



FIGURE 9—*Volutoderma santana* Packard, 1922 from the Pacific slope of North America. 1, 2, hypotype, LACMIP 13211, $\times 1.7$; 3, hypotype, LACMIP 13210, $\times 1.6$; 4, 5, hypotype, LACMIP 13208, $\times 1.2$; 6, 7, holotype, UCMP 12294, $\times 1$; 8, 9, hypotype, LACMIP 13209, $\times 0.8$; 10, 11, hypotype, LACMIP 12130, $\times 0.8$.

from the Cenomanian at Gabel Delta, Sinai, figured as *Volutoderma* sp. by Abbass (1963, p. 96, pl. 9, fig. 6, 6a), also have slightly concave whorl sides and are probably not *Volutoderma*.

Dartvelle and Brébion (1956) and Brébion (1956) referred poorly preserved specimens from Bas-Congo, Africa to *Volutoderma* cf. *V. capensis* (Woods, 1907) and *V. cf. V. constricta* Dall, 1907. Kiel and Bandel (2003) have referred *Rostellites capensis* Woods, 1907 from the Umzamba Formation (Santonian–Campanian, South Africa) to *Liopeplum capensis*. The Bas-Congo specimens are probably congeneric, i.e., *Liopeplum* Dall, 1890 rather than *Volutoderma*. Dall (1907, p. 8, fn 5) supplied the new name *Volutoderma (Rostellana?) constricta* for a specimen from the Pugnellus Sandstone of the Colorado Group, figured by Stanton (1893, pl. 34, fig. 3). Stanton's figure does not resemble those of Brébion (1956, pl. 1, fig. 10a, 10b) and Dartvelle and Brébion (1956, pl. 1, figs. 10, 11).

Bandel (2000) has referred two of Stoliczka's Indian volutes from near Garudamangalam in the Santonian Kulakkalnattam Formation to *Volutoderma*, figuring them as *Volutoderma stoliczkana* (Dall, 1907) and *V. multistriata* (Stoliczka, 1868). However, judging from Bandel's figures, these specimens lack three characteristics of *Volutoderma*: differentiated spiral sculpture, an apexward

spread of the parietal callus shield, and a somewhat bulbous whorl shape. They are more similar to *Carota* than to *Volutoderma*.

Japanese *Volutoderma (Rostellinda?)* sp. Yabe and Nagao, 1925 (p. 123, pl. 29, fig. 13, 13a, 13b) from North Sakalin has shape, sculpture, and growth line suggestive of *Carota*. *Volutoderma (Rostellinda?)* sp. Yabe and Nagao, 1928 (p. 95, pl. 17, fig. 16, 16a) from Hokkaido, has only two columellar folds, but the specimen is too poor to suggest another assignment.

Kiel and Perrilliat (2004) figured (fig. 4, 10, 11) a 34 mm-high specimen as *Volutoderma?* sp. from the Maastrichtian Mexcala Formation, Guerrero, southern Mexico. It resembles juveniles of Pacific Slope *Volutoderma* spp., but this Mexican specimen lacks its anterior siphon and appears more biconic than any known Pacific Slope species.

Wenz (1943) raised several of Dall's (1907) taxa to generic rank and gave the range of *Volutoderma* as Senonian to Maastrichtian from North America and New Zealand, but only Pacific Slope of North America specimens ranging in age from Coniacian to early Maastrichtian age display characteristics of *Volutoderma*.

Of the eight Upper Cretaceous, Pacific Slope species Anderson (1958) referred to *Volutoderma*: three species—*V. gabbi* (White, 1889), *V. californica* Dall, 1907, and *V. suciana* Dall, 1907—are