

New Eastern Pacific Subgenera of *Turbo* LINNAEUS, 1758 and *Astraea* RÖDING, 1798

BY

JAMES H. McLEAN

Los Angeles County Museum of Natural History
900 Exposition Boulevard, Los Angeles, California 90007

IN THE COURSE OF REVIEWING the tropical eastern Pacific species of Turbinidae, the need for one new subgenus of *Turbo* LINNAEUS, 1758, and one of *Astraea* RÖDING, 1798, has been recognized. Both of these genera are large cosmopolitan groups in tropical and subtropical areas of the world. Subgenera in each are based upon sculpture of the mature shell and the morphology of the calcareous opercula. In many of the available taxa, the opercular differences are striking, and no doubt some will eventually come to be treated as full genera, following review on a worldwide scale.

The available generic taxa in these two groups are diagnosed and many of the type species are illustrated in the Treatise on Invertebrate Paleontology (MOORE, ed., 1960).

Chaenoturbo McLEAN, subgen. nov.
(of *Turbo* LINNAEUS)

Type Species: *Turbo mazatlanicus* PILSBRY & LOWE, 1932 (p. 87; plt. 9, fig. 6).

Diagnosis: Mature shell relatively small, openly umbilicate. The two keels of the juvenile shell are weakly stellate. Surface of operculum granular, central area raised relative to the flat shelf-like area along the outer margin, the marginal area evenly sloping to the summit adjacent to the columella; a deep central pit is bordered by a broad, spirally descending cord making two turns.

Discussion: The operculum of *Turbo mazatlanicus* has not previously been described. This is an uncommon species, generally known from beachworn specimens collected at Mazatlan, Mexico. Seven lots are represented in the Los Angeles Museum, ranging from the Cape San Lucas area of Baja California south to Port Utria, Colombia, with operculate specimens on hand from the Tres Marias Islands and Cuastecamate Cove, Jalisco, Mexico.

Living specimens occur on rocky bottoms offshore at depths of 20 - 50 feet.

The open umbilicus of mature shells of *Turbo mazatlanicus* differentiates this species from all other New World turbos. Juvenile shells of most turbinids are umbilicate (ROBERTSON, 1957, p. 319), but the only other subgeneric taxon listed by MOORE (1960, p. 268) as umbilicate in the mature shell is *Subninella* THIELE, 1929 (*Lunatica* RÖDING, 1798, is erroneously so listed). The type species of *Subninella*, the Australian *T. undulatus* GMELIN, 1791, is a moderately large, low-spined form with rounded whorls and a convex operculum. The granular, deeply pitted operculum of *T. mazatlanicus* is not similar to that of any other New World subgenus of *Turbo* (*Callopoma* GRAY, 1850; *Halosephus* REHDER, 1943; *Marmorostoma* SWAINSON, 1829; *Taeniaturbo* WOODRING, 1928). On the opercular distinction plus that of the umbilicate shell, the monotypic *Chaenoturbo* is regarded as coordinate in rank with the other above mentioned taxa.

The prefix *chaeno-* is derived from the Greek verb *χαίρω*, meaning to gape, open, and referring in *Chaenoturbo* to the open umbilicus.

Megastraea McLEAN, subgen. nov.
(of *Astraea* RÖDING)

Type Species: *Trochus undosus* WOOD, 1828.

Diagnosis: Shell exceptionally large, exceeding 100 mm in height; periostracum thick, forming raised lamellae. Outer face of operculum bearing 3 (or 4, counting the small, upper marginal rib) raised, spinose ridges.

Discussion: Two subtropical species of the Californian province comprise the Recent members of this subgenus of *Astraea* RÖDING, 1798: the familiar *A. undosa*, and the less well known *A. turbanica* (DALL, 1910), as synonyms of which I regard *A. petrothauma* BERRY, 1940, and *A.*

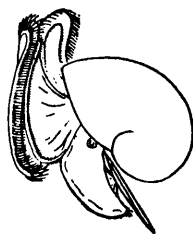
rupicollina STOHLER, 1959. Not until 1959 with the description of *A. rupicollina* were fully mature living specimens of *A. turbanica* discovered near the Coronado Islands south of San Diego on the outer coast of Baja California (STOHLER, 1959, p. 425). DALL's species (DALL, 1910, p. 134) was based upon an immature specimen from the Magdalena Bay area (see KEEN, 1958, p. 263, fig. 75), and BERRY's taxon was based upon Lower Pleistocene specimens from Los Angeles County (BERRY, 1940, p. 10; pl. 2, figs. 2, 3). Recently collected material from a number of localities along the outer coast of Baja California now provides the basis for arriving at the above synonymy; comparison of this material with type material of the 3 taxa clearly indicates that a single species is represented. WOODRING (1946, p. 63) anticipated this synonymy in treating BERRY's taxon as a subspecies of DALL's taxon. Mature specimens of *A. turbanica* are easily separated from *A. undosa*. They are generally larger than *A. undosa*, have 2 peripheral carinations rather than one, and the lowermost ridge of the operculum is curved and nearly lacking spines, in contrast to that of *A. undosa*, in which it is uncurved, thick, and spiny. *Astraea gradata* GRANT & GALE, 1931, from the middle Pliocene of Los Angeles County (GRANT & GALE, 1931, p. 818; pl. 31, figs. 1, 3, 5, 8, 9) is also referable to *Megastraea*.

Astraea undosa was considered by early workers to be referable to the subgenus *Pomaulax* GRAY, 1850, but the type species of *Pomaulax* is *Trochus japonicus* DUNKER, 1845 (see KEEN, 1956, p. 6; MOORE, 1960, p. 266), a Japanese species having a smooth, convex operculum. *Pomaulax* is now in use for the Californian species *A. gibberosa* (DILLWYN, 1817). The subgenus *Uvanilla* GRAY, 1850, type species *Trochus unguis* WOOD, 1828, comprises a group of tropical eastern Pacific species of medium size, having 2 granulose (rather than spiny) ridges on the operculum. On the basis of size, periostracal, and opercular differences, *Megastraea* is regarded as coordinate in rank with *Uvanilla*.

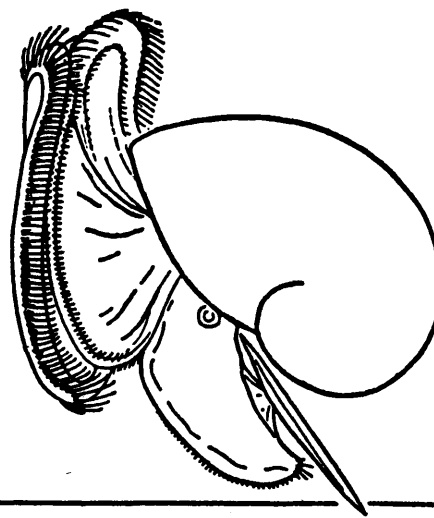
The prefix *meg-* is derived from the Greek adjective *μεγας* and means large, an appropriate designation for this group of the largest species of *Astraea*.

LITERATURE CITED

- BERRY, SAMUEL STILLMAN
1940. New Mollusca from the Pleistocene of San Pedro, California - I. Bull. Amer. Paleont. 25 (94A): 1-18; pls. 1-2 (28 September 1940)
- DALL, WILLIAM HEALEY
1910. New species of West American shells. The Nautilus 23 (11): 133-136 (April 1910)
- GRANT, ULYSSES S., IV & HOYT RODNEY GALE
1931. Catalogue of the marine Pliocene and Pleistocene Mollusca of California and adjacent regions... Mem. San Diego Soc. Nat. Hist. 1: 1-1036; pls. 1-32; 15 text figs. (3 November 1931)
- KEEN, A. MYRA
1956. Nomenclatural problems in the Archaeogastropoda. Ann. Rept. Amer. Malacol. Union, Bull. 23: 6-7
1958. Sea shells of tropical West America; marine mollusks from Lower California to Colombia. i-xi + 624 pp.; illus. Stanford, Calif. (Stanford Univ. Press)
- MOORE, RAYMOND CECIL (editor and director)
1960. Treatise on invertebrate paleontology (I) Mollusca, vol. 1: xxiii + 351 pp.; 216 figs. Univ. Kansas Press
- PILSBRY, HENRY AUGUSTUS & HERBERT N. LOWE
1932. West Mexican and Central American mollusks collected by H. N. Lowe, 1929-31. Proc. Acad. Nat. Sci. Philadelphia 84: 33-144; 7 figs.; pls. 1-17; 2 fotogr. (21 May 1932)
- ROBERTSON, ROBERT
1957. The subgenus *Halosephus* REHDER, with notes on the Western Atlantic species of *Turbo* and the subfamily Bothropomatinae THIELE. Journ. Wash. Acad. Sci. 47 (9): 316 to 319; 3 text figs. (September 1957)
- STOHLER, RUDOLF
1959. Two new species of West North American marine gastropods. Proc. Calif. Acad. Sci., ser. 4, 29 (11): 423-444; 10 text figs. (27 February 1959)
- WOODRING, WENDELL PHILLIPS, MILTON NUNN BRAMLETTE & WILLIAM STEPHEN WEBSTER KEW
1946. Geology and paleontology of Palos Verdes Hills, California. U.S. Geol. Survey Prof. Paper 207; v + 145 pp.; 37 pls. (Systematic paleontology by WOODRING)



THE VELIGER



A Quarterly published by
CALIFORNIA MALACOOLOGICAL SOCIETY, INC.
Berkeley, California

VOLUME 13

July 1, 1970

NUMBER 1

CONTENTS

- The Anatomy and Functional Morphology of the Reproductive System in the
Opisthobranch Mollusk *Phyllaphysia taylori* DALL, 1900
(5 Plates; 13 Text figures)
ROBERT D. BEEMAN I
- An Aberrant *Cryptomphalus (Helix) aspersa* (MÜLLER) from Southern California
(1 Plate)
T. W. FISHER 32
- Occurrence of the Spirochaete Genus *Cristispira* in Western Canadian Marine
Bivalves
F. R. BERNARD 33
- Egg Capsules of Some Prosobranchs from the Pacific Coast of Panama
(6 Text figures)
CHARLES N. D'ASARO 37
- Comparisons among Growth Characteristics of Two Species of Sea Mussel, *Mytilus*
edulis and *Mytilus californianus* (11 Text figures)
J. R. E. HARGER 44
- Calotrophon*, a New World Muricid Genus (Gastropoda : Muricacea)
(1 Plate; 6 Text figures)
JAMES H. MCLEAN & WILLIAM K. EMERSON 57
- Two New Species of Janolidae from Toyama Bay, Japan (Gastropoda : Nudibranchia)
(3 Text figures)
KIKUTARÔ BABA & TAKEO ABE 63
- Some Associates of *Tresus nuttallii* (CONRAD, 1837) (Pelecypoda : Mactridae) from
Humboldt Bay, California
WILLIAM E. STOUT 67

[Continued on Inside Front Cover]

Distributed free to Members of the California Malacozoological Society, Inc.
Subscriptions (by Volume only) payable in advance to Calif. Malacozool. Soc., Inc.
Volume 13: \$18.- Domestic; \$19.- in the Americas; \$19.50 in all other Foreign Countries
Single copies this issue \$14.-. Postage extra.
Send subscription orders to Mrs. JEAN M. GATE, 12719 San Vicente Boulevard,
Los Angeles, California 90049. Address all other correspondence to Dr. R. STOHLER, Editor,
Department of Zoology, University of California, Berkeley, California 94720

CONTENTS — *Continued*

Reprint → New Eastern Pacific Subgenera of *Turbo* LINNAEUS, 1758, and *Astraea* RÖDING, 1798
 JAMES H. McLEAN 71

Swimming Gastropods (Opisthobranchia and Prosobranchia) (20 Text figures)
 WESLEY M. FARMER 73

Commensal Activity as a Function of Age in Two Species of California Abalones
 (Mollusca : Gastropoda) (2 Plates; 2 Text figures)
 JOHN C. HANSEN 90

An Ecological Study of Two Sympatric Species of *Fasciolaria* (Mollusca:Gastropoda)
 in Alligator Harbor, Florida (1 Plate; 9 Text figures)
 FRED ETHAN WELLS, Jr. 95

The Date of Publication of GOULD's "Descriptions of Shells from the Gulf of
 California"
 EUGENE V. COAN 109

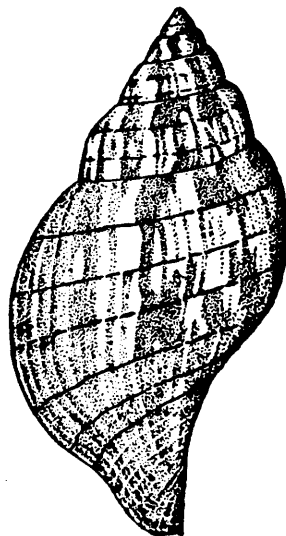
NOTES & NEWS 110

Additional Remarks on Studies of Cenozoic Marine Mollusks of the Pacific
 Coast WARREN O. ADDICOTT

Dolabrifera dolabrifera (RANG, 1828) : Range Extension to the Eastern Pacific
 (1 Text figure) HANS BERTSCH

On the Authorship of Part V of ESCHSCHOLTZ's "Zoologischer Atlas," 1833
 JAMES H. McLEAN

BOOKS, PERIODICALS & PAMPHLETS 114



Note: The various taxa above species are indicated by the use of different type styles as shown by the following examples, and by increasing indentation.

ORDER, Suborder, **DIVISION**, Subdivision, **SECTION**,
 SUPERFAMILY, FAMILY, Subfamily, *Genus*, (*Subgenus*)
New Taxa

THE VELIGER is open to original papers pertaining to any problem concerned with mollusks.

This is meant to make facilities available for publication of original articles from a wide field of endeavor. Papers dealing with anatomical, cytological, distributional, ecological, histological, morphological, physiological, taxonomic, etc., aspects of marine, freshwater or terrestrial mollusks from any region, will be considered. Even topics only indirectly concerned with mollusks may be acceptable.

It is the editorial policy to preserve the individualistic writing style of the author; therefore any editorial changes in a manuscript will be submitted to the author for his approval, before going to press.

Short articles containing descriptions of new species or other taxa will be given preferential treatment in the speed of publication provided that arrangements have been made by the author for depositing the holotype with a recognized public Museum. Museum numbers of the type specimens must be included in the manuscript. Type localities must be defined as accurately as possible, with geographical longitudes and latitudes added.

Short original papers, not exceeding 500 words, may be published in the column "NOTES and NEWS"; in this column will also appear notices of meetings of regional, national and international malacological organizations, such as A. M. U., U. M. E., W. S. M., etc., as well as news items which are deemed of interest to our Members and subscribers in general. Articles on "METHODS and TECHNIQUES" will be considered for publication in another column, provided that the information is complete and techniques and methods are capable of duplication by anyone carefully following the description given. Such articles should be mainly original and deal with collecting, preparing, maintaining, studying, photographing, etc., of mollusks or other invertebrates. A third column, entitled "INFORMATION DESK," will contain articles dealing with any problem pertaining to collecting, identifying, etc., in short, problems encountered by our readers. In contrast to other contributions, articles in this column do not necessarily contain new and original materials. Questions to the editor, which can be answered in this column, are invited. The column "BOOKS, PERIODICALS, and PAMPHLETS" will attempt to bring reviews of new publications to the attention of our readers. Also, new timely articles may be listed by title only, if this is deemed expedient.

Manuscripts should be typed in final form on a high grade white paper, not exceeding 8½" by 11", at least double spaced and accompanied by a clear carbon or photo copy. A pamphlet with detailed suggestions for preparing manuscripts intended for publication in THE VELIGER is available to authors upon request. A self-addressed envelope, sufficiently large to accommodate the pamphlet (which measures 5½" by 8½"), with double first class postage, should be sent with the request to the Editor.

EDITORIAL BOARD

DR. DONALD P. ABBOTT, *Professor of Biology*
Hopkins Marine Station of Stanford University

DR. JERRY DONOHUE, *Professor of Chemistry*
University of Pennsylvania, Philadelphia, and
Research Associate in the Allan Hancock Foundation
University of Southern California, Los Angeles

DR. J. WYATT DURHAM, *Professor of Paleontology*
University of California, Berkeley

DR. E. W. FAGER, *Professor of Biology*
Scripps Institution of Oceanography, La Jolla
University of California at San Diego

DR. CADET HAND, *Professor of Zoology and*
Director, Bodega Marine Laboratory
University of California, Berkeley

DR. G DALLAS HANNA, *Curator*
Department of Geology
California Academy of Sciences, San Francisco

DR. JOEL W. HEDGPETH, *Resident Director*
Marine Science Laboratory, Oregon State University
Newport, Oregon

DR. LEO G. HERTLEIN,
Curator of Invertebrate Paleontology
California Academy of Sciences, San Francisco

DR. A. MYRA KEEN, *Professor of Paleontology and*
Curator of Malacology
Stanford University, Stanford, California

DR. VICTOR LOOSANOFF, *Professor of Marine Biology*
Pacific Marine Station of the University of the Pacific

DR. JOHN MCGOWAN, *Associate Professor of*
Oceanography
Scripps Institution of Oceanography, La Jolla
University of California at San Diego

DR. FRANK A. PITELKA, *Professor of Zoology*
University of California, Berkeley

MR. ALLYN G. SMITH, *Associate Curator*
Department of Invertebrate Zoology
California Academy of Sciences, San Francisco

DR. RALPH I. SMITH, *Professor of Zoology*
University of California, Berkeley

DR. CHARLES R. STASEK, *Associate Professor*
of Zoology
Florida State University, Tallahassee, Florida

DR. DONALD M. WILSON, *Professor of Biology*
Department of Biological Sciences
Stanford University, Stanford, California

EDITOR-IN-CHIEF

DR. RUDOLF STOHLER, *Research Zoologist*
University of California, Berkeley

ASSOCIATE EDITOR

MRS. JEAN M. CATE
Los Angeles, California