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Some Central Pacific Crustaceans

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INTRODUCTION

The following report on crustaceans selected from material which has accumulated in Bishop Museum for several years includes (1), new species, (2) known species as new Hawaiian records, and (3) known species rarely recorded in the central Pacific.

Recently, valuable collections have been received as a result of the current dredging operations of the *Makua,* a boat of the Fish and Game Division, Territorial Board of Agriculture and Forestry. These collections clearly reveal the presence of a crustacean fauna about the Hawaiian Islands, at depths of about 10 fathoms and beyond, which is not seen on the shallow reefs. Many of the unique species taken nearly 50 years ago by the *Albatross* of the United States Fish Commission have again been brought to view.

Other rare crustaceans recorded in the report were received from the Honolulu Aquarium and came from fish traps operated by commercial fishermen off the coast of Oahu at depths ranging around 16 fathoms. These specimens show that fauna at these depths has close affinities with that of the western Pacific and the Indian Ocean.

It is well known that many organisms, both land and marine forms, have been introduced into the Hawaiian area within recent years, chiefly as a result of war activities. Ocean-going craft returning to Hawaii from forward areas in the Pacific transport on their hulls marine organisms not previously recognized among local shore fauna, and some of these immigrants become established in the new environment. Among crustaceans, a conspicuous example is *Schizophrys aspera* (H. Milne Edwards), a species typical of the western Pacific

and Indian seas. Only recently was this crab noted for the first time in Hawaii, among dense fouling on the hull of a barge that had seen service in Guam. Judging from the large numbers of juvenile specimens and ovigerous females among the fouling, the extension of the range of this crab to Hawaii is assured.

In the following report 12 new species are recorded:

Cirripedia
- Koleolepas tinkeri

Amphipoda
- Elasmopus calliactis

Anomura
- Catapagurus granulatus
- Cestopagurus setosus

Brachyura
- Heteronucia spinifera
- Trigonothir samoaensis
- Aethra edentata
- Carpilodes medipacificus
- Xanthias glabrous
- Xanthias oahuensis
- Pseudocryptocoeloma symmetrinudus
- Clistocoeloma suvaense

Class CRUSTACEA

Subclass CIRRIPEDIA

Order THORACICA

Family LEPADIDAE

Genus **Koleolepas**

The genus of pedunculate barnacles, *Koleolepas,* was established in 1900 by Stebbing (32)[1] who described the genotype, *Koleolepas willeyi,* from a specimen collected by Dr. Willey at Lifu, Loyalty Islands. In 1931, Hiro (11) described *Heterolepas* (*Heterolepas*) *avis* from specimens taken at a depth of about 20 meters off Misaki, Sagami Bay, Japan. On reviewing the characters of *H. avis* in 1933, Hiro (12) transferred the species to the genus *Koleolepas.* Up to now, apparently but two species of the genus have been recorded. The features of the genus *Koleolepas* are as follows:

No valves present; reduced scutum or none; dorsal border crestlike. Aperture with liplike borders and a bulb at the base. Cirri with rami shorter than protopodites. Peduncle with an adhesive disk at the base. Attached to gastropod shells under sea anemones.

[1] Numbers in parentheses refer to Bibliography, page 242.

Koleolepas tinkeri, new species (fig. 1, *a-i*).

Larger specimens expanding to a length of 40 mm.; capitulum 7 mm. broad; disk 10 mm. long; aperture short; crest delicate, transparent. Scutum narrow, bent near middle, 3 mm. long, firmly attached to bulbous process. In two specimens scutum was on the right side, in two others on the left side.

First cirrus separated by a wide space from the second, protopodites curved, rami usually with 7-8 segments; filamentary appendage a long process, thick at base, tapering to an acute end. Protopodites of cirri second to fifth broader than those of first and sixth. Penis large, without articulations; terminal appendage minute, segmented.

Labrum with a deep, broad indentation, the border of which is toothed; palps not extending beyond lateral borders of labrum. Mandible with upper and lower edges of front border sharp; two broad intermediate lobes bearing teeth. First maxilla with almost straight front border, which bears strong spines. Second maxilla consisting of a pair of long straight lobes joined at base.

Adhesive disk at base of stalk oval, upper surface smooth, covered by sea anemone; lower surface rough, adhering to shell of mollusk.

Mature specimens enclose two egg cases, each a flat ribbon coiled counter clockwise at one end then expanding into a series of elongated, folded plates which partially overlap each other. Each ribbon encloses a large number of eggs.

Color of living animal: capitulum orange yellow; stalk pale yellow, almost white; adhesive disk pale orange. Color pattern on capitulum: a white band beginning at a level with bulbous process, forming two loops, the second of which is taller, then bending forward parallel with dorsal border and terminating close to anterior end of aperture. A break in the band often occurs along the dorsal border.

Type locality off the southwest coast of Oahu, depth about 16 fathoms (Bishop Mus. coll., Cat. No. 351).

The Hawaiian species differs from *Koleolepas willeyi* in the mouthparts and perhaps in other internal organs. In the species from Lifu, the palps which flank the labrum override that organ. In the Hawaiian form, the palps are much lower, not extending beyond the lobes of the labrum. Also, in the mandible of *K. willeyi,* the lower of the intermediate lobes of the front border is convex; in the Hawaiian form, it is truncate. Stebbing makes no mention of filamentary or terminal appendages of the first and sixth cirri, respectively. If the former appendage were as large as that in the Hawaiian species, it could hardly have been overlooked.

The color pattern of the capitulum of *K. willeyi,* as shown by Stebbing in a figure of a living specimen, is indefinite but may approach that seen in the Hawaiian species. In *K. tinkeri,* however, the white looped band is a constant feature seen in both young and adult specimens.

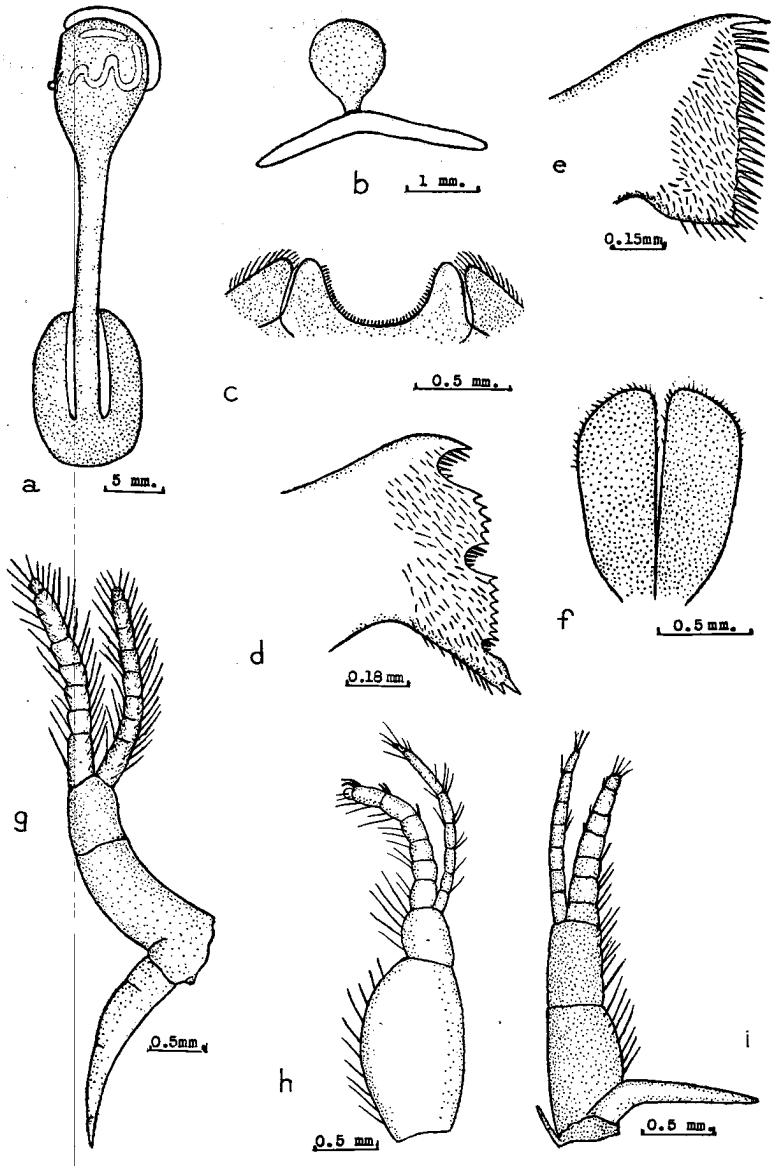

FIGURE 1.—*Koleolepas tinkeri:* **a,** expanded specimen; **b,** bulbous process with scutum attached; **c,** labrum and palps; **d,** mandible; **e,** first maxilla; **f,** second maxilla; **g,** first cirrus with large filamentary process at base; **h,** fourth cirrus; **i,** sixth cirrus with large penis and minute terminal appendage at base.

In *K. avis,* the labrum differs from that of *K. tinkeri* in having a more shallow depression with a less regular border; the palps also protrude to a greater extent than in the Hawaiian species. Differences also occur in the second maxillae and in the filamentary and terminal (caudal) appendages. A protrusion of the lips in *K. avis,* giving the animal a birdlike appearance, is apparently a typical feature of the Japanese form. No extension of the lips has been observed in Hawaiian specimens, either in a contracted or a fully expanded condition. Hiro observes that there is no trace of a color pattern on the capitulum of *K. avis.*

Attention was first called to the Hawaiian form of this commensal barnacle by Spencer W. Tinker, Director of the Honolulu Aquarium. Specimens were observed associated with the sea anemone, *Calliactis armillatas* Verrill, which is commonly attached to the *Tonna* shells occupied by large hermit crabs. The aquarium specimens were taken by trap fishermen operating off the southwest coast of Oahu at depths of about 16 fathoms. More than 20 specimens of the barnacle have been recovered, indicating that it is not uncommon in that locality. The same hermit crab-sea anemone complex sometimes occurs on the shallow reefs, but the barnacle has not appeared in near shore waters. Its color harmonizes with the sea anemone by which it is covered. Careful observation is necessary to detect the tip of the barnacle as it appears under the edge of the basal plate of the anemone when the entire association is removed from the water.

By reason of structural features and commensal mode of life, representatives of the genus *Koleolepas* may be considered among the most remarkable barnacles known. Hiro (12) has suggested a new family, Koleolepadidae, for their reception.

Family BALANIDAE

Genus **Pyrgoma**

Pyrgoma crenatum Sowerby (fig. 2, *a-c*).

Pyrgoma crenatum Hiro, Rec. Oceanogr. Wks. **7**(1) : 14-15, fig. 7, 1935.

On recent examination of Bishop Museum's collection of dried reef corals taken at Washington Island, a species of *Favia* was found to support examples of a small barnacle of the genus *Pyrgoma,* which H. A. Pilsbry, Philadelphia Academy of Sciences, identifies as *P.*

crenatum Sowerby. Attention is here called to this form, because, apparently, no representative of the genus has previously been reported from central Polynesia.

Most of the numerous species of *Pyrgoma* described are recorded from tropical and subtropical waters and are, with few exceptions, associated with stony reef corals. A few are known from northern latitudes and from depths of about 100 fathoms. The general existence of these forms, however, seems to be correlated with the availability of reef corals.

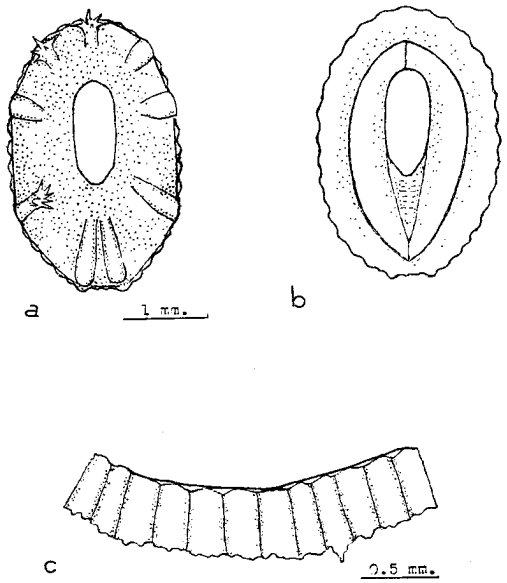

FIGURE 2.—*Pyrgoma crenatum:* **a,** upper flat surface of shell; **b,** inner surface of shell; **c,** section of base, outer surface.

Hirō (13) reports that each of the nine species of *Pyrgoma* in Tanabe Bay, Japan, is practically confined to a single host coral, whereas in the Palau Islands, where the coral population is greater, most of the seven species of *Pyrgoma* recorded are supported by two or more hosts.

The characters of the Washington Island form are as follows:

Shell elongate-oval, evenly rounded at extremities, length 3 mm., breadth 2 mm.; flat with shallow base. Upper surface provided with 9 radiating ridges in two groups, 5 ridges toward one extremity and 4 toward the other. Of the 5 ridges one is axillary; of the 4 ridges toward the opposite extremity, two are

close together, one on either side of the longitudinal axis of the shell. Ridges vary greatly in length, height and form; some are short and low, others tall, columnar with spiniform crowns. Orifice elongate, about one-third the length of shell, rounded at one end, angular at the other. Tergum somewhat triangular, scutum elongate. Base about one-half millimeter in depth, at right angles to flat surface of shell, plicated externally, lower margin uneven. Inner surface of shell smooth, sheath broad. Color of shell, pale pink. (Host coral, *Favia* sp., Bishop Mus. coll., Cat. No. 344.)

It is quite probable that the Washington Island specimens are immature, as the small size of the shell and the few radiating ridges might indicate. The species, however, is apparently quite variable. Among eight specimens examined by Hiro (13) the long diameter of the shells ranged from 6 to 10 mm.; the number of ridges, from 14 to 35.

Subclass MALACOSTRACA

Order AMPHIPODA

Family GAMMARIDAE

Genus **Elasmopus**

An amphipod of remarkable commensal relationship, which appears in considerable numbers off the coast of Oahu at depths ranging around 16 fathoms, should apparently be assigned to the genus *Elasmopus* and seems to represent an undescribed species. The amphipod is constantly associated with a hermit crab-sea anemone-*Tonna* shell complex. For this reason I have suggested the specific name *calliactis* for the gammarid which is observed in contact with the brightly colored anemone, *Calliactis armillatas* Verrill, specimens of which often completely cover the *Tonna* shell occupied by a hermit crab. While its usual host is the sea anemone, the amphipod harmonizes in color equally well with the hermit crab and no doubt has freedom of movement from one organism to the other.

Elasmopus calliactis, new species (fig. 3, *a-i*).

Type specimen a male 10 mm. in length. Lateral lobes of head broadly convex in front; inferior lobes separated from lateral ones by a deep sinus; eyes oval.

Superior antenna, in length, less than half that of the body; first and second joints of peduncle equal in length; third joint one-half the length of the second; flagellum a little shorter than the peduncle, composed of 15 joints; accessory flagellum two-jointed, as long as proximal segment of the flagellum.

Inferior antenna subequal in length to peduncle of superior one; middle joint of peduncle the longest; flagellum with seven joints.

Blunt lobes of first and second maxillae bear stiff bristles; palp of maxilliped

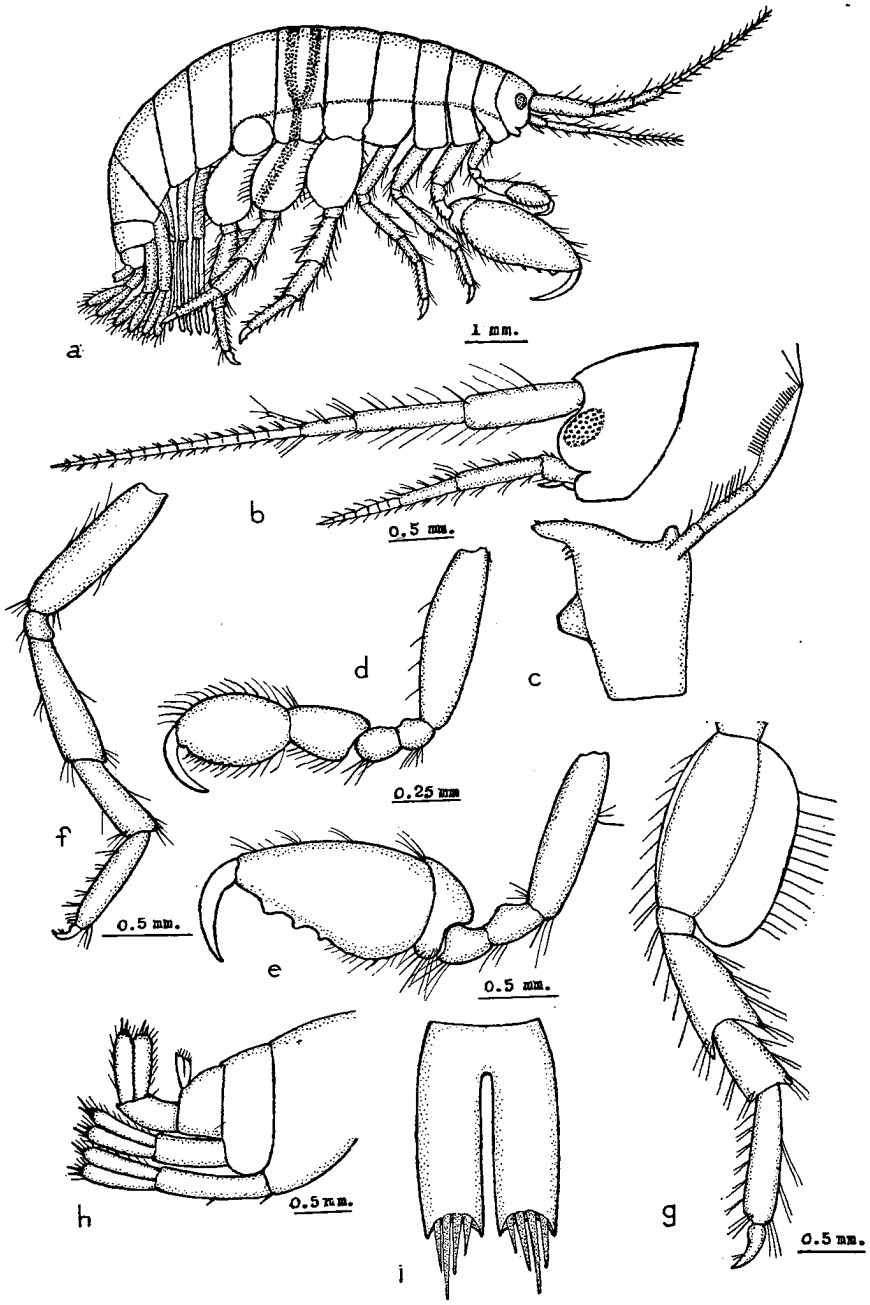

FIGURE 3.—*Elasmopus calliactis:* **a,** lateral view of specimen; **b,** head and antennae; **c,** mandible; **d,** first gnathopod; **e,** second gnathopod; **f,** first peraeopod; **g,** last peraeopod; **h,** tip of abdomen, with uropods; **i,** telson (*c, i,* greatly enlarged).

with acutely pointed terminal segment. Mandible provided with a blunt lobe about the middle of the median border; terminal segment of palp longer than preceding one, bearing a comb of short bristles on inner margin.

First side plate directed forward at an angle, anterior border slightly concave; fourth side plate the longest, posterior margin concave; lower borders of fifth and sixth side plates concave; seventh side plate the smallest, circular in shape.

First gnathopod with elongate oval propodus, upper and lower margins bearing long hairs, with a few spinules on lower margin of palm. Second gnathopod stout, propodus inflated proximally, narrow distally; cutting margin bearing three teeth; dactylus short, strongly curved, margins smooth.

First and second peraeopods normal; dactylus stout, slightly inflated proximally, a tuft of bristles on concave border near tip. Last three peraeopods similar, increasing slightly in length from third to fifth; second joint of each expanded, anterior and posterior distal borders of fourth joint extend well back over the fifth joint.

First and second uropods subequal in length; rami of first uropod shorter than peduncle; rami of second uropod equal in length to peduncle, inner ramus slightly longer than outer; rami of third uropod longer than peduncle, outer ramus longer than inner. All rami bear a few spines at tips as well as hairs on margins. Telson longer than broad, deeply cleft, each lobe concave at distal border and bearing four strong spines.

Color. Eye and first (superior) antenna orange red. Most segments of body with two transverse bands of orange red, converging into a single stripe on side plates and extending across the second joints of third to fifth peraeopods. Transverse color bands of head and first body segment are single. Propodus of second gnathopod a pale shade of orange red. Color markings of specimens usually strong in life but rapidly fading in alcohol. (Bishop Mus. coll., Cat. No. 5565.)

In 1932, Stephensen (33) arranged the then known species of *Elasmopus* (26 in number and four uncertain) in three groups according to the character of the dorsal border of the body segments. The Hawaiian form falls in group A: none of the segments dorsally dentate. Stephensen included about 20 species in this group.

Pirlot (22) reported on species of the genus of the Siboga Expedition and described one new form. Sheard (30) listed seven species recognized in Australian waters, and Schellenberg (29) recorded 11 species, six of which were new, from the tropical Pacific. One of these, a new subspecies, was from Kaneohe Bay, Oahu.

Of the numerous described species of *Elasmopus,* none seems to agree with the Hawaiian form, either in structural features or ecological association. Specific differences between the Hawaiian species and previously described ones appear in the lobes of the head, in the mandible, in the gnathopods, and in the telson. So far as I can determine there is no record within the genus of a commensal relationship similar to that exhibited by this species.

Order ISOPODA

Family CIROLANIDAE

Genus **Cirolana**

Cirolana parva Hansen (fig. 4, *a-g*).

Cirolana parva Richardson, U. S. Nat. Mus., Bull. **54**: 111-113, figs. 93-95, 1905.

During 1948, fishermen of Oahu called the attention of the Fish and Game Division of the Territorial Board of Agriculture and Forestry to the depredations against gill-netted fish of a minute marine crustacean. Reports from a number of localities on the windward side of the island disclosed persistent losses of fish not promptly removed from the nets after becoming enmeshed. Often on lifting the nets early in the morning swarms of the crustacean were found devouring the overnight catches, and not infrequently skeletons of fish completely devoid of flesh were found hanging in the nets which had been submerged only 10 or 12 hours previously.

Although this menace apparently assumed alarming proportions during 1948 in a few localities, no recent complaints have been received of its recurrence, or of its extension to other areas.

A critical examination of the crustacean reveals it to be an isopod of the genus *Cirolana* and, without doubt, identical with *Cirolana parva* Hansen, a widely distributed and quite variable form.

The features of the Hawaiian species are as follows:

Specimens average about 6.6 mm. in length; head rounded, eyes on the lateral border, seen from below as well as from above. First of thoracic segments much the longest. First abdominal segment concealed by last thoracic; fifth abdominal segment covered at lateral borders by fourth; sixth abdominal segment triangular, posterior border rounded, crenulated, bearing eight spines and a few hairs. Inner branch of uropod longer and broader than outer branch, and extending slightly beyond tip of sixth abdominal segment.

First antenna short, reaching to the posterior border of head, joints of flagellum usually nine; second antenna reaching to posterior border of fourth segment, joints of flagellum ranging from 19 to 23. Mandible (right) with three strong but bluntly rounded teeth on cutting edge. First three pairs of legs prehensile; last four pairs ambulatory. Male appendage of second pleopod with a long slender, acutely pointed process attached to base of inner branch.

Color of living specimens, gray, speckled with minute brown dots. (Bishop Mus. coll., Cat. No. 5569.)

The Hawaiian form is close to *Cirolana minuta* Hansen but differs from that species in the absence of an acuminate tubercle on the frontal

lamina; in the shape of the sixth abdominal segment; in the maxilliped and in other features. In Hawaiian specimens examined the number of joints of the flagellae of the antennae falls short of those indicated for *Cirolana parva* of Puerto Rico, but is within close range

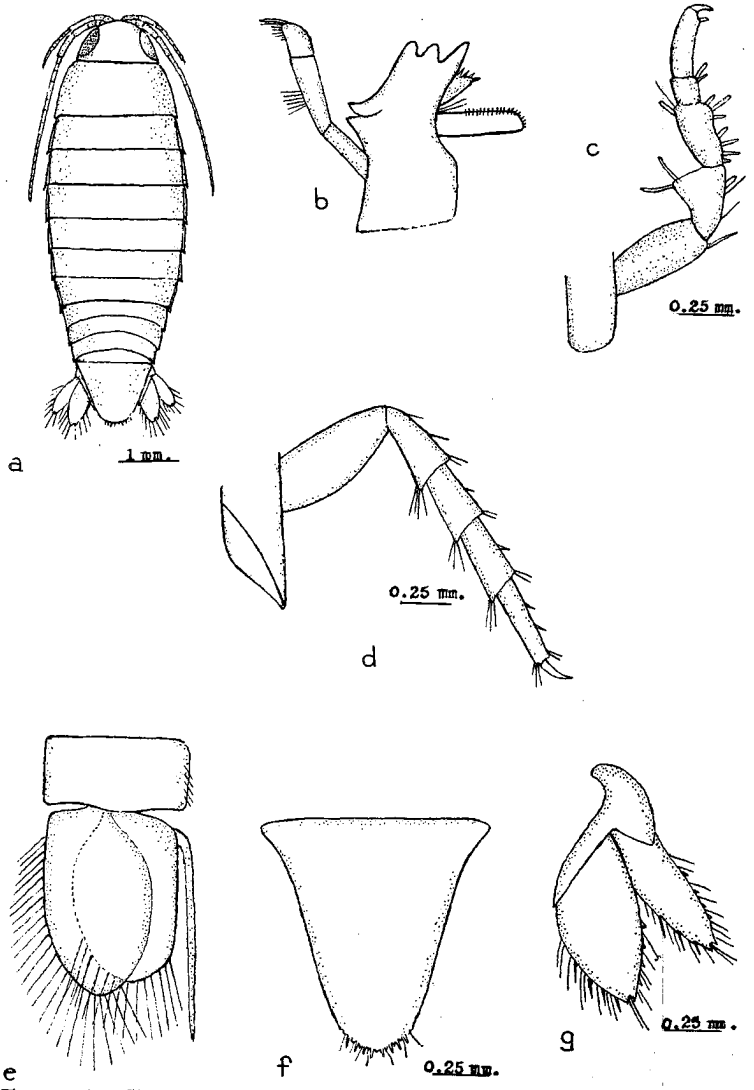

FIGURE 4.—*Cirolana parva:* **a**, dorsal view of specimen; **b**, mandible; **c**, second leg; **d**, seventh leg; **e**, second pleopod, male; **f**, terminal segment of abdomen; **g**, uropod (*b, e,* greatly enlarged).

of the species from other localities. Also, in Hawaiian specimens examined one mandible, usually the left, shows more wear than the other. Instead of the strong teeth of the cutting edge of the right mandible, only blunt lobes characterize this border in the left one.

The distribution of *Cirolana parva* includes localities in the Red Sea and Indian Ocean, Ceylon, Samoa, the Tuamotus, the Gulf of Mexico, Puerto Rico, and the Bahamas. Bishop Museum has specimens, apparently identical with the Hawaiian form, which were collected at Palmyra Island in 1913 by Joseph F. Rock. These alcoholic specimens are uniformly dark brown in color.

ORDER DECAPODA

TRIBE MACRURA

FAMILY PALINURIDAE

Genus **Justitia**

Justitia longimana (H. Milne Edwards) (figs. 5, *a-c*; 6).

Justitia longimana Holthuis, The Decapoda Macrura of the Snellius Expedition. **1**: 115-116, Leiden, 1946.

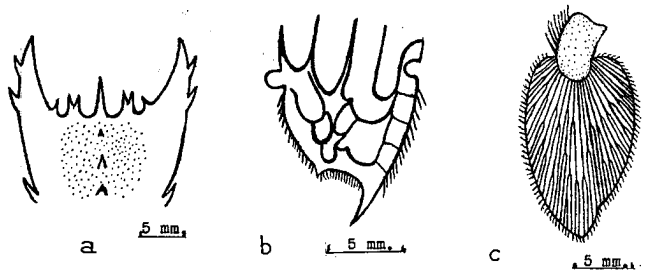

FIGURE 5.—*Justitia longimana:* **a,** front border of carapace, rostrum, supraocular horns and spines; **b,** lateral extremity of abdominal segment, right side; **c,** pleopod, female.

A specimen of this remarkable palinurid was taken in a fish trap off the southwest coast of Oahu in about 16 fathoms of water during the spring of 1948. As this is apparently the first Pacific record of the crustacean, its discovery in the Hawaiian area is of considerable interest.

The type locality of the species is the Caribbean Sea, from which general source has come a number of specimens now in European

and American museums. In 1787, the crustacean was reported by Parra and inadequately described and roughly figured by him under the name "Camaron de lo alto." In 1837, Edwards (7) recognized the form as a palinurid and briefly described it as *Palinurus longimanus*. In addition to the Atlantic records, a single specimen was taken at Mauritius, Indian Ocean, described in detail and figured by Miers (20) as *Palinurus longimanus* var. *mauritius*.

A new genus, *Justitia,* was established for the palinurid by Holthuis (14), who expressed doubt as to the justification of the var. *mauritius* which was based upon slight color differences and variations in development and arrangement of spines on the carapace.

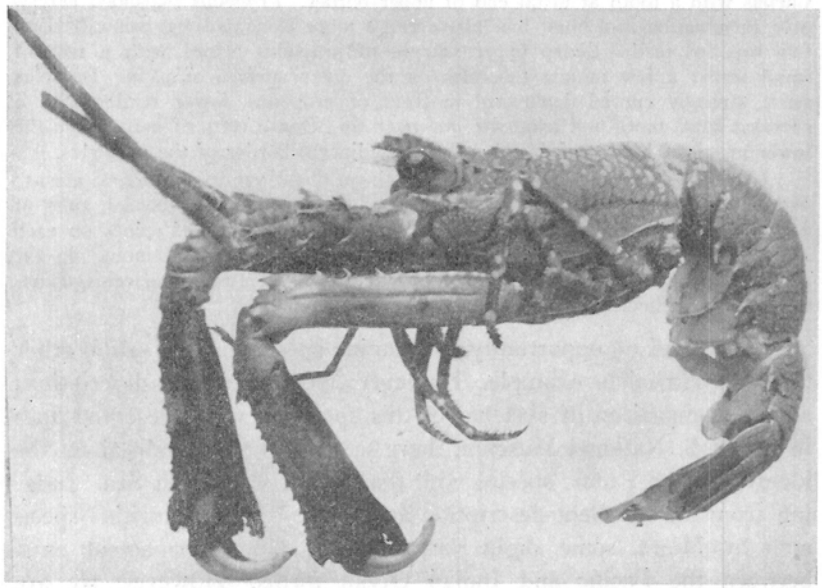

FIGURE 6.—*Justitia longimana.*

The Hawaiian specimen has the following characters:

A female 150 mm. long from tip of rostrum to posterior extremity of telson. Carapace 53 mm. in length, surface scabrous, anterior borders of scales fringed with short stiff hairs. Rostrum narrow, acutely pointed, 5 mm. long. Anterior border of carapace, lateral of rostrum, bearing two sharp spines arising from a common base. Lateral of these, a shorter spine proceeds from the base of the supraocular horn. Supraocular horn rising over the eyestalk, upper border bearing two teeth, lower border unarmed except for the spine at base.

On carapace, in a midline posterior to rostrum, is a row of three spines, the middle one the largest. Behind the supraocular horn is a longitudinal row of

three spines, decreasing in size from anterior to posterior one. Postorbital region of carapace armed with three spines, the anterior one on a higher level than the other two. Postantennal area with two spines, the anterior one the larger.

Cervical groove deep, posterior margin with a row of 10 spines, four on the upper border of the carapace and three on each side lower down. Peduncle of antenna stout, surface scabrous, armed with strong, sharp spines; flagellum with numerous short articulations, bordered with short hairs; a fringe of longer hairs on the lower border. Antennule slender, peduncle exceeding in length that of antenna; flagellum short. Eyestalk stout, expanded and slightly compressed distally; cornea large, black, facets indistinct.

Anterior legs about as long as body of animal, slightly compressed, subchelate; merus and propodus subequal in length; upper border of merus sharp, with a strong distal tooth and two smaller ones on the anterior half; inner distal border of merus expanded into several thin lobes, unlike in the two appendages. Carpus with a tooth at distal end of upper border. Propodus expanded anteriorly, terminating in a blunt lobe above and a more elongated one below bearing two rounded teeth. Sharp upper margin of propodus armed with a row of small teeth; a few minute tubercles on the outer surface of palm. Dactylus stout, strongly curved downward in front of propodus, lower border with a rounded basal tooth and a minute one near tip. Dense tufts of hair fringe the lower proximal border of dactylus and the adjacent border of the propodus.

Legs 2-5 slender, smooth, a sharp tooth on distal ventral border of merus; dactylus about one-half as long as propodus, grooved on outer border, tufts of hair below and a few bristles above. Sternum with a row of spines on each side of the midline, increasing in sharpness posteriorly and continuing on the abdominal segments. Pleopods simple, broad, leaflike with radiating veins, dichotomously branched. (Bishop Mus. coll., Cat. No. 5566.)

I have had no opportunity to examine specimens of *Justitia* other than the Hawaiian example. However, from published descriptions and by comparison of sketches of this specimen with preserved ones in the U. S. National Museum, there seems to be no doubt about the identity of the Pacific species with that of the Caribbean Sea. Judging from the excellent description and figure of the Mauritius specimen by Miers, some slight variations in spinous armament exist between the Pacific and Indian Ocean forms. However, we are probably considering a widely dispersed species which is likely to present individual variations in different habitats.

Tribe ANOMURA

Family GALATHEIDAE

Genus **Galathea**

Galathea pilosa de Man?, Archiv. für Naturgesch. **53**: 460-462, pl. 19, fig. 4, 1888. (See figure 7, *a-d*.)

Specimens of the genus *Galathea,* collected at Christmas Island (Pacific Ocean) by the Whippoorwill Expedition of 1924, closely resemble *Galathea pilosa* de Man from Amboina and may be identical with it. The characters of the Christmas Island form are as follows:

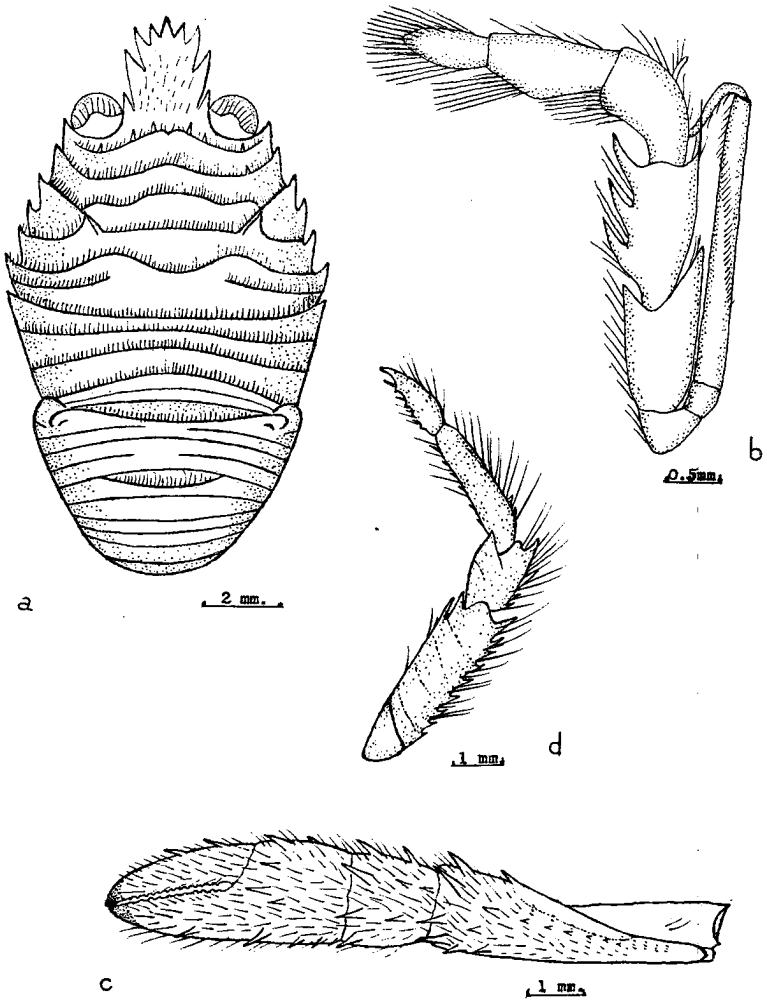

FIGURE 7.—*Galathea pilosa* ?: **a,** carapace and abdomen, dorsal view; **b,** third maxilliped; **c,** cheliped, left side; **d,** first walking leg.

Total length of largest specimen (female) 20 mm., rostrum and cephalothorax 10 mm. Rostrum squarish when viewed from above, its length but slightly exceeds its greatest breadth. Four sharp teeth borne on each lateral border of rostrum; first and fourth small, second and third large and stout. Tip of rostrum extends but little beyond adjacent teeth.

Six spinules are arranged in a curved line across cephalothorax just behind the front, and two others are borne on each side of cephalothorax, one in front of cervical groove and one behind it. Each lateral border of the cephalothorax carries seven sharp teeth. The first tooth (external orbital angle) is stout with a smaller one just behind it; five other teeth follow, the fourth of these being slightly the largest.

Three stout teeth occupy the entire medial border of the merus of the outer maxilliped. Both chelipeds heavily armed with stout, sharp spines and densely pilose; two blunt teeth on inner border of carpus; fingers stout, with numerous small teeth on cutting edges. Walking legs armed with teeth and densely pilose on margins.

The larger of the Christmas Island specimens considerably exceed in size the type of *Galathea pilosa* which, as recorded, is 12.5 mm. long, rostrum and cephalothorax 5.8 mm. (Bishop Mus. coll., Cat. No. 3544.)

Family PAGURIDAE

Genus **Catapagurus**

Catapagurus granulatus, new species (fig. 8, *a-f*).

Type specimen a male, has carapace 4 mm. in length; rostrum broadly rounded, a little shorter than lateral pointed projections. Carapace smooth, anterior portion bearing numerous short hairs disposed in longitudinal series toward lateral borders. Eyestalks stout, falling short of distal extremity of middle peduncular segments of antennule and antenna. Eyes slightly inflated, occupying about one-fourth the eyestalks. Ophthalmic scales distant, sharp-pointed, directed straight forward. Third segment of antennular peduncle the longest. Antenna more than four times length of carapace, its acicle slender, reaching to distal extremity of middle peduncular segment.

Chelipeds equal in length, the right one the stouter; surface densely covered with minute granules, some of which are sharp. Carpus of right cheliped a little shorter than hand, the upper border flattish, outer surface traversed longitudinally by a shallow furrow, the borders of which are ornamented by sharp granules. Palm of right cheliped longer than fingers, outer surface marked by a low, longitudinal ridge. Left cheliped with slender fingers longer than palm and bearing fewer hairs than right cheliped.

First and second walking legs longer than chelipeds and more than three times length of carapace; dactylus thin, swordlike, longer than propodus. Vas deferens extending from coxa of fifth right leg, curving over the dorsal surface of the abdomen toward left side, a blunt lobe close to the sharp apex. Left uropod the longer; telson bilobed, a broad shallow depression between the pointed lobes.

The genus *Catapagurus,* established by A. Milne Edwards in 1880, has received those forms in which the vas deferens curves over the abdomen from right to left, instead of under the body as in the genus *Cestopagurus.* Melin (19) reduced *Catapagurus* to the status of a subgenus of *Eupagurus.* Future writers may wish to follow this arrangement.

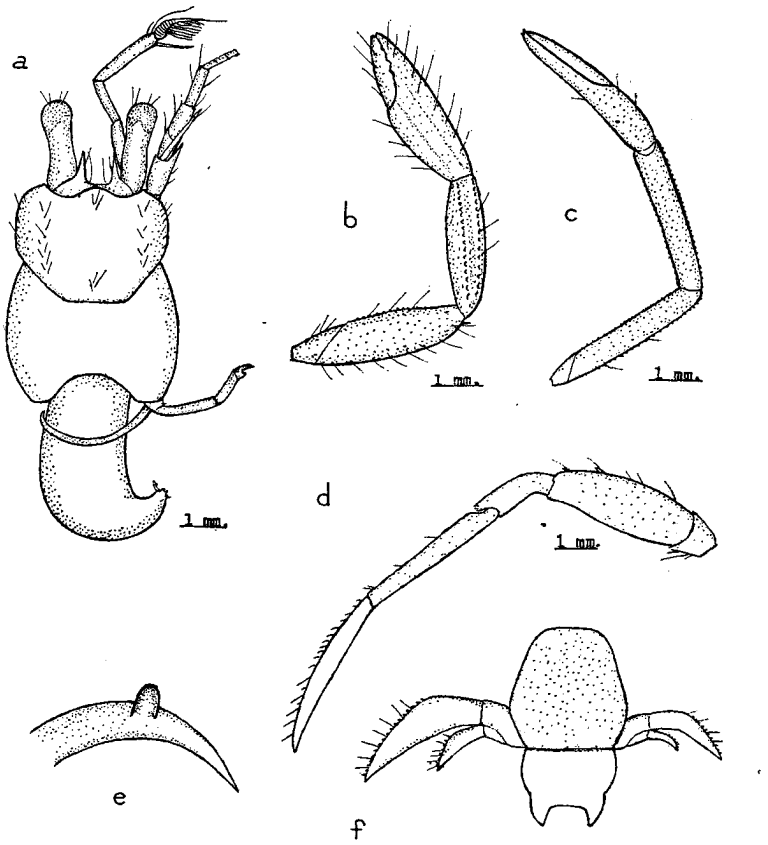

FIGURE 8.—*Catapagurus granulatus:* **a,** carapace, eyestalks, etc.; **b,** right cheliped; **c,** left cheliped; **d,** first walking leg; **e,** tip of vas deferens; **f,** telson and uropods (*e, f,* greatly enlarged).

Numerous species of *Catapagurus* have been recorded from the western Atlantic, the Indian, and the Pacific Oceans. Apparently no representative of the genus has previously been reported from the

Hawaiian area. Of the several species known from Japanese waters, the Bonin Islands and Fiji, the Hawaiian form seems to be nearest *C. japonicus* Yokoya (*37*), from which it differs in the front border of the carapace, the ophthalmic scales and features of the appendages.

Hawaiian specimens in Bishop Museum were taken off Bird Island, depth 190 to 260 feet (Cat. No. 5448) and off the south coast of Oahu, depth 118 to 160 feet (Cat. No. 5514).

Genus **Cestopagurus**

Cestopagurus setosus, new species (fig. 9, *a-i*).

Type specimen, a male, has carapace 3 mm. long, front border with bluntly rounded rostrum, more prominent than the sharp lateral projections. Eyestalks long but not reaching distal end of peduncle of either antennule or antenna. Terminal segment of peduncle the longest in both antennule and antenna. Ophthalmic scales distant, sharp pointed. Acicle of antenna longer than penultimate segment of peduncle.

Right cheliped longer and stouter than left; both well-covered with tufts of long setae which stand out at right angles to the surface. Fingers of right hand about one-half as long as palm, strongly curved downward; a longitudinal row of spinules on outer surface of palm and carpus, near upper border. Carpus and merus of right cheliped about equal in length; in left cheliped carpus is longer than merus. Fingers of left hand nearly equal in length with palm.

First and second walking legs slender, more than twice as long as carapace, all segments setose but not so densely covered as chelipeds; dactyli slightly curved, longer than propodi.

Vas deferens long, passing from coxa of fifth right leg across ventral surface of the body, curving up around left side. In this specimen it passes between fourth and fifth legs on the left side and terminates in a bluntly rounded end. Left uropod the larger; telson bilobed, the fissure narrow and shallow.

Type locality off south coast of Oahu, depth 60 feet (Bishop Museum coll., Cat. No. 5512).

The genus *Cestopagurus* was established by Bouvier (5) in 1897 to include a species, *C. coutieri,* taken at Djibouti. In 1911, the species was again reported by Riddell (26) from the Sudanese Red Sea. So far as I can determine, but two additional species of the genus have been recorded. In 1905, Alcock (2) described *C. olfaciens* from the Maldives, and in 1916, *C. helleri* was described by Balss (3) from the Red Sea.

The Hawaiian form differs from *C. coutieri* in the shape of the rostrum, in the relative length of the eyestalks, in the peduncle of the antennule, and in the character of the chelipeds. In *C. olfaciens*

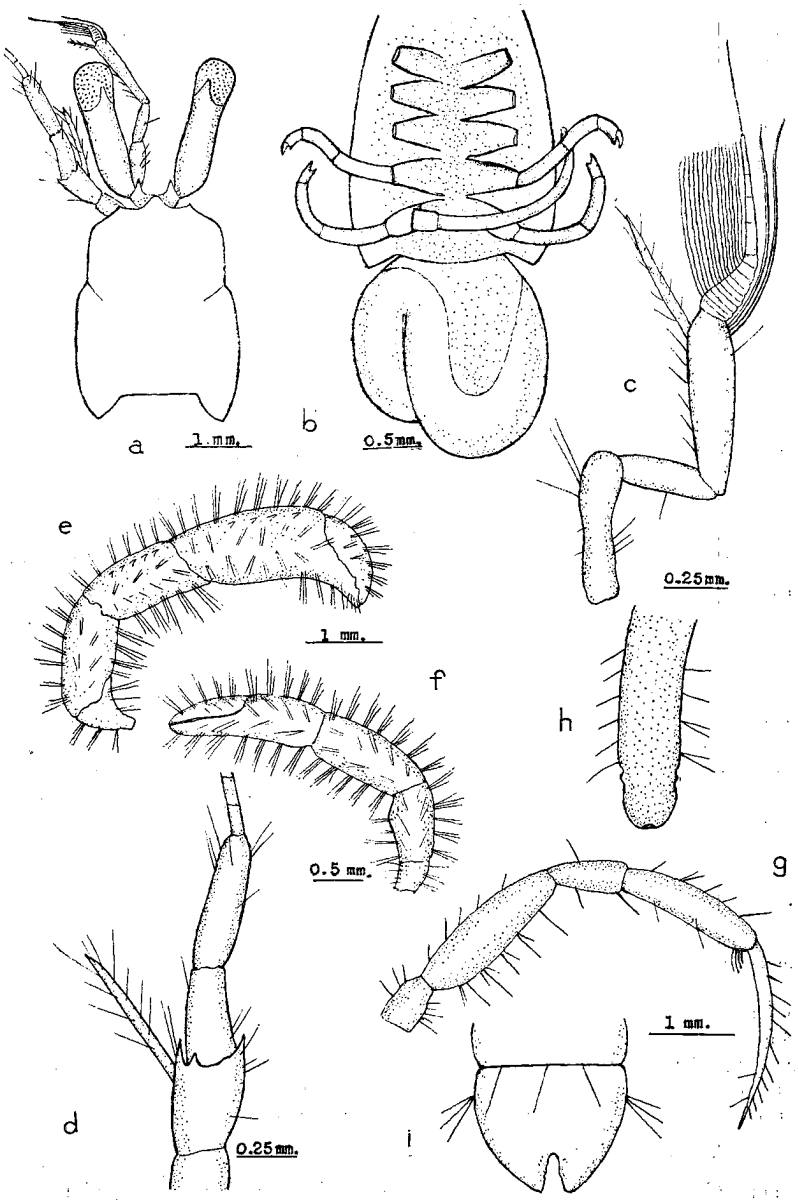

FIGURE 9.—*Cestopagurus setosus:* **a,** carapace, eyestalks, etc.; **b,** ventral view of carapace with position of vas deferens; **c,** antennule; **d,** peduncle of antenna; **e,** cheliped, right side; **f,** cheliped, left side; **g,** second walking leg; **h,** tip of vas deferens; **i,** telson (*h, i,* greatly enlarged).

the chelipeds and walking legs are smooth and nearly bare. Also, the eyestalk in *C. olfaciens* is longer than the peduncle of the antenna. In *C. helleri* the peduncle of the antennule is very much longer than that of the antenna; the ophthalmic scales bear two small spines at their tips; the fingers of the left hand are relatively longer than in the Hawaiian species, and the vas deferens is very much shorter.

Order DECAPODA

Tribe BRACHYURA

Family HOMOLIDAE

Genus **Homola**

Homola (Parhomola) majora (Kubo)? (fig. 10, *a-f*).

Homola (*Parhomola*) *majora* Sakai, Tokyo Bunrika Daigaku, Sci. Repts., Sect. B, **3,** Suppl. 1: 49-51, pl. 9, fig. 2, 1936.

The small form taken in the Hawaiian area is considered a probable juvenile specimen of *Homola* (*Parhomola*) *majora,* previously recorded from Japanese waters only. Similarities of the Hawaiian form to Japanese species are as follows:

Front and rostrum, including supraocular spines, each of the latter being provided with a lateral tooth. Antenna, similar with respect to relative length of terminal and subterminal segments of peduncle. Surface of carapace and appendages densely covered with flat, wartlike granules, some giving rise to hairs or stiff bristles. Chelipeds of female, fingers thin, closing in a straight line, without teeth on cutting edges.

The differences between the Hawaiian form and the Japanese species are as follows:

Spines of carapace, including rostrum and supraoculars, blunt in Hawaiian specimen, tipped by short, stiff hairs. Lateral tooth of supraocular spine in the Hawaiian specimen more proximal in position than in Japanese species. Spines of carapace fewer and less fully developed in Hawaiian than in Japanese species. Borders of walking legs mostly free of spines in the Hawaiian specimen, but bearing tubercles tipped with hairs or stiff bristles. Size differences: Hawaiian specimen (female), carapace 8 mm. in length from posterior border of carapace to base of rostrum; Japanese specimen (male), carapace 61.5 mm. long.

One small specimen, probably juvenile, was taken off the north coast of Oahu at a depth of 120 feet (Bishop Mus. coll., Cat. No. 5510). And another small specimen, of about the same size, was dredged off the southwest coast of Oahu at a depth of 40 to 350 feet (Cat. No. 5530).

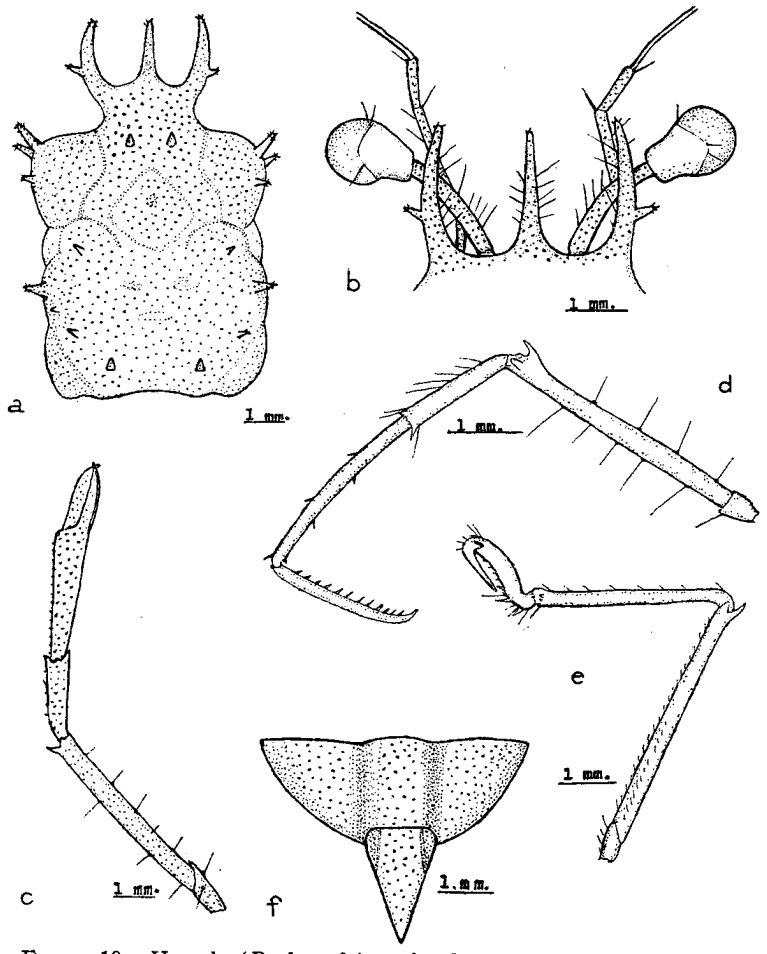

FIGURE 10.—*Homola* (*Parhomola*) *majora*?: **a**, carapace, dorsal view; **b**, front border of carapace, eyestalks, etc.; **c**, right cheliped; **d**, first walking leg; **e**, fourth walking leg; **f**, tip of abdomen.

FAMILY LEUCOSIIDAE

Genus **Heteronucia**

Heteronucia spinifera, new species (fig. 11, *a-d*).

Holotype a female, length of carapace 3.50 mm., breadth between tips of lateral spines 4.25 mm. Carapace slightly convex above, general surface covered by minute, polished tubercles, and bearing numerous prominent elevations, mostly conical, simple or subdivided, the tips of which are set with spinules.

Front consists of two broadly rounded lobes with spiniform margins and a wide trough between, drawn back permitting anterior edge of buccal cavity and pterygostomian region to be seen from above. Lateral borders of carapace bearing 6 broad spines on each side, the third being the longest. Surface of spines set with minute spinules. Anterior spine on right side is bifid. Eleven prominent elevations are seen on upper surface of carapace; 3 occupy antero-posterior midline of gastro-cardiac area, the anterior and simple one being the smallest. The next one posteriorly is larger and bifid, and the posterior one is the largest and trifid. On either side, occupying the hepatic and branchial areas, are four conical elevations arranged in a diamond-shaped pattern. All bear minute spinules. Posterior border of carapace is straight, terminating a narrow shelflike area covered by minute tubercles.

Under surface of carapace covered by minute tubercles; buccal cavity broad, completely closed by the external maxillipeds. Anterior border of pterygostomian area bearing a pair of broad teeth, clearly seen from above. The minute antennal filament lies in the orbit.

Abdomen composed of four distinctly separate segments, the terminal one small, oval, and set deeply in the broad subterminal segment; surface of abdomen ornamented with minute tubercles.

Chelipeds and walking legs covered with minute tubercles, as on carapace. Chelipeds stout, longer than carapace; upper and lower borders of merus bearing a few spinules; carpus nodular on upper border; hand thickened proximally; fingers a little longer than palm, curved inward at tips, grooved longitudinally with cutting edges thin, granular. Upper border of palm flat, bearing a few spinules.

Preserved specimen white, upper surface of palm of cheliped pale brown.

Type locality off Waikiki, Oahu, from a coral head in 18 feet of water (Bishop Mus. coll., Cat. No. 5185).

Although the genus *Heteronucia* is recognized over a wide area extending from the Indian Ocean to Japan and the Tuamotus and Mangarevan (Gambier) Islands of eastern Polynesia, few species have been described. A widely ranging form, *H. venusta* Nobili (21) from the Gambier Islands has also been recorded as *Nucia gelida* from the Tuamotus by Rathbun (23), from Japan by Sakai (27), and from Timor by Ihle (15). It differs from the Hawaiian species in having smaller but more numerous tall tubercles on the carapace. The species, *H. vesiculosa* Alcock (1), described from Ceylon, lacks the spinulose character of the Hawaiian species. Also, *H. ingens*—described from Amirante by Rathbun (25) and recorded from Salomon, Chagos Archipelago, by Ward (36)—and *H. mesanensis* Rathbun (24), of the Gulf of Siam, both differ from the new species in the character of the carapace. In *H. oeschi* Ward (35), the surface of the carapace and the chelae are coarsely granular but not spinulose as in the Hawaiian species.

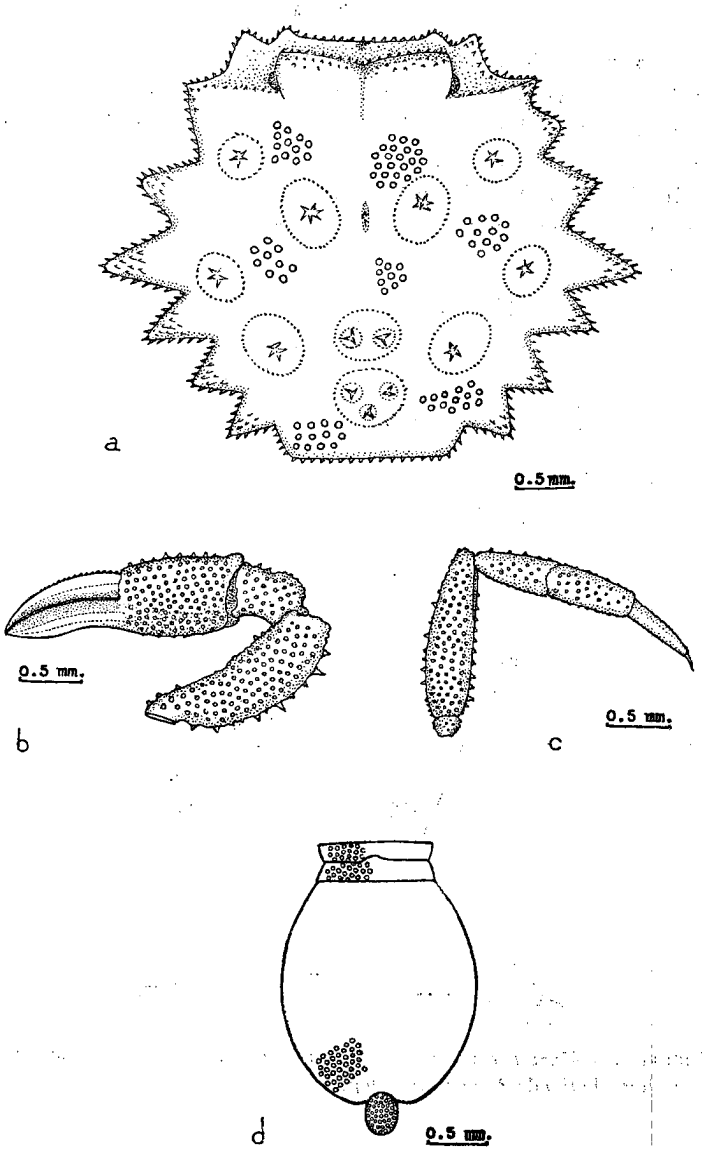

FIGURE 11.—*Heteronucia spinifera*: **a**, carapace, dorsal surface; **b**, left cheliped; **c**, walking leg; **d**, abdomen, female.

Genus **Myra**

Myra brevimana Alcock, Asiatic Soc. Bengal, Jour. **65**: 206-207, 1896; Illus. Zool. Investigator, Crust., pl. 29, fig. 8, 1897.—Borradaile, Fauna and Geogr. Maldive and Laccadive Arch. **1**: 438, 1903.—*Persephona brevimana* Rathbun, U. S. Fish Comm., Bull. **23** for 1903, pl. 3: 891, 1906.—*Myra brevimana* Ihle, Siboga-Expeditie, Monogr. 39b^2: 258, 1918. (See figure 12, *a-d.*)

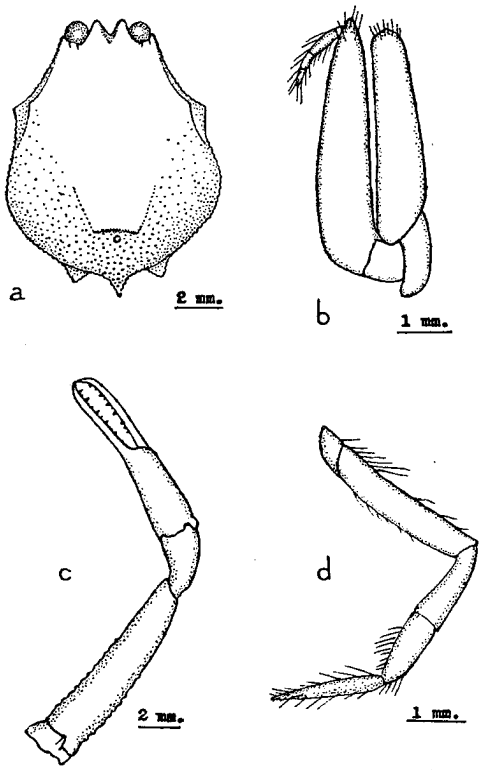

FIGURE 12.—*Myra brevimana:* **a**, carapace, dorsal surface; **b**, outer maxilliped; **c**, left cheliped; **d**, posterior leg.

Carapace ovoid or subglobular, strongly convex above, surface granular; front prominent, posterior margin of carapace bearing three spines or teeth, the median sharp one at a higher level than broader and blunter lateral ones.

Chelipeds similar to each other in the individual and in the sexes; arm and hand long, the latter segment slightly inflated; fingers as long as palm; walking legs more slender and shorter than chelipeds.

Color of alcoholic specimen, yellowish-white with two irregular bands of orange-red curving over the convexity of the carapace from frontal region and meeting behind to include median posteromarginal spine. Faint bands of same color cross arms of chelipeds.

The species is known from the Seychelles to Hawaii. Specimens were taken by the *Albatross* off the coasts of Hawaii, Maui and Kauai at depths of 52 to 179 fathoms. Recently the species was dredged off the southwest coast of Oahu on very rough bottom at depths ranging from 10 to 50 fathoms (Bishop Mus. coll., Cat. No. 5558).

Family MAIIDAE (MAJIDAE)

Genus **Trigonothir** (Simocarcinus of some authors)

Trigonothir samoaensis, new species (fig. 13, *a-d*).

Type specimen an ovigerous female, length 21 mm., including the rostrum. Length of rostrum, lateral aspect, 6 mm. Carapace with two pairs of lateral processes having smooth, even borders; anterior ones broadly rounded, posterior pair bluntly rounded and narrower than anterior ones. Breadth of carapace between tips of anterior lateral processes 9 mm., between posterior ones 15 mm. Dorsal surface of carapace marked by an elevated, crescent-shaped lobe along posterior border; a round, conical elevation in the midline between posterior

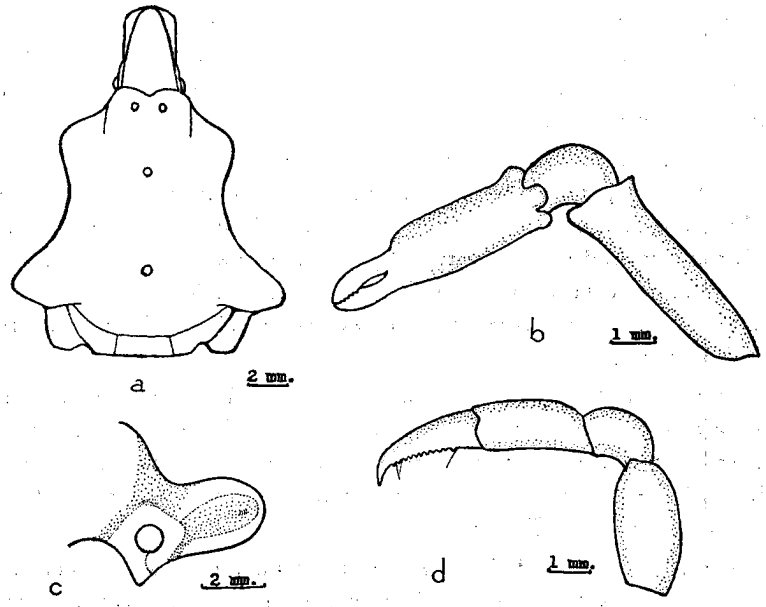

FIGURE 13.—*Trigonothir samoaensis:* **a,** carapace, dorsal surface; **b,** left cheliped; **c,** rostrum, side view; **d,** walking leg.

lateral processes; a similar but smaller elevation in midline of gastric area, and a low elevation on each side of midline at anterior border of carapace. Surface of carapace covered with microscopic tubercles.

Rostrum strongly concave on dorsal border and slightly turned up at the tip; upper border smooth, narrower than lower border; anterior extremity rounded; lateral and ventral borders concave; curved cirri borne on lateral border near tip. Eye situated in middle of a raised quadrangular area, at the lower posterior angle of which is a tubercle.

Chelipeds equal, smooth; merus cylindrical with two lobes at distal extremity; carpus one-half as long as merus; propodus slightly compressed laterally, fingers hollowed out at tip; dactylus arched, a series of even triangular teeth on cutting edges of both fingers.

First walking legs longer than chelipeds and nearly twice as long as second pair; third walking legs shorter than second pair; fourth pair shorter than third and inserted almost dorsal to them. Walking legs smooth, carpus and merus in last three pairs somewhat swollen. Dactyli of walking legs with a row of minute teeth on their ventral borders.

The genus *Trigonothir* (= *Simocarcinus*) ranges from the Red Sea and Madagascar to Hawaii. Four previously reported species were recognized by Balss (4). A widely distributed form, *T. simplex* (Dana), is known in Hawaii as a common species clinging to the brown seaweed, *Sargassum* sp., which grows in shallow water near shore. The species, *T. pyramidatus* (Heller), ranges from the Red Sea and Madagascar to the Marshall Islands, whereas *T. camelus* Kluntzinger seems to be confined to the Red Sea and Indian Ocean. Another Pacific form, *T. obtusirostris* Miers, has been recorded from Funafuti and the Gilbert Islands.

The Samoan species differs from female specimens of *T. simplex* in the following respects: The carapace is more triangular in shape, and the anterior lateral lobes are conical and bluntly rounded instead of being thin and slightly turned up. In the new species the margin of the carapace between the lobes is smooth, while in *simplex* it is rough with teeth or tubercles. The two species also differ in features of the rostrum.

From *T. obtusirostris,* the Samoan species differs in the form of the carapace as seen from above, and in the shape of the rostrum. Differences of a similar character also apply to *T. camelus.* Laurie (16), who retains the generic term *Simocarcinus,* considers *T. pyramidatus* a variety of *T. simplex.*

The type locality of the new species is Papatea, Tau, Samoa, the reef table at low tide, 100 feet from shore, collected by Wray Harris (Bishop Mus. coll., Cat. No. 5087).

Genus **Hyastenus**

Hyastenus tenuicornis Pocock, Ann. Mag. Nat. Hist. VI, **5**: 76-77, 1890. (See figure 14, *a-d.*)

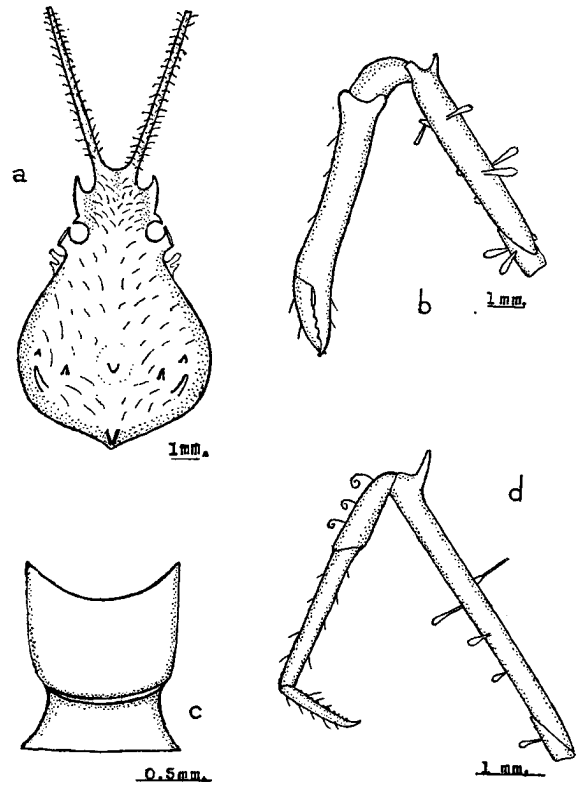

FIGURE 14.—*Hyastenus tenuicornis:* **a,** carapace, dorsal view, with broken rostral spines; **b,** left cheliped; **c,** postocular process, flat crown; **d,** first walking leg.

Length of carapace of largest Hawaiian specimen 8 mm., not including rostral spines. Rostral spines very long, strongly divergent, slightly directed downward; in males nearly twice the length of the carapace. A prominent supraocular eave is directed forward terminating in a sharp point, with a posterior angle directed backward toward the postocular lobe. Postocular lobe consisting of a stout stalk with a flat crown the anterior corners of which are sharp.

In male specimens, one cheliped is much stouter than the other; fingers very short. Walking legs slender, the first the longest; a stout spine is borne at upper distal end of merus.

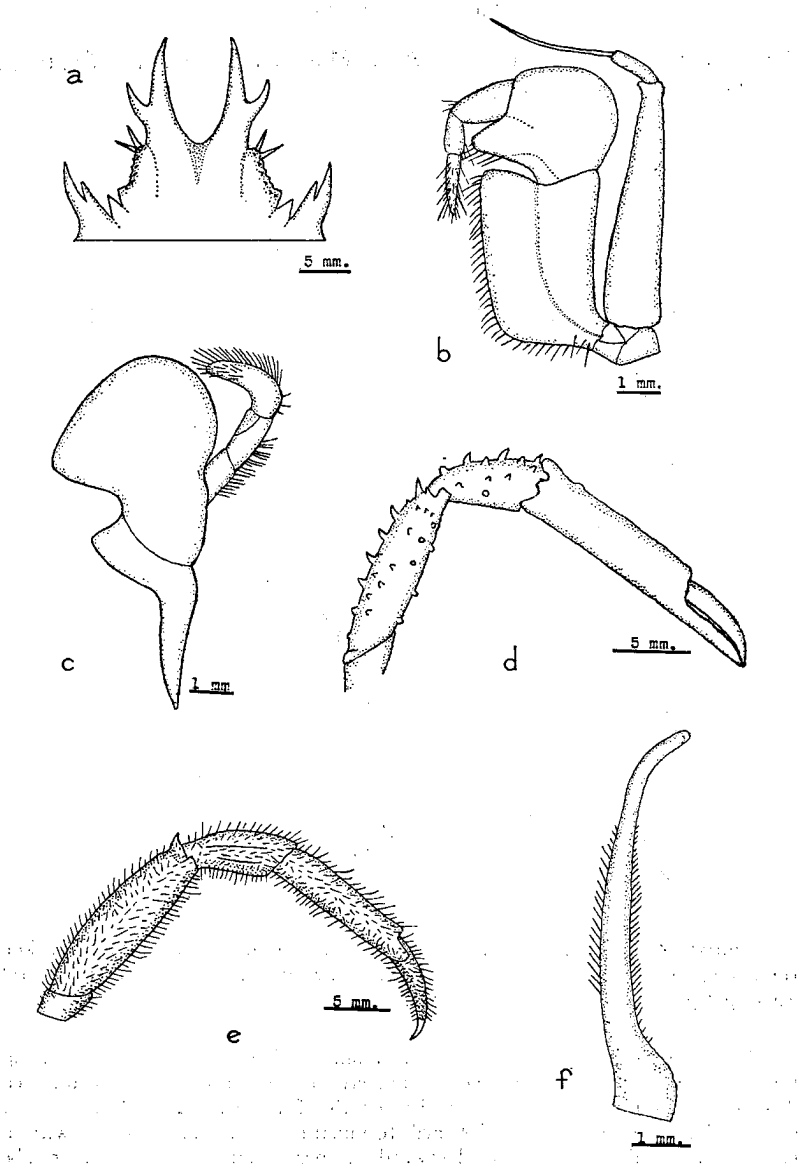

FIGURE 15.—*Schizophrys aspera:* **a,** front region of carapace; **b,** external maxilliped; **c,** mandible; **d,** right cheliped; **e,** third walking leg; **f,** first pleopod of male.

This species has been recorded from off Cheduba, Lower Burma, and near Ceylon. Specimens in Bishop Museum are from four stations about Oahu, at depths of 10 to about 50 fathoms (Cat. Nos. 918, 5443, 5444, and 5471).

Genus **Schizophrys**

Schizophrys aspera (H. Milne Edwards) (figs. 15, *a-f*; 16).

Schizophrys aspera Sakai, Tokyo Bunrika Daigaku Sci. Repts., Sect. B, **3**, Suppl. **3**: 306, pl. 31, fig. 4, 1938.

Carapace pear-shaped, narrow in front, surface convex, covered with large granules and numerous sharp tubercles. Rostrum with two nearly parallel pseudorostral spines, slightly incurved at tips, and each bearing a strong accessory spine on the side. Postocular spine stout, bearing an accessory spine on the upper border. Narrow posterior margin of carapace somewhat protruding, bordered with sharp tubercles. Behind postocular spine, carapace is bordered by a row of six other sharp spines, the last two of which are small and more dorsal in position than the others.

Arm and carpus of cheliped spiny; palm long, smooth, except for one or two proximal tubercles; fingers slender, about one-half as long as palm. Walking legs slender, hairy.

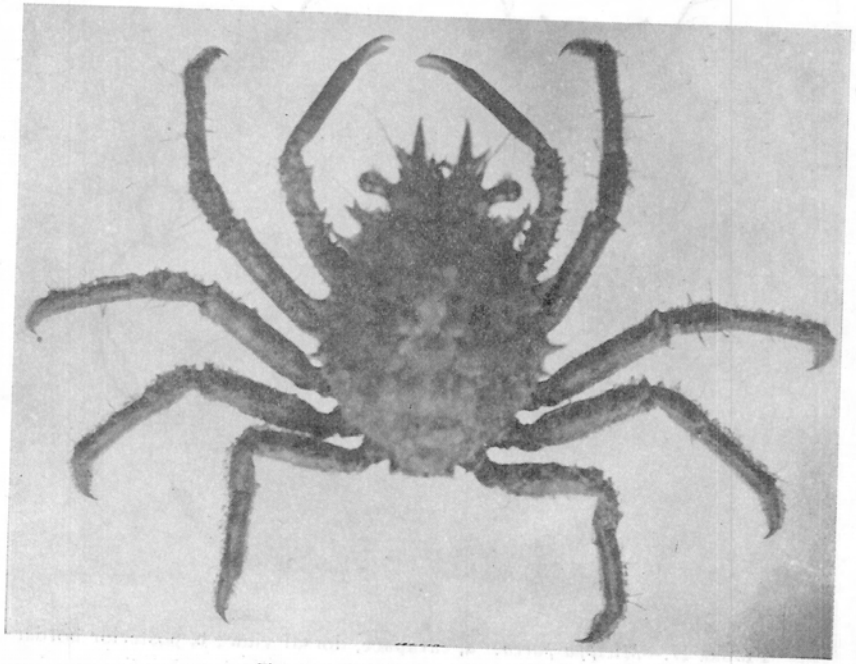

FIGURE 16.—*Schizophrys aspera.*

Large numbers of this crustacean were recovered from the fouling on the hull of a barge in Pearl Harbor dry dock April 5, 1950. The barge served in Guam during World War II, but had been anchored in Pearl Harbor for the past two years.

Apparently the species has not been recorded previously from the Hawaiian area. The adults of this crab may have been transported from Guam, but the myriads of juvenile specimens observed indicate that propagation of the species has taken place since reaching Pearl Harbor.

Of the numerous specimens recovered, most of the larger ones (about 50 mm. in length of carapace) were ovigerous females. The carapace and hairy walking legs of the species are often well covered with sediment and support tunicates, algae, and other organisms. Previous records of distribution indicate that the species is widely dispersed in the warmer waters of the Indo-Pacific region, ranging from the Red Sea and east Africa to Japan. It has also been reported from Funafuti and Samoa (Bishop Mus. coll., Cat. No. 5620).

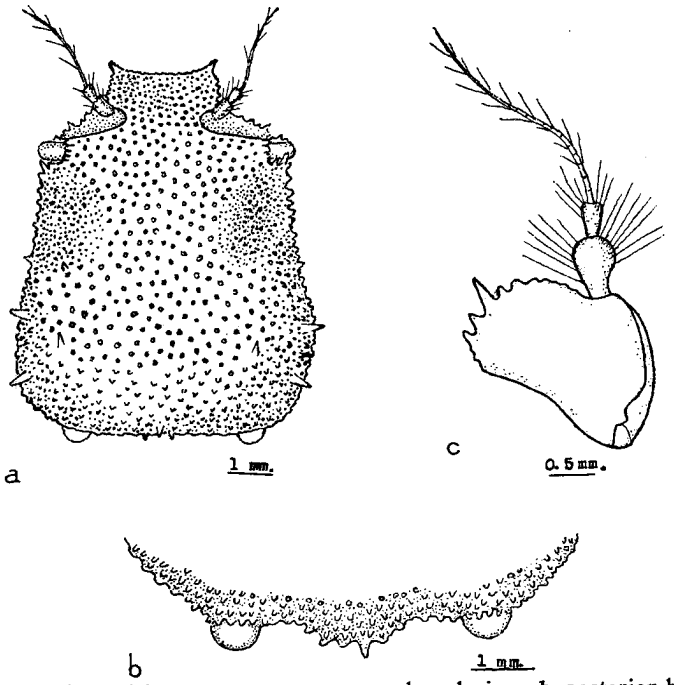

FIGURE 17.—*Micippa parca:* **a**, carapace, dorsal view; **b**, posterior border of carapace; **c**, antenna.

Genus **Micippa**

Micippa parca Alcock (fig. 17, *a-c*).

Micippa margaritifera var. *parca* Alcock, Asiatic Soc. Bengal, Jour. **64**(2) : 253, 1896.

Rostrum broad, concave above and terminating at each distal corner in a tooth which is turned up and out. Several strong spines occupy the branchial region of carapace. Two pearl-like tubercles set in posterior margin of carapace, one near each lateral border. A group of strong spinules occupy mid region between tubercles.

In *M. margaritifera* Henderson (10), so far not observed in Hawaiian waters, three pearl-like tubercles are carried on the posterior margin of the carapace. In *M. parca* strong spinules take the place of the middle one of the three tubercles.

The type locality of *M. parca* is the Andaman Islands. In the Hawaiian area, the *Albatross* dredged the species about French Frigate Shoal and Modu Manu (Nihoa). Recently it was recovered from three stations about Oahu at depths of 100 to 150 feet (Bishop Mus. coll., Cat. No. 5430-5432). The length of the carapace of one of the larger specimens is 8.5 mm.

Family PARTHENOPIDAE

Subfamily PARTHENOPINAE

Genus **Parthenope**

Parthenope (Platylambrus) stellata Rathbun, U. S. Fish Comm., Bull. **23** (3) : 884, pl. 15, figs. 1, 2, 7, 1906. (See figure 18, *a-d.*)

Carapace subtriangular, broader than long. Surface rough and irregular with elevations and depressions; covered but not crowded with groups of granules arranged in stellate form; surface between groups minutely pitted.

Chelipeds stout, longer than carapace; surface nodular and pitted as carapace. Margins of chelipeds bearing numerous granulated spines and tubercles. Surface of walking legs pitted; margins with irregular spines and tubercles. Dactyli subcylindrical, a little longer than propodi.

Rathbun recognized a number of varieties of this species among material dredged by the *Albatross*. Specimens under my observation combine some of the characters of the species proper and recognized varieties but differ from them in other particulars. In general sculpture and ornamentation they closely resemble the species; but the chelipeds lack the stellate granules, and the walking legs are without hairs on the propodi and dactyli.

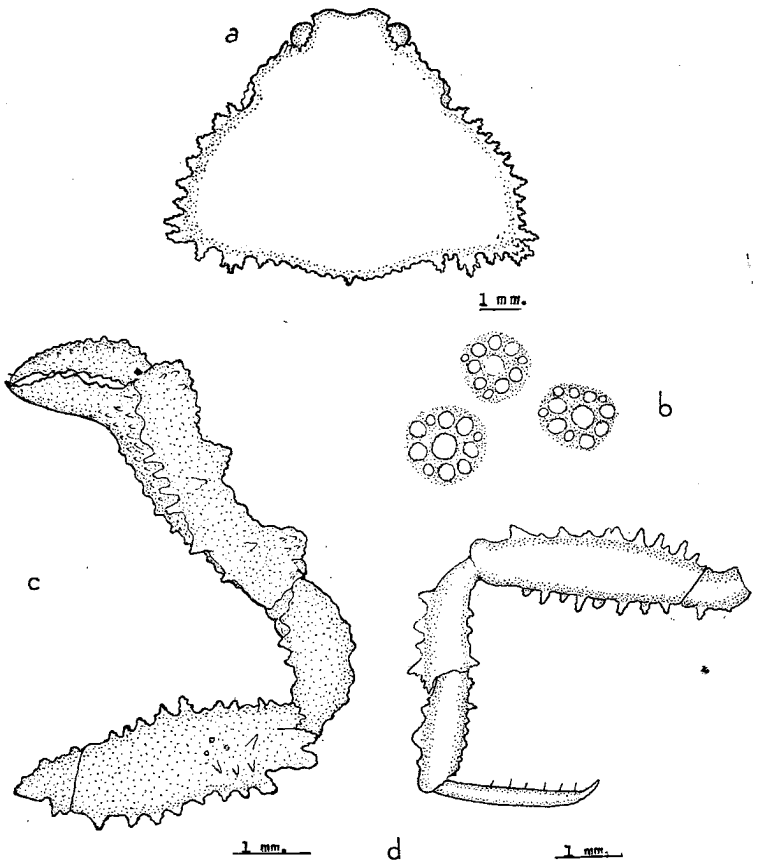

FIGURE 18.—*Parthenope* (*Platylambrus*) *stellata:* **a,** outline of carapace, dorsal view; **b,** groups of stellate tubercles; **c,** cheliped, left side; **d,** walking leg.

Two specimens, probably juvenile, the larger being 20 mm. in breadth of carapace, were recently taken by the *Makua* one mile off Kahala, Oahu, at a depth of 150 feet (Bishop Mus. coll., Cat. No. 5508).

Genus **Aethra**

Aethra edentata, new species (figs. 19, *a-g*; 20, *a, b*).

Type specimen, a female. Carapace transversely oval, the thin lateral borders concealing the legs; greatest breadth 30 mm., length, including rostrum, 25 mm. Upper surface of carapace minutely punctate and bearing a few scattered tubercles. Hepatic and lateral areas of carapace depressed; gastric region

elevated, a prominence on either side of the midline crowned by a transverse row of tubercles. Cardiac region elevated by a curved ridge, indistinctly broken into five portions, the middle one the largest. A low, transverse ridge near each posterolateral border.

Rostrum short, broad at base, bluntly pointed in front, slightly deflexed, lateral margins granular, deeply concave above, the concavity extending backward as a shallow furrow between the gastric prominences. Orbit small, eyestalk short, thick, cornea more in evidence from below than from above.

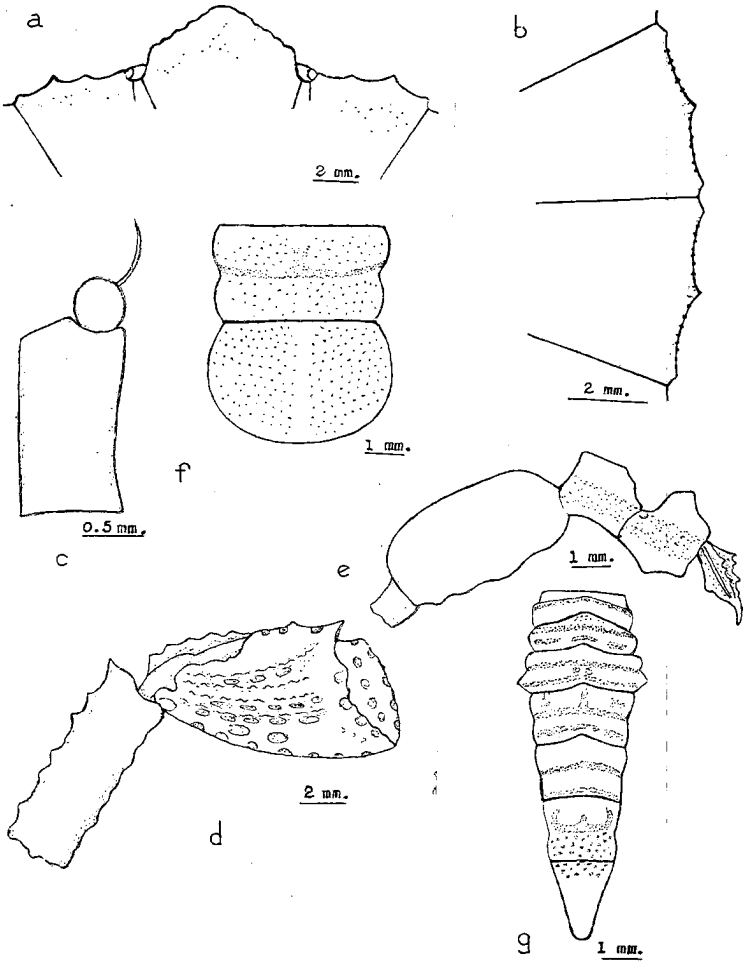

FIGURE 19.—*Aethra edentata:* **a,** front border of carapace; **b,** two lobes of anterolateral border of carapace; **c,** antenna; **d,** right cheliped; **e,** walking leg; **f,** tip of abdomen, female; **g,** abdomen, male.

Margin of carapace thin, slightly turned up, with seven lateral lobes, the closed suture lines being distinct. Margin of lobes bearing a more or less distinct tooth bordering the suture lines and a more prominent one near the middle. Intervening margin of lobe roughened by minute punctae and granules.

Antenna with large basal segment and small round peduncle from the under side of which arises the minute flagellum. Chelipeds equal, upper and lower borders carinate; merus smooth, lower border bicarinate, the thin scalloped edges partially concealing propodus when limb is folded. Carpus overriding proximal end of propodus, toothed on upper and outer borders. Palm expanded distally, upper border short, with a few irregular teeth, lower border smooth, entire; outer surface with a longitudinal, inflated ridge which is roughened by wrinkles and three irregular lines. Fingers short, thin, and deep, the cutting edges provided with small teeth and meeting when closed. Inner surface of palm and fingers smooth and concave to conform with the surface of the carapace with which they are in contact when at rest.

Walking legs short, decreasing in length from first to fourth; segments carinate above and below, merus bicarinate below. Abdomen with nearly parallel sides; segments, except terminal one, pitted and eroded, crossed transversely by ridges; terminal segment flat, surface marked by minute punctae.

Color of carapace in life dull white with a violet tint. Body and appendages, seen from below, pale brown with a violet tint. Outer surface of palm and fingers marked by oval spots of violet color.

FIGURE 20.—*Aethra edentata:* a, dorsal view; b, ventral view.

The best known species of the genus, *Aethra scruposa* (Linnaeus), is widely distributed, having been recorded from the Indian Ocean, the Malay Archipelago, New Caledonia and Fiji. A closely related form, *A. scutata,* was described from the west coast of Mexico by Smith (31) in 1869. Authors generally have considered the Mexican representative of the genus as a subspecies of *A. scruposa,* but Flipse (9) listed it in 1930 as a valid species.

Hawaiian specimens taken in 1949 bear close resemblance to previously described species, but differ from them in the complete absence of dentition on the lower border of the palm of the cheliped. Also,

the rostrum appears to be more pronounced in the Hawaiian specimens, thereby forming a greater break in the general oval outline of the carapace. The smooth lower margin of the palm, sharply contrasted with the dentate segment of previously known forms, suggests the specific name, *edentata,* for the Hawaiian species.

A male cotype 27 mm. broad has the margin of the carapace worn and eroded, and the elevations of the upper surface of the carapace are less prominent than in the female. The Hawaiian specimens are considerably smaller than previously described forms of the genus and may not be fully grown.

Type locality, southwest coast of Oahu, at depths of 40 to 350 feet (Bishop Mus. coll., Cat. No. 5561).

Subfamily EUMEDONINAE

Genus **Harrovia**

Harrovia truncata Rathbun ?, U. S. Fish Comm., Bull. 23 (3): 886-887, pl. 14, fig. 8, text fig. 40, 1903 (1906). (See figures 21, *a-g;* 22.)

Carapace broader than long; upper surface granular, flattened with elevations and depressions. Three elevations correspond to the divisions of the gastric area. Intestinal region crossed by a broad excavation which curves forward laterally; a transverse fold of the cardiac area extends backward partially covering the intestinal excavation.

Front prominent, a little deflexed, consisting of two broad, truncate lobes, slightly oblique and separated medially by a narrow groove, and laterally by a faint notch from the superior orbital lobe. The line of demarcation between frontal and orbital lobes is more obvious from below than from above. Anterior edge of front margin double, granulate. Orbit inconspicuous from above, with two grooves in superior border and two prominent teeth below.

Anterolateral border thin, bearing three broad, low teeth, the first remote from the inconspicuous external orbital angle; posterolateral border with a notch near the middle. Chelipeds subequal, stout, longer than carapace; merus with a prominent tooth about middle of upper border and two teeth below toward distal end; carpus with a strong tooth on inner border; hand with four longitudinal ridges on outer border, and inner surface of palm strongly inflated. Fingers stout, shorter than palm, in contact when closed; low blunt teeth on cutting edges of right hand, on left hand, teeth inconspicuous.

Walking legs flat with sharp borders; merus bicarinate below; two broad teeth on upper border of carpus and one on upper border of propodus; dactylus as long as propodus, hairy on both upper and lower borders. Lower border of propodus hairy; outer border of joints of walking legs bearing transverse rows of minute hairs. Under surface of carapace, maxillipeds, etc. generally covered with a dense coating of short hairs with inflated ends. Abdomen of male with seven segments; first pleopod of male well covered with short spines.

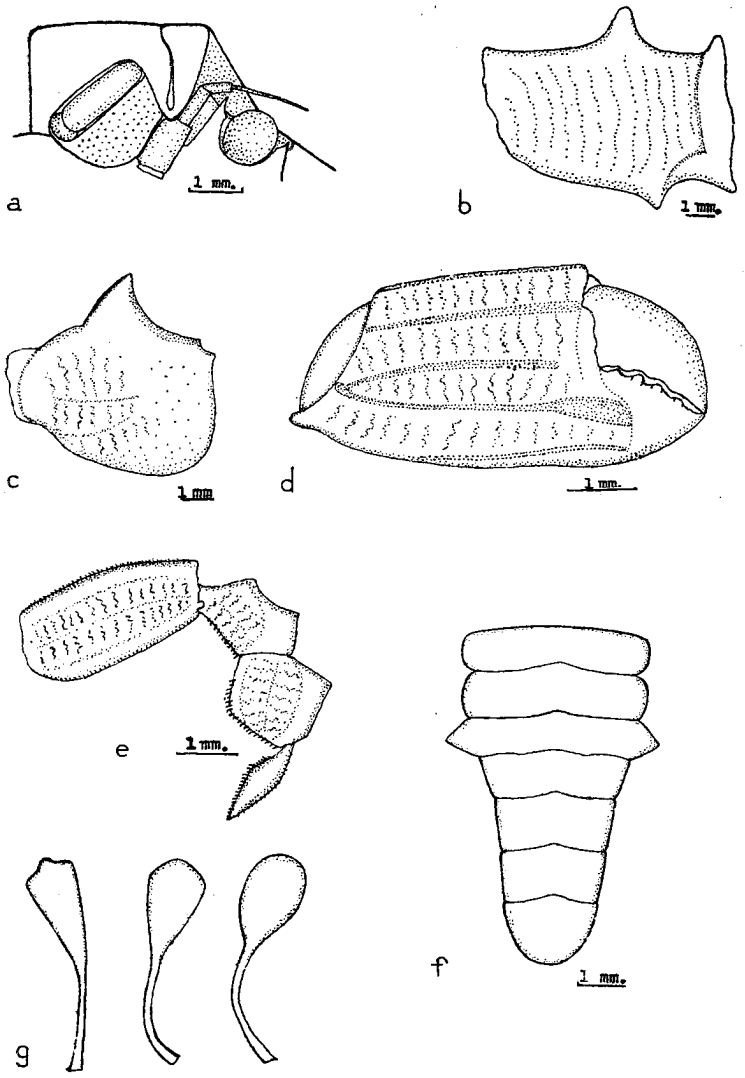

FIGURE 21.—*Harrovia truncata* ?: **a**, left half of rostrum, left orbit, etc., from below; **b**, merus of cheliped, side view; **c**, carpus of cheliped, dorsal view; **d**, outer surface of hand; **e**, posterior leg; **f**, abdomen, male; **g**, group of hairs from under the surface of carapace (enlarged).

Color of living specimens white, with the exception of the chelipeds which are bright red. Color of chelipeds soon fades in alcohol and entire specimen becomes white.

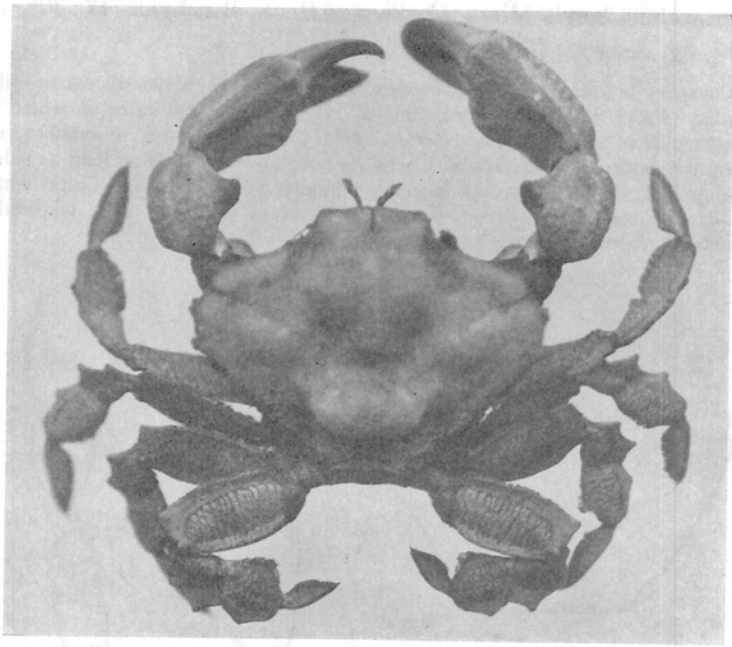

FIGURE 22.—*Harrovia truncata*?

From material collected by the *Albatross* in the vicinity of Kauai, at depths of 233 to 40 fathoms, Miss Rathbun described a new species of *Harrovia* based on an immature specimen 6.5 mm. in breadth of carapace. In general features this small form compares favorably with two specimens taken off the southwest coast of Oahu by the *Makua* on August 8, 1949. The larger of these two is 26 mm. in breadth of carapace. On comparing one of these specimens with the type in the U. S. National Museum, Dr. Fenner A. Chace, Jr., Curator, concluded that the two were the same species, although some slight differences were noted in the proportion of the carapace, in the anterolateral teeth, and in the cardiac fold. However, the variations observed may be accounted for by the difference in maturity of the specimens. (Bishop Mus. coll., Cat. No. 5632.)

FAMILY PORTUNIDAE

Genus **Lissocarcinus**

Lissocarcinus laevis Miers, Challenger Rept., Brachyura **17**: 205, pl. 17, fig. 3, 1886. (See figure 23, *a-f.*)

Carapace broader than long, convex, appearing smooth but microscopically granular. Front prominent, consisting of two broad lobes, each of which is slightly concave in the middle. Anterolateral teeth blunt, five in number, including the external orbital angle. Chelipeds with fingers nearly as long as palm. Walking legs slender, dactylus lanceolate longer than propodus. Color white with dark purple markings on carapace which are arranged in a bilaterally symmetrical pattern in some specimens.

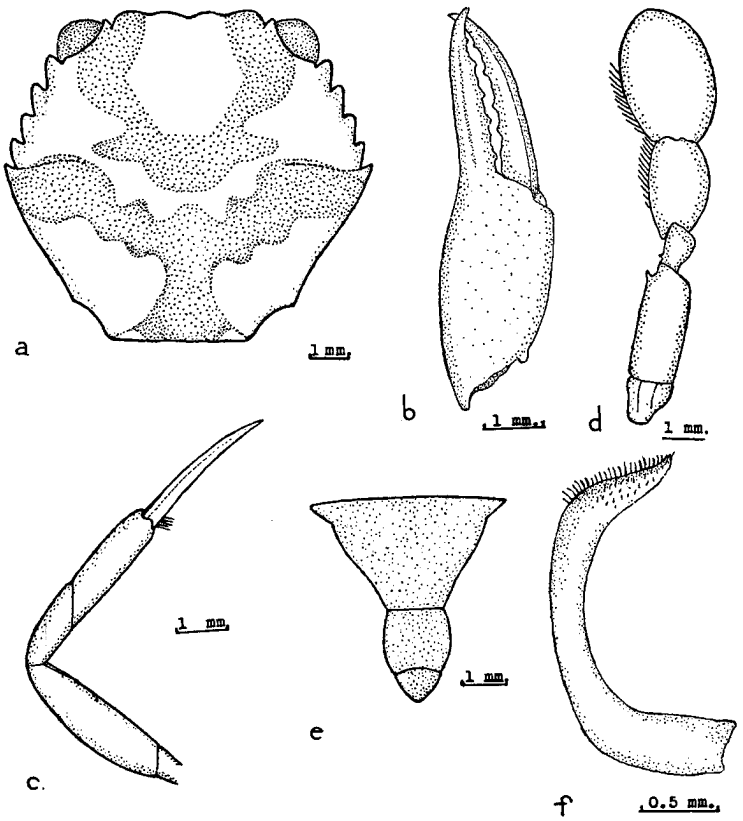

FIGURE 23.—*Lissocarcinus laevis:* **a,** carapace, dorsal view; **b,** left chela; **c,** first walking leg; **d,** posterior leg; **e,** abdomen, male; **f,** anterior pleopod, male.

The species is known from off Ceylon, Mergui, and the Andamans; and the *Albatross* dredged one male specimen off the northeast coast of the island of Hawaii at 77 to 75 fathoms. In Bishop Museum are several specimens taken by the *Makua* off Ilio Point, Molokai, and from stations about Oahu, at depths ranging from 50 to 220 feet. The breadth of the carapace of an ovigerous female is 10 mm. (Cat. Nos. 5435, 5436, 5455, 5462).

Genus **Thalamita**

Thalamita spinifera Borradaile.

Thalamita exetastica var. *spinifera* Borradaile, Fauna and Geogr. Maldive and Laccadive Arch. 1: 203, 1902. (See figure 24, *a*.)

Frontal teeth six in number, the median pair being set at a lower level than the submedian. Five sharp teeth, including the external orbital angle, occupy the anterolateral border, decreasing in size from the first to the last. There is a well-developed supplementary tooth at base of first. Chelipeds well covered with minute rounded granules, and a row of spinules occupies the posterior border of the propodus of the last walking leg.

This species, which apparently is not uncommon about the Hawaiian Islands at depths a little beyond the reef platform, resembles *Thalamita picta* Stimpson in the frontal teeth; but the latter species is without an anterolateral supplementary tooth. From *T. exetastica* Alcock the species differs chiefly in being ornamented by rounded instead of squamose granules, and in the spinous posterior border of the propodus of the last leg.

The *Albatross* dredged 80 specimens of *T. spinifera* in the Hawai-

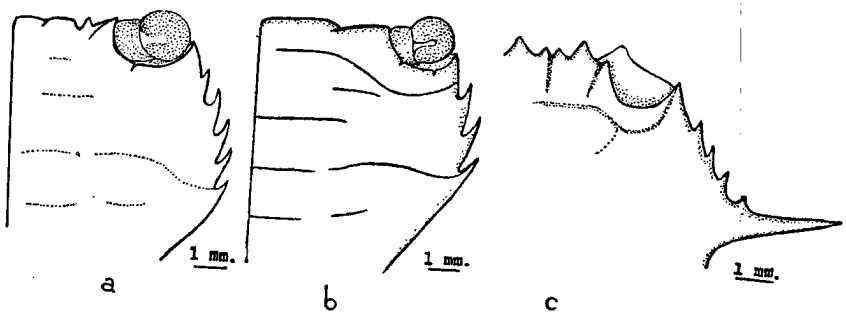

FIGURE 24.—Portunidae spp.: **a**, *Thalamita spinifera*, right half of front and right anterolateral border; **b**, *Thalamita auauensis*, right half of front and right anterolateral border; **c**, *Portunus* (*Xiphonectes*) *macrophthalmus*, front and right anterolateral border.

ian area; and in 1917, D. Kuhns procured 25 specimens by dredging off Waikiki, Oahu. Also, one specimen was taken by the *Makua* off Kekaha, Kauai, in April 1949, at depths ranging from 80 to 140 feet. (Bishop Museum collections include Cat. Nos. 393-395 and 5480.)

Thalamita auauensis Rathbun, U. S. Fish Comm., Bull. 23 (3): 874, pl. 12, fig. 1, 1903 (1906). (See figure 24, *b*.)

A *Thalamita* belonging to the *admete* group. Carapace strongly crested. Front consisting of two broad, straight lobes separated by a narrow notch; crest of inner orbital angle little shorter than frontal lobe. Fourth anterolateral tooth is rudimentary or absent, and last one (fifth) is somewhat smaller than either of the first three.

Chelipeds with hand crested, granulated, bearing five spines in two rows. Last leg with a strong, sharp tooth at distal posterior border of merus, and a row of spinules on posterior border of propodus.

Although seldom, if ever, seen on the reef platform near shore, this species is apparently a common one at slightly greater depths. The *Albatross* took it at numerous stations about the Hawaiian Islands at depths of 13 to 183 fathoms. Bishop Museum has specimens from seven stations about Kauai and Oahu, the depths ranging from 16 to 50 fathoms (Cat. Nos. 392, 393, 403, 5458, 5518-5520).

Genus **Portunus**

Portunus (Xiphonectes) macrophthalmus Rathbun, U. S. Fish Comm., Bull. 23 (3): 871, pl. 12, fig. 5, text fig. 31, 1903 (1906). (See figure 24, *c*.)

Median pair of frontal teeth very small and narrow. Posterior anterolateral spines very long and stout; five or six anterolateral spines, including orbital one, in front of posterior one. Last two segments of male abdomen narrow, constricted, the penultimate one with concave lateral borders.

This species closely resembles the shallow water form, *Portunus (Xiphonectes) longispinosus* (Dana), which, however, has seven or eight anterolateral spines in front of the long posterior one; and the male abdomen is not so narrow.

Albatross specimens in the United States National Museum, Washington, were taken about Molokai, Kauai, and Modu Manu (Nihoa), at depths of 23 to 362 fathoms. Bishop Museum has one specimen taken by the *Makua* off the Royal Hawaiian Hotel, Oahu, at a depth of 60 feet and four specimens from off the southwest coast of Oahu at depths of 40 to 350 feet (Cat. Nos. 5469, 5549).

Genus **Libystes**

Libystes villosus Rathbun, Biol. Soc. Wash., Proc. **37**: 127, 1924 (fig. 25, *a-f*).

Carapace broader than long, strongly convex longitudinally, surface smooth, a ridge of fine granules extending forward from posterolateral angle.

Chelipeds smooth, in male specimen the right is stouter than the left; fingers a little shorter than palm, widely gaping at base in larger chela, straighter and closing more completely in smaller one. Borders of walking legs fringed with shaggy hair. A few tufts of hair on lateral borders of carapace and chelipeds.

Color of male 10 mm. broad, in alcohol, dark red, with large cheliped mottled pale red and yellow.

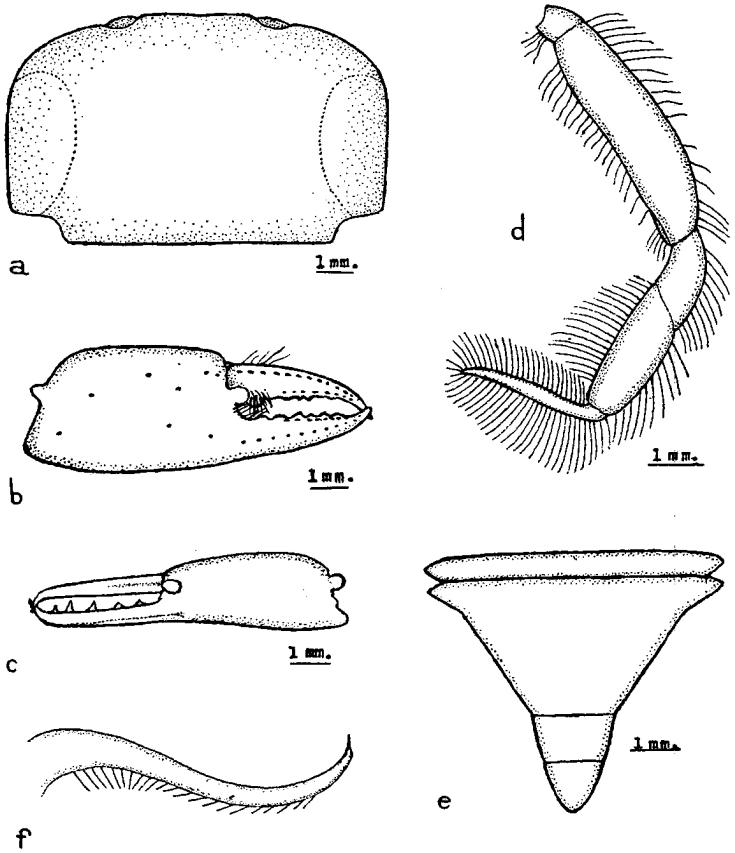

FIGURE 25.—*Libystes villosus:* **a**, outline of carapace from above; **b**, right chela; **c**, left chela; **d**, fourth walking leg; **e**, abdomen, male; **f**, anterior pleopod, male (enlarged).

The type specimen in the United States National Museum was taken at Apia, Samoa, at the mouth of a river. There are four specimens in Bishop Museum: one from Wake Island (Cat. No. 1790); two from off Honolulu Harbor, Oahu, at a depth of 180 feet (Cat. No. 5540); and one from off the Elks Club, Honolulu, at a depth of 240-260 feet (Cat. No. 5501).

Many years ago, the species *Libystes nitidus* A. Milne Edwards (8), lacking the shaggy hair on the legs, was reported from Hawaii. It has not appeared in recent collections.

Megalops of a Portunid

A megalops which appears in the off shore waters of Oahu and elsewhere in the central Pacific is of sufficient interest to have its occurrence recorded. It was first noted in 1930, when specimens were recovered from the stomach of an *aku* (Honolulu Fish Market). In 1932, H. L. Kelly collected 150 specimens on the shore at Lanikai, Oahu. In 1936, F. R. Fosberg took a few specimens at Christmas Island (north Pacific). And in May 1950, many specimens were collected from the same general locality by the U. S. S. *Manning* of the United States Fish and Wild Life Service. During recent dredging operations of the *Makua,* the megalops was frequently taken about Oahu at depths of 30 to 350 feet. Characters of the megalops (fig. 26, *a-e*) are as follows:

> Carapace about 8 mm. in length including prominent rostral spine; strongly convex transversely; eyes large. Chelipeds equal, longer than carapace, smooth and unarmed; fingers about as long as palm, cutting edges with low teeth. Walking legs slender; in first three dactylus longer than propodus, in fourth as long as propodus and flattened; a strong sharp spine on the basal joint of the fourth walking leg.
>
> Abdomen with first four segments large and strongly convex above; lateral spines on posterior border of fourth segment; fifth segment short; sixth segment flat with truncated posterior border; uropodal lobes single.

This megalops closely resembles crustacean larvae described by Delsman and de Man (6), as was pointed out by Marie Lebour (17), to whom Hawaiian specimens were submitted. The flattened dactylus of the fourth walking leg clearly indicates a portunid relationship, but more specific determination cannot be made at this time. In dredging hauls by the *Makua,* from which the megalops was recovered, specimens of *Thalamita auauensis* Rathbun commonly occurred.

However, numerous portunids frequent the reefs and deeper Hawaiian waters. During the *Whippoorwill* Expedition of 1924, *Thalamita picta* was found to be the most common portunid on the reefs of Christmas Island, where Fosberg collected the larvae in 1936. Specimens of the megalops are in Bishop Museum collections (Cat. Nos. 3653, 4904, 5629, 5630 and 5636).

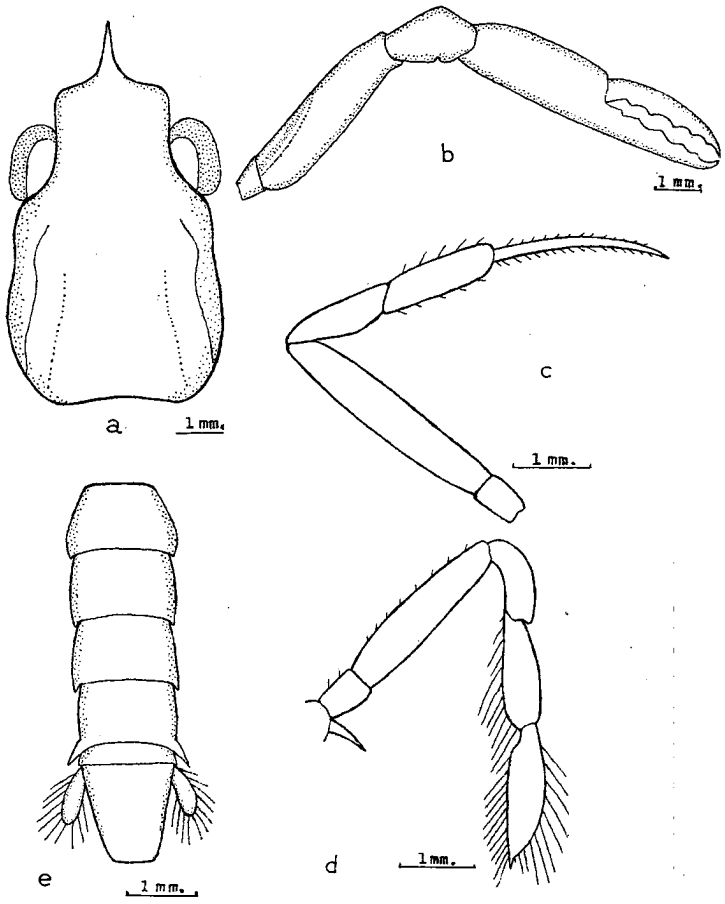

FIGURE 26.—Megalops of portunid: **a**, carapace, dorsal view; **b**, right cheliped; **c**, third walking leg; **d**, fourth walking leg; **e**, abdomen.

FAMILY XANTHIDAE

Genus **Carpilodes**

Carpilodes medipacificus, new species (fig. 27, *a-d*).

Holotype a female, carapace 11 mm. in length by 18 mm. in breadth. Dorsal surface convex, smooth, a few areas demarcated by shallow grooves. Surface of anterior half of carapace microscopically pitted; pits of various sizes, tending to run together on front portion, more conspicuous on frontal, hepatic, and mesobranchial areas, almost none on mesogastric, cardiac, and metabranchial areas.

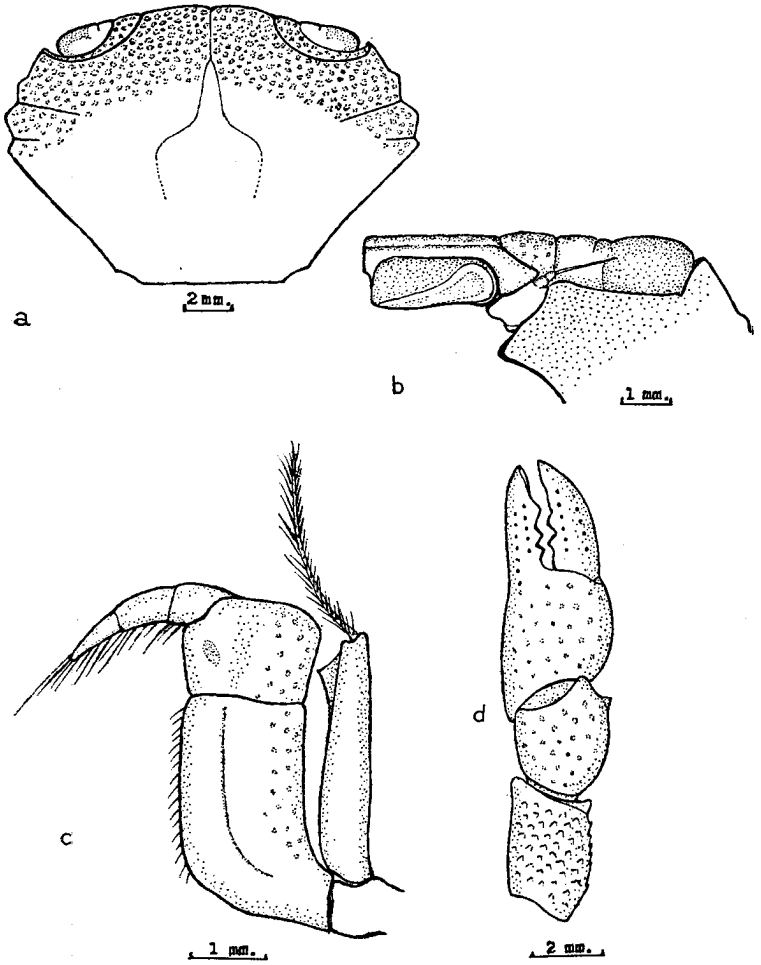

FIGURE 27.—*Carpilodes medipacificus:* **a,** carapace, upper surface; **b,** left half front and ocular region, from below; **c,** outer maxilliped; **d,** left cheliped.

Has a transverse groove immediately behind front border, and gastric and cardiac areas are bounded by very shallow furrows.

Front border smooth, slightly arched, divided in middle by a shallow notch, terminating laterally in a blunt tubercle. Superior orbital border entire, wide mesially, distinctly defined by a furrow. Anterolateral border with four broad, blunt lobes, the fourth being the smallest. Two shallow grooves extend diagonally inward from border, the longer one from between second and third lobes, the shorter one from between third and fourth lobes.

External maxillipeds smooth on outer surface; ischium crossed by a longitudinal furrow; merus broader than long. Chelipeds subequal, of smooth appearance; upper border of merus sharp, serrate; outer surface of carpus finely pitted, a stout tooth at inner angle. Palm short and high, outer surface pitted; fingers longer than upper border of palm, grooved longitudinally, hollowed out at tips, each bearing a few teeth on proximal half of cutting edge. Legs slender, smooth and unarmed; a few bristles on borders of last three segments; dactylus nearly as long as propodus.

Type locality Pearl and Hermes Reef; collector, T. T. Dranga, 1927 (Bishop Mus. coll., Cat. No. 2730).

This specimen seems to be closely related to *Carpilodes guttatus* (de Man) of Amboina (18). From that species, however, it differs in the absence of a furrow separating the gastric and hepatic areas of the carapace; in the more complete separation of the first and second lobes of the anterolateral border; and in the presence of a very stout tooth on the inner border of the carpus of the cheliped, instead of merely a blunt angle.

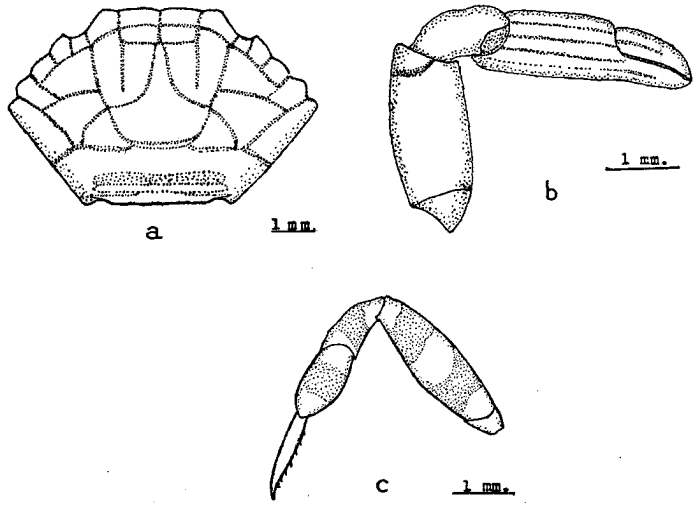

FIGURE 28.—*Carpilodes pallidus:* **a**, carapace, dorsal surface; **b**, right cheliped; **c**, third walking leg.

The natural color of the specimen is doubtful. After more than 20 years in alcohol, the carapace is faded to a pale pink and the chelipeds and walking legs are pale yellow, almost white.

Carpilodes pallidus Borradaile, Zool. Soc. London, Proc., 586, pl. 40, fig. 3, 1900. (See figure 28, *a-c.*)

Carapace about 8 mm. in breadth, sculptured and granulated much as in *Carpilodes rugatus* (Milne Edwards), but furrows not so deep as in that species. Chelipeds equal, granular above, smooth below; outer surface of hand grooved longitudinally. Fingers with several blunt teeth. Legs granular, propodi short, broad, dactyli with short, straight claws.

In living specimen, carapace white, chelipeds deep pink, almost red, fingers white; walking legs with alternating, broad bands of deep pink and white, dactyli white.

The type locality of the species is Rotuma, and it is known from Indian Ocean localities and islands of the south Pacific as far east as Tahiti. Bishop Museum has specimens from reefs of various Line Islands, and from Wake Island. In 1949, a specimen was dredged from off the coast of Oahu at depths of from 10 to 50 fathoms. The species has not been reported from the shallow reefs about Hawaii (Bishop Mus. coll., Cat. Nos. 811, 836, 1407, 1892, 1954, 2064 and 5551).

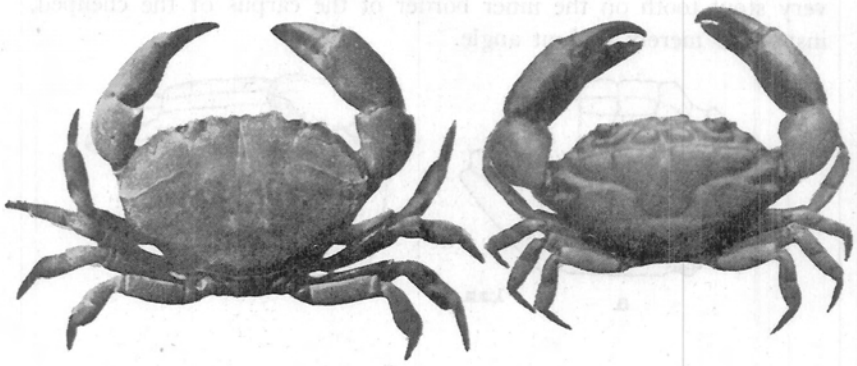

FIGURE 29.—**a**, *Ozius guttatus;* **b**, *Xanthias glabrous.*

Genus **Ozius**

Ozius guttatus A. Milne Edwards, Nouv. Arch. Mus. d'Hist. Nat. Paris, Bull. **9**: 239, pl. 11, fig. 1, 1873. (See figure 29, *a.*)

Carapace transversely oval, slightly convex, areas imperfectly defined, surface finely granular. Front with four small teeth. Anterolateral border with five lobes, including outer orbital angle. First three lobes broad and flat, fourth

and fifth toothlike, the fifth the smallest. A conspicuous granular ridge extends from notch between third and fourth anterolateral lobes inward and forward toward gastric area.

Chelipeds unequal, the right one the stouter, surface smooth, finely granular. Carpus with a blunt tooth at inner angle. Fingers of right hand shorter than upper border of palm; dactylus with a large basal tooth. Fingers of left hand slender, straight, longer than upper border of palm.

The species is known from the Red Sea, Zanzibar, the Palau Islands, Fiji, and Samoa. It has not yet been reported from Hawaii or eastern Polynesia. A young male 34 mm. broad was collected at Tongatabu in 1926 by J. M. Ostergaard (Bishop Mus. coll., Cat. No. 3870).

Genus **Xanthias**

Xanthias tetraodon (Heller) (fig. 30).

Xanthias tetraodon Sakai, Studies on the crabs of Japan IV. Brachygnatha, Brachyrhyncha, 467-468, pl. 91, fig. 5, Tokyo, 1939.

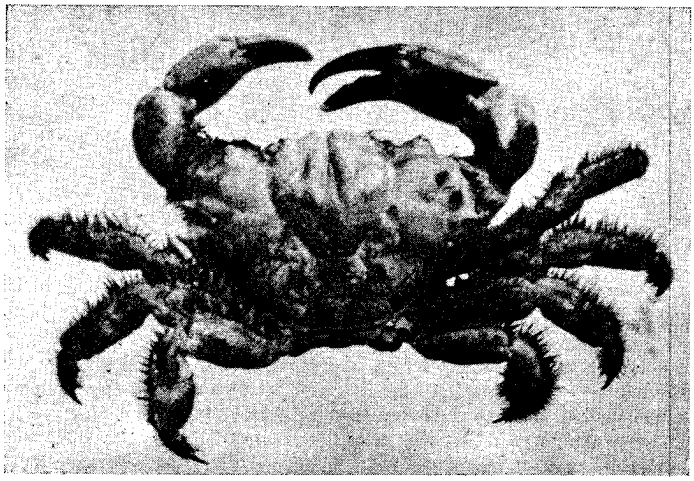

FIGURE 30.—*Xanthias tetraodon.*

Surface of carapace smooth, areas well marked, some slightly inflated. Front with two oblique lobes separated from each other and from inner orbital angles by deep notches. Anterolateral border bearing four tooth-like lobes, besides small external orbital angle. First lobe broad and bluntly pointed, directed outward and forward, the following ones sharper, the last two curving upward and forward.

Chelipeds equal, stout, smooth; inner angle of carpus bearing a double-pointed tooth; outer surface of palm with a longitudinal furrow near the upper border. Fingers long, sharp, curving inward, bearing a few low teeth on cutting edges, black with light tips, color extending well back on sides and lower border of palm. Long yellow hairs fringe margins of merus of chelipeds and front border of walking legs.

The species has a wide range of distribution, being recorded from the Dutch East Indies, Japan, New Zealand, the Marshall Islands, Jaluit, and the Tuamotus. A male specimen 62 mm. broad was collected at Jarvis Island in 1935 by F. D. Coman (Bishop Mus. coll., Cat. No. 4126).

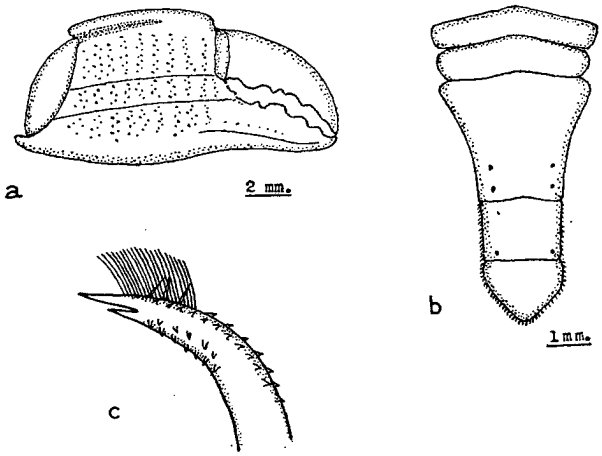

FIGURE 31.—*Xanthias glabrous:* **a**, right cheliped, male; **b**, abdomen, male; **c**, tip of first pleopod, male.

Xanthias glabrous, new species (figs. 29, *b;* 31, *a-c*).

Holotype a male, greatest width of carapace 21 mm., length 13 mm.; carapace moderately convex anteriorly, flat posteriorly; surface smooth and shiny with areas well defined by furrows most of which are broad and deep. Front bilobed, separated in middle by a deep notch, each slightly arched lobe having a submarginal groove resulting in a crestlike margin. Supraocular margin broad, separated from frontal lobe by a shallow groove and provided with two notches, the lateral one the deeper. Postfrontal lobes, gastric, hepatic, branchial, and cardiac areas clearly differentiated, the grooves separating them being broad and deep anteriorly, but less pronounced in posterior region. Protogastric and hepatic areas undivided.

Anterolateral border cut into four rounded lobes separated by broad furrows. First lobe fused with a blunt external orbital angle, third lobe the largest; third and fourth lobes a little more pointed than first or second. Flagellum of antenna short, resting in orbit.

Chelipeds large, subequal; arm smooth, a subterminal notch in upper border. Carpus smooth, outer surface impressed by shallow tri-radiating grooves which do not reach the border; inner angle bearing a stout, blunt tooth. Both outer and inner surfaces of palm microscopically pitted, giving appearance of vertical wrinkles. Outer surface of palm with a longitudinal groove near upper border which terminates before reaching anterior border. Three faint, longitudinal ridges borne on outer surface of hand; one mostly confined to immovable finger, the other two, parallel to each other, traverse the palm about its middle. Fingers stout, gaping but little when closed, their cutting edges bearing teeth of unequal size.

Walking legs slender, smooth; propodus and dactylus subequal in length, the former segment sparsely, the latter one more densely, haired.

Color claret red, with bluish tints at articulations of walking legs; immovable fingers, under surfaces and greater portion of inner and outer surfaces of palms black.

In general appearance, this species is strikingly similar to *Xanthias latifrons* (de Man). (See Sakai, 28.) The color, the front, anterolateral border, and the sculpture of the carapace present, at first sight, the appearance of an oversized example of de Man's species. Careful observation, however, reveals specific differences. The undivided protogastric and hepatic areas distinctly separate the new species from *X. latifrons,* and the comparatively smooth carpus contrasts sharply with the nodular segment of de Man's species. Other differences are seen in the palmar segments. The broad black band encompassing the greater portion of the palm is probably a special feature of the new species.

Type locality, off the southwest coast of Oahu at depths of 40 to 300 feet (Bishop Mus. coll., Cat. No. 5612).

Xanthias oahuensis, new species (figs. 32, *a-e;* 33, *a*).

Holotype a female, breadth of carapace 12 mm., length 8 mm. Areas of anterior portion of carapace well marked and separated by smooth grooves; surface ornamented with rounded granules. Posterior portion of carapace almost smooth, low transversely disposed granules marking the posterolateral areas. Front bowed, more prominent just lateral of the prominent median notch, entire edge granular. Orbit with unbroken granular margin, except for antennal process, and terminating below in a blunt tooth.

A prominent line of granules extends transversely across the protogastric area, and another curves forward and inward from the last anterolateral tooth toward the gastric area. Cardiac area separated from gastric region by a groove, but not distinct from the branchial area.

Anterolateral border of carapace bearing a rounded granular lobe posterior to outer ocular border, followed by three prominent granular teeth, the last being the smallest. Posterolateral border nearly straight, about equal in length to curved anterolateral border. Under surface of carapace smooth, except for a granulated subocular area. Basal antennal segment touching front, with flagellum within orbit.

Chelipeds stout, short, equal; ischium and merus concealed by carapace; outer surface of merus smooth, granular below. Carpus and propodus covered with rounded tubercles; two blunt teeth on inner angle of carpus. Tubercles of outer surface of palm without linear arrangement except for two curved lines near middle, indistinctly enclosing a spindle-shaped granular area. Fingers crossing when closed; dactylus granular at base, strongly curved downward and inward, four small teeth borne on cutting edge; immovable finger with three teeth, distal one largest.

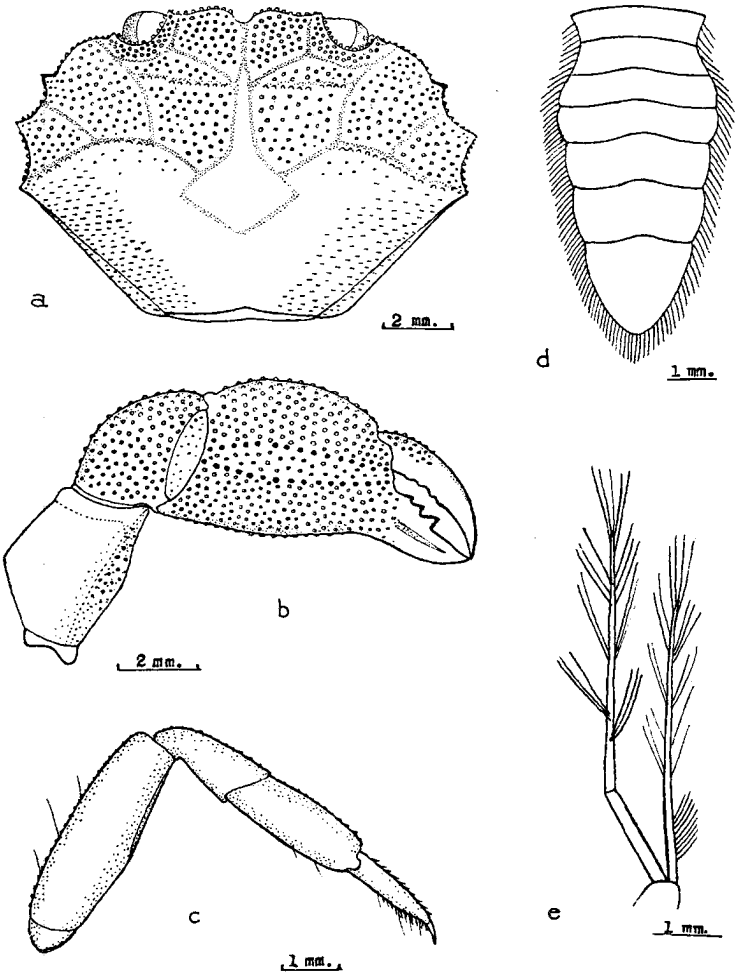

FIGURE 32.—*Xanthias oahuensis:* **a,** carapace, dorsal surface; **b,** right cheliped; **c,** third walking leg; **d,** abdomen of female; **e,** first pleopod of female.

Walking legs slender, long, smooth; upper border of merus sharp, bearing minute granules and a few fine hairs; dactylus about as long as propodus, bearing numerous short spinules and hairs (Bishop Mus. coll., Cat. No. 5273.)

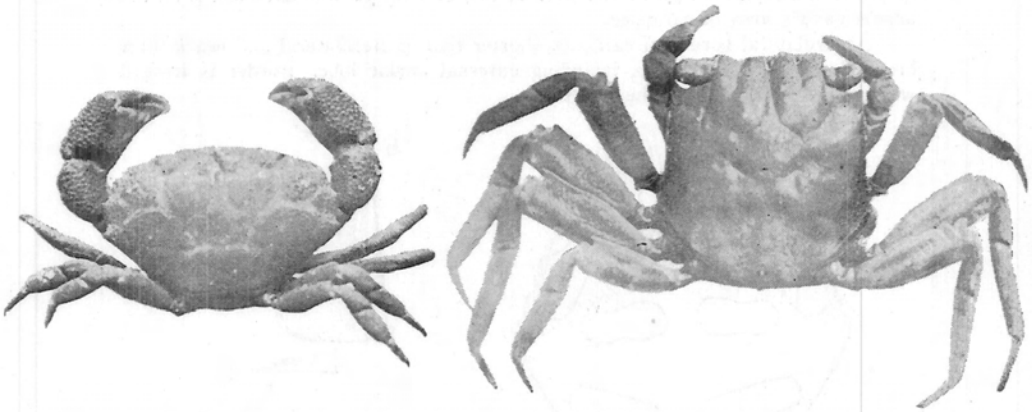

FIGURE 33.—**a,** *Xanthias oahuensis;* **b,** *Sesarma (Sesarma) trapezoidea.*

The specimen, which was taken in shallow water on the reef at Kahala, Oahu, bears close relationship with *Xanthias gilbertensis* Balss (4), reported from the Gilbert Islands. In the Hawaiian species, however, the areas of the anterior part of the carapace are more sharply differentiated, and the disposition of the granules also differs from that of the Gilbert Island species. On the outer surface of the palm of *X. gilbertensis,* the tubercles of the upper half are arranged in longitudinal lines; but this is not true of the Hawaiian form. In the Gilbert Island species the granules of the carapace and appendages seem to be more closely crowded together than in the Hawaiian specimen.

Genus **Pseudocryptocoeloma**

Pseudocryptocoeloma symmetrinudus, new species (fig. 34, *a-d*).

Holotype, a male with carapace 5 mm. in length and 6.5 mm. in breadth, fronto-orbital space 4 mm. Front deflexed, smooth, notched in middle. Just behind front, a transverse line of long yellow hairs extends laterally on the eyestalks. Upper surface of carapace covered with tufts of short hairs, except for eight prominent nude areas arranged in a symmetrical pattern as follows: On either side of midline is an inflated, postfrontal area, longer than wide, bare, and separated from opposite one by a deep furrow. Parallel with each anterolateral border of carapace, including orbital area, is an elongated region, smooth and bare, separated from postfrontal nude area by a furrow filled with short hairs.

Two transversely disposed nude areas occupy postgastric region, one on either side of midline. Tufts of short hairs separate these areas and border them laterally. Postcardiac region is marked by two inflated nude areas, transversely disposed and separated by short hairs. A line of long yellow hairs forms an arc across gastric area of carapace.

Anterolateral border of carapace shorter than posterolateral and bears three broad, low, granulated teeth, including external ocular lobe. Border is fringed with hairs, which conceal the low teeth.

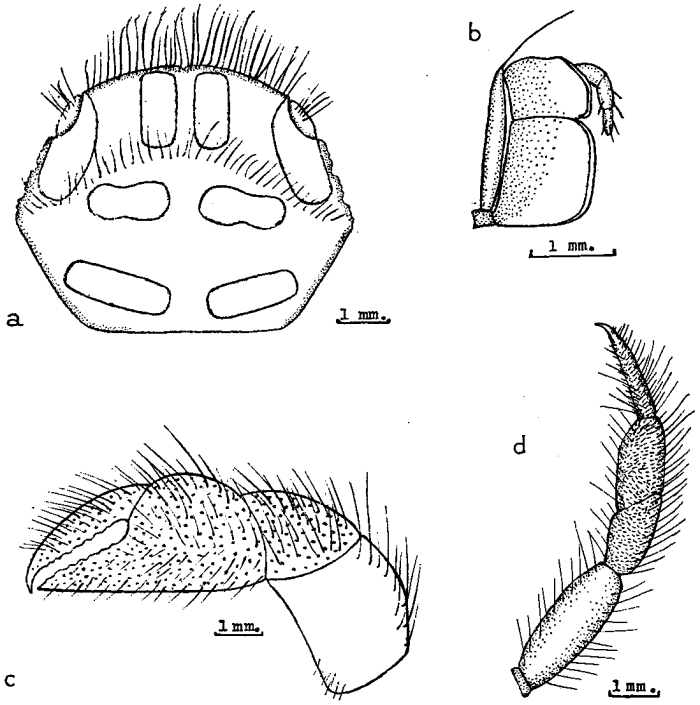

FIGURE 34.—*Pseudocryptocoeloma symmetrinudus:* **a,** carapace, dorsal view, with eight nude areas outlined; **b,** outer maxilliped; **c,** left cheliped; **d,** first walking leg.

Basal segment of antenna in orbital hiatus; antennules large. External maxillipeds filling buccal cavity; ischium longer than broad, merus broader than long; lateral half covered with short hairs, median portion bare with a narrow, clear margin.

One cheliped, the left, remains on the specimen. Arm smooth and bare on outer and inner surfaces, borders fringed with hairs. Carpus sparsely covered with small tubercles and densely haired on outer surface; inner angle terminating in a blunt tubercle. Palm with a short, rounded upper border; upper and outer surfaces densely covered with small tubercles. Fingers compressed, sharp, outer surface bearing tubercles; dactylus longer than immovable finger, strongly curved inward and downward at tip. Cutting edges of both fingers bearing low,

irregular teeth. Outer surface of carpus, palm, and fingers covered with short hairs interspersed with long yellow ones. Walking legs densely covered with short hairs; segments also bearing long yellow hairs.

Type locality, Siufaga, Tau, Samoa, reef table at low tide, 800 feet from shore; collector, Wray Harris, 1937 (Bishop Mus. coll., Cat. No. 5109).

The genus *Pseudocryptocoeloma* was established by Ward (34) in 1936 to provide for the species *P. parvus,* described from Lindeman Island, Queensland. The new species differs from the Australian form in the arrangement of the nude areas of the carapace. In *P. parvus* the entire median and posterior portions of the carapace are bare.

Family GRAPSIDAE

Subfamily VARUNINAE

Genus **Varuna**

Varuna litterata (Fabricius) (fig. 35).

Varuna litterata Alcock, Asiatic Soc. Bengal, Jour. 69 (2) : 401-402, 1900.

Carapace squarish, flat, areas well marked; furrow between gastric and cardiac regions deep, forming a distinct figure H in middle of carapace. Front

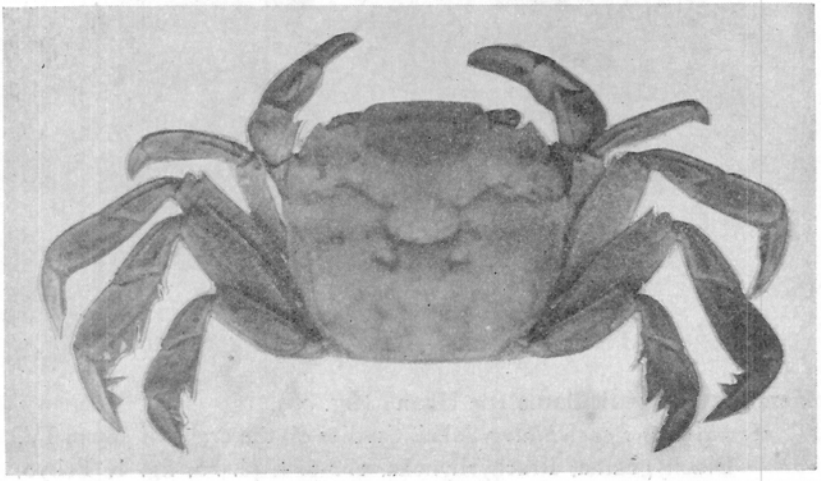

Figure 35.—*Varuna litterata.*

thin, straight; anterolateral border sharp, cut into three broad, flat lobes, including external orbital angle. A spindle-shaped area on the posterolateral border is marked off by a raised line.

Chelipeds equal, upper border of merus with a subdistal notch; carpus with a sharp tooth at inner angle and a smaller one at outer angle of anterior border. Outer surface of palm marked by a shallow longitudinal groove near upper border and a raised line near lower border which extends entire length of immovable finger. Fingers long, thin, bearing numerous teeth on cutting edges. Walking legs thin, flat; propodus and dactylus fringed on posterior border with long hairs.

This highly adaptive crab is not uncommon in the warmer parts of the western Pacific, and ranges from there through the Indian Ocean to the African coast. Its habitats vary from the open ocean, where it clings to floating logs, to brackish water of estuaries; it even ascends into fresh water.

The species has not been recorded from the Hawaiian area or from eastern Polynesia, where its relative, *Planes cyaneus* Dana, which has similar oceanic habits, is well known. A male specimen 23 mm. broad was taken from a fresh-water stream several hundred yards from the sea shore in Suva, Fiji, in 1933 (Bishop Mus. coll., Cat. No. 3973).

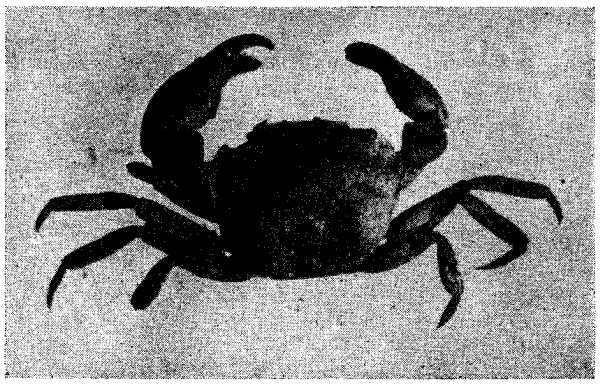

FIGURE 36.—*Hemigrapsus penicillatus.*

Genus **Hemigrapsus**

Hemigrapsus penicillatus (de Haan) (fig. 36).

Hemigrapsus penicillatus Sakai, Studies on the crabs of Japan IV. Brachygnatha, Brachyrhyncha, 673-674, pl. 75, fig. 1, Tokyo, 1939.

Carapace a little broader than long, upper surface convex, smooth, areas fairly well defined, the furrow between gastric and cardiac regions deep. Front slightly sinuose; anterolateral border sharp, cut into three teeth, including ex-

ternal orbital angle; first and second teeth broad, the third the smallest. A facet defined on the posterolateral border by a raised line.

Infraorbital ridge divided into a long inner portion, a shorter middle portion, and an external tubercle. Chelipeds stout and unequal in male specimen; surface smooth, a blunt lobe at inner angle of carpus. Fingers curved inward, bearing numerous rounded teeth on cutting edges; dactylus longer than upper border of palm; a tuft of soft hairs on both inner and outer surfaces at base of fingers in adult male. These tufts of hairs not present in female or young male specimens. Walking legs slender, dactylus a little shorter than propodus.

The type locality of the species is Japan, where, in some areas it is a common littoral crab. It is also known from Formosa and the China and Korean coasts. Six specimens were collected by W. A. Bryan at Laysan Island in 1903. The largest of these, a male, is 23 mm. in breadth of carapace (Bishop Mus. coll., Cat. No. 276).

Subfamily SESARMINAE

Genus **Sesarma**

Sesarma (Sesarma) trapezoidea Guerin (fig. 33, *b*).

Sesarma (Sesarma) trapezoidea de Man, Zool. Jahrb. Syst. **4**: 426, pl. 9, fig. 7, 1889.

Carapace trapezoidal, a little longer than broad. Four prominent postfrontal lobes, about equal in size, concealing true frontal border from above. Surface somewhat convex, areas well marked and slightly inflated individually. Upper surface of carapace covered closely, but not densely, with minute tufts of short hairs; a fringe of longer hairs on lateral borders. External orbital angle tooth-like, followed by a notch in lateral border of carapace. Merus of cheliped triangular in cross section, each border with a blunt subdistal tooth; outer surface scabrous; carpus with wrinkled outer surface and blunt inner angle; palm, in male, inflated, outer surface granular; dactylus twice as long as upper border of palm. Walking legs with outer surface of merus granular and wrinkled; carpus with longitudinal ridges; dactylus shorter than propodus. Lateral borders of antepenultimate and penultimate abdominal segments in male nearly parallel; small terminal segment as long as broad at base.

Among numerous localities from which the species is reported are the following: The Celebes, the Philippines, Amboina, Queensland, Fiji, and Tahiti. Specimens in Bishop Museum are from Fiji (Cat. No. 4538), Tahiti (Cat. No. 2872), and Raiatea (Cat. No. 3958). Of these the largest specimen, a female from Fiji, has a carapace 30 mm. long and 28 mm. broad. The species has not been recorded from Hawaii.

Genus **Clistocoeloma**

Three specimens of an apparently undescribed form of this genus are in Bishop Museum. They present some rather unusual features for the genus, while bearing certain similarities to well-recognized species.

Clistocoeloma suvaense, new species (figs. 37, *a-i;* 38).

Type specimen a male. Carapace approximately square; length, posterior border to declivity of front 18 mm.; height of front 3 mm.; breadth of front 12 mm.; between external orbital angles 18 mm.; greatest breadth, about mid-carapace, 21 mm.

Front abruptly turned down, margin bilobed with a broad median notch; lobes evenly convex, edge turned up. Surface of carapace convex in fore part, flat behind; areas well defined, especially in anterior half, smooth when denuded. Surface concealed by a short black pile interspersed with numerous scattered tufts of short hairs resembling tubercles. Postfrontal lobes subdivided by a shallow longitudinal furrow into two nearly equal portions.

Anterolateral border slightly turned up, edge rounded, somewhat irregular, undulating, with little evidence of teeth or lobes. On right side, a shallow notch behind external orbital angle marks off an obscure lobe; on left side, a corresponding lobe is even less clearly defined. Superior orbital border entire. Antenna excluded from orbit by a junction of front and lower inner angle of orbit. Side walls of carapace hairy and reticulated; here, however, the hairs arise from shallow punctae, the surface being free from granules.

Mandible strongly convex on outer surface, slightly truncate anteriorly; terminal segment of three-jointed palp long, sickle-shaped. Ischium and merus of external maxillipeds subequal in length, each longer than broad, exopodite slender.

Chelipeds massive, subequal; merus triangular in cross section, borders sharp, the inner one with low blunt teeth; carpus rectangular in lateral view, inner angle a low, serrated lobe, a few minute teeth lower down on inflated inner border. Height of palm twice that of length of upper border, outer surface convex, smooth, marked by numerous minute punctae; upper border obliquely traversed by a pectinate ridge extending nearly to anterior margin; mesial of this ridge is the upper serrated margin of palm which arches forward to anterior border. Inner border of palm slightly inflated, a vertical row of granules parallel with front border but a little distance from it. Fingers stout, smooth, with horny tips and a wide space between when closed; teeth on cutting edges low and irregular; dactylus milled on upper border with 25 lamellae. Outer borders of merus and carpus of cheliped covered by scattered tufts of short hairs, and a few similar tufts borne on outer surface of palm close to upper border.

Walking legs slender, densely covered with short hairs, the meropodites tufted as is carapace; dactyli only a little shorter than propodites. Margin of penultimate segment of abdomen slightly concave for reception of narrow terminal segment. In female, the terminal segment of abdomen is sunk for half its length into the penultimate one. First pleopods of male straight and stout.

I took two specimens of this form, a male and a female, on a reef in Suva Harbor in 1933, and a male specimen was collected

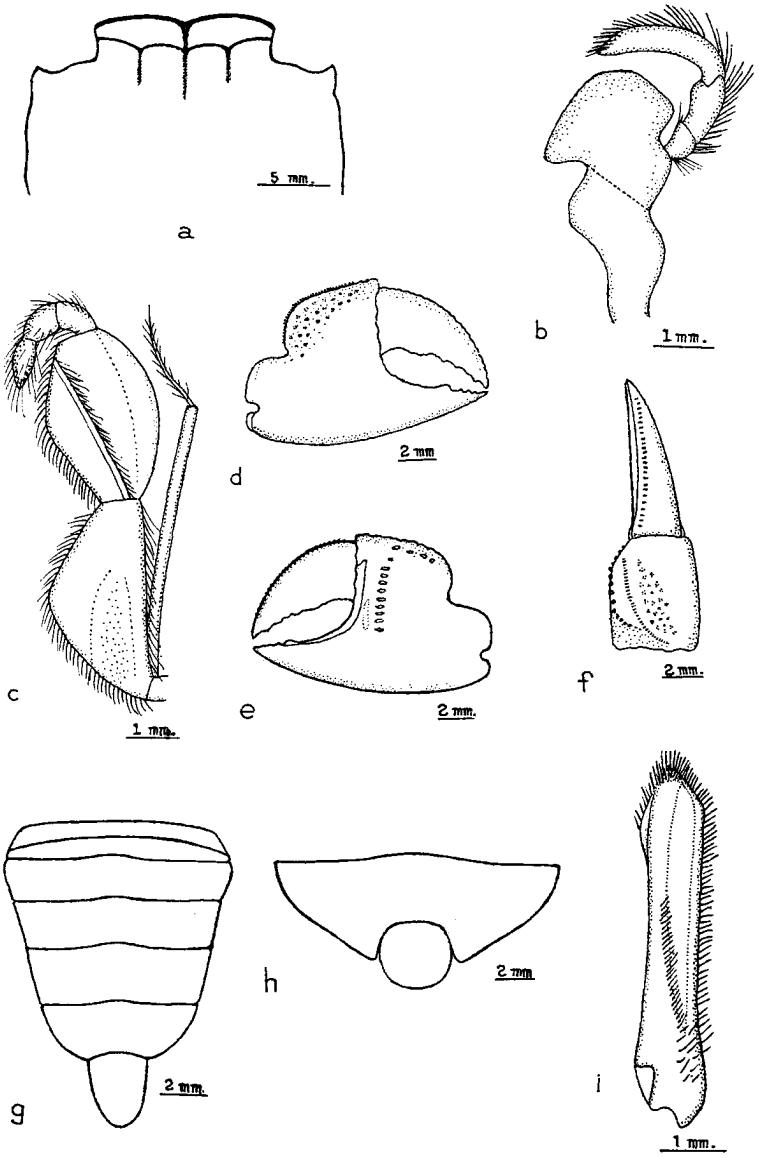

FIGURE 37.—*Clistocoeloma suvaense:* **a,** outline of forepart of carapace; **b,** mandible; **c,** outer maxilliped; **d,** outer surface of hand; **e,** inner surface of hand; **f,** dorsal border of hand; **g,** abdomen, male; **h,** tip of abdomen, female; **i,** first pleopod, male.

on a Samoan reef by Otto Swezey and G. P. Wilder in 1923 (Bishop Mus. coll., Cat. Nos. 3976, 1710).

Apparently but three species of the genus have been recognized in the Indo-Pacific area up to this time: *C. balansae* A. Milne Edwards; *C. merguiense* de Man; and *C. tectum* (Rathbun), described as *Sesarma* (*Sesarma*) *tectum*.

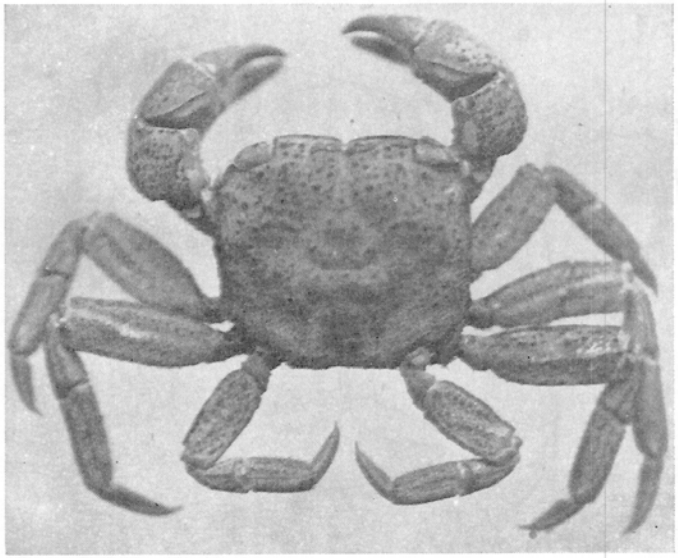

FIGURE 38.—*Clistocoeloma suvaense.*

The species here described differs from *C. balansae* in having the outer postfrontal lobes entire, in the massive character of the chelipeds, in the wide gap between the fingers when closed, and in the greater number of lamellae on the upper border of the dactylus of the cheliped. There is a marked difference between the new species and *C. merguiense* in the shape of the carapace; in *C. merguiense,* the carapace is decidedly broader than long. Also, de Man's species is a smaller form. *C. suvaense* differs from *C. tectum,* a Philippine species, in that the surface of the carapace is free from tubercles; in the even, entire character of the margin of the frontal lobes; in the greater number of lamellae on the upper borders of dactyli of chelipeds; in the disposition of the hairs on the borders of the walking legs; and in the shape of the abdomen of the male.

There is a pronounced difference in the anterolateral borders of the carapace of the new species from each of the previously recognized Indo-Pacific forms. In both Fijian specimens, lobes of the anterolateral borders are ill defined, whereas in the Samoan specimen, a male 18 mm. broad, no lobes or teeth are differentiated behind the outer orbital angles.

Although the Samoan specimen appears to be identical with those from Suva in most respects, a few variations are to be noted. These variations, however, may possibly be explained as individual or age differences. In the smaller Samoan form, only 16 lamellae ornament the upper border of the dactylus of the cheliped, and the gap between the fingers when closed is less than in the Fijian specimens.

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