OCCASIONAL PAPERS

OF

BERNICE P. BISHOP MUSEUM

HONOLULU, HAWAII

Volume XIX August 6, 1948 Number 10

Hawaiian Caprellidae[1]

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INTRODUCTION

This paper is a report on a small assortment of Caprellidae that has been accumulating in Bernice P. Bishop Museum throughout several years, the result of casual collections by numerous individuals. It is not to be considered a final word on Hawaiian caprellids, but as a beginning that may serve as a basis for future investigations. Caprellids are often neglected by the general collector, or overlooked entirely because of their small size and specialized ecological associations. The seven species listed below may be considered representative of the Hawaiian shore fauna, as all were taken in shallow water about the island of Oahu. Doubtless this short list can be expanded by careful explorations about the several islands. Colonies of hydroids, bryozoans, and seaweeds frequently harbor these unique amphipods.

While no new species was recognized among the specimens examined, all are of considerable interest because of their wide distribution. As far as we can discover from the literature, but one species, *Caprella acutifrons* Latreille, has previously been recorded from Hawaii. Apparently, the other six species are now reported from this general area of the Pacific for the first time. One, *Paracaprella pusilla* Mayer, seems to have been unobserved, up to this time, beyond its previously known range of the West Indies and the east coast of South America.

The wide dispersal of caprellids may be accounted for, without doubt, by their clinging habits and their customary association with fouling organisms, which are frequently transported on the bottoms of ships. Caprellids have been taken from fouled buoys and the bottoms of boats in Hawaii and elsewhere. Some of them are adaptive to wide

[1] The funds for printing this paper were contributed by the Juliette Atherton Trust.

ranges of temperature and other ecological factors, resulting in cosmopolitan distribution.

This study, initiated by G. S. Mansfield, junior author, in 1942 and interrupted by his participation in the war, was followed up and completed by C. H. Edmondson, senior author.

SPECIMENS EXAMINED

Key to genera of Hawaiian caprellids (adapted from Mayer)

A. Rudimentary appendages on third and fourth pereion segments; mandibular palp present or absent.
  B. Last two pairs of pereiopods inserted at almost the same level; spines often borne on head and on second and third pereion segments; mandibular palp 3-jointed.....**Metaprotella.**
  BB. Last two pairs of pereiopods not inserted at almost the same level; no spines borne on head or second and third pereion segments; mandibular palp absent or rudimentary.
    C. Form very small; rudimentary appendages on third and fourth pereion segments 1-jointed; pereion segments, 2-6, markedly 6-sided when viewed from above; no mandibular palp .....**Hemiaegina.**
    CC. Form not especially small; rudimentary appendages on third and fourth pereion segments 2-jointed; pereion segments, 2-6, not markedly 6-sided when viewed from above; rudimentary mandibular palp sometimes present.....**Paracaprella.**
AA. No rudimentary appendages on third and fourth pereion segments; no mandibular palp present.....**Caprella.**

Genus **Metaprotella** Mayer, 1890

Metaprotella sandalensis Mayer, Siboga-Exped., Caprellidae **34**: 40-42, pl. 1, figs. 30, 31, 34-36; pl. 6, figs. 56-63; pl. 9, figs. 16, 17, 44, 60, 1903. (See figures 1, *a-g;* 2, *a-g.*)

Metaprotella sandalensis Mayer form *macrodon* Schellenberg, K. Sven. Vet.-Akad., Handl. **16** (6): 94-95, fig. 48, 1938.

A distinctive feature of the genus *Metaprotella* established by Mayer is the fusion of the sixth and seventh pereion segments. The fusion results in the insertion of the last two pairs of pereiopods at nearly the same level. General characters of the species, *M. sandalensis* Mayer, include a slender body, spines on the head, on the second and sometimes the third pereion segments, and a spinous process at the lower distal border of the basal segment of the inferior antenna. The mandibular palp is 3-jointed.

The species is exceedingly variable. Mayer recognizes at least six varieties, and Schellenberg has recently described an additional form. The variations are shown in the disposition of the spines on the pereion segments, as well as in other minor differences.

Only six Hawaiian specimens, from three localities, have been examined. With respect to the spines on the segments of the body, they fall into two general groups: one in which spines decorate the head and the second and third pereion segments; the other in which spines are lacking on the third pereion segment. Specimens within these groups also may show minor differences among themselves.

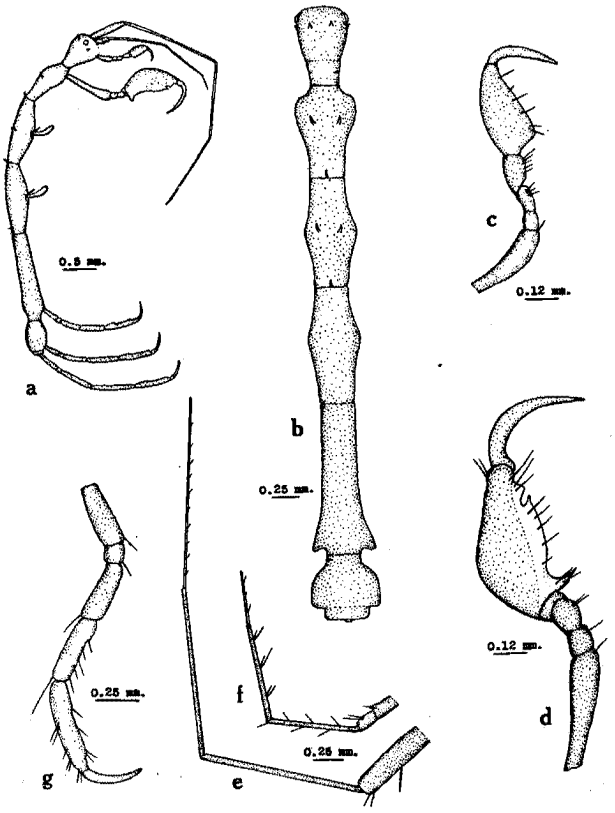

FIGURE 1.—*Metaprotella sandalensis,* male, collected off Oahu at 10 fathoms: **a,** lateral view; **b,** body segments, dorsal view; **c,** first gnathopod; **d,** second gnathopod; **e, f,** superior and inferior antenna, respectively; **g,** third pereiopod.

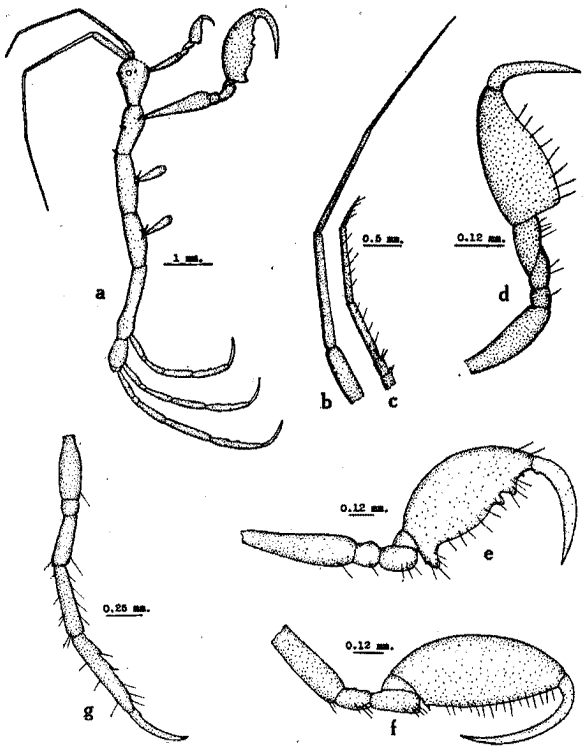

FIGURE 2.—*Metaprotella sandalensis,* from Kaneohe Bay: **a,** lateral view, male; **b, c,** superior and inferior antenna, respectively, male; **d,** first gnathopod, male; **e,** second gnathopod, male; **f,** second gnathopod, female; **g,** third pereiopod, male.

VARIATIONS IN HAWAIIAN SPECIMENS EXAMINED

A. SPINES OF THE BODY

1. One specimen, a male 6 mm. long, was taken from a submerged buoy, at a depth of 10 fathoms, one mile off the west coast of Oahu. The body bears 10 spines arranged as follows: a pair, one on each side, near the upper border of the head; a pair, similarly placed, about the middle of the upper border of the second and third pereion segments; a spine in the midline of the upper posterior border of the second and third pereion segments; and a spine on each side of the head below the eye.

2. Four specimens, three males, one female, each 6 mm. in length, were taken from shallow water in Kaneohe Bay, Oahu. One of the males bears nine spines on the head and second pereion segment, but none on the third segment. The spines on the head are arranged as in 1, those on the second segment also as in 1, with an additional spinule on each side just above the insertion of the second gnathopod. One male and the female of this lot bear but seven spines on the head and second pereion segment, lacking the spinules at the insertion of the second gnathopod.

3. One very small damaged specimen (male ?) about 3 mm. long was taken at Lisiansky Island in the northwest Hawaiian group. The spines on the third pereion segment as in 1, those on head and second segment undetermined.

B. APPENDAGES OF THE BODY

Variation in the relative length of the third segment of the peduncle of the superior antenna is noted among the Hawaiian specimens. In male specimen A, 1 the second and third segments of the peduncle are equal in length. Among specimens A, 2, differences are seen. In one male the third segment is much shorter than the second, whereas in other specimens of this lot the second and third segments are subequal. In males examined the flagellum of the superior antenna varies in number of segments from 10 to 12. In the female the flagellum has 11 segments.

In all males examined the first gnathopod varies but little in form. It is much smaller than the second gnathopod in both sexes. The palmar edge of the propodus is straight or slightly sinuose, setose, but without spines or teeth.

The second gnathopod varies but little among male specimens examined. The basal segment (arm) is about as long as the second pereion segment; the propodus has a strong proximal tooth slightly curved forward, a broad triangular tooth toward the distal extremity of the palmar border, and a small, sharp tooth just proximal of the broad one and separated from it by a narrow concavity.

Appendages of the third and fourth pereion segments are slender, rudimentary, 3-jointed, about one-fourth as long as the branchial vesicles. The last three pereiopods are slender, the segments narrow and, except the second, elongated.

The second gnathopod of the female specimen from Kaneohe Bay is slightly smaller than the corresponding appendages of the males from the same locality. It differs from that of a male, however, in that the palmar edge of the propodus is smooth and entire following a small proximal spine.

The species and its varieties have been reported by Mayer from Ceylon, Amboina, Singapore, and other East Indian localities, and also from Lifu, Loyalty Islands. The bathymetric range recorded varies from near shore areas to depths of 36 meters. Schellenberg describes a new form, *macrodon,* from the reefs of Fiji and the Gilbert Islands. This form bears a very long, narrow tooth on the proximal border of the propodus of the second gnathopod of the male.

While we have not designated specific varieties for the Hawaiian specimens examined, some of them resemble the typical form, with respect to the disposition of the spines of the pereion segments. On the other hand, the second gnathopod in all males in our collection conforms closely to that of the variety *ralumina,* recorded by Mayer from Ralum, Bismark Archipelago. We have not seen specimens in Hawaii which approach the form *macrodon* of Schellenberg.

Genus **Hemiaegina** Mayer, 1890

Hemiaegina minuta Mayer, Fauna and Flora des Golfes von Neapel **17**: 40, pl. 1, figs. 25-27; pl. 3, figs. 32-35; pl. 5, figs. 52, 53; pl. 6, figs. 13, 33, 34; pl. 7, fig. 4, 1890. Siboga-Exped., Caprellidae **34**: 65, pl. 6, fig. 72, 1903. (See figure 3, *a-g.*)

Adult male, minute, slender form, 4 mm. long. Pereion segments smooth, subequal in length. Segments, 2-6, when viewed from above have a six-sided appearance, resulting in pronounced and regular angular contours of body. Superior antenna rather long; second segment of peduncle twice length of first; third segment very short; flagellum with 13 segments. Inferior antenna shorter than peduncle of superior antenna; flagellum with two segments.

First gnathopod much smaller than second; palmar edge of propodus nearly straight, marked proximally by a prominent rounded lobe. Second gnathopod with basal segment (arm) longer than second pereion segment; propodus about twice as long as its greatest breadth; palmar marked by three teeth, the more distal one large, triangular; dactylus slightly thickened near middle.

Branchial vesicles narrow, oval; rudimentary appendages at base of branchial vesicles very small, 1-jointed. Last three pereiopods slender; propodus of last pereiopod with a strong proximal tooth and concave palmar border.

Largest female observed slightly less than 4 mm. in length; similar to males in general features including pereion segments and appendages. Flagellum of superior antenna with 10 segments instead of 13 as in males.

Seven males and six females were collected on Waikiki reef, Oahu, in shallow water. They were parasitic on a plumularian hydroid. The species was previously recorded by Mayer from a locality between Amoy, China, and Formosa, at a depth of 5 to 25 fathoms.

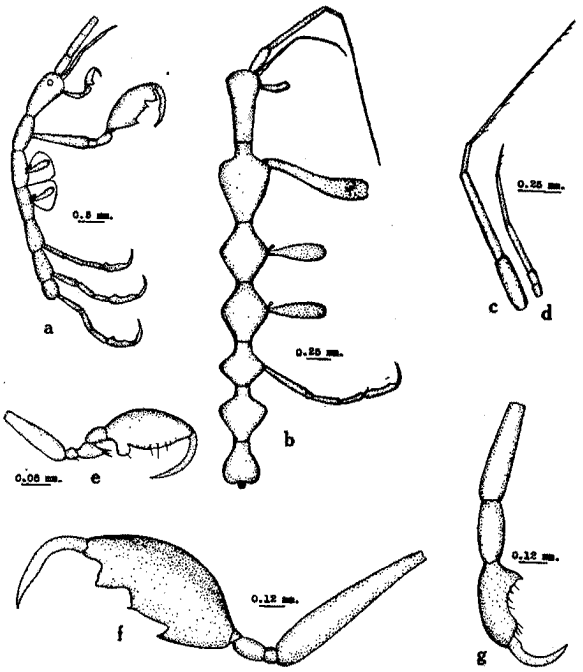

FIGURE 3.—*Hemiaegina minuta,* from Waikiki reef: **a,** lateral view, female; **b,** body segments, dorsal view, male; **c, d,** superior and inferior antenna, respectively, male; **e,** first gnathopod, male; **f,** second gnathopod, male; **g,** third pereiopod, female.

Raj described a caprellid from shallow water of the Gulf of Manaar under the name of *Hemiaegina quadripunctata* (Madras Govt. Mus., Bull., new ser. I, 1 (1): 126-127, pl. 15, fig. 1, *a-e,* 1927). Characters noted in this species include a squarish instead of a triangular notch in the palmar border of the propodus of the second gnathopod, and the presence of 11 segments in the flagellum of the superior antennae of both sexes. A male of this Indian form was 4.5 mm. long. Raj suggests that it may, in the course of time, be shown that the caprellid he described is a variety of *Hemiaegina minuta.*

Genus **Paracaprella** Mayer, 1890

Paracaprella pusilla Mayer, Fauna und Flora des Golfes von Neapel **17**: 41, pl. 1, figs. 28-30; pl. 3, figs. 45-47; pl. 5, figs. 48, 49; pl. 6, fig. 10, 1890. Siboga-Exped., Caprellidae **34**: 67, pl. 2, figs. 36, 37; pl. 7, fig. 52, 1903. (See figure 4, *a-h.*)

Adult male, 9 mm. long, robust form; distinction between rounded cephalon and first pereion segment very marked. Cephalon together with first segment of pereion about equal in length to second segment; third segment longer than second; fourth segment shorter than third; fifth segment nearly as long as third; sixth and seventh segments very short. Second pereion segment marked by a sharp pointed lobe on each side extending forward from the lower anterior border. Third segment also marked by lobes in a similar position but somewhat shorter and more rounded than those of the second segment.

Superior antenna setose throughout; segments of peduncle stout; flagellum with 11 to 14 segments. Inferior antenna about equal in length to first two segments of superior antenna; flagellum with two joints.

First gnathopod small; palmar edge straight, setose; second gnathopod very large; basal segment (arm) with a large protuberance on proximal, inferior border; propodus equal in length to third pereion segment; proximal border of propodus marked by a strong quadrangular protuberance, beyond which palmar edge is deeply concave; dactylus with a proximal tooth and a densely setose edge.

Branchial vesicles large, oval, bent forward. Appendages of third and fourth pereion segments rudimentary, 2-jointed. Last three pereiopods with narrow segments; propodus with a prominent tooth proximally, and a concave palmar edge.

Hawaiian specimens which conform closely to Mayer's descriptions of the species were collected in Honolulu Harbor in 1937 by R. E. Nieman, being taken from the screen of an intake water pipe of the Hawaiian Electric Company. The 10 specimens collected at that time are all males. In addition, a lot of about 30 specimens was recovered from a hydroid colony, *Pennaria* species, in Honolulu Harbor, March 18, 1941, by Don Abbott and C. Mills. Most of these specimens are females and none, apparently, had reached maturity.

The species may be recognized by the rounded head, separated from the first segment of the pereion by a deep incision; by the sharp pointed lobes of the anterior border of the second pereion, and the rounded ones of the third segment; and by the form of the second gnathopod of the male, if the specimen is mature. In the Hawaiian specimens the second gnathopod of the male closely conforms to the corresponding appendage as figured by Mayer. The second gnathopod of a female (probably immature) from Honolulu Harbor presents the basal segment (arm) without a proximal, inferior protuberance, and

an almost straight palmar edge of the propodus. A small sharp tooth is proximally located and two or three smaller ones more distally situated.

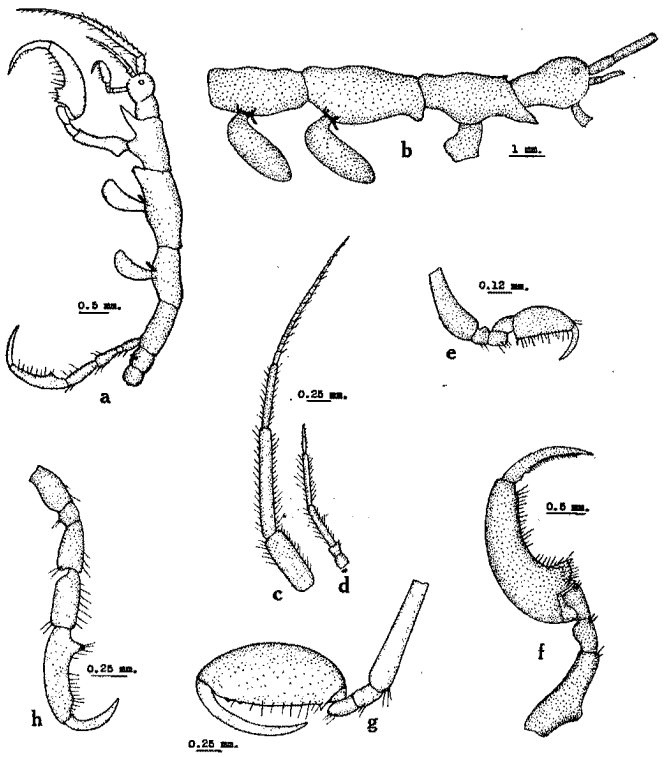

FIGURE 4.—*Paracaprella pusilla,* from Honolulu Harbor: **a,** lateral view, male; **b,** four body segments, lateral view, male; **c, d,** superior and inferior antenna, respectively, male; **e,** first gnathopod, male; **f,** second gnathopod, male; **g,** second gnathopod, female; **h,** first pereipod, male.

Previous records of the species are from the West Indies and South America. Other species of the genus are known from the east coast of the United States, the China Sea, and Australia.

Key to Hawaiian species of Caprella

A. A single spine borne on upper border of head.
  B. Body linear; second pereion segment and arm of second gnathopod (male) greatly elongated.....**C. scaura.**
  BB. Body robust; second pereion segment and arm of second gnathopod not greatly elongated.....**C. acutifrons.**

AA. No spines borne on head.
  B. Anterior distal extremity of arm of second gnathopod with a thin winglike border; merus acute below; propodus not especially long and narrow, nor palmar edge deeply concave.....**C. equilibra.**
  BB. Anterior distal extremity of arm of second gnathopod without a thin winglike border; merus not acute below; propodus (male) long and narrow, palmar edge deeply concave.....**C. danilevskii.**

Genus **Caprella** Lamarck, 1801

Caprella scaura Templeton, Ent. Soc. London, Trans. **1**: 191-192, pl. 20, fig. 6, 1836.—Stebbing, Challenger Repts., Amphipoda **39**: 1257-1264, pl. 144, 1888.—Mayer, Fauna und Flora des Golfes von Neapel **17**: 70-73, pl. 4, figs. 40-51; pl. 6, fig. 41; pl. 7, figs. 2, 35, 36, 1890. Siboga-Exped., Caprellidae **34**: 117-120, pl. 5, figs. 13-18; pl. 10, fig. 11, 1903.—Barnard, South African Mus., Ann. **20**: 371-372, 1925. (See figure 5, ***a-l.***)

Caprella attenuata Dana, U. S. Expl. Exped. **14**: 817-819, 1853; pl. 55, figs. *a-g,* 1855.

Male, 16 mm. long, body very slender; first, second, and fifth pereion segments long, the second usually the longest. Head short, bearing a slender, forward-directed spine on upper border a little removed from anterior end. Fifth, sixth, and seventh pereion segments bearing slender spines on upper surfaces and on lateral borders at insertion of pereiopods.

Second and third segments of superior antenna long, subequal; flagellum with 14 segments, the proximal half being indistinctly jointed. Inferior antenna equal in length to first two segments of superior antenna.

Second gnathopod with basal segment (arm) as long or longer than second pereion segment, from posterior tumid extremity of which it arises; propodus of second gnathopod long and narrow, length more than three times its greatest breadth; two narrow teeth mark palmar border and a third, broad, triangular one is situated toward distal extremity. Palmar border of first gnathopod nearly straight, setose; dactylus finely dentate on margin.

Branchial vesicles narrow, ovate. Three posterior pereiopods with narrow segments, the second joint short; propodus about twice length of fourth segment.

Ovigerous female 8 mm. in length, none of pereion segments greatly elongated. In addition to spines, as in male, dorsal surface of pereion segments marked by swellings or protuberances in middle and at extremities. Third segment of superior antenna relatively shorter than in male; flagellum longer than third segment, but with 14 joints, as in male, and with basal portion indistinctly

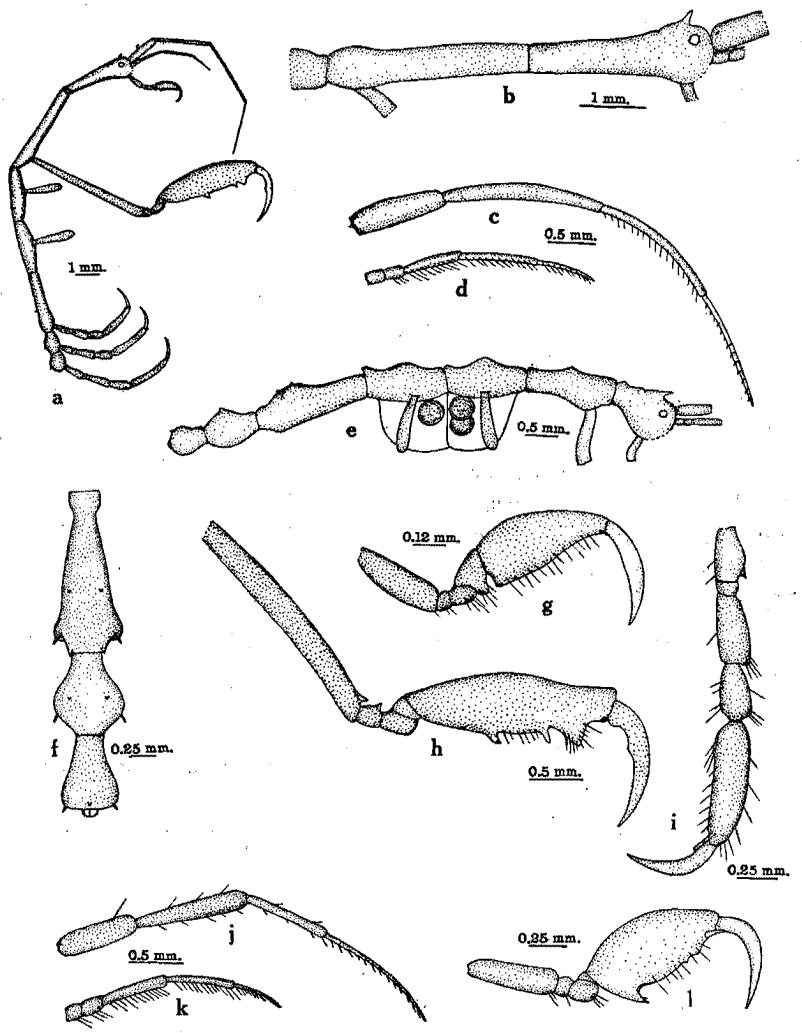

FIGURE 5.—*Caprella scaura*, male, from Pearl Harbor, female from Waikiki: **a**, lateral view, male; **b**, two body segments, lateral view, male; **c**, **d**, superior and inferior antenna, respectively, male; **e**, lateral view, female; **f**, last three body segments, male; **g**, first gnathopod, male; **h**, second gnathopod, male; **i**, third pereiopod, male; **j**, **k**, superior and inferior antenna, respectively, female; **l**, second gnathopod, female.

jointed. Second gnathopod much larger than first, inserted at anterior extremity of second pereion segment; basal segment (arm) short; propodus with a large basal tooth, and evidence of two smaller ones situated more distally on palmar border.

More than 60 specimens of this species, which are among the collections of Bishop Museum, were taken from two localities about Oahu. More than one-half of the number were recovered from algae and other fouling organisms on the bottom of a yacht which had been cruising in local waters. These specimens were, for the most part, immature and included many females, a few of which were ovigerous. Twenty-nine specimens were collected from among algae in shallow water in Pearl Harbor, most of them apparently mature specimens, males predominating in number.

Templeton described *C. scaura* from Mauritius Island, the species being associated with marine plants in shallow water. The known geographical distribution of the species, as recorded by Mayer, includes the West Indies, east coast of South America, west coasts of North and South America, Vladivostok, and localities on the coasts of Japan, China, and Australia. Six varieties of the species are recognized by Mayer.

The species varies considerably with respect to the surface of the segments of the body, the number of joints in the flagellum of the superior antenna, the length of the arm of the second gnathopod of the male, and other features. The mature Hawaiian specimens appear to conform closely to the variety *typica* which has previously been reported from the West Indies and the coast of Japan. The largest Hawaiian specimen examined is 16 mm. long. Specimens of some varieties of the species are more than twice that length. The known bathymetric range of the species varies from shallow water to a depth of at least 80 fathoms.

Caprella acutifrons Latreille (fig. 6, *a-i*).

Caprella penantis Leach, Edinburgh Encyclopedia, Crustaceology, **7**: 404, 1813-1814.

Caprella acutifrons Mayer, Fauna und Flora des Golfes von Neapel **17**: 50-57, pl. 2, figs. 34-41; pl. 4, figs. 52-71; pl. 7, figs. 16, 17, 1890. Siboga-Exped., Caprellidae **34**: 79-89, pl. 3, figs. 4-28; pl. 7, figs. 62-65, 1903.—Schellenberg, K. Sven. Vet.-Akad., Handl. **16**: 95, 1938.

Caprella acutifrons variety *natalensis* Hiro, Annot. Zool. Japonenses **16**: 312, pl. 22, fig. 5, 1937.

Adult male stout, with a strong anteriorly directed spine on upper border of cephalon. Pereion smooth except hinder portions of fifth, sixth, and seventh segments, which bear spinous processes. Segments of pereion 1-4 of nearly equal length. Flagellum of superior antenna with 12 or 13 segments. Inferior antenna slightly shorter than superior one. First gnathopod small; propodus setose with a pair of blunt spines on proximal palmar border. Second gnathopod large, stout, attached to middle of second pereion segment; palmar border of propodus concave with a strong proximal tooth directed distally; dactylus with angular inner edge slightly serrated. Branchial vesicles large, circular in outline. Three posterior pereiopods short, stout, compressed.

Length of body usually ranging from 8 to 10 mm. Very large specimens 11 mm. in length. Color in life, white to brownish.

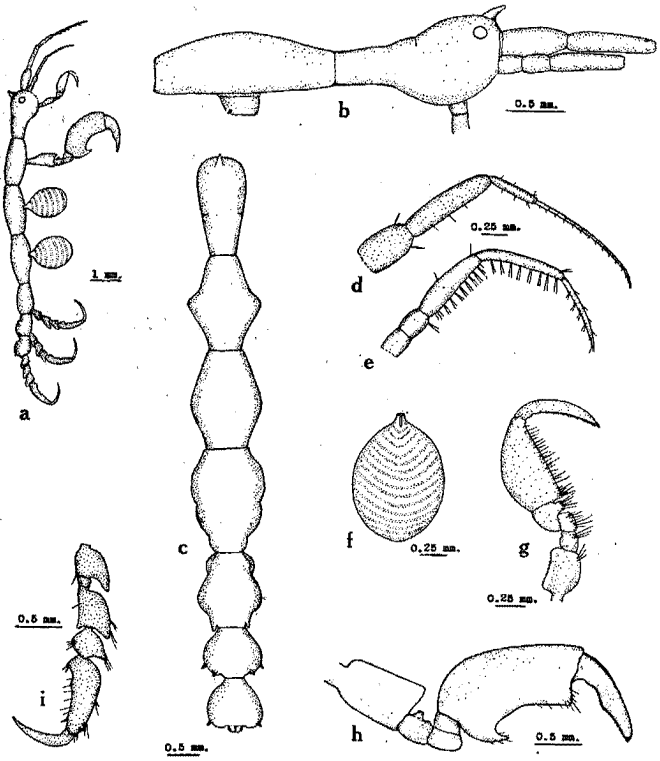

FIGURE 6.—*Caprella acutifrons*, male from Kaneohe Bay: **a**, lateral view; **b**, first two body segments, lateral view; **c**, body segments, dorsal view; **d**, **e**, superior and inferior antenna respectively; **f**, branchial vesicle; **g**, first gnathopod; **h**, second gnathopod; **i**, third pereiopod.

Adult females differ from males in the following respects: Cephalon together with first segment shorter than second pereion segment. Flagellum of superior antenna usually with but 8 or 9 segments. First and second gnathopods, which are similar in general form, also resemble first gnathopod of male. Second gnathopod somewhat larger than first and attached close to anterior end of second pereion segment. Brood pouch, developed from third and fourth pereion segments, consisting of large overlapping plates. Length of body 6 to 7 mm. Ovigerous females 4.5 mm. in length have been observed.

Juvenile specimens at the time of hatching are about 1 mm. in length and bear general resemblance to adults. The dorsal spine of the head is represented in very young specimens by a rounded tubercle. It is developed as a distinct spine, however, in juvenile specimens 2.5 mm. in length.

This species, cosmopolitan in warm and temperate seas of the world, seems to be the most abundant of the Caprellidae to be found in the shoal waters of Hawaii. It is typically associated with the hydroid *Pennaria* species upon which it is parasitic. Large numbers of species have been taken in Kaneohe Bay, Kahana Bay and Honolulu Harbor, Oahu, where colonies of the hydroid grow luxuriantly. This caprellid is a voracious species, a dozen specimens being capable of completely stripping a large colony of *Pennaria* of its polyps in a few hours.

Schellenberg, who recorded the species from local waters, noted the similarity of the Hawaiian form with variety *neglecta* Mayer and also with variety *natalensis* Mayer. The variety *neglecta* has been reported from Japan, Hongkong, and Australia. The variety *natalensis* was described from Port Natal, South Africa, and is also known from Tateyama and Tanabe Bay, coast of Japan. In Tanabe Bay the caprellid is associated with seaweeds, *Sargassum* species. The Port Natal specimens, reported by Mayer, are somewhat larger than any we have seen in Hawaii.

Caprella equilibra Say, Acad. Nat. Sci. Philadelphia, Jour. **1**: 391-392, 1818. (See figure 7, *a-g.*)

Caprella januarii Dana, U. S. Expl. Exped. **14**: 819, 1853; pl. 55, fig. 2, 1855.

Caprella obesa Haswell, Linn. Soc. New South Wales, Proc. **4**: 348-349, pl. 24, fig. 1, 1879.

Caprella aequilibra Mayer, Fauna und Flora des Golfes von Neapel **6**: 45-48, pl. 1, fig. 7; pl. 2, figs. 1-11; pl. 4, figs. 20-25; pl. 5,

figs. 16-18, 1882; **17**: 48-50, pl. 2, figs. 42, 43; pl. 4, figs. 35-37; pl. 6, figs. 18, 37, 1890. Siboga-Exped., Caprellidae **34**: 89-92, pl. 3, figs. 29-34; pl. 7, figs. 66-69, 1903.

Adult female 6.5 mm. long; pereion smooth, segments 1-5 nearly equal in length, sixth and seventh segments shorter, subequal; spinous processes developed on posterior portions of last three pereion segments, and a spine on second segment in front of articulation of second gnathopod.

Flagellum of superior antenna with 10 segments; inferior antenna about as long as peduncle of superior one. First gnathopod small, anterior border of basal segment (arm) terminating distally in a pointed process; carpus large; palmar edge of propodus entire. Second gnathopod much larger than first, inserted near front end of second pereion segment; anterior border of basal segment (arm) terminating distally in a thin, winglike pointed process; lower border of merus

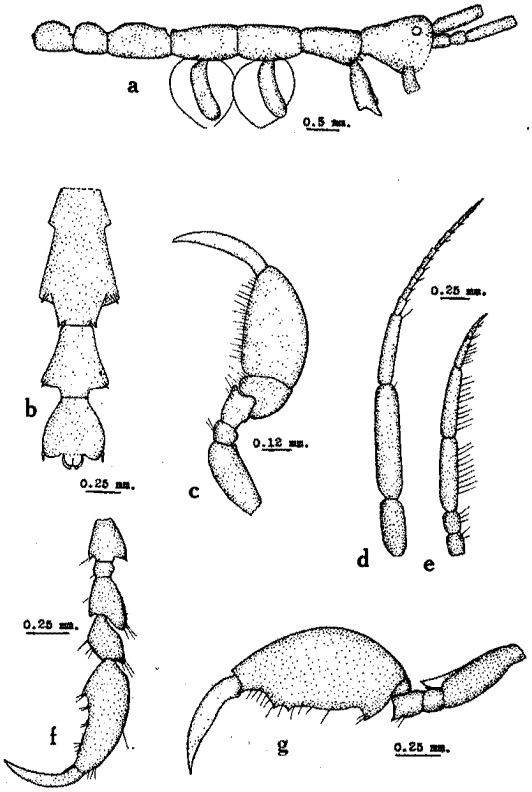

FIGURE 7.—*Caprella equilibra,* female collected one mile off coast of Oahu, depth 15 feet: **a**, lateral view; **b**, last three body segments; **c**, first gnathopod; **d**, **e**, superior and inferior antenna, respectively; **f**, first pereiopod; **g**, second gnathopod.

acute; propodus about twice as long as its greatest width; palmar edge somewhat sinuose, with a strong proximal tooth, and two smaller ones close together toward distal extremity.

First four segments of posterior pereiopods short, compressed; propodus long, broad proximally with a strong tooth directed distally. Branchial vesicles narrow, directed almost straight. Plates of brood pouch broadly oval, overlapping.

The males of the species are not recognized with certainty among the specimens at hand. The typical male of this species, as figured by Dana (*C. januarii*), by Haswell (*C. obesa*), and by Mayer, in part, is apparently quite different from the female. In the male the first two segments of the pereion are represented as being very long, together nearly one-half the length of the entire body. The second gnathopod is attached close to the posterior end of the second segment which places it near the middle of the body. The propodus of the second gnathopod is somewhat longer and narrower than in the female. The teeth on the palmar border, however, agree fairly well with those of the female.

Hawaiian specimens were recovered from algae on a submerged buoy anchored one mile off the west coast of Oahu, at a depth of 15 feet. All of the adult specimens procured are females. None in the collection has the first and second pereion segments unusually elongated. One small specimen, however, has the second gnathopod inserted near the middle of the second pereion segment, and also bears a spine on the ventral surface of the body between the attachments of the second gnathopods. This is said to be a feature of the male of the species. No brood pouch is developed on this specimen, and the second gnathopod resembles that of recognizable females.

The species ranges widely through cold and warm seas. It is known from many localities in European waters; from the Scandinavian peninsula to South Africa. There are also records from Bermuda and the east American shores. In the Pacific it has been reported from the California coast, Japan, Hongkong (on a ship's bottom), and Australia and Tasmania. It is also known from Singapore, West Australia, and Madagascar. Its reported bathymetric range is from surface waters down to about 80 fathoms. Algae and hydroids seem to be its ecological associates.

Caprella danilevskii Czerniavski (fig. 8, *a-l*).

Caprella inermis Haswell, Linn. Soc. New South Wales, Proc. **4**: 348, pl. 23, fig. 3, 1879.

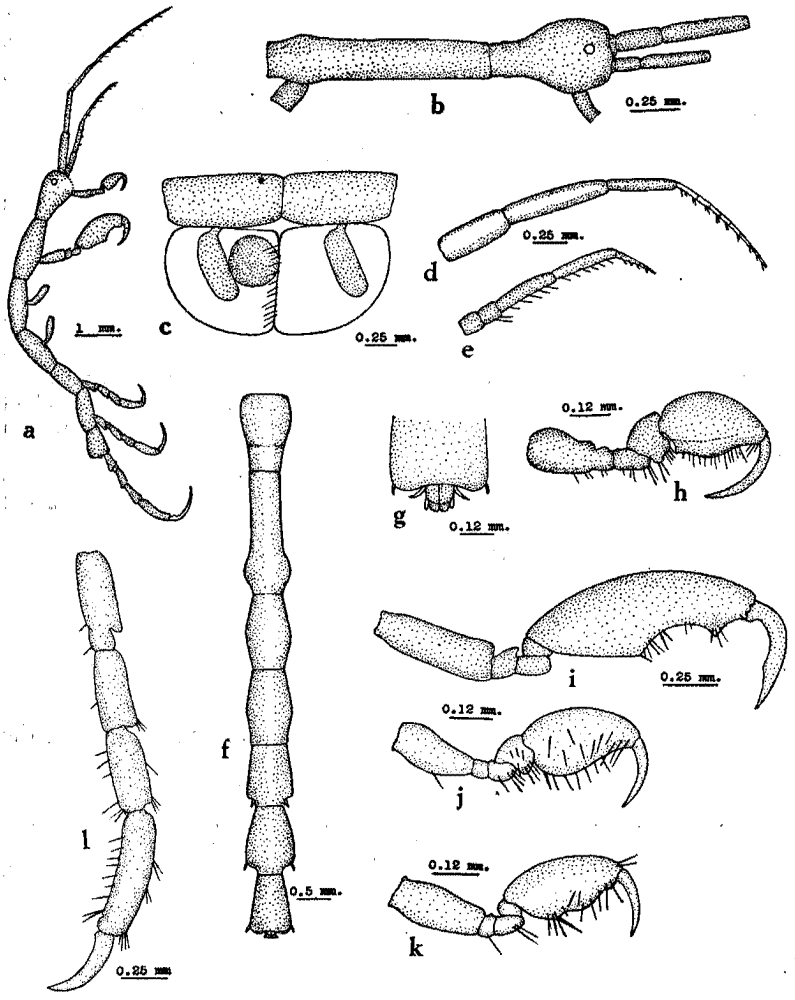

FIGURE 8.—*Caprella danilevskii,* Waikiki reef: **a,** lateral view, male; **b,** first two body segments, lateral view, male; **c,** brood pouch, female; **d, e,** superior and inferior antenna, respectively, male; **f,** body segments, dorsal view, male; **g,** abdomen, male; **h,** first gnathopod, male; **i,** second gnathopod, male; **j,** first gnathopod, female; **k,** second gnathopod, female; **l,** third pereiopod, male.

Caprella danilevskii Stebbing, Challenger Repts., Amphipoda **29**: 1264-1268, pl. 145, 1888.—Mayer, Fauna und Flora des Golfes von Neapel **17**: 58-60, pl. 5, fig. 44; pl. 7, figs. 12, 13, 54, 1890. Siboga-Exped., Caprellidae **34**: 99, 1903.—Hiro, Annot. Zool. Japonenses **16**: 312-313, pl. 22, fig. 6, 1937.

Adult male with slender, smooth body; first pereion segment short, about one-half as long as cephalon; second segment of pereion about four times as long as first; third and fourth segments equal in length, shorter than second; fifth, sixth, and seventh segments subequal in length, shorter than fourth; seventh segment narrower than sixth.

Flagellum of superior antenna usually with nine segments; inferior antenna about as long as peduncle of superior one.

First gnathopod small, palmar border slightly sinuose, setose. Second gnathopod large, inserted near the posterior extremity of second pereion segment; propodus about three times as long as its greatest breadth; palmar portion about one-half length of propodus, deeply concave, with a broad, blunt proximal tooth and a narrower one more distally situated; dactylus with a tooth near middle of inner edge.

Branchial vesicles small, narrowly ovate, directed forward. Three posterior pereiopods with long narrow segments (except second); dactylus about one-half propodus in length.

Length of body 8 to 9 mm. Color in life, reddish brown to pink.

Adult females differ from males in that the first and second segments of the pereion are much shorter; the second gnathopod attached near the anterior end of the second pereion segment is similar to the first in size and general form, but with palmar edge more sinuose; the first gnathopod is much like that of the male; the plates of the brood pouch are scarcely overlapping, the adjacent edges fringed with hairs; and the body is about 6 mm. long.

This species is almost as cosmopolitan as *C. acutifrons,* being known from widely separated localities in cold as well as warm seas. In European waters, it has been recorded from the coasts of France to northern Africa. There are also records from Bermuda and Rio de Janeiro. In the Pacific it is known from Sakhalin Island, Korea Strait, and Tateyama and Tanabe Bay, Japan. It has been taken from Australian localities, such as Port Jackson, New South Wales, and Griffith Point, Victoria.

In the shoal waters of Hawaii the species is typically associated with the brown seaweeds, *Sargassum* species. It has also been recovered from the tufted colonies of the bryozoan, *Bugula neritina.* Specimens have been taken from many localities about Oahu and, with the exception of *C. acutifrons, C. danilevskii* is the most abundant caprellid in Hawaiian waters.