

First Tertiary Occurrence of a Rare Patelliform Gastropod (Archaeogastropoda: Symmetrocapulidae), Eocene Tejon Formation, Tehachapi Mountains, California

by

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Abstract. Two specimens of ?*Symmetrocapulus* sp., a moderately large patelliform gastropod, were found in rocky nearshore deposits of the middle Eocene Tejon Formation, western Tehachapi Mountains, at the southern end of the Great Valley of California. This rare genus, which is provisionally classified in the Archaeogastropoda, has been previously known only from Jurassic through Lower Cretaceous deposits in Europe, Africa, and Japan. The Tejon specimens extend the geologic range of this rare genus into the middle Eocene and extend its geographic range into the Western Hemisphere.

INTRODUCTION

Two moderately large and very rare specimens of the patelliform gastropod ?*Symmetrocapulus* sp. were recently found by the author while intensively collecting middle Eocene rocky nearshore deposits in the basal part of the marine Tejon Formation, western Tehachapi Mountains, south-central California. The shell apex of each specimen is posterior; the asymmetrical horseshoe-shaped muscle scar is posterior and very high dorsally. *Symmetrocapulus* has been previously known only from Jurassic through Lower Cretaceous deposits in Europe, Africa, and Japan (KASE, 1984).

Abbreviations used for catalog and/or locality numbers are: CSUN, California State University, Northridge; LACMIP, Natural History Museum of Los Angeles County, Invertebrate Paleontology Section.

MATERIALS

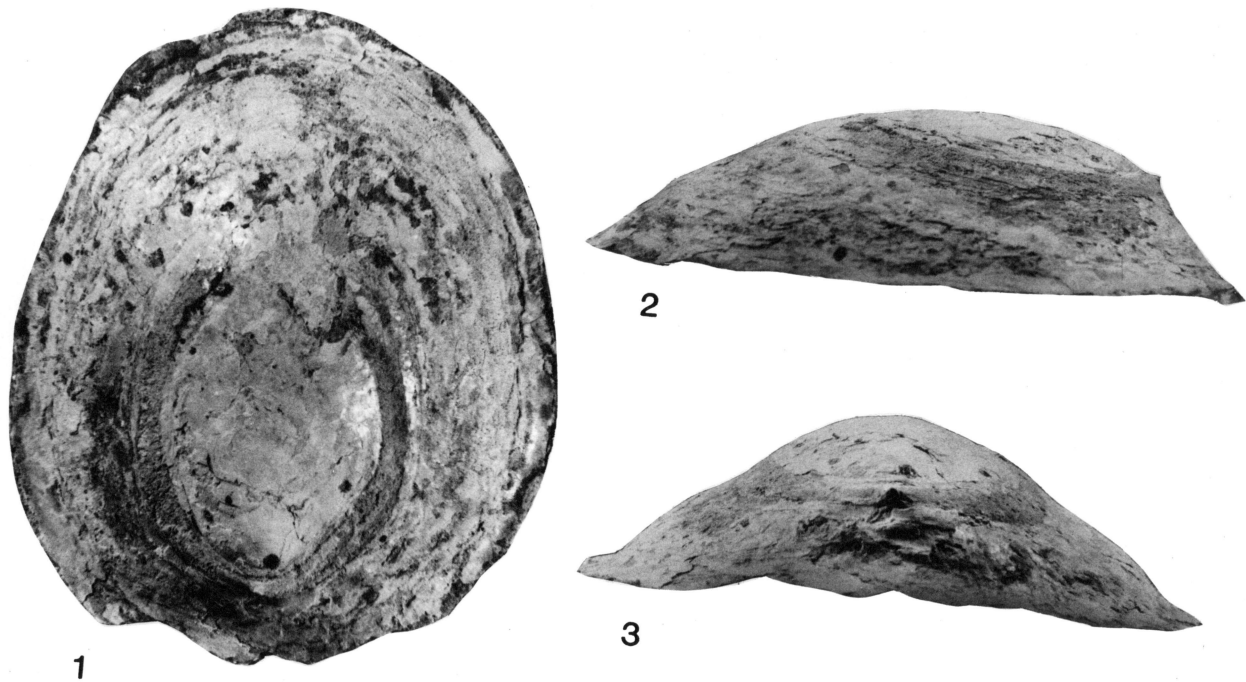
Two specimens of ?*Symmetrocapulus* sp. were found at locality CSUN 1201, 13 m above the base of the Tejon Formation, in a steep-sided roadcut exposure about 20 m east of the eastern side of the Edmonston Pumping Plant, 16 km east of Grapevine, Kern County, California. The exposures at the pumping plant are predominantly sandstone and are badly weathered and crumbly. Fossils are

poorly preserved and chalky. Only the inner shell layer is present in the two ?*Symmetrocapulus* specimens. The muscle-scar pattern is also present in both specimens. A partial external mold of one of the specimens (hypotype, LACMIP 8048) was found, but the thin outer shell layer is inseparably fused to the surrounding rock matrix. On this specimen, the innermost surface of this outer shell layer is smooth with numerous algal or sponge boreholes. No characters of external shell features were discernible.

The Tejon specimens are compared to casts of the European *Symmetrocapulus tessonii* (J. A. Eudes-Deslongchamps, 1843), and to casts of the Japanese *S. hanaii* Kase, 1984. All these casts were provided by Tomoki Kase of the National Science Museum, Tokyo, Japan. Comparisons were also made with illustrated specimens in the literature.

DEPOSITIONAL ENVIRONMENT AND GEOLOGIC AGE

The ?*Symmetrocapulus* specimens were collected from an abundantly fossiliferous lens at locality CSUN 1201. This lens was part of a shoreline-associated sequence of rocky nearshore deposits that was laid down as a transgressing sea advanced over an irregular surface of gneissic bedrock during the middle Eocene ("Transition Stage") (SQUIRES, 1989a, b; LINDBERG & SQUIRES, in press). The 1-m-



Explanation of Figures 1 to 3

Figures 1 to 3. ?*Symmetrocampus* sp., dorsal, left lateral, and posterior views of hypotype, LACMIP 8048, locality CSUN 1201. = ~~06~~ LACMIP loc. 12022.

Figures 1 and 2: $\times 1.1$. Figure 3: $\times 1.3$.

thick lens represents a poorly sorted, channel-lag storm accumulation of marine molluscan debris indicative of a rocky nearshore environment. The bivalves *Acustostrea*, *Anomia*, *Brachidontes*, and, especially, *Isognomon* are abundant. The *Isognomon* from this lens is discussed in SQUIRES (1989b). Patellogastropod limpets from this lens and associated lenses are described in LINDBERG & SQUIRES (in press).

SYSTEMATIC PALEONTOLOGY

Family SYMMETROCAPULIDAE Wenz, 1938

Genus *Symmetrocampus* Dacqué, 1933

Type species: By original designation, *Patella rugosus* J. Sowerby, 1816 (*non* Röding, 1798), Middle Jurassic (Bathonian), England.

?*Symmetrocampus* sp.

(Figures 1–3)

Description: Shell moderately large. Hypotype, LACMIP 8048, length 72 mm, width 63 mm; hypotype, LACMIP 8049, length 74 mm, width 50 mm (incomplete). Very low profile patelliform shell. External shell layer thin and prismatic? Internal shell layer thicker and nacreous lamellar

with a nonnacreous, crossed-lamellar muscle scar. Dorsally situated, horseshoe-shaped muscle scar broadly open anteriorly. Left arm of muscle scar longer and less sharply curved than the right. Scar narrowest at posterior end. Scar rising anteriorly. Apex about $\frac{1}{7}$ of maximum length from posterior end. Posterior slope concave. Anterior slope convex. Exterior features not known, but closely spaced concentric ribbing seems to be present just posterior to the apex.

Discussion: The familial placement of *Symmetrocampus* has long been uncertain. COX (1960) followed WENZ (1938) in retaining *Symmetrocampus* in the superfamily Patellacea, but COX (1960) elevated Wenz's subfamily to the queried family Symmetrocapulidae. COX (1960) mentioned that this family may eventually prove to be related to the mesogastropod family Capulidae.

KASE (1984) transferred *Symmetrocampus* to the family Capulidae, based on the characters of the muscle scar and the posteriorly situated shell apex. MCLEAN (1988) rejected this familial assignment, and, based on the horseshoe-shaped muscle scar and posterior apex in which the first teleoconch whorl is coiled and offset to the right, provisionally ranked Symmetrocapulidae as a sister group to the smaller sized, deep-sea hydrothermal-vent limpets in the Lepetrodilacea and the "tapersnout" limpets, which

were subsequently described in the Peltospiracea (MCLEAN, 1989). MCLEAN (1988) hypothesized that these hydrothermal-vent archaeogastropod limpets are living derivatives of families, like *Symmetrocapulidae*, that once were distributed more broadly in the shallow seas of the Late Paleozoic and Mesozoic. With this new occurrence of *?Symmetrocapulus* sp. in middle Eocene rocky nearshore deposits, the fossil record of the possible ancestors of the modern hydrothermal-vent limpets can now be extended into the early Cenozoic. Members of *Symmetrocapulus* inhabited wave-swept rocky coasts, but this habitat is poorly represented in the fossil record because taxa from this high-energy environment rarely survive taphonomic processes intact.

?Symmetrocapulus sp. from the Tejon Formation is questionably placed in genus *Symmetrocapulus* because poor preservation prevents positive assignment. If the Tejon specimens are true *Symmetrocapulus*, then erosion of the shell has completely obliterated the offset, asymmetrical apex that is a diagnostic feature of this genus, as shown in the figures for the type species of the genus in COX (1960:fig. 144a, b). What is called the protoconch in the description therein is evidently the first teleoconch whorl (MCLEAN, 1989; pers. comm.). If future specimens of *?Symmetrocapulus* sp., however, reveal that the asymmetrical apex is truly not present, then this species would be similar to the European *S. tessonii* (J. A. EUDES-DESLONGCHAMPS, 1843:113-114, pl. 7, figs. 3, 4) and the Japanese *S. hanaii* (KASE, 1984:149, pl. 24, figs. 5-7). It may be that these three belong in an undescribed genus of *Symmetrocapulidae*, one in which the coiled first teleoconch whorl is lost and the progression to bilateral symmetry is more complete than in true *Symmetrocapulus*.

?Symmetrocapulus sp. from the Tejon Formation resembles *Symmetrocapulus hanaii* (KASE, 1984:149, pl. 24, figs. 5-7) in characters of size, shape, posterior apex, muscle scar, and asymmetry of the arms of the muscle scar. *Symmetrocapulus hanaii* is known from Lower Cretaceous deposits in Japan (KASE, 1984). The middle Eocene *?Symmetrocapulus* sp. from the Tejon Formation is the only known Tertiary species of *Symmetrocapulus* and the only species known from the Western Hemisphere. The Tejon specimens of *?Symmetrocapulus* sp. most likely represent a new species because of its disparity in geologic age and geographic position with *S. hanaii*, but a new species cannot be diagnosed at this time owing to the lack of exterior features.

SOHL (1965:15, pl. 1, figs. 22-24) reported a single specimen of *?Symmetrocapulus corrugatus* Sohl, 1965, from the lower limey part of the Middle Jurassic (Bajocian) Carmel Formation, central Utah. He was unable positively to assign this specimen to *Symmetrocapulus* because the muscle-scar pattern was not known.

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