose cord, and fine regularly axial riblets, which are crossed by fine distant spiral lirae. Sculpture in postnuclear whorls ( $4\frac{1}{4}$  in holotype) consisting of strong irregular, unequal, and nodulose cords separated by narrow grooves with a median cord larger than the others and nodose, forming thereby an obscure shoulder; in later whorls these unequal spiral cords are made somewhat scabrous by rather sharp axial growth lines, which are particularly prominent in the grooves; on the last whorl several wider spiral cords are present that are nodose where the cords cross low, broad, and rounded axial ribs; a strong siphonal fasciole is present. Color when

fresh a graying reddish brown variously and irregularly maculated with white and darker reddish brown. Aperture large, slightly less than  $\frac{3}{4}$  the total shell length, ovate, with a distinct posterior channel and a short, rather broad anterior canal. Outer lip strongly convex, made somewhat sinuous by the external spiral cords, internally crenulate and reddish or yellowish brown, somewhat thickened and whitish farther within, where in fully grown specimens 4 to 6 denticles may be present, often obscure but sometimes prominent especially in gerontic specimens. Inner lip rather straight, with a slight angle and outward projection above the anterior canal; parietal and columellar callus broad, latter with a thickened abapertural margin and white except for yellowish tinge near the margin, which is slightly sinuate just below the fasciole. Operculum typically thaisid, dark reddish brown, with lateral nucleus (Plate 9: figure 10).

Radula (Plate 3: figure 1): lingual ribbon about 5 mm long; rachidian broad with a prominent central cusp and 2 slightly smaller lateral cusps, and with 4 small denticles marginal to each lateral cusp, the last cusp at the margin somewhat larger than the others; a small denticle is usually present on the inner side of the lateral cusps. Single marginal on each side of rachidian with a broad base, which on the inner side possesses a sharp projection on the anterior corner; from the outer end of the base the tooth continues at right angles as a narrow, slightly curved, and pointed limb.

RANGE.—Easter Island and Rapa.

HABITAT.—On rocks at tide line and in tide pools.

MATERIAL.—Holotype: Shore, Dec 1908, USBF Str. *Albatross*, USNM 110766. Paratypes: 2 specimens, as above, USNM 633087. 102 specimens from stas E-2, E-4, E-8, E-10, E-10A, E-11, E-15, E-16, E-17, E-18, E-19, E-27, E-27A, E-28, E-31, E-32, E-33, E-35; 1 specimen, tide pool between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 206951; 1 specimen, Hanga Roa, 5 Feb 1965, I. Efford, UBC 6319; 27 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200295, 200317, 200318; 7 specimens, 1958, R. Vargas D., MNSH 200319, 200391; 5 specimens, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317413; 14 specimens, Aug 1968, H. G. Richards, ANSP 321101; 1 specimen, Oct 1968, P. C. McCoy, ANSP 315564; 1 specimen, 1958, W. J. Eyerdam, USNM 633991; 12 specimens, S. Englert, CAS.

MEASUREMENTS (mm).—

	width	height
USNM 110766 holotype	11.28	17.77
USNM 756190	16.34	25.72
USNM 756288	15.95	24.44
USNM 756288	12.84	20.21
USNM 755975	9.57	15.47

REMARKS.—This abundant mollusk is quite unlike any other species found in Polynesia and from the nature of the radula and shell form and sculpture seems to belong in *Neothais*. The type-species, *N. smithi* (Brazier, 1889), has much stronger spiral sculpture, the last whorl possessing 6 strong subnodulose spiral cords. The Hawaiian species, *N. harpa* (Conrad), differs by its somewhat cancellate sculpture and darker color.

#### Genus *Pascula* Dall, 1908

*Trophon*, subgenus *Pascula* Dall, 1908a:312.—Thiele, 1929: 292.—Wenz, 1941:1100. [Type-species: *Trophon (Pascula) citricus* Dall, 1908; original designation.]  
*Pascula* Dall.—Radwin and D'Attilio, 1976:185.

REMARKS.—This group was proposed as a section of *Trophon* Monfort, 1910, by Dall on the basis of a supposed resemblance of the radulae of the two groups. Thiele and Wenz, as cited above, follow without comment Dall's allocation, but Radwin and D'Attilio give *Pascula* generic standing in the Trophoninae.

Although the radula of *Pascula citrica* (Dall) (Plate 3: figures 3, 4) does bear a resemblance to that of *Trophon*, the base is relatively longer and more narrow, and the lateral cusps on the rachidian more distant from the end. In shell characters, also, there is little similarity with any of the Trophoninae including the species of the Australian and Neozelanic genus *Xymene* Iredale, 1915.

The radula is much closer to that of the genera *Maculotriton* Dall, 1904, (Ponder, 1972a:226, fig. 1:5-6), *Phrygiomurex* Dall, 1904 (Ponder, 1972a:227, fig. 7), and *Cronia* H. and A. Adams, 1853 (Cooke, 1919:107, fig. 33), from the Indo-Pacific, and *Evokesia* Radwin and D'Attilio, 1972 (Radwin and D'Attilio, 1972:335-338), from the East Pacific and Western Atlantic. The shell is, however, quite different from that in all these groups, and I am therefore considering *Pascula* Dall to be a distinct



genus and am placing it near the three genera mentioned above.

The subfamilial position of these genera is at the present time uncertain; Wenz (1941:1113-1114) placed the first three in his subfamily Drupinae (= Thaisinae), and the authors of *Evokesia* assigned this genus to the Muricopsinae. The radular characters of all four genera are, in my opinion, neither thaisine or muricopsine, and these genera form a rather compact group whose allocation within the family must await further study.

Another member of *Pascula* is *Purpura ochrostoma* Blainville 1832, which Cernohorsky has recently placed in *Cronia* H. and A. Adams, 1853 (Cernohorsky, 1976a:122-124), on the basis of its radula. As mentioned above, the radula of *Pascula* is very similar to that of *Cronia*, but on the basis of shell characters *P. ochrostoma* is better placed in *Pascula*. This species appears to range from the eastern Indian Ocean to Fiji and Tonga. A related and very similar species from Micronesia, Polynesia, and Hawaii, possibly unnamed, and whose relationship with *P. ochrostoma* is at present unclear, also belongs in *Pascula*.

### *Pascula citrica* (Dall, 1908)

PLATE 3: FIGURES 3, 4; PLATE 9: FIGURE 11

*Trophon* (*Pascula*) *citricus* Dall, 1908a:311, 437 [Easter Island].—Lamy, 1936:267; 1938:136.—Steele, 1957:112. *Pascula citrica* (Dall).—Radwin and D'Attilio, 1976:185.

DIAGNOSIS.—Shell elongate-ovate, adult specimens from 9.6 to 18.4 mm in length; spire acuminate, about half the total length; color usually a light yellowish brown, sometimes light grayish yellowish brown with the nodes occasionally reddish brown, often with subsutural reddish brown spots; the reddish brown maculations prominent in dead beach shells. Protoconch mamillate, convexly conical, with  $3\frac{1}{4}$  smooth whorls, first whorl opaque white, others yellowish brown, end of protoconch marked by the reflected and thickened outer lip of the sinusigerid shell. Teleoconch of  $5\frac{1}{4}$  postnuclear whorls in shell 12.85 mm long, first whorl with submedian keel of strong nodes at the beginning, which soon become located at the intersection of narrow axial riblets and a peripheral cord; very early the axial ribs broaden and in the last 2 or 3 whorls become strong subsutural nodes;

in the early postnuclear whorls the axial ribs are crossed by spiral grooves, especially below the periphery, but these generally become obscure or vanish on the last whorl, which bears a series of 5 spiral rows of nodes aligned in 9 to 11 axial rows; the nodes and the spiral grooves vary in strength with the ones on the shoulder the largest. Aperture ovate, outer lip thin, usually with about 7 or 8 elongate denticles within; columellar lip almost straight, columellar callus smooth with a raised abapertural margin, columellar region and inner aperture an orange yellow color; siphonal fasciole strong, with a pronounced pseudumbilicus; siphonal canal moderately wide and short, somewhat flexed.

Operculum irregularly ovate with a lateral nucleus and thickened internally on the inner edge.

Radula (Plate 3: figures 3, 4) ribbon about 5.5 mm in length, situated in a rather large complex radular sac. Rachidian with a broad somewhat narrow and slightly arcuate base; central cusp large, moderately slender, lateral cusps smaller, sometimes very small, located about midway between the center and edge of base; a small, low denticle is usually present at inner base of each lateral cusp. Lateral teeth simple, angulately sickle shaped with base broader, especially near angle.

RANGE.—Easter Island.

HABITAT.—On and under rocks in tide pools.

MATERIAL.—Lectotype: Dec 1904, USBF Str. *Albatross*, USNM 110767. Paratypes: 2 specimens, type-locality, USNM 633986. Also 283 specimens from stas E-1, E-2, E-4, E-5, E-8, E-10A, E-11, E-13, E-15, E-16, E-17, E-18, E-18A, E-19, E-24, E-25, E-27, E-27A, E-28, E-29, E-31, E-33; 1 specimen, in 1-2 m off Hanga Piko, 18 Jan 1969, J. E. Randall, BPBM 206934; 3 specimens, in shallow water, off camp, 27 Jan 1965, I. Efford, UBC 6355; 1 specimen from fish stomach, 1965, I. Efford, UBC 6332; 4 specimens in large tide pool, Apina Nui, W of Hanga Roa, Apr 1977, A. J. Kohn, USNM 769715; 23 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200345, 200432; 18 specimens, R. Vargas D., MNSH 200346; 2 specimens, 9 Apr 1956, Y. Valencia D., MNSH 200420; 4 specimens, MNSH 200411; 4 specimens, 1 Jul 1957, J. Pellisier, UCC; 10 specimens, Aug 1968, H. G. Richards, ANSP 321089; 6 specimens, Aug 1968, H. G. Richards, ANSP 321097; 3 specimens, Aug 1968, H. G. Richards, ANSP 321086, 321088; 8 specimens, Oct 1968, P. C. McCoy, ANSP 315548; 3 specimens, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317415, 317416; 3 specimens, 1952-1956, S. Englert, ANSP 222412; 1 specimen, 1958, W. J. Eyerdam, USNM 633992; 5 specimens, Oct 1964, yacht *La Raillieuse*, USNM 683887; 5 specimens, S. Englert, CAS; 79 specimens, S. Englert, CAS.



## MEASUREMENTS (mm).—

	width	height
USNM 110767 lectotype	6.55	12.95
USNM 633986 paratype	6.88	15.15
USNM 756104	8.40	18.35
USNM 756104	9.08	18.20
USNM 756104	6.80	13.33
USNM 756104	5.62	10.65
USNM 756174	4.75	9.55

REMARKS.—A related undescribed species occurs on Rurutu in the Austral Islands, the southernmost chain of islands in French Polynesia.

*Pascula citrica* closely resembles some specimens of *Evokesia rufonotata* Carpenter, 1864, of the Panamic fauna.

## Family CORALLIOPHILIDAE Chenu, 1859

Genus *Coralliophila* H. and A. Adams, 1853

*Rhizocheilus*, subgenus *Coralliophila* H. and A. Adams, 1853:135 [Type-species: *Murex neritoideus* Gmelin, 1791, not *Murex neritoideus* Linné, 1767 (= *Purpura violacea* Kiener, 1836); Cossmann, 1903.]  
*Coralliophila* H. and A. Adams.—Thiele, 1929:300.

*Coralliophila violacea* (Kiener, 1836)

*Murex neritoideus* Gmelin, 1791:3559. [Not *Murex neritoideus* Linné, 1767.]  
*Fusus neritoideus* (Gmelin).—Lamarck, 1816:8, pl. 435: figs. 2a, 2b.  
*Pyrula neritoidea* (Gmelin).—Lamarck, 1822b:146.  
*Purpura neritoidea* (Gmelin).—Quoy and Gaimard, 1835: 582, pl. 32: figs. 22–24.  
*Purpura violacea* Kiener, 1836:77, pl. 19: fig. 57 [New Caledonia, here designated]. [New name for *Murex neritoideus* Gmelin, 1791, preoccupied by *Murex neritoideus* Linné, 1767.]  
*Purpura diversiformis* Kiener, 1836, pl. 19: fig. 57.  
*Purpura squamulosa* Reeve, 1846, pl. 12: species 70 [Ticao, Philippines].  
*Coralliophila neritoides* (Gmelin).—Keen, 1971:543, fig. 1061.  
*Coralliophila violacea* (Kiener).—Cernohorsky, 1972a:131, pl. 37: fig. 5.—Salvat and Rives, 1975:142, 310, fig. 189.

DIAGNOSIS.—This purple-mouthed species is distinctive because of its rather inflated, often more or less angulate body whorl, broadly conical spire, and its finely and squamulose striate exterior, which is

often obscured by a calcareous coating. In some of the easternmost localities—Marquesas, Easter Island, Clipperton, Cocos Island—the specimens are predominately angulate.

RANGE.—Throughout the entire Indo-Pacific region from East Africa to the Hawaiian Islands, Clipperton, and Easter Island. It has also been recorded from Cocos Island.

HABITAT.—It is almost always found rather firmly affixed on heads of *Porites*, a coral found both in tide pools and in deeper water.

MATERIAL.—13 specimens from stas E-4, E-5, E-18; 2 specimens, Hanga Piko, B. Alarcón, USNM 756339; 2 specimens, Ko Te Riku, E of Hanga Piko, B. Alarcón, USNM 756342; 1 specimen, in 70 ft (21 m), off Motu Nui, 4 Feb 1969, B. A. Baker, BPBM 206960; 3 specimens, in 60 ft (18 m) off Motu Tautara, 7 Feb 1969, J. E. Randall, BPBM 206964.

## MEASUREMENTS (mm).—

	width	height
USNM 756342	30.74	41.33
USNM 756108	26.23	32.45
USNM 756108	19.12	23.52
USNM 756108	17.60	19.18

REMARKS.—This conspicuous species has not previously been recorded from Easter Island.

Kiener gives three localities for this species: the Nicobar Islands, Port Dorey, New Guinea (now Teluk Dore Hum, on the western side of Geelvink Bay, Western New Guinea), and New Caledonia. I here designate New Caledonia as the type-locality for *Coralliophila violacea* (Kiener).

Genus *Quoyula* Iredale, 1912

*Quoyula* Iredale, 1912:221. [Type-species: *Purpura monodonta* Quoy and Gaimard, 1835 (= *Purpura monodonta* Blainville, 1832); original designation.]

*Quoyula monodonta* (Blainville, 1832)

“Pourpre monodonte” Quoy and Gaimard, 1833, pl. 37: figs. 9–11 [vernacular name].  
*Purpura monodonta* Blainville (ex Quoy and Gaimard), 1832:241 [Tongatapu, Tonga].—Quoy and Gaimard, 1835:561, pl. 37: figs. 9–11.  
*Purpura madreporarum* Sowerby, 1834b, pl. [237]: fig. 12.

*Quoyula monodonta* (Blainville).—Iredale, 1912:221.  
*Quoyula madreporarum* (Sowerby).—Cernohorsky, 1972a:  
 131, pl. 37: fig. 7.—Salvat and Rives, 1975:310, fig. 188.

**DIAGNOSIS.**—A species characterized by its small spire, ovate, often very irregular outline, patulous aperture, rather broad, concave, flattened columellar lip, which may or may not have a blunt tooth at its base; exterior white, interior of aperture and columellar area pale to dark reddish purple and white, occasionally pure white.

**RANGE.**—Entire Indo-Pacific region, from East Africa to Hawaiian Islands and Easter Island, as well as in the Panamic Province from southern Baja California to Panama.

**HABITAT.**—On coral in tide pools and in moderately deep water.

**MATERIAL.**—1 specimen, Ovahe, 1958, R. Vargas D., MNSH 200451.

**REMARKS.**—Although most recent workers have used *Quoyula madreporarum* (Sowerby, 1832), as the name for this species, an extensive search of the literature by J.P.E. Morrison and myself has failed to uncover a valid use of this name before 1834, when part 42 of Sowerby's *Genera of Recent and Fossil Mollusks* (Sowerby, 1834b) was published. This part contained the two unnumbered plates and accompanying text of *Purpura*, one of which included a figure and the name of *Purpura madreporarum*; in another printing the plates were numbered, the plate with *P. madreporarum* receiving the number 237; I have been unable to verify the source of the occasional citation of plate 95a for this reference.

In 1832, however, Blainville had described a *Purpura monodonta* (Blainville, 1832:241) based on figures on one of the plates illustrating the species described by Quoy and Gaimard in their work on zoology in *Voyage . . . de l'Astrolabe*; names only in the vernacular were used in the legend on the plate, which was published in 1833, their description was not published until 1835 (Quoy and Gaimard, 1835:561). This species, usually placed in the synonymy of *Q. madreporarum* (Sowerby), must replace it, therefore, as the valid name for this taxon. Some workers have attempted to keep these two names as distinct taxa, but at the present time I am unable validly to subdivide this corallicolous and therefore rather plastic species.

## Family COLUMBELLIDAE Swainson, 1840

### Subfamily COLUMBELLINAE Swainson, 1840

#### Genus *Zafrona* Iredale, 1916

*Zafrona* Iredale, 1916:32–33.—Radwin, 1969:42; 1977:404.  
 [Type-species: *Columbella isomella* Duclos, 1844; original designation.]

*Pyrene*, subgenus *Anachis*, section *Zafra* A. Adams.—Thiele, 1929:304 [synonym(?) *Zafrona* Iredale].

*Anachis*, subgenus *Zafrona* Iredale.—Wenz, 1941:1145.

*Columbella*, section *Metanachis* Thiele, 1924:207; 1929:305.

*Pterygia*, subgenus *Metanachis* Thiele.—Wenz, 1941:1150.

**REMARKS.**—The type-species of *Zafrona*, *Columbella isomella* Duclos, is very close to the Caribbean *Z. pulchella* (Blainville, 1829), and indeed I feel that these species may turn out to be synonymous.

Some recent workers have considered *Zafrona* to be a subgenus of *Anachis* H. and A. Adams, 1835. Radwin, however, has shown (1969:42; 1977:404) that on the basis of the radula, *Zafrona* is more closely related to *Columbella* and *Nitidella* than to *Anachis* or *Mitrella*. In fact, he places these two pairs in different subfamilies, the Columbellinae and the Pyreninae.

#### *Zafrona consobrinella*, new species

PLATE 9: FIGURES 12, 13

*Columbella* (*Seminella*) *striatula* Dunker.—Lamy, 1936:267; 1938:136.—Steele, 1957:111. [Not *Columbella striatula* Dunker, 1871.]

**DIAGNOSIS.**—A rather small, elongate-ovate species, with axial ribs crossed by spiral cords, brown in color variously maculated with white and darker brown and with a whitish suprasutural-peripheral band.

Closest to *Zafrona striatula* (Dunker, 1871) but considerably smaller, less elongate, the axial ribs crossed by fewer and relatively broader spiral cords.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell rather small; 5 to 6.7 mm in length, elongate-ovate, of an overall light brown color, strongly maculated with white and with irregular spots of a strong brown color below the suture and just above the periphery; a whitish band is

present above the suture and at the periphery of the last whorl and the brown areas are usually irregularly marked by white spots. Protoconch conical, slightly deviated, consisting of  $3\frac{1}{2}$  smooth whorls; teleoconch consisting of  $4\frac{1}{4}$  to 5 whorls, first post-nuclear whorl with strong axial ribs cut by 2 spiral grooves forming 3 rows of large nodules; as the whorls increase in size the spiral ridges become more numerous and distant, numbering about 6 to 8 on the penultimate whorl; the axial ribs number from 23 to 25 on the penultimate whorl, and the nodes are rather broad and low and often white in color; on the last whorl the nodes become more obscure and are more frequently white, giving the last whorl a somewhat spotted appearance. Aperture elongate, vertical with a pronounced angle between the parietal and columellar lips; outer lip thickened, prosocyrte, with a broad, shallow, subsutural sinus, and with 4 to 6 denticles on the interior, the posterior one being the largest; columellar lip with a low fold deep within at the base of the columella and three low folds low on the columellar lip above the anterior canal or sinus, which is deep and moderately large.

**HABITAT.**—Unknown, probably in crevices and near and under rocks in tide pools.

**MATERIAL.**—Holotype: sta E-18A, USNM 756156. Paratypes: 3 specimens from stas E-18A, E-27A; 1 specimen, Te Raa Raa, S of Hanga Piko, B. Alarcón, USNM 756336; 1 specimen, Cook Bay [Hanga Roa], 29 Dec 1934, A. Metraux; MNHN.

**MEASUREMENTS (mm).—**

	<i>width</i>	<i>height</i>
USNM 756156 holotype	2.22	5.24
USNM 756164 paratype	2.06	4.90
USNM 756156 paratype	2.29	5.50
USNM 756250 paratype	2.34	5.32
USNM 756336 paratype	2.91	6.65
MNHN paratype	2.27	5.15

**REMARKS.**—This new species is most closely related to *Z. striatula* (Dunker, 1871) described from Fiji, but represented in our collection from southern Japan, Samoa, and Hawaii. That species is, however, considerably larger (15 specimens from Japan and Samoa average 7.7 mm in height), relatively more slender, the sculpture finer and more regular, and the white spots are absent.

Kobelt (1896:227, pl. 31: fig. 1) copies Tryon's

uncolored figure of *Z. striatula*, and like him gives Tahiti as the locality for this species; I have seen no specimens from the Society Islands or French Polynesia agreeing with Dunker's description.

**ETYMOLOGY.**—From the Latin *consobrinella* (little cousin), in allusion to the fact that it is a small-sized relative of *Z. striatula* (Dunker).

**Subfamily PYRENINAE Suter, 1913**

**Genus *Euplica* Dall, 1889**

*Columbella*, subgenus *Euplica* Dall, 1889:187. [Type-species: *Columbella turturina* Lamarck, 1822; monotypy.]  
*Euplica* Dall.—Radwin, 1969:42.

**REMARKS.**—This group has been considered by some authors to be a subgenus and even a synonym of *Columbella* Lamarck, 1799; however, the radula (Cernohorsky, 1972a:135, fig. 9) is much closer to that of *Pyrene* Röding, 1798, which has long been considered to be generically separable from *Columbella* Lamarck, 1799. Thiele (1929:302–304), using radular characters as a basis, conceived the family Columbelloidea to consist of two genera *Pyrene* Röding and *Columbella* Lamarck, the former with numerous subgenera and sections under it, the latter with five sections; the other two genera that he included in this family are now thought to belong in the Buccinidae. In a recent study by Radwin (1969:42) the family has been divided into two subfamilies, the Pyreninae and Columbelloinae, with most of the subgenera and sections of Thiele raised to generic level.

The protoconch is markedly different from that of all other genera in the family that I have been able to examine. It is multispiral, convexly conical, somewhat beehive-shaped, with very fine, moderately crowded, axial riblets on the last  $2\frac{1}{4}$  to  $2\frac{1}{2}$  whorls.

***Euplica loisae*, new species**

**PLATE 10: FIGURES 6–8**

*Columbella lutea* Quoy and Gaimard.—Dall, 1908a:437.—Steele, 1957:111. [Not *Columbella lutea* Quoy and Gaimard, 1833.]

*Columbella (Mitrella) margarita* Reeve.—Lamy, 1936:267; 1938:135.—Steele, 1957:111. [Not *Columbella margarita* Reeve, 1859.]

**DIAGNOSIS.**—Shell rather small for the genus, 7 to

10.5 mm in height, ovate-biconic, whorls convex, early whorls with periphery usually made angulate by strong, somewhat separated nodes, which may be present or absent on last whorl; spiral sculpture usually restricted to grooves near base of last whorl. Color very variable, usually brown yellowish or orange, variously maculated with white, the nodes usually marked with white. Outer lip thickened, denticulate, angulate posteriorly, columella with a broad basal fold, sometimes bifid and a smaller one above, the folds extending inward only half a whorl; columella and outer lip usually tinged with grayish purplish red splotches.

RANGE.—Easter Island, Pitcairn, Rapa.

DESCRIPTION.—Shell rather small, 7.1 to 10.5 mm in height, ovately biconic, whorls convex, often angulate by rather distant axial nodes. Protoconch mamillate, consisting of  $3\frac{3}{4}$  to 4 convex whorls, the first  $1\frac{1}{4}$  whorls white, smooth, glassy, the remainder sculptured with narrow, crowded, axial lirae. Post-nuclear whorls  $5\frac{1}{2}$  in holotype ( $5\frac{3}{4}$  whorls in large specimen, 10.8 mm in height), first 1 to  $1\frac{1}{4}$  whorls marked by rather distant axial ribs that broaden at the base of the whorl, where they generally have a blotch of opaque white or they may be completely white; in subsequent whorls the ribs diminish in strength with the upper, subsutural part disappearing first and later the lower suprasutural part disappears, leaving only nodes at the subangulate periphery, or the nodes may be completely absent on the last 3 whorls, with all intergrades between these two extremes being found; spiral sculpture is generally restricted to rather distant striae on the base and occasionally some obscure microscopic grooves between the suture and the shoulder; sometimes the early post-nuclear whorls show spiral striae crossing the axial ribs. The color is very variable, generally of various shades of orange brown or orange yellow, variously maculated and marked with white and diverse shades of the orange brown, orange yellow, or reddish brown, occasionally unicolored, orange or orange yellow with or without faintly discernible maculations; the columellar callus and inner margin of outer lip tinged with pale purplish pink, the latter in two areas: just below the uppermost denticle, and above the anterior siphonal canal. Aperture about half the height of the shell; outer lip thickened within, subangulately arcuate above with a conspicuous internal sinus, below which

is a series of 6 to 8 denticles, the uppermost one usually somewhat separated from the others; columella with 2 rather strong slanting folds; near the margin of the columellar callus is a ridge bearing usually 4 to 6 denticles, sometimes fewer; anterior siphonal canal rather broad, open.

HABITAT.—In rocky tide pools, under and near stones and debris, and in deeper water (9 to 13.5 meters) among coral rubble.

MATERIAL.—Holotype: sta E-18, USNM 753940. Paratypes: *Easter Island*: About 100 specimens from stas E-8, E-10A, E-16, E-17, E-18, E-18A, E-27, E-27A, E-28, E-30; 1 specimen, in tide pool, between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206952; 3 specimens, in tide pool, S end of Hanga Roa, J. E. Randall, BPBM 206974; 1 specimen, in large tide pool, Apina Nui, W of Hanga Roa, Apr 1977, A. J. Kohn, USNM 769718; 1 specimen, Onetea, Hanga Nui, 27 Apr 1977, A. J. Kohn, USNM 769723; 2 specimens, Haka Ea, Vaihu, 1 May 1977, A. J. Kohn, USNM 769725; 3 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200430; 2 specimens, Vaihu, 1958, R. Vargas D., MNSH 200276; about 70 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200274; 26 specimens, 1958, R. Vargas D., MNSH 200282, 200342; about 50 specimens, 1954, Prof. Baeza, MNSH 200327, 200341; 26 specimens, 9 Apr 1956, Y. Valencia, MNSH 200275; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204067; 15 specimens, S. Englert, USNM 657473; 7 specimens, S. Englert, CAS 58661-58667; 29 specimens, S. Englert, CAS 58668-58696; 15 specimens, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 321087. 3 specimens, 1 Jul 1957, J. Pellisier, UCC.

*Pitcairn*: 4 specimens from tide pool, Isaacs, below pastor's house, Adamstown, 7 Oct 1964, sta P17-64, H. A. Rehder and R. L. Sixberry, USNM 671823; 1 specimen, in 65 ft (19.5 m), in coral and rubble, off Timiti's Crack, E side, 20 Jan 1971, J. E. Randall and D. Bryant, USNM 731961.

*Rapa*: About 45 specimens from six collecting stations, 28 Jan to 16 Feb 1971 in rocky tide pools and shallow water, also in stomach contents of fishes *Diodon hystrix* and *Coris aygula*; 6 specimens, in 10 to 16 in coral rubble, Ilots de Bass (*Morotiri*), 20 Feb 1971.

MEASUREMENTS (mm).—

	width	height
USNM 753940 holotype	4.81	8.98
USNM 755971 paratype	5.15	10.62
USNM 755971 paratype	5.50	10.38
USNM 756099 paratype	3.80	8.04
USNM 755971 paratype	3.68	7.36
USNM 756204 paratype	3.60	7.08

REMARKS.—This species is closest to *Euplica vari-*



ans Sowerby, 1832, but is obviously different in its reduced spiral sculpture, usually narrower form with a higher spire, and in the presence of a pinkish coloration on the outer lip and columellar area. The columellar folds in *E. varians* are stronger, the upper part of the basal fold virtually distinct and forming a rather prominent central fold. It is very variable in coloration as well as in the strength of the peripheral knobs.

This is another species with a range restricted to the southeastern fringe of the Indo-Pacific region.

ETYMOLOGY.—I dedicate this species to my wife, Lois, for whose constant help and continuing encouragement during the preparation of this paper I am deeply grateful.

#### Genus *Seminella* Pease, 1868

*Seminella* Pease, 1868a:233-234. [Type-species: *Cithara varia* Pease, 1860; monotypy.]

REMARKS.—This group, restricted to the Indo-Pacific region, and considered by Wenz (1941:1145) to be a junior synonym of *Zafra* Adams, 1860, is quite distinct from that genus in the characters of the columella and its general form. It similarly bears no close relationship to *Mitropsis* Pease, 1868, which Wenz places also in the synonymy; the latter may turn out not to belong in the Columbellidae.

Pace, in his list of the superspecific and specific names proposed in the Columbellidae (Pace, 1902:45), states that Fischer selected *C. ornata* Pease as type; actually Fischer, as an example only, used the name *C. garretti* Tryon, which the latter author had unnecessarily proposed as a replacement name because of the earlier *Columbella ornata* Ravenel, 1858. When Pease proposed the name *Seminella* (Pease, 1868a:234) he listed by name only two species: *Cithara ornata* Pease and *C. varia* Pease, both from Polynesia. The first of these, however, is a nomen nudum here and was not described until ten months later (Pease, 1868c:97). The other species, *Cithara varia* Pease, 1860, becomes therefore the type by monotypy.

#### *Seminella* cf. *ornata* (Pease, 1868)

PLATE 9: FIGURE 17

*Cithara ornata* Pease, 1868a, 233. [Nomen nudum.]

*Seminella ornata* Pease, 1868a, 234. [Nomen nudum.]

*Citharopsis ornata* Pease, 1868c:97, pl. 11; fig. 19 [Tahiti].

*Columbella (Seminella) garretti* Tryon, 1883:166, pl. 56: fig. 94.—Kobelt, 1896:223, pl. 30: fig. 12.

REMARKS.—I have seen seven specimens from Easter Island, all of them more or less worn, that resemble in size and general form the species described from Tahiti. The best preserved of them appear to have a color pattern close to that found in some specimens of *S. ornata* of which I have examined many examples. A larger series of fresh material from Easter Island might show some constant differences; none of the dead shells I have seen show, for instance, any trace of the reddish brown markings so prevalent in *S. ornata*. I am, therefore, for the present assigning this Easter Island material to the species from French Polynesia with some doubt.

MATERIAL.—5 specimens, sta E-27A, USNM 756249; 1 specimen, Vaihu, 1958, R. Vargas D., MNSH 200398; 1 specimen, 1958, R. Vargas D., MNSH 200392.

#### MEASUREMENTS (mm).—

	width	height
MNSH 200398	1.42	3.10
USNM 756249	1.35	2.82

#### *Nodochila*, new genus

DIAGNOSIS.—Shell subelongate-ovate, with axial ribs on the spire that become reduced on the last whorl to subsutural nodes, the ribs crossed by fine, crowded spiral lirae. Outer lip simple, not thickened internally and without lirae or teeth but obscurely and finely denticulate at the edge from the external spiral lirae; a shallow sinus is present below the suture. Columellar lip almost straight with only a very slight angle above anterior canal, lip and callus smooth, edge of callus not strongly marginate; fasciole rather pronounced, with weak spiral lirae and strong growth lines.

TYPE-SPECIES.—*Zafra pascua* Hertlein, 1962.

REMARKS.—I am unable to place this species in any known group in the family and therefore I am constrained to propose for it a new genus. The striking features of this genus are the lack of denticles on either lip, the almost straight columella without the angle caused by the flexure of the anterior canal,

the rather distinct fasciole, and the fine spiral sculpture of the dull surface.

In certain of these characters it agrees with the genus *Decipifus* Olsson and McGinty, 1958, but the type-species (the only known species) has a higher, more turreted spire, different sculpture, and possesses a low parietal ridge at the posterior angle of the aperture.

ETYMOLOGY.—From the Greek *nodos* (toothless) plus *chila* (lips).

*Nodochila pascua* (Hertlein, 1962),  
new combination

PLATE 10: FIGURE 2

*Columbella* (*Mitrella*) *impolita* Sowerby.—Lamy, 1936:267; 1938:135.—Steele, 1957:112. [Not *Columbella impolita* Sowerby, 1847.]

?*Columbella* cf. *diminuta* C. B. Adams.—Steele 1957:112. [Not *Columbella diminuta* C. B. Adams, 1852.]

*Zafra pascua* Hertlein, 1962:247, figs. 1–3 [Easter Island].

DIAGNOSIS.—Shell rather small, from 5.3 to 8.6 mm in length, regularly ovate in shape with spire and apertural lengths about equal; protoconch paucispiral with a deviated and partially submerged initial whorl, postnuclear whorls of spire axially ribbed, concave subsuturally, and crossed by fine crowded spiral lirae, the axial ribs evanescent on the last whorl except for subsutural nodes. Color white with a band of dark reddish brown near the anterior end of the neck above the moderately conspicuous white siphonal fasciole; the band is visible internally in the anterior siphon and generally appears spirally striate because of the fact that the color is lighter (faded or worn) on the spiral lirae. Occasionally there are patches of faint brown spiral lines between the nodes, and a series of brown lines on the periphery of the last whorl may be present. Aperture elongate ovate, anteriorly truncate, outer lip simple, without denticles but with the edge made minutely and obscurely denticulate by the external spiral sculpture; inner lip and callus smooth, the lip almost straight with only a very slight angle above the moderately broad and open siphonal canal.

RANGE.—Easter Island.

HABITAT.—Near and under loose rocks in tide pools.

MATERIAL.—21 specimens from stas E-1, E-10A, E-15, E-18A, E-27A, E-29, E-30; 1 specimen, in large tide pool, Apina Nui, W of Hanga Roa, Apr 1977, A. J. Kohn, USNM 769717; 1 specimen, Haka Ea, Vaihu, 1 May 1977, A. J. Kohn, USNM 769726; 2 specimens, La Perouse Bay, 13 Oct 1934, A. Metraux, MNHN; 1 specimen, Vaihu, 1958, R. Vargas D., MNSH 200406; 1 specimen, 1934, A. Metraux, MNHN; 18 specimens, 1958, R. Vargas D., MNSH 200400; 2 specimens, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317412, 321096; 12 specimens, S. Englert, ANSP 222405; 52 specimens, S. Englert, CAS; 9 specimens, S. Englert, CAS.

MEASUREMENTS (mm).—

	length	width
ANSP 222405	8.22	3.40
USNM 751605	7.65	3.21
USNM 756296	6.25	2.98
USNM 756296	4.82	2.17

REMARKS.—This species, first recorded erroneously as *Columbella impolita* Sowerby by Lamy, was described by Hertlein as a new species in the genus *Zafra* A. Adams, 1860. At that time I agreed with Hertlein in this allocation. Further study, however, has convinced me that the species does not belong in *Zafra*, which is particularly characterized by a strong vertical lamella on the columella. I am unable to find any group in the Columbellidae with the combination of characters outlined in the generic diagnosis and therefore I erect a new genus to receive this interesting little species.

It is relatively abundant, although most of the specimens have been collected as dead shells from beach drift.

Family BUCCINIDAE Rafinesque, 1815

Subfamily PISANIINAE Tryon, 1881

Genus *Caducifer* Dall, 1904

*Colubraria*, section *Caducifer* Dall, 1904:136. [Type-species: *Triton truncatus* Hinds, 1844; original designation.]

*Pisania*, subgenus *Caducifer* Dall.—Wenz, 1941:1193.—Cernohorsky, 1971a:147.

*Caducifer* Dall.—Keen, 1971:557.—Cernohorsky, 1975b:195.

*Monostiolum*, subgenus *Caducifer* Dall.—Ponder, 1972b:258.

REMARKS.—I follow Cernohorsky (1975b:195) in giving *Caducifer* generic rank rather than subgeneric standing under *Pisania* Bivonia, 1832. In addition to

*Monostiolum* Dall, 1904, *Jeannea* Hedley, 1912, should probably also be placed as a subgenus under *Caducifer*. The species of these three groups all have a tricuspidate rachidian tooth in the radula and possess a more or less conspicuous denticle at the base of the columella.

Ponder's choice (1972b:258) of *Monostiolum* Dall as the generic name to be used for this group over the coeval *Caducifer* Dall is rendered inoperative by Keen's earlier choice (1971:557) of *Caducifer*.

***Caducifer decapitata englerti* (Hertlein, 1960),  
new combination**

PLATE 9: FIGURES 15, 16

*Colubraria* (*Taeniola*) *decollata* (Sowerby).—Dall, 1908a: 437. [Not *Triton decollatus* Sowerby, 1833.]

*Colubraria decollata* (Sowerby).—Steele, 1957:112. [Not *Triton decollatus* Sowerby, 1833.]

*Pisania ignea* Linné [sic].—Odhner, 1922:238.—Steele, 1957:112. [Not *Buccinum igneum* Gmelin, 1791.]

*Triton* (*Epidromus*) *cylindricus* Pease.—Lamy, 1936:267; 1938:137.—Steele, 1957:112. [Not *Triton cylindricus* Pease, 1868.]

*Pisania englerti* Hertlein, 1960:19–20, pl. 7.

DIAGNOSIS.—This subspecies differs from the nominate subspecies in possessing a finer spiral sculpture and obscure axial ribs; from the subspecies *C. decapitata cylindrica* Pease it differs in having somewhat more irregular spiral sculpture and in the juvenile specimens being more inflated and subfusiform and not slender and straight sided.

RANGE.—Easter Island.

DESCRIPTION.—Shell elongate fusiform, decollate at maximum growth stage, measuring from 8.2 to 14.2 mm in length, and 3.7 to 6.0 mm in width at this stage (maximum size of nondecollate shell seen is 12.45 mm in length). Protoconch paucispiral, bulbous, smooth; early postnuclear whorls marked by strong and broad axial ribs, crossed by spiral cords; on the fifth postnuclear whorl the axial ribs diminish in strength and are absent on the last 2 whorls; in the early whorls a finer cord becomes intercalated between the spiral cords, and in later whorls the cords become relatively less strong, and further finer lirae arise so that on the body whorl there are from 3 to 5 finer lirae between the stronger lirae; the median intercalated lirae may become as prominent as

the original lirae, resulting in the lirae on the body whorl becoming subequal or with only a single intercalated fine lira. Color, when fresh, white with large dark chestnut blotches oriented both axially and spirally. Aperture narrowly and acutely ovate, parietal wall with a strong toothlike ridge, columella straight, obliquely truncate, with a blunt node at the base; parietal wall covered with a thin callus that extends over the columellar area, where it is thicker with a free-standing margin over the umbilical area; outer lip thickened, reflected, denticulate within; anterior canal short, well marked.

HABITAT.—Found in tide pools, on alga-covered rocks and under rubble.

MATERIAL.—53 specimens from stas E-10, E-13, E-17, E-18A, E-21, E-27A, E-33; 1 specimen, Hanga Piko, 1 Jul 1917, K. Bäckström, GM Moll. 12020; 3 specimens, in large tide pool, Apina Nui, W of Hanga Roa, Apr 1977, A. J. Kohn, USNM 769716; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204060; 5 specimens (paratypes), 1961, S. Englert, USNM 638945; 6 specimens (paratypes), S. Englert, CAS; 8 specimens, S. Englert, CAS; 29 specimens, R. Vargas D., MNSH 200339; 1 specimen, 1954, Prof. Baeza, MNSH 200338.

MEASUREMENTS (mm).—

	<i>width</i>	<i>height</i>
USNM 751580	5.75	14.28
USNM 756311	6.10	14.03
USNM 756052	4.53	10.40

REMARKS.—This species was described from a series of nondecollate specimens, with the maximum length given as 9.9 mm. Through discovery of full-grown decollate specimens it has been possible now to properly allocate this form.

The most recent treatment of the species placed under *Caducifer* Dall, 1904, has been by Cernohorsky (1971a:147), who has united all species under one name, namely *Pisania* (*Caducifer*) *truncata* (Hinds, 1844). This species, however, is in my opinion quite distinct from typical *Caducifer decapitata* (Reeve, 1844), and from *C. decapitata cylindrica* (Pease, 1868), by reason of its generally larger size with coarser, broader axial ribs and with more regular and distantly spaced spiral cords, the interspaces between the cords marked by microscopic threads; the spiral cords are thickened and white where they cross the axial ribs, particularly in the peripheral area.

*Caducifer truncata* is found in the western Pacific region from the Ryukyus to Fiji and Samoa.

*Caducifer decapitata* (Reeve) is smaller, more slender, with the axial ribs less prominent and spiral threads more numerous and more finely granulose and with finer intercalated threads. This species can be divided into three geographic races.

The nominate subspecies, known at the present time from the Ryukyus, Philippines, Fiji, and Samoa, has rather coarse sculpture with the axial ribs moderately prominent, and a strigate color pattern.

The subspecies *C. d. cylindrica* (Pease) was described originally from Tahiti (Pease, 1868c:94), and I have been able to examine the syntypes, sent me on loan from the Museum of Comparative Zoology, Harvard University, through the kindness of Dr. Kenneth J. Boss. The 3 specimens are small, averaging 9.5 mm in length with 8 to 9 spiral cords on the penultimate whorl, which are not nodulose, or only weakly so, on the last 2 whorls; the interspaces are marked by crowded microscopic spiral striae. I have seen, in addition, only one similar specimen from Vahitahi in the Tuamotus; the subspecies is apparently uncommon in Polynesia. Specimens from Micronesia, Hawaii, and the Marquesas, which I have for the present identified as *C. d. cylindrica*, are larger in size and have the spiral cords more granulose and with the intercalary striae fewer and stronger. Until I am able to examine more material from Polynesia resembling the type material, I am for the present retaining the name *C. d. cylindrica* for the race from Micronesia, Polynesia, and Hawaii. The immature shell of this race has a slender, high spire, with rather weak axial ribs (Plate 9: figure 14).

The Easter Island race, *C. decapitata engleri* (Hertlein), is characterized by the immature shell being more inflated, fusiform, with a shorter spire, and with the axial ribs stronger. Otherwise it is close to the subspecies *C. d. cylindrica* except that the spiral sculpture is more irregular with threads tending to become more subequal. The color pattern in these two subspecies consists of squarish blotches separated by axial lines of white and two spiral white lines.

I have not seen immature specimens of either *C. decapitata decapitata* or of *C. truncata*.

### Family NASSARIIDAE Iredale, 1916 (1840)

REMARKS.—The family concept dates from the subfamily name "Nassinae" proposed by Swainson in 1840.

### Genus *Nassarius* Dumeril, 1806

#### Subgenus *Telasco* H. and A. Adams, 1853

*Nassa*, subgenus *Telasco* H. and A. Adams, 1853:119.—Cernohorsky, 1972a:160–161. [Type-species: *Nassa variabilis* Philippi, 1836 (= *Buccinum costulatum* Brocchi (ex Renier), 1814; Oostingh, 1939.)]

REMARKS.—The name of the type-species must be credited to Brocchi, 1814, as the names of Renier, 1804, have been rejected by the International Commission on Zoological Nomenclature in Opinion 316 (Hemming, 1954b).

The following species is placed in this subgenus with some doubt because of the absence of a parietal fold at the adapical channel of the aperture.

#### *Nassarius (Telasco) albomaculatus*, new species

PLATE 10: FIGURES 4, 5

DIAGNOSIS.—A shell of moderate size, ovate-acuminate, last whorl smooth, 2 preceding whorls with low, broad, obscurely nodulose, opisthocyrt ribs, and broadly crenulate at the suture; whorls with microscopic crowded axial striae; color brown with large irregular white maculations and a narrow sub-sutural band of dark reddish brown and white; no spiral color lines present; columella smooth, parietal wall with a very thin, transparent callus and without any trace of a parietal tooth. Differs from *N. (T.) gaudiosus* Hinds, 1844, in possessing much weaker spiral grooves on base of last whorl, the absence of brown spiral lines, a thinner parietal callus, and in lacking a parietal tooth and a strong callus over the columella and anal fasciole.

RANGE.—Easter Island.

DESCRIPTION.—Shell 16.25 to 17 mm in length, ovate-acuminate, moderately solid, with convex whorls. Protoconch of 4+ whorls, trochoid, white, smooth, last whorl bluntly angulate, on the last three-fourths furnished with a sharp fine keel that appears to descend gradually to the suture, due to the slight



tilting of the protoconch, last part of protoconch microscopically granulate and ending in a deep opisthocyrtly arcuate lip. Teleoconch consisting of 6 whorls, earliest whorls pale purplish pink with a subsutural row of low nodes and 3 low spiral cords crossing broad low axial ribs that are at first obscure but soon become more prominent and obscurely nodulose, later, however, again becoming lower, broader and more obscure especially on the lower part of the penultimate and antepenultimate whorls; on the last whorl the ribs are only faintly indicated below the subsutural band of nodules, the remainder of the last whorl being smooth; on the base only 2 or 3 faint grooves are visible above the anterior sinus; the whole surface is sculptured by exceedingly fine and crowded axial threads giving the shell a satiny appearance, except on the ventral surface where the thin parietal callus and its extension give the shell a glossy appearance; the last 3 whorls are moderate to brownish orange, marked with rather large irregular white maculations which may in places be edged by a fine dark brown margin and which are often somewhat spirally aligned; the subsutural row of nodules prominently marked with alternate blotches of dark reddish brown and white. Aperture acuminately ovate, parietal lip meeting the vertical columellar lip in an obtuse angle; parietal wall without a tooth or swelling at the adapical angle of aperture, and with a thin transparent callus covering the base of the last whorl; columella with a basal entrant groove and a low rather short fold paralleling the columellar edge of the anterior canal; columella covered with a white callus but without a marginate callus shield; fasciole bordered by a distinct brown ridge that joins the brown margin of the anterior sinus and basal portion of the outer lip. Outer lip rather thick, white, somewhat varicose externally, with 13 or 14 moderately long denticles a short distance within.

**MATERIAL.**—Holotype: Te Raa Raa, B. Alarcón, USNM 751615. Paratypes: 2 specimens, Te Raa Raa, B. Alarcón, USNM 767046; 1 specimen, Hanga Piko, 1958, R. Vargas D., MNSH 200334; 1 specimen, Anakena, 1958, R. Vargas D., MNSH 200335.

**MEASUREMENTS (mm).—**

	<i>width</i>	<i>height</i>
USNM 751615 holotype	8.26	16.90
USNM 767046 paratype	8.72	16.34
USNM 767046 paratype	8.58	16.25

**REMARKS.**—This species bears some resemblance to *Nassarius (Telasco) gaudiosus* Hinds, 1844, but the lack of a columellar callus shield and parietal tooth, the microscopic axial sculpture, and the distinct color pattern, with the conspicuous subsutural band and the lack of any trace of spiral lines distinguish it from any forms of *N. (T.) gaudiosus* that I have seen.

**ETYMOLOGY.**—From the Latin *albomaculatus* (spotted with white).

**Family MITRIDAE Swainson, 1831**

**Subfamily MITRINAE Swainson, 1831**

**Genus *Mitra* Lamarck, 1798**

**Subgenus *Strigatella* Swainson, 1840**

*Mitra*, subgenus *Strigatella* Swainson, 1840:130, 131, 319.—Cernohorsky, 1970:38. [Type-species: *Mitra zebra* Lamarck, 1811 (= *Voluta paupercula* Linné, 1758); Gray, 1847.]

***Mitra (Strigatella) flavocingulata* Lamy, 1938**

FIGURE 10; PLATE 9: FIGURE 18

*Mitra (Strigatella) amphorella* Lamarck.—Lamy, 1936:267. —Steele, 1957:111. [Not *Mitra amphorella* Lamarck, 1811.]

*Mitra (Strigatella) amphorella* var. *flavo-cingulata* Lamy, 1938:135 [Easter Island].

*Mitra* cf. *M. michelinii* Guerin.—Steele, 1957:111.

*Strigatella rapanuiensis* J. Cate, 1968:87, pl. 11: figs. 4a, 4b. [Easter Island].—Cernohorsky, 1970:39.

*Mitra (Strigatella) flavocingulata* Lamy.—Cernohorsky, 1976b:487, pls. 437, 438.

**DIAGNOSIS.**—This relatively large species, commonly growing to 25 mm in length but reaching a maximum of 37 mm, is closer to *Mitra (Strigatella) scutulata* Gmelin than to *M. (Nebularia) vexillum* Reeve as stated by Cate (1968:87). It differs in being smoother, lacking the spiral grooves of *M. (S.) scutulata* but possessing instead spiral rows of punctae which may disappear on the latter part of the body whorl. The shell is covered with a periostracum of dark grayish brown to brownish black, which tends

0.1mm



FIGURE 10.—*Mitra (Strigatella) flavocingulata* Lamy, Auckland Institute and Museum, Hanga Piko, half-row of radula.

to obscure the banding found in the species. The banding is of alternating bands of yellow and dark brown of varying widths. The strong columellar folds and base of the columella are white and the interior of the outer lip is light bluish gray.

Radula (Figure 10) ribbon 4.6 mm in length in a shell 23 mm long. Rows of teeth in ribbon 84 plus 5 nascentes. The radular characters are those typical of members of the subgenus *Strigatella* (Cernohorsky, 1970:14–15). The radula drawing was kindly sent me by W. O. Cernohorsky.

RANGE.—Easter Island.

HABITAT.—In rocky tide pools, on sandy bottom and under rocks.

MATERIAL.—26 specimens from stas E-4, E-8, E-10, E-15, E-17, E-21, E-25, E-29, E-30, E-32, E-33; 1 specimen, off Hanga Roa, 28 Jan 1965, I. Efford, UBC 6324; 6 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200270; 1 specimen, Vaihu, 1958, R. Vargas D., MNSH 200279, 1 specimen, 1954, Baeza, MNSH 200429; 3 specimens, Oct 1968, P. C. McCoy, ANSP 315544; 2 specimens, S. Englert, CAS.

MEASUREMENTS (mm).—

	<i>width</i>	<i>height</i>
USNM 756331	16.30	37.50
USNM 751556	14.22	32.36
USNM 751581	14.10	29.90
USNM 756073	13.74	29.60
USNM 751556	11.85	24.27
USNM 751601	11.42	22.78

REMARKS.—This species is distinctive not only because of its coloration but because of the strong spiral punctation on the whorls of the spire and the upper part of the body whorl. It has no relationship with *M. (S.) tristis* Broderip, 1836, of the Panamic Province.

Subfamily VEXILLINAE Thiele, 1929

Genus *Vexillum* Röding, 1798

Subgenus *Pusia* Swainson, 1840

*Pusia* Swainson, 1840:320.—Cernohorsky, 1970:55. [Type-species: *Mitra microzonias* Lamarck, 1811; monotypy.]

*Vexillum (Pusia) microzonias* (Lamarck, 1811)

*Mitra microzonias* Lamarck, 1811:218 [Indian Ocean].—Lamarck, 1816:1, pl. 374: figs. 8a,b (1798).—Deshayes, 1832b:463.

*Pusia microzonias* (Lamarck).—Swainson, 1840:320.—Cernohorsky, 1965:148, pl. 21: figs. 110, 110a; 1971b:183, pl. 45: fig. 328.

*Vexillum (Pusia) microzonias* (Lamarck).—Cernohorsky, 1970:56.—Salvat and Rives, 1975:341, fig. 305.

DIAGNOSIS.—A shell of rather large size for the subgenus, reaching 22 mm in length, elongate ovate, rather strongly axially ribbed, with more or less pronounced spiral striae in the interspaces and strongly spirally and subgranosely lirate on the lower half of the base; dark reddish brown (paler when faded) with a white spiral band of varying width at the periphery, appearing above the suture on the whorls of the spire; occasionally a narrow band is present on the base.

RANGE.—Indonesia and southern Japan to Micronesia and Polynesia.

HABITAT.—Under coral and rocks on sandy substrate on reef and in tide pools.

MATERIAL.—1 specimen, Te Raa Raa, S of Hanga Piko, sta E-7, USNM 756334.

MEASUREMENTS.—Length, 15.77 mm; width, 7.54 mm.

REMARKS.—A worn specimen of this rather uncommon species was given me by Sr. Alarcón on our visit to Easter Island. This specimen has the axial ribs on the body whorl somewhat more narrow and more numerous than is typical, and the white peripheral band is narrow and not broadened on the axial ribs as is frequently the case.

## Subfamily IMBRICARIINAE Troschel, 1867

Genus *Imbricaria* Schumacher, 1817

*Imbricaria* Schumacher, 1817:236.—Cernohorsky, 1970:43.  
[Type-species: *Imbricaria conica* Schumacher, 1817 (= *Mitra conularis* Lamarck, 1811); monotypy.]  
*Conoelix* Swainson, 1821, pl. 24. [Type-species: *Conoelix lineatus* Swainson, 1821 (= *Mitra conularis* Lamarck, 1811); original designation.]

*Imbricaria punctata* (Swainson, 1821)

PLATE 9: FIGURE 19

*Conoelix punctata* Swainson, 1821, pl. 24, expl. [Otaheite].  
*Mitra (Cylindra) nucea* Dall (ex Gronovius), 1908a:437.—Steele, 1957:111. [Not *Voluta nucea* Gmelin, 1791.]  
*Imbricaria punctata* (Swainson).—Cernohorsky, 1971b:160, pl. 37: fig. 256.—Salvat and Rives, 1975:335, fig. 283.

DIAGNOSIS.—A rather small species up to 20 mm in length, obconic-cylindrical in shape with low conical spire, grayish yellow to grayish greenish yellow with a pale band at the shoulder; whorls sculptured with distant spiral rows of punctae; aperture elongate, columellar lip with 5 or 6 plaits.

RANGE.—From Cocos-Keeling and southern Japan to Hawaii and Easter Island; I have seen no authentic material from Mauritius or elsewhere in the western Indian Ocean.

MATERIAL.—1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204061.

MEASUREMENTS.—The specimen from Easter Island measures 16.4 mm in length and 8.4 mm in width.

REMARKS.—This species has not been found since a single specimen was picked up during the visit of the *Albatross* in 1904, and it is probably a rare straggler to this island. The specimen resembles the Hawaiian representatives of this species and not the Polynesian specimens, which have a lower spire with concave sides resulting in an attenuate spire; the spiral rows of punctae on the shoulder of the last whorl and spire are also weaker. The original figure given by Swainson resembles the Hawaiian form, although he cites Tahiti as the provenance of his species.

## Family MARGINELLIDAE Fleming, 1828

## Subfamily CYSTISCINAE Stimpson, 1865

Genus *Granula* Jousseau, 1875

*Granula* Jousseau, 1875:83–86.—Coan, 1965:190.—McLean, 1969:50. [Type-species: *Marginella bensoni* Reeve, 1865; Coan, 1965.]  
*Kogomea* Habe, 1951a:103.—Coan, 1965:190.—McLean, 1969:50. [Type-species: *Erato novemprovincialis* Yokoyama, 1928; original designation.]

*Granula pascuana*, new species

PLATE 9: FIGURE 20

*Marginella sandwicensis* Pease.—Odhner, 1922:248. [Not *Marginella sandwicensis* Pease, 1860.]  
*Marginella sandwicensis* Pease.—Steele, 1957:112.

DIAGNOSIS.—This species resembles *G. sandwicensis* (Pease, 1860), from Hawaii and the Tuamotus but the columellar callus is heavier anteriorly and the 2 basal columellar folds do not continue over the basal callus but terminate at the pronounced vertical callus ridge, which is markedly marginate abaperturally. The columellar folds, 3 or 4, are fewer in number than in *G. sandwicensis*.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, 2 to 2.5 mm long, obovate, white, glossy, smooth when fresh. Protoconch dome-shaped, with 1½ smooth whorls, first one very large. Postnuclear whorls 1½ in holotype, smooth, glossy, last whorl large. Aperture rather narrow, wider anteriorly where the outer lip is somewhat effuse, anterior sinus narrow, rather deep, outer lip thickened internally, inner edge marked with about 8 low rounded denticles, outer edge narrowly marginate; columella marked by a rather thick callus marked anteriorly by a prominent vertical ridge and a furrow between its abapertural side and the well defined basal fasciole; anterior part of columella with 4 slightly oblique folds, the 3 anteriormost ones large and not extending onto the callus, the uppermost one small, occasionally obscure or absent.

MATERIAL.—Holotype: sta E-27A, USNM 710721. Paratypes: 59 specimens from stas E-27A and E-30; 4 specimens, beach drift, Hanga Piko, 1 Jul 1917, K. Bäckström, GM Moll; 29 specimens, 1958, R. Vargas D., MNSH 200393; 2 specimens, S. Englert, CAS 58697, 58698.

## MEASUREMENTS (mm).—

	width	height
USNM 710721 holotype	1.35	2.10
USNM 756248 paratype	1.68	2.44
USNM 756248 paratype	1.31	2.04

REMARKS.—This species appears to be sufficiently distinct in the characters of the columellar folds and the strong development of the anterior portion of the columellar callus to be ranked as a species. *Granula japonica* (Nomura and Hatai, 1940) differs from both *G. sandwicensis* (Pease) and *G. pascuana* in being somewhat larger and broader and from the former in possessing fewer columellar folds, and from the latter in lacking the pronounced vertical ridge in the anterior portion of the callus. From *G. sandwicensis* the Easter Island species differs in having fewer columellar folds and in possessing a vertical ridge in the anterior portion of the callus.

ETYMOLOGY.—A latinized adjective formed from the Spanish name of the island, Isla de Pascua.

## Family TURRIDAE Swainson, 1840

## Subfamily MANGELIINAE Fischer, 1883

Genus *Lienardia* Jousseau, 1884

*Lienardia* Jousseau, 1884b:184.—Powell, 1966:114.  
[Type-species: *Clavatula rubida* Hinds, 1844; original designation.]

DIAGNOSIS.—This genus comprises a group of ovate, more or less broad species with broad, rounded ribs crossed by spiral cords or lirae, a microscopically granulose surface, a paucispiral protoconch with a smooth apical whorl and a more or less pronounced keel on the following whorl. The subsutural sinus is deep, U-shaped with a callose adsutural margin, the outer lip with a strong external varix and with denticles on the inner side as well as on the columellar lip.

*Lienardia exilirata*, new species

PLATE 11: FIGURES 7-9

DIAGNOSIS.—A small, ovate shell, from 5.1 to 7.2 mm in length with strong, rounded ribs crossed by rather fine, low spiral lirae, brownish to moderate

orange in color, generally with a more or less distinct whitish band just below the shoulder.

RANGE.—Easter Island.

DESCRIPTION.—Small, ovate, 5.1 to 7.2 mm in length, brownish to moderate orange, the broad ribs on the whorls only slightly angulate at the shoulder. Protoconch paucispiral, papillate, 1/4 to 1/2 smooth whorls, the last part slightly keeled at the periphery. Teleoconch with about 6 whorls, earliest ones with 2 spiral lirae that cross rather broad rounded ribs; the number of lirae increases on later whorls, the finer ones being found on the shoulder ramp and between and below the original 2 lirae; on the penultimate whorls 8 or 9 subequal lirae cross the 10 broad axial ribs; in one specimen before me these lirae are all subequal (Plate 11: figure 7); the surface of the whorls is microscopically granulose. Aperture moderately broad, outer lip with a strong external varix and a deep U-shaped sinus margined at the suture by a heavy callus; inner edge of outer lip with 5 to 6 denticles, and columellar lip with 2 to 6 denticles; anterior siphonal canal short, deep, and moderately wide.

MATERIAL.—Holotype: sta E-30, USNM 758393. Paratypes: 6 specimens, stas E-18A, E-30, USNM 756161, 756111, 758393; 2 specimens, S. Englert, CAS 58700, 58701.

## MEASUREMENTS (mm).—

	width	height
USNM 758393 holotype	3.19	6.44
USNM 756161 paratype	3.30	7.16
CAS 58700 paratype	3.16	6.80
USNM 758394 paratype	3.06	6.55
USNM 756111 paratype	2.95	6.05
CAS 58701 paratype	2.58	5.15

REMARKS.—As all the specimens of this species that I have seen were dead when collected and from sand above the high tide mark, most of them are more or less worn. The least worn and freshest specimens lack a fully mature outer lip, so I have chosen as holotype the most perfect of the worn shells, and am figuring along with it the two immature specimens, as I used all three in drawing up the description.

This species differs from somewhat similar species like the Hawaiian *L. mighelsi* Iredale and Tomlin, 1917 in having finer spiral lirae and in possessing a different coloration.

ETYMOLOGY.—From the Latin *exilis* (fine) plus *lirata* (with lirae).



## Subfamily CLATHURELLINAE

H. and A. Adams, 1858

Genus *Clathurella* Carpenter, 1857

*Clathurella* Carpenter, 1857:399.—Powell, 1966:116.—McLean, 1971:127. [Type-species: *Clavatula rava* Hinds, 1844; Cossmann, 1896.]

**DIAGNOSIS.**—This genus is characterized by a polygyrate conical protoconch of which the last whorls are conspicuously keeled, strong axial and spiral sculpture, a microscopically granose, shagreenlike surface of the whorls, a deep U-shaped posterior sinus, and denticles on both columellar and outer lip.

**REMARKS.**—Hitherto believed to be restricted to the Californian and Panamanian Provinces the present species from Easter Island and an undescribed species from Tahiti show that *Clathurella* occurs also in the Indo-Pacific region.

*Clathurella fuscobasis*, new species

FIGURE 11; PLATE 11: FIGURES 3, 4

**DIAGNOSIS.**—Shell smaller than any of the species from the Californian and Panamanian provinces, 3.2 to 4 mm in height, with a more angulate shoulder and fewer spiral lirae; within the outer lip there are fewer and larger denticles.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell small, 3.2 to 4 mm in height, broadly and ovately fusiform and slightly attenuate anteriorly, whorls rather strongly angulate at the shoulder, light yellowish brown to grayish yellow with the base of the last whorl grayish reddish brown to brownish orange, and with a narrow dark subsutural band. Protoconch conical, of  $3\frac{1}{4}$  whorls, the first  $1\frac{1}{2}$  smooth and lighter in color, the remaining whorls with a fine median keel. Teleoconch of 4 to  $4\frac{1}{4}$  whorls, the early whorls with broad axial ribs, 11 on the penultimate whorl, angulate at the shoulder and crossed by 2 spiral cords of which the median or shoulder keel is stronger than the one below it and is a continuation of the keel on the protoconch; on the last 3 whorls a narrower cord appears at the suture and several fine spiral threads are visible on the shoulder ramp; on the base of the last whorl 4 spiral cords are present and 4 more, rather crowded, are

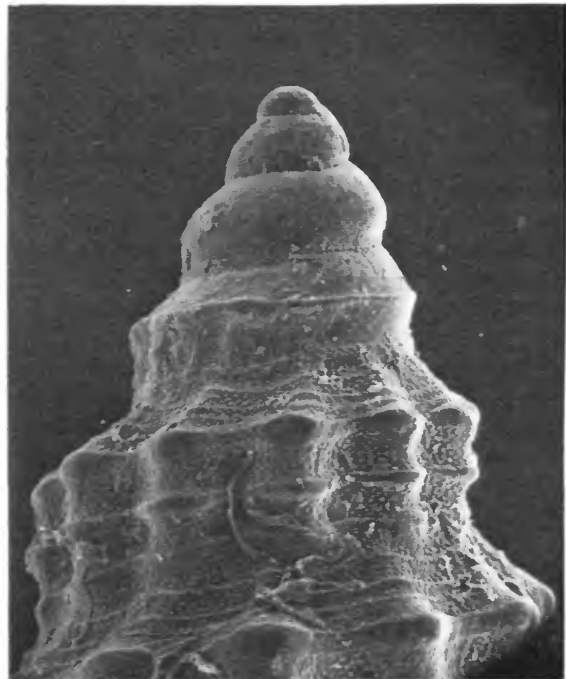


FIGURE 11.—*Clathurella fuscobasis*, new species, MNSH 200469, Vaihu, protoconch,  $\times 70$ . (Photo reproduced at 95%.)

on the anterior siphonal neck; the whole surface is marked by a microscopically granose sculpture like shagreen. The posterior sinus is deep, U-shaped, margined adsuturally by a strong callus; outer lip somewhat thin beyond a moderately strong varix, internally with 3 strong denticles of which the central one is smaller than the other 2; the columellar lip with several small denticles; the columellar lip, adsutural callus at the sinus, and the outer lip in the area of the 2 largest denticles are reddish brown in color; anterior sinus rather deep and broad.

**MATERIAL.**—Holotype: sta 27A, USNM 756265. Paratypes: 5 specimens, stas E-10A, E-27A, USNM 755996, USNM 756263; 2 specimens, Vaihu, 1958, R. Vargas D., MNSH 200469, 200470.

## MEASUREMENTS (mm).—

	width	height
USNM 756265 holotype	1.60	3.66
USNM 755996 paratype	1.80	4.04
MNSH 200469 paratype	1.84	3.80
MNSH 200470 paratype	1.52	3.21

REMARKS.—As mentioned above there is another Indo-Pacific species that belongs in *Clathurella*, an undescribed species from Tahiti, distinct from the present species.

ETYMOLOGY.—From the Latin *fuscus* (reddish brown) plus *basis* (base), referring to the dark anterior portion of the shell.

#### Subfamily DAPHNELLINAE Casey, 1904

REMARKS.—It has been suggested that this subfamily should be called Raphitominae, based on the use by Bellardi in 1875. I, however, use Casey's later name because the characters of the protoconch in the type-species of *Raphitoma* Bellardi, 1848, are in doubt. The generic characters usually given for this genus are generally based on the recent species "*Raphitoma*" *pseudohystrix* Sykes, 1906. The type of *Raphitoma* Bellardi, 1848, the Pleistocene species *Pleurotoma hystrix* Cristofori and Jan, 1832, has more convex whorls, finer and less strongly spinose cancellate sculpture, and possesses a polygyrate conical protoconch. It appears that the recent species *R. pseudohystrix* may require a new generic name, but before this is done the fossil *R. hystrix* must be critically studied and the characters of the protoconch and subsutural sinus elucidated. In my view it would be unwise to base a subfamilial name on a genus of which important diagnostic characters are in doubt.

#### Genus *Microdaphne* McLean, 1971

*Microdaphne* McLean, 1971:129. [Type-species: *Philbertia trichodes* Dall, 1919 (new name for *Pleurotoma hirsutum* DeFolin, 1867, preoccupied by *Pleurotoma hirsutum* Bellardi, 1847); original designation.]

DIAGNOSIS.—Shell small, 2.2 to 3.4 mm in height, elongate-ovate, with a conspicuous coarse clathrate sculpture, the spiral cords forming strong triangular spines where they cross the ribs. Protoconch of 4 to 4¼ whorls, the first 1½ convex, lirate, the others with curved axial ribs. Aperture narrow, the subapertural sinus deep, in the form of a reversed L (Powell, 1966:6); the outer lip with a strong varix spinose where the spiral cords cross it and with internal denticles; anterior siphonal canal moderately long.

REMARKS.—The sculpture found in this genus has a remarkable resemblance to that of the recent Mediterranean species "*Raphitoma*" *pseudohystrix* Sykes, 1906. The latter species, however, has a larger shell, with a paucispiral, peglike, exerted spirally lirate protoconch, and lacks the strong labial varix of *M. trichodes* (Dall).

*Microdaphne trichodes* and the species described below are the only species assignable at the present time to this genus.

#### *Microdaphne morrisoni*, new species

FIGURE 12; PLATE 11: FIGURES 5, 6

*Daphnellinae* sp.—Maes, 1967:142, pl. 16: fig. B.

DIAGNOSIS.—Shell small, grayish white to grayish yellow, more slender than *M. trichodes* with a paler protoconch whose last whorls are more strongly angulate and possess fewer and stronger axial ribs.

RANGE.—Tuamotus and Easter Island, probably to Indonesia.

DESCRIPTION.—Shell small, from 2.2 to 3.4 mm in height elongately fusiform, turreted, whorls strongly and spinosely angulate at the shoulder, the axial ribs forming with the spiral cords a spinose clathrate sculpture; color glassy grayish white or grayish yellow with occasional scattered reddish brown spots on the spines



FIGURE 12.—*Microdaphne morrisoni*, new species, USNM 711825, protoconch,  $\times 400$  [Raroia, Tuamotus]. (Photo reproduced at 78%.)

and the peripheral row of spines often opaque white. Protoconch polygyrate with first  $1\frac{1}{4}$  whorls papillate and spirally lirate, the following 3 whorls with rather strong axial ribs, which number 16 on the last nuclear whorl, and which are strongly but roundly angulate at the periphery, the shoulder ramp rather broad and slightly concave in profile; lip of protoconch with a deep subsutural sinus. Teleoconch of holotype with 3 whorls, which have 2 small spiral cords below the large peripheral one, all of which form strong spines at the juncture with the axial ribs, those on the shoulder being strongest on the spire whorls while on the last whorl the one below or peripheral cord bears the largest spines; there is a low cord with short triangular spines above the shoulder cord and a fine spinose cord between the shoulder and peripheral cords; on the last whorl there are 3 decreasingly smaller cords below the peripheral cord, and 3 on the anterior neck, all of which are spinose. The outer lip with a deep rounded, U-shaped sinus at the suture, a strong spinose varix behind the lip edge and 6 denticles within; anterior canal moderately long.

**MATERIAL.**—Holotype: beach drift, Motu Mataira, Raroia, Tuamotu Islands, USNM 758390. Paratypes: From the Tuamotu Islands, 14 lots from Raroia, 1 lot from Makatea, all USNM; from Easter Island, 5 specimens, stas E-18A and 27-A.

**MEASUREMENTS.**—

	<i>width</i>	<i>height</i>
USNM 758390 holotype Raroia	1.63	3.20
USNM 723594 paratype Raroia	1.60	3.02
USNM 629763 paratype Makatea	1.46	2.82
USNM 711601 paratype Raroia	1.29	2.68
USNM 756266 paratype Easter Island	1.23	2.28
USNM 711601 paratype Raroia	1.13	2.20

**REMARKS.**—In worn examples the spines on the shoulder angle of the spire whorls are not as long or acute as in fresh specimens; this is the case in the Easter Island shells that I have examined. The Easter Island specimens have a yellowish tinge, quite different from the white and grayish white of the Raroia individuals but this is probably indirectly due to the influence of the weathered lateritic soil of the island.

This species is very close to the type-species of *Microdaphne*, the Panamanian *M. trichodes* (Dall, 1919), and for a time I considered the Polynesian species to be only subspecifically distinct. The constant difference in the protoconchs of the two species leads

me to believe that the lineages of the two species have been distinct for some time, and the strong resemblance in their sculpture is the result of convergence arising from primitive genetic similarities.

The species described and figured by Maes, from Cocos-Keeling Islands, as “*Daphnellinae* sp.” (Maes, 1967:142, pl. 16: fig. B) appears to be identical to the new species. McLean (1971:130) felt that it was the same as *M. trichodes*.

**ETYMOLOGY.**—Named for Dr. Joseph P. E. Morrison, who collected most of the specimens on which this description is based and whose collecting activities on Raroia Atoll, Tuamotu Islands, in 1952 resulted in the most extensive collection ever made in one small area in Polynesia, and probably in the world.

**Genus *Kermia* Oliver, 1915**

*Kermia* Oliver, 1915:539.—Powell, 1966:134. [Type-species: *Kermia benhami* Oliver, 1915; original designation.]

*Clathurina* Melvill, 1917:185.—Powell, 1966:134. [Type-species: *Pleurotoma foraminata* Reeve, 1845; original designation.]

**DIAGNOSIS.**—This genus is distinguished by its elongate, subcylindrical shape, more or less reticulate sculpture, and its deep U-shaped, subsutural sinus, with the sutural margin drawn forward and heavily calloused; the protoconch has the last whorl coarsely diagonally reticulate.

***Kermia crassula*, new species**

PLATE 11: FIGURE 2

**DIAGNOSIS.**—A small stout species averaging somewhat smaller than *K. benhami* from the Kermadecs, broader with the sculpture coarser with spiral cords fewer in number and the nodes at the intersections of the axial and spiral cords strongly nodose.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell small, 2.43 to 3.18 mm in height, elongately ovate, grayish brown in color with the subsutural and fourth spiral row of nodes down from suture of a grayish white color, the latter row not always completely paler in color. Protoconch of 3 whorls, conical, brownish orange to orange yellow, earliest whorl sometimes darker suprasuturally; first  $1\frac{1}{4}$  whorl smooth, the following whorls marked by

rather coarse diagonally cancellate sculpture. Teleoconch with  $3\frac{1}{2}$  to 4 whorls (4 in holotype), sculptured with equally strong axial ribs and spiral cords, the axial ribs numbering 13 on the penultimate whorl, strongly nodose where they are crossed by the three spiral cords on the spire whorls; the last whorl has 8 nodose spiral cords with 2 or 3 subobscure rugose cords on the siphonal fasciole; columellar lip rather flattened, outer lip with a deep U-shaped subsutural sinus, its mouth margined at the suture with a prominent callosity; internally the rather thick outer lip bears 5 denticles; siphonal canal broad.

**MATERIAL.**—Holotype: Vaihu, 1958, R. Vargas D., MNSH 200397. Paratypes: 6 specimens, Vaihu, 1958, R. Vargas D., MNSH 200465; 2 specimens, Vaihu, 1958, R. Vargas D., USNM 758383; 1 specimen, sta E-27A, USNM 756257.

**MEASUREMENTS.**—

	<i>width</i>	<i>height</i>
MNSH 200397 holotype	1.29	3.18
MNSH 200465 paratype	1.20	2.80
USNM 758383 paratype	1.25	2.74
USNM 758383 paratype	1.15	2.72
MNSH 200465 paratype	1.01	2.48
MNSH 200465 paratype	1.10	2.46
MNSH 200465 paratype	1.04	2.43

**REMARKS.**—This species differs greatly from any other known member of the genus by reason of its small size, rather broad shape, and strong sculpture.

**ETYMOLOGY.**—From the Latin *crassus* (broad or thick) plus *ula* (diminutive).

***Kermia sagenaria*, new species**

PLATE 11: FIGURE 1

**DIAGNOSIS.**—Shell from 5.5 to 8 mm in height, elongate-ovate, with rather deep sutures and conspicuously but coarsely cancellate, the axial ribs more widely separated than the spiral cords. Resembles *K. subcylindrica* (Hervier, 1896) from Lifu, but relatively broader with the sculpture somewhat coarser, and the spiral cords less numerous on the last whorl; the last whorl is not subangulate on the base.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell from 5.5 to 8 mm in height, elongately ovate, whorls subsuturally somewhat shouldered,

sutures impressed; grayish white with no apparent color markings in the dead shells examined except that the rather large nodes on the cord at the angle of the shoulder are opaque white. Protoconch of 3 whorls, conical, yellowish brown, the first  $1\frac{1}{4}$  smooth, the remaining ones ornamented with the typical diagonally reticulate sculpture. Teleoconch with  $5\frac{1}{2}$  whorls (holotype), ornamented with strong axial ribs (14 in the penultimate whorl) crossed by 5 spiral cords in the whorls of the spire, the resulting interspaces being wider than high; occasionally a weak spiral cord is present on the shoulder ramp between the suture and the shoulder cord; the intersections of ribs and cords moderately nodulose with those on the shoulder cord stronger than the others; the last whorl has 8 spiral cords from the shoulder up to the siphonal fasciole, which is marked by 4 spiral ridges; there is no trace of any microsculpture in the interspaces. Outer lip with a strong and deep typical subsutural U-shaped notch, the upper sutural border heavily callosed; the rest of the lip is thick, marked by a strong varix externally and by 7 denticles internally, the terminal ones at the lower margin of the labial sinus and the outer margin of the siphonal canal being larger than the other ones; siphonal canal deep and moderately broad.

**MATERIAL.**—Holotype: sta E-30, USNM 756115. Paratypes: sta E-30, USNM 758385; S. Englert, CAS 58699.

**MEASUREMENTS (mm).**—

	<i>width</i>	<i>height</i>
USNM 756115 holotype	3.22	7.94
CAS 58699 paratype	2.78	6.29
USNM 758385 paratype	2.45	5.56

**REMARKS.**—As mentioned above *Kermia subcylindrica* (Hervier, 1896) from Lifu, Loyalty Islands, most closely resembles the present species, but is relatively narrower, has a yellowish color band about the whorls, finer sculpture, with more spiral cords on the last whorl, 10 instead of 8.

**ETYMOLOGY.**—From the Latin, *sagena* (net).

**Family CONIDAE Rafinesque, 1815**

**Genus *Conus* Linné, 1758**

*Conus* Linné, 1758:712. [Type-species: *Conus marmoreus* Linné, 1758; Children, 1823.]



*Conus miliaris pascuensis*, new subspecies

PLATE 9: FIGURES 21, 22

*Conus militaris* [sic] Hwass.—Dall, 1908a:437. [Not *Conus miliaris* Hwass, 1792.]

*Conus* sp.—Fuentes, 1914:316.—Knoche, 1925:152.

*Conus miliaris* Hwass.—Odhner, 1922:248.—Lamy, 1936:267; 1938:134.—Steele, 1957:111.—Kohn and Riggs, 1975:348–359. [Not *Conus miliaris* Hwass, 1792.]

**DIAGNOSIS.**—Differs from typical *Conus miliaris* Hwass, 1792, in possessing a higher spire, a narrower last whorl relative to its length, fewer tubercles on the shoulder of the last whorl, and fewer spiral striae on the spire; the shell is also darker in color with the spiral lines of reddish brown dots stronger and darker.

**RANGE.**—Easter Island.

**DESCRIPTION.**—Shell of medium size, generally ranging from 16 to 38 mm in height, broadly obconic, with a moderately low conical spire that is indistinctly convex; last whorl gently convex below shoulder and at the base slightly concave abaperturally. Color of last whorl strong or medium yellowish brown to medium brown with two pale irregular spiral bands or series of blotches on the side and a third at the angulate and nodose shoulder; frequently there are irregular dark blotches in the upper half of the shell; below the shoulder is a series of about 18 to 21 spiral rows of reddish brown dots; between the nodes on the shoulder and spire are reddish brown blotches. Protoconch paucispiral, mamillate, consisting of 1½ smooth, somewhat deviated whorls, first 4½ postnuclear whorls with a low shoulder and axial sculpture evanescent, subsequent whorls with irregular axial riblets and 2 to 4 spiral grooves with the suprasutural angulation rather distantly nodose; the last whorl of the holotype has 15 nodes on the shoulder; below the shoulder the last whorl has shallow spiral grooves that become stronger on the base where they separate rather prominent subnodulose lirae. Periostracum thin, yellowish brown in color. Outer lip slightly thickened internally with short shallow grooves marking the location of the external broad cords, the grooves colored with reddish brown except in the area of the light bands on the last whorl.

**HABITAT.**—In tide pools, on sandy alga-bound bottom, among rubble.

**MATERIAL.**—Holotype: Hanga Piko, E. Pakarati, USNM 766496. Paratypes: 154 specimens from stas E-4, E-8, E-11,

E-15, E-16, E-17, E-18, E-18A, E-24, E-25, E-27, E-28, E-29, E-31, E-33, E-35, E-36; 1 specimen, Hanga Roa Tai, B. Alarcón, USNM 756348; 3 specimens, off Hanga Piko, in 3 to 7 ft (0.9 to 2.1 m), bottom rocky with some sand, 18 Jan 1969, J. E. Randall, BPBM 206935; 1 specimen, in tide pool between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206945; 1 specimen, in 40 ft (12.0 m), on sand, off S end Hanga Roa, 10 Feb 1969, J. E. Randall, BPBM 206966; 8 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 4 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200250, 200436; 2 specimens, Ovahe, 1958, R. Vargas D., MNSH 200433; 6 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200249; 1 specimen, La Perouse Bay, 1958, R. Vargas D., MNSH 200434; 4 specimens, Aug 1968, H. G. Richards, ANSP 321104; 9 specimens, Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317421; 3 specimens, Tupa of Hiramoko (archeological site), near Anakena Bay, 1955–56, W. Mulloy, USNM 758546, 758547, 758548; 7 specimens, Dec 1940, USBF Str. *Albatross*, USNM 204069; 3 specimens, S. Englert, CAS 58702–58704; 1 specimen, S. Englert, CAS 58705.

**MEASUREMENTS** (mm).—Apex of USNM 756348 broken, hole in shell, affecting height measurement.

	width	height
USNM 766496 holotype	14.95	25.98
USNM 758546 paratype	21.68	37.86
USNM 756348 paratype	22.95	35.82+
USNM 756056 paratype	17.77	31.76
USNM 756103 paratype	15.44	24.75
USNM 756103 paratype	16.09	23.12
USNM 756103 paratype	13.62	23.10
USNM 756103 paratype	11.92	22.60
USNM 756103 paratype	13.70	22.52
USNM 756103 paratype	14.02	22.00
USNM 756103 paratype	9.62	16.28
USNM 756103 paratype	8.14	13.90

49 specimens collected in one locality, Haka Ea (sta E-18) were measured and found to range from 30.55 to 13.90 mm in height, and from 18.80 to 8.14 mm in width; the average height was 22.28 mm and average width 13.56 mm.

**REMARKS.**—The differences between this Easter Island race of *Conus miliaris* Hwass, 1792, and the nominate form from the rest of the Indo-Pacific region have been summarized in the diagnosis above and also have been discussed at greater length in a recent paper by Kohn and Riggs (1975).

This is one of the more abundant species found at Easter Island. It feeds on polychaetes belonging to four families (Kohn and Lloyd, 1973:706–708).

ETYMOLOGY.—From the Latin *pascuensis* (inhabiting Isla de Pascua).

***Conus nanus* Sowerby, 1833**

*Conus nanus* Sowerby, 1833a, pt. 24, fig. 6 [Lord Hood's Island (= South Marutea)].—Broderip and Sowerby, 1833b:53.—Salvat and Rives, 1975:346, fig. 327.

DIAGNOSIS.—A small species, reaching about 25 mm in height, obconic, basically white with the anterior tip suffused with purplish blue which is present also in the lower half of the interior of the outer lip; the anterior half of the shell is obscurely darker and an obscure dark band is present about midway between shoulder and anterior end; occasionally pale irregular brownish splotches are seen in the middle of the last whorl. The low conical spire is strongly knobbed, with rather strong axial growth lines and without spiral grooves; weak spiral lirae that are present on the last whorl become somewhat stronger near the base.

RANGE.—Ryukyus and Queensland east to Hawaii and Easter Island; possibly occurring also in the Philippines. Records of it being found in the Indian Ocean should be regarded as doubtful.

HABITAT.—Not known but probably in tide pools on sandy substrate.

MATERIAL.—4 specimens, Ko Te Riku, E of Hanga Piko, B. Alarcón; USNM 756343.

MEASUREMENTS (mm).—

	width	height
USNM 756343	14.18	24.65
USNM 756343	13.29	23.95
USNM 756343	14.00	23.79
USNM 756343	13.08	22.68

REMARKS.—These 4 specimens are above the average size for this species, which is found abundantly in Polynesia.

*Conus nanus* Sowerby has been thought by some to be a synonym or a subspecies of *C. sponsalis* Hwass (Kohn, 1959:390–391), or a synonym of *C. ceylanensis* Hwass (Pease, 1868d:126). In my opinion it is sufficiently different from either to be considered a distinct species.

***Conus ebraeus* Linné, 1758**

*Conus ebraeus* Linné, 1758:715 [India].—Salvat and Rives,

1975:168, 345, fig. 321.—Hinton, 1972:72, pl. 35: fig. 12.

DIAGNOSIS.—A common Indo-Pacific species characterized by its broadly obconic shape, generally depressed spire, and its color pattern of spiral rows of squarish deep red brown spots on a whitish or yellow (periostracum) background.

RANGE.—Entire Indo-Pacific Region.

MATERIAL.—1 specimen, La Perouse Bay, 1958, R. Vargas D., MNSH 200435.

REMARKS.—I have seen only one specimen from Easter Island of this species, which is very abundant in Polynesia.

**Family TEREBRIDAE Mörch, 1852**

**Genus *Acuminia* Dall, 1908**

*Terebra*, subgenus *Acuminia* Dall, 1908b:124,125 [Type-species: *Buccinum lanceatum* Linné, 1767; original designation.]

REMARKS.—In shell characters the members of this group, comprising at the present time, besides the type-species, only *A. penicillata* (Hinds, 1844) and *A. venosa* (Hinds, 1844), are close to those of *Hastula* H. and A. Adams, 1853. In *Hastula*, however, the sculpture is stronger, the suture more pronounced and the protoconch seems to vary between being multi-spiral and more or less acuminate and paucispiral with a dome-shaped apex. Until the radula of *H. strigilata* (Linné, 1767), the type-species, or that of a closely related species is known I retain *Acuminia* as a distinct genus because of the characteristic radula.

Cernohorsky and Jennings (1966:61) have described and figured the radula of *A. penicillata* (Hinds). The teeth consist of a pair of slender, tapering and slightly curved teeth with a rounded broadened base.

***Acuminia venosa* (Hinds, 1844), new combination**

*Terebra lanceata* Lamarck [sic], var.—Kiener, 1838:20 [in part], pl. 10: fig. 22b.

*Terebra venosa* Hinds, 1844a:157; 1844b:179, pl. 44: fig. 90.—Lamy, 1936:267; 1938:134.—Steele, 1957:111. [Easter Island, here designated.]

*Hastula penicillata* (Hinds).—Cernohorsky, 1971b:212, pl. 54: fig. 406. [Not *Terebra penicillata* Hinds, 1844.]

**DIAGNOSIS.**—A rather small, subulate species, smooth except for low obscure and distant axial ribs more pronounced subsuturally and in the earliest post-nuclear whorls; suture fine, impressed; white in color with narrow, irregular axial streaks of chestnut brown that are absent or weak on the upper part of the whorl, resulting in a pale subsutural band; aperture patulous below with a broad anterior sinus.

**RANGE.**—Known from Mauritius, Fiji, Kermadec Islands, Austral Islands, and Easter Island. In Fiji it is found with *A. penicillata* (Hinds).

**HABITAT.**—In sand just below tide line at beach at Anakena, one of the two sand beaches on the island.

**MATERIAL.**—95 specimens, stas E-35A, USNM 756065; 2 specimens, beach at Anakena, S. Englert, USNM 607128; 6 specimens, beach at Anakena, S. Englert, USNM 711471; 11 specimens, beach at Anakena, 14 Jan 1965, I. Efford, UBC 6344; 25 specimens, Anakena, 1958, R. Vargas D., MNSH 200311, 200314; 61 specimens, Feb 1968, M. Codoceo, MNSH 200310; 2 specimens, 9 Apr 1956, V. Valencia D., MNSH 200287; 2 specimens, 1954, Prof. Baeza, MNSH 200312; 12 specimens, 14 Feb 1969, J. E. Randall, BPBM 206967; 13 specimens, Oct 1968, P. C. McCoy, ANSP 315550; 6 specimens, 1 Aug. 1957, J. Pellisier, UCC; 37 specimens, S. Englert, CAS.

**MEASUREMENTS.**—164 specimens from Easter Island, both from the beach at Anakena and from kitchen midden material at one of the archeological sites, were measured. These ranged from 33.7 mm to 10.2 mm in length, and the average length was 20.3 mm. Ninety-five living specimens collected within the space of one hour at the beach at Anakena without size discrimination, ranged in length from 29.15 mm to 10.56 mm, and averaged 17.3 mm. The specimens from Easter Island appear to average smaller than those from other parts of the range of this species.

**REMARKS.**—This species is closest to *A. lanceata* (Linné, 1767) and *A. penicillata* (Hinds, 1844), and has indeed been put into the synonymy of the latter species by some recent authors (Cernohorsky and Jennings, 1966:61; Cernohorsky, 1971b:212). I am inclined, however, to maintain them as distinct species, *A. venosa* having a more slender spire, and darker coloration, with a pronounced broad, pale subsutural band and darker axial strigations.

Salvat and Rives (1975:364) have recently recorded *A. penicillata* (as *Hastula penicillata*) from the Marquesas, and the figure given by them resembles at first glance a dark form of *A. venosa*. They describe

the whorls of this species, however, as possessing axial ribs and a line of punctae a third of the way down from the suture. Specimens of this form collected by R. L. Sixberry in Taiohae Bay on Nuku Hiva show that this Marquesan species is related to or identical with *Hastula (Punctoterebra) betsyae* R. D. Burch, 1965, from the Hawaiian Islands. The Marquesas shells are smaller and darker in coloration than the specimens from Hawaii.

Specimens from the Kermadec Islands in the NMNH collections are uniformly darker and may represent a distinct race.

Hinds was ignorant of the habitat of his new species, which he described from the collection of Hugh Cuming. Three syntypes are present in the British Museum (Cernohorsky, 1969:221) of which the holotype measures 35.0 mm and one of the paratypes 34.9 mm; the third specimen, smaller and darker, is very likely a later addition since it has the appearance of a member of the more darkly colored population from the Kermadec Islands. The holotype and the larger of the paratypes are of a size larger than any of the more than one hundred specimens I have seen and measured. However, the largest ones I have seen come from Easter Island; a somewhat damaged specimen is estimated to have measured about 33.7 mm in length when complete. As it is one of the more abundant species on Easter Island, and as it is very likely that it was collected there during the visit of HMS *Blossom* in 1825 (Rosewater, 1968:351) and then came into the collections of Hugh Cuming, I designate Easter Island as the type locality of *Terebra venosa* Hinds, 1844.

#### *Egentelaria*, new genus

**DIAGNOSIS.**—Shell moderately long, subulate, with straight sides and flattened whorls, and a rather truncate base; whorls sculptured with more or less distant axial ribs that may become evanescent towards the base of the whorls, with a pale band below the suture and one around the periphery of the body whorl. Aperture basally somewhat patulous, outer lip rather strongly sigmoidally curved at the suture, forming a rather narrow posterior sinus. Operculum broadly oval, nucleus in middle of inner side, with distant rugose growth lines.

This group is most closely related in shell characters

to *Impages* E. A. Smith, 1873; it seems to differ from the latter in the aperture flaring more at the base, the outer lip being more arcuate near the suture, thus resulting in a rather narrow posterior sinus. The principal difference, however, between the two groups is that *Impages* has radular teeth in the form of a hollow tube with barb and connected with a poison gland, while *Egentelaria* has neither radular teeth nor a radular sac. Another important difference is in the operculum; that of *Impages* is broadly oval with the nucleus terminal at the inner angle of the broad base, while that of *Egentelaria* is broadly oval with the nucleus in the middle of the inner edge.

The type-species, *Terebra stylata* Hinds, 1844, has generally been placed in *Hastula* H. and A. Adams, 1853, but the radular characters of the type-species *H. strigilata* (Linné, 1758) are unknown, and the latter differs from *E. stylata* in several important shell characters.

TYPE-SPECIES.—*Terebra stylata* Hinds, 1844.

ETYMOLOGY.—From the Latin *egenus* (lacking) plus *telum* (dart) plus *aria* (agent), that which lacks a dart.

***Egentelaria stylata* (Hinds, 1844),  
new combination**

*Terebra stylata* Hinds, 1844a:152 [Japan, Philippine Islands]; 1844b:161, pl. 44: fig. 79.

*Terebra inconstans* Hinds.—Lamy, 1936:267; 1938:134.—Steele, 1957:111. [Not *Terebra inconstans* Hinds, 1844.]

*Hastula stylata* (Hinds).—Cernohorsky, 1971b:214, pl. 54: fig. 410.—Salvat and Rives, 1975:364, fig. 398.

DIAGNOSIS.—This species is characterized by its subulate form, flat-sided spire, and broad base; its coloration is generally dark, brownish gray to deep chestnut brown, with a white subsutural band of varying width, and irregular elongate chestnut splotches at the lower margin of the white subsutural band, the splotches sometimes in the form of clustered streaks, sometimes conjoined and forming a more or less continuous irregular band. The protoconch has  $3\frac{1}{2}$  whorls and is mamillate with a low, pointed apex. The last whorl has a distinct, sharply delineated white band. The whorls are distant, low but rather acute axial ribs that are evanescent on the lower part of the whorl. The aperture is acutely triangular, with a narrow sinus at the suture formed by the outer lip being

rather strongly arcuate subsuturally; the anterior sinus broad, the anterior end of the outer lip patulous. Operculum small, broadly ovate with strong growth ridges and a mediolateral nucleus.

RANGE.—Bonin Islands, Philippines, Fiji, Tahiti, Marquesas, and Easter Island. I have seen specimens labeled as coming from the Seychelles but this locality needs to be verified.

HABITAT.—In sand near tide line on beaches; on Easter Island found together with *Acuminia venosa* (Hinds).

MATERIAL.—3 specimens, sta E-35A, USNM 756066; 3 specimens, Anakena, 1958, R. Vargas D., MNSH 200442, 200443; 4 specimens, 1958, R. Vargas D., MNSH 200456; 3 specimens, 1934, A. Metraux, MNHN; 22 specimens, S. Englert, CAS.

MEASUREMENTS (mm).—

	length	width
MNHN	42.48	9.10
MNHN	41.38	8.95
USNM 756066	35.25	8.12
USNM 756066	30.62	6.86
USNM 756066	27.84	6.50

REMARKS.—The localities cited by Hinds in his original description of this species are Japan and the Philippines. It is not known from the main Japanese Islands, but does occur in the Bonin Islands. It is apparently rare in the Philippines, as I have seen only one worn specimen.

Family PYRAMIDELLIDAE Gray, 1840

Genus *Odostomia* Fleming, 1813

*Odostomia* Fleming, 1813:76.—Wenz, 1940:855. [Type-species: *Turbo plicatus* Montagu, 1803; Woodward, 1851.]

*Odostomia* species

REMARKS.—Twenty-five specimens were found in sand at sta E-27A that I assign to *Odostomia* sensu lato with some doubt. They agree with this genus in general form, in having a stout fold on the columella, and in the absence of strong sculpture. Because the specimens are all more or less worn I hesitate to describe them as representing a new species. I follow this course of action particularly since they closely



resemble an undescribed species from Hawaii that has marked axial riblets on the early postnuclear whorls, and some of the less worn specimens from Easter Island faintly show what appears to be axial riblets on these early whorls. Both Hawaiian and Easter Island shells show one or more spiral grooves on the penultimate whorl and between the suture and periphery on the last whorl. Some of the specimens show pronounced spiral lirae within the outer lip, but in others they seem to be absent.

Until fresh, living material is collected it is difficult to assign this species to the proper subgenus (or genus). I mention it only to call attention to its presence at Easter Island.

### Family RETUSIDAE Thiele, 1926

#### Genus *Retusa* Brown, 1827

##### Subgenus *Cylichnina* Monterosato, 1884

*Cylichnina* Monterosato, 1884:143. [Type-species: *Bulla umbilicata* Montagu, 1803; Cossmann, 1895.]

*Cylichnania* Marwick, 1931:153. [Type-species: *Cylichnania bartrumi* Marwick, 1931; original designation.]

*Ventomnestia* Iredale, 1936:333. [Type-species: *Ventomnestia colorata* Iredale, 1936; original designation.]

*Retusa*, subgenus *Ventomnestia* Iredale.—Habe, 1950:12.

*Cylichna*, subgenus *Cylichnania* Marwick.—Zilch, 1959:24.

*Retusa*, subgenus *Cylichnina* Monterosato.—Wenz, 1959:46.

REMARKS.—I can find no valid characters differentiating *Cylichnania* Marwick from *Cylichnina*.

I follow most recent authors in placing *Cylichnina* as a subgenus of *Retusa*, although the umbilicate apical area gives it a quite distinctive appearance. It is possible that an examination of the soft parts of the tropical Indo-Pacific species may show that they are distinct from typical *Cylichnina*. In this case *Cylichnania* Marwick may be available as a name for this group.

#### *Retusa (Cylichnina) pusilla* (Pease, 1860), new combination

##### PLATE 11: FIGURE 10

*Haminea pusilla* Pease, 1860a:20 [Sandwich Islands].—Kay, 1965:9, pl. 9: fig. 1.

*Mnestia pusilla* (Pease).—Pilsbry, 1921b:366, fig. 5.

DIAGNOSIS.—Shell small, from 3.5 to 6 mm in height, relatively solid, broadly cylindrical, narrowed anteriorly and posteriorly, more or less flattened or even occasionally slightly concave medially; narrowly and deeply perforate apically with the perforation surrounded by a broadly rounded keel; narrowly umbilicate with the inner lip partly reflected over the umbilicus. Surface sculptured by fine, somewhat wavy and irregular spiral grooves with occasional finer grooves between, crossed by fine axial furrows, rendering the surface finely and irregularly cancellate, the axial grooves apically more crowded and coarser. Color greenish yellow to olive brown, usually irregularly maculated with white and occasionally with narrow, zigzag streaks of reddish brown; the apical portion, including the rounded keel is white, and there are 2 irregular whitish spiral bands at one- and two-thirds of the shell length, the upper one narrower or occasionally absent. Aperture narrow, outer lip posteriorly thickened and arcuate, and anteriorly broadly rounded, with the inner lip reflected over the umbilicus, and the columella either slightly slanting or almost straight, with an obscure fold at the base.

RANGE.—Hawaiian Islands and Easter Island.

MATERIAL.—7 specimens from stas E-10A and E-18A; 1 specimen, tide pool, S end of Hanga Roa, J. E. Randall, BPBM 206975; 5 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200395; 1 specimen, Aug 1968, H. G. Richards, ANSP 321079; 2 specimens, S. Englert, CAS.

##### MEASUREMENTS (mm).—

	width	height
CAS	2.90	6.06
USNM 755997	2.39	4.89
USNM 755997	2.24	4.54
USNM 755997	2.13	4.49
USNM 755997	2.15	4.47

REMARKS.—Although both Pease and Kay describe this species as being white, and Pilsbry mentions only "some indistinct brownish markings" (Pilsbry, 1921b:366), an examination of Hawaiian specimens collected by Thaanum and in the National Museum of Natural History show faintly the yellowish coloring and the indistinct banding seen more clearly in the Easter Island material. I feel that fresh specimens from Hawaii will reveal this same pattern, and since in all other particulars the shells are similar I have little hesitation in allocating the shells from Easter Island to the Hawaiian species.

*Cylichna villica* Gould, 1859, from the China Seas is very close but the holotype shows the apical portion strongly rugose. Further material from southern Japan, Taiwan, and the southern coast of China should help determine the range of variation in *Retusa* (*Cylichnina*) *villica* (Gould), and its exact relationship to *R. (C.) pusilla* (Pease).

#### Family SMARAGDINELLIDAE Thiele, 1925

REMARKS.—The genus *Smaragdinella* A. Adams, 1848, and those genera usually placed near it have been placed by most recent authors in the family Atyidae in a distinct subfamily. Marcus and Burch (1965:236) appear to have been the first to raise this group to familial rank. For a discussion of this family see Marcus and Marcus (1970:185), and Rudman (1972:206–208). The family name Atyidae cannot be used in any case as it is preoccupied by Atyidae de Haan, 1849, in Crustacea (Decapoda: Caridea); the latter family name was placed on the "Official List of Family Group Names in Zoology" by the International Commission on Zoological Nomenclature in Opinion 470. The molluscan family name seems to have been proposed first by Thiele, 1926. Furthermore there is an early name for this family, namely Haminoecidae Pilsbry, 1895 (as Hamineinae, of the family Akeridae). To my knowledge the only authors to use this correct name are Kuroda, Habe, and Oyama (1971:288).

#### Genus *Smaragdinella* A. Adams, 1848

*Smaragdinella* A. Adams, 1848:475–476. [Type-species: *Bulla viridis* Quoy and Gaimard (ex Rang), 1833 (= *Bulla calyculata* Broderip and Sowerby, 1829); original designation.]

#### *Smaragdinella calyculata* (Broderip and Sowerby, 1829)

##### PLATE 10: FIGURE 3

*Bulla calyculata* Broderip and Sowerby, 1829:369–370 [Pitcairn Island].

*Bulla viridis* Quoy and Gaimard (ex Rang), 1833:350–352, pl. 26: figs. 13–16 [Guam, Marianas].

*Bulla glauca* Quoy and Gaimard, 1833:352–353, pl. 26: figs. 10–12 [New Ireland].

*Linteria acuminata* Sowerby, 1870, pl 1: sp. 2 [Guadeloupe; Sandwich Islands].

*Smaragdinella viridis* (Quoy and Gaimard).—Pilsbry, 1895: 258–259, pl. 33: figs. 42, 53, 54.—Dall, 1908a:437.—Odhner, 1922:248.—Lamy, 1936:267; 1938:134.—Steele, 1957:111.

*Smaragdinella calyculata* (Broderip and Sowerby).—Rudman, 1972:201–206.

DIAGNOSIS.—This tectibranch has a very characteristic shell that is usually of a dark green color but often brown. The columella, broad entering plate, and apical tip are whitish. When living, the external shell covers only a part of the animal.

RANGE.—From southern Japan and Indonesia west to Hawaii and Easter Island. It has also been reported from Mauritius and Réunion.

HABITAT.—This small tectibranch is found on surf swept rocks and in tide pools crawling on and among seaweed. Occasionally it is very abundant locally.

MATERIAL.—17 specimens from stas E–10A, E–14, E–18A, E–27A; 1 specimen in tide pool, 0 to 8 in (0 to 20 cm) depth, between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 206958; 2 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200445; 19 specimens, 1958, R. Vargas D., MNSH 200446; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204072; 1 specimen, S. Englert, CAS; 2 specimens, S. Englert, CAS; 2 specimens, Aug 1968, H. G. Richards, ANSP 321083.

#### MEASUREMENTS (mm).—

	width	height
USNM 756009	7.25	10.54
USNM 756223	6.38	8.54
USNM 756009	5.00	6.89

#### Genus *Phanerophthalmus* A. Adams, 1850

*Cryptophthalmus* Ehrenberg, 1828, signature h.

*Phanerophthalmus* A. Adams, 1850:559, 599. [Type-species: *Bulla lutea* Quoy and Gaimard, 1833.]

*Lathophthalmus* Pruvot-Fol, 1932:750; 1934:30.—Rudman, 1972:190. [New name for *Cryptophthalmus* Ehrenberg, 1828, preoccupied by *Cryptophthalmus* Rafinesque, 1814.]

REMARKS.—Pruvot-Fol (1934:30) states that *Phanerophthalmus* A. Adams, 1850, and *Lathophthalmus* Pruvot-Fol, 1932 (new name for *Cryptophthalmus* Ehrenberg, 1828 [not *Cryptophthalmus* Rafinesque, 1814]) are possibly synonymous; therefore his substitute name *Lathophthalmus* may be unnecessary. The shells are basically the same, and the differences in

external characters are in the extent of the approximation of the parapodial edges and in the presence or absence of a mantle foramen (Marcus and Marcus, 1970:185). In a recent study, Rudman states that differences between the type species of both genera are so slight that he unites both under the older name (Rudman, 1972:190).

### *Phanerophthalmus* species

REMARKS.—One shell belonging to this species was found in drift sand at sta E-27A. The shell agrees in shape with specimens in the USNM collection found on Raroia Atoll, Tuamotus, and Ofu, Manua Group, American Samoa.

The Easter Island shell is 2.6 mm high, while one of the Samoan shells measures 3.7 mm.

Until shells of this shape can be directly related by dissection to a complete animal a definite identification is impossible. Could it be that these Polynesian shells are assignable to *Cryptophthalmus cylindricus* Pease, 1861, from Tahiti, whose shell was not described by Pease? The species has not been recorded since its original description.

## Family SIPHONARIIDAE Gray, 1840

### Genus *Siphonaria* Sowerby, 1824

*Siphonaria* Sowerby, 1824, pt. 21.—Hubendick, 1946:18.  
[Type-species: *Siphonaria siphonaria* Sowerby, 1824 (= *Patella javanica* Lamarck, 1819); Gray, 1847.]

REMARKS.—The following new species I place in the genus *Siphonaria* sensu lato as sufficient preserved material is not available to permit determination of the proper subgenus.

### *Siphonaria pascua*, new species

PLATE 12: FIGURES 4-7

*Siphonaria pica* Sowerby.—Odhner, 1922:238.—Lamy, 1936:268; 1938:142.—Steele, 1957:112. [Not *Siphonaria pica* Sowerby, 1835.]

DIAGNOSIS.—A small species, from about 3.5 to 8.2 mm in length, low conical, bluish black to reddish brown black, with from 17 to 48 rounded, whitish axial ribs of varying strength; the siphonal area

marked by 2 usually rather conspicuous approximated ribs. Interior dark reddish brown to blackish red with the margin spotted with white at the rib endings.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, usually about 4.8 to 8.2 mm in length, generally broadly elliptical in outline with a central apex, protoconch capuliform with incurved apical part directed to rear and slightly to the left, blue-black in color and smooth except for fine growth lines. Early part of teleoconch with low broad ribs crossed by irregular and crowded growth lines; ribs in last part of shell generally become whitish or yellowish white in color; ribs vary greatly in strength and number, with usually 13 to 18, often somewhat irregular major ribs with smaller ones in between, the total number sometimes reaching nearly 50; the siphonal area is marked by two approximated, usually rather prominent, white ribs. The interior is dark reddish brown to blackish red, the margin marked by separated whitish spots indicating the ends of the ribs.

HABITAT.—On rocks at shore line.

MATERIAL.—Holotype: S. Englert, CAS 58706. Paratypes: 30 specimens from stas E-10A, E-18A, E-27A, E-30, E-34; 6 specimens, S. Englert, CAS 58707-58712; 1 specimen, S. Englert, CAS 58713; 30 specimens, 1958, R. Vargas D., MNSH 200444.

### MEASUREMENTS (mm).—

	length	width	height
CAS 58706 holotype	8.07	6.16	2.74
CAS 58707 paratype	8.20	6.18	2.66
USNM 756167 paratype	6.89	5.14	2.62
USNM 755116 paratype	6.24	4.13	2.11
USNM 755116 paratype	5.92	4.45	2.30
USNM 756224 paratype	5.46	4.25	2.16
USNM 756224 paratype	4.83	3.60	1.81

REMARKS.—Although I hesitated for a while before describing this new species of *Siphonaria*, an exhaustive search of collections at my disposal and of the literature revealed no described species with which *S. pascua* might be confused. It is distinctive by reason of its relatively small size, possession of rather broad, rounded, whitish ribs, and the very dark interior. It should not be a surprise to anyone to find a new species of the *Siphonaria* in such an isolated place as Easter Island.

ETYMOLOGY.—From the Spanish name for the Island, Isla de Pascua.

### Genus *Williamia* Monterosato, 1884

*Piliscus*, subgenus *Allerya* Mörch, 1877a:210; 1877b:99. [Not *Allerya* Bourguignat, 1878.]  
*Williamia* Monterosato, 1884:150.—Hubendick, 1946:70.—Zilch, 1959:84. [Type-species: *Ancylus gussoni* Costa, 1829; Cossmann, 1895.]

REMARKS.—Neave (1940:657) was the first to point out that Monterosato was in error in proposing a substitute for *Allerya* Mörch, 1877, created as a subgenus of *Piliscus* Lovén for *Ancylus gussoni* Costa, 1829, and *Piliscus* (*Allerya*) *krebsii* Mörch, 1877. Monterosato stated that Mörch's name was preoccupied by *Allerya* Bourguignat, 1876, but this generic name, proposed for two species of land snails from Sicily and now considered to be a synonym of *Discus* Fitzinger, 1833 (Endodontidae), was published in 1878, and thus it does not preoccupy Mörch's name. Because *Williamia* has become generally accepted and is widely used for this world-wide group of pulmonate limpets, I am submitting a request to the International Commission on Zoological Nomenclature that under suspension of the rules, *Williamia* Monterosato, 1884, be placed on the "Official List of Generic Names," and that *Allerya* Mörch, 1877, be added to the "Official Index of Rejected Generic Names."

### *Williamia polynesica*, new species

PLATE 12: FIGURES 10, 11

DIAGNOSIS.—Shell small, 2.5 to 7.7 mm in length, broadly oval, capuliform, thin, light yellowish brown to reddish brown with obscure radial rays of darker color, very finely concentrically striate, apex posterior with protoconch turned to the left and sinistral.

RANGE.—Hawaiian Islands and Easter Island.

DESCRIPTION.—Shell relatively small, 2.5 to 7.7 mm in length, capuliform, thin, broadly oval with the apex posterior and protoconch twisted to left, lateral basal margins in profile slightly arcuate so that shell rests on anterior and posterior ends; light yellowish brown to grayish or medium reddish brown, sometimes grayish green, often very indistinctly rayed with alternating rays of light and dark color, finely and rather closely concentrically striate, striae near edge

usually more or less irregular, edge of shell thin, frangible, in fresh specimens often slightly flaring. Protoconch sinistral, helicoid, of  $2\frac{1}{8}$  whorls, glassy, smooth, sharply demarcate. Interior shining, adductor muscle scar typical for genus, quadrately oval, ring-like, interrupted on right side where the siphonal area is marked by an anteriorly located low obscure ridge running anterolaterad from apex.

HABITAT. Living from littoral to 5 mm and possibly deeper.

MATERIAL.—Holotype: off Waikiki, Oahu, Hawaii, in 3 to 5 m, D. Thaanum, USNM 757897. Paratypes: 13 specimens from stas E-10A, E-18A, E-27A; 20 specimens, R. Vargas D., MNSH 200416; 2 specimens, S. Englert, CAS 58714, 58715; 55 specimens from 13 lots from Oahu, Molokai, Hawaii, and Midway, all in NMNH.

### MEASUREMENTS (mm).—

	length	width	height
USNM 757897 Hawaii holotype	4.40	3.50	1.91
MNSH 200416 Easter Island	7.72	6.23	3.12
MNSH 200416 Easter Island	5.68	4.86	2.69
USNM 756008 Easter Island	5.08	4.30	2.70
USNM 499654 Hawaii	4.11	3.42	2.08
USNM 756158 Easter Island	3.57	2.71	1.40
USNM 756158 Easter Island	3.48	2.54	1.16
USNM 499654 Hawaii	2.69	2.20	1.11

REMARKS.—I describe this species with some hesitation, as it closely resembles *Williamia galapagana* Dall, 1917, and also *W. gussoni* (Costa, 1829) from the Mediterranean and the islands off northwestern Africa. Until something is known of the biology of members of the genus, particularly the spawning and characters of the larvae and a comparison can be made of the living or freshly preserved material of the species concerned, I prefer to maintain them as distinct taxa. This is all the more desirable in view of the distinct nature of the fauna of Easter Island with no apparent relationships with that of South America.

ETYMOLOGY.—Latinized name *polynesica* means pertaining to Polynesia.

### Family TRIMUSCULIDAE Burch, 1945 (1840)

REMARKS.—The family Gadiniidae was first pro-



posed by Gray in 1840 (Gray, 1840:149), but Burch (1945:14) was apparently the first to use the correct form *Trimusculidae*.

### Genus *Trimusculus* Schmidt, 1818

*Trimusculus* Schmidt, 1818:218.—Rehder, 1940:67.—Zilch, 1959:81. [Type-species: *Patella mammillaris* Linnaeus, 1758; Rehder, 1940.]

*Gadinia* Gray, 1824a:275.—Rehder, 1940:67 [Type-species: *Patella afra* Gmelin, 1791; monotypy.]

### *Trimusculus odhneri* (Hubendick, 1946), new combination

PLATE 12: FIGURES 8, 9

*Gadinia varia* Garrett, 1878:335 [Society and Paumotu Islands].—Hubendick, 1946:75. [Nomen nudum.]

*Gadinia odhneri* Hubendick, 1946:76, pl. 5: figs. 41–42 [Manila, Philippines].

**DIAGNOSIS.**—Shell patelliform, of moderate size, 4 to 12.5 mm in length, broadly oval, somewhat flattened to depressed conical, adult shells often more or less arcuate in profile with shell resting on anterior and posterior ends, white with a yellowish-brown deciduous periostracum; protoconch sinistral, helicoid, situated at one third distance from posterior end to near center, about 1¼ glossy whorls, strong yellowish brown, or glassy white when faded, but becoming paler near beginning of teleoconch: first part of teleoconch smoothish with faint radial striae and obscure concentric growth lines, rest of teleoconch marked with rather separated radial riblets crossed by very irregular and rugose growth striae; in last part of shell these radial riblets increase in number by intercalation, becoming more numerous, rounded, separated by rather deep intervals and crossed by rugose irregular growth striae, and occasionally by concentric sublamellar ridges, which apparently represent former margins; often smaller riblets are present between the larger ones; margin strongly denticulate by the ends of the riblets.

**RANGE.**—Micronesia and Polynesia; also Niuafoou near Samoa.

**MATERIAL.**—2 specimens, sta E-27A, UNSM 756208.

**MEASUREMENTS (mm).**—MCZ 288105 labeled as "*Gadinia varia* Garrett."

		length	width	height	
NRS	Inv. 1572 holotype [Manila]	12.50	12.00	2.50	
USNM	242999	Guam	11.15	10.03	4.42
USNM	383837	Niuafoou	9.10	8.50	2.95
MCZ	288105	Tuamotus	8.91	8.06	3.93
MCZ	288105	Tuamotus	6.74	5.99	2.10
USNM	756208	Easter Island	5.19	3.85	0.95
USNM	743874	Enewetak	3.84	3.15	1.69

**REMARKS.**—This species was described from a single specimen said to have been collected at Manila, Philippines, in the course of the voyage around the world of the Swedish expedition of the *Eugenie* (1851–53). Because the holotype is somewhat larger than any I have seen, I have given the measurements of other specimens.

An examination of specimens (in the collections of NMNH and MCZ) received from Andrew Garrett and labeled *Gadinia varia* Garrett shows that this species is the same as Hubendick's species. Garrett (1878:335) was in error in considering this Indo-Pacific species to be a synonym of the Californian *G. reticulata* Sowerby, 1835. The latter species is thicker and the radial riblets are more regular and the concentric sculpture much less prominent. *Trimusculus costatus* (Krauss, 1848), from South Africa, and *T. conicus* (Angas, 1867), from New South Wales and New Zealand, a species with which Hubendick tentatively identified *Gadinia varia* Garrett, have coarser and fewer radial ribs.

According to Hubendick (1946, in litt.) the *Eugenie* visited Tahiti, Niue, Ha'ano Island in the Tonga group, Ponape and Guam, before reaching the Philippines.

Extensive collecting in the Philippines has not turned up this species; furthermore, Manila is an unlikely locality for this genus whose species live intertidally on rocks and reefs on more or less exposed areas. It is my belief that the type of *T. odhneri* was very possibly collected on Guam (we have a specimen found by Bartsch in Apra Bay, Guam, that is only slightly smaller than the type) and that an error in labeling occurred when processing the collections in Manila. I, therefore, designate Guam, Marianas, as the type locality of *Trimusculus odhneri* (Hubendick).

Family **ELLOBIIDAE** H. and A. Adams,  
1855 (1824)

REMARKS.—Some authors (Morrison, 1964:119; Keen, 1971:843; Abbott 1974:331) have recently been using Melampidae Stimpson, 1851, as the valid family name for this group. According to the *International Code of Zoological Nomenclature* (Article 40a,b, and Recommendation 40A), however, the family name Ellobiidae should be conserved, as done by Franc (1968:524). The earliest valid use of a family name for this group is by Gray in 1824 who use the form Auriculadae (Gray, 1824b:107).

Subfamily **MELAMPODINAE** Stimpson, 1851

Genus *Melampus* Montfort, 1810

*Melampus* Montfort, 1810:319. [Type-species: *Bulimus coniformis* Bruguière, 1789 (= *Voluta coffea* Linné, 1758); original designation.]

*Melampus pascus* Odhner, 1922

PLATE 12: FIGURE 2

*Melampus philippii* Küster.—Dall, 1908a:437.—Odhner, 1922:249.—Lamy, 1936:268; 1938:142.—Steele, 1957:113. [Not *Melampus philippii* Küster, 1845.]  
*Melampus pascus* Odhner, 1922:249, pl. 8: fig. 5. [Easter Island].—Steele, 1975:113.

DIAGNOSIS.—Differs from *Melampus castaneus* Mühlfeldt, 1816 (+ *M. philippii* Küster, 1845) in being broader, with a generally lower spire, the whorls of which lack any incised spiral lines. The third columellar fold is much weaker than in *M. castaneus*, sometimes absent, and the denticles on the interior of the outer lip are usually less stout.

RANGE.—Easter Island.

DESCRIPTION.—Shell broadly obovate, 8 to 14 mm in length, dark grayish or reddish brown (Kelley and Judd, 1965) when fresh, fading to brownish pink, the conic spire varying somewhat in height. Whorls 9 to 9½ in largest specimens, early whorls reddish brown or in adult shells, purplish red, multi-spiral; protoconch papillate, paucispiral, smooth, somewhat ovate in shape, slightly less than 2 whorls; postnuclear whorls with low, irregular, often crowded ridges marking growth lines, occasionally with a

single incised line in the earliest whorls; body whorl more or less strongly shouldered, smooth except for fine crowded spiral lirae at the base. Outer lip rather thin, slightly thickened internally, somewhat effuse in its basal part which shows a broad internal callus bearing 5 to 7 denticles on its outer portion. The columellar lip bears a small sometimes obscure denticle medially located, a conspicuous second denticle, which is a sublamellar deeply entrant fold, a low obscure denticle or ridge, and finally a rather strong basal fold, which extends onto the thick basal part of the outer lip forming, as it were, its basal continuation. An umbilical depression is situated behind the basal part of the outer lip.

HABITAT.—This species lives under debris and stones above tide level.

MATERIAL.—Cotypes: 2 specimens, beach drift, Hanga Piko, 1 Jul 1917, K. Bäckström, GM Moll. 11992. Also 210 specimens from stas E-4, E-8, E-9, E-10A, E-11, E-15, E-18, E-19, E-27A; 7 specimens, La Perouse Bay, 8 Oct 1972, M. Villarroel, USNM 708434; 6 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200452; 1 specimen, Hanga Roa, 1958, R. Vargas D., MNSH 200268; 28 specimens, 1958, R. Vargas D., MNSH 200316; 1 specimen, 9 Apr 1956, Y. Valencia D., MNSH 200266; 1 specimen, 1954, Prof. Baeza, MNSH 200315; 6 specimens, Dec 1904, USBF Str. *Albatross*, USNM 204057; 7 specimens, S. Englert, USNM 657471; 90 specimens, S. Englert, CAS.

MEASUREMENTS (mm).—

	width	height
GM Moll. 11992 lectotype	3.82	5.15
USNM 751554	8.25	13.73
USNM 751554	8.05	13.58
USNM 751554	8.00	13.19
USNM 751554	7.92	12.20
USNM 756012	5.95	9.94

REMARKS.—The original description of this species was based on two juvenile specimens. A careful comparison of adult specimens with comparable specimens of *Melampus castaneus* Mühlfeldt, 1816, from various parts of the Indo-Pacific region has led to its recognition as a distinct species. The differences are summarized in the diagnosis given above.

Subfamily **PEDIPEDINAE** Odhner, 1925

Genus *Leuconopsis* Hutton, 1884

*Leuconopsis* Hutton, 1884:213.—Thiele, 1931:464.—Powell, 1933:150.—Morton, 1955:132 et seq.—Zilch, 1959:70.

[Type-species: *Leuconia obsoleta* Hutton, 1878; monotypy.]

REMARKS.—In the most recent survey of the classification and phylogeny of the Ellobiidae, Morton (1955:127–168) confirms Thiele's allocation of *Leuconopsis* to the subfamily Pedipedinae.

The occurrence of a species of *Leuconopsis* on Easter Island is most interesting from the standpoint of the biogeographical relationships of the island. The type-species of *Leuconopsis* is rather abundant throughout New Zealand with a probably distinct subspecies on Chatham Island. A species, *L. pacifica* Oliver, 1915, is found in the Kermadecs, and three species are recorded from New South Wales, South Australia, and Victoria respectively.

***Leuconopsis rapanuiensis*, new species**

PLATE 12: FIGURE 3

DIAGNOSIS.—Shell small, ovate, moderate yellowish pink to light reddish brown in color when fresh, with a strong fold at upper end of columellar wall and a somewhat weaker fold below it. Closest to *Leuconopsis obsoleta* (Hutton) from New Zealand but with somewhat thicker shell, more brown in color, with more ovate shape and with the lower tooth stronger.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, rather thick, up to about 3.2 mm in length, ovate to elongate-ovate, moderate yellowish pink to light reddish brown in color. Protoconch consisting of a large apical, glassy, light brown bulb, representing a reduction of the heterostrophic condition (Morton, 1955:151). Post-nuclear whorls 5 in holotype, first one smooth, following ones with spiral grooves of varying strength and spacing; the spiral grooves sometimes obscure or absent on last 2 whorls, especially in middle part; suture impressed, irregular, subsutural margin often whitish, occasionally with obscure curved riblets below along growth lines; upper part of last whorl slightly appressed below suture. Aperture narrowly ovate, posterior angle acute; parietal callus moderately heavy; upper columellar fold strong, horizontal, confluent with upper margin of columellar callus; lower columellar fold moderately strong. Outer lip thickened internally, somewhat everted at rounded anterior end, which curves into the columellar callus.

HABITAT.—The specimens were found in beach drift, but undoubtedly the species lives in the same situation as does the type species: intertidally, under sand- and mud-submerged stones.

MATERIAL.—Holotype: sta E-27A, USNM 756790. Paratypes: 38 specimens, sta E-27A, USNM 756238; 1 specimen, 1958, R. Vargas D., MNSH 200394.

MEASUREMENTS (mm).—

	width	height
USNM 756790 holotype	1.68	2.93
USNM 756238 paratype	1.95	3.20
USNM 756238 paratype	1.82	3.10
USNM 756238 paratype	1.76	3.00
USNM 756238 paratype	1.54	2.50
USNM 756238 paratype	1.64	2.46
USNM 756238 paratype	1.34	2.28

REMARKS.—I have already pointed out above the differences between this new species and *Leuconopsis obsoleta* (Hutton) from New Zealand. Iredale (1908: 385–386) has commented on the variability in shape and sculpture of the New Zealand species, and I have found a similar situation in *L. rapanuiensis*. In the larger specimens the spire is higher, more attenuated, giving the shell an elongate-ovate shape; connected by intermediate forms, other specimens are ovate, with a short spire. The spiral sculpture is similarly variable, it being always present in the early whorls, but on the penultimate and body whorls it may be restricted to the upper part of the whorl and obscure on the remainder of the whorl, or even completely absent on the latter part of the last whorl.

*Leuconopsis pacifica* Oliver from the Kermadecs differs in being generally smaller, more elongate with fine spiral grooves on the early whorls and obscure fine spiral grooves on the upper and basal parts of the body whorl; the whorls are narrowly shouldered sub-suturally, the suture subcanaliculate near the aperture where the outer lip is incurved forming a pronounced sinus.

ETYMOLOGY.—From *Rapa Nui*, the Polynesian name for Easter Island, plus *ensis*, Latin suffix denoting place.

**Genus *Rangitotoa* Powell, 1933**

*Rangitotoa* Powell, 1933:148–149.—Morton, 1955:132 et seq.—Zilch, 1959:68. [Type-species: *Rangitotoa insularis* Powell, 1933; original designation.]

REMARKS.—Zilch (1959:68) relying on Powell's statement (Powell 1933:149) placed this genus in the family Melampodinae, but I follow Morton's suggestion in putting *Rangitotoa*, at least temporarily, in the Pedipedinae.

I am referring three specimens (USNM 725374) collected by me on 27 January 1971 under rocks on the small islet of Rapa Iti, off the east coast of Rapa, French Polynesia, to *Rangitotoa insularis*. Although these apparently immature specimens have a lower spire than the majority of the specimens of similar size that I have seen from New Zealand, yet among the latter are one or two of a shape comparable to those from Rapa, and for this reason I assign the Rapa specimens to *R. insularis*.

#### *Rangitotoa* species

##### PLATE 12: FIGURE 1

REMARKS.—I hesitate to propose a new name on the basis of the three specimens I have before me: two immature shells, and one adult but very likely gerontic specimen. Nevertheless I do want to record the presence of this genus on Easter Island as it is another example of a biogeographical relationship with the faunas of the Kermadecs and northern New Zealand. The record from Rapa mentioned above is midway between the original locality of *Rangitotoa* and the occurrence of the genus on Easter Island.

The two immature specimens, though comparable in shape to similar specimens of *R. insularis*, seem to have a somewhat larger protoconch. The outer lip of the adult specimen is internally thickened in its lower part giving the inside of the outer lip a sinuous appearance; the lower columellar fold is stronger than in typical *R. insularis*.

MATERIAL.—3 specimens, sta E-27A, USNM 756239.

MEASUREMENTS (mm).—Adult specimen: width, 2.21; height, 4.12.

#### Family JULIIDAE Dall, 1898 (1871)

REMARKS.—Dall was the first to replace the family name Prasinidae Stoliczka 1871, with Juliidae (Dall, 1898:810).

#### Subfamily JULIINAE Dall, 1898

##### Genus *Julia* Gould, 1862

*Julia*, Gould, 1862:283.—Beets, 1944:28.—Kay, 1968:110. [Type-species: *Julia exquisita* Gould, 1862; monotypy.]

##### *Julia exquisita* Gould, 1862

##### PLATE 11: FIGURES 13-16

*Julia exquisita* Gould, 1862:284 [Sandwich Islands].—Dall, Bartsch, and Rehder, 1938:126, pl. 34: figs. 13-16.—Kay, 1962:434.

DIAGNOSIS.—The shells of this distinctive bivalved gastropod family are characterized by their broadly ovate outline with the anterior end broadly rounded and the posterior end acuminate and deeply excavated; in each valve there is a rounded knob, that in the right valve larger, each fitting into a socket in the opposite valve. Exterior of shell smooth, light green when fresh, often with several curving rows of radial spots of white, and curving dark radial lines on the dorsal slope.

RANGE.—Throughout Indo-Pacific region.

HABITAT.—Found living on the alga *Caulerpa*.

MATERIAL.—3 valves, stas E-10A and E-27A; 1 specimen (1 valve), Aug 1968, H. G. Richards and D. L. Govoni, ANSP 317402.

MEASUREMENTS (mm).—Each width listed is twice that of a single valve.

	length	width	height
USNM 756013	4.00	2.60	2.80
ANSP 317402	3.54	1.80	2.50

REMARKS.—I follow Kay in considering *J. borbonica* (Deshayes, 1863) as a probable synonym (Kay, 1968:110-111), but more material from both ends of its wide range needs to be carefully studied.

#### Subfamily BERTHELINIINAE Beets, 1949

##### Genus *Berthelinia* Crosse, 1897

##### Subgenus *Tamanovalva* Kawaguti and Baba, 1959

*Tamanovalva* Kawaguti and Baba, 1959:178.—Keen and Smith, 1961:51.—Kay, 1968:112. [Type-species: *Tamanovalva limax* Kawaguti and Baba, 1959; original designation.]



*Berthelinia*, subgenus *Tamanovalva* Kawaguti and Baba.—  
Kay, 1968:112.

*Berthelinia (Tamanovalva) cf. pseudochloris*  
Kay, 1964

PLATE 11: FIGURES 11, 12

*Berthelinia pseudochloris* Kay, 1964b:191, fig. 1, pl. 9:  
figs. 1, 4.

REMARKS.—I have seen eight valves from Easter Island, all from drift sand, of a form that I am referring with some doubt to the Hawaiian *B. pseudochloris* Kay. Unfortunately all eight valves are right valves, and as no living specimens were seen in the tide pools we have no knowledge of the nature of the protoconch or nucleus which is found only on the left valve.

In general outline the shells resemble *B. pseudochloris* in having a rather attenuated posterior end with a straight dorsal posterior edge. The Easter Island specimens appear to be somewhat less high than the Hawaiian form, and all shells exhibit a yellowish cast, half of them rather bright yellow. Kay describes the shells as translucent but in a recent letter states that one valve had a yellowish tint.

HABITAT.—Should be found living on the alga *Caulerpa* in tide pools.

MATERIAL.—3 valves from stas E-30 and E-35B; 5 valves, Hanga Roa, 1958, R. Vargas D., MNSH 200390.

MEASUREMENTS (mm).—

	length	height
USNM 756068	5.30	3.50
USNM 756068	5.00	3.42
MNSH 200390	4.86	3.26
MNSH 200390	4.17	2.82

REMARKS.—Colonies of *Caulerpa* in the tide pools should be examined for living specimens of this form. Until these are found and compared with specimens from Hawaii the exact status of the Easter Island form will be in doubt.

The yellow color of the shell resembles that of *B. chloris* Dall, 1918, from the Eastern Pacific.

Family APLYSIIDAE Rafinesque, 1815 (1809)

REMARKS.—This family was first recognized by Lamarck in 1809 as "Laplysiens."

Subfamily DOLABELLINAE Pilsbry, 1895

Genus *Dolabella* Lamarck, 1801

*Dolabella* Lamarck, 1801:62.—Cuvier, 1804:436-440.—Pilsbry, 1896:150-151.—Engel, 1942:197. [Type-species: *Dolabella callosa* Lamarck, 1801 (= *Patella auricularia* Lightfoot, 1786); monotypy.]

REMARKS.—Pilsbry lists 11 species belonging to this genus and MacFarland enumerates ten. Engel, however, believes that there are only two species—*D. gigas* and the present species of which he gives an extensive synonymy.

*Dolabella auricularia* (Lightfoot, 1786)

*Patella auricularia* Lightfoot, 1786:154.—Rehder, 1967:25, 33. [Ambon; China.]

*Dolabella callosa* Lamarck, 1801:62.—Rehder, 1967:25, 33.

*Dolabella scapula* (ex Martyn) Pilsbry, 1896:152-153, pl. 26: figs. 26-28, pl. 27: figs. 29, 30.—Engel, 1942:199, 207-233.—Rehder, 1967:25, 33.

*Dolabella agassizi* MacFarland, 1918:306-345, pls. 1-10 [Easter Island].—Engel, 1942:199, 207.

*Dolabella auricularia* (Lightfoot).—Rehder, 1967:25, 33.

DIAGNOSIS.—A rather large mollusk, from 50 to 200 mm in length, conical, narrow in front, broad posteriorly where the body is obliquely truncate, greenish in color, occasionally with brownish markings, skin warty with elongated processes to almost smooth. Shell internal, calcareous, curved, hatchet-shaped, with en-rolled spire and a brownish to yellow cuticle on the exterior.

RANGE.—Indo-Pacific region to western Mexico.

MATERIAL.—21 Dec 1904, USBF Str. *Albatross*, CASIZ Type no. 256, holotype of *D. agassizi* MacFarland, 1918; MacFarland erroneously gives the collecting date as 21 Dec 1899 (MacFarland, 1918:301).

Family NOTARCHIDAE Eales and Engel, 1935

Subfamily DOLABRIFERINAE Pilsbry, 1895

Genus *Dolabrifera* Gray, 1847

*Dolabrifera* Gray, 1847b:162.—Pilsbry, 1896:117. [Type-species: *Dolabella dolabrifera* Cuvier [sic] (= *Dolabella dolabrifera* Rang (ex Cuvier), 1828); original designation.]

***Dolabrifera dolabrifera* (Rang, 1828)**

FIGURE 13

*Dolabella dolabrifera* Cuvier, 1817:398 [nomen nudum].  
*Dolabella dolabrifera* Rang (ex Cuvier), 1828:51, pl. 4:  
 figs. 1-6.  
*Dolabrifera dolabrifera* (Rang).—Pilsbry, 1896:118, pl.  
 34: figs. 11-13, 16.—Kay, 1964a:184, pl. 8: fig. 6.—  
 Marcus, 1972:852, fig. 6, etc.

**DIAGNOSIS.**—A species relatively small for the family; according to Kay living Hawaiian specimens average 40 mm in length but they reach 70 mm. The animal is pyriform and is usually of a grayish green to brown color but may be light red or yellowish white; surface with pustules and microscopic branched filaments; shell under the thick mantle well calcified, with a narrow upper portion and one side straight, the other side convex, and basally broad and rounded.

**RANGE.**—Circumtropical.

**HABITAT.**—In tide pools and in deeper water on and among algae.

**MATERIAL.**—1 specimen, in 60 ft (18 m) off Motu Tautara, 7 Feb 1969, J. E. Randall, BPBM 206965.

**REMARKS.**—I have made use of the papers by Kay and Marcus in preparing the brief diagnosis of this species.

I follow Marcus in placing the genus *Dolabrifera* in the family Notarchidae (Marcus 1972:842-843, 869). With Dr. Marcus' kind permission I use one of her figures to illustrate the shell.

The identification of this species and of *Berthellina citrina* listed further on was made by Dr. T. E.

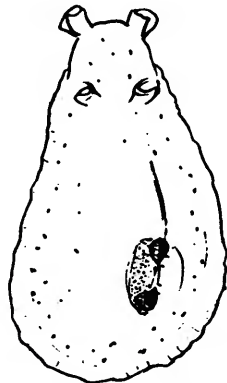


FIGURE 13.—*Dolabrifera dolabrifera* (Rang), after Marcus, 1972.

Thompson of Bristol, England, to whom I am duly grateful.

**Family UMBRACULIDAE Dall, 1889****Genus *Umbraculum* Schumacher, 1817**

*Umbraculum* Schumacher, 1817:55, 177. [Type-species: *Patella umbraculum* Lightfoot, 1786; monotypy.]

***Umbraculum umbraculum* (Lightfoot, 1786)**

FIGURE 14

*Patella umbraculum* Lightfoot, 1786:178 [China]. [Non-binomial *Umbrella chinensis* Martini, 1769, in synonymy.]  
*Patella sinica* Gmelin, 1791:3705 [China].—Rehder, 1967:30.  
*Patella umbracula* Röding, 1798:6.—Rehder, 1967:30.  
*Operculatum aurantium* Pease, 1868b:287-288 [Hawaii].—Rehder, 1967:30.  
*Umbraculum sinicum* (Gmelin).—Pilsbry, 1896:180-182, pl. 70: figs. 58-60, pl. 71: figs. 63-65, pl. 72: figs. 70, 71.  
*Umbraculum umbraculum* (Lightfoot).—Kira, 1962:114, pl. 40: fig. 7.—Rehder, 1967:30.



FIGURE 14.—*Umbraculum umbraculum* (Lightfoot), USNM 634592,  $\times 2$  [Mauke, Cook Islands]. (Photo reproduced at 100%.)

**DIAGNOSIS.**—This large tectibranch has an oval, depressed, limpet-like shell, yellowish or whitish in color, reaching more than 120 mm in length.

**RANGE.**—Indo-Pacific region, from East Africa to Hawaii and Easter Island.

**MATERIAL.**—A fragment of the shell from an archeological site above the beach at Anakena, collected by Dr. William S. Ayres in 1973; 1 specimen, Hanga Roa, 20 Jul 1978, B. Alarcón, USNM 781975.

**MEASUREMENTS (mm).**—USNM 781975: length, 76.5; width, 57.5.

**REMARKS.**—Dr. William S. Ayres of the University of Oregon has also sent me a photograph of a pendant made from a nearly perfect specimen of this shell with a hole bored at one end through which a loop of sennit cord is tied; the shell is 73 mm long and 54 mm wide. This object was collected at Easter Island in 1882 by the Geiseler Expedition and is now in the Berlin Museum of Ethnology.

#### Family PLEUROBRANCHIDAE Menke, 1828 (1822)

**REMARKS.**—This family was first distinguished by Ferussac in 1822 as "Les Pleurobranches."

Besides the species of *Berthellina* listed below, another member of this family occurs at Easter Island. A small thin haliotiform shell with a relatively large elongate and rounded suboblong last whorl with fine axial interrupted striae was found in drifted sand. Similar shells were found by Morrison in beach sand on Raroia Atoll, Tuamotus. According to T. E. Thompson (in litt.) it is difficult to allocate isolated shells even to genus in the family as species in both *Berthella* and *Pleurobranchus* have similar shells. These shells may belong to one of Pease's species described from Polynesia, possibly *Berthella pellucida* (Pease, 1860) (R. Burn, in litt.).

#### Subfamily BERTHELLININAE Burn, 1962

##### Genus *Berthellina* Gardiner, 1936

*Berthella* Blainville.—Vayssièrè, 1898:255. [Not *Berthella* Blainville, 1825.]

*Berthellina* Gardiner, 1936:198.—Burn, 1962:132–134. [Type-species: *Berthellina engeli* Gardiner, 1936 [new name for *Berthella plumula* (Montagu, 1801) in sensu

Vayssièrè, 1898, not *Bulla plumula* Montagu, 1801] (= *Pleurobranchus citrina* Rüppell and Leuckart, 1828); original designation.]

#### *Berthellina citrina* (Rüppell and Leuckart, 1828)

##### FIGURE 15

*Pleurobranchus citrina* Rüppell and Leuckart, 1828:208, pl. 5: fig. 1.—Pilsbry, 1896:208–209, pl. 48: figs. 29–31.—Edmunds and Thompson, 1972:219–222, fig. 1.

*Berthella plumula* (Montagu).—Vayssièrè, 1898:271, 291, pl. 17: figs. 17–30 [not *Bulla plumula* Montagu, 1801].

*Berthella brocki* Vayssièrè, 1898:256, pl. 16: figs. 1–13.

*Berthella brocki* Vayssièrè.—Odhner, 1922:248.—Steele, 1957:113.

*Berthellina engeli* Gardiner, 1936:198.—Edmunds and Thompson, 1972:219–222, fig. 1. [New name for *Berthella plumula* (Montagu, 1801) in sensu Vayssièrè.]

**DIAGNOSIS.**—A relatively small species, 20 to 50 mm in life, 12 to 30 mm in alcohol, broadly ovate to subrectangular, pale yellow to orange, more or less marbled with dark irregular lines or streaks. The small elongated triangular shell is centrally located under the broad mantle.

**RANGE.**—Mediterranean Sea and throughout the Indo-Pacific region.

**MATERIAL.**—2 specimens, K. Bäckström, GM Gast. 5285.

**REMARKS.**—The specimens collected by Odhner were colorless as a result of their prolonged stay in alcohol. The brief description has been derived from Pilsbry (1896) and Edmunds and Thompson (1972).

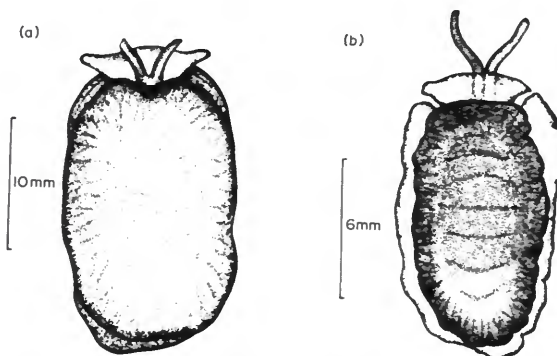


FIGURE 15.—*Berthellina citrina* (Rüppell and Leuckart), after Edmunds and Thompson, 1972; a, ventral view; b, dorsal view.

The latter authors give more extended synonymy of this species.

Dr. T. E. Thompson has generously allowed me to reproduce the drawing of this species that appeared in his paper.

#### Family DORIDIDAE Rafinesque, 1815

REMARKS.—One small specimen somewhat less than 10 mm in length and deep yellow in color was collected by A. J. Kohn at Haka Ea, Vaihu on 1 May 1977. It was submitted for study to Dr. Eveline Marcus who has informed me that because it is a juvenile with immature reproductive parts it cannot be positively identified.

I list this specimen in my report to call attention to the presence of a member of this family on Easter Island.

### Class BIVALVIA

#### Family NUCULIDAE Gray, 1824

##### Genus *Nucula* Lamarck, 1799

*Nucula* Lamarck, 1799:87.—Keen, 1969a:N230. [Type-species: *Arca nucleus* Linné, 1758; monotypy.]

##### *Nucula polynesica*, new species

PLATE 13: FIGURES 1, 2

DIAGNOSIS.—Small, broadly ovate, posterior end short, subtruncate, anterior end broadly rounded, exterior smooth except for irregular concentric sulci and a few low, irregular, concentric folds near the ventral margin; internal margin crenulate; resilifer broadly triangular, oblique; anterior teeth 6 to 9, posterior teeth 4 to 5.

RANGE.—Easter Island.

DESCRIPTION.—Shell small, 2 to 3 mm in length, broadly ovate with the posterior end broadly rounded to subtruncate and the anterior end evenly rounded, the opisthogyrate umbones 1/5 to 1/6 of the total length from the posterior end; smooth except for irregular, obscure, concentric sulci and a few low, obscure, irregular concentric folds near the ventral margin; internal ventral margin crenulate; hinge line

arched, resilifer broadly triangular, oblique, separating the series of teeth, anterior teeth from 6 to 9, posterior ones 4 to 5 and situated on a moderately broad shelf.

MATERIAL.—Holotype: sta E-27A, USNM 756244. Paratypes: 3 valves, sta E-27A, USNM 767087.

#### MEASUREMENTS (mm).—

	length	height	anterior teeth	posterior teeth
USNM 756244 holotype				
left valve	2.86	2.26	8	5
right valve	2.87	2.25	8	5
USNM 767087 paratypes				
left valve	3.10	2.47	9	4
right valve	2.31	1.78	7	4
right valve	1.97	1.40	6	4

REMARKS.—This species is similar to *N. hawaiiensis* Pilsbry, 1921, in shape and hinge characters but seems to reach a larger size and lacks the rather regular concentric ridges, especially prominent near the ventral margin that are found in the Hawaiian species. The hinge teeth in the latter appear to be more numerous than in our species in specimens of comparable size.

ETYMOLOGY.—Name derived from the biogeographical province in which this species occurs.

#### Family ARCIDAE Lamarck, 1809

##### Genus *Barbatia* Gray, 1842

*Barbatia* Gray, 1842:81.—Newell, 1966:N252. [Type-species: *Arca barbata* Linné, 1758; Gray, 1847.]

*Calloarca*, subgenus *Barbarca* Dall, Bartsch, and Rehder, 1938:23.—Newell, 1966:N252. [Type-species: *Calloarca (Barbarca) hua* Dall, Bartsch, and Rehder, 1938; original designation.]

##### *Barbatia* cf. *nuttingi* (Dall, Bartsch, and Rehder, 1938), new combination

PLATE 12: FIGURES 12-15

*Calloarca (Barbarca) nuttingi* Dall, Bartsch, and Rehder, 1938:26, pl. 4: figs. 17-20 [Laysan Island, Hawaii].

DIAGNOSIS.—A small, oval, moderately inflated shell, reaching 12 mm in length, trapezoidal in outline, the dorsal and ventral margin subparallel, with the dorsal margin angulate at both ends, more strongly at the posterior end; umbones fairly prominent, situ-



ated at  $\frac{1}{4}$  of the total length from the anterior end; outer surface finely and granosely ribbed, reddish brown and white in color, the posterior half usually darker; hinge teeth rather numerous, interrupted under the umbones, slanted, and larger distally.

RANGE.—Hawaiian Islands and Easter Island.

MATERIAL.—7 valves, sta E-27A, USNM 756247; 11 valves, 1958, R. Vargas D., MNSH 100212.

MEASUREMENTS (mm).—Width estimated by doubling width of single valve.

	length	width	height
MNSH 100212	10.33	6.2	6.28
MNSH 100212	9.70	4.7	5.34
USNM 756247	9.40	4.3	4.32

REMARKS.—I hesitate to assign this species definitely to *B. nuttingi* because the Easter Island specimens, collected in beach drift, are more or less worn, and because the complex of small species of *Barbatia* that includes also *B. maunaluana* Dall, Bartsch, and Rehder, 1938, and *B. parva* (Sowerby, 1833), needs further critical study.

*Barbatia parva* (Sowerby) is a darker, more oval shell, with fewer and stronger hinge teeth.

#### Family MYTILIDAE Rafinesque, 1815

#### Subfamily MYTILINAE Rafinesque, 1815

#### Genus *Septifer* Recluz, 1848

*Septifer* Recluz, 1848:277.—Soot-Ryen, 1969:N274. [Type-species: *Mytilus bilocularis* Linné, 1758; Stoliczka, 1871.]

#### *Septifer bryanae* (Pilsbry, 1921)

PLATE 13: FIGURES 9-12

*Congerina bryanae* Pilsbry, 1921a:323 [Oahu, Hawaii].

*Septifer bryanae* (Pilsbry).—Dall, Bartsch, and Rehder, 1938:51, pl. 9: figs. 1-4.

*Septifer bilocularis* (Linné).—Salvat and Rives, 1975:367, fig. 405. [Not *Mytilus bilocularis* Linné, 1758.]

DIAGNOSIS.—A small species, generally with a maximum length about 10 mm but occasionally reaching 15.5 mm, dorsal margin rather distinctly angulate, with fine, rather crowded radial riblets that are finely nodulose; occasionally the concentric ridges are prominent, resulting in a clathrate sculpture in worn specimens. Color varies from greenish or bluish gray to

brown or pale greenish yellow, variously mottled with white and occasionally with reddish brown spots or radial streaks. Shell with a moderately large internal triangular anterior septum with 3 to 7 denticles on the antero-dorsal margin and numerous fine denticles on the antero-ventral margin; internal resilium occupying anterior half of antero-dorsal margin, with a series of about 7 strong denticles from end of resilium to dorsal angulation; posterior end of shell rather finely crenulated.

RANGE.—Indonesia and Philippines to Hawaii and Easter Island.

MATERIAL.—1 valve, sta E-10A, USNM 756000; 3 valves, Anakena, 1958, R. Vargas D., MNSH 100214.

MEASUREMENTS (mm).—

	length	width	height
USNM 190443 Hawaii	14.48	9.95	8.85
MNSH 100214 Easter Island	9.96	6.48	5.65
MNSH 100214 Easter Island	9.46	5.34	5.95
MNSH 100214 Easter Island	7.20	4.06	3.81
USNM 756000 Easter Island	5.24	3.23	2.96

REMARKS.—Four single valves of this species were found in sand; the width given above of these specimens is the result of doubling the width of the single valves.

This species has its center of distribution in the Hawaiian Islands, Micronesia, and Polynesia; only a few specimens from Indonesia and the Philippines are assignable to this species. It differs from *S. bilocularis* (Linné, 1759) in its small size, finer, more nodulose sculpture, finer internal crenulations on the posterior margin and in generally more numerous denticles anterior to the septum.

#### Subfamily MODIOLINAE Keen, 1958

#### Genus *Modiolus* Lamarck, 1799

*Volsella* Scopoli, 1777:113. [Suppressed under ICZN Opinion 325 (Hemming, 1955).]

*Modiolus* Lamarck, 1799:87.—Soot-Ryen, 1969:N278. [Type-species: *Mytilus modiolus* Linné, 1758; monotypy.]

#### *Modiolus matris* Pilsbry, 1921

PLATE 13: FIGURES 7, 8

*Modiolus matris* Pilsbry, 1921a:321, pl. 12: fig. 18 [Oahu, Hawaii].

*Volsella matris* (Pilsbry).—Dall, Bartsch, and Rehder, 1938:44, pl. 7: figs. 12–15.

**DIAGNOSIS.**—A relatively small species, from 9 to 19 mm in length, inflated, rather high, with a rounded not angulate dorsal margin and a gently concave ventral margin. Exterior marked by fine, regular concentric ridges rather close together, and provided with rather long periostracal hairs which on most of the surface are usually rubbed off; color yellowish, tinged with yellowish pink near the dorsal and posterior margins and/or furnished with interrupted radial streaks of various widths of dark pink.

**RANGE.**—Hawaiian Island, Easter Island, Rapa, and Raevavae in Austral Islands.

**HABITAT.**—The two lots from Hawaii were dredged in 33 to 50 fathoms (59 to 90 m), while the specimen from Raevavae in the Austral Islands was collected in 1.2 to 1.5 m among coral ridges separated by sand. The species, therefore, probably lives nestled among rubble in shallow to moderate depths. The two valves from Easter Island were undoubtedly found dead as drift shells on the beach.

**MATERIAL.**—2 valves, Anakena, 1958, R. Vargas D., MNSH 100213.

**MEASUREMENTS (mm).**—Width of MNSH 100213 estimated by doubling measurement of one valve.

	length	width	height
USNM 337467 Hawaii	16.72	10.12	9.45
USNM 732208 Raevavae	13.43	7.86	8.88
USNM 337448 Hawaii	11.84	6.16	6.67
MNSH 100213 Easter Island	8.96	5.3	5.00

**REMARKS.**—The species is distinguished from other small forms by its relatively high, somewhat arcuate form, and particularly by its distinctive concentric sculpture. Its distribution along the eastern limit of the Indo-Pacific Region is noteworthy.

#### Family MALLEIDAE Lamarck, 1819

#### Genus *Malleus* Lamarck, 1799

#### Subgenus *Malvufundus* Gregorio, 1885

*Fundella* Gregorio, 1884:73. [Type-species: *Fundella lioyi* Gregorio, 1884; original designation.] [Not *Fundella* Zeller, 1848.]

*Malleus*, subgenus *Malvufundus* Gregorio, 1885:122.—

Hertlein and Cox, 1969:N329. [Type-species: *Malleus regula* Forskäl, 1775; Cox, 1969.]

*Parimalleus* Iredale, 1931:205; 1939:342.—Hertlein and Cox, 1969:N329. [Type-species: *Parimalleus cursator* Iredale, 1931; original designation.]

*Brevimalleus* McLean, 1947:70.—Hertlein and Cox, 1969:N329. [New name for *Fundella* Gregorio, 1884, preoccupied by *Fundella* Zeller, 1848.]

#### *Malleus (Malvufundus) maculosus* Reeve, 1858

PLATE 14: FIGURES 10–13

*Malleus maculosus* Reeve, 1858a: pl. 3: sp. 9.—Dautzenberg and Bouge, 1933:431. [Lord Hood's Island (= South Marutea)].

**DIAGNOSIS.**—Shell generally small, but occasionally reaching a length of 35 mm, very irregular in growth form, main part of shell broadly ovate, anterior wing above byssal sinus short or absent, ventrally irregularly prolonged to varying length; early part of shell externally sculptured with irregular concentric lamellae, prolongation irregularly rugose and often showing blisterlike laminations; color whitish often with irregular reddish purple maculations. Internally the main nacreous part of shell is sharply delimited from the ventral extension by its margin which may be strongly raised; the left valve is usually more deeply cupped than the right valve, and both valves are whitish or golden in color, occasionally infused in places with purplish red; the shelly prolongation often shows a subcentral pallial ridge running partway down the prolongation.

**RANGE.**—Micronesia, Tuamotu Islands, Gambier Islands, and Easter Island.

**HABITAT.**—In tide pools among and under rocks and in crevices, attached by byssus.

**MATERIAL.**—3 specimens sta. E-8, USNM 755972.

**MEASUREMENTS (mm).**—

	length	width
USNM 755972	10.56	7.22
USNM 755972	7.85	5.77

**REMARKS.**—This small, nestling species is liable to be overlooked by collectors, and a careful search would probably uncover more specimens on Easter Island than the three small specimens we found in one tide pool in La Perouse Bay.

I have seen only two lots from Kapingamarangi in the southern Caroline Islands and one lot from Bikini in the Marshalls. It will certainly be found elsewhere

in Micronesia as we have it from several places in French Polynesia.

### Family PECTINIDAE Rafinesque, 1815

#### Genus *Chlamys* Röding, 1798

*Chlamys* Röding, 1798:161. [Type-species: *Pecten islandicus* Müller, 1776; Herrmannsen, 1847.]

#### *Chlamys pasca* (Dall, 1908)

PLATE 13: FIGURES 3-6

*Pecten (Chlamys) pasca* Dall, 1908a:401-402, 437 [Easter Island].

*Pecten (Hinnites) pascus* Dall.—Steele, 1957:113.

**DIAGNOSIS.**—A rather small species close to *Chlamys coruscans hawaiiensis* Dall, Bartsch, and Rehder, 1938, but the primary radial ribs are fewer in number, 12 to 13 instead of 15, and are basically simple rather than compound-tripartite; intercalary ribs arise at some distance from the beak and become simple and subequidistant from the primary ribs on the left valve and close to a primary rib and thus in effect are bipartite on the right valve. The crests of the rather angulate ribs are more or less bare and the intervals are covered with a pronounced shagreen sculpture which is present on the left anterior and both posterior auricles. The auricles have fewer and narrower costae than in *C. coruscans*, the left posterior auricle larger, the right anterior auricle without shagreen sculpture but with rather coarse concentric ridges crossing the radial costae; crurae finely denticulate. Color yellowish white, usually mottled or more or less suffused with red or reddish orange.

**RANGE.**—Easter Island.

**MATERIAL.**—4 valves, sta E-18A, E-27A; 1 valve (holotype), Dec 1904, USBF Str. *Albatross*, USNM 110765; 4 valves, Oct 1956, S. Englert, USNM 765021; 1 specimen, La Perouse Bay, in 40 to 100 m, 2 Feb 1958, Downwind Expedition: *Horizon* sta 76, USNM 765022; 8 valves, 1958, R. Vargas D., MNSH 100216.

**MEASUREMENTS (mm).**—

	width	height
USNM 110765 holotype, left valve	13.22	15.93
USNM 765021 left valve	14.98	18.06
USNM 765201 left valve	15.05	14.56
USNM 765021 right valve	12.40	13.50
USNM 765021 complete specimen	7.83	8.55

**REMARKS.**—This species was previously known from only a single, somewhat beach worn, left valve. I have now been able to examine one complete specimen and 17 single valves found in drifted sand, of which 13 are left and 4 are right valves. The larger valves are unfortunately also beach worn and/or broken, and therefore I am figuring an immature specimen. In writing up this species I have fortunately been able to consult Dr. Thomas R. Waller, whose detailed description of *Chlamys coruscans* Hinds, 1845, has been of great help (Waller, 1972:231-236). As mentioned above, this species is closest to *Chlamys coruscans hawaiiensis* Dall, Bartsch, and Rehder.

Dall in his remarks mentions that the present species "seems to belong to a group of species called Hinnites," which he does not regard as a phylogenetically natural group. This comment was apparently prompted by the fact that the older part of the valve shows an irregularity in growth and sculpture that I believe is due to the conditions under which it grew. I am including photographs of an additional left and a right valve to show this irregularity (Plate 13: figures 5, 6).

### Family LIMIDAE Rafinesque, 1815

#### Genus *Lima* Bruguière, 1797

*Lima* Bruguière, 1797, pl. 206.—Cox and Hertlein, 1969: N385. [Type-species: *Ostrea lima* Linné, 1758; subsequent monotypy, Cuvier 1797.]

#### *Lima* species

**REMARKS.**—Three specimens, all single valves and more or less beach worn, found in sand above the tide line, have been examined. All agree in the reduced squamose sculpture of the radial ribs, the largest specimen showing the scales as low, resembling round roof tiles, and rather distantly spaced except near the margin of the shell. The interspaces in the early stages of growth are somewhat wider than the ribs but later become subequal or slightly narrower. It is less scabrous than *Lima lima* (Linné) and its relatives.

In the absence of an unworn complete specimen I hesitate to describe this species as new. To this species may belong the shell listed by Dall (1908a:437) as *Lima lima* (Linné). Unfortunately this specimen can-

not be found in the collections of the National Museum of Natural History.

**MATERIAL.**—2 single valves, stas E-18A and E-27A; 1 valve, Ovahe, 1958, R. Vargas D., MNSH 100215.

**MEASUREMENTS (mm).**—

	<i>length</i>	<i>width</i>
MNSH 100215	35.75	27.93
USNM 756139	11.65	9.25

### Genus *Limaria* Link, 1807

*Limaria* Link, 1807:157.—Cox and Hertlein, 1969:N389. [Type-species: *Limaria inflata* Link, 1807 (= *Ostrea tuberculata* Olivi, 1792); Winkworth, 1930.]

**REMARKS.**—I follow the most recent study of this family, that of Cox and Hertlein (1969), in restoring *Limaria* Link to generic rank.

#### Subgenus *Promantellum* Iredale, 1939

*Promantellum* Iredale, 1939:384.—Keen, 1971:100. [Type-species: *Promantellum perfragilis* Iredale, 1939; original designation.]

**REMARKS.**—Cox and Hertlein (1961:N389) have considered *Promantellum* a junior synonym of *Limaria* but I feel that the group is distinct enough to warrant subgeneric recognition.

From typical *Limaria* it differs in being generally flatter, usually somewhat more elongate, in the posterior gape being longer, reaching from the hinge to the ventral margin instead of being restricted more or less to the dorsal half of the posterior side, and in the anterior gape also reaching from the hinge to the ventral margin.

#### *Limaria (Promantellum) fragilis* (Gmelin, 1791), new combination

*Ostrea fragilis* Gmelin, 1791:3332 [Nicobar Islands].

*Lima (Mantellum) fragilis* (Gmelin).—Thiele, 1920:34, pl. 1: fig. 2, pl. 6: fig. 4.—Lamy, 1930:169; 1936:268; 1938:142.

*Lima (Mantellium) fragilis* (Gmelin) [sic].—Steele 1957:113.

*Limea fragilis* (Gmelin).—Cernohorsky, 1972a:220, pl. 62: fig. 1.

*Lima fragilis* (Gmelin).—Salvat and Rives, 1975:371, fig. 419.

**DIAGNOSIS.**—This rather common Indo-Pacific species is recognizable by its rather flattened, obliquely elongate shape and a sculpture consisting of fine, rather sharp and separated radial ridges whose marginal ends give the margin a serrated appearance; both posterior and anterior gapes extend from the hinge to the ventral margin.

**RANGE.**—Throughout most of the Indo-Pacific, from Natal, South Africa through Indonesia and the Philippines to Micronesia and Polynesia.

**MATERIAL.**—1 specimen, Anakena Bay, 29 Dec 1934, A. Metraux, MNHN.

**MEASUREMENTS.**—The fragile specimen listed above measures approximately 9.1 mm in length and 6.6 mm in width.

### Family LUCINIDAE Fleming, 1828

#### Genus *Codakia* Scopoli, 1777

##### Subgenus *Epicodakia* Iredale, 1930

*Epicodakia* Iredale, 1930:389.—Chavan, 1969a:N496. [Type-species: *Epicodakia consettiana* Iredale, 1930 (= *Lucina minima* Tenison-Woods, 1876, not *Lucina minima* Roemer, 1836); original designation.]

*Codakia*, subgenus *Epicodakia* Iredale.—Bretsky, 1969:326.—Britton, 1971:323–324.

**REMARKS.**—I follow Bretsky (1969:326) and Britton (1971:323–324) in giving *Epicodakia* and *Ctena* Mörch, 1861, subgeneric rank under *Codakia* rather than considering them distinct genera as Chavan (1969a:N495–N496) has done.

#### *Codakia (Epicodakia) bella* (Conrad, 1837), new combination

*Lucina bella* Conrad, 1837:254, pl. 19: fig. 11 [San Diego].

*Lucina ramulosa* Gould, 1850:255 [Paumotu Islands]; 1852:415, pl. 36: fig. 523.

*Lucina divergens* Philippi, 1850:103, pl. *Lucina* 2: fig. 4.—Odhner, 1922:248.—Steele, 1957:113.

*Jagonia ramulosa* (Gould).—Dall, 1908a:437.

*Codakia (Jagonia) divergens* (Philippi).—Lamy, 1921:254–256; 1936:268; 1938:142–143.

*Codakia (6 Lucina)* [sic] sp.—Fuentes, 1914:317.

*Ctena bella* (Conrad).—Dall, Bartsch, and Rehder, 1938:129, pl. 35: figs. 1–8.



**DIAGNOSIS.**—A well-known and abundant species throughout the western and central Pacific, characterized by its broadly ovate to suborbicular shape, up to 30 mm in length, white and occasionally flushed with yellow inside and out, with crowded axial riblets, often dichotomizing, especially at the anterior and posterior ends, the ribs crossed by low concentric ridges that form low elongate nodules on the ribs.

**RANGE.**—Cocos-Keeling and Indonesia and southern Japan to Hawaii and Polynesia, as far east as Easter Island.

**HABITAT.**—In sand and under rocks in rocky tide pools.

**MATERIAL.**—17 specimens and 85 valves from stas E-1, E-8, E-10A, E-14, E-15, E-16, E-18, E-18A, E-25, E-26, E-27A, E-31, E-32, E-33, E-35, E-35A; 9 valves, Hotu Iti, 8 Aug 1972, M. Villarroel, USNM 708440; 2 valves, in sand pockets in 3 to 7 ft (0.9 to 2.1 m), Hango Piko, 18 Jan 1969, J. E. Randall, BPBM 206936; 2 specimens, 5 valves, in tide pools between Hanga Roa and Hanga Piko, 24 Jan 1969, J. E. Randall and B. A. Baker, BPBM 206946; 1 specimen, tide pool between Hanga Roa and Hanga Piko, 26 Jan 1969, J. E. Randall, BPBM 206959; 19 specimens, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 2 valves, in tide pool, Hanga Piko, 31 Dec 1964, I. Efford, UBC 6316; 6 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200261; 6 specimens, Hanga Piko, 1958, R. Vargas D., MNSH 200423; 1 specimen, Anakena, 1958, R. Vargas D., MNSH 200422; 13 specimens, 1958, R. Vargas D., MNSH 200425; 4 specimens, 1954, Prof. Baeza, MNSH 200424; about 40 specimens, May 1960, L. Perez, MNSH 200260; 7 specimens, 26 valves, Dec 1904, USBF Str. *Albatross*, USNM 204074; 3 specimens, S. Englert, CAS.

**MEASUREMENTS** (mm).—No width given for USNM 755967, a single valve.

	length	width	height
USNM 755967	21.82		21.14
USNM 756061	18.22	9.70	17.45
USNM 756061	11.25	5.80	10.71

**REMARKS.**—Some recent authors have been using the specific name *C. divergens* (Philippi) for this species, in the belief that the identity of Conrad's species is in doubt since it was described as coming from San Diego, California. No species with the characters given by Conrad occurs in the Californian or Panamic provinces, however, and the description agrees exactly with the characters of specimens from Hawaii. In Conrad's article other species are described from California that are actually found only in Hawaii and the

Indo-Pacific region, so we apparently have here a case of erroneous type-locality.

## Family LASAEIDAE Gray, 1847

### Genus *Lasaea* Brown, 1827

*Lasaea* Brown, 1827, expl. pl. 20: figs. 17, 18.—Keen, 1938: 19.—Dall, Bartsch, and Rehder, 1938:141.—Chavan, 1969b:N520. [Type-species: *Cardium rubrum* Montagu, 1801; monotypy.]

### *Lasaea hawaiiensis* Dall, Bartsch, and Rehder, 1938

#### PLATE 14: FIGURES 7-9

*Lasaea hawaiiensis* Dall, Bartsch, and Rehder, 1938:141, fig. 18, pl. 38: figs. 1-4.

**DIAGNOSIS.**—Small, reaching a little over 5 mm in length, broadly ovate, inflated, yellowish brown in color, tinged with reddish purple near the umbones and hinge, superficially smooth with conspicuous growth lines, but microscopically granulose with underlying minute irregular often divergent radial granulose ridges; hinge teeth relatively heavy, purplish pink to purplish red in color, with the interior of the shell often more or less suffused with purplish red.

**RANGE.**—Hawaiian Islands, Easter Island, Gambier Islands, Rapa.

**HABITAT.**—Undoubtedly under stones in tide pools, although all our specimens were found dead.

**MATERIAL.**—About 50 specimens from stas E-20, E-27, E-27A; 1 valve, 1958, R. Vargas D., MNSH 100217; 1 specimen, S. Englert, CAS.

**MEASUREMENTS** (mm).—No widths given for single valves.

	length	width	height
USNM 756087	5.15		4.55
USNM 756087	4.34		3.86
USNM 756243	4.19		3.54
USNM 756243	3.74	2.05	2.80

**REMARKS.**—This species appears to be closest to the Japanese species *L. nipponica* Keen, 1938, published four months before *L. hawaiiensis*. It tends, however, to be larger, with the hinge teeth relatively smaller, and the anterior lateral tooth in the right valve longer and not apically truncate as in *L. nipponica*.

## Family CHAMIDAE Lamarck, 1809

Genus *Chama* Linné, 1758

*Chama* Linné, 1758:691. [Type-species: *Chama lazarus* Linné, 1758; Children, 1825 (ICZN Opinion 484, 1957).]

*Chama iostoma* Conrad, 1837

*Chama imbricata* Broderip, 1835a:149; 1835b:304, pl. 39: fig. 2 [Lord Hood's Island (= South Marutea)].—Reeve, 1846 (in 1846–1847), pl. 1: sp. 3.—Salvat and Rives, 1975:373, fig. 428. [Not *Chama imbricata* Lamarck, 1801.]

*Chama iostoma* Conrad, 1837:256 [Sandwich Islands].—Reeve, 1846 (in 1846–1847), pl. 2: sp. 7.—Dall, Bartsch and Rehder, 1938:151, pl. 40: figs. 1–4.

*Chama broderipii* Reeve.—Dall, 1908a:437.—Steele, 1957:113. [Not *Chama broderipii* Reeve, 1846.]

DIAGNOSIS.—A species of medium to large size (some specimens from the Society Islands and Tuamotus reach 110 mm in greatest diameter), typically rather rounded in outline but also oblong and occasionally triangular in cross-section, almost always heavily encrusted, obscuring the external sculpture, which when apparent is concentrically foliately lamellose on the upper valve with an arcuate lamellose ridge below the rugose area below and posterior to the hinge line; the lower valve is strongly rugose between the area of attachment and the dorsal line. The interior is generally strongly tinged at the edge, particularly the ventral margin, with dark grayish red to dark reddish or grayish purple.

RANGE.—From Thailand and the Philippines, through Micronesia to Hawaii; Queensland to Easter Island.

MATERIAL.—7 specimens from stas E-9A, E-11, E-18, E-25; 1 specimen, Dec 1904, USBF Str. *Albatross*, USNM 204076; 4 specimens, Hanga Roa, 1958, R. Vargas D., MNSH 200253, 200254, 200306, 200308; 1 specimen, between Hanga Roa and Hanga Piko, R. Vargas D., MNSH 200307; 1 specimen, off Motu Nui, Jan–Feb 1972, M. Codocco, MNSH; 1 specimen, near Hanga Roa, 8 May 1958, V. Koltun and P. Pasternak, ZIL; 3 specimens, S. Englert, CAS.

## MEASUREMENTS (mm).—

	diameter		height	
	max.	min.	l. valve	r. valve
USNM 756178	56.1	45.5	32.0	28.1
USNM 756178	50.3	46.2	29.3	28.0

REMARKS.—The specimens from Easter Island are on the average smaller than those found on the coral reefs of the islands to the west and the internal coloring is generally more restricted to a narrower band at the margin. These same characteristics are also found in specimens I have examined from Lizard Island, Queensland, and from Fiji.

I am unwilling to separate as taxonomically distinct those specimens of a more elongate form with the lower or left valve possessing a high arched dorsal margin and the ventral margin not raised above substrate or only slightly so, and with the right valve being smaller and flattened, resulting in the shell being triangular in a dorso-ventral cross-section. This is the extreme form of what Broderip called *C. imbricata*.

## Family SEMELIDAE Stoliczka, 1870 (1825)

REMARKS.—The first family name proposed for this taxon is *Amphidesmitae* Latreille, 1825, based on the junior synonym *Amphidesma* Lamarck, 1818.

Genus *Semele* Schumacher, 1817

*Semele*, Schumacher, 1817:165–166.—Keen, 1969b:N636. [Type-species: *Tellina reticulata* Spengler, 1798 [not *Tellina reticulata* Linné, 1767] (= *Tellina proficua* Pulteney, 1799); monotypy.]

*Amphidesma* Lamarck, 1818:489.—Keen, 1969b:N636.

*Semele australis* (Sowerby, 1833)

## PLATE 14: FIGURES 5, 6

*Amphidesma australe* Sowerby, 1833b:200 [Lord Hood's Island (= South Marutea)].

*Amphidesma australis* Sowerby.—Reeve, 1853, pl. 6: sp. 41.

*Semele australis* (Sowerby).—Dall, 1908a:437.—Lamy 1914:338.—Steele, 1957:113.

*Semele tita* Dall, Bartsch, and Rehder, 1938:177, pl. 45: figs. 1–4 [Hawaii, Hawaii].

DIAGNOSIS.—This species is quite distinct by reason of its broad, transversely oval shape, strong, rounded, undulating concentric ribs with finer, crowded and irregular concentric ridges superimposed, which are separated by deep and narrow interspaces.

RANGE.—Cook Island, north to Hawaii and east to

Easter Island, with a single valve each from Bikini, Marshall Islands, and Lifu, Loyalty Islands.

**MATERIAL.**—1 specimen and 4 valves from stas E-1, E-10A, E-16, E-18A, E-25; 1 specimen and 3 valves, Dec 1904, USBF Str. *Albatross*, USNM 204075.

**MEASUREMENTS (mm).**—Width not given for single valves.

	length	width	height
USNM 756153	26.03		22.98
USNM 751543	24.73		24.36
USNM 756186	17.12	7.2	15.02
USNM 204075	12.16		11.64

**REMARKS.**—The species appears to be restricted principally to the Polynesian and Hawaiian biogeographical provinces. Its presence in Micronesia and Melanesia, indicated by the presence in our collection of only one specimen from each area, should be verified.

In his original description Sowerby cites as habitat of this species the shores of Australia and the islands of the Pacific; in the next line he says that Cuming found it in crevices of coral rock at Lord Hood's Island. I designate South Marutea Atoll in the Tuamotus as the type-locality for *S. australis*.

#### Family TELLINIDAE Blainville, 1814

##### Genus *Tellina* Linné, 1758

##### Subgenus *Cadella* Dall, Bartsch, and Rehder, 1938

*Cadella* Dall, Bartsch, and Rehder, 1938:196. [Type-species: *Tellina lechriogramma* Melvill, 1893; original designation.]

*Tellina*, subgenus *Cadella* Dall, Bartsch, and Rehder.—Keen, 1969b:N615.

##### *Tellina (Cadella) mauia* (Dall, Bartsch, and Rehder, 1938)

PLATE 12: FIGURES 16, 17

*Cadella mauia* Dall, Bartsch, and Rehder, 1938:197, pl. 50: figs. 1-4.

**DIAGNOSIS.**—A small ovate shell, reaching 6 mm in length, white with gray blotches in shell substance giving the appearance of watered silk, moderately elongate, the umbones near the posterior end, with fine,

crowded, concentric riblets. Hinge with two cardinals in each valve, the left anterior and the right posterior one bifid, laterals in right valve strong, those in left valve weak.

**RANGE.**—Hawaiian Islands and Easter Island.

**MATERIAL.**—1 valve, Easter Island 1958, R. Vargas D., MNSH 100219.

**MEASUREMENTS (mm).**—Length, 4.96; width, 0.93; height, 3.04.

**REMARKS.**—A single valve of this little tellinid has been seen from Easter Island, agreeing in most characters with the species described from Maui, Hawaii, except that the crowded, concentric riblets in the Easter Island specimen are somewhat finer. This species has not turned up in French Polynesia in the course of intensive collections, although eight lots of the other Hawaiian species, *Tellina (Cadella) oahuana* Dall, Bartsch, and Rehder, 1938, were collected.

#### Family HIATELLIDAE Gray, 1824

##### Genus *Hiatella* Bosc, 1801

*Hiatella* Bosc, 1801:120.—Keen, 1969c:N700. [Type-species: *Hiatella monoperta* Bosc, 1801 (= *Mya arctica* Linné, 1767); Winckworth, 1932.]

*Saxicava* Fleury-Bellevue, 1802:354.—Keen, 1969c:N700.

##### *Hiatella hawaiiensis* (Dall, Bartsch, and Rehder, 1938)

PLATE 14: FIGURES 1-4

*Saxicava hawaiiensis* Dall, Bartsch, and Rehder, 1938:200, pl. 50: figs. 13-14 [Oahu, Hawaii].

*Saxicava australis* (Lamarck).—Lamy, 1936:268; 1938:143.—Steele 1957:113. [Not *Corbula australis* Lamarck, 1818.]

**DIAGNOSIS.**—This species differs from *H. arctica* (Linné, 1767) in being more elongate rather than irregularly trapezoidal, often lacking the usually pronounced posterior ridges, and in the concentric sculpture being more regular and often sublamellar; the hinge teeth, even in young specimens, are reduced to a rather obscure protuberance or a mere thickening in the cardinal area of each valve.

**RANGE.**—Hawaiian Islands, Easter Island.

**HABITAT.**—Unknown, probably nestling in crevices in rocks.

**MATERIAL.**—2 specimens, Anakena Bay, 29 Dec 1934, A. Metraux, MNHN; 1 specimen, Easter Island 1958, R. Vargas D., MNSH 100218.

**MEASUREMENTS (mm).**—

	<i>length</i>	<i>width</i>	<i>height</i>
MNHN	12.54	4.15	5.70
MNHN	8.92	3.20	4.34

**REMARKS.**—I am unable to separate these Easter Island shells from the Hawaiian specimens. The essentially edentulous nature of even the youngest specimens makes the allocation of these tropical forms to the basically boreal and temperate genus *Hiatella* somewhat doubtful. An examination of the soft parts should help us locate this species in its proper place. From *H. australis* (Lamarck) it differs essentially in its not possessing the pronounced cardinal tooth of that species.

**Family TEREDINIDAE Rafinesque, 1815**

**REMARKS.**—Two valves of a species of shipworm were recovered from beach drift at Hanga Nui. Without the complete animal or at least the pallets it is impossible to allocate these specimens to a particular genus in the family, let alone identify them to species. Except for boats there are practically no wooden marine structures on the island, so driftwood is the most likely source of members of this family on the island.

**Class CEPHALOPODA**

**Family OCTOPODIDAE Rafinesque, 1815**

**Genus *Octopus* Cuvier, 1797**

*Octopus* Cuvier, 1797:390.—Lamarck, 1798:130.—Robson, 1929:56. [Type-species: *Sepia octopus* Gmelin, 1791, tautonymy.]

**REMARKS.**—Most recent authors cite Lamarck, 1798, as author of *Octopus*. According to Hemming's statement in "Opinion 233" of the International Commission on Zoological Nomenclature (Hemming, 1954a:288), the short note in which Lamarck's use

of *Octopus* was proposed (Lamarck, 1798:130) appeared in August 1798 (Thermidor, year 6 of the Revolutionary Calendar), while Cuvier's use of the name in his *Tableau élémentaire* (Cuvier, 1797:390) appeared also in the year 6, but on 27 December 1797. Actually, Cuvier's *Tableau* was published some time prior to the date cited by Hemming for it was reviewed in number 11 of volume 1 of the *Journal Typographique et Bibliographique*, which appeared on 24 December 1797.

***Octopus rapanui* Voss, 1979**

*Octopus rapanui* Voss, 1979:360–367, figures 1, 2.

**DIAGNOSIS.**—A rather small species (mantle length of mature specimens 70 to 115 mm) not obviously related to any other species from the Indo-Pacific. Apparently fleshcolored ventrally and darker and purplish dorsally, the mantle, head and arms with scattered rough tubercles on the dorsal and lateral surfaces. The lower beak has a projecting spinelike rostrum and the radula has very long and slender rachidian teeth. The penis has a secondary diverticulum.

**RANGE.**—Easter Island.

**MATERIAL.**—Holotype: male, Hanga Piko, 14 Jan 1965, I. Efford and J. Mathias, USNM 729860. Paratypes: 2 males, 1 female, Hanga Piko, 14 Jan 1965, I. Efford and J. Mathias, USNM 729990; 1 female, Apina Iti, 18 Jan 1965, I. Efford and J. Mathias, UMML 1746; 1 male, Vinapu, 25 Jan 1965, I. Efford and J. Mathias, UMML 1742; 1 male, Hanga Roa, 5 Feb 1965, I. Efford and J. Mathias, UMML 1743; 1 female (?), sta. E-37, USNM 751587.

**REMARKS.**—The description of this species is based on nine specimens, 5 males and 3 females collected in January 1965 during the Canadian Medical Expedition, and one young female(?) collected by Benito Alarcón on 2 November 1974, the last day of our stay on Easter Island. None of these are in a good state of preservation, but its distinct characters differentiate it from any known species from the tropical Pacific. More critical study is needed of the species of this area, particularly of the internal anatomy.

The holotype and 4 paratypes are in the National Museum of Natural History and 4 paratypes are in the collections of the University of Miami School of Marine and Atmospheric Science.



**Species Advectitious or Erroneously Ascribed  
to Easter Island**

**Family TROCHIDAE Rafinesque, 1815**

***Tegula (Chlorostoma) atra* (Lesson, 1831)**

*Trochus ater* Lesson, 1831:344, pl. 16: fig. 2.

*Chlorostoma atrum* (Lesson).—Pilsbry, 1889:173–174, pl. 28: figs. 40, 41.

*Tegula (Chlorostoma) atra* (Lesson).—Marincovich, 1973: 24.

REMARKS.—This rather common species inhabits the entire Chilean coast southward to just north of Magellan Straits and is found in Peru northward to Paita.

Two greatly worn shells, labeled as having been collected on Easter Island by R. Vargas D., were found in the collections of the Museo Nacional de Historia Natural in Santiago, Chile. If the label is correct it seems certain that these shells were carried to Easter Island personally or in ballast.

**Family LITTORINIDAE Gray, 1840**

**Genus *Littorina* Ferussac, 1822**

***Littorina (Austrolittorina) unifasciata  
fernandezensis* Rosewater, 1970**

*Littorina undulata?* var.—Fuentes, 1914:316. [Not *Littorina undulata* Gray, 1839.]

*Littorina (Austrolittorina) unifasciata fernandezensis* Rosewater, 1970:471, pl. 359: figs. 9–12, pl. 361: fig. B.

REMARKS.—This species was recorded from Easter Island by Fuentes in 1914 as *Littorina undulata?* var. (Fuentes, 1914:316). The material, collected in 1911, was submitted to the British Museum for study and the mollusks were identified by G. A. Robson. On a visit to the British Museum Dr. J. Rosewater found three specimens of this lot preserved in alcohol (BMNH 1914.5.8.6–9) and was able to borrow this material for study.

I have been able to examine these specimens and confirm Dr. Rosewater's conclusion that they belong to *Littorina unifasciata fernandezensis* Rosewater as they are indistinguishable from the large number of specimens we have from Juan Fernandez.

As extensive collecting in the last forty years on Easter Island has failed to turn up specimens of this species, I am inclined to believe that these specimens were collected by Fuentes in the Juan Fernandez Islands, possibly on his 1914 trip to Easter Island, as this group lies on the direct route between Valparaiso and Easter Island.

**Family NASSARIIDAE Iredale, 1916**

***Nassarius gayii* (Kiener, 1834)**

*Buccinum gayii* Kiener, 1834:71, pl. 28: fig. 79.

*Nassarius gayii* (Kiener).—Cernohorsky, 1975a:141–143, figs. 44–49.

REMARKS.—This species, found along almost the entire coasts of Peru and Chile, was represented in the collection of the Museo Nacional de Historia Natural by two worn specimens purporting to have been collected on Easter Island by R. Vargas D. This is, in my opinion, another case of an advectitious specimen, possibly brought there in ballast.

**Family ARCIDAE Lamarck, 1809**

***Arca angulata* King and Broderip, 1831**

*Arca angulata* King and Broderip, in King, 1831:336 [Juan Fernandez Island].—Reeve, 1844, pl. 13: sp. 84.—Stempell, 1899:219, pl. 12: figs. 1–9.

REMARKS.—A living specimen of this species that is known only from the Juan Fernandez Islands, was found nestling in a crevice of a piece of pumice found floating near the water's edge of Ovahe Beach (sta E–12).

This pumice was undoubtedly brought to Easter Island by the branch of the Peru Current that sweeps by the Juan Fernandez Islands and heads in a north-westerly direction. Its waters are gradually warmed as it mingles with the warm water of the southeastern Pacific gyral current whose northern portion touches Easter Island.

At the present time it is impossible to ascertain the origin of the piece of pumice that was carried to Juan Fernandez by the Peru current, and thence to Easter Island.

**Family PECTINIDAE Rafinesque, 1815*****Chlamys (Zygochlamys) patagonicus* (King and Broderip, 1831)**

*Pecten patagonicus* King and Broderip, in King, 1831:337.  
—Reeve, 1853 (in 1852-1853), pl. 26: fig. 110.—Steele, 1957:113.

*Chlamys patagonicus* (King and Broderip).—Grau, 1959:82.

REMARKS.—The specimen recorded by Steele (1957:113) as having been collected at Easter Island

is apparently the same one that Grau mentions as being in his collection, which is now in the Smithsonian Institution. The specimen (USNM 774080) is a single valve, badly worn at the margins and the hinge area, that was found on the beach at Anakena by Father Englert. It is without doubt advectitious and was probably dropped there by some visitor or arrived in a ship's ballast.

The species is an inhabitant of cold water and is found from Puerto Montt in southern Chile, through the Straits of Magellan to Puerto Quequen in southern Argentina, as well as in the Falkland Islands.

## Addendum

After I had returned corrected galley proof of this report (and before I received page proof), I received E. Alison Kay's excellent and most useful book, *Hawaiian Marine Shells* (Bernice P. Bishop Museum Special Publication 64(4), 1979). The timely arrival of Kay's work allows me to make some essential revisions of my treatment of certain species.

Page 62: *Fossarus multicosatus* Pease should be changed to *Fossarus cumingii* A. Adams, 1855. I have seen no specimens of *F. multicosatus* from Hawaii, and am unable to compare it critically with my material from Easter Island.

Pages 76, 77: *Zafrona striatula* (Dunker, 1871), with which my new species *Z. consobrinella* is compared, is probably a junior synonym of *Z. pusilla* (Pease, 1860). This species, described as *Triton pusilla* Pease (1860c:434), is placed by Kay (1979:261) in the synonymy of *Caducifer nebulosa* (Gould, 1860). Gould's species, is however quite different, and is a true Columbelloid, possibly belonging also in *Zafrona*. Pease's name is not preoccupied by *Columbella pusilla* Sowerby, 1844, which is an *Astyris*.

Pages 81, 82: *Caducifer decapitata cylindrica* (Pease, 1868), the Micronesian, Hawaiian, and Polynesian race of *Caducifer decapitata*, should bear the name *Caducifer decapitata fuscomaculata* (Pease, 1860); see Kay (1979:260).

Page 88: *Microdaphne morrisoni*, new species, is found also in Hawaii, identified there as *M. trichodes* (Dall, 1919) by Kay (1979:362).

Page 98: *Williamia polynesica*, new species, is *Williamia radiata* (Pease, 1860), described as *Tectura radiata* Pease (1860c:437).

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PLATE 1.—Coast line of Easter Island: 1, south coast between Akahanga and Hanga Nui;  
2, tide pools near Hanga Piko. (Photos by H. A. Rehder.)



PLATE 2.—Coast line of Easter Island: 1, south coast near Haka Ea, Vaihu; 2, southeast coast at Hanga Nui. (Photos by H. A. Rehder.)



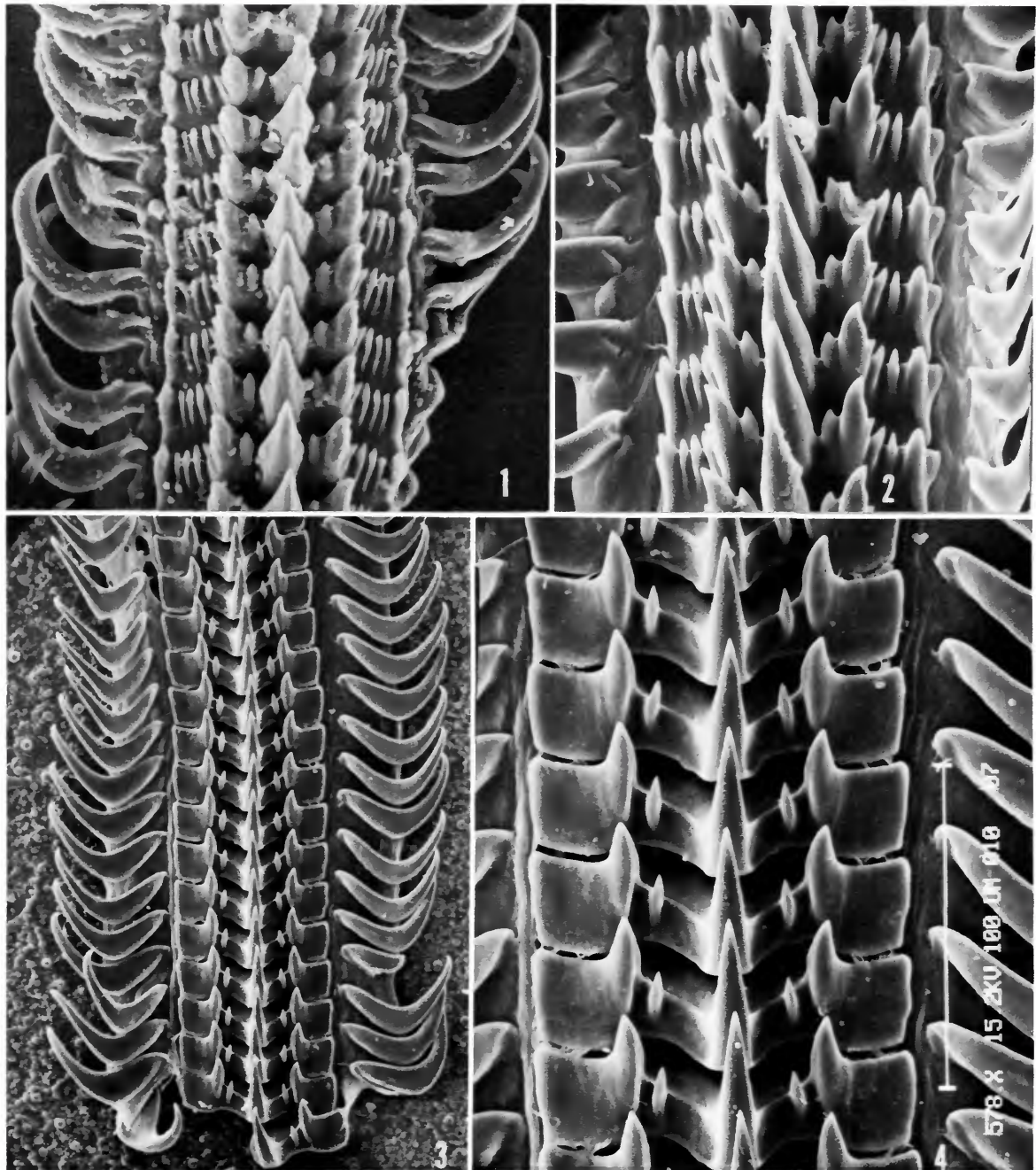


PLATE 3.—Radulae of Muricidae (Thaisinae): 1, *Neothais nesiotis* (Dall), USNM 756190, Hanga Nui,  $\times 460$ ; 2, *Agnewia tritoniformis* (Blainville), USNM 758404,  $\times 450$  [Sydney, N.S.W.]; 3, 4, *Pascula citrica* (Dall), USNM 756104 (3,  $\times 235$ ; 4,  $\times 578$ ). (Photos reproduced at 97%.)

## PLATE 4

*Plaxiphora (Mercatoria) mercatoris* Leloup

1. USNM 756791,  $\times 1\frac{1}{2}$ .

*Emarginula velascoi*, new species

2. Holotype, USNM 756019,  $\times 10$ .
3. Paratype, USNM 756207,  $\times 10$ .

*Zeidora bahamondei*, new species

4. Paratype, MNSH 200402,  $\times 10$ .
5. Holotype, MNSH 200403,  $\times 10$ .

*Diadora granifera* (Pease)

- 6, 7. USNM 756075,  $\times 10$ .

*Euchelus (Herpetopoma) alarconi*, new species

8. Holotype, USNM 756195,  $\times 10$ .

*Stomatella esperanzae*, new species

- 9–11. Paratype, ANSP 321080,  $\times 5$ .

*Nerita (Heminerita) morio* (Sowerby)

- 12, 13. USNM 751557,  $\times 2$ .

*Nerita (Heminerita) lirillata*, new species

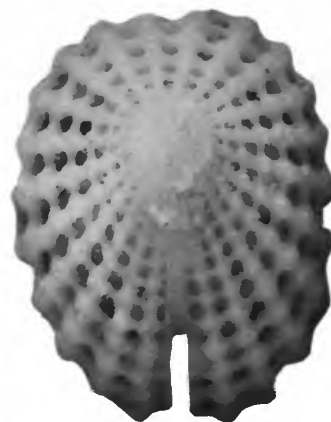
14. Holotype, USNM 756795,  $\times 2$ .
15. Paratype, USNM 756197,  $\times 2$ .



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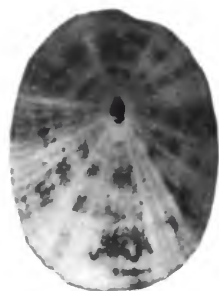
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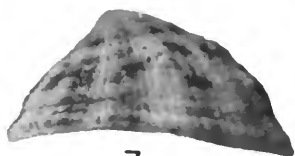
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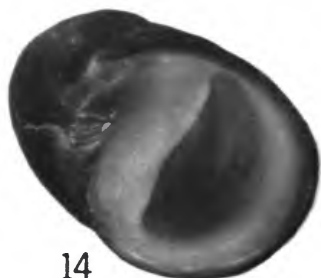
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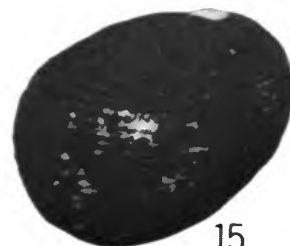
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## PLATE 5

*Nodilittorina pyramidalis pascua* Rosewater

1. USNM 756048, × 3.

*Isseliella chiltoni* (Oliver)

2. Holotype, Canterbury Museum M2911 × 10 [Sunday Island, Kermadecs].  
3-5. USNM 756260, × 10.

*Rissoina (Rissolina) turricula engleri*, new subspecies

6. Holotype, USNM 755993, × 10.

*Zebina tridentata crassilabrum* (Garrett)

7. USNM 756231, × 10.

*Assiminea vulgaris* (Webster)

8. USNM 756237, × 20.

*Merelina (Mereliniopsis) crassula*, new species

9. Holotype, USNM 767026, × 20.

*Merelina (Merelina) longinqua*, new species

10. Holotype, USNM 766829, × 20.

*Caecum* cf. *solitarium* Oliver

11. USNM 756269, × 20.

*Caecum amydroglyptum*, new species

12. Holotype, USNM 756977, × 20.

*Heliacus codoceae*, new species

- 13-15. Holotype, ANSP 321078, × 6.

*Orbitestella toreuma* Powell

16. USNM 680882, × 20 [North Cape, New Zealand].

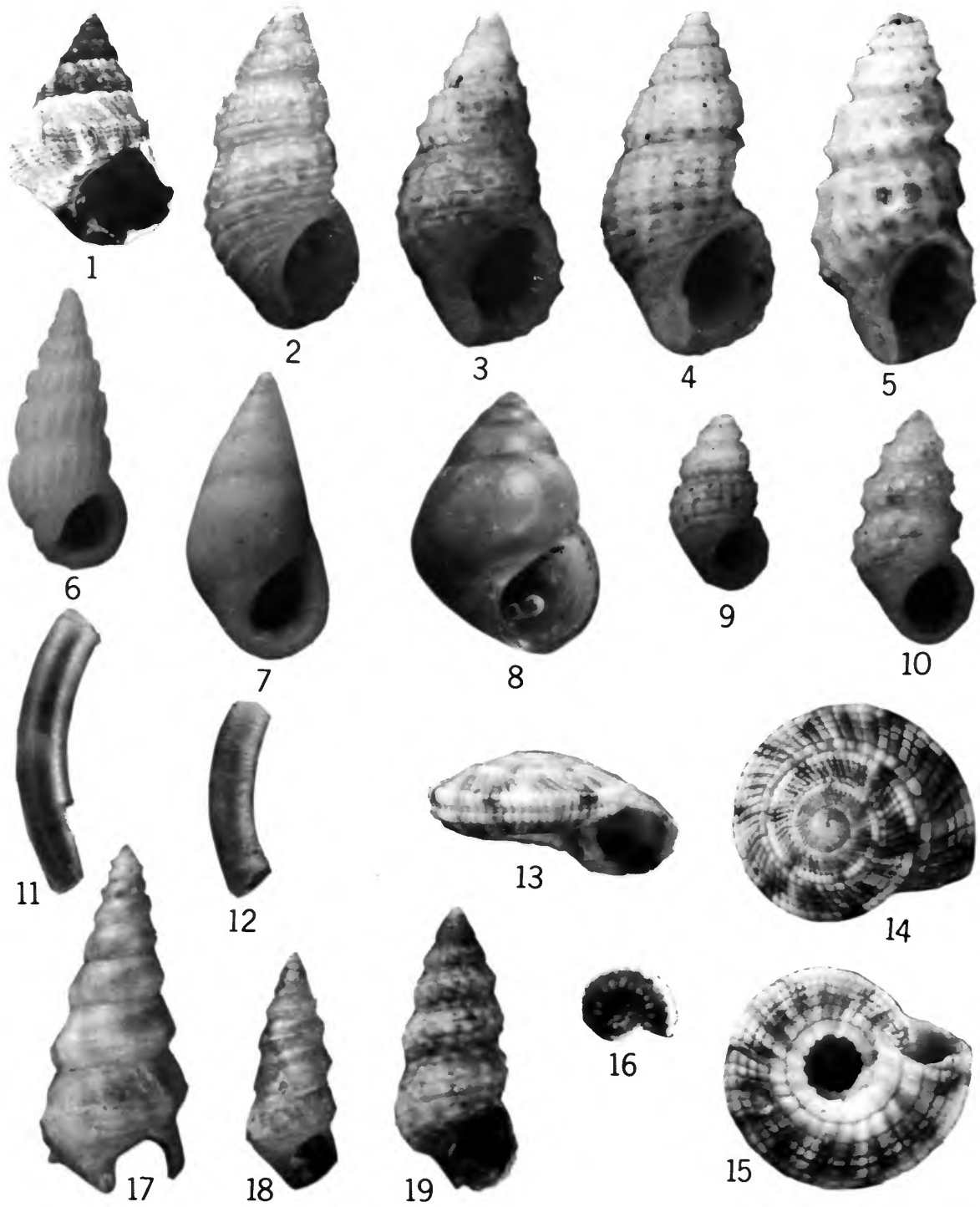
*Cerithidium actinium*, new species

17. Holotype, USNM 767085, × 20.  
18. Paratype, USNM 756213, × 20.

*Cerithidium* species

19. USNM 756276, × 20.





## PLATE 6

*Cerithium (Cerithium) rubus* Deshayes

- 1, 2. USNM 756100, × 2.

*Cerithium (Cerithium) sandwichense* Sowerby

3. USNM 769731, × 2.

*Cerithium (Thericium) egenum* Gould

4. USNM 751603, × 6.

*Cerithium (Thericium) leptocharactum*, new species

5. Holotype, USNM 756335, × 3.  
6. Paratype, USNM 751613, × 3.  
7. Paratype, USNM 756160, × 3.

*Cerithiopsis powelli* Marshall

8. MNSH 200387, × 10.

*Cerithiopsis aquilum*, new species

9. Holotype, MNSH 200388, × 10.

*Iniforis limitaris*, new species

10. Holotype, USNM 756215, × 10.

*Triphora vargasi*, new species

11. Holotype, MNSH 200384, × 5.

*Triphora leucathema*, new species

12. Holotype, USNM 756003, × 10.

*Triphora aporema*, new species

13. Holotype, ANSP 321077, × 10.

*Triphora loisae*, new species

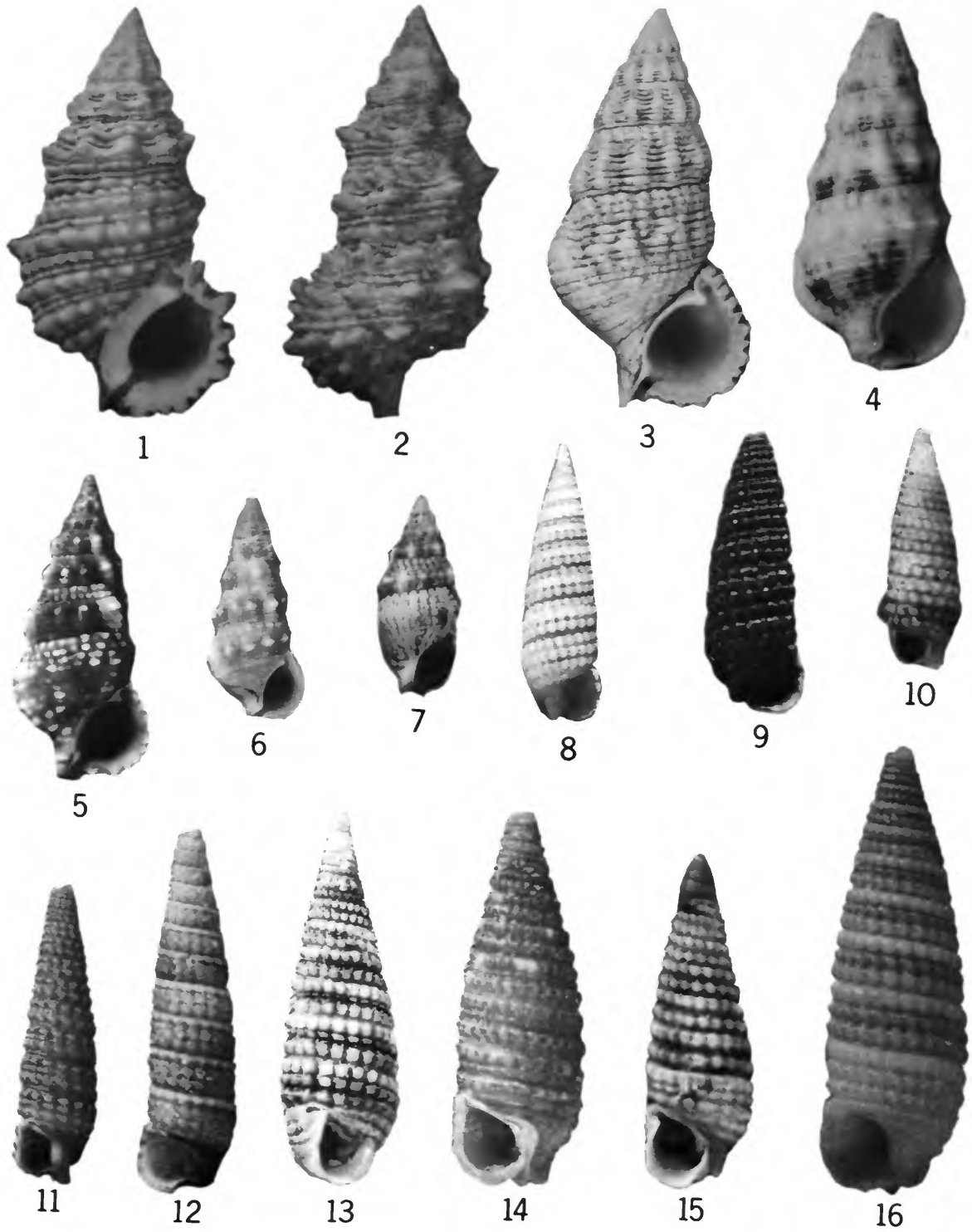
14. Holotype, USNM 756778, × 10.

*Triphora exomilisca*, new species

15. Holotype, USNM 756779, × 20.

*Triphora eucharis*, new species

16. Paratype, ANSP 339947, × 10.



## PLATE 7

*Metaxis polynesica*, new species

1. Holotype, MNSH 200413, × 20.

*Dendropoma platypus* (Mörch)

- 2, 3. USNM 769730, × 3.

*Planaxis (Angiola) fasciatus* Pease

4. Holotype, ANSP 18286, × 8 [Tuamotus].

*Planaxis (Hinea) akuana*, new species

5. Holotype, USNM 756793, × 3.

*Recluzia lutea* (Bennett)

6. USNM 214770, × 3 [Kermadec Islands].

*Janthina (Iodina) umbilicata* Orbigny

7. USNM 339268, × 5 [Hilo, Hawaii].

*Epitonium (Gyroscala) pyramis* Tinker

8. USNM 756060, × 3.

*Melanella cumingi* (A. Adams)

9. USNM 751588, × 2.

*Melanella pisinna*, new species

10. Holotype, USNM 756117, × 5.
11. Paratype, USNM 756571, × 5.

*Balcis aciculata* (Pease)

12. USNM 339222, × 5 [Hawaii].

*Hemiliostraca bahamondei*, new species

13. Holotype, USNM 766572, × 10.

*Vitreolina wareni*, new species

14. Holotype, CAS 59676, × 10.
15. Paratype, USNM 766700, × 10.

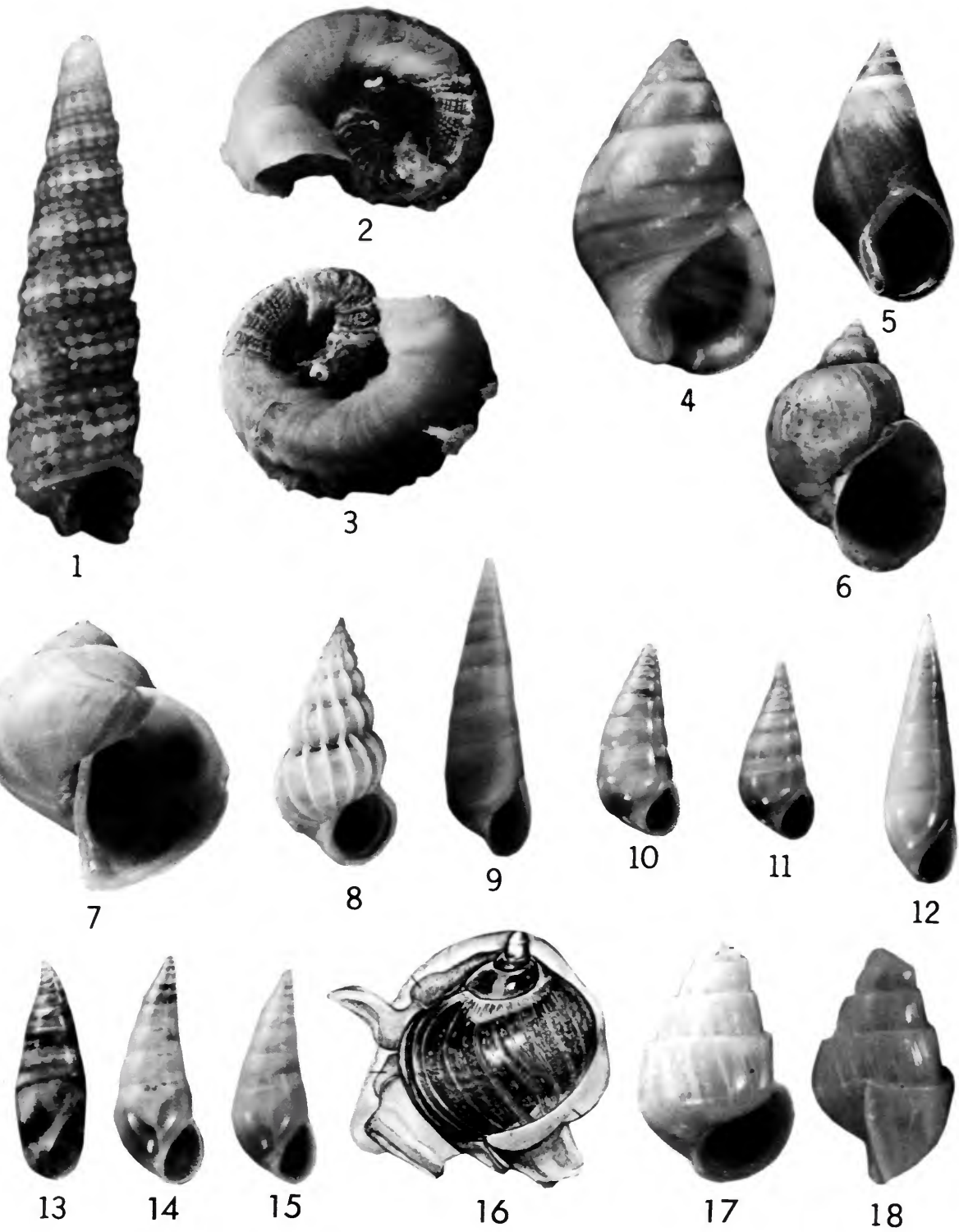
*Luetzenia goodingi*, new species

16. Male specimen (after Gooding and Lützen, 1973), × 8.

*Mucronalia? angulata* Mandahl-Barth

- 17, 18. Cotypes, MHNP, × 10.





**PLATE 8***Antisabia foliacea* (Quoy and Gaimard)

1, 2. USNM 756192, × 3.

*Antisabia imbricata* (Gould)

3, 4. USNM 756083, × 3.

*Pilosabia trigona* (Gmelin)

5, 6. USNM 708437, × 3.

*Fossarus multicostatus* Pease

- 7. CAS, × 10.
- 8. USNM 756121, × 10.
- 9. USNM 751574, × 10.
- 10. MNSH 200399, × 10.

*Mamilla simiae* (Deshayes)

11, 12. CAS, × 2.

*Natica ochrostigmata*, new species

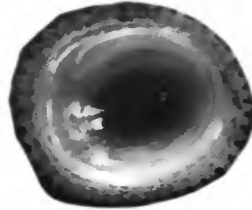
- 13. Holotype, USNM 339159, × 3 [Hawaii].
- 14. Paratype, USNM 339158, × 3 [Hawaii].
- 15. Operculum, USNM 768948, × 5.



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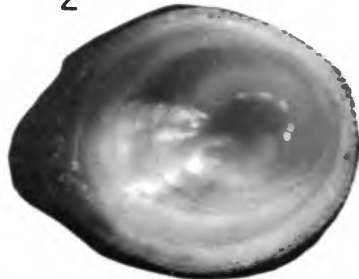
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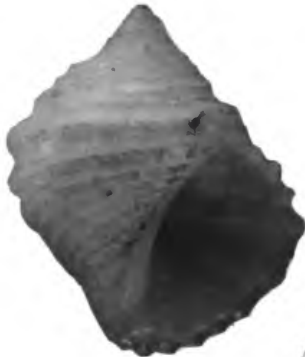
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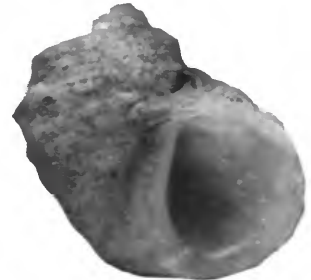
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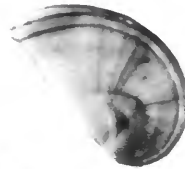
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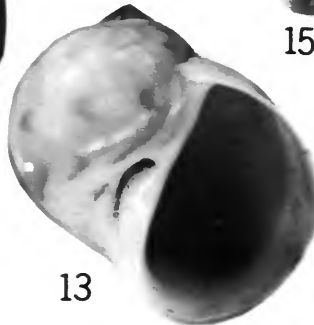
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## PLATE 9

*Cypraea caputdraconis* Melvill

- 1, 2. USNM 756338, × 2.

*Cypraea engleri* Summers and Burgess

- 3, 4. USNM 751586, × 2.

*Morula praecipua*, new species

5. Holotype, USNM 751592, × 3.

*Neothais nesiotae* (Dall)

6. USNM 756190, × 2.  
7, 8. USNM 756288, × 2.  
9. Juvenile, MNSH 200391, × 10.  
10. Operculum, USNM 756288, × 3.

*Pascuala citrica* (Dall)

11. Lectotype, USNM 110767, × 3.

*Zafrona consobrinella*, new species

12. Holotype, USNM 756164, × 10.  
13. Paratype, USNM 756336, × 10.

*Caducifer decapitata cylindrica* (Pease)

14. USNM 337863, × 4 [Hilo, Hawaii].

*Caducifer decapitata engleri* (Hertlein)

15. CAS, × 4.  
16. USNM 751580, × 4.

*Seminella* cf. *ornata* (Pease)

17. MNSH 200398, × 20.

*Mitra (Strigatella) flavocingulata* Lamy

18. USNM 751601, × 2.

*Imbricaria punctata* (Swainson)

19. USNM 204061, × 2.

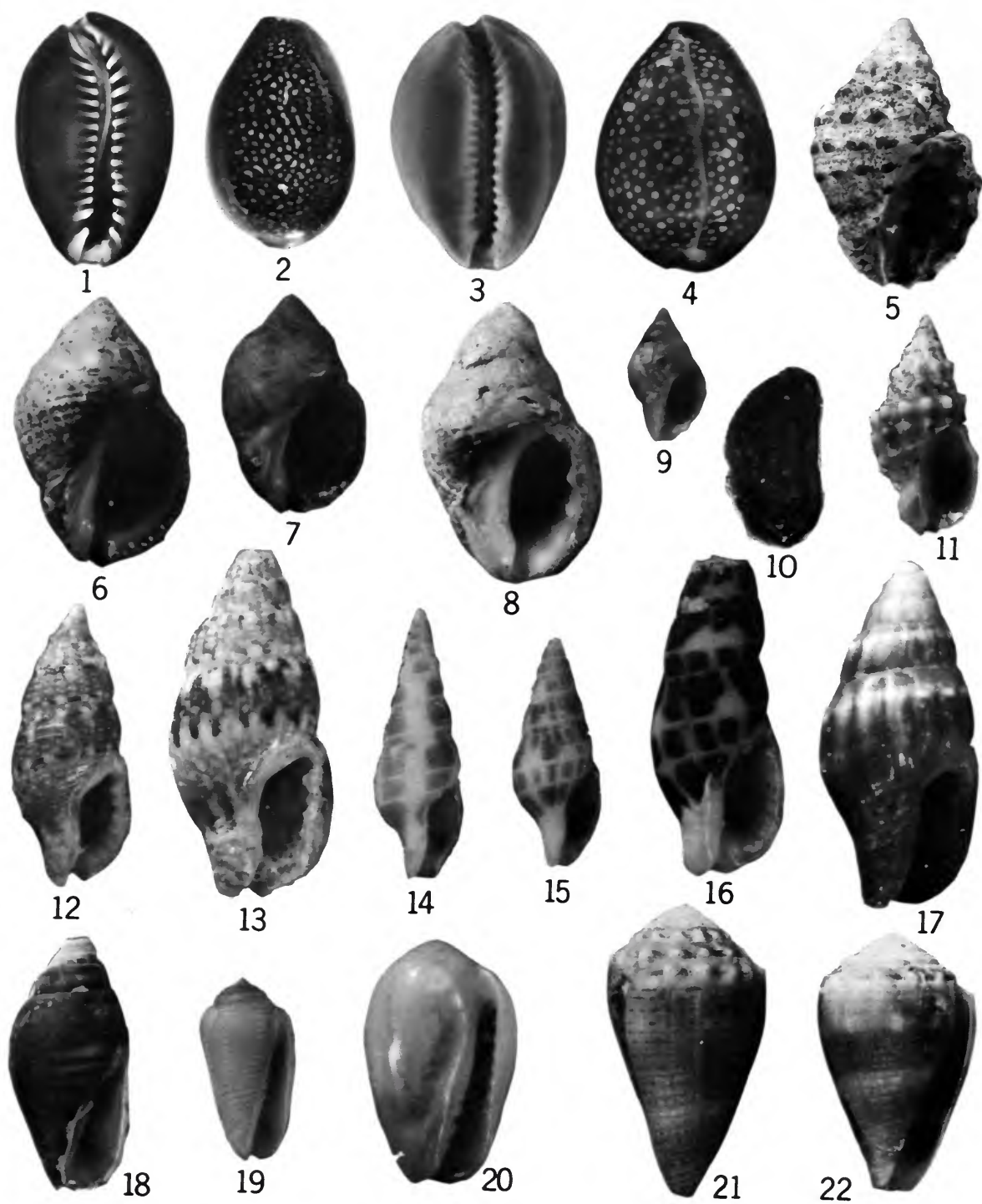
*Granula pascuana*, new species

20. Holotype, USNM 710721, × 20.

*Conus miliaris pascuensis*, new subspecies

21. Holotype, USNM 766496, × 2.  
22. Paratype, USNM 756103, × 2.





## PLATE 10

*Casmaria ponderosa perryi* (Iredale)

1. USNM 756337,  $\times 1\frac{1}{8}$ .

*Nodochila pascua* (Hertlein)

2. USNM 751605,  $\times 9$ .

*Smaragdinella calyculata* (Broderip and Sowerby)

3. USNM 756009,  $\times 9$ .

*Nassarius (Telasco) albomaculatus*, new species

4. Holotype, USNM 751615,  $\times 3\frac{1}{2}$ .
5. Paratype, USNM 767046,  $\times 3\frac{1}{2}$ .

*Euplica loisae*, new species

6. Holotype, USNM 753940,  $\times 9$ .
- 7, 8. Paratypes, USNM 756099,  $\times 9$ .



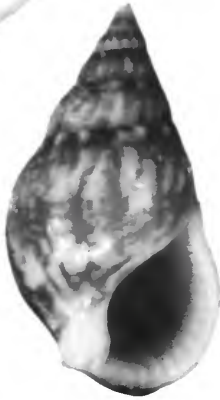
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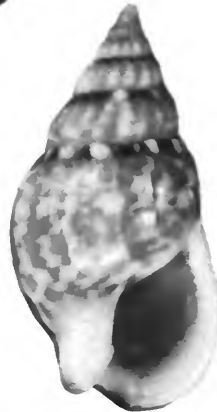
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## PLATE 11

*Kermia sagenaria*, new species

1. Holotype, USNM 756115,  $\times$  8.

*Kermia crassula*, new species

2. Holotype, MNSH 200397,  $\times$  20.

*Clathurella fuscobasis*, new species

- 3, 4. Holotype, USNM 756265,  $\times$  20.

*Microdaphne morrisoni*, new species

5. Holotype, USNM 758390,  $\times$  20 [Raroia, Tuamotus].
6. Paratype, USNM 756145,  $\times$  20.

*Lienardia exilirata*, new species

7. Holotype, USNM 758393,  $\times$  8.
- 8, 9. Paratypes, USNM 758394,  $\times$  8.

*Retusa (Cylichnina) pusilla* (Pease)

10. MNSH 200395,  $\times$  8.

*Berthelinia (Tamanovalva) cf. pseudochloris* Kay

- 11, 12. USNM 756068,  $\times$  10.

*Julia exquisita* Gould

- 13-16. USNM 756013,  $\times$  10.





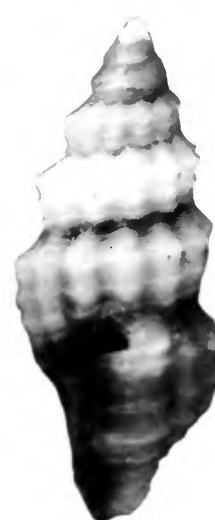
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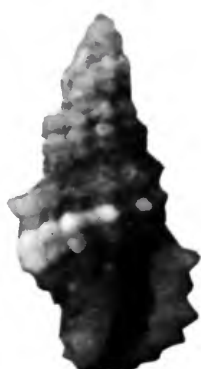
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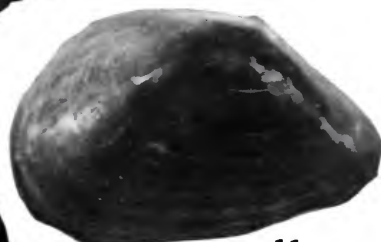
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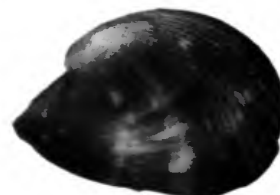
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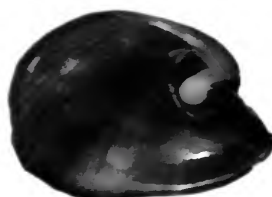
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## PLATE 12

*Rangitotoa* species

1. USNM 756239, × 10.

*Melampus pascus* Odhner

2. USNM 751554, × 3.

*Leuconopsis rapanuiensis*, new species

3. Holotype, USNM 756790, × 20.

*Siphonaria pascua*, new species

- 4, 5. Holotype, CAS 58706, × 5.
- 6, 7. Paratype, USNM 756116, × 5.

*Trimusculus odhneri* (Hubendick)

8. MCZ 288105, × 4 [Tuamotus].
9. USNM 383837, × 4 [Niuafuou].

*Williamia polynesica*, new species

10. Holotype, USNM 757897, × 10.
11. Paratype, USNM 756008, × 10.

*Barbatia* cf. *nuttingi* (Dall, Bartsch, and Rehder)

- 12, 13. Right valve, MNSH 100212, × 5.
- 14, 15. Left valve, MNSH 100212, × 5.

*Tellina* (*Cadella*) *mauia* (Dall, Bartsch, and Rehder)

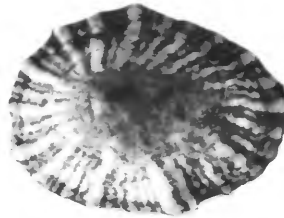
- 16, 17. MNSH 100219, × 10.



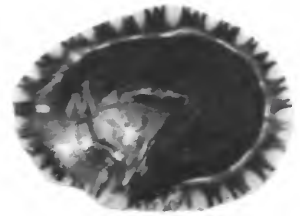
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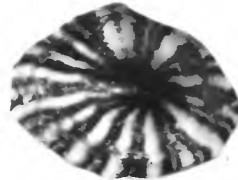
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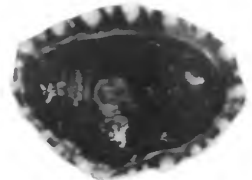
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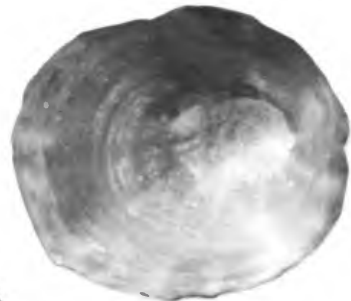
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## PLATE 13

*Nucula polynesica*, new species

- 1, 2. Holotype, 756244, × 20.

*Chlamys pasca* (Dall)

- 3, 4. USNM 765022, × 5.  
5. USNM 765021, × 3.  
6. Holotype, USNM 110760, × 3.

*Modiolus matris* Pilsbry

- 7, 8. MNSH 100213, × 5.

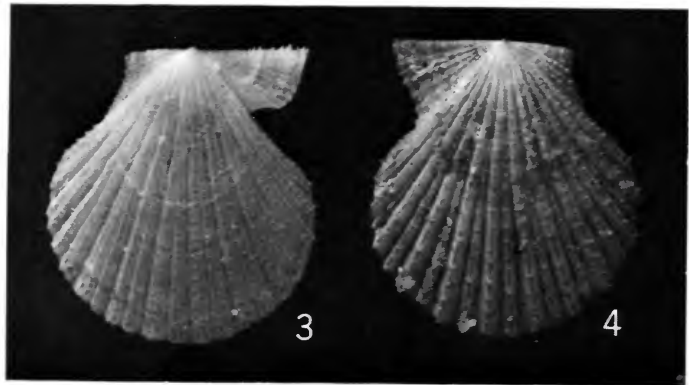
*Septifer bryanae* (Pilsbry)

- 9, 10. Right valve, MNSH 100214, × 8.  
11, 12. Left valve, MNSH 100214, × 8.





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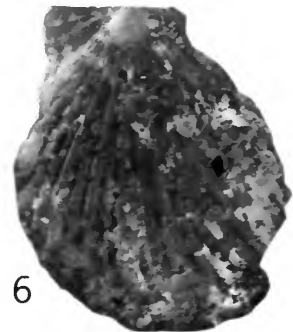
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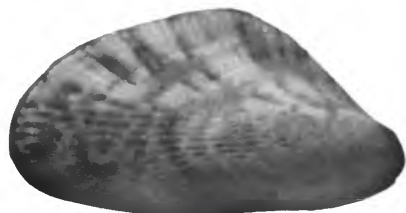
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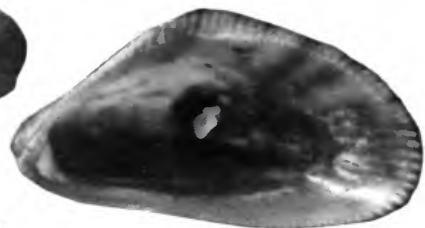
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## PLATE 14

*Hiatella hawaiiensis* (Dall, Bartsch, and Rehder)

- 1-4. USNM 484204,  $\times 7\frac{1}{2}$  [Oahu, Hawaii].

*Semele australis* (Sowerby)

5. Left valve, USNM 756186,  $\times 3$ .  
6. Right valve, USNM 756186,  $\times 3$ .

*Lasaea hawaiiensis* Dall, Bartsch, and Rehder

- 7, 9. Left valve, USNM 756243,  $\times 15$ .  
8. Right valve, USNM 756243,  $\times 15$ .

*Malleus (Malvufundus) maculosus* Reeve

- 10, 11. Right valve, USNM 755972,  $\times 7\frac{1}{2}$ .  
12, 13. Left valve, USNM 755972,  $\times 7\frac{1}{2}$ .



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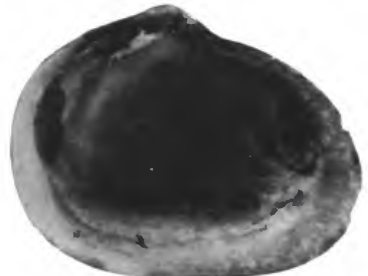
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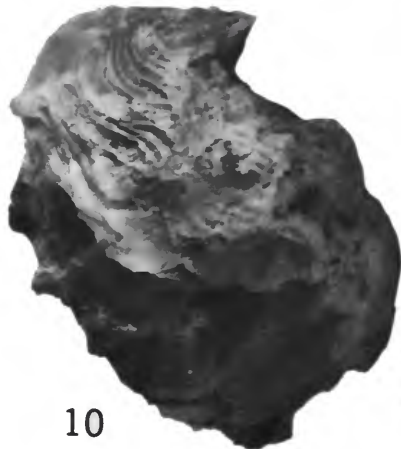
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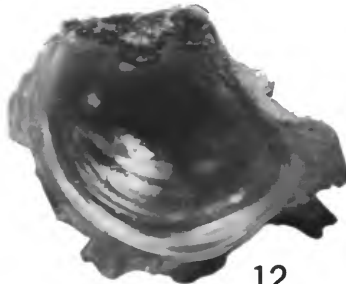
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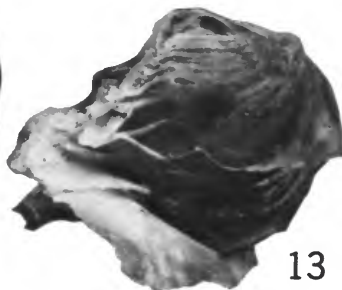
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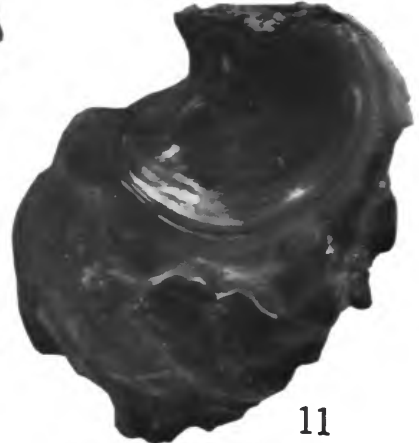
10



12



13



11

# Index

(New genera, species, and combinations in italics; page numbers of principal accounts in italics)

- Acanthopleura brevispinosa, 16  
 acicula, Balcis, 55  
*aciculata*, Balcis, 55  
 Eulima, 55  
*actinium*, Cerithidium, 33  
 Actinopyga difficilis, 54  
 acuminata, Linteria, 96  
 Acuminia, 92  
 lanceata, 93  
 penicillata, 92, 93  
 venosa, 10, 92, 93, 94  
 Acuminia, subgenus, 92  
 adansoni, Cerithium, 34  
 adansonii, Cerithium, 34  
 afra, Patella, 99  
 agassizi, Dolabella, 103  
 Agnewia, 71  
*akuana*, Planaxis (*Hinea*), 9, 50  
 Alabina, 33  
*alarconi*, Euchelus (*Herpetopoma*), 19  
*albomaculatus*, Nassarius (*Telasco*), 82  
 albovittata, Triphora, 43  
 Albulina mammatata, 65  
 Allerya, 98  
 Allerya, subgenus, 98  
 ambiguus, Fossarus, 62  
 amoena, Nerita, 21  
 Puperita, 21  
 Amphidesma, 112  
 australe, 112  
 australis, 112  
 amphorella, Mitra, 83  
 Mitra (*Strigatella*), 83  
 amphorella var. flavo-cingulatus, Mitra (*Strigatella*), 63  
*amydroglyptum*, Caecum, 32  
 Anachis, 76  
 Ancyclus gussoni, 98  
 angasi, Rissoina, 26, 27  
 Angiola perscelida, 48  
 Angiola, subgenus, 48  
 angulata, Arca, 115  
 Mucronalia?, 57  
 angulatus, Euchelus, 19  
 antiquata, Antisabia, 59, 60  
 Hipponyx, 59  
 Antisabia, 59  
 antiquata, 59, 60  
 costellata, 60  
 foliacea, 9, 59, 60  
 grayana, 60  
 imbricata, 9, 60, 61  
 apertura, Patella, 18  
*aporema*, Triphora, 43, 46  
*aquilum*, Cerithiopsis, 40  
 Arca angulata, 115  
 barbata, 106  
 nucleus, 106  
 arctica, Hiatella, 113  
 Mya, 113  
 Argyropeza, 39  
 divina, 39  
 leucocephala, 39  
 Assiminea, 30  
 grayana, 30  
 nitida, 30  
 vulgaris, 30  
 Astyris, 116  
 ater, Trochus, 115  
 atra, Tegula (*Chlorostoma*), 115  
 atramentosa, Nerita, 21  
 atrata, Nerita, 23  
 atromarginatum, Cerithium, 36  
 Cerithium (*Conocerithium*), 37  
 Cerithium (*Thericium*), 36, 37  
 atrum, Chlorostoma, 115  
 aurantium, Operculatum, 104  
 auricula, Stomatella, 20  
 auricularia, Dolabella, 103  
 Patella, 103  
 australe, Amphidesma, 112  
 australis, Amphidesma, 112  
 Corbula, 113  
 Hiatella, 114  
 Saxicava, 113  
 Semele, 112, 113  
 aygula, Coris, 36, 78  
*bahamondei*, Hemiliostraca, 55  
 Zeidora, 17  
 Balcis, 55, 56  
 acicula, 55  
*aciculata*, 55  
 vitrea, 55  
 Barbarca, subgenus, 106  
 barbata, Arca, 106  
 Hipponyx, 61  
 Barbatia, 106  
 (Hawaiarca) alii, 72  
 maunaluana, 107  
*nuttingi*, 106, 107  
 parva, 107  
 barbatus, Hipponyx, 61  
 bartrumi, Cylichnania, 95  
 bastowi, Orbitestella, 31  
 bavayi, Cerithium, 37  
 Cerithium (*Conocerithium*), 37  
 bella, Codakia (*Epicodakia*), 110  
 Ctena, 110  
 Lucina, 110  
 benhami, Kermia, 89  
 bensoni, Marginella, 85  
 Nerita, 21  
 Puperita, 21  
 Bertella brocki, 105  
 Berthellina, 102  
 chloris, 103  
 pseudochloris, 103  
 (Tamanovalva) pseudochloris, 103  
 Berthella, 105  
 brocki, 105  
 pellucida, 105  
 plumula, 105  
 Berthellina, 105  
 citrina, 104, 105  
 engeli, 105  
 betsyae, Hastula (*Punctoterebra*), 93  
 bilocularis, Septifer, 107  
 Bittium, 33  
 leucocephalum, 39  
 perparvulum, 33, 40  
 borbonica, Julia, 102  
 brasiliana, Planaxis, 50  
 Planaxis (*Hinea*), 51  
 breve, Cerithium, 39  
 Brevimalleus, 108  
 brevis, Clypeomorus, 39  
 brevispinosa, Acanthopleura, 16  
 Brochina, 32  
 brocki, Bertella, 105  
 Berthella, 105  
 broderipii, Chama, 112  
 bryanae, Congeria, 107  
 Septifer, 107



- Buccinum costulatum*, 82  
   erinacea, 68  
   gayii, 115  
   igneum, 81  
   lanceatum, 92  
   lineatum, 49  
   reticulatum, 50  
   vibex, 68  
*Bulimus coniformis*, 100  
*Bulla calyculata*, 96  
   glauca, 96  
   lutea, 96  
   plumula, 105  
   umbilicata, 95  
   viridis, 96  
*Cadella*, 113  
   mauia, 113  
*Cadella*, subgenus, 113  
*Caducifer*, 80, 81  
   decapitata, 81, 82, 116  
   decapitata cylindrica, 81, 82, 116  
   decapitata engleri, 81, 82  
   decapitata fuscomaculata, 116  
   nebulosa, 116  
   truncata, 82  
*Caducifer*, subgenus, 80  
*Caducifer*, section, 80  
*Caecum*, 31  
   *amydroglyptum*, 32  
   solitarium, 31  
*calceolina*, *Zeidora*, 17  
*Calloarca* (*Barbarca*) *hua*, 106  
   (*Barbarca*) *nuttingi*, 106  
*callosa*, *Dolabella*, 103  
*calyculata*, *Bulla*, 96  
   *Smaragdinella*, 96  
*Canarium*, subgenus, 63  
*Canarium ustulatum*, 63  
*caput draconis*, *Cypraea*, 67  
*caput-draconis*, *Cypraea*, 67  
*caputdraconis*, *Cypraea*, 5, 9, 11, 67, 68  
*caput-serpentis*, *Cypraea* (*Aricia*), 67  
*caputserpentis*, *Cypraea*, 67  
*carbonaria*, *Nerita*, 23  
*Cardium rubrum*, 111  
*carifa*, *Melanella*, 57  
   *Vitreolina*, 57  
*Casmaria*, 68  
   *ponderosa nipponensis*, 68  
   *ponderosa perryi*, 68  
*Casmaria*, subgenus, 68  
*Cassidea perryi*, 68  
*Cassid* *vibex*, 68  
*castaneus*, *Melampus*, 100  
*Caulerpa*, 102, 103  
*Cerithium*, 33, 34  
   *adansoni*, 34  
   *adansonii*, 34  
   *atromarginatum*, 36  
   *bavayi*, 37  
   *breve*, 39  
   (*Cerithium*) *columna*, 35  
   (*Cerithium*) *rubus*, 34, 35  
   (*Cerithium*) *sandwichense*, 36  
   *columna*, 35  
   (*Conocerithium*) *atromarginatum*, 37  
   (*Conocerithium*) *bavayi*, 37  
   (*Conocerithium*) *egenum*, 37  
   *echinatum*, 35  
   *egenum*, 37, 38  
   *maculosum*, 36  
   *musiva*, 39  
   *mutatum*, 35  
   *nassoides*, 36  
   *patiens*, 39  
   *rubus*, 34  
   *rugosum*, 39  
   *rugulosum*, 46  
   *sandvicense*, 36  
   *sandwichense*, 36  
   *sandwichense*, 36  
   *serratum*, 34  
   (*Theridium*) *atromarginatum*, 36, 37  
   (*Theridium*) *egenum*, 37  
   (*Theridium*) *leptocharactum*, 38  
   (*Triforis*) *levukensis*, 43, 46  
   *tristoma*, 42  
   *tuberculiferum*, 34, 35  
   *vulgatum*, 36  
*Cerithidium*, 33  
   *actinium*, 33  
   *pusillum*, 33  
   *submamillatum*, 33  
*Cerithiopsis*, 40, 41  
   *aquillum*, 40  
   (*Metaxia*) *rugulosa*, 46  
   *powelli*, 40  
*cernica*, *Natica*, 65  
   *Robillardia*, 6, 57  
*ceylanensis*, *Conus*, 92  
*chaidea*, *Purpura*, 72  
*Chama*, 112  
   *broderipii*, 112  
   *imbricata*, 112  
   *iostoma*, 112  
   *lazarus*, 112  
*Cheilea*, 61  
   *equestris*, 61, 62  
*cheilostoma*, *Merelina*, 29  
   *Rissoa*, 29  
*chiltoni*, *Isselia*, 28  
   *Isseliella*, 28, 29  
*chinensis*, *Umbella*, 104  
*Chlamys*, 109  
   *coruscans*, 109  
   *coruscans hawaiiensis*, 109  
   *pasca*, 109  
   *patagonicus*, 116  
   (*Zygochlamys*) *patagonicus*, 116  
*chloris*, *Berthelinia*, 103  
*Chlorostoma atrum*, 115  
*cifara*, *Melanella*, 57  
   *Vitreolina*, 57  
*cinerascens*, *Holothuria*, 57  
*Cithara garretti*, 79  
   *ornata*, 79  
   *varia*, 79  
*Citharopsis ornata*, 79  
*citrica*, *Pascula*, 73, 74  
*citricus*, *Trophon* (*Pascula*), 73, 74  
*citrina*, *Berthelinia*, 104, 105  
   *Pleurobranchus*, 105  
*clathrata*, *Emarginula*, 17  
*Clathurella*, 87, 88  
   *fuscobasis*, 87  
*Clathurina*, 89  
*Clavatula rava*, 87  
   *rubida*, 86  
*Clypeomorus*, 38  
   *brevis*, 39  
   *clypeomorus*, 38  
*clypeomorus*, *Clypeomorus*, 38  
*Cochlear*, 60  
*Codakia*, 110  
   *divergens*, 111  
   (*Epicodakia*) *bella*, 110  
   (*Jagonia*) *divergens*, 110  
   (6 *Lucina*) *species*, 110  
*codocoae*, *Heliacus*, 32  
*coffea*, *Voluta*, 100  
*colorata*, *Ventomnestia*, 95  
*Colubraria decollata*, 81  
   (*Taeniola*) *decollata*, 81  
*Columbella*, 77  
   *diminuta*, 80  
   *impolita*, 80  
   *isomella*, 76  
   *lutea*, 77  
   *margarita*, 77  
   (*Mitrella*) *impolita*, 80  
   (*Mitrella*) *margarita*, 77  
   *ornata*, 79  
   *pusilla*, 116  
   (*Seminella*) *garretti*, 79  
   (*Seminella*) *striatula*, 76  
   *striatula*, 76  
   *turturina*, 77  
*columna*, *Cerithium*, 35, 36  
   *Cerithium* (*Cerithium*), 35  
*communis*, *Janthina*, 52  
*commutata*, *Scala*, 51  
*concatenata*, *Sistrum*, cf., 70  
*concinna*, *Emarginula*, 16, 17  
*Conger* *bryanae*, 107  
*conica*, *Emarginula*, 16  
   *Imbricaria*, 85

- Sabia*, 58  
*conicus*, *Trimusculus*, 99  
*coniformis*, *Bulimus*, 100  
*Conoelix*, 85  
    *lineatus*, 85  
    *punctata*, 85  
*consettiana*, *Epicodakia*, 110  
*consobrinella*, *Zafzona*, 76, 116  
*conularis*, *Mitra*, 85  
*Conus*, 90  
    *ceylanensis*, 92  
    *ebraeus*, 92  
    *marmoreus*, 90  
    *miliaris*, 91  
    *miliaris pascuensis*, 9, 91  
    *militaris*, 91  
    *nanus*, 92  
    *sponsalis*, 92  
*Coralliophila*, 75  
    *neritoides*, 75  
    *violacea*, 75  
*Coralliophila*, subgenus, 75  
*Corbula australis*, 113  
*Coris aygula*, 36, 78  
*cornucopiae*, *Hipponix*, 58  
*coronata*, *Rissoina*, 27  
*coruscans*, *Chlamys*, 109  
*coruscans hawaiiensis*, *Chlamys*, 109  
*costellata*, *Antisabia*, 60  
*costulatum*, *Buccinum*, 82  
*crassilabrum*, *Rissoa*, 27  
    *Zebina tridentata*, 27  
*crassula*, *Kermia*, 89  
    *Merelinia* (*Mereliniopsis*), 30  
*Cronia*, 73, 74  
*Cryptophthalmus*, 96  
    *cylindricus*, 97  
*Ctena*, subgenus, 110  
*Ctena bella*, 110  
*cumingi*, *Melanella*, 53  
*cumingii*, *Eulima*, 53  
    *Fossar*, 62  
    *Fossarus*, 116  
*cursor*, *Parimalleus*, 108  
*curta*, *Rissoina*, 27  
*Cylichna villica*, 96  
*Cylichnania*, 95  
    *bartrumi*, 95  
*Cylichnania*, subgenus, 95  
*Cylichnina*, subgenus, 95  
*cylindraceus*, *Trochus*, 32  
*cylindrica*, *Caducifer decapitata*, 81, 82, 116  
*cylindricus*, *Cryptophthalmus*, 97  
    *Triton*, 81  
    *Triton* (*Epidromus*), 81
- Cypraea*, 66  
    (*Aricia*) *caput-serpentis*, 67  
    *caput draconis*, 67  
    *caput-draconis*, 67  
    *caputdraconis*, 5, 9, 11, 67, 68  
    *caputserpentis*, 67  
    *englerti*, 9, 67, 68  
    *kingae*, 67, 68  
    *pellucidula*, 66  
    *scabriuscula*, 66  
*Cyrbasia*, 41  
    (*Joculator*) *species*, 41  
    (*Joculator*) *turrigera*, 41  
*dancei*, *Obortio*, 33  
*decapitata*, *Caducifer*, 81, 82, 116  
*decapitata cylindrica*, *Caducifer*, 81, 82, 116  
*decapitata englerti*, *Caducifer*, 81, 82  
*decapitata fuscomaculata*, 116  
*Decipifus*, 80  
*decollata*, *Colubraria*, 81  
    *Colubraria* (*Taeniola*), 81  
*decollatus*, *Triton*, 81  
*Dendropoma*, 47  
    *gregarium*, 48  
    *lamellosum*, 48  
    *platypus*, 47  
    *psaroccephalum*, 48  
    *rhysoconcha*, 48  
    *species*, 48  
*Dendropoma*, subgenus, 47  
*Dentalium imperforatum*, 31  
    *trachea*, 31  
*depauperatus*, *Strombus floridus*, 63  
*Diadora granifera*, 18  
*difficilis*, *Actinopyga*, 54  
*diminuta*, *Columbella*, 80  
*Diodon hystrix*, 36, 78  
*Diodora*, 18  
    *foveolata*, 18  
    *granifera*, 18  
*Discus*, 98  
*distorta*, *Hemiliostraca*, 56  
    *Leiostraca*, 55  
*divergens*, *Codakia*, 111  
    *Codakia* (*Jagonia*), 110  
    *Lucina*, 110  
*diversiformis*, *Purpura*, 75  
*divina*, *Argyropeza*, 39  
*Dolabella*, 5, 103  
    *agassizi*, 103  
    *auricularia*, 103  
    *callosa*, 103  
    *dolabrifera*, 103, 104  
    *scapula*, 103  
*Dolabrifera*, 103, 104  
    *dolabrifera*, 104
- dolabrifera*, *Dolabella*, 103, 104  
    *Dolabrifera*, 104  
*dorsuosa*, *Torinia*, 32  
*Drupa*, 69  
    *morum*, 69  
    *ricinus*, 70  
    *uva*, 70  
*Drupella*, 72  
*dufresnii*, *Melanella*, 53  
*ebraeus*, *Conus*, 92  
*echinatum*, *Cerithium*, 35  
*Echinometra insularis*, 57, 58  
    *mathaei*, 57, 58  
*ecphora*, *Fossarus*, 62, 63  
*Egentelaria*, 93  
    *stylata*, 10, 94  
*egenum*, *Cerithium*, 37, 38  
    *Cerithium* (*Conocerithium*), 37  
    *Cerithium* (*Thericium*), 37  
*elongata*, *Emarginula*, 17  
*Emarginula*, 16  
    *clathrata*, 17  
    *concinna*, 16, 17  
    *conica*, 16  
    *elongata*, 17  
    *peasei*, 17  
    *subclathrata*, 16, 17  
    *velascoi*, 16  
*engeli*, *Berthellina*, 105  
*englerti*, *Caducifer decapitata*, 81, 82  
    *Cypraea*, 9, 67, 68  
    *Pisania*, 81  
    *Rissoina* (*Rissolina*) *turricula*, 26, 27  
*Epicodakia*, subgenus, 110  
*Epicodakia consettiana*, 110  
*Epitonium*, 51  
    (*Gyroscala*) *pyramis*, 51  
    (*Gyroscala*) *torquatum*, 52  
    *lamellosum*, 52  
    *pyramis*, 51, 52  
*equestris*, *Cheilea*, 61, 62  
    *Patella*, 61  
*Erato novemprovincialis*, 85  
*erinacea*, *Buccinum*, 68  
*Erosaria caputdraconis*, 67  
*esperanzae*, *Stomatella*, 20  
*eucharis*, *Triphora*, 46  
*Euchelus*, 18, 19  
    *angulatus*, 19  
    *foveolatus*, 19  
    *gemmatas*, 19  
    (*Herpetopoma*) *alarconi*, 9, 19  
    *scabriusculus*, 18  
*Eulima*, 53, 55  
    *aciculata*, 55  
    *cumingii*, 53  
    *major*, 53, 54  
    *recurva*, 57

- Euplica, 77  
*loisae*, 77  
 varians, 78  
 Euplica, subgenus, 77  
 Evokesia, 73, 74  
 rufonotata, 75  
 exalta, Metaxia, 47  
 exigua, Janthina, 53  
*exilirata*, *Lienardia*, 86  
*exomilisca*, *Triphora*, 45  
 exquisita, Fissurella, 18  
 Glyphis, 18  
 Julia, 102
- fasciata, Mamilla, 65  
 Planaxis, 48  
 fasciatus, Planaxis, 48, 49  
 Planaxis (*Angiola*), 48  
 fernandezensis, Littorina (*Austrolittorina*) unifasciata, 115  
 fibrosa, Mamilla, 65  
 filosa, Natica, 65  
 Finella, 33  
 fissura, Patella, 16  
 Fissurella exquisita, 18  
 foveolata, 18  
 flabellum, Zeidora, 18  
 flavo-cingulata, Mitra (*Strigatella*)  
*amphorella* var., 83  
 flavocingulata, Mitra (*Strigatella*), 9,  
 83, 84  
 floridus depauperatus, Strombus, 63  
 foliacea, Antisabia, 9, 59, 60  
 Hipponix, 59  
 foraminata, Pleurotoma, 89  
 Fossar, Le, 62  
 Fossar cumingii, 62  
 Fossarus, 62  
 adansoni, 62  
 ambiguus, 62  
 cumingii, 116  
 ecphora, 62  
 multicostatus, 62, 63, 116  
 foveolata, Diodora, 18  
 Fissurella, 18  
 Glyphis, 18  
 foveolatus, Euchelus, 19  
 fragilis, Janthina, 52  
 Lima, 110  
 Lima (*Mantellium*), 110  
 Lima (*Mantellum*), 110  
*Limaria* (*Promantellum*), 110  
 Limea, 110  
 Ostrea, 110  
 Fundella, 108  
 lioyi, 108  
 fuscoapicata, Metaxia, 47  
*fuscobasis*, *Clathurella*, 87
- fuscocomaculata, Caducifer decapitata,  
 116  
 Fusus neritoideus, 75
- Gadinia, 99  
 odhneri, 99  
 reticulata, 99  
 varia, 99  
 galapagana, Williamia, 98  
 garretti, Cithara, 79  
 Columbella (*Seminella*), 79  
 gaudiosus, Nassarius (*Telasco*), 82, 83  
 gayii, Buccinum, 115  
 Nassarius, 115  
 gemmata, Triphora, 42  
 gemmatus, Euchelus, 19  
 Gena, 20  
 laevis, 20  
 planulata, 20  
 strigosa, 20  
 varia, 20  
 glauca, Bulla, 96  
 Glyphis exquisita, 18  
 foveolata, 18  
*goodingi*, *Luetzenia*, 57, 58  
 graeca, Patella, 18  
 granifera, Diodora, 18  
 Diodora, 18  
 Granula, 85  
 japonica, 86  
*pascuana*, 85  
 sandwicensis, 85, 86  
 granulosa, Merelina (*Mereliniopsis*), 30  
 Rissoina, 30  
 grayana, Antisabia, 60  
 Assimineia, 30  
 grayanus, Hipponix, 60  
 Hipponyx, 60  
 gregarium, Dendropoma, 48  
 Guildingia, subgenus, 16  
 gussoni, Ancylus, 98  
 Williamia, 98  
 Gyroscala, subgenus, 51
- Haminea pusilla, 95  
 haneti, Nerita, 22  
 hargravesi, Recluzia, 53  
 harpa, Neothais, 71, 73  
 Hastula, 92, 94  
 penicillata, 92, 93  
 (*Punctoterebra*) *betsyae*, 93  
 strigilata, 92, 94  
 stylata, 94  
 hawaiiensis, Chlamys coruscans, 109  
 Hiattella, 113  
 Lasaea, 111  
 Saxicava, 113  
 hawaiiensis, Nucula, 106  
 heberti, Heliacus, 32
- Heliacus, 32  
*codocoeae*, 32  
 heberti, 32  
 herberti, 32  
 sterkii, 32, 33  
 Helix incurva, 56  
 janthina, 52  
 polita, 55  
 Hemiliostraca, 55, 56  
*bahamondei*, 55  
 distorta, 56  
 metcalfei, 56  
 perspicua, 56  
 species, 56  
 Heminerita, subgenus, 21  
 herberti, Heliacus, 32  
 Herpetopoma, subgenus, 18, 19  
 Hiattella, 113  
 arctica, 113  
 australis, 114  
 hawaiiensis, 113  
 monoperta, 113  
 Hinea, subgenus, 49, 50, 51  
 Hinia, 49, 50  
 Hipponix, 58, 59  
 barbatus, 61  
 cornucopiae, 58  
 foliacea, 59  
 grayanus, 60  
 imbricata, 60  
 Hipponyx antiquatus, 59  
 barbata, 61  
 grayanus, 60  
 pilosus, 61  
 radiata, 60  
 hirsutum, Pleurotoma, 88  
 Holothuria cinerascens, 57  
 Horologica, 41  
 hua, Calloarca, (*Barbarca*), 106  
 Hydrocena nitida, 30  
 hystrix, Diodon, 36, 78  
 Pleurotoma, 88
- Ianthina, 52  
 ianthina, 52  
 janthina, 52  
 umbilicata, 53  
 ianthina, Ianthina, 52  
 icafra, Melanella, 57  
 Vitreolina, 57  
 ignea, Pisania, 81  
 igneum, Buccinum, 81  
 Imbricaria, 85  
 conica, 85  
 punctata, 85  
*imbricata*, *Antisabia*, 9, 60, 61  
 Chama, 112  
 Hipponix, 60

- Impages, 94  
 imperforatum, Dentalium, 31  
 impolita, Columbella, 80  
     Columbella (Mitrella), 80  
 inconstans, Terebra, 94  
 incurva, Helix, 56  
 inepta, Planaxis, 48  
 inflata, Limaria, 110  
 Iniforis, 41  
     jousseamei, 41  
     limitaris, 41  
     malvaceus, 41  
 insculpta, Nerita (Heminerita), 22  
 insularis, Echinometra, 57, 58  
     Rangitotoa, 101  
 Iodina, subgenus, 53  
 Iopsis, subgenus, 27  
 iostoma, Chama, 112  
 iota, Melanella, 57  
     Vitreolina, 57  
 islandicus, Pecten, 109  
 isomella, Columbella, 76  
 Isselia, 28  
     chilioni, 28  
 Isselia, subgenus, 28  
 Isselliella, 28  
     chilioni, 28, 29  
 Isselliella, subgenus, 28  
  
 Jagonia ramulosa, 110  
 Janthina, 52  
     communis, 52  
     exigua, 53  
     fragilis, 52  
     (Iodina) umbilicata, 53  
     janthina, 52  
     lutea, 53  
     umbilicata, 53  
     violacea, 52  
 Janthina, subgenus, 52  
 janthina, Helix, 52  
     Janthina, 52  
     Janthina, 52  
 japonica, Granula, 86  
     Nerita, 21, 22  
 javanica, Patella, 97  
 Jeannea, 81  
 jehennei, Recluzia, 53  
 Jocularator, subgenus, 41  
 Jocularator ridicula, 41  
 johnii, Recluzia, 53  
 jousseamei, Iniforis, 41  
 Julia, 102  
     borbonica, 102  
     exquisita, 102  
  
 kermadecensis, Metaxia, 46, 47  
 Kermia, 89  
     benhami, 89  
  
     *crassula*, 89  
     *sagenaria*, 90  
     subcylindrica, 90  
 kingae, Cypraea, 67, 68  
 Kogomea, 85  
 krebsii, Piliscus (Allerya), 98  
  
 laevis, Gena, 20  
     Stomatella, 21  
 lamberti, Triphora, 44, 45  
 lamellosum, Dendropoma, 48  
     Epitonium, 52  
     Scala, 51  
 lanceata, Acuminia, 93  
     Terebra, 92  
 lanceatum, Buccinum, 92  
 langfordi, Strombiformis, 57  
     Vitreolina, 57  
 Lasaea, 111  
     hawaiiensis, 111  
     nipponica, 111  
 Lathophthalmus, 96  
 lazarus, Chama, 112  
 lechriogramma, Tellina, 113  
 Le Fossar, 62  
 Leiostraca, 53  
     distorta, 55  
 lemniscata, Natica, 65  
*leptocharactum*, *Cerithium* (*Thericium*), 38  
*leucathema*, *Triphora*, 42  
*leucocephala*, *Argyropeza*, 39  
 leucocephalum, Bittium, 39  
 Leuconia obsoleta, 101  
 Leuconopsis, 100, 101  
     obsoleta, 101  
     pacifica, 101  
     *rapanuiensis*, 101  
 levukensis, *Cerithium* (*Triforis*), 43, 46  
     Trifora, 46  
     Triforis, 43  
 Lienardia, 86  
     *exilirata*, 86  
     mighelsi, 86  
 Lima, 109  
     fragilis, 110  
     lima, 109  
     (Mantellium) fragilis, 110  
     (Mantellum) fragilis, 110  
     species, 109  
 lima, Lima, 109  
     Ostrea, 109  
 Limaria, 110  
     inflata, 110  
     (*Promantellum*) fragilis, 110  
 limax, Tamanova, 102  
 Limea fragilis, 110  
*limitaris*, Iniforis, 41  
 Limnaea palmeri, 53  
  
 lineatum, Buccinum, 49  
 lineatus, Conoelix, 85  
     Planaxis, 48, 49  
 lineolatus, Planaxis, 48  
 Linteria acuminata, 96  
 lioyi, Fundella, 108  
*lirellata*, *Nerita*, 9  
     *Nerita* (*Heminerita*), 22, 23  
 Littorina, 115  
     (Austrolittorina) unifasciata fernandezensis, 115  
     pyramidalis, 25  
     undulata, 25, 115  
     undulata var., 115  
*loisae*, *Euplica*, 77  
     *Triphora*, 44, 45  
*longinqua*, *Merelina* (*Merelina*), 29  
 Lucina bella, 110  
     divergens, 110  
     minima, 110  
     ramulosa, 110  
*Luetzenia*, 57, 58  
     *goodingi*, 57, 58  
 lutea, Bulla, 96  
     Columbella, 77  
     Janthina, 53  
     Patella, 20  
     Recluzia, 53  
 Lyncina, 66  
  
 maculatus, Strombus, 9, 63  
     Strombus (Canarium), 63  
 maculosum, *Cerithium*, 36  
 maculosus, Malleus, 108  
     Malleus (Malvufundus), 108  
 Maculotriron, 73  
 madreporarum, Purpura, 75, 76  
     Quoyula, 76  
 major, Eulima, 53, 54  
 Malleus, 108  
     maculosus, 108  
     (Malvufundus) maculosus, 108  
     regula, 108  
 Malluvium, 59  
 malvaceus, Iniforis, 41  
 Malvufundus, subgenus, 108  
 Mamilla, 65  
     fasciata, 65  
     fibrosa, 65  
     melanostoma, 65  
     simiae, 65  
 mammillaris, Patella, 99  
 mammata, Albula, 65  
 mammatus, Polinices, 65  
 Maorichiton, subgenus, 16  
 margarita, Columbella, 77  
     Columbella (Mitrella), 77



- Marginella** *bensoni*, 85  
*sandwicensis*, 85  
*sandwichensis*, 85  
*marmoreus*, Conus, 90  
**Mastonia**, 42  
*mathaei*, Echinometra, 57, 58  
*matris*, Modiolus, 107  
     *Volsella*, 108  
*mauia*, Cadella, 113  
     *Tellina* (Cadella), 113  
*maunaluana*, Barbatia, 107  
*medipacifica*, Melanella *cumingi*, 53  
**Melampus**, 100  
     *castaneus*, 100  
     *pascus*, 9, 100  
     *philippii*, 100  
**Melanella**, 53, 56  
     *carifa*, 57  
     *cifara*, 57  
     *cumingi*, 53  
     *cumingi medipacifica*, 53  
     *dufresnii*, 53  
     *icafra*, 57  
     *iota*, 57  
     *modicella*, 54  
     *pisinna*, 54  
     *yamazii*, 54  
**Melanerita**, subgenus, 21  
*melanostoma*, Mamilla, 65, 66  
*melanotragus*, Nerita, 21  
**Mercatora**, subgenus, 16  
*mercatoris*, Plaxiphora, 9, 16  
     *Plaxiphora* (Mercatora), 16  
     *Plaxiphora* (Poneroplax), 16  
**Merelina**, 29  
     *cheilostoma*, 29  
     (*Merelina*) *longinqua*, 29  
     (*Mereliniopsis*) *crassula*, 30  
     (*Mereliniopsis*) *granulosa*, 30  
     *pisinna*, 29  
     *queenslandica*, 30  
**Mereliniopsis**, subgenus, 30  
**Metanachis**, section, 76  
**Metanachis**, subgenus, 76  
*metaxa*, Metaxia, 46  
     *Murex*, 46  
**Metaxia**, 46  
     *exalta*, 47  
     *fuscoapicata*, 47  
     *kermadecensis*, 46, 47  
     *metaxa*, 46  
     *polynesica*, 47  
*metcalfei*, Hemiliostraca, 56  
*melchlinii*, Mitra, 83  
**Microdaphne**, 88  
     *morrisoni*, 88, 116  
     *trichodes*, 88, 89, 116  
*microzonias*, Mitra, 84  
     *Pusia*, 84  
     *Vexillum* (Pusia), 84  
*mighelsi*, Lienardia, 86  
*miliaris*, Conus, 91  
*miliaris pascuensis*, Conus, 9, 91  
*militaris*, Conus, 91  
*minima*, Lucina, 110  
*mirabilis*, Rissoina, 28  
**Mitra**, 83  
     *amphorella*, 83  
     *conularis*, 85  
     (*Cylindra*) *nucea*, 85  
     *melchlinii*, 83  
     *microzonias*, 84  
     (*Nebularia*) *vexillum*, 83  
     (*Strigatella*) *amphorella*, 83  
     (*Strigatella*) *amphorella* var. *flavo-*  
         *cingulata*, 83  
     (*Strigatella*) *flavocingulata*, 9, 83, 84  
     (*Strigatella*) *scutulata*, 83  
     (*Strigatella*) *tristis*, 84  
     *zebra*, 83  
**Mitrella**, 76  
**Mitropsis**, 79  
*Mnestia* *pusilla*, 95  
*modicella*, Melanella, 54  
**Modiolus**, 107  
     *matris*, 107  
*modiolus*, Mytilus, 107  
*mollis*, Planaxis, 50  
*monodonta*, Purpura, 75, 76  
     *Quoyula*, 75  
*monoperta*, Hiatella, 113  
**Monostiolum**, 81  
*morio*, Nerita (Heminerita), 5, 9, 11,  
     22, 23, 24  
     Nerita (Odontostoma), 22  
     Neritina, 21, 22, 23  
*morrisoni*, *Microdaphne*, 88, 116  
**Morula**, 70, 72  
     (*Oppomorus*) *palmeri*, 72  
     *papillosa*, 70  
     *praecipua*, 70  
     *uva*, 70, 71  
*morum*, Drupa, 69  
*morus*, Ricinula, 70  
     *Sistrum*, 70  
**Mucronalia** *angulata*, 57  
*multicostatus*, Fossarus, 62, 63, 116  
**Murex** *metaxa*, 46  
     *neritoideus*, 75  
     *ricinus*, 70  
     *serratus*, 34  
     *sinensis*, 34  
     *tubercularis*, 40  
*musiva*, Cerithium, 39  
*mutatum*, Cerithium, 35  
**Mya** *arctica*, 113  
*Mytilus* *bilocularis*, 107  
     *modiolus*, 107  
     *nanus*, Conus, 92  
**Nassa** *variabilis*, 82  
**Nassarius**, 82  
     *gayii*, 115  
     (*Telasco*) *albomaculatus*, 82  
     (*Telasco*) *gaudiosus*, 82, 83  
*nassoides*, Cerithium, 36  
**Natica**, 64  
     *cernica*, 65  
     *filosa*, 65  
     *lemiscata*, 65  
     *ochrostigmata*, 64, 65  
     *sagittifera*, 64, 65  
     *sebae*, 65  
     *simiae*, 65  
     *vitellus*, 64  
*nebulosa*, Caducifer, 116  
**Neothais**, 14, 71, 72, 73  
     *harpa*, 71, 73  
     *nesiotes*, 60, 71, 72  
**Neothais**, subgenus, 71  
**Nerita**, 21  
     *amoena*, 21  
     *atramentosa*, 21  
     *atrata*, 23  
     *bensoni*, 21  
     *carbonaria*, 23  
     *haneti*, 22  
     (*Heminerita*) *insculpta*, 22  
     (*Heminerita*) *livellata*, 22, 23  
     (*Heminerita*) *morio*, 5, 9, 11, 22, 23,  
         24  
     *japonica*, 21, 22  
     *livellata*, 9  
     *melanotragus*, 21  
     *neritinoideus*, 22, 23  
     *nigra*, 21  
     *ocellata*, 23  
     (*Odontostoma*) *morio*, 22  
     *pica*, 21  
     *picea*, 23  
     (*Pila*) *plicata*, 25  
     (*Ritena*) *plicata*, 24, 25  
     *rudis*, 21  
     *saturata*, 21  
     *vitellus*, 64  
     *yoldii*, 21  
**Neritina** *morio*, 21, 22, 23  
*neritinoideus*, Nerita, 22, 23  
*neritoidea*, Purpura, 75  
     *Pyrula*, 75  
*neritoides*, Coralliophila, 75  
*neritoideus*, Fusus, 75  
     *Murex*, 75  
*nesiotes*, *Neothais*, 60, 71, 72  
     *Thais*, 72  
*nigra*, Nerita, 21  
     *Stomatella*, 20  
*nipponensis*, *Casmaria ponderosa*, 68

- nipponica, Lasaea, 111  
 nitida, Assiminea, 30  
     Hydrocena, 30  
 Nitidella, 76  
 Nodilittorina, 25  
     pyramidalis, 25  
     pyramidalis pascua, 9, 25  
*Nodochila*, 79  
     pascua, 80  
 nodulosus, Tectarius, 25  
 nodus, Ricinula, 70  
 Notosinister, 42  
 novemprovincialis, Erato, 85  
 nucea, Mitra (Cylindra), 85  
     Voluta, 85  
 nucleus, Arca, 106  
     Planaxis, 48  
 Nucula, 106  
     hawaiiensis, 106  
     polynésica, 106  
     nuttingi, Barbatia, 106, 107  
     Calloarca (Barbarca), 106  
  
 oahua, Tellina (Cadella), 113  
 obsoleta, Leuconia, 101  
     Leuconopsis, 101  
 Obtortio, 33  
     dancei, 33  
     varicosa, 33  
     vulnerata, 33  
 ocellata, Nerita, 23  
*ochrostigmata*, Natica, 64, 65  
 ochrostoma, Purpura, 74  
 Octopus, 9, 114  
     rapanui, 114  
 octopus, Sepia, 114  
 odhneri, Gadinia, 99  
     Trimusculus, 99  
 Odostomia, 94  
     species, 94  
 Operculatum aurantium, 104  
 Orbitestella, 31  
     bastowi, 31  
     toreuma, 31  
 ornata, Cithara, 79  
     Citharopsis, 79  
     Columbella, 79  
     Seminella, 79  
 Ostrea fragilis, 110  
     lima, 109  
     tuberculata, 110  
  
 pacifica, Leuconopsis, 101  
 palmeri, Limnaea, 53  
     Morula (Oppomorus), 72  
     Recluzia, 53  
 papillosa, Morula, 70  
 Parimalleus, 108  
     cursator, 108  
  
 parva, Barbatia, 107  
 pasca, Chlamys, 109  
     Pecten (Chlamys), 109  
 pascua, Nodilittorina pyramidalis, 9, 25  
     *Nodochila*, 80  
     *Siphonaria*, 97  
     Zafra, 79, 80  
     *parcuana*, *Granula*, 85  
     *pascuensis*, *Conus militaris*, 9, 91  
 Pascula, 73, 74  
     citrica, 73, 74  
 Pascula, subgenus, 73  
 pascus, Melampus, 9, 100  
     Pecten (Hinnites), 109  
 patagonicus, Chlamys, 116  
     Chlamys (Zygochlamys), 116  
     Pecten, 116  
 Patella afra, 99  
     apertura, 18  
     auricularia, 103  
     equestris, 61  
     fissura, 16  
     graeca, 18  
     javanica, 97  
     lutea, 20  
     mammillaris, 99  
     retorta, 58  
     sinica, 104  
     umbracula, 104  
     umbraculum, 104  
 patiens, Cerithium, 39  
 pauperula, Voluta, 83  
 peasei, Emarginula, 17  
 Pecten (Chlamys) pasca, 109  
     (Hinnites) pascus, 109  
     islandicus, 109  
     patagonicus, 116  
 pellucida, Berthella, 105  
 pellucidula, Cypraea, 66  
     Trivirostra, 66  
 penicillata, Acuminia, 92, 93  
     Hastula, 92, 93  
     Terebra, 92  
 perfragilis, Promantellum, 110  
 perparvulum, Bittium, 33, 40  
 perplexa, Scalaria, 51, 52  
 perryi, Casmaria ponderosa, 68  
     Cassidea, 68  
 perscelida, Angiola, 48  
 perspicua, Hemiliostraca, 56  
 Phanerophthalmus, 96  
     species, 97  
 Philbertia trichodes, 88  
 philippii, Melampus, 100  
 Phrygiomurex, 73  
 pica, Nerita, 21  
     Siphonaria, 97  
 picea, Nerita, 23  
 pigra, Planaxis, 51  
  
 Pileopsis pilosus, 61  
 Piliscus, 98  
     (Allerya) krebsii, 98  
 Pilosabia trigona, 9, 60, 61  
 pilosus, Hipponyx, 61  
     Pileopsis, 61  
 Pisania, 80  
     (Caducifer) truncata, 81  
     englerti, 81  
     ignea, 81  
     pisinna, *Melanella*, 54  
     Merelina, 29  
 pistellaria, Prionocidaris, 58  
 Planaxis, 48, 50  
     (Angiola) fasciatus, 48  
     brasiliiana, 50  
     fasciata, 48  
     fasciatus, 48, 49  
     (Hinea) akuana, 9, 50  
     (Hinea) brasiliiana, 51  
     inepta, 48  
     lineatus, 48, 49  
     lineolatus, 48  
     mollis, 50  
     nucleus, 48  
     pigra, 51  
     zonatus, 48, 49  
 planulata, Gena, 20  
 platypus, Dendropoma, 47  
 Plaxiphora, 16  
     (Mercatora) mercatoris, 16  
     mercatoris, 9, 16  
     (Poneroplax) mercatoris, 16  
 Pleurobranchus, 105  
     citrina, 105  
 Pleurotoma foraminata, 89  
     hirsutum, 88  
     hystrix, 88  
 plicata, Nerita (Pila), 25  
     Nerita (Ritena), 24, 25  
     Rissoina, 26, 27  
 plicatula, Rissoa, 26  
     Rissoina (Rissolina), 26  
 plicatus, Turbo, 94  
 Plocamotis, subgenus, 20  
 plumula, Berthella, 105  
     Bulla, 105  
 Polinices (Mamilla) simiae, 65  
     mammatus, 65, 66  
     sebae, 65  
 polita, Helix, 55  
 politus, Turbo, 55  
*polynésica*, *Metaxia*, 47  
     Nucula, 106  
     Williamia, 98, 116  
 Polynices sebae, 65  
 ponderosa perryi, Casmaria, 68  
 Porites, 75  
 powelli, Cerithiopsis, 40

- praecipua*, *Morula*, 70  
*Prionocidaris pistellaris*, 58  
*proficua*, *Tellina*, 112  
*Promantellum*, subgenus, 110  
*Promantellum perfragilis*, 110  
*psarocephalum*, *Dendropoma*, 48  
*pseudochloris*, *Berthelinia*, 103  
*Berthelinia* (*Tamanovalva*), 103  
*pseudohystrix*, "Raphitoma," 88  
*pulchella*, *Zafrona*, 76  
*punctata*, *Conoelix*, 85  
*Imbricaria*, 85  
*pupa*, *Puperita*, 21  
*Puperita*, subgenus, 21  
*Puperita amoena*, 21  
*bensoni*, 21  
*pupa*, 21  
*Purpura*, 76  
*chaidea*, 72  
*diversiformis*, 75  
*madreporarum*, 75, 76  
*monodonta*, 75, 76  
*neritoidea*, 75  
*ochrostoma*, 74  
*(Polytropa)* *scobina*, 72  
*scobina*, 72  
*smithi*, 71, 73  
*squamulosa*, 75  
*violacea*, 75  
*Pusia*, 84  
*microzonias*, 84  
*Pusia*, subgenus, 84  
*pusilla*, *Haminea*, 95  
*Columbella*, 116  
*Mnestia*, 95  
*Retusa* (*Cylichnina*), 95, 96  
*Triton*, 116  
*Turritella*, 33  
*Zafrona*, 116  
*pusillum*, *Cerithidium*, 33  
*pyramidale*, *Tectarium*, 25  
*pyramidalis*, *Littorina*, 25  
*Nodilittorina*, 25  
*Tectarius*, 25  
*pyramidalis pascua*, *Nodilittorina*, 9, 25  
*pyramis*, *Epitonium*, 51, 52  
*Epitonium* (*Gyroscala*), 51  
*Pyrene*, 77  
*Pyrula neritoidea*, 75  
*queenslandica*, *Merelina*, 30  
*Quoyula*, 75  
*madreporarum*, 76  
*monodonta*, 75  
*radiata*, *Hipponyx*, 60  
*Tectura*, 116  
*Williamia*, 116  
*ramulosa*, *Jagonia*, 110  
*Lucina*, 110  
*Rangitotoa*, 12, 101, 102  
*insularis*, 101, 102  
*species*, 102  
*rapanui*, *Octopus*, 114  
*rapanuiensis*, *Leuconopsis*, 101  
*Strigatella*, 83  
*Raphitoma*, 88  
"Raphitoma" *pseudohystrix*, 88  
*rava*, *Clavatula*, 87  
*Recluzia*, 53  
*hargravesi*, 53  
*jehennei*, 53  
*johnii*, 53  
*lutea*, 53  
*palmeri*, 53  
*rollandiana*, 53  
*recurva*, *Eulima*, 57  
*Vitreolina*, 57  
*regula*, *Malleus*, 108  
*reticulata*, *Gadinia*, 99  
*Tellina*, 112  
*Zeidora*, 17  
*reticulatum*, *Buccinum*, 50  
*retorta*, *Patella*, 58  
*Retusa*, 95  
*(Cylichnina)* *pusilla*, 95, 96  
*(Cylichnina)* *villica*, 96  
*rhyssocochlea*, *Dendropoma*, 48  
*Ricinula morus*, 70  
*nodus*, 70  
*ricinus*, *Drupa*, 70  
*Murex*, 70  
*Sistrum*, 70  
*ridicula*, *Joculator*, 41  
*Rissoa cheilostoma*, 29  
*crassilabrum*, 27  
*plicatula*, 26  
*tridentata*, 27  
*Rissoia vulgaris*, 30  
*Rissoina*, 26  
*angasi*, 26, 27  
*coronata*, 27  
*curta*, 27  
*granulosa*, 30  
*mirabilis*, 28  
*plicata*, 26, 27  
*(Rissolina)* *plicatula*, 26  
*(Rissolina)* *turricula*, 26, 27  
*(Rissolina)* *turricula englerti*, 26, 27  
*semiglabrata*, 27  
*(Zebina)* *tridentata*, 27  
*Rissolina*, subgenus, 26  
*Ritena*, subgenus, 24  
*Robillardia*, 57, 58  
*cernica*, 6, 57  
*rollandiana*, *Recluzia*, 53  
*ruber*, *Triforis*, 42  
*rubida*, *Clavatula*, 86  
*rubrum*, *Cardium*, 111  
*rubus*, *Cerithium*, 34  
*Cerithium* (*Cerithium*), 34, 35  
*rudis*, *Nerita*, 21  
*rufonotata*, *Evokesia*, 75  
*rugosum*, *Cerithium*, 39  
*rugosus*, *Strombus*, 39  
*rugulosa*, *Cerithium* (*Metaxia*), 46  
*rugulosum*, *Cerithium*, 46  
*Sabia*, 58  
*conica*, 58  
*sagenaria*, *Kermia*, 90  
*sagittifera*, *Natica*, 64, 65  
*sandvicense*, *Cerithium*, 36  
*sandwichense*, *Cerithium*, 36  
*Cerithium* (*Cerithium*), 36  
*sandwicensis*, *Granula*, 85, 86  
*Marginella*, 85  
*sandwichense*, *Cerithium*, 36  
*sandwichensis*, *Marginella*, 85  
*Saxicava*, 113  
*australis*, 113  
*hawaiensis*, 113  
*scabriuscula*, *Trivia oryza*, 66  
*scabriusculus*, *Euchelus*, 18  
*Scala commutata*, 51  
*lamellosum*, 51  
*Scalaria perplexa*, 51, 52  
*scalaris*, *Turbo*, 51  
*Scaliola*, 33  
*scapula*, *Dolabella*, 103  
*Schwartziella*, 26  
*scobina*, *Purpura*, 72  
*Purpura* (*Polytropa*), 72  
*scutulata*, *Mitra* (*Strigatella*), 83  
*sebae*, *Natica*, 65  
*Polinices*, 65  
*Polynices*, 65  
*Semele*, 112  
*australis*, 112, 113  
*tita*, 112  
*semiglabrata*, *Rissoina*, 27  
*Zebina*, 27  
*Seminella*, 79  
*ornata*, 79  
*Sepia octopus*, 114  
*Septifer*, 107  
*bryanae*, 107  
*Serpulorbis*, 48  
*species*, 48  
*serratum*, *Cerithium*, 34  
*serratus*, *Murex*, 34  
*shawi*, *Trivirostra edgari*, 66  
*simiae*, *Mamilla*, 65  
*Natica*, 65  
*Polinices* (*Mamilla*), 65  
*sinensis*, *Murex*, 34

- sinica*, *Patella*, 104  
*sinicum*, *Umbraculum*, 104  
*sipho*, *Siphonaria*, 97  
*Siphonaria*, 97  
*pascua*, 97  
*pica*, 97  
*sipho*, 97  
*Siphonium* (*Stoa*) *platypus*, 47  
*Sistrum concatenata*, 70  
*morus*, 70  
*ricinus*, 70  
*Smaragdinella*, 96  
*calyculata*, 96  
*viridis*, 96  
*smithi*, *Purpura*, 71, 73  
*solitarium*, *Caecum*, 31  
*sponsalis*, *Conus*, 92  
*squamulosa*, *Purpura*, 75  
*sterkii*, *Heliacus*, 32, 33  
*Stomatella*, 20  
*auricula*, 20  
*esperanzae*, 20  
*laevis*, 21  
*nigra*, 20  
*striatula*, *Columbella*, 76  
*Columbella* (*Seminella*), 76  
*Zafra*, 76, 77, 116  
*Strigatella*, subgenus, 83, 84  
*Strigatella rapanuiensis*, 83  
*strigilata*, *Hastula*, 92, 94  
*strigosa*, *Gena*, 20  
*Strombiformis*, 53  
*langfordi*, 57  
*Strombus*, 63  
(*Canarium*) *maculatus*, 63  
*floridus depauperatus*, 63  
*maculatus*, 9, 63  
*rugosus*, 39  
*urceus*, 63  
*stylata*, *Egentelaria*, 10, 94  
*Hastula*, 94  
*Terebra*, 94  
*subclathrata*, *Emarginula*, 16, 17  
*subcylindrica*, *Kermia*, 90  
*submamillatum*, *Cerithidium*, 33  
*Subularia*, 55  
*subulata*, *Turbo*, 55  
*Supplanaxis*, subgenus, 48  
*suturata*, *Nerita*, 21  
  
*Tamanovalva*, 102  
*limax*, 102  
*Tamanovalva*, subgenus, 102, 103  
*Tectarium pyramidale*, 25  
*Tectarius nodulosus*, 25  
*pyramidalis*, 25  
*Tectura radiata*, 116  
*Tegula* (*Chlorostoma*) *atra*, 115  
*Telasco*, subgenus, 82  
  
*Tellina*, 113  
(*Cadella*) *mauia*, 113  
(*Cadella*) *oahua*, 113  
*lechriogramma*, 113  
*proficua*, 112  
*reticulata*, 112  
*Terebra inconstans*, 94  
*lanceata*, 92  
*penicillata*, 92  
*stylata*, 94  
*venosa*, 92, 93  
*Thais nesiotis*, 72  
*Thericium*, subgenus, 36  
*tita*, *Semele*, 112  
*toreuma*, *Orbitestella*, 31  
*Torinia*, 32  
*dorsuosa*, 32  
*torquatum*, *Epitonium* (*Gyroscala*), 52  
*trachea*, *Dentalium*, 31  
*trichodes*, *Microdaphne*, 88, 89, 116  
*Philbertia*, 88  
*tridentata*, *Rissoa*, 27  
*Rissoina* (*Zebina*), 27  
*Zebina*, 27, 28  
*tridentata crassilabrum*, *Zebina*, 27  
*Trifora levukensis*, 46  
*Triforis levukensis*, 43  
*ruber*, 42  
*trigona*, *Pilosabia*, 9, 60, 61  
*Trimusculus*, 99  
*conicus*, 99  
*costatus*, 99  
*odhneri*, 99  
*Triphora*, 42  
*albovittata*, 43  
*aporema*, 43, 46  
*eucharis*, 46  
*exomilisca*, 45  
*gemma*, 42  
*leucathema*, 42  
*lamberti*, 44, 45  
*loisae*, 44, 45  
*vargasi*, 43  
*Triphoris vulpina*, 42  
*tristis*, *Mitra* (*Strigatella*), 84  
*tristoma*, *Cerithium*, 42  
*Triton cylindricus*, 81  
*decollatus*, 81  
(*Epidromus*) *cylindricus*, 81  
*pusilla*, 116  
*truncatus*, 80  
*Trivia*, 66  
*oryza scabriuscula*, 66  
*Trivirostra*, 66  
*edgari shawi*, 66  
*pellucidula*, 66  
*Trochus ater*, 115  
*cylindraceus*, 32  
  
*Trophon*, 73  
(*Pascula*) *citricus*, 73, 74  
*truncata*, *Caducifer*, 82  
*Pisania* (*Caducifer*), 81  
*truncatus*, *Triton*, 80  
*tubercularis*, *Murex*, 40  
*tuberculata*, *Ostrea*, 110  
*tuberculiferum*, *Cerithium*, 34, 35  
*Turbo plicatus*, 94  
*politus*, 55  
*scalaris*, 51  
*subulata*, 55  
*turricula*, *Rissoina* (*Rissolina*), 26, 27  
*turricula englerti*, *Rissoina* (*Rissolina*), 26, 27  
*turrigera*, *Cyrbasia* (*Joculator*), 41  
*Turritella pusilla*, 33  
*turturina*, *Columbella*, 77  
  
*Umbella chinensis*, 104  
*umbilicata*, *Bulla*, 95  
*Ianthina*, 53  
*Janthina*, 53  
*Janthina* (*Iodina*), 53  
*umbracula*, *Patella*, 104  
*Umbraculum*, 104  
*sinicum*, 104  
*umbraculum*, 104  
*umbraculum*, *Patella*, 104  
*Umbraculum*, 104  
*undulata*, *Littorina*, 25, 115  
*undulata* var., *Littorina*, 115  
*unifasciata fernandezensis*, *Littorina* (*Austrolittorina*), 115  
*urceus*, *Strombus*, 63  
*ustulatum*, *Canarium*, 63  
*uva*, *Drupa*, 70  
*Morula*, 70, 71  
  
*Vaceuchelus*, 19  
*vargasi*, *Triphora*, 43  
*varia*, *Gadinia*, 99  
*Gena*, 20  
*variabilis*, *Nassa*, 82  
*varians*, *Euplica*, 78, 79  
*varicosa*, *Obtortio*, 33  
*velascoi*, *Emarginula*, 16  
*venosa*, *Acuminia*, 10, 92, 93, 94  
*Terebra*, 92, 93  
*Ventomnestia*, 95  
*colorata*, 95  
*Ventomnestia*, subgenus, 95  
*Vexillum*, 84  
(*Pusia*) *microzonias*, 84  
*vexillum*, *Mitra* (*Nebularia*), 83  
*vibex*, *Buccinum*, 68  
*Cassis*, 68  
*villica*, *Cylichna*, 96  
*Retusa* (*Cylichnina*), 96



violacea, *Coralliophila*, 75  
*Janthina*, 52  
*Purpura*, 75  
viridis, *Bulla*, 96  
*Smaragdinella*, 96  
vitellus, *Natica*, 64  
*Nerita*, 64  
vitrea, *Balcis*, 55  
*Vitreolina*, 56  
*carifa*, 57  
*cifara*, 57  
*icafra*, 57  
*iota*, 57  
*langfordi*, 57  
*recurva*, 57  
*wareni*, 56  
Volsella, 107  
*matris*, 108  
*Voluta coffea*, 100  
*nucea*, 85  
*paupercula*, 83

*vulgaris*, *Assimineia*, 30  
*Rissoia*, 30  
vulgatum, *Cerithium*, 36  
vulnerata, *Obtortio*, 33  
vulpina, *Triphoris*, 42  
  
*wareni*, *Vitreolina*, 56  
Williamia, 98  
*galapagana*, 98  
*gussoni*, 98  
*polynesiaca*, 98, 116  
*radiata*, 116  
  
Xymene, 73  
  
yamazii, *Melanella*, 54  
yoldii, *Nerita*, 21  
  
Zafra, 79, 80  
*pascua*, 79, 80

Zafra, section, 76  
Zafrona, 76  
*consobrinella*, 76, 116  
*pulchella*, 76  
*pusilla*, 116  
*striatula*, 76, 77, 116  
Zafrona, subgenus, 76  
Zebina, 27  
*semiglabrata*, 27  
*tridentata*, 27, 28  
*tridentata crassilabrum*, 27, 28  
Zebinella, subgenus, 27  
zebra, *Mitra*, 83  
Zeidora, 17  
*bahamondei*, 17  
*calceolina*, 17  
*fiabellum*, 18  
*reticulata*, 17  
zonatus, *Planaxis*, 48, 49



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