

NOTES ON GONIDEA ANGULATA LEA, A FRESH-
WATER BIVALVE, WITH DESCRIPTION
OF A NEW VARIETY

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The National Museum contains the original type of Lea, the type of Gould's *A. feminalis*, a cotype of *A. randalli* Trask, and specimens agreeing well with the figure of Sowerby's *A. biangulata*, together with a good series from some twenty different localities, ranging from Spokane, Wash., south to Los Angeles, Cal. These specimens show the species to occur in the watersheds of the Columbia River and its branches, of the Umpqua River, of the Sacramento and San Joaquin rivers, the Santa Clara Valley, and the valley of Los Angeles.

All the named forms are markedly angular; the secondary radial rib present in all of them is especially prominent in the form called *biangulata* by Sowerby.

The valves may be compressed or inflated, the angle may be blunt or carinate, the posterior end, always wider than the anterior, may be very or only moderately wide, dorsally alate or merely angular. The anterior end is short and rounded or, in some specimens, very attenuate and almost pointed.

The periostracum is yellowish brown, darker in the older parts, varying to black; when light it is frequently elegantly rayed with dark green. The hinge teeth are conspicuous in the young, but obsolete in the adult; the surface is more or less concentrically undulate. The nacre is livid bluish white or with a salmon-colored flush in the concavity of the valve, all salmon-colored, or elegant purple partially or throughout. The maximum length was $5\frac{3}{4}$ inches; a specimen in the collection 4.5 inches in length has a width of $2\frac{3}{8}$ inches, but the majority are more slender. The young, 40 mm. long, may have a well-developed lateral carina or be entirely destitute of angulation.

Mr. Harold Hannibal, of Santa Clara County, California, has recently sent to the Museum a fine series of specimens from Guadalupe Creek, between San José and San Francisco Bay, which are remarkable for the almost total absence of lateral angulation, their large size, compressed form, and freedom from erosion. Hardly any trace of the angulation is left, and in this character all agree;

also in having the anterior end but slightly attenuated. An average specimen measures 116 mm. long, 42 mm. wide at the beaks, and 52 mm. wide at the posterior dorsal angle, with a maximum diameter of 28 mm. The corresponding measurements for a specimen of the typical form are: 92.0, 33.0, 45.0, and 30.0 mm.

Lea, in his original description, mentions the radiations, which are still faintly visible on his type, collected nearly three-quarters of a century ago. In the generic diagnosis of *Gonidea* in the Synopsis of the Naiades (Proc. U. S. Nat. Mus., xxii, p. 657) we find the expression "epidermis rayless"—an inadvertence which should be corrected.

In his communication, Mr. Hannibal gives the following interesting data as to the habits of the species in his locality: It is found in "sloping clay banks, between four inches and two feet below the water level. They dig close to the surface a horizontal burrow, perhaps three times their length or less, with a sloping ditch down the slope [of the bank], which they stay in when the water level falls in summer. They are sometimes solitary, but usually there are two or three very large ones and several small ones in the same burrow, where they brace themselves very tightly. A twenty-five-yard-long clay bank will often yield forty or fifty big fellows for dissection work. One exception to this *situs* was found in an artificial pond with brick walls, mud bottom, and inhabited by ducks. Here scattered big fellows might be found all over the bottom, where they had been washed in at the time of high water, and later were unable to get out."

It may be added that Mr. Henry Hemphill found the strongly angulated form of the species imbedded to the level of the angle or carina, in rapid streams, so that material carried along by the current would slip easily over the flattened surface of the end of the valves without disturbing the animal or eroding the shell.

The form discovered by Mr. Hannibal presents such a contrast to the angulate type of the species that in the absence of connecting links it might easily be taken for a new species, and to distinguish it from the typical *angulata* I would propose for it the name of variety *haroldiana*. Types of the variety are No. 110,596, U. S. Nat. Mus.