

CONTRIBUTIONS TO THE NATURAL HISTORY OF THE ISOPODA.

By HARRIET RICHARDSON.

Collaborator, Division of Marine Invertebrates.

V.

ISOPOD CRUSTACEANS OF THE NORTHWEST COAST OF NORTH AMERICA.^a

The present paper contains a list of the Isopods collected by the Harriman Alaska Expedition, and in addition a number of species from California received from Dr. William E. Ritter, head of the zoological department of the University of California. Five species are described as new. A little-known species, *Idotea gracillima* (Dana) is figured for the first time and described more fully than heretofore; and *Asellus tomalensis* (Harford) also is redescribed and figured.

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- DANA, JAMES D. *Crustacea United States Exploring Expedition during the years 1838-42 under the command of Charles Wilkes, U. S. N.*, Philadelphia, XIV, Pt. 2, 1853, pp. 704, 742, 778, pl. XLVI, fig. 6; pl. XLIX, fig. 7; pl. LI, fig. 4.
- *Catalogue and Descriptions of Crustacea collected in California by Dr. John L. Le Conte*. *Proc. Acad. Nat. Sci. Philad.*, VII, 1854-55, pp. 175-177.
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^a Reprinted from the Harriman Alaska Expedition, X, *Crustacea*, 1904.

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- Descriptions of Three New Species of Sessile-eyed Crustacea, with remarks on *Ligia occidentalis*. Proc. Cal. Acad. Sci., VII, 1877, p. 116.
- LOCKINGTON, W. N. Description of Seventeen New Species of Crustacea. Proc. Cal. Acad. Sci., VII, 1877, p. 46.
- MIERS, E. J. On a Collection of Crustacea Decapoda and Isopoda, chiefly from South America, with descriptions of New Genera and Species. Proc. Zool. Soc. London, 1877, p. 671 (footnote).
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- Descriptions of New Marine Invertebrates from Puget's Sound collected by naturalists of the Northwest Boundary Commission. Proc. Acad. Nat. Sci. Philad., XVI, 1864, p. 155.
- WALKER, ALFRED O. Crustacea collected by W. A. Herdman in Puget Sound, Pacific Coast of North America, September, 1897. Trans. Liverpool Biological Soc., XII, 1898, pp. 280-281, pl. xv, figs. 7-10.

FLABELLIFERA or CYMOTHOIDEA.

Family CIROLANIDÆ.

CIROLANA HARFORDI (Lockington).

Eggs harfordi LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 46.

Cirolana californica HANSEN, Vidensk. Selsk. Skr., 6th ser., natur. og math. Afd., V, 1890, pp. 338-339, pl. III, figs. 2-2f.

Cirolana harfordi RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, pp. 822-823.

Locality.—Wilson Cove, California. (Dr. Ritter and party.)

Family ÆGIDÆ.

ROCINELA BELLICEPS (Stimpson).

Ega belliceps STIMPSON, Proc. Acad. Nat. Sci., Philad., XVI, 1864, p. 155.

Ega alaskensis LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 46.

Rocinela alaskensis RICHARDSON, Proc. Am. Phil. Soc., XXXVII, 1898, p. 11.

Rocinella belliceps RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 827.

Locality.—Yakutat, Alaska. (Harriman Alaska Expedition.)

Family CYMOTHOIDÆ.

LIVONECA VULGARIS Stimpson.

Livoneca vulgaris STIMPSON, Bost. Journ. Nat. Hist., VI, 1857, p. 508, pl. xxii, fig. 9; Proc. Bost. Soc. Nat. Hist., VI, 1859, pp. 88, 89.—SCHWEDTE and MEINERT, Naturhistorisk Tidsskrift, XIV, 1883-1884, pp. 344-349, pl. xiv, figs.

1-5.—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 830.

Locality.—San Francisco Bay. (Dr. Ritter and party.)

Family SPHÆROMIDÆ.

DYNAMENE TUBERCULOSA Richardson.

Dynamene tuberculosa RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 833.

Locality.—Bodega Bay, California. (Dr. Ritter and party.)

SPHÆROMA OREGONENSIS Dana.

Sphæroma oregonensis DANA, Proc. Acad. Nat. Sci. Philad., VII, 1854-55, p. 177;

U. S. Expl. Exp., 1853, Crust., Pt. 2, XIV, p. 778, pl. LI, fig. 4.—STIMPSON,

Bost. Journ. Nat. Hist., VI, 1857, p. 509.—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 836.

Localities.—Pöpop Island (from fresh water), Yakutat, and Glacier Bay, Alaska; Greenville Channel and Lowe Inlet, British Columbia (Harriman Alaska Expedition).

SPHÆROMA PENTODON, new species.

Body elliptical in outline; color dark brown; surface minutely but densely granular.

Head transversely situated, with a prominent ridge on the anterior margin. Eyes post-laterally placed, and composed of many ocelli. First pair of antennæ extend to the posterior margin of the head; flagellum, eight jointed. Second pair of antennæ reach the middle of the second thoracic segment; flagellum composed of fifteen joints.

Segments of the thorax about equal in length, with the exception of the first, which is somewhat longer than any of those following. The lateral parts, which are not distinctly separated from the dorsal parts

of the segments, are drawn out in acute processes in the first three segments; those of the following segments are more nearly regular in outline.

The abdomen is somewhat broader than the thorax, although this expansion of the abdomen does not show in a dorsal view. The first segment is about equal in length to the last thoracic segment, and is marked on either side by two suture lines, indicative of coalesced segments. The terminal segment is entire and not produced, being evenly rounded in outline. The anterior portion of the segment is convex, with a longitudinal series of four small tubercles on either side of the median line, the two series being close together. The posterior extremity of the segment is marked by a prominent transverse elevation.

The inner immovable branch of the uropoda is narrow, elongate, and pointed posteriorly; it extends to the extremity of the abdomen. The

outer mobile branch is furnished on its lateral margin with five strong teeth. Both branches are of equal length.

The first three pairs of legs are slender and are furnished with long hairs. The other four pairs are somewhat stouter.

Ten specimens were collected at Sausalito, California, by Dr. Ritter and party.

This species is perhaps more closely related to *Spheroma sieboldii* Dollfus^a from Japan than it is to any of the known species

of the genus from the Pacific coast of North America. It differs, however, from that species in having a prominent transverse elevation on the posterior portion of the terminal segment, while in *S. sieboldii* the posterior part of the segment is distinctly concave; in having five teeth on the lateral margin of the outer uropod, while in *S. sieboldii* there are seven; in having fifteen joints to the flagellum of the second pair of antennæ, this organ in *S. sieboldii* having a flagellum composed of only ten joints; in having two longitudinal series of four small tubercles, one on either side of the median line on the terminal abdominal segment, while in *S. sieboldii* the granulations on the caudal segment form, in the middle, two divergent lines; and in having the body covered with minute granulations, in *S. sieboldii* the granulations being strong and more prominent.

The type is in the Museum of the University of California. The co-type is in the U. S. National Museum, Cat. No. 28768.

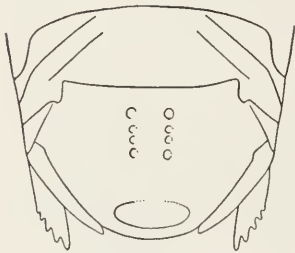


FIG. 1.—ABDOMEN OF SPHEROMA
PENTODON. $\times 8$.

^a Notes from the Leyden Museum, XI, 1889, pp. 93-94, pl. v.

VALVIFERA OR IDOTEOIDEA.

Family IDOTEIDÆ.

CHIRIDOTEA ENTOMON (Linnæus).

- Oniscus entomon* LINNÆUS, Syst. Nat., 12th ed., II, 1766, p. 1060.—PALLAS, Spicil. Zool., IX, 1772, p. 64, pl. v, figs. 1-6.
- (?) *Entomon pyramidale* KLEIN, Rem. sur les Crustacés, figs. 1-3.
- Squilla entomon* DE GEER, Mém. pour servir à l'Hist. des Insectes, VII, 1778, p. 514, pl. xxxii, figs. 1-10.
- Asellus entomon* OLIVIER, Encycl. Méth., 1789, p. 253.
- (?) *Cymothoa entomon* FABRICIUS, Ent. Syst., II, 1793, p. 505.
- Idotea entomon* BOSCH, Hist. Nat. des Crust., II, 1802, p. 178.—LATREILLE, Hist. Nat. Crust. et Ins., VI, 1803-4, p. 361; VII, pl. LVIII, figs. 2, 3.—(?) LAMARCK, Hist. des Anim. sans Vert., 1st ed., V, 1818, p. 159.—(?) DESMAREST, Consid. Crust., 1825, p. 289.—RATHKE, Nueste Schriften der naturf. Gesellsch. in Danzig, I, 1820, p. 109, pl. IV.—KRØYER, Vid. Selsk. Skrift., VII, 1838, p. 323.—MILNE EDWARDS, Hist. Nat. Crust., III, 1840, p. 128.—KRØYER, Nat. Tidsskr., II, 1847, p. 402.—WHITE, List Cr. Brit. Mus., 1847, p. 93.—BRANDT, Cr. in Middendorff's Sibirische Reise, II, Pt. 1, 1851, p. 145.—MEINERT, Nat. Tidsskr., 3d ser., XI, 1877, p. 84.—BRANDT, Comptes Rendus, 1880, p. 713; Ann. Mag. Nat. Hist., VI, 1880, p. 98.
- (?) *Saduria entomon* ADAMS, in White, Sunderland's Voyage Baffin's Bay, etc., Appendix, 1852, p. ccvii.
- Idotaga longicauda* LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt 1, p. 45.
- Glyptonotus entomon* MIERS, Trans. Linn. Soc. London, XVI, 1883, pp. 12, 13, pl. 1, figs. 1, 2 (see Miers for above synonymy).—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 843.

Localities.—St. Michael, Alaska (Dr. Ritter); Yakutat Bay, Alaska (Harriman Alaska Expedition.)

IDOTEA RESECATA Stimpson.

- Idotea resecata* STIMPSON, Bost. Journ. Nat. Hist., VI, 1857, pp. 504-505, pl. xxii, fig. 7; Proc. Bost. Soc. Nat. Hist., VI, 1859, p. 88.—MIERS, Journ. Linn. Soc. London, XVI, 1883, pp. 45-46.—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 844.

Locality.—Tomales Bay, California. (Dr. Ritter and party.)

IDOTEA GRACILLIMA (Dana).

- Stenosoma gracillimum* DANA, Proc. Acad. Nat. Sci. Philad., 1854-55, VII, p. 175.—STIMPSON, Bost. Journ. Nat. Hist., VI, 1857, p. 505.
- Idotea gracillima* MIERS, Journ. Linn. Soc. London, XVI, 1883, p. 35.—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 844.

Locality.—California (Dana).

The description of this species given by Professor Dana is very short and rather vague. He describes the body as extremely narrow and filiform, the thoracic segments subquadrate, head quadrate. He refers to the linear post-abdomen, which is truncated at the apex, is three-jointed, and marked on either side with a suture. The antennæ

are described as being a little shorter than half the body, with a ten to twelve jointed flagellum.

No figure of the form has ever been given.

A species of *Idotea* was sent to the U. S. National Museum by Dr. Ritter. The specimens, which are eight in number, were collected by him at Bolinas, California. They are more closely allied to *I. gracillima* than to any other known species of *Idotea* from the Pacific coast of North America. Until evidence can be given of their distinctness, I shall consider them identical with *I. gracillima*.

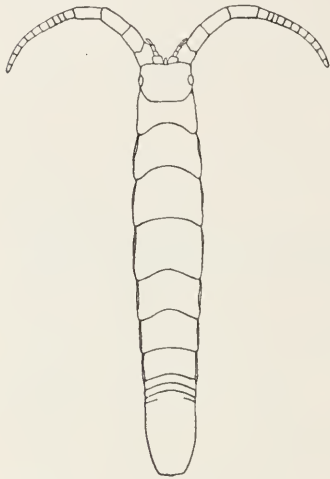


FIG. 2.—*IDOTEA GRACILLIMA* (DANA).
× 5.

Description.—Body slender, about seven times longer than wide,^a with the sides nearly parallel. Surface entirely smooth; color in alcohol uniformly pinkish. A note referring to the color of the specimens in life states that they are green, brown, and striped.

Head quadrate, with rounded antero-lateral margins, and a slight median excavation in the anterior margin. Eyes situated at the extreme lateral edge and

about the middle of the head; they are small, but distinct. The first pair of antennae are four-jointed and extend a little beyond the extremity of the second peduncular joint of the second pair of antennae. The second pair of antennae are equal to half the length of the body; the last two joints of the peduncle are subequal; in the smaller specimens the flagellum is composed of ten joints; in the larger ones there are eighteen joints.

The first thoracic segment is short in the middle but is produced antero-laterally on either side; it is not wider than the head. The second, third, and fourth segments are subequal in length, and are longer than the first segment. The fifth, sixth, and seventh segments gradually decrease in length. The epimera of all the segments are extremely narrow; those of the second and third segments extend but half the length of the segment; those of the fourth and fifth segments extend three-fourths the length of the segment; those of the last two segments extend the entire length of the segment.



FIG. 3.—ABDOMEN OF *IDOTEA GRACILLIMA*, SHOWING VARIATIONS.

^a The female is figured. The body is somewhat broader than in the male.

The abdomen consists of three distinct segments, with suture lines on either side of another coalesced segment. The third or terminal segment has subparallel sides to about the middle, where the segment gradually becomes narrower to a truncate extremity. On the posterior margin of the terminal segment is a faint indication of a double emargination on either side of an obtuse median point.

Legs small and slender and devoid of hairs.

The five small specimens and one large one agree in having the terminal segment as described above. The two larger specimens show the emargination more distinctly, one of the specimens more so than the other. Figures, showing all three variations, are given.

The specimens agree in all other characters.

Dana's specimens were collected by Prof. J. Le Conte on the coast of California.

IDOTEA WOSNESENSKII Brandt.

Idotea wosnesenskii BRANDT, Middendorff's Sibirische Reise, II, Pt. 1, 1851, Crust., p. 146.

Idotea hirtipes DANA, Cr. U. S. Expl. Exp., XIV, Pt. 2, 1853, p. 704, pl. XLVI, fig. 6.

Idotea oregonensis DANA, Proc. Acad. Nat. Sci., Philad., VII, 1854, p. 175.

Idotea wosnesenskii STIMPSON, Bost. Journ. Nat. Hist., VI, 1857, p. 504.

Idotea wosnesenskii SPENCE BATE, Lord's Naturalist in British Columbia, II, 1866, p. 281.—MIERS, Journ. Linn. Soc. London, XVI, 1883, p. 40.—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 846.

Localities.—Dutch Harbor on Unalaska Island; Humboldt Bay on Popof Island; Yakutat; Garforth Island in Muir Inlet, and Sitka, Alaska; Beaver Cove, on Vancouver Island; (Harriman Alaska Expedition.) Lands End, California. (Dr. Ritter and party.)

IDOTEA STENOPS Benedict.

Idotea stenops BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 54-55.—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 846.

Locality not given. (Dr. Ritter and party.)

IDOTEA OCHOTENSIS Brandt

Idotea ochotensis BRANDT, Middendorff's Sibirische Reise, II, Pt. 1, 1851, Crust., p. 145, pl. VI, fig. 33.—MIERS, Journ. Linn. Soc. London, 1883, XVI, pp. 32-34, pl. I, figs. 8-10.—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 846.

Localities.—Lands End and Fort Point, California. (Dr. Ritter and party.) Humboldt Bay on Popof Island, Alaska. (Harriman Alaska Expedition.)

SYNIDOTEA RITTERI, new species.

Body, ovate in outline. Color, yellow, with markings of black; terminal segment almost entirely black.

Head with prominent, rounded antero-lateral angulations, at base of which, and just above the eyes, is a conspicuous horn-like projection,

hook-shaped, directed upward and forward, one on either side of the head. In the median excavation of the frontal margin on either side of the median line is a prominent tubercle. Between the eyes and in line with them on the posterior portion of the head are two low tubercles. The eyes are situated at the extreme lateral margins on the posterior portion of the head, and are somewhat elevated above the surface; they are black and conspicuous, and composed of many ocelli. The first pair of antennæ consist of four joints, the last joint being clavate and fringed with hairs; the second pair of antennæ have a five-jointed peduncle, and a flagellum composed of eight joints; the third joint of the peduncle has a prominent tubercle.

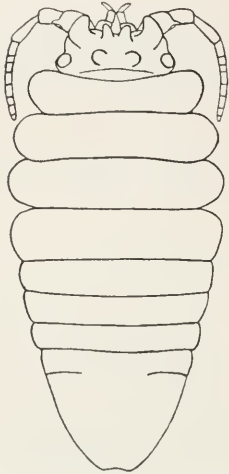


FIG. 4.—SYNIDOTEA RITTERI.
× 10.

The first four segments of the thorax are longer than the last three. The lateral parts of all the segments are widely expanded, with margins well rounded. The lateral parts are not separated from the dorsal portion of the segments, but are firmly-anchylosed.

The abdomen consists of one segment, with suture marks, one on either side, indicative of another partly coalesced segment. The abdomen tapers gradually to a broadly rounded extremity, which is slightly excavate in the median line.

The seven pairs of legs are but sparingly furnished with hairs. The upper half of the opercular valve is black, the lower half yellow.

There are three longitudinal lines of low swellings on the body, one median, the other two placed one on either side of the median line.

Only one specimen was taken at Lands End, California, by Dr. Ritter and party.

This species is closely allied to *Synidotea consolidata* (Stimpson),^a but differs from that species in the shape and greater size of the tubercles in front of the eyes, the tubercles being hook-shaped and very prominent in *S. ritteri* and projecting far in front of the anterior margin of the head, while in *S. consolidata* they are small (Stimpson speaks of them as being minute), are not hooked, and do not project any considerable distance in front of the anterior margin of the head; in the greater size of the two median tubercles on the anterior division of the head (Stimpson does not mention these tubercles in his description, but in the specimens sent to the U. S. National Museum from Pacific Grove, California, by Mr. J. O. Snyder, and which



FIG. 5.—HEAD OF (a) SYNIDOTEA RITTERI
AND OF (b) *S. CONSOLIDATA*. × 10.

^a Proc. Cal. Acad. Sci., I, 1856, p. 97; Bost. Journ. Nat. Hist., VI, 1857, p. 503.

Dr. James E. Benedict has identified with *S. consolidata*, and figured in his paper on the genus *Synidotea*,^a these tubercles are present, but very minute); in the shape of the terminal segment of the body, it being much broader, and tapering very gradually to a broadly rounded extremity, which has a slight median notch

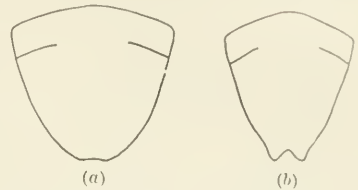


FIG. 6.—ABDOMEN OF (a) *SYNIDOTEA RITTERI* AND OF (b) *S. CONSOLIDATA*. $\times 10$.

or excavation in *S. ritteri*, while in *S. consolidata* the terminal segment of the body is narrower, and tapers to an extremity marked by two pronounced teeth or angulations separated by a deep median notch.

Specimens of the same size were taken in making the above comparisons.

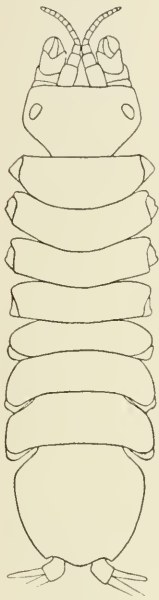


FIG. 7.—*JANIROPSIS KINCAIDI*. $\times 20\frac{1}{2}$.

ASELLOTA or ASELOIDEA.

Family JANIRIDÆ.

JANIROPSIS KINCAIDI, new species.

Color of body light brown, profusely and densely covered with black markings.

Head wider than long; frontal margin nearly straight, with lateral angles rounded. Eyes large, black, situated some little distance from the lateral margin. First pair of antennæ short; flagellum consisting of only eight joints in the female, of ten in the male. Second pair of antennæ lost in all the specimens.

Maxillipeds with palp consisting of five joints, the first three of which are very much dilated.

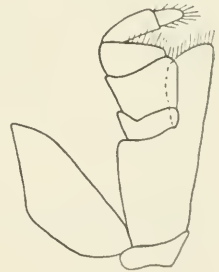


FIG. 8.—MAXILLIPED OF *JANIROPSIS KINCAIDI*. $\times 77$.



FIG. 9.—LAST THORACIC SEGMENT, ABDOMEN, AND UROPODA OF *JANIROPSIS KINCAIDI*. $\times 20\frac{1}{2}$.

First segment of thorax with lateral margins straight; epimera rather bilobed and occupying most of the lateral margin of the segment. Second, third, fourth and fifth segments with antero-lateral angles produced into rounded lobes. Epimera of second and third segments situated about the middle of the lateral margin; those of the fourth and fifth segments occupying more of a posterior position on the lateral margin. Epimera of the last two segments situated at the post-lateral angles of the segments.

^a Proc. Acad. Nat. Sci. Philad., 1897, p. 393.

Abdomen broad, gradually becoming somewhat narrower toward the posterior extremity. Posterior margin produced in three lobes, two lateral lobes, one on either side of a broadly rounded median lobe; the two lateral lobes are acute. The uropoda are short, not longer than half the length of the terminal segment of the body; the basal segment is broad, quadrate in shape, and shorter than either branch; the inner branch is somewhat longer than the outer one. The middle piece of the operculum in the male is very similar to the figure given by Sars^a of the type species of the genus, *Janiropsis breviremus*. It is produced and greatly dilated at the distal extremity.



FIG. 10.—UROPOD OF *JANIROPSIS KINCAIDI*. $\times 77$.

Nine specimens were obtained by the Harriman Alaska expedition at Yakutat, Alaska. They were collected by T. Kincaid, after whom the species is named. Five females and four males were collected. The first pair of legs in the male are not greatly longer

than the others; they are longer in the type species of *Janiropsis*.

The very short superior antennæ with few articulations, the greatly dilated joints of the maxillipeds, the form and shape of the middle piece of the male operculum with its dilated tip and the shortness of the uropoda, which are only half the length of the terminal segment of the body, are characters which undoubtedly place this species with *Janiropsis* Sars.

Type.—Cat. No. 28,717, U.S.N.M.

JANIROPSIS CALIFORNICA, new species.

Body narrow, elongate. Surface smooth; color uniformly whitish.

Head with a prominent rounded median lobe on the anterior margin; lateral angulations rounded; lateral margins straight and converging toward the base. Eyes black, distinct, but small, and simple in structure. First pair of antennæ are composed of six joints, and extend



(a)



(b)



(c)

FIG. 11.—*JANIROPSIS KINCAIDI*; a, MIDDLE PIECE OF MALE OPERCULUM; b, LATERAL PLATE OF MALE OPERCULUM; c, SECOND PLEOPOD OF MALE. $\times 41$.

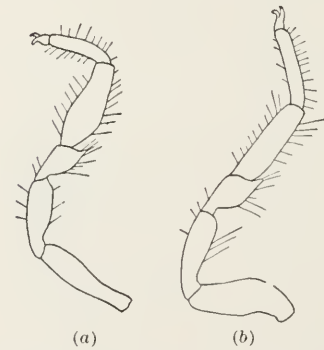


FIG. 12.—*JANIROPSIS KINCAIDI*; a, LEG OF FIRST PAIR; b, LEG OF SECOND PAIR. $\times 27$.

^a Crustacea of Norway, II, 1899, p. 102.

nearly to the middle of the fifth joint of the peduncle of the second pair of antennæ. Second pair of antennæ are about equal to one-third the length of the body; the flagellum is composed of nineteen or twenty joints.

The first thoracic segment is but little wider than the head; the margins are entire, with rounded lateral lobes. The second segment has the lateral margin straight with the epimeron showing slightly along the edge. The third and fourth segments have the antero-lateral lobe rounded, the posterior margin straight, with the epimeron showing as a rounded lobe. The fifth, sixth, and seventh segments have rounded lateral margins with epimera showing on the posterior part of the segments.

The terminal segment is rounded posteriorly with smooth margins and a median lobe between the uropoda.

Uropoda very short, about half as long as the terminal segment. Branches about equal in length, and twice as long as the peduncle.

Legs simple, ambulatory, similar in shape and size, and biunguiculate.

Only two good specimens, both females, were taken at Sausalito, California, by Dr. Ritter and party. Two imperfect specimens also are from the same locality.

Until now the only other known species of this genus was *Janiropsis breviremis* Sars.^a As that author has pointed out, this genus differs from *Janira*, to which it is very closely related, in the much shorter uropoda; in the shorter second pair of antennæ; in the structure of the first pair of antennæ, which have the flagellum composed of only a restricted number of articulations; in the structure of the first pair of legs in the male, these being "remarkably developed, prehensile, much longer than any of the other pairs, with the carpal joint fusiformly dilated"—in the female, however, this pair do not differ from the other legs, all being ambulatory in character; in the greatly dilated joints of the maxillipeds, and in having the tip of the middle piece of the male operculum produced and dilated at the distal extremity.



FIG. 13.—ANTERIOR PART OF BODY OF JANIROPSIS CALIFORNICA. $\times 27$.

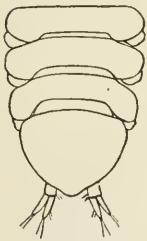


FIG. 14.—POSTERIOR PART OF BODY OF JANIROPSIS CALIFORNICA. $\times 27$.

JANIRA OCCIDENTALIS Walker.

Janira occidentalis WALKER, Trans. Liverpool Biological Soc., XII, 1898, pp. 280-281, pl. xv, figs. 7-10.—RICHARDSON, Proc. U. S. Nat. Mus., XXI, 1899, p. 859.

Locality.—Puget Sound. (Harriman Alaska expedition.)

^aCrustacea of Norway, II, 1899, p. 98.

Family ASELLIDÆ.

ASELLUS TOMALENSIS Harford.

Asellus tomalensis HARFORD, Proc. Cal. Acad. Sci., VII, 1877, pp. 54-55.

The description of this form is given in the following concise manner:

Head a little transverse, narrower than the body. Upper antenna not reaching to the extremity of the peduncle of the lower. Flagellum of lower antenna longer than its peduncle. Body narrow in front, gradually increasing in width toward the tail.

Peduncle of caudal appendages more than half the length of the terminal filaments. Length six-twentieths inch.

The description is from a single specimen.

Eight specimens of a species of *Asellus* were collected by the Harri-man Alaska expedition at Lake Washington, Seattle. I have referred them to the above species, being unwilling to describe a new species of *Asellus* from a locality so close to that from which *A. tomalensis* was found (Tomales Bay, California), when so little is known about *A. tomalensis*. Some of the specimens were sent to Dr. William E. Ritter for comparison with the type and only specimen of *A. tomalensis* in the collection of the California Academy of Sciences. The result of his comparison is given in the following quotation from his letter:

About the only difference that I am able to make out is in the fact that the inner ramus of the sixth pleopods (uropods?) of *A. tomalensis* is about half as long as the exopodite and that neither is armed with a tuft of hairs at the tip. This is the case with the one appendage present, but its mate is gone. It is possible that the hair tuft may have been broken off, but the tips of the rami themselves are perfectly smooth. They show no evidence of having lost anything.

The fact, however, that the general hairiness of the Academy specimen is about the same as that of your specimen makes me suspicious that the tuft referred to has been removed. The antennæ and antennules differ in no essential respect so far as I can see. The chelipeds of the type specimen I am unfortunately unable to find.

Description of specimens.—Body narrow, elongate, gradually widening somewhat from the anterior to the posterior extremity.

Head but little narrower than the first thoracic segment and about twice as wide as long; frontal margin slightly excavate and without

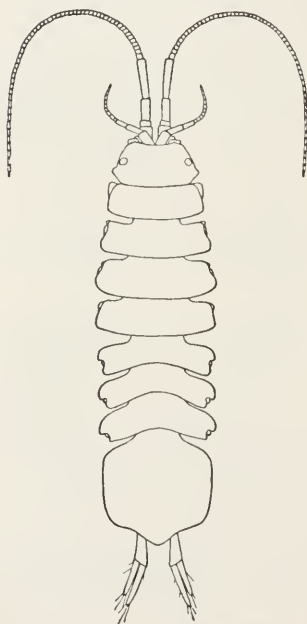


FIG. 15.—ASELLUS TOMALENSIS HARFORD. $\times 9$.

median process between the antennæ; lateral margins straight, with a small lobe on either side near the base of the head. Eyes lateral, situated in the median transverse line. First pair of antennæ reach the extremity of the peduncle of the second pair of antennæ; flagellum contains about ten joints. Second pair of antennæ are about two-thirds the length of the body; the flagellum consists of about fifty-five joints.

The first segment of the thorax has the epimeral lobes distinct and visible from a dorsal view at the antero-lateral angles of the segment. In the second and third segments the epimera are bilobed and occupy the anterior portion of the lateral margins. In the fourth segment the epimeron is a small lobe situated at the antero-lateral extremity of the segment. In the fifth and sixth segments the epimeron is a small lobe about the middle of the lateral margin. In the seventh segment it has more of a posterior position on the lateral margin.

The abdomen is broad, with the sides nearly parallel. Posteriorly it is produced in the center in a large triangularly shaped lobe with rounded apex. The uropoda are slender appendages; the peduncle is somewhat shorter than the branches; the inner branch is about a fifth longer than the outer branch. The margins of all the segments, the uropods, and legs are fringed with hairs.

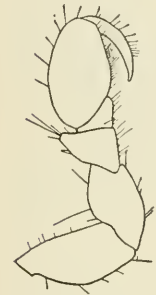


FIG. 17.—LEG OF
FIRST PAIR OF
ASELLUS TOMA-
LENSIS. $\times 20\frac{1}{2}$.

The legs of the first pair are cheliform; the propodus is elliptical in outline, with the inferior margin straight. The other legs are similar and ambulatory in character.

The color of the species is a light brown somewhat mottled.



FIG. 16.—MANDI-
BLE OF ASELLUS
TOMALENSIS.

Family MUNNIDÆ.

MUNNA sp.?

A very much mutilated specimen of a species of *Munna* was taken by the Harriman Alaska Expedition at the Pribilof Islands. The *Munnidæ* have not heretofore had any representatives from the Pacific coast. Although it is very probable that the present specimen is the type of a new species, it is not, however, in a sufficiently complete condition to warrant a description.

ONISCOIDEA.

Family LIGIDÆ.

LIGIA OCCIDENTALIS Dana.

Ligia occidentalis DANA, U. S. Expl. Exp. Crust., XIV, Pt. 2, p. 742, pl. XLIX, fig. 7; Proc. Acad. Nat. Sci. Philad., VII, p. 176.—STIMPSON, Bost. Journ. Nat. Hist., VI, 1857, p. 506.—HARFORD, Proc. Cal. Acad. Sci., VII, 1877, p. 116.—BUDDE-LUND, Crust. Isop. Terrestria, 1885, p. 264.—RICHARDSON, Proc. U. S. Nat. Museum, XXI, 1899, p. 866.

Localities.—Sausalito, California, and San Bartolomé Bay, Lower California. (Dr. Ritter and party.)

LIGIA PALLASII Brandt.

Ligia pallasii BRANDT, Bull. Soc. Impér. des Natur. de Moscou, VI, 1833, p. 172.
Ligia dilatata STIMPSON, Bost. Journ. Nat. Hist., VI, 1857, p. 507, pl. XXII, fig. 8.—S. I. SMITH, Report of Progress of Geological Survey of Canada, 1878-79.
Ligia septentrionalis LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 46.
Ligia stimpsoni MIERS, Proc. Zool. Soc. London, 1877, p. 671 (see footnote).
Ligia pallasii BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 261-262.

Locality.—Lowe Inlet, British Columbia. (Harriman Alaska Expedition.)

Family TRICHONISCIDÆ.

TRICHONISCUS PAPILLICORNIS, new species.

Body covered with low tubercles. Color, light brown. Head with sides produced at the antero-lateral angles in large lobes; front triangularly produced with a slight emargination at the apex of the triangle. Eyes situated on the lateral margins at the base of the antero-lateral lobes; they are small and black and apparently simple in structure. The peduncle of the antennæ consists of five stout joints, the last three of which have the inner margins beset with numerous strong tubercular-like papillæ, each surmounted with a tuft of short, stiff hairs or bristles; the fifth joint is also produced at the outer distal angle in an acute process. The flagellum is composed of about seven joints, the joints being rather indistinctly defined; the

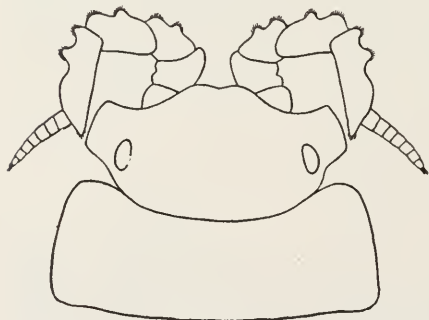


FIG. 18.—HEAD AND FIRST THORACIC SEGMENT OF TRICHONISCUS PAPILLICORNIS. $\times 41$.

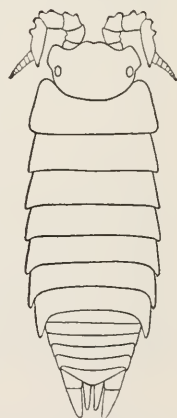


FIG. 19.—TRICHONISCUS PAPILLICORNIS. $\times 15$.

of about seven joints, the joints being rather indistinctly defined; the

last joint is tipped with a bunch of hairs. The buccal mass is very prominent below.

The segments of the thorax are about equal in length. The post-lateral angles of all the segments, except the first, are produced backward, very slightly in the case of the second, third, and fourth, but becoming gradually more so, until the last two segments show this character very markedly.

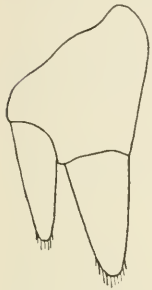


FIG. 21.—UROPOD OF LEFT SIDE OF TRICHONISCUS PAPILLICORNIS. $\times 77$.

The abdomen is narrower than the thorax. All the segments are visible in entirety, not being covered laterally by the last thoracic segment. The terminal segment is triangularly produced with the apex somewhat rounded.

The uropoda are short, styliform; the outer branch is the stouter and extends a little beyond the extremity of the inner branch. Both branches are tipped with a few hairs.

Only a single specimen was obtained by the Harriman Alaska expedition, at Seldovia, Cook Inlet. It was found on the beach.

Type.—Cat. No. 28772, U.S.N.M.

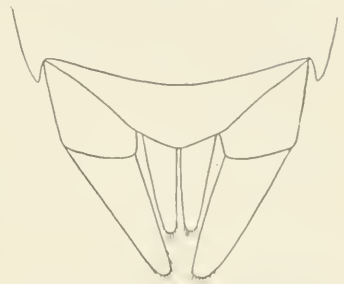


FIG. 20.—CROP AND LAST SEGMENT OF ABDOMEN OF TRICHONISCUS PAPILLICORNIS. $\times 77$.



FIG. 22.—LEG OF FIRST PAIR OF TRICHONISCUS PAPILLICORNIS. $\times 15$.

VI.

ISOPODS COLLECTED AT THE HAWAIIAN ISLANDS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

The U. S. Fish Commission is undertaking a systematic exploration of the marine fauna of the Hawaiian Islands, under the direction of Dr. D. S. Jordan. During the summer of 1902, under the immediate charge of Prof. C. H. Gilbert, the U. S. Fish Commission steamer *Albatross* was engaged in dredging in the vicinity, while a party of assistants explored the shore and shallow water.

The isopods collected were not numerous. Most of them are new to science, only two species in the collection, *Ligia hawaiiensis* Dana and *Cymothoa recta* Dana, having been previously recorded from the islands.

Two new genera of parasitic isopods, representing different families of *Epicaridea*, the *Dajidae* and the *Bopyridae*, are herein described. The Bopyrid genus is particularly interesting, because it is the first of that family known to occur in the visceral cavity of Decapods, the *Entoniscidae* alone having been known to have that position in relation to their hosts, the Brachyurous Crustacea.

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CHELIFERA OR TANAIIOIDEA.

Family APSEUDIDÆ.

APSEUDES sp.?

One mutilated specimen was obtained by the U. S. Fish Commission steamer *Albatross* off the south coast of Molokai Island, the Hawaiian Islands.

FLABELLIFERA OR CYMOTHOIDEA.

Family ÆGIDÆ.

ÆGA QUADRATASINUS Richardson, new species.

Body (fig. 23) ovate, about two and a third times longer than broad. Color uniformly light yellow.

Head with frontal margin rounded and produced in a small median process between the basal joints of the first pair of antennæ; posterior margin nearly straight. Eyes situated on the antero-lateral margin, extending along each side from the posterior margin of the head to the proximal end of the third peduncular joint of the first pair of antennæ, and separated from each other on the anterior margin by a distance

equal to the length of one eye. The first pair of antennæ (fig. 24) have the peduncle composed of two short joints of equal length, and a long, slender joint equal to the length of the first two taken together; none of these joints are dilated; the flagellum is composed of twenty-four joints and extends to the posterior margin of the second thoracic segment. The second pair of antennæ have a five-jointed peduncle, the distal end of the fifth joint of which extends to the middle of the first thoracic segment; the flagellum is composed of twenty-four joints, and reaches the posterior margin of the third thoracic segment.

The frontal lamina, or interantennal plate is cone-shaped, round and flat at its distal end, and produced at its proximal end to an acute point. The segments of the thorax are equal in length. The epimera of the second, third, and fourth segments are not produced posteriorly beyond the margin of the segment; those of the fifth, sixth, and seventh segments are produced backward.

FIG. 24.—FRONTAL LAMINA AND PEDUNCLES OF BOTH PAIRS OF ANTENNÆ OF *EGA QUADRATASINUS*. $\times 9\frac{3}{4}$.

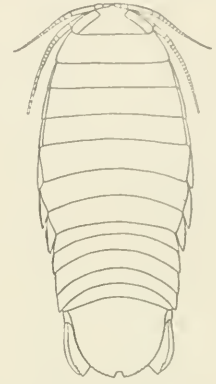
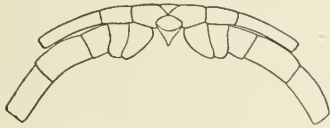


FIG. 23.—*EGA QUADRATASINUS*, NEW SPECIES. $\cdot 2\frac{1}{2}$.

There is an arcuate carina on all the epimera which extends from the post-lateral external angle to the internal antero-lateral angle of the opposite side.

All six segments of the abdomen are distinct, the first segment being a little shorter than the four following. The sixth or terminal segment is well rounded posteriorly, with a pronounced and wide emargination, quadrangular in shape, in the median line. On either side of this emargination the posterior margin is crenulate for some distance, and is provided with minute spines, about eight on either side.

The uropoda (fig. 25) are about equal in length, and are not longer than the terminal abdominal segment. The outer branch is oval in shape, denticulate, and provided with spines on the external and posterior margin. The inner branch is unlike the outer branch in shape, and tapers to a narrow extremity at the post-lateral side of the external margin, the external margin being almost straight; this branch is also crenulate and provided with small spines.

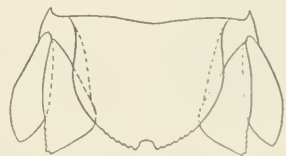


FIG. 25.—TERMINAL SEGMENT WITH UROPODA OF *EGA QUADRATASINUS*. $\cdot 5\frac{1}{2}$.

The first three pairs of legs are prehensile. On the third pair (fig. 26) there is one spine on the ischium, six on the merus, two on the

carpus, and one at the distal end of the propodus. The four following pairs of legs are gressorial, and are provided with spines on the ischium, merus, carpus, and propodus.

Only one specimen was obtained in 1902 from Kauai Island, the Hawaiian Islands, by the U. S. Fish Commission steamer *Albatross*.

Type.—Cat. No. 28971, U.S.N.M.

This species approximates more closely to *Ega incisus*^a Schiødte and Meinert than to any other described species of the genus. It differs, however, in the shape of the abdomen, which is more triangular in *A. incisus*; in the shape of the terminal notch, which is V-shaped in *A. incisus*, more quadrangular in *A. quadratasinus*; in the smaller eyes, which do not meet in the median line as in *A. incisus*, but are separated by a space equal to the length of one eye; by the longer antennæ of both pairs, each containing also a greater number of joints in the flagellum; and in having the prehensile legs provided with numerous spines, while in *A. incisus* there is a single spine on the ischium and a single one on the carpus.



FIG. 26.—LEG OF THIRD PAIR OF *Ega quadratasinus*.
X 8.

***ÆGA DESHAYESIANA* (Milne Edwards.)**

Rocinela deshayesiana MILNE EDWARDS, Hist. Nat. Crust., III, p. 243.

Ega deshayesiana SCHIØDTE and MEINERT, Naturhistorisk Tidsskrift, XII, (3), 1879-80, pp. 360-361, pl. VIII, figs. 7-9.

Locality.—Pailolo Channel, between Molokai and Maui Islands and North East Approach.

This species has been recorded from the Mediterranean (Milne Edwards); from the Adriatic, at Fayal, the Azores, and Palermo (Schiødte and Meinert); from lat. 15° 40' N., long. 23° 5' 8" W. (Studer).

A single specimen was obtained by the U. S. Fish Commission steamer *Albatross* which differs from those recorded as described and figured by Schiødte and Meinert only in having seven spines instead of six on the merus, and in not having the single spine on the distal end of the propodus. Its occurrence in this locality is rather remarkable.

***ROCINELA HAWAIIENSIS* Richardson, new species.**

Body (fig. 27) narrow, elongate, two and a half times longer than wide. Color uniformly yellow, with no markings.

Head triangular; front produced over the basal joints of the first pair of antennæ. Eyes very large and round, separated from each

^a Naturhistorisk Tidsskrift, (3), XII, 1879-1880, pp. 373-374, pl. x, figs. 13-15.

other by a distance equal only to half the width of one eye. First pair of antennæ, with a flagellum of five joints, extend to the end of the peduncle of the second pair of antennæ. Second pair of antennæ, with a flagellum of seventeen joints, reach the posterior margin of the second thoracic segment.

First two segments of thorax subequal in length; third and fourth subequal and a little longer than the first two; fifth and sixth longest, each one nearly equal to the first two segments taken together; seventh segment shorter than the two preceding, about equal to the third or fourth. Epimera of the last four segments acutely pointed at their posterior extremities; those of the second and third segments more rounded posteriorly.

The first abdominal segment is entirely concealed by the seventh thoracic segment except at the sides; the three following segments are subequal, with acutely produced postero-lateral angles; the fourth segment has the sides not produced and mostly covered by the postero-lateral angles of the preceding segment: terminal segment narrowly rounded. Uropoda oar-like, subequal in length and equal in width. Both branches are faintly crenulate on the external margin. The basal joint of the uropoda extends only half the length of the inner branch.

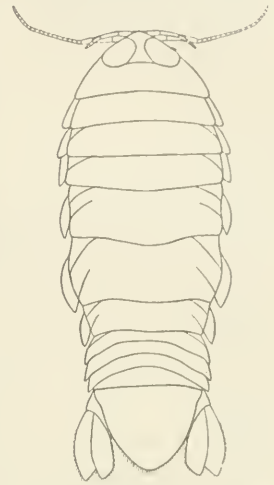


FIG. 27.—ROCINELA HAWAIIENSIS, NEW SPECIES. · 23.



FIG. 28.—LEG OF SECOND PAIR OF ROCINELA HAWAIIENSIS. × 5j.

First three pairs of legs (fig. 28) prehensile, with long slender curved dactyli; the propodus is armed with three spines; the carpus with one spine, and the merus with three spines, except on the first pair of legs. The four gressorial legs are long and slender and armed with few spines.

Only one specimen was taken by the U. S. Fish Commission steamer *Albatross* at Kauai Island, the Hawaiian Islands, at a depth of 414 to 636 fathoms.

Type.—Cat. No. 28972, U.S.N.M.

This species is perhaps nearer to *R. orientalis* Schiödte and Meinert^a than to any other known species of the genus. It differs from that form, however, in the much larger eyes which are separated by a distance equal only to half the width of one eye, while in *R. orientalis* the eyes are separated by a distance equal to one-third the width of the head; in the narrower and more elongate body; in having the two branches of the uropoda of equal length and width, while in *R. orientalis* the outer branch is

^a Naturhistorisk Tidsskrift, (3), X11, 1879-80.

narrower and shorter than the inner branch; in the shorter basal joint of the uropoda, it being equal to half the length of the inner branch, while in *R. orientalis*, the basal joint extends almost to the posterior extremity of the inner branch; and in the narrower terminal abdominal segment.

Family CYMOTHOIDÆ.

CYMOTHOA RECTA Dana.

Cymothoa recta DANA, U. S. Expl. Exp., Crustacea, XIV, pp. 751-752, pl. XLIX, fig. 13a-c.

Locality.—Puako Bay, Hawaii.

Dana's specimens were obtained at Hilo, Hawaii, by Dr. C. Pickering.

Only one adult specimen was obtained, but a large number of young males (fig. 29), which are probably the young of this species, were taken from the following localities: Between Kauai Island and Modu Maru or Bird Island; north coast of Molokai Island; south coast of Oahu Island. Depth, $6\frac{1}{2}$ to 299 fathoms. These young specimens are probably at a stage somewhat later than the young of the first and second stages described by Schiøedte and Meinert^a for *C. astrum* Linnaeus and *C. eximia*, because all seven pairs of legs are present. The pleopods, uropods, and terminal segment are, however, fringed with hairs, and the first and second antennæ are very long, the first pair reaching the extremity of the first thoracic segment and composed each of ten joints, the second pair extending to the posterior margin of the third thoracic segment and composed each of sixteen long joints. The eyes are large and post-laterally situated, and the frontal margin of the head is well rounded. The antero-lateral angles of the first thoracic segment are not produced along the sides of the head as in the adult.

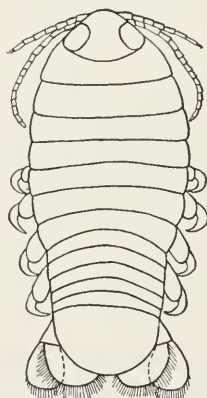


FIG. 29.—YOUNG MALE OF
CYMOTHOA RECTA DANA.
× 8.

ONISCOIDEA.

Family LIGIIDÆ.

LIGIA HAWAIENSIS Dana.

Ligia hawaiiensis DANA, U. S. Expl. Exp., Crustacea, XIV, pp. 740-741, pl. XLIX, fig. 4 a-e.

Locality.—Pearl Harbor.

A single specimen, without uropods, is referred to the above species, described by Dana, from the islands Oahu and Kauai, in the Hawaiian

^aNaturhistorisk Tidsskrift, (3), XIV, 1883-84, pp. 276-278 and 281-282, pl. VIII, figs. 10-13; pl. IX, fig. 11.

Archipelago. The specimen differs from the description in having shorter antennae, which do not extend beyond the fifth thoracic segment. Difference in sex may account for this, as it has been shown that in this genus the antennae of the females are shorter than those of the males.

Family ONISCIDÆ.

PORCELLIO LÆVIS Latreille.

Porcellio lævis LATREILLE, Hist. Crust. Ins., VII, p. 46.—LEACH, Edinb. Encycl., VII, p. 406.—MILNE EDWARDS, Hist. Nat. des Crust., III, p. 169.—BUDDE-LUND, Nat. Tidsskrift, (3), VII, p. 236; Crust. Isop. Terrestria, 1885, pp. 138-141. (See Budde-Lund for further synonymy.)

Locality.—Aiea, Oahu.

EPICARIDEA or BOPYROIDEA.

Family DAJIDÆ.

ZONOPHRYXUS Richardson, new genus.

Type.—*Zonophryxus retrodens* Richardson, new species.

Body of female provided on the ventral side with a border which surrounds it on all sides, and which is wider in the anterior or cephalic region. The posterior portion of the marginal border is provided with nine small triangular processes, four on either side of a median one, and undoubtedly indicates five coalesced abdominal segments. Five pairs of legs present on the anterior half of the ventral side. Five pairs of incubatory lamellæ on either side of the ventral surface meet in the median line, the fifth pair being narrow and elongate and concealing the second and third pairs, which are very small, and a part of the fourth pair. Dorsal surface convex, with only faint traces of segmentation, the boundaries of the three divisions of the body not being indicated. Small incisions at the side of the anterior half of the body on the marginal border probably indicate the place of separation of the head from the thorax, the first thoracic segment from the second, and the second from the third.

Male with the first thoracic segment fused with the head. All seven pairs of legs present. Segments of abdomen consolidated into one.

This genus differs from all the other *Dajida* in having the marginal border surrounding the body and in having the nine triangular processes on the posterior margin of this border, representing five coalesced abdominal segments.

It differs from *Dajus* Krøyer in having the segments of the abdomen fused in the female; in having but slight traces of segmentation in the thoracic region, and in both male and female lacking uropoda. It differs from *Branchiophryxus* Caullery in having five pairs of legs

and five pairs of incubatory lamellæ, only four pairs of legs and of incubatory lamellæ being true of *Branchiophryxus*, and in having a single pair of pleopoda, which are altogether wanting in that genus. It differs from *Notophryxus* Sars in the form of the abdomen and head and in having five pairs of incubatory lamellæ instead of a single pair. It differs from *Aspidophryxus* Sars in the form of the head and abdomen of the female, and in having no trace of segmentation or appendages to the abdomen of the male.

ZONOPHRYXUS RETRODENS Richardson, new species.

Body of female (fig. 30) rather quadrangular in shape, with only faint traces of segmentation on the dorsal surface. Dorsal surface very convex, with no distinct boundary between the three chief divisions of the body, the head, thorax, and abdomen being continuously one. On the ventral side a border surrounds the entire body, and is wider in the cephalic region. (Fig. 31.)

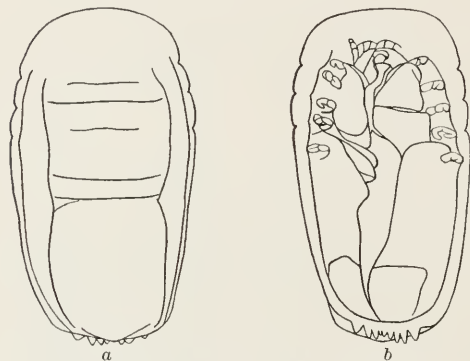


FIG. 30.—*ZONOPHRYXUS RETRODENS*, NEW SPECIES. *a*, DORSAL VIEW; *b*, VENTRAL VIEW. $\times 4$.

The cephalic part projects in front as a broadly rounded area or border. On either side of the body on the anterior half of the body, the lateral border is incised with three small indentations, marking off the head from the first thoracic segment, the second from the first, and the third from the second. Five indistinct lines on the dorsal surface of the anterior half of the body mark off the head from the thorax and outline the first four thoracic segments. The posterior half of the body shows no trace of segmentation on the dorsal surface. The posterior margin of the border at the terminal part of the body is produced in 9 triangularly-shaped processes. These processes are arranged four on either side of a median one, and undoubtedly indicate the five coalesced abdominal segments.



FIG. 32.—FIRST LAMELLA OF MARSUPIUM OF *ZONOPHRYXUS RETRODENS*. $\times 14\frac{1}{2}$.

The legs are in five pairs and are confined to the anterior half of the body on the ventral side.

The incubatory lamellæ (fig. 32) consist of five pairs of plates, meeting in the median ventral line. The fifth pair overlap the second, third, and fourth pairs.

On the ventral side a border surrounds the entire body, and is wider in the cephalic region. (Fig. 31.)

The cephalic part projects

in front as a broadly rounded

area or border. On either side

of the body on the anterior

half of the body, the lateral

border is incised with three

small indentations, marking

off the head from the first

thoracic segment, the second

from the first, and the third

from the second. Five indistinct

lines on the dorsal surface of

the anterior half of the body

mark off the head from the

thorax and outline the first

four thoracic segments. The

posterior half of the body

shows no trace of segmenta-

tion on the dorsal surface. The

posterior margin of the border

at the terminal part of the

body is produced in 9 trian-

gularly-shaped processes. These

processes are arranged four

on either side of a median

one, and undoubtedly indicate

the five coalesced abdominal

segments.



FIG. 31.—MAXILLIPED OF *ZONOPHRYXUS RETRODENS*. $\times 14\frac{1}{2}$.

Only a single pair of pleopoda are present, which fold back upon the lower portion of the fifth pair of incubatory plates.

From the oral area there extends on the ventral side a long process, which subdivides and terminates in two lobes, one on either side, beneath the incubatory lamella.

The male (fig. 33) has the head fused with the first thoracic segment. The other six segments are free and distinct. All the segments of the abdomen are consolidated into one, which is somewhat oval and pointed posteriorly. All seven pairs of legs are present, the first pair being attached to the cephalic segment. The head is large, concave on its dorsal surface, the anterior margin produced into a rounded process, which is directed upward. Eyes are wanting. There are no pleopoda or uropoda.

Only one specimen was obtained by the U. S. Fish Commission steamer *Albatross* from the south coast of Oahu Island, Hawaiian Islands, in 1902. The specimen was unattached.

Type.—Cat. No. 28970, U.S.N.M.

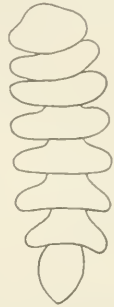


FIG. 33.—ZONOPHRYXUS RETRODENS, MALE. — 8.

Family BOPYRIDÆ.

Subfamily ENTOPHILINÆ.

ENTOPHILUS Richardson, new genus.

Type.—*Entophilus omnitectus* Richardson, new species.

Body of female rather asymmetrical. Dorsal surface with segmentation indicated by depressions more or less clearly defined. All seven pairs of legs present. Marsupium bounded ventrally by five pairs of incubatory lamellæ. Seven pairs of plates, overlapping the dorsal surface and attached only to the bases of the legs, extend in two longitudinal series, one on either side of the thorax; these plates probably correspond to the epimeral plates.

Two series of five plates each are present on either side of the abdomen, meeting along the median dorsal side and surrounding the abdomen at the sides, the lower plates nearly meeting again on the ventral side in the median line. Terminal part of abdomen truncate.

Pleopoda consisting of five pairs of double-branched lamellæ. Uropoda absent.

Male with the six segments of the abdomen clearly and distinctly defined, the last segment provided with a pair of single-branched uropoda; all the preceding segments of the abdomen provided with a pair of single-branched well-developed pleopoda. Seven pairs of thoracic legs attached to the seven thoracic segments.

ENTOPHILUS OMNITECTUS Richardson, new species.

Body of female (fig. 34) somewhat asymmetrical. Segmentation on dorsal surface more or less indistinctly defined. Marsupial pouch on

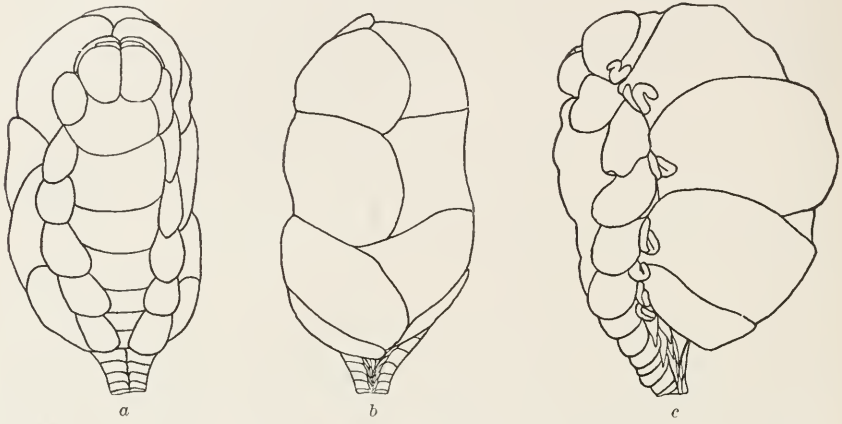


FIG. 34.—ENTOPHILUS OMNITECTUS, NEW SPECIES. *a*, DORSAL VIEW; *b*, VENTRAL VIEW; *c*, LATERAL VIEW. $\times 5\frac{1}{2}$

ventral side extremely large and completely enclosed by incubatory lamellæ, which are visible from a dorsal view at the sides of the body.

Color of dorsal surface of thorax orange; head, abdomen, and incubatory plates white. The orange markings on the young within the marsupium give an orange appearance to the ventral side of the body.

Head distinctly bilobed. Eyes absent. Both pairs of antennæ visible from a dorsal view, the first pair consisting of perhaps three indistinct joints; the second pair extend half the length of the head and consist of a number of indistinctly defined joints. (Fig. 35.)



FIG. 35.—MAXILLIPED OF ENTOPHILUS OMNITECTUS. $\times 14\frac{1}{2}$.

The segments of the thorax are more distinctly defined in some specimens than in others. Along the lateral margins of the thorax is a series of plates, a pair for each segment; these plates overlap the dorsal surface of the thorax at the sides and are free on their whole surface, being attached only at the extreme lateral margin to the legs. (Fig. 36.)

Similar plates are also found on the abdomen, where they meet five from either side along the median dorsal line. The exact homology

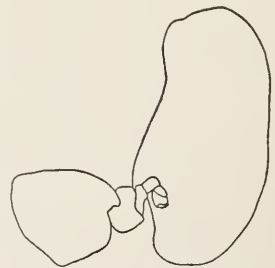


FIG. 36.—LEG OF FIFTH PAIR WITH FIFTH LAMELLA OF MARSUPIUM ATTACHED (ON RIGHT SIDE) AND FIFTH "LAME PLEURALE" OF ENTOPHILUS OMNITECTUS. $\times 9\frac{1}{2}$.

of these plates is rather doubtful, but it seems probable that they correspond to the "lamæ pleurales" of Giard and Bonnier.

The five pairs of abdominal plates, which meet in the median line on the dorsal side, extend around the sides of the abdomen and gradually almost come together on the ventral side, the last pair being very much closer together than the first pair. The last two pairs of plates are almost concealed by the overlapping plates of the preceding segments.

The extremity of the abdomen is truncate and without uropoda. The pleopoda (fig. 37) are five pairs of double-branched tapering appendages, all similar in shape.



FIG. 37.—ONE DOUBLE-BRANCHED PLEPOD OF *ENTOPHILUS OMNITECTUS*. $\times 17\frac{1}{2}$.

There are five pairs of incubatory lamellæ, which form the ventral side of the marsupial pouch, enclosing it completely, the lamellæ overlapping in the median line. (Fig. 38.)

Seven pairs of small, feeble legs are present, a pair for each segment of the thorax.

The male (fig. 39) is narrow and elongate and without any color markings. The head is very large and without eyes. The seven segments of the thorax are about equal in length, each one carrying a pair of



FIG. 38.—FIRST LAMELLA OF MARSUPIUM OF *ENTOPHILUS OMNITECTUS*. $\times 14\frac{1}{2}$.

appendages, so that there are seven pairs of thoracic legs in all. The six segments of the abdomen are distinct, the terminal one being rounded and carrying a pair of single-branched appendages, the uropoda; the five preceding abdominal segments are provided each with a pair of single-branched, well developed pleopoda.

A large number of specimens were obtained by the U. S. Fish Commission steamer *Albatross* on the north and northeast coast of Main Island, Hawaiian Islands, and the northeast approach to Pailolo Channel, between Main Island and Molokai Island.

The parasites were found in the visceral cavity of *Munnida normani* Henderson.

This is the first instance of the discovery of a Bopyrid in that position in relation to its host, all the other known representatives of the family being either branchial or abdominal parasites. The *Entomiscida*, on the other hand, are always found in the visceral cavity.

Type.—Cat. No. 28967, U.S.N.M.

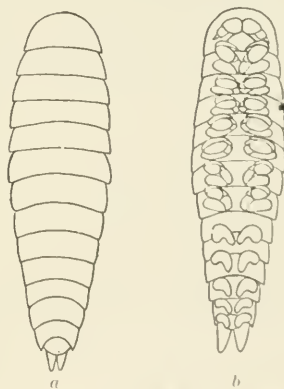


FIG. 39.—*ENTOPHILUS OMNITECTUS*, MALE. *a*, DORSAL VIEW; *b*, VENTRAL VIEW. $\times 14\frac{1}{2}$.