



Explanation of Figures 49 to 51

Figures 49–51. *Acila (Truncacila) princeps* Schenck, 1943. Figure 49. Holotype CAS 69075, CAS loc. 69075, right valve, $\times 1.3$. Figure 50. Hypotype CAS 950.01, CAS loc. 950, right valve, $\times 1.7$. Figure 51. Holotype CAS 69075, CAS loc. 69075, posterior view, $\times 1.3$.

gin convex. Lunule poorly developed, slightly depressed. Umbones low, located posteriorly; umbonal angle varying from 94 to 119° . Beaks pointed, incurved, opisthogyrate. Disk very broad, ornamented with abundant ribs diverging from umbo area and forming chevron-shaped (divaricate) pattern. Chevron angle 30 to 39° . Chevrons bisected by line extending from slightly anterior of umbo to anterior of ventral margin; ribs anterior to bisecting line 30 to 39 , ribs posterior to bisecting line 45 to 54 . Secondary divarication uncommon. Total number of ribs on disk of each valve usually approximately 85 ; ribs flat and narrow to wide, with interspaces approximately $\frac{1}{2}$ to $\frac{1}{4}$ as wide, except anterior of chevron-bisecting line, and to a lesser extent on extreme posterior part of disk, where ribs become round and slightly wider. Each rib commonly bifurcates into two riblets along ventral margin between approximately $\frac{1}{3}$ of distance from posterior end to meeting of anterior end and ventral margin. Growth check(s) near ventral margin often associated with appearance of these bifurcated riblets. Ventral-margin edge and interior, for short distance, finely crenulate. Escutcheon slightly? sunken, bounded by smooth? region; middle part of area crossed by numerous oblique ribs, becoming stronger ventrally. Interior nacreous. Simple pallial line. Adductor muscle scars well delineated. Approximately 21 anterior teeth and 11 posterior teeth.

Dimensions of holotype: Conjoined valves, height 26 mm, length 34.5 mm, thickness 18.7 mm.

Holotype: CAS 69075 [= LSJU 6960].

Type locality: CAS 69075 [= LSJU 2372], west side San Joaquin Valley, northern California.

Paratypes: CAS 69076 [= LSJU 6963]; CAS 69077 [= LSJU 6961], and CAS 69078 [= LSJU 6962].

Geologic age: Late late Campanian to early late Maastrichtian.

Distribution: UPPER UPPER CAMPANIAN TO POSSIBLY LOWER MAASTRICHTIAN: Point Loma For-

mation, La Jolla, San Diego County, southern California; Rosario Formation, San Antonio del Mar, Baja California, Mexico. UPPER LOWER TO LOWER UPPER MAASTRICHTIAN: Tesla Formation, Alameda and San Joaquin counties, northern California; Moreno Formation, "Garzas Sand" member and also Mercy sandstone lenticle, within middle part of Tierra Loma Member, Merced County, north-central California. LOWER UPPER MAASTRICHTIAN: El Piojo Formation, Lake Nacimiento, San Luis Obispo County, west-central California. UPPER MAASTRICHTIAN UNDIFFERENTIATED: Panoche Formation, Franklin Canyon, west of Martinez, Contra Costa County, northern California; Deer Valley formation (informal), north flank of Mount Diablo, Contra Costa County, northern California.

Discussion: The above description of this species is based on nine specimens: two left valves, one partial left valve, two right valves, three with conjoined valves, and one internal mold of a left valve. The lunule and escutcheon are both poorly preserved on every examined specimen.

Acila (T.) princeps is very closely similar to *A. (T.) demessa* in having, on some specimens, ribs that are flat-topped and very closely spaced. *Acila (T.) princeps* differs from *A. (T.) demessa* by having larger size, more uniform sculpture, and more numerous ribs. Schenck (1943:63) mentioned an area of obsolete radial ribbing on the holotype, but that is not the case (see Figures 44 and 49).

Schenck (1943:63) reported that the chevron angle, which he referred to as the angle of bifurcation, of *A. (T.) princeps* is 60 to 67° . In this present study, we measured the chevron angle of *A. (T.) princeps* near where the divarication begins, in the same manner as we measured this feature for all the other studied species. The only way we could obtain measurements of 60 to 67° is if we measured the along the ventral margin of the valve, where the ribs usually curve significantly.

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APPENDIX

LOCALITIES CITED

- Locality 1. Private shale quarry at 340 Blackburn Road, 6 km NW of Fulford Harbor, Saltspring Island, off southeast coast of Vancouver Island, British Columbia. Haslam Formation, lower part. Age: Late Santonian. Collector: Raymond Graham, September 29, 2000.
- Locality 2. Cliff on left bank of Chemainus River, 500 m downstream from the confluence with Banon Creek, 3.3 km SW of town of Chemainus, southeastern Vancouver Island, British Columbia. Haslam Formation, lower part. Age: Late Santonian. Collectors: Lois Walker and Raymond Graham, August 25, 2002.

- Locality 3. SE $\frac{1}{4}$ of an intertidal bench, 300 m seaward from the high-water mark at Collishaw Point, N end of Hornby Island, off east coast of Vancouver Island, British Columbia. Northumberland Formation. Age: Latest Campanian or early Maastrichtian. Collector: Raymond Graham, June 21, 1997.
- Locality 4. Intertidal bench 400 m N of Buckley Bay/Denman Island ferry terminal, west-central shoreline of Denman Island, off east coast of Vancouver Island, British Columbia. Cedar District Formation, upper part. Age: Late middle to early late Campanian. Collector: Raymond Graham, June 21, 2001.
- CAS 950. Hard lens about 0.3 m thick outcropping behind old distillery on Johnson Ranch at San Antonio del Mar, Baja California, Mexico. Rosario Formation. Age: Late Campanian to early Maastrichtian. Collectors: E. K. Jordan and L. G. Hertlein, January, 1926.
- CAS 1552. 152 m W of center of section 28, T. 26 S, R. 18 E., Sawtooth Ridge Quadrangle (7.5 minute, 1961), N end of Shale Hills, SW side of Antelope Valley, eastern Temblor Range, Kern County, south-central California. Moonlight Formation? Age: Latest middle Campanian to earliest late Campanian. Collector: G. D. Hanna and J. H. Snow, April, 1929.
- CAS 69075. [= SU 2372]. In second valley (with right turns), about 1.6 km N of Laguna Seca, on brow of hill on N side of valley, 366 m N and 503 m E of SW corner of section 12, T. 12 S, R. 10 E, Charleston School Quadrangle (7.5 minute, 1956), Merced County, north-central California. Moreno Formation, Mercy sand lentil within Tierra Loma Shale Member. Age: Late early to early late Maastrichtian. Collector: M. B. Payne, 1941.
- CAS 69079. [= LSJU 1274]. White concretionary limestone bed embedded in shale, just NE of town of Oil City, 305 m NE of center of section 17, T. 19 S, R. 15 E, Domingue Ranch Quadrangle (7.5 minute, 1956) Fresno County, north-central California. Moreno Formation, about 91 to 122 m below top of formation. Age: Late early to early late Maastrichtian. Collector: P. W. Reinhart, January 27, 1934.
- CAS 69080. About 1.6 km E of Queen Charlotte City, above beach, Bearskin Bay, Skidegate Inlet region, southern Graham Island, Queen Charlotte Islands, British Columbia, Canada. Haida Formation, probably Shale member. Age: Probably latest Albian to Cenomanian. Collector: unknown.
- CAS 69082. [= LSJU 2575]. Limestone concretion embedded in purple shale, NE corner of SE $\frac{1}{4}$ of section 23, T. 16 S, R. 12 E, Monocline Ridge Quadrangle (7.5 minute, 1955), Fresno County, northern California. Moreno Formation, Marca Shale Member. Age: Late early to early late Maastrichtian. Collector: D. C. Birch.
- CAS 69086. In railroad cut near Santa Fe Railroad tunnel above Franklin Canyon Inn, W of Martinez, Briones Valley Quadrangle (7.5 minute, 1959), Contra Costa County, northern California. Panoche Formation. Age: Late Maastrichtian. Collector: E. A. Watson.
- CAS 69095. In small area of Cretaceous siltstone in SW $\frac{1}{4}$ of section 21, T. 26 S, R. 18 E, Sawtooth Ridge Quadrangle (7.5 minute, 1961), N end of Shale Hills, W side of Antelope Valley, eastern Temblor Range, Kern County, south-central California. Moonlight Formation? Age: Latest middle Campanian or earliest late Campanian. Collector: G. Henny.
- CAS 69110. [= LACMIP 22874]. On E fork of Huling Creek, at edge of streambed in limestone bed, on S limb of hairpin meander, 1457 m N 25.5°E of confluence of Huling Creek and North Fork of Cottonwood Creek, Ono Quadrangle (15 minute, 1952), Shasta County, northern California. Budden Canyon Formation, Chickabally Mudstone Member. Age: Early Albian (*Leconteites lecontei* Zone). Collector: M. A. Murphy, summers 1951–1953.
- LACMIP 8068. Approximately 2.4 km S of Punta San Jose, Baja California, Mexico. Rosario Formation. Age: Late late Campanian to possibly early Maastrichtian. Collector: unknown.
- LACMIP 10832. In the field on both sides of the E-W highway connecting Pentz and Chico, about 1.3 km N86°W of Pentz, Cherokee Quadrangle (7.5 minute, 1949), Butte County, northern California. Chico Formation, Pentz Road member (informal). Age: Early Campanian. Collectors: W. P. Popenoe and D. W. Scharf, August 15, 1931.
- LACMIP 10835. Loose blocks in landslide, SW $\frac{1}{4}$ of SW $\frac{1}{4}$ of section 8, T. 22 N, R. 3 E, Paradise Quadrangle (15 minute, 1953), Butte Creek, Butte County, northern California. Chico Formation, Ten Mile Member. Age: Early Campanian. Collectors: W. P. Popenoe and W. Findlay, September 3, 1933.
- LACMIP 17611. Outcrop in streambed of Dry Creek, 472 m south and 152 m east of northwest corner of sec. 36, T. 21 N, R. 3 E, Cherokee Quadrangle (7.5 minute, 1970), Pentz area, Butte County, northern California. Chico Formation, Pentz Road member (informal). Age: Early Campanian. Collector: E. Göhre, 2000–2002.
- LACMIP 22406. Gullies on both sides of highway approximately 0.8 km straight W of Pentz, Cherokee Quadrangle (7.5 minute, 1970), Butte County, northern California. Chico Formation, Pentz Road member (informal). Age: Early Campanian. Collector: W. P. Popenoe, July 18, 1946.
- LACMIP 23314. On W slope of gully near gully bed, about 640 m S28°W of NE corner of section 24, T. 1 N, R. 1 E, of S side of Deer Valley, Antioch South Quadrangle (7.5 minute, 1973), Contra Costa County, northern California. Deer Valley formation (informal). Age: Late Maastrichtian. Collector: W. P. Popenoe, August, 1944.
- LACMIP 23950 [= CAS 69106]. Gray mudstone in the

- N bank, 732 m W and 610 m N of SE corner of section 4, T. 29 N, R. 6 W, Ono Quadrangle (15 minute, 1952), Shasta County, northern California. Budden Canyon Formation, Gas Point Member. Age: Late Turonian. Collectors: W. P. Popenoe and W. A. Findley, 1933.
- LACMIP 24365. In fine-grained sandstone on left bank of French Creek [= Swede Creek], approximately 152 m N and W of SE corner of section 5, T. 32 N, R. 2 W, Millville Quadrangle (15 minute, 1953), Shasta County, northern California. Redding Formation, Frazier Siltstone Member. Age: Turonian. Collector: W. P. Popenoe, August 25, 1957.
- LACMIP 25431. Exposed in littoral zone and 3 to 6 m above high tide, S side of Punta San Jose, about 0.8 km E of the point and 48 km airline S of Ensenada, Pacific coast of Baja California, Mexico. Rosario Formation. Age: Late late Campanian to possibly early Maastrichtian. Collectors: W. P. Popenoe and W. Sliter, October, 1965.
- LACMIP 28780. Pentz, Butte County, northern California. Chico Formation, Pentz Road member (informal). Age: Early Campanian. Collector: P. W. Reinhart, year unknown.
- LACMIP 30141. Fossils in pebbly sandstone, about 1.6 km N of Nacimiento River on E side of road (?Bee Rock Road) near middle of northern-section line of section 18, T. 25 S, R. 10 E, Tierra Redonda Mountain Quadrangle (7.5 minute, 1949), San Luis Obispo County, west-central California. El Piojo Formation. Age: Early late Maastrichtian. Collector: unknown.
- UCMP 814. South of Antone, between Rock Creek and Spanish Gulch, in sections 12 and 13 and SE $\frac{1}{4}$ of section 11, T. 13 S, R. 24 E, Antone Quadrangle (7.5 minute, 1985), Wheeler County, Oregon. Unnamed Cretaceous strata. Age: Cenomanian. Collector: unknown.
- UCMP A-6275. Rio de Santo Tomás, Punta China area, northwest Baja California, Mexico. Alisitos Formation. Age: Late Aptian. Collector: E. C. Allison.
- UCMP B-5320. Sea cliff on S side of Punta San Jose, Baja California, Mexico. Rosario Formation. Age: Late late Campanian to possibly early Maastrichtian. Collectors: E. C. Allison and F. H. Kilmer, June 27, 1957.
- UCMP B-5665. In arenaceous bed 35 m stratigraphically below base of major volcanic-pyroclastic part of formation, upper Arroyo Ink, approximately 2 km due E of Punta China, Santo Tomás map (1:50,000, 1964), northwest Baja California, Mexico. Alisitos Formation. Age: Late Aptian. Collector: E. C. Allison.
- UO 461. Soft sandstone about 61 m above valley floor, NE side of Bridge Creek Valley, 0.8 km from and NW from Mitchell Rock, SE $\frac{1}{4}$, SW $\frac{1}{4}$ of section 26 and NE $\frac{1}{4}$, NW $\frac{1}{4}$ of section 35, T. 11 S, R. 21 E, Mitchell Quadrangle, Wheeler County, northeast-central Oregon. Hudspeth Formation, lower part of "Main Mudstone member." Age: Early Albian or early middle Albian. Collector: unknown.
- USGS M-175. 61 m E of the SW corner of sec. 33, T. 18 N, R. 4 W, 2012 m S of point "1009 ft" on Logan Ridge, Lodoga Quadrangle (15 minute, 1943), Colusa County, northern California. Probably float from lower Turonian Venado Sandstone Member of Cortina formation (informal). Collectors: R. D. Brown, Jr., and E. I. Rich, 1958. =LACMIP locality 31464