



## Explanation of Figures 3 to 12

Figures 3–12. *Clavocerithium (C.) santanum* (Loel & Corey, 1932). Figures 3–6: holotype UCMP 31608, locality UCMP 6128, apertural, oblique apertural, lateral, and abapertural views,  $\times 3.8$ ; Figure 7: hypotype LACMIP 12103, locality LACMIP 7700, oblique apertural view,  $\times 3.1$ ; Figure 8: hypotype LACMIP 12104, locality CSUN 1185, apertural view,  $\times 2.6$ ; Figure 9: hypotype LACMIP 12105, locality CSUN 1185, abapertural view,  $\times 3.3$ ; Figure 10: hypotype LACMIP 12106, locality LACMIP 7700, abapertural view of middle spire,  $\times 3.1$ ; Figure 11: paratype UCMP 31611, locality UCMP A-252, apertural view,  $\times 2.9$ ; Figure 12: hypotype LACMIP 12107 locality, LACMIP 7700, apertural view,  $\times 3.5$ .

*thium stercusmuscarum* in the northern Gulf of California are commonly inhabited by hermit crabs (HARTSHORNE *et al.*, 1987; FÜRISCH & FLESSA, 1987). Nearly all the specimens that I observed of this gastropod on the tidal sandflat at San Felipe were occupied by hermit crabs. Some of the abrasion of the shells of *Clavocerithium (C.) santanum* could have taken place during movements associated with the hermit crabs.

Only about 15% of the studied specimens of *Clavocerithium (C.) santanum* have retained their apertures, and

only a few of these specimens show the fragile outer lip, the very fragile detached columellar callus, and the central plait on the columella. These features, especially the central plait on the columella, could have been worn off if the shells served as homes for hermit crabs.

Most of the specimens of *Clavocerithium (C.) santanum* that are in the LACMIP collection from locality LACMIP 7700 consist only of the upper spire. Many of these are like other specimens of this species found elsewhere in that the upper spire whorls are straight sided for the first 3 to

6 mm in height and grade into tabulate whorls beyond that height. On a few specimens from locality 7700, however, the upper spire whorls remain straight sided for up to 15 mm in height (Figure 12), and the rest of the shell (presumably with tabulate whorls) is missing. Specimens with such long and slender upper spire whorls were detected only at this locality.

Previously, *Clavocerithium* (*Clavocerithium*) comprised only *C. (C.) lacazei* (COSSMANN, 1897:pl. 11, figs. 15, 17; 1898:15; 1920:94-95, pl. 3, figs. 24-25; WENZ 1940:762, fig. 2208; HOUBRICK, 1978:121, pl. 93, figs. 1, 2) from the upper? Eocene at Bois Gouët, Brittany, northwestern France. The exact age of these fossil beds has been much disputed, and assigned by various authors to either the middle Eocene or late Eocene (DAVIES, 1975:186).

On the basis of comparisons with several LACMIP specimens of *Clavocerithium* (*C. lacazei*) from Bois Gouët, as well as with the published illustrations of this species, *C. (C.) santanum* differs in having (1) a smaller shell, (2) whorls more tabulate (although a few specimens have convex whorls similar to those in *C. (C.) lacazei*, (3) four rather than 12 spiral ribs on middle of spire, (4) a detached columellar callus, (5) no axial ridges on upper whorls, and (6) a columellar callus that is not just restricted to the parietal area.

*Clavocerithium* (*Clavocerithium*) *santanum*, which is only the second species in the typical subgenus, is the first report of this subgenus in the New World, fossil or Recent, and the first early Miocene report.

*Indocerithium* Chavan, 1952, is the only other known subgenus of *Clavocerithium*. HOUBRICK (1975, 1978) reviewed *Indocerithium*, which is distinguished by an outer lip that extends one-third onto the previous whorl, and reported the subgenus to range from early Pliocene to Recent. Only three species are assigned to this subgenus, and two are extinct. All are from Indonesia and/or the Philippines and are associated with coral-reef biotopes.

The name *Clavocerithium* is a Latin neuter noun, and the species name *santana* must be changed to *santanum*.

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#### LOCALITIES CITED

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- CSUN 401. SW  $\frac{1}{4}$  of section 33, T6N, R21W, U.S. Geological Survey, 7.5-minute, Topatopa Mountains, California Quadrangle, 1943, upper Sespe Creek area, Ventura County, southern California (SQUIRES & FRITSCH, 1978:fig. 2C). = LACMIP loc. 16342.
- CSUN 428. In extreme NW corner of section 26, T6N, R22W, U.S. Geological Survey, 7.5-minute, Lion Canyon, California Quadrangle, 1943, upper Sespe Creek area, Ventura County, southern California (SQUIRES & FRITSCH, 1978:fig. 2B).
- CSUN 555. NE  $\frac{1}{4}$  of the SW  $\frac{1}{4}$  of section 20, T3N, R 18W, U.S. Geological Survey, 7.5-minute, Simi, California Quadrangle, 1943, Big Mountain, north side of Simi Valley, Ventura County, southern California (BLUNDELL, 1981:pl. 1). =
- CSUN 1185. Along steep ridge, at elevation of 860 ft. (265 m), near head of Hicks Canyon,  $37^{\circ}33'10''$  N and  $118^{\circ}47'00''$  E (1000-meter Universal Transverse Mercator Grid, 1927 datum), U.S. Geological Survey, 7.5-minute, El Toro, California Quadrangle, 1968 (photorevised 1982), northern Santa Ana Mountains, Orange County, southern California (DANIEL, 1989: appendices B2 and C4). = LACMIP loc. 16508.
- LACMIP 7700. Cliff west of old adobe in SW part of Plano Trabuco, N40°W of old adobe, 34 m above stream bench in 1-m-thick bed of hard ledge-forming slimy sandstone, in places almost a coquina (LACMIP records), U.S. Geological Survey, 7.5-minute, Cañada Gobernadora, California Quadrangle, 1968 (photorevised 1988), southern end of northern Santa Ana Mountains, Orange County, southern California.
- UCMP 6128. "At base of bluff, west of the S end of the remnant hill which is on the lower plain, west side of Plano Trabuco" (LOEL & COREY, 1932:57), U.S. Geological Survey, 7.5-minute, Cañada Gobernadora, California Quadrangle, 1968 (photorevised 1988), southern end of northern Santa Ana Mountains, Orange County, southern California.
- UCMP A-253. "N side of first large gulch on E side of

Wiley Canyon, center of S side of section 36, T4N, R19W, lowest invertebrate fossiliferous bed (possibly estuarine deposition)" (LOEL & COREY, 1932:79), south side of Santa Clara River, Oak Ridge area, U.S. Geological Survey, 7.5-minute, Piru, California Quadrangle, 1952 (photorevised 1969), Ventura County, southern California.

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