

## 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.*

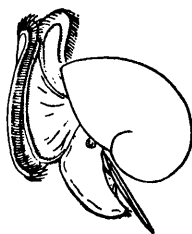
*rupicollina* STOHLER, 1959. Not until 1959 with the description of *A. rupicollina* were fully mature living specimens of *A. turbanica* discovered near the Coronado Islands south of San Diego on the outer coast of Baja California (STOHLER, 1959, p. 425). DALL's species (DALL, 1910, p. 134) was based 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; plt. 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; plt. 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*.

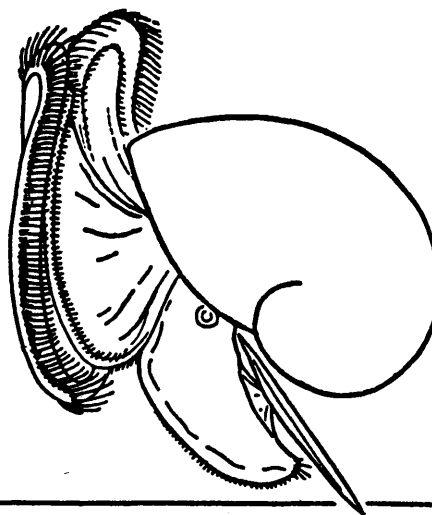
The prefix *meg-* is derived from the Greek adjective *μεγας* and means large, an appropriate designation for this group of the largest species of *Astraea*.

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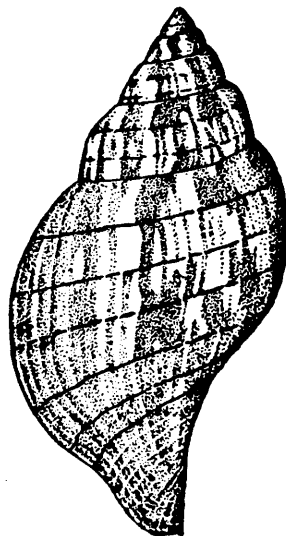
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**Note:** The various taxa above species are indicated by the use of different type styles as shown by the following examples, and by increasing indentation.

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

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