

# *Julia exquisita* Gould, A Bivalved Gastropod<sup>1</sup>

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THREE LIVING SPECIMENS of a bivalved gastropod identified as *Julia exquisita* Gould were collected near Koloa, Kauai, Hawaii, on February 2 and 3, 1962. Originally described by Gould from shells obtained from the Hawaiian Islands during the U. S. Exploring Expedition (Gould, 1862: 283-284), *J. exquisita* is one of nine named species of *Julia* which have heretofore been known only from shell valves and classified as Pelecypoda. Keen (1960: 29-30), comparing the shells of *Julia* with those of the recently described bivalved gastropod *Berthelinia limax* (Kawaguti and Baba, 1959) suggested that when living animals of *Julia* were found they would be gastropods rather than pelecypods. The purpose of this note is to report on the first living collection of a species of *Julia* and to present a preliminary account of the anatomy of *J. exquisita* which confirms Keen's hypothesis.

The animal of *J. exquisita* is similar to the bivalved gastropods which have been described, *B. limax* (Kawaguti and Baba), *B. typica* (Gatliff and Gabriel) (Burn, 1960: 45), and *Midorigai australis* Burn (1960: 46). Ranging in size from 4 mm to 6 mm in length, the animals are sluglike, bearing two convex shells dorsally. The body is long and slender, the foot nearly as wide as the neck. The head and neck extend some 2 mm from the anterior edges of the shells when the animal is moving. The rhinophores are slender, squared off at the tips, and at their bases is the slightly elevated eye prominence. The oral tentacles do not extend beyond the edge of the foot, and are prominent, rounded structures. The anterior edge of the foot is bilabiate, wide, extending laterally to the oral tentacles, and the sole is grooved its whole length by faint grooves. The foot is flattened posteriorly and medially.

The body is dark green, sparsely ornamented on the neck and foot with small white patches ringed with brown and with similar but much more prominent single patches on the rhinophores. The mantle is also green, but has horizontal brown and white bands at the hinge line and at the distal edge of the shells. The sole of the foot is lighter green than the rest of the animal. The eye prominence is white, the eyes black.

*J. exquisita* resembles the previously described bivalved gastropods in general organization of internal anatomy. As in *Berthelinia* and *Midorigai* the visceral mass is enclosed by the two shell valves and covered by the mantle, the ctenidia are attached to the inner surface of the right mantle as a series of thin lamellae, the external oviducal groove runs along the right side of the body, and the adductor muscle is oval and subcentral in the anterior third of the body. The radula is also similar: uniserial with six teeth in the ascending series, each tooth simple at the tip and bearing fine denticulations on both sides. *J. exquisita* differs from the described species of *Berthelinia* and *Midorigai* in some anatomical details which will be described more fully in a later paper: there is an area of black pigmentation in the region of the hypobranchial gland, the penis appears to be more complex than the simple penis without armature described in *B. limax* (Kawaguti and Baba, 1959: 179) and *M. australis* (Burn, 1960: 46), and the adductor muscle appears to be larger in proportion to body length than it is in other species.

The shells conform closely to Gould's (1862: 283-284) description. They are broadly oval in outline, the anterior margin rounded, the posterior deeply excavated. The sculpture consists of concentric incremental lines only. It is noteworthy that Gould did not mention any other sculpture, although Dall, Bartsch, and Rehder (1938: 126), recording *J. exquisita* from the Hawaiian Islands, described "... 10 low, broad,

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feebly rounded, radiating cords" on the posterior portion of the shell. The shells from living animals are bright green, with narrow, radiating, interrupted bands of red-brown and white extending from the hinge to the ventral margin. Beachworn specimens may be white. The hinge consists of a shelf which forms posteriorly a toothlike knob on the left valve and a depression in the right valve into which the left valve fits.

The animals were found in sand patches on small rocks some 3 ft under water. Three genera of algae also occurred on the rocks: *Laurencia*, *Gracillaria*, and *Gracillariopsis*. The animals readily crawled and hung by mucous threads on all three genera of algae when confined to aquaria in the laboratory. Although the described species of *Berthelinia* and *Midorigai* are associated only with the alga *Caulerpa*, it has not been possible to associate *J. exquisita* with a single algal genus.

Keen and Smith (1961: 49–50) separated *Julia*, subfamily Juliinae, from *Berthelinia* and *Midorigai*, subfamily Bertheliniinae, in the Juliidae on the basis of differences in shell characters. Although, in general, anatomically similar, it appears that *Julia* is also to be distinguished from the Bertheliniinae on the basis of habitat.

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