



## Explanation of Figures 3 to 17

Figures 3–8. *Acila (Truncacila) allisoni* Squires & Saul, sp. nov., rubber peels. Figure 3. Holotype UCMP 154232, UCMP loc. B-5665, left valve,  $\times 2.8$ . Figure 4. Paratype UCMP 154233, UCMP loc. B-5665, left valve,  $\times 3.2$ . Figure 5. Paratype UCMP 154234, UCMP loc. A-6275, right valve,  $\times 2.8$ . Figure 6. Holotype UCMP 154232, UCMP loc. B-5665, posterior view,  $\times 3$ . Figure 7. Paratype UCMP 154233, UCMP loc. B-5665, posterior view of

valve), height 12.1 mm, length 15.5 mm (incomplete), thickness 7.8 mm (approximate).

**Holotype:** UCMP 154232.

**Type locality:** UCMP B-5665, near Punta China, Baja California, Mexico, 31°30'N, 116°40'W.

**Paratypes:** UCMP 154233, 154234, 154235.

**Geologic age:** Late Aptian.

**Distribution:** Alisitos Formation, Baja California, Mexico.

**Discussion:** The above description of the new species is based on eight rubber peels: one left valve, three right valves, two with conjoined valves, and two partial hinges.

The new species is most similar to *Acila (Truncacila) bivirgata* (J. de C. Sowerby, 1836:335, pl. 11, fig. 8) from upper Aptian strata of England. The similarity is close enough for Allison (1974) to have identified as Sowerby's species specimens from the Alisitos Formation. Illustrations (Figures 9–11) of *A. (T.) bivirgata* are herein provided for comparison, and this is the same specimen used in Schenck (1936:47, pl. 2, figs. 1, 2). The new species differs from *A. (T.) bivirgata* by having the line bisecting the chevrons located nearer the center of the ventral margin, slightly wider ribs, narrower interspaces, and a less sunken escutcheon.

The new species differs from *Acila (T.) schencki* Stoyanow (1949:61–63, pl. 8, figs. 1–8), the only other Aptian acilid known from western North America, by having more numerous and narrower ribs (especially on the anterior half of the disk), no tendency for the line bisecting the chevrons to be slightly anterior of the center of the ventral margin, and an absence of strong curvature dorsally of the ribs near the anterior edge of the disk.

**Etymology:** Named for the late E. C. Allison, in recognition of his extensive collecting of mollusks from the Alisitos Formation.

*Acila (Truncacila)*, sp. nov.?

(Figure 12)

*Acila (Truncacila)* sp. A. Schenck, 1936:51, pl. 2, fig. 13.

**Diagnosis:** Shell medium, quadrate. Chevrons bisected by line meeting ventral margin near meeting of anterior

end and ventral margin. Total number of ribs on disk of left valve approximately 55; ribs (posterior of chevron-bisecting line) narrow, with interspaces approximately  $\frac{1}{2}$  as wide.

**Description:** Shell medium for subgenus (14.2 mm in height and 21.2 mm in length), longer than high, height/length ratio = 0.67. Quadrate, inequilateral, equivalved, valves moderately inflated. Anterior end broadly rounded. Antero-dorsal margin long and straight, generally parallel to ventral margin. Posterior end straight, truncate. Umbones low, located posteriorly; umbonal angle 100°. Disk broad, ornamented with abundant ribs diverging from umbo area and forming chevron-shaped (divaricate) pattern. Chevron angle 55°. Chevrons bisected by line extending from slightly anterior of umbo to point located near where anterior end and ventral margins meet; ribs anterior to bisecting line about 21; ribs posterior to bisecting line about 34 (excluding occasional short bifurcations near ventral margin). Total number of ribs on disk usually approximately 55; ribs narrow with interspaces approximately  $\frac{1}{2}$  as wide, except anterior of chevron-bisecting line, where ribs become more widely spaced.

**Geologic age:** Early Albian or early middle Albian, possibly Cenomanian.

**Distribution:** POSSIBLY LOWER ALBIAN: Budden Canyon Formation, upper lower Chickabally Mudstone Member, Ono area, Shasta County, northern California. LOWER ALBIAN OR LOWER MIDDLE ALBIAN: Hudspeth Formation, lower part of "Main Mudstone member," near Mitchell, Wheeler County, northeast-central Oregon. POSSIBLY CENOMANIAN: Unnamed strata, near Antone, Wheeler County, northeast-central Oregon.

**Discussion:** The possible new species is known only from a single specimen (hypotype CAS 69097 = UO 6000), a left valve (height 14.2 mm, length 21.2 mm), the posterior end of which is not preserved. This hypotype is the only moderately well preserved specimen of *Acila* of Albian age known from the study area. It is likely that this species is new, but until more specimens are discovered, we are reluctant to name it.

A possible record of *A. (T.)* sp. nov.? is a latex peel of a fragment from CAS loc. 69110 in the upper lower Chickabally Mudstone Member of the Budden Canyon

←

left valve,  $\times 4$ . Figure 8. Paratype UCMP 154235, UCMP loc. A-6275, right-valve hinge,  $\times 3.7$ . Figures 9–11. *Acila (Truncacila) bivirgata* (J. de C. Sowerby, 1836), CAS hypotype 5770, Gault Formation, Folkestone, England,  $\times 3.7$ . Figure 9. Left valve. Figure 10. Right valve. Figure 11. Posterior view. Figure 12. *Acila (Truncacila)* sp. nov.?, hypotype CAS 69087, UO loc. 461, left valve,  $\times 1.8$ . Figures 13–17. *Acila (Truncacila) haidana* Packard in Schenck, 1936, CAS loc. 69080. Figure 13. Holotype CAS 69081, left valve,  $\times 3$ . Figure 14. Paratype CAS 69080.01, left valve,  $\times 2.8$ . Figure 15. Hypotype LACMIP 13227, LACMIP loc. 24365, right valve,  $\times 3.4$ . Figure 16. Holotype CAS 69081, posterior view,  $\times 3$ . Figure 17. Hypotype CAS 69106.03, LACMIP loc. 23950, partial right-valve hinge,  $\times 4.8$ .

Formation in the Huling Creek area, southwest of Redding, Shasta County, northern California. Jones et al. (1965) assigned these rocks to the early Albian. Another possible record of *A. (T.)* sp. nov.? is a plastic replica of a partial specimen from unnamed strata at UCMP loc. 814 south of Antone, between Rock Creek and Spanish Gulch, Wheeler County, northeast-central Oregon. Popenoe et al., (1960:column 54 of chart 10e) assigned rocks from this area to the Cenomanian.

*Acila (T.)* sp. nov.? is similar to *A. (T.) rosaria* but differs by having a truncate posterior end, usually slightly wider ribs, and slightly wider spaced ribs. *Acila (T.)* sp. nov.? is somewhat similar to *A. (T.) allisoni* but differs by having a larger size, more widely spaced ribs that are never wavy, uniform-rib strength over the entire disk, and chevrons bisected by a line located anterior of center of ventral margin.

*Acila (Truncacila) haidana* Packard  
in Schenck, 1936

(Figures 13–17)

*Acila (Truncacila) demessa* Finlay, var. *haidana* Packard in Schenck, 1936:50–51, pl. 2, figs. 3, 4, 6, 10.

? *Nucula (Acila) truncata* Gabb. Whiteaves, 1884:232.

**Diagnosis:** Shell small, subquadrate (usually) to elliptical. Chevrons bisected by line usually meeting center of ventral margin (rarely to anterior of center). Total number of ribs on disk of each valve approximately 40; ribs (posterior of chevron-bisecting line) very narrow to narrow, with interspaces  $\frac{1}{2}$  as wide to same width as ribs.

**Description:** Shell small for subgenus (up 14.4 mm in height and 16.7 mm in length), longer than high, height/length ratio = 0.73 to 0.86. Subquadrate (usually) to elliptical, inequilateral, equivalved, valves moderately inflated. Antero-dorsal margin long, straight to lowly convex. Posterior end truncate and set off from escutcheon by weak rostration. Ventral margin convex. Umbones low, located posteriorly; umbonal angle 101 to 116°. Beaks pointed, opisthogyrate. Disk broad, ornamented with abundant ribs diverging from umbo area and forming chevron-shaped (divaricate) pattern. Chevron angle 46 to 59°. Chevrons bisected by line extending from slightly anterior of umbo to center (rarely anterior) of ventral margin; ribs anterior to bisecting line 18 to 20, ribs posterior to bisecting line about 20 to 28. Secondary divarication rare, only on specimens with anteriorly located divarication. Total number of ribs on disk of each valve usually approximately 40; ribs very narrow to narrow, with interspaces approximately  $\frac{1}{2}$  as wide to same width as ribs, except anterior of chevron-bisecting line, where ribs become wider and more widely spaced. Growth checks near ventral margin or absent. Escutcheon moderately prominent, slightly sunken, and crossed by narrow ribs. Hinge with at least 18 anterior taxodont teeth

and, at least, six posterior taxodont teeth. Resilifer opisthocline, narrow.

**Dimensions of holotype:** Conjoined valves (partially open), height 11.5 mm, length 15.7 mm, thickness 9 mm (taking into account the partial opening).

**Holotype:** CAS 69081 [= CAS 5090].

**Type locality:** CAS 69080, just east of Queen Charlotte City, Bearskin Bay, Skidegate Inlet region, Queen Charlotte Islands, British Columbia.

**Paratypes:** CAS 69080.01 [= CAS 5091] and CAS 69080.02 [= CAS 5092].

**Geologic age:** Latest Albian (probably) to early Turonian.

**Distribution:** UPPERMOST ALBIAN (PROBABLY) TO CENOMANIAN: Haida Formation, just east of Queen Charlotte City, Bearskin Bay, Skidegate Inlet region, Queen Charlotte Islands, northern British Columbia. LOWER TURONIAN: Hornbrook Formation, Osburger Gulch Member, Jackson County, southern Oregon; Redding Formation, Frazier Siltstone, Shasta County, northern California; Cortina formation (informal), Venado Sandstone Member, near Sites, Colusa County, northern California; Panoche Formation, Garzas Creek, Stanislaus County, north-central California.

**Discussion:** The above description of this species is based on eight specimens: one left valve, six right valves, and one with conjoined valves. The escutcheon area is poorly preserved on all of these specimens.

Whiteaves (1884:232) reported one specimen of *Nucula (Acila) truncata* Gabb, 1864, from the type locality area of *A. (T.) haidana* and one specimen from the vicinity of Alliford Bay, also in the Skidegate Inlet region, Queen Charlotte Islands. Whiteaves, unfortunately, did not figure these specimens, nor could they be located by us in any museum collection. Based on their geographic occurrence, however, it is most likely that they are *A. (T.) haidana*.

Schenck (1936:50) included tentatively “? *Nucula (Acila) truncata* Gabb. Whiteaves, 1879:162; 1903:389–390,” in his synonymy of *A. (T.) haidana*, but Whiteaves reported that these specimens were collected at localities on 1) the northwest side of Hornby Island, 2) the southwest side of Denman Island, Vancouver Island, and 3) Sucia Island, Washington. All of these localities occur in the Nanaimo Group. Both *A. (T.) demessa* and *A. (T.) grahami* are herein recognized from this group, but *A. (T.) haidana* is not. It does not seem likely, therefore, that these Nanaimo Group specimens of Whiteaves (1879, 1903) should be identified as *A. (T.) haidana*. Whiteaves, furthermore, provided no type numbers and no illustrations of these specimens. In addition, Bolton (1965) did not list type numbers from them. Additionally, none of them is part of the GSC collection.

One specimen of *Acila (T.) haidana* is from USGS loc. M-175 near Sites, Colusa County, northern California. Although this locality is usually reported as being in the upper part of the Cenomanian Antelope Shale, Popenoe et al. (1987:79) reported that some of the fossils at this particular locality probably slumped from the overlying basal Venado Formation of early Turonian age. We concur, based on the presence of the following Turonian gastropods found with the *Acila (T.) haidana* specimen: *Gyrodos* (?*Sohlella*) *yolensis* Popenoe et al., 1987 and *Gyrodos* (*Gyrodos*) *dowellii* White, 1889.

*Acila (Truncacila) demessa* Finlay, 1927

(Figures 18–26)

*Nucula truncata* Gabb, 1864:198, pl. 26, figs. 184, 184a, 184b.

not *Nucula truncata* Nilsson, 1827:16, pl. 5, fig. 6.

*Acila demessa* Finlay, 1927:522 (new name for *Nucula truncata* Gabb, not Nilsson); Stewart, 1930:45, pl. 3, fig. 6.

*Acila (Truncacila) demessa* Finlay, Schenck, 1936:48–50, pl. 2, figs. 5, 7, 8, 9, text-fig. 7; 1943:pl. 8, fig. 5; pl. 9, figs. 1, 3, 7.

*Acila shumardi* Dall, Ludvigsen & Beard, 1994:90, fig. 54 (in part); 1997:110, fig. 65 (in part).

?*Nucula (Acila) truncata* Gabb, Whiteaves, 1879:162 (in part); 1903:389–390 (in part).

**Diagnosis:** Shell medium, subtrigonal to subquadrate. Chevrons bisected by line meeting ventral-margin anterior. Total number of ribs on disk of each valve approximately 70; ribs (posterior of chevron-bisecting line) flat and very narrow to moderately wide, with interspaces approximately  $\frac{1}{5}$  to  $\frac{1}{3}$  as wide. Escutcheon bounded by smooth area not crossed by ribs.

**Description:** Shell medium for subgenus (up to 20.4 mm in height and 26.5 mm in length, most specimens approximately 13 mm in height and 16 mm in length), longer than high, height/length ratio = 0.72 to 0.89. Subtrigonal to subquadrate; inequilateral, equivalved, valves moderately inflated. Anterior end broadly rounded. Antero-dorsal margin long, straight to convex. Posterior end straight, abruptly truncate and set off from escutcheon by weak rostration. Ventral margin convex. Umbones low, located posteriorly; umbonal angle 103 to 117°. Beaks pointed, incurved, opisthogyrate. Disk very broad, ornamented with abundant ribs diverging from umbo area and forming chevron-shaped (divaricate) pattern. Chevron angle approximately 30 to 34°. Secondary development of chevrons on few specimens. Chevrons bisected by line extending from slightly anterior of umbo to center of ventral margin; ribs anterior to bisecting line 22 to 39 (excluding occasional bifurcations near where anterior and ventral margins meet), ribs posterior to bisecting line 26 to 47. Total number of ribs on disk of each valve usually approximately 70; ribs flat and very narrow to moderately wide, with interspaces approximately  $\frac{1}{5}$  to  $\frac{1}{3}$  as wide,

except anterior of chevron-bisecting line, where ribs become wider and more widely spaced. Growth checks near ventral margin common on some specimens and associated, from about  $\frac{1}{3}$  of distance from posterior end to where anterior end meets ventral margin, with bifurcation of ribs into riblets and riblet insertion. Prominent growth checks, corresponding to same position on each valve, occasionally continue across escutcheon area to beaks. Ventral-margin edge and inner margin (for short distance) finely crenulate. Escutcheon prominent, sunken, and bounded by shallow groove not crossed by ribs; narrow ribs present on slightly inflated central part of escutcheon area. Interior nacreous. Adductor scars well delineated. Left-valve hinge with approximately 11 posterior taxodont teeth, similar in form, becoming stronger posteriorly; approximately 23 anterior taxodont teeth, similar in form, becoming stronger anteriorly. Resilifer narrow, opisthoclinal; bordered posteriorly by strong, high tooth.

**Lectotype:** ANSP 4417 (designated by Stewart, 1930:46).

**Type locality:** Pentz, Butte County, northern California.

**Geologic age:** Late Turonian to late Campanian and possibly early Maastrichtian.

**Distribution:** UPPER TURONIAN: Budden Canyon Formation, Gas Point Member, Shasta County, northern California; Ladd Formation, Baker Canyon Member to Holz Shale Member transition, Santa Ana Mountains, Orange County, southern California. CONIACIAN: Redding Formation, Member V, upper part, Shasta County, northern California. LOWER SANTONIAN: Redding Formation, Member V, Shasta County, northern California. UPPER SANTONIAN: Haslam Formation, lower part, Chemanius River, near Nanaimo, Vancouver Island, British Columbia; Haslam Formation, lower part, Salt-spring Island, British Columbia; Redding Formation, Member VI?, Shasta County, northern California; Chico Formation, Musty Buck Member, Butte County, northern California. SANTONIAN UNDIFFERENTIATED: Panoche Formation, Merced County, north-central California. UPPER SANTONIAN/LOWERMOST CAMPANIAN: Haslam Formation, upper part, Brannen Lake, near Nanaimo, Vancouver Island, British Columbia. LOWER CAMPANIAN: Chico Formation, Ten Mile Member, Butte County, northern California; Chico Formation, Pentz Road member (informal), Butte County, northern California; Ladd Formation, upper Holz Shale member, Santa Ana Mountains, Orange County, southern California. LOWER MIDDLE CAMPANIAN: Ladd Formation, upper Holz Shale Member, Santa Ana Mountains, Orange County, southern California. UPPER MIDDLE TO LOWER UPPER CAMPANIAN: Cedar District Formation, upper part, west shoreline of Denman Island off east coast of Vancouver Island, British Columbia. Chatsworth Formation, Dayton and Bell canyons, Simi Hills, Ventura