

CLADOCERA OF MAUNA KEA, HAWAII

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CLADOCERA OF MAUNA KEA, HAWAII

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The Cladocera discussed in this paper were collected by members of the staff of Bernice P. Bishop Museum on the Mauna Kea Expedition of the Hawaiian Academy of Science in August 1935 and sent to me for examination by Professor C. H. Edmondson. The collection includes specimens from Lake Waiau near the summit, altitude 13,007 feet, and from a pond on the slope of Mauna Kea, altitude 6,500 feet. Of the four species described below, three have not been recorded previously from the island of Hawaii.

FAMILY DAPHNIIDAE

Simocephalus capensis G. O. Sars.

The specimens of the Mauna Kea Expedition, taken from a pond on the slope of Mauna Kea, agree with the typical form in most respects, especially in the shape of the head and the armature of the posterior border of the valves. The head is comparatively small, front forming an angle below but not so acute as shown by Sars (15, p. 16, pl. 3, fig. 3)¹; vertex armed with a few minute denticles which are absent in young individuals. Ocellus small, rhomboidal. Dorsal margin of posterior border of the valves denticulated, ventral margin below the posterior prominence smooth. Anal spines of the post-abdomen number 7 or 8; anal claws finely ciliated along the concave edge. Length, 2 mm; height, 1.3 mm; somewhat smaller than the typical form from South Africa. Parthenogenetic females only.

This species is so closely allied to the widespread species *S. serrulatus* (Koch) that Brehm (1, p. 668) considers it to be a form of *S. serrulatus*.

Distribution: South Africa.

¹ Numbers in parentheses refer to Literature Cited, p. 8.

***Ceriodaphnia dubia* Richard (fig. 1, a-c).**

This species was quite abundant in the pond on the slope of Mauna Kea. Unfortunately I was unable to refer to Richard's original description of 1895, but these specimens seem to agree with the descriptions and figures given by Daday (3, p. 145), Sars (17, p. 631; 18, p. 317), and Gauthier (6, p. 107). The anal spines of

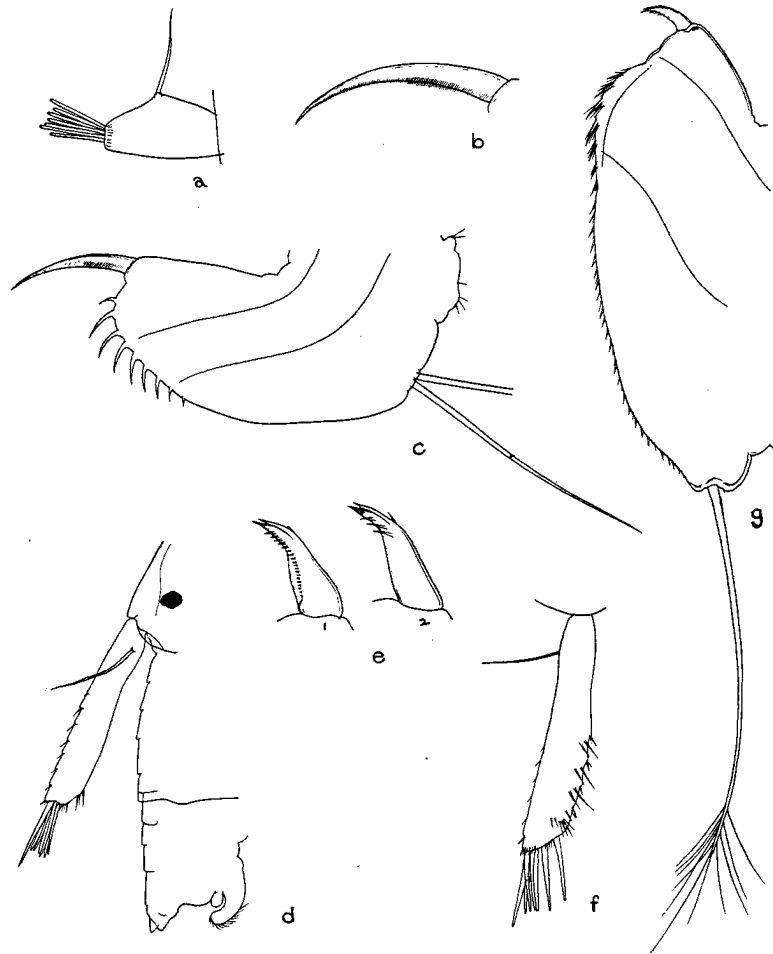


FIGURE 1.—*Ceriodaphnia dubia* (a-c) and *Macrothrix chevreuxi* (d-g) from Mauna Kea: a, antennule of female; b, anal claw; c, post-abdomen of female; d, frontal part of head, lip-plate and antennule; e, anal claw (1) inner side, (2) outer side; f, antennule, ventral inner aspect; g, post-abdomen.

the post-abdomen number 8 or 9 on each side, the outer one being the smallest (18, p. 318) (fig. 1, *c*). The anal claws are finely ciliated along the concave margin throughout the entire length but from near the middle almost to the base the cilia are slightly larger, giving the appearance of accessory spinules (fig. 1, *b*). Sars does not mention this feature but writes "apical claws without any secondary denticles" (18, p. 318, pl. 34, fig. 1, *b*). Gauthier's figures (6, p. 107, figs. 13, *C* and *D*) show distinctly the basal accessory spinules. The Mauna Kea form, however, has no such distinct basal series of spinules on the claws, but has slightly larger cilia on the middle part of the claw (fig. 1, *b*) as in the Scandinavian species *C. affinis* Lilljeborg (10, pp. 203-204, pl. 28, figs. 22 and 23). I believe that such slight variation in the cilia on the claws is not sufficient difference on which to base the separation of the species and that *C. affinis* is probably identical with *C. dubia* as Daday has already proposed (3, p. 145; 6, p. 107). Length of the Mauna Kea form, 0.76 mm; height, 0.53 mm. Parthenogenetic females only.

Distribution: New Zealand, Australia, Africa, Sumatra (Brehm: Toba Lake), Patagonia (5, *C. dubia* variety *acuminata*).

FAMILY MACROTHRICIDAE

Macrothrix chevreuxi Guerne and Richard (figs. 1, *d-g*, and 2).

This species is most abundant in the sample from a pond on the slope of Mauna Kea. The general form of the specimens agrees well with the figure of the type (7, p. 5, figs. 3-6). The antennules (fig. 1, *d*) are somewhat shorter than those of the type (7, p. 6; 9, pp. 282-283) in which they extend about half the length of the lip-plate. In the features of the spines just above the tip on the antero-ventral margin and of a row of fine spines crowning the outer side of the tip, the Mauna Kea specimens agree with Jenkin's Kenya form. The lip-plate and the ventral surface of the head (fig. 1, *d*) also seem to agree closely with Jenkin's figure (9, p. 282, fig. 13). The pre-anal margin of the post-abdomen is slightly curved and armed with spines accompanied by rows of fine hairs at the sides; the post-anal margin is more curved than the pre-anal part and has 5 or 6 (rarely 4) spines accompanied by groups of fine hairs (fig. 1, *g*). The anal claws are well developed and differ slightly from Jenkin's description in having a heavier dorsal spine and a spinule on the dorsal

side, three spines on the outer side near the tip and a number of minute denticles along the inner concave margin (fig. 1, *e*). Length, 0.76-0.98 mm; height, 0.50-0.65 mm. Parthenogenetic females only.

Distribution: South America and Africa.



FIGURE 2.—*Macrothrix chevreuxi* from Mauna Kea, female.

FAMILY CHYDORIDAE

Alona cambouei Guerne and Richard (fig. 3).

The collection of this species was made from Lake Waiau and includes parthenogenetic females and many young individuals. The valves of these specimens are mostly smooth and nearly transparent, some minutely granulated; the parts above the fornices show a slight reticulation; the post-ventral corner of the valves is rounded. The shape of the post-abdomen varies slightly. According to the system of comparative measurements adopted by Jenkin (9, pp. 286-287) to define the shape and size of the post-abdomen, in which L_r = the relation between the total length and the length of the pre-anal part, W = the width of the post-anal part, and D = the depth at the pre-anal angle, the Waiau form is defined by the ratios $L_r = 0.38-0.39$, $D = 0.23-0.25$, and $W = 0.38-0.39$. All these measurements are somewhat larger than those of the Kenya form². The post-anal marginal spines are 8-9 and are rather long, like those of the Kenya

² For the Kenya specimens of *Alona cambouei*, Jenkin (9, p. 89) has given the ratios $L_r = 0.33-0.36$, $D = 0.2-0.23$, and $W = 0.33-0.35$.

form, and are often forked in distal 2 or 3; the lateral spinules are usually 5 or 6. The anal claws are ciliated from the middle to the tip along the concave margins, but can not be traced to the base of the claws as in Jenkin's Kenya form (9, p. 289). At the base of the claws there is a series of fine basal spinules. Length, 0.38-0.53 mm; height, 0.25-0.32 mm.

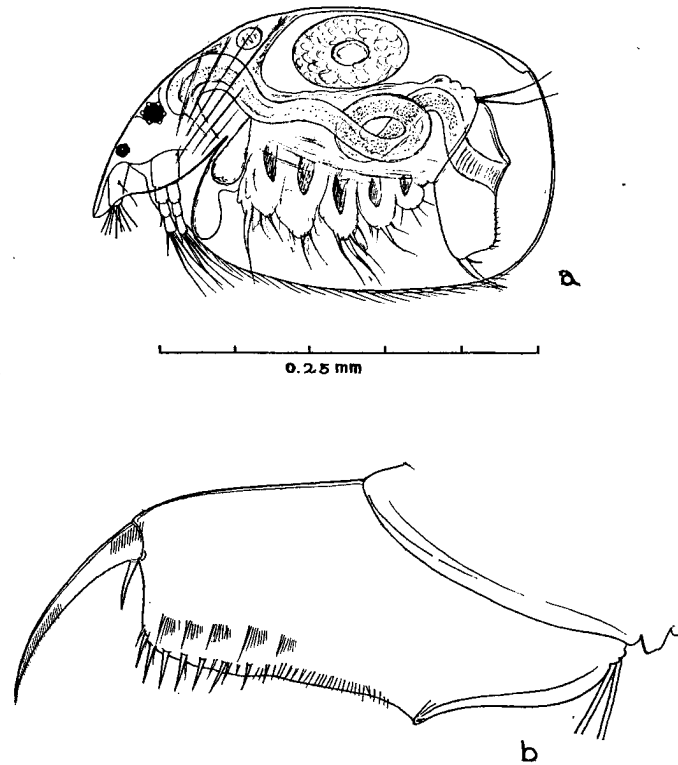


FIGURE 3.—*Alona cambouei* from Mauna Kea, female: *a*, lateral aspect; *b*, post-abdomen.

Distribution: India, Tongking, Palestine, Madagascar, Africa, and South America (Chile, Peru, Patagonia, Colombia, Bonaire, Paraguay), and Hawaii (Kalae, Molokai, recorded by Sars).

The collection of this species at such a high altitude in Hawaii (13,007 feet) is very interesting. Delachaux (4) has recorded the species from Lake Huaron in the Peruvian Andes at an altitude of

16,864 feet (5,140 meters) where the water temperature is 10°C, and Rammner (11, p. 367) has recorded it from a small pool, Pos de Tanki Onima, in Bonaire, where the water is 30°C.

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