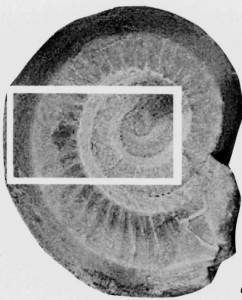


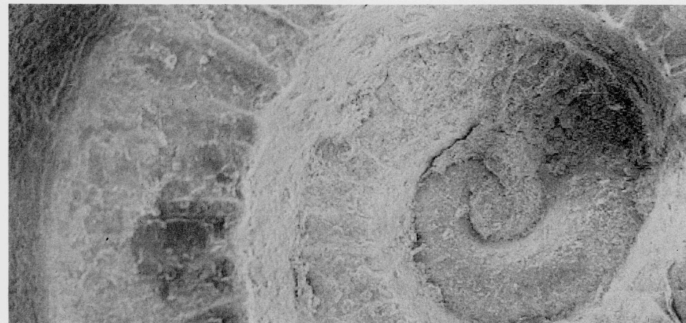
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Explanation of Figures 22–26

All specimens from CSUN loc. 1563, and all figures = SEM micrographs. Figures 22–26. *Orbitestella palaiopacifica* Squires & Goedert, sp. nov. Figures 22–23. Holotype LACMIP 11365. Figure 22. Apical view, $\times 60$, maximum diameter 0.82 mm. Figure 23. Close-up of apex, box on Figure 22 shows area of coverage $\times 240$, maximum length 0.38 mm. Figures 24–25. Paratype LACMIP 11366. Figure 24. Umbilical view, $\times 60$, maximum diameter 0.65 mm. Figure 25. Close-up of umbilicus, box on Figure 24 shows area of coverage, $\times 240$, maximum length 3.8 mm. Figure 26. Paratype LACMIP 11367, apertural view, $\times 90$, diameter 1.2mm.

prominent keel, and a sloping smooth area in the umbilicus just anterior to suture rather than a vertical area.

The new species is also similar to *Orbitestella diegensis* (Bartsch, 1907:172–173, figs. 7a–c), which is the only species of *Orbitestella* living along the Pacific coast of North America. It is found from Monterey Bay, central California, to northern Baja California, and is common in coarse sand near kelp (McLean, 1978). The new species differs in the following features: the hump on the dorsal surface is lower, the keel is weaker and not noded, there are no

spiral ribs between the keel and the basal margin, the border along the umbilicus is stronger, and fewer and coarser spiral ribs are present on the base.

The new species superficially resembles certain Cretaceous species of genus *Neamphitomaria* Bandel, 1988, that Bandel (1988) assigned to family Omalogyridae. Although *Neamphitomaria stantoni* (Sohl, 1960:67, pl. 6, figs. 29, 39, 43, 44; Dockery, 1993:92, pl. 35, figs. 1–3) and *N. planospira* Dockery (1993:93, pl. 35, figs. 4–8), both from Upper Cretaceous (Campanian Stage) strata in Missis-

sippi, superficially resemble the new species, the new species differs by having a smooth protoconch, overlapping whorls within the umbilicus, a carina bordering the umbilicus, and fewer, much more widely spaced axial ribs.

The geologic range of genus *Neamphitomaria* is Late Cretaceous (Campanian Stage) to Eocene (Dockery, 1993). Bandel (1988) placed only one Eocene species, *Neamphitomaria rotella* (Lea, 1833:123, pl. 4, fig. 112; Palmer, 1937: 176, pl. 21, figs. 8, 13; Bandel, 1988:pl. 3, fig. 5; pl. 4, figs. 7, 8, text fig. 3) from the middle Eocene Gosport Sand, Alabama, in his genus. The new species differs from *Neamphitomaria rotella* in the following features: there is a hump on the dorsal surface, there are axial ribs, and the umbilicus is deeper.

The Orbitestellidae are minute, mainly southern hemisphere gastropods. Most species live beneath rocks and among coralline algae in the low intertidal zone (Ponder, 1990). The familial taxonomic position of the orbitestellids was unclear until anatomical work by Ponder (1990) showed them to be primitive heterobranchs, even though their protoconchs are not heterotrophic. Orbitestellids may have originated during the Middle Jurassic in New Zealand, and undescribed species are known from Eocene and Miocene rocks in southern Australia (Ponder, 1990; Beu & Maxwell, 1990).

The genus *Orbitestella* ranges with certainty from the middle early Eocene to Recent. The only described Eocene and Oligocene species are reported from the Paris Basin, France (Cossmann, 1888; Gougerot & Le Renard, 1977; Lozouet & Maestrati, 1982) and from Washington (herein). The Washington occurrence is the earliest record of *Orbitestella* anywhere and is the first fossil record of this genus from the Pacific coast of North America.

Etymology: The new species is named for the ancient Pacific Ocean, and the name is derived from *palaios*, Greek, meaning ancient.

Family OMALOGYRIDAE Sars, 1878

Genus *Ammonicera* Vayssière, 1893

Type species: *Homalogyra fischeriana* Monterosato, 1869, by monotypy, Recent, Atlantic Ocean.

Ammonicera benhami Squires & Goedert, sp. nov.

(Figures 27–32)

Diagnosis: An *Ammonicera* whose protoconch has a spiral cord and whose teleoconch has broad axial tubercles.

Description: Shell minute, planispiral. Protoconch $\frac{3}{4}$ whorl, with a low hump. Sutural area of protoconch bearing a spiral cord, bordered by a narrow groove on its inside. Suture deeply incised. Teleoconch almost two whorls with identical sculpture on both sides of whorls. Sculpture of about 27 axial ribs, nodelike and medially located for the first one-half whorl, flattened and extending as broad tu-

bercles across the whorl for remaining whorls. Nine tubercles on first whorl of teleoconch. Upper and lower periphery of body whorl showing a spiral cord, interspace smooth and vertical on early part of teleoconch but bulging on latter part. Aperture quadrate, continuous.

Dimensions of holotype: Height 0.20 mm, diameter 0.59 mm.

Holotype: LACMIP 11368.

Type locality: CSUN loc. 1563, Larch Mountain, Washington, 47°59'03"N, 123°8'12"W.

Paratypes: LACMIP 11369–11371.

Discussion: Seven specimens were found, all are from CSUN loc. 1563. They range from 0.4 to 0.59 mm in diameter.

Due to the small size of the species of the family Omalogyridae, there have not been many systematic studies of living species, and the fossil record of this family is very poorly known. In recent years, the genera *Ammonicera* Vayssière, 1893, and *Omalogyra* Jeffreys, 1860, have been the most recognized by workers. There has not been consistency, however, in their usage, with some species assigned to one genus for awhile and then assigned to the other one. The work of Sleurs (1984) and Rolán (1992) has helped to refine the current thinking on diagnostic characters of each genus. *Ammonicera* has a groove on the protoconch, and the teleoconch has strong axial ribs (Sleurs, 1984). *Omalogyra* has a smooth protoconch or one covered with small tubercles, and the teleoconch is smooth but with a few undulated axial ribs more evident near the suture (Rolán, 1992). The new species is placed in genus *Ammonicera* because the protoconch has a shallow groove and the teleoconch has well-developed axial ribs.

The sculpture of the teleoconch of the new species is most similar to *Ammonicera sculpturata* Rolán (1992:40, figs. 9, 12, 14), which lives in the waters surrounding Cuba. The new species differs by not having three spiral cords on the protoconch and by not having any undulated spiral striae between the periphery and the row of axial tubercles on the teleoconch.

The new species is one of the two earliest known, named species of *Ammonicera*. The other species is *Ammonicera rota* (Forbes & Hanley, 1850:160, pl. 73, fig. 10; pl. 88, figs. 1, 2; Fretter & Graham, 1978:223–224, fig. 187) that ranges in age from the middle Eocene (Lutetian Stage) in the Paris Basin, France, to the Recent in Norway and the Mediterranean (Fretter & Graham, 1978; Lozouet & Maestrati, 1982; Sleurs, 1984). It lives among seaweeds, in rock pools, and also on sandy bottoms in depths of up to 25 m (Fretter & Graham, 1978). Fretter & Graham (1978) included only Recent taxa in their synonymy of *A. rota*. The new species differs from *A. rota* in the following features: fewer axial ribs and more widely spaced, axial ribs on the first one-half of the teleoconch nodelike rather than narrow and long, and axial ribs on the remaining