



Figures 16–23. *Mesalia martinezensis* (Gabb, 1869). Specimens coated with ammonium chloride. **16–18.** Hypotype LACMIP 13399, height 58 mm, diameter 25.4 mm. **16.** Apertural view. **17.** Oblique apertural view. **18.** Abapertural view. **19.** Hypotype LACMIP 13400, LACMIP loc. 22557, apertural view, height 36.3 mm, diameter 14.1 mm. **20.** Hypotype LACMIP 13401, LACMIP loc. 21607, abapertural view, height 38.3 mm, diameter 19.3 mm. **21.** Hypotype LACMIP 13402, LACMIP loc. 22698, abapertural view, height 33.9 mm, diameter 21.6 mm. **22.** Hypotype LACMIP 13403, LACMIP loc. 26897, apertural view, height 10.6 mm, diameter 6.5 mm. **23.** Hypotype LACMIP 13404, LACMIP loc. 22330, base, diameter 17.2 mm.

Discussion: The largest specimens of this species occur in the lower San Franciscuito Formation, Pinyon Ridge east of Big Rock Creek, Valymero area, Antelope Valley, Los Angeles County, southern California.

There is considerable variability in the strength of the spiral ribs on *M. martinezensis*. Most specimens are carinate on all whorls, including the last whorl. On some specimens, however, the carina becomes weaker on the later whorls as the other spiral ribs become stronger, giving these whorls a convex shape (Figures 19–21), like

shells misidentified by some workers as *Turritella macleayi* Waring, 1914.

The overall teleoconch morphology of the 10 mm-high tip of *Mesalia martinezensis* superficially resembles that of the 15-mm high mathildid *Carinathilda diminuta* (Perrilliat, Vega, and Corona, 2004) illustrated by Kiel et al. (2002: 329–330, fig. 2.4) from the lower Maastrichtian of the Mexcala Formation, Guerrero, southern Mexico. *Carinathilda diminuta* is definitely a mathildid because it has a heterostrophic protoconch. The resemblance be-

tween these two gastropods, nevertheless, provides evidence that the Late Cretaceous mathildids and lower Paleogene turritellids can have similar looking adult shells.

Mesalia martinezensis resembles "*Mesalia*" *virginiae* Stilwell et al. (2004: 29–30, pl. 5, figs. 6–10) from lower Paleocene (Danian) rocks on Seymour Island, Antarctic Peninsula, but *M. martinezensis* has a subtle effuse spout rather than the longer and more distinct, twisted narrow anterior canal that "*M. virginiae*" possesses. In addition, *M. martinezensis* has stronger ribs and a parasigmoidal growth line, rather than an opisthocyrt one on the last whorl. In our opinion, the aperture of "*M. virginiae*" is unlike that of *Mesalia*.

Gabb (1869) mentioned that the broadly expanding whorl of *martinezensis* approaches that seen on *Turritella robusta* Gabb (1864: 135, pl. 21, fig. 74; not = *T. (Haustator) robusta* Grzybowski, 1899), but Merriam (1941: 128) reported that the Late Cretaceous *T. robusta*, which is represented by a single poorly preserved type specimen, is probably not a *Mesalia*. This type specimen has an umbilicus, therefore it is not a turritellid. It is from the Redding area, northern California, and not from Tuscan Springs, as erroneously reported by Merriam (1941). Jones et al. (1978: pl. 1, fig. 19) identified this specimen, which is of Turonian age, to be *Glaucina? robusta* (Gabb, 1864).

Merriam (1941: 10, 116) stated that mainly in profile the Pacific slope Miocene *Turritella temblorenensis* Wiedey, 1928, might readily be confused with *Mesalia martinezensis*. The latter also resembles the Pacific slope Miocene *Turritella temblorenensis tritschi* Hertlein, 1928, and *Turritella ocoyana* Conrad, 1857. The latter, however, has a different growth line. In addition, *T. martinezensis* strongly resembles *Turritella fredeai* Hodson, 1926, of Miocene age from northern Colombia and northern Venezuela. None of these above-mentioned Miocene species, however, has the effuse spout of *Mesalia*.

Mesalia clarki (Dickerson, 1914a)
(Figures 24–32)

Turritella [sic] *clarki* Dickerson, 1914a: 142–143, pl. 13, fig. 8.
Mesalia clarki (Dickerson).—Merriam, 1941: 128, pl. 39, fig. 6;
Zinsmeister, 1983: table 1, pl. 2, fig. 14.

Description: Medium small (up to approximately 31 mm height). Turritelliform. Pleural angle approximately 21 to 22°. Protoconch unknown. Teleoconch up to 12 whorls, consisting of two whorl shapes: flatish rounded and anteriorly angulate. Sutural area indented. Sculpture consisting only of spiral ribs, variable in number, strength, and spacing. Flattish to rounded whorl shape: upper spire with one or two secondaries on posterior part and two (bicostate) primaries on anterior part; lower spire and last whorl with seven to eight nearly equal

strength primaries (anteriorly located ribs can be somewhat angulate); spiral threads on all interspaces; posteriormost rib part of broad band; ribs on anterior part of whorl tend to be slightly stronger than posteriorly located ribs; base of last whorl with three ribs. Angulate whorl shape: upper spire with one secondary on posterior part and two (bicostate), well developed, flat-topped primaries on anterior part; lower spire and last whorl with three primaries on posterior part and two stronger primaries, with one secondary in between each, on anterior part; spiral threads on all interspaces. Base (including short neck) of last whorl with approximately seven, evenly spaced ribs; interspaces and ribs covered by spiral threads. Aperture small; columella narrow with thin callus, occasionally with single, weak fold, slight twist on anterior end of columella. Spout effuse, short, and narrow. Growth-line trace on last whorl (including base) parasigmoidal, with lateral sinus flexure strongest medially.

Holotype: UCMP 11936, height 25 mm, diameter 16.5 mm.

Type Locality: UCMP loc. 1540.

Geologic Range: Late Paleocene = *Turritella infra-granulata* Zone.

Distribution: "Martinez" Formation, northeast side of Mount Diablo, Contra Costa County, northern California (Dickerson, 1914a; Merriam, 1941; Zinsmeister and Paredes-Mejia, 1988 [faunal list]; upper Santa Susana Formation, Trailer and Quarry canyons, Los Angeles County, Santa Monica Mountains, southern California (Strathearn et al., 1988 [faunal list]; Squires and Saul, 1998: 1025).

Discussion: *Mesalia clarki* is abundant in the upper Santa Susana Formation at LACMIP loc. 10508, in the Santa Monica Mountains, Los Angeles County, southern California. The anterior ends of the shells are very fragile, and nearly all the specimens have incomplete apertures. None of the specimens has retained their protoconch, and most specimens are missing their upper spire. Growth lines are hard to discern, usually visible only on a single whorl (typically the penultimate whorl), and were rarely preserved on the base of the last whorl. Some of the specimens appear to have a wider pleural angle (23°) than normal, but these particular specimens have been crushed. A few of the specimens (five percent) have naticid boreholes, and a few other specimens are encrusted, in part, by bryozoans. Rare specimens are coated by calcareous algae.

All previous workers assigned *Mesalia clarki* to various genera without knowledge of the shape of the aperture. Our cleaning of representative specimens of Dickerson's species revealed it to have a short, shallow effuse spout (Figures 24–25) and bicostate sculpture on the juvenile whorls (Figure 30). There is considerable variation in the sculpture and the shape of the whorls on *M. clarki*. Some