



Figures 54–62. Specimens coated with ammonium chloride. Figures 54–57. *Caestocorbula attina* Squires & Saul, sp. nov. Figure 54. Paratype LACMIP 13129, LACMIP loc. 25526, left valve, $\times 8$. Figure 55. Paratype CAS 69098.02, CAS loc. 69098, left valve, $\times 10.4$. Figure 56. Holotype LACMIP 13128, LACMIP loc. 25526, right valve, $\times 6.9$. Figure 57. Paratype CAS 69098.02, CAS loc. 69098, dorsal view, $\times 10.4$. Figures 58–59. *Caestocorbula aura* Squires & Saul, sp. nov. Figure 58. CAS paratype 69106.05, CAS loc. 69106, left valve, $\times 7$. Figure 59. CAS holotype 69106.01, CAS loc. 69106, right valve, $\times 6$. Figures 60–62. *Caryocorbula? allisoni* Squires & Saul, sp. nov., holotype UCMP 155541, UCMP loc. A-9521, $\times 5.4$. Figure 60. Left valve. Figure 61. Right valve. Figure 62. Dorsal view.

Caestocorbula aura Squires & Saul, sp. nov.

(Figures 58,59)

Diagnosis: Small *Caestocorbula* with both valves trigonal. Commarginal ribs on left valve weak, and flattish. Umbo of right valve smooth; ventrally of umbo, ribs weak, rounded, and prominent.

Description: Shell small (maximum 7 mm in length), longer than high. Valves trigonal, moderately inflated, and equilateral. Posterior slope of left valve set off by very weak barely discernible keel. Left valve rostrate. Right valve with moderately long, projected rostrum; longer than that on left valve. Posterior slope of right valve slightly concave, moderately long, ribbed, and set off by low keel. Umbones moderately high and near midline of valves; beaks prosogyrate. Left-valve sculpture consisting of flattish, weak commarginal ribs overlapping shingle-like and moderately widely spaced (approximately 3 ribs/

mm). Right valve usually smooth on umbo, with sculpture beginning near medial part of valve and consisting of moderately closely spaced (approximately 4 ribs/mm), rounded, weak commarginal ribs with moderately deep interspaces. Ribs on right valve becoming stronger and more widely spaced ventrally. Left-valve hinge with posteriorly directed chondrophore with median groove. Right-valve hinge with single cardinal tooth, posteriorly adjoining pit deep. Pallial line simple, well incised, and nearly vertical posteriorly.

Dimensions of holotype: Right valve, 4.9 mm in height, 6.6 mm in length.

Holotype: CAS 69106.05.

Type locality: CAS loc. 69106, 40°23'40"N, 122°32'15"W.

Paratype: CAS 69106.01.

Geologic age: Turonian.

Distribution: Budden Canyon Formation, lower part of Gas Point Member, near Ono, Shasta County, northern California (Figure 1, locale 4).

Discussion: This new species is based on 104 specimens: 76 right valves and 28 left valves. No conjoined valves were found. Specimens are most abundant at the type locality. Only a single specimen (right valve) has a predatory drill hole.

The new species is most similar to *Caestocorbula attina* but differs from *C. attina* by usually having no ribs on the umbo of the right valve, more closely spaced ribs on the right valve, better defined ribs on the left valve, and a less symmetrical left valve.

Etymology: The species is named for its occurrence in the Gas Point Member; Latin, *aura* meaning wind (gas).

Caestocorbula? allisoni Squires & Saul, sp. nov.

(Figures 60–62)

Diagnosis: Small *Caestocorbula?* with both valves bulbous. Commarginal ribs on left valve medium, those on right valve weak to medium, becoming slightly stronger ventrally.

Description: Shell small (maximum 7 mm in length), higher than long. Valves bulbous, rounded, and strongly inflated. Left valve smaller than right valve. Valves inequilateral, plump centrally and anteriorly; posterior ends constricted and, especially right valve, with projected rostrum extending from medial part of valve. Rostrum on right valve extending beyond end of rostrum on left valve. Posterior slope of right valve smooth, moderately steep, and set off by moderately low, straight keel. Umbones moderately high and at midline of valves; beaks prosogyrate. Sculpture of left valve consisting of moderately widely spaced, medium-strength commarginal ribs. Sculpture of right valve consisting of weak to medium-strength commarginal ribs, becoming slightly stronger ventrally. Right-valve hinge with single, large triangular cardinal tooth; adjoining pit broad and deep.

Dimensions of holotype: Conjoined-valved specimen, 8.1 mm in height, 7 mm in length, 5.1 mm in thickness.

Holotype: UCMP 155541.

Type locality: UCMP loc. A-9521, 31°30'N, 116°40'W.

Geologic age: Late Aptian.

Distribution: Alisitos Formation, upper member, Punta China, northwestern Baja California, Mexico (Figure 1, locale 21).

Discussion: This new species is based on three specimens: two pairs of conjoined valves and one right valve.

The left valve of the holotype of the new species is

complete, and the posterior end of the right valve, which is broken, originally extended beyond (how much is unknown) the limit of the left valve. One of the other specimens borrowed from the UCMP collection had been cut in half, parallel to the hinge, thereby revealing the presence of the cardinal tooth.

The new species seems to be assignable to *Caestocorbula* based on the sharply constricted posterior parts of the valves. Unlike *Caestocorbula*, however, it has equally inflated valves with non-discrepant sculpture; hence, the new species is tentatively assigned to this genus. Future studies might show that *C.? allisoni* belongs to a new genus.

Caestocorbula? allisoni is most similar to *Corbula* sp. Woods (1908:213, pl. 34, fig. 13) from the Aptian to lower Albian Lower Greensand in England. The new species differs by having slightly narrower commarginal ribs on the right valve. The left valve of this English species is not known. *Corbula* sp. Woods might belong to *Parmicorbula*, but information about the left valve must be obtained before making this assignment.

The new species is similar to *Parmicorbula rupana* Stephenson (1952:133, pl. 33, figs. 9–12) from the Cenomanian Woodbine Formation of central and northeastern Texas. The new species differs from Stephenson's species by having a more rounded shape, especially the left valve, and somewhat stronger commarginal ribs.

Etymology: The species is named for the late E. C. Allison, in recognition of his paleontological work in Baja California.

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APPENDIX

LOCALITIES CITED

Localities are LACMIP, unless otherwise indicated. All quadrangle maps listed below are U. S. Geological Survey maps.

CAS 69098. [= LACMIP 23476]. Hard concretionary sandstone in first large creek (Coyote Creek) N of Crow Creek, section 30, T. 30 N, R. 6 W, Ono Quadrangle (15 minute, 1952), Shasta County, northern California. Budden Canyon Formation, Bald Hills Member (upper part). Age: Cenomanian. Collector: P. Rodda, August, 1955.

CAS 69106. [= LACMIP 23950]. Gray mudstone in N bank of Roaring River, 610 m N and 732 m W 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 (lower part). Age: Turonian. Collectors: W. P. Popenoe & W. A. Findley, 1933.

- CAS 69109. [= LACMIP 23768]. Hard pebbly sandstone in creek on E side of old Gas Point Road, 472 m S and 610 m E of NW corner of section 16, T. 30 N, R. 6 W, Ono Quadrangle (15 minute, 1952), Shasta County, northern California. Budden Canyon Formation, Bald Hills Member (upper part). Age: Cenomanian. Collector: P. Rodda, August, 1956.
2853. Broken concretion with numerous fossils, just S of Arroyo Tiburon (a tributary on W side of Arroyo Santa Catarina). Near mouth of and along W side of Arroyo Santa Catarina, SE side of Mesa San Carlos, northern Baja California, Mexico. Rosario Formation. Age: Late Campanian to early Maastrichtian. Collector: M. L. Webster, 1966.
7792. At Carlsbad Research Center north of Palomar Airport, near some claypits south of Letterbox Canyon, 5 m above base of temporary cut bank, N side of Faraday Ave., E of intersection with Rutherford Road, approximately 1088 m N, 2966 m W of SE corner of San Luis Rey Quadrangle (7.5 minute, 1968), San Diego County, southern California. Point Loma Formation. Age: Late Campanian to early Maastrichtian. Collector: J. D. Loch.
8180. Concretions in shale just above sandstone on S side of Silverado Canyon, 121 m N and 61 m E of SW corner of section 9, T. 5 S, R. 7 W, Santiago Peak Quadrangle (7.5 minute, 1954), Santa Ana Mountains, Orange County, southern California. Ladd Formation, Baker Canyon Member. Age: Turonian. Collector: B. N. Moore, 1928.
9936. Fossiliferous brown sandstone about 4.5 km (2.8 mi.) S of U. S. Highway 26, along W side of Bridge Creek, 610 m N and 805 E of SW corner of section 25, T. 13 S, R. 27 E, Aldrich Mtn. North Quadrangle (7.5 minute, 1972; photorevised 1983), Grant County, east-central Oregon. Unnamed strata. Lower Cenomanian. Collectors: W. P. Popenoe and J. Alderson, June 12, 1975. [Locality is same as LACMIP locality 28787].
10667. On ridge just above creek bed and near base of sandstone, 853 m S and 1,371 m E of NW corner of section 33, T. 11 S, R. 10 E, Ortigalita Peak NW Quadrangle (7.5 minute, 1969; photorevised, 1984), Merced County, California. Moreno Formation, Tierra Loma Member. Age: Late early to early late Maastrichtian. Collector: B. C. Adams, August, 1941.
10764. [= CIT 1466]. Concretion in sandstone near top of N slope of hillside about 0.4 km S of Alturas-Redding Highway, about 0.2 km W of middle of E line of section 35, T. 33 N, R. 3 W, Redding Quadrangle (15 minute, 1953), Shasta County, northern California. Redding Formation, Bella Vista Sandstone Member. Age: Turonian. Collector: W. P. Popenoe, March 23, 1940.
10769. Small lens in massive sandstone outcropping in bed of Dry Creek, about 0.2 km S of line between townships 32 and 33N, 1463 m N6°40'W from SE corner of section 6, T. 32 N, R. 3 W, Redding Quadrangle (15 minute, 1953), Shasta County, northern California. Redding Formation, Bella Vista Sandstone Member. Age: Turonian. Collectors: W. P. Popenoe & C. Ahlroth, June 23, 1936.
10787. Near crest of N slope of divide between Basin Hollow and Clover Creek, no more than 122 m S of section line, near NE corner of NW 1/4 of section 33, T. 32 N, R. 2 W, Redding Quadrangle (15 minute, 1953), Shasta County, northern California. Redding Formation, lower part Member V (of Popenoe, 1943). Age: Early Santonian. Collectors: W. P. Popenoe & D. W. Scharf, August 8, 1931.
10816. [= CIT 1007]. Hard limy sandstone outcropping on lower slope of hills N of Oak Run, approximately 0.4 km S26°E of NW corner of section 16, T. 32 N, R. 2 W, Millville Quadrangle (15 minute, 1953), Shasta County, northern California. Redding Formation, Member IV. Age: Coniacian. Collectors: W. P. Popenoe & D. W. Scharf, Aug. 9, 1931.
10832. [= CIT 1012]. Beds of small gullies in the field on both sides of the E-W highway connecting Pentz and Chico, about 1.3 km N86°W of Pentz, NW/4, NW/4 of section 25, T. 21 N, R. 3 E (Cherokee Quadrangle, 7.5 minute, 1949), Butte County, northern California. Chico Formation, Pentz Road member (informal). Age: Early Campanian. Collectors: W. P. Popenoe & D. W. Scharf, August, 15, 1931.
10882. Just N of Silverado Canyon, 838 m N and 69 m E of NW corner of section 8, T. 5 S, R. 7 W, Black Star Quadrangle (7.5 minute, 1967), Santa Ana Mountains, Orange County, southern California. Ladd Formation, Baker Canyon Member. Age: Turonian. Collector: W. P. Popenoe, May 19, 1934.
10884. [= CIT 978]. Sandstone about 46 m above top of gray basal Cretaceous conglomerate, approximately 2.4 km SE of dam just above mouth of Harding Canyon, NE slope and near crest of bluff overlooking Santiago Canyon at about the NE corner of section 33, T. 5 S, R. 7 W, Santiago Peak Quadrangle (7.5 minute, 1954), Santa Ana Mountains, Orange County, southern California. Ladd Formation, Baker Canyon Member. Age: Turonian. Collector: W. P. Popenoe, April 14, 1933.
10889. Conglomerate lens in shale 122 m above creek W of fork of Harding and Santiago creeks, Santa Ana Mountains, Orange County, southern California. Ladd Formation, Baker Canyon Member. Age: Turonian. Collector: W. P. Popenoe, August, 1929.
11965. [= SDSNH 3457]. At Carlsbad Research Center north of Palomar Airport, in temporary exposures of shale S of Letterbox Canyon, along Faraday Ave., San Luis Rey Quadrangle (7.5 minute, 1975 provisional edition), San Diego County, southern California. Point Loma Formation. Age: Late Campanian to early Maastrichtian. Collector: B. O. Riney, September 8, 1987.