

Department of the Interior:

U. S. NATIONAL MUSEUM.

— 7 —

# BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

NO. 7.—CONTRIBUTIONS TO THE NATURAL HISTORY OF THE HAWAIIAN  
AND FANNING ISLANDS AND LOWER CALIFORNIA.

BY

THOS. H. STREETS, M. D.

WASHINGTON:

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U.S. GEOLOGICAL SURVEY

Department of the Interior:

U. S. NATIONAL MUSEUM.

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PUBLISHED UNDER THE DIRECTION OF THE SMITHSONIAN INSTITUTION.

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GOVERNMENT PRINTING OFFICE.  
1877.

## ADVERTISEMENT.

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This work is the seventh of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

JOSEPH HENRY,

*Secretary of the Smithsonian Institution.*

SMITHSONIAN INSTITUTION,

*Washington, April, 1877.*

CONTRIBUTIONS  
TO THE  
NATURAL HISTORY

OF THE  
HAWAIIAN AND FANNING ISLANDS

AND  
LOWER CALIFORNIA,

MADE IN CONNECTION WITH THE UNITED STATES NORTH PACIFIC  
SURVEYING EXPEDITION, 1873-75.

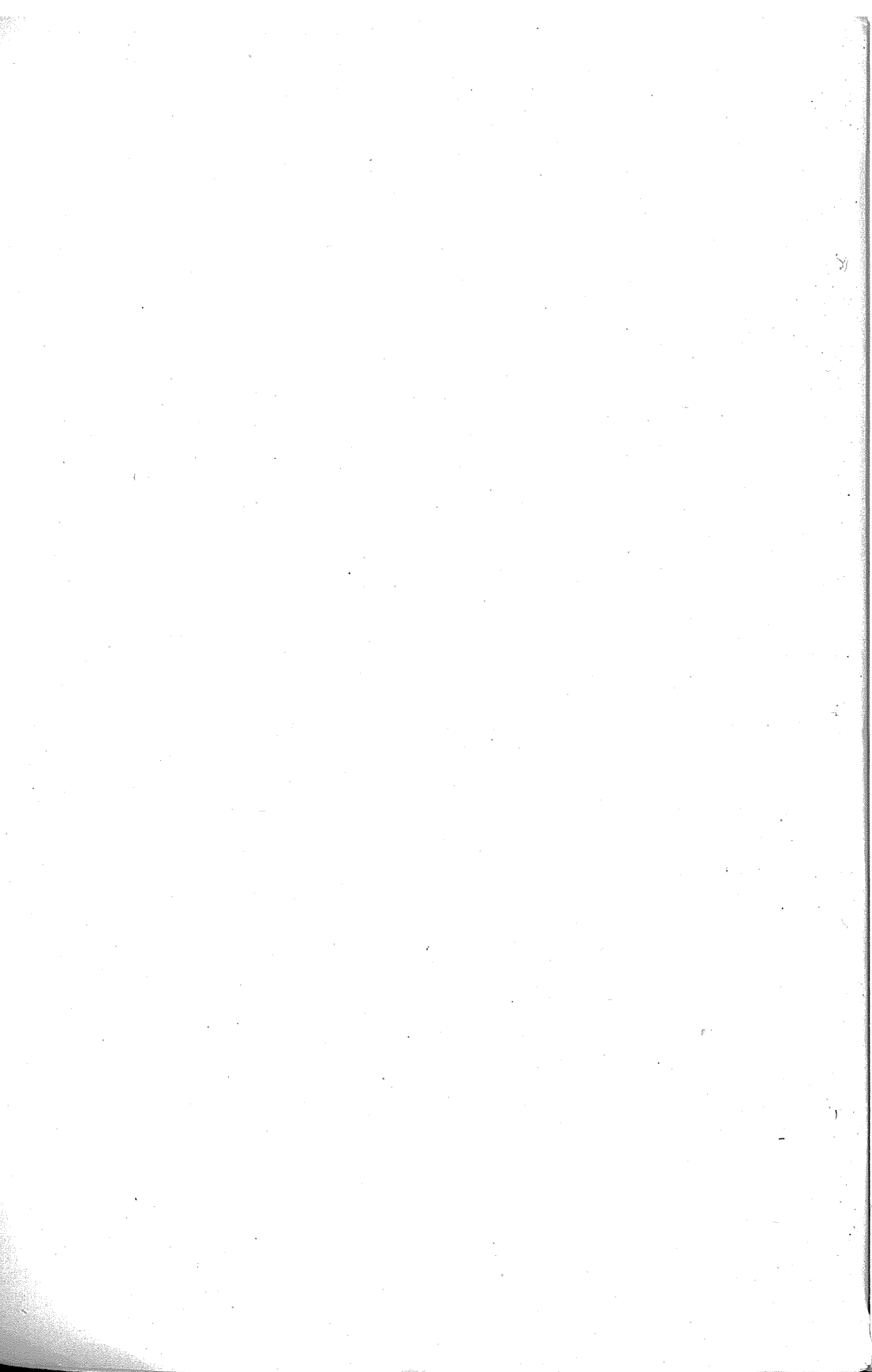
BY  
THOS. H. STREETS, M. D.,  
PASSED ASSISTANT SURGEON, U. S. NAVY.

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WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
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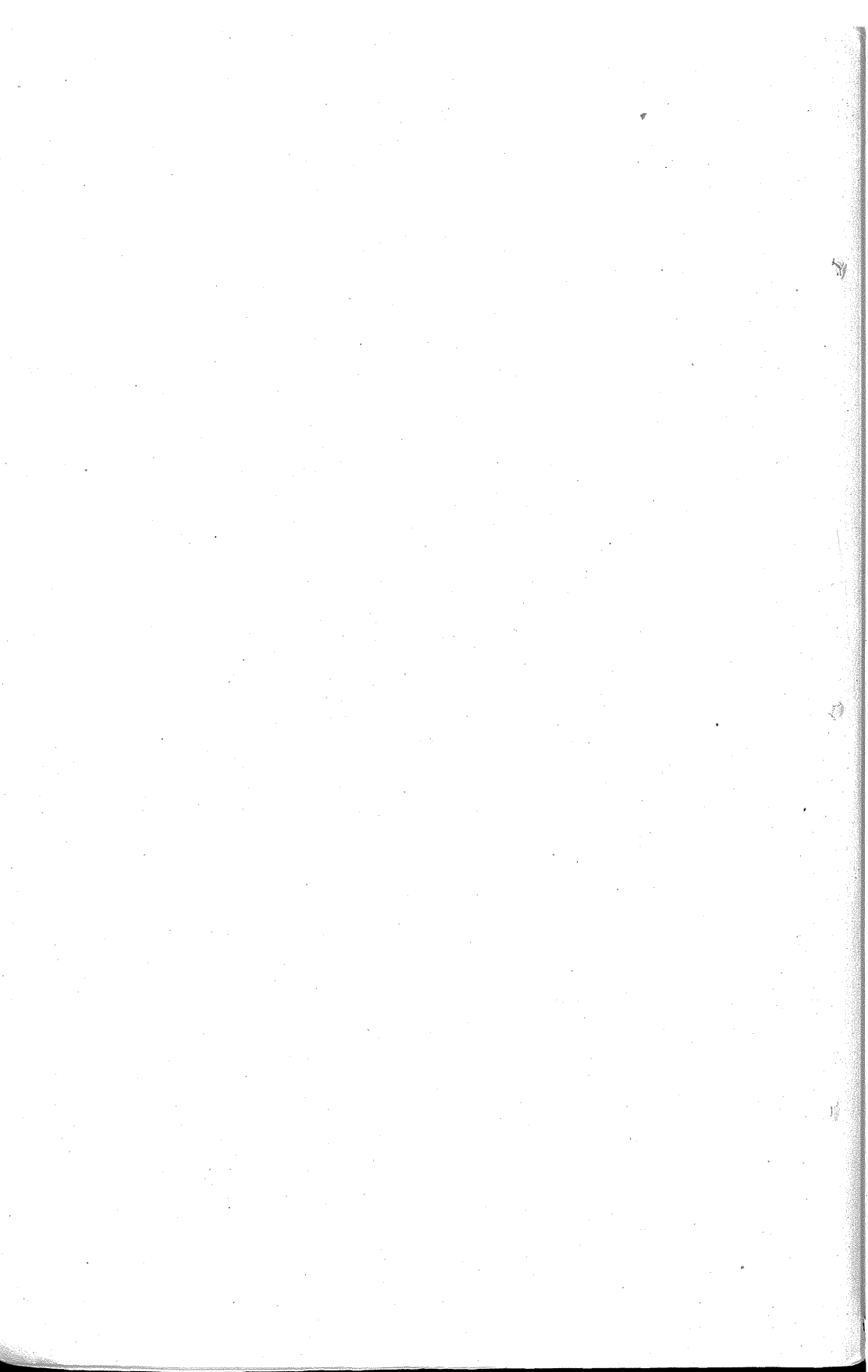
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## P R E F A C E.

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The collections that furnished material for this bulletin\* were made, one in 1873-74, by Surgeon William H. Jones, U. S. N., and the writer, while serving on board the United States ship Portsmouth, Commander Joseph S. Skerrett commanding, engaged in the survey of the islands of the North Pacific Ocean; and the other by the writer alone, in 1874-75, while on board the United States steamer Narragansett, Commander George Dewey commanding, engaged in the survey of the coasts of the peninsula of Lower California.

The first collection very well represents the fish-fauna of the harbor of Honolulu and the avi-fauna of the Fanning group. While among the latter islands, our means for the preservation of specimens were too limited to permit of a very extensive collection of fish. A complete botanical collection was made at Palmyra and Christmas Islands. The plants were sent home from the Pacific; and before I arrived there to commence the work of arranging the collection, they had been identified by Prof. A. Gray, and distributed through the general collection of the Agricultural Department at Washington, so that it was impossible to get a list of them except by overhauling the entire collection. The present list, therefore, represents little more than the duplicate series. I am indebted to Prof. Gray and Dr. Vasey, Botanist of the Agricultural Department, for the notes accompanying the list of plants from Lower California.

The Fanning group, with the exception of the Hawaiian, were the only islands visited in the Pacific. This group comprises the islands of Christmas, Fanning, Washington, and Palmyra. They are situated immediately north of the equator from latitude  $1^{\circ} 57'$  to  $5^{\circ} 49'$ , and extend from longitude  $157^{\circ} 27'$  W. to  $162^{\circ} 11'$  W. Palmyra is the most northern and western, and Christmas the most southern and eastern of the group. From these two came the largest part of our collection. They are uninhabited, save by parties that go there to harvest the crop

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\* Excepting the Crustaceans, the invertebrate portion of the collection is excluded from this bulletin.



of cocoanuts. They are exclusively coral formations; and all except Christmas are well clothed with vegetation, and are frequently visited by rains.

In regard to the Lower Californian collection, it by no means represents either the fauna or flora of any place or section. The specimens were collected all along the coasts—our stay at any one place being too short to admit of more than a mere cursory examination of its life.

I regret to say that a large collection of birds' eggs from Palmyra and Christmas Islands was completely destroyed by rats on board the ship.

To Dr. Elliott Coues, U. S. A., belongs the credit of the identification of the birds, and he has very kindly furnished me with the notes accompanying that portion of the ornithological collection from the Californian peninsula. I desire to express, in this connection, my obligations to Prof. T. Gill for assistance in the classification of the fishes, and for his advice in other matters relating to my ichthyological work. To both these eminent gentlemen I tender my sincere thanks.

T. H. S.

SMITHSONIAN INSTITUTION,  
*Washington, D. C., April, 1877.*

# ORNITHOLOGY.

## SYLVICOLIDÆ.

### DENDRÆCA AUDUBONI, (*Towns.*) *Bd.* [No. 70632].

- Sylvia audubonii*, TOWNS., Jour. Acad. Nat. Sci. Phila., vii, 1837, 190.  
*Sylvicola audubonii*, BP., List, 1838, 21.—AUD., B. Am., ii, 1841, pl. 77.  
*Dendræca audubonii*, BD., B. N. A., 1858, 273.—COUES, Key, 1872, 100; Birds Northwest, 1874, 58.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 229, pl. xiii, f. 1.

Locality: mouth of the Colorado River. Immature plumage; throat scarcely tinged with yellow. One specimen.

## FRINGILLIDÆ.

### PASSERCULUS SAVANNA ALAUDINUS, (*Bp.*) [No. 70633].

- Passerculus alaudinus*, BP., Comp. Rend., xxxvii, 1853, 918.—BD., Birds N. A., 1858, 446.  
*Passerculus savanna alaudinus*, BD., BREW., & RIDG., N. A. Birds, i, 1874, 537, pl. xxiv, f. 11.—HENSHAW, Wheeler's Exped., vol. v, 1875, Zoöl., 254.  
*Passerculus savanna*, ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177.—COUES, Birds Northwest, 1874, 127 (in part).

Locality: San Ignacio River, Sonora, Mexico. One specimen. Flew aboard the ship while at anchor, and was captured.

### PASSERCULUS SAVANNA ANTHINUS, (*Bp.*) *Cs.* [No. 70634].

- Passerculus anthinus*, BP., Comp. Rend., xxxvii, 1853, 919.  
*Passerculus savanna anthinus*, COUES, Key, 1872, 136.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 539, pl. xxiv, f. 10.—COUES, Birds Northwest, 1874, 128.

Locality: Todos Santos Islands, Pacific coast of Lower California. One specimen.

### PASSERCULUS ROSTRATUS, (*Cass.*) *Bd.* [No. 70635].

- Emberiza rostrata*, CASSIN, Proc. Acad. Nat. Sci. Phila., vi, 1852, 348.  
*Ammodramus rostratus*, CASSIN, Ill. B. Cal. Tex., &c., i, 1855, 226, pl. 38.  
*Passerculus rostratus*, BAIRD, Birds N. Am., 1858, 446.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 542, pl. 24, f. 12.—COUES, Key, 1872, 136.

Locality: Todos Santos Islands. One specimen. Inseparable from typical *rostratus* of Southern and Lower California (mainland), though

## MUGILIDÆ.

AGONOSTOMA DORSALIS, n. sp. [No. 15111]

D.  $4\frac{1}{8}$ . A.  $\frac{3}{5}$ .

The height of the body is one-fifth of the total length, and the length of the head is contained four and a half times in the same. Small teeth in the upper jaw; no teeth in the lower jaw, on the vomer, or palatines. Eyes without adipose membrane. Upper lip thin. The end of the maxilla extends to the vertical from the front margin of the orbit. Interorbital space flat. Præorbital serrated anteriorly and below. The anterior dorsal commences midway between the end of the snout and the base of the caudal fin.

Silvery, with a metallic luster along the back; the base of the second dorsal fin black.

Length, 1.50 inches.

# CRUSTACEA.

## MAIIDÆ.

## LIBININÆ.

### LIBINIA SEMIZONALE, *Streets*. n. sp.

Carapace pyriform; regions distinctly marked; surface shining, uneven, and shortly pubescent in places; pubescence more marked anteriorly; spinous. The arrangement of the spines is as follows:— eight in the median line of the body, placed, four on the gastric region, one on the genital, two on the cardiac, and one on the intestinal; on the anterior portion of the gastric region are two other spines, arranged transversely, in a line with the first one of the longitudinal series; so that all the spines of this region form the letter **T**; on the hepatic region are two spines, placed one above the other; immediately beneath these, on the lateral line, is another (on the left side there were two); the spines on the hepatic region, with those on the lateral line and the transverse row on the gastric region, taken together form a semicircle across the anterior portion of the carapace; sub-hepatic spines two, the anterior of which is the larger; there is another under the lateral line posterior to a sulcus separating the hepatic and branchial regions; four on the middle of the branchial region, inclosing a regular diamond-shaped space; another small spine on the upper part of the same region, on the edge of the depression separating it from the cardiac region; finally, there is an elevation, or a faint trace of a spine, on the posterior part of the branchial region.

Rostrum prominent, broad; broadest at the base, and slightly converging to the points; directed upward at an angle with the body; convex above and densely pubescent; the entire under surface deeply excavated; its apex obliquely truncated above, producing, by reason of its hollow under surface, two points, the outer surfaces of which are

straight and nearly parallel, while the inner margins are sloping, and converge to the median line of the rostrum; along the inner edge of the tips is arranged a row of long, stiff hairs; sides of the rostrum slightly concave, and at the base of the upper surface is a broad, shallow depression, which narrows to the apex of the bifurcation. A prominent spine projects over the inner canthus of the eye; the outer angle of the orbit not produced; a deep sulcus on the superior border of the orbit, which is bridged over at the top by a small spine, which arises from the base of the prominent spine at the inner canthus; on the inferior border of the orbit is another fissure, from the bottom of which is a strong spine, springing from the base of the outer angle, and projecting inward and downward under the basal article of the external antenna.

External antennæ hidden under the rostrum; the basal article robust, longer than broad, forming a part of the inferior border of the orbit; the external angle produced in the form of a tooth; the remaining articles slender and cylindrical; a row of long stiff hairs along the entire inner side of the antennæ.

Legs slender, smooth, and shining like the carapace; the joints cylindrical, with the exception of the fourth, which is depressed, and marked by a longitudinal depression above and below; the tarsi are tapering, and armed with long corneous points; the anterior pair of feet only very slightly more robust than the following; the hands much compressed; fingers slender, white at the tips, with their cutting edges approximating along nearly their entire length.

Abdomen composed of seven segments; on the center of the first segment there is a rather prominent tubercle; the terminal segment is somewhat triangular, with a rounded apex.

The breadth of the carapace is exactly three-fourths of the length. Length, including the rostrum, 2.70 inches; breadth, 2.03; the anterior pair of legs a little longer than the body; the length of the second pair equals that of the first; the length of the hand and carpus of the first pair comprise one-half of their entire length.

Locality: Lower California.

The arrangement of the spines on the surface of the carapace, and the absence of the lateral row of spines are sufficient to distinguish this species from all others belonging to the genus.

## CANCRIDÆ.

## XANTHINÆ.

ATERGATIS LIMBATUS, (*Edw.*) *Dana*.

*Atergatis limbatus*, DANA, U. S. Expl. Exped. Crust., i, 157.—HELLER, Crust. Novara Exped., 8.

*Xantho granulatus*, RÜPPELL, Krabben des rothen Meeres, 24, pl. 5, f. 3.

*Ægle granulatus*, DE HAAN, Faun. Japon., 17.

*Cancer limbatus*, EDWARDS, Hist. Nat. des Crust., i, 377, pl. 16, f. 1.

Locality: Hawaiian Islands.

## CHLORODINÆ.

ETISUS LEVIMANUS, *Randall*.

*Etisus levimanus*, RANDALL, Jour. Acad. Nat. Sci. Philadelphia, viii, 115.—DANA, U. S. Expl. Exped. Crust., i, 185, pl. 10, f. 1.

Locality: Hawaiian Islands.

CHLORODIUS UNGULATUS, *Edwards*.

*Chlorodius ungulatus*, EDWARDS, Hist. Nat. des Crust., i—DANA, U. S. Expl. Exped. Crust., i, 205, pl. xi, f. 8.

Locality: Hawaiian Islands.

CHLORODIUS SANGUINEUS, *Edwards*.

*Chlorodius sanguineus*, EDWARDS, Hist. Nat. des Crust., i, 402—DANA, U. S. Expl. Exped. Crust., i, 207, pl. xi, f. 11.—HELLER, Crust., Novara Exped., 18.

*Chlorodius exaratus*, STIMPSON, Proc. Acad. Nat. Sci. Philadelphia, 1858, 34.—EDWARDS, Hist. Nat. des Crust., i, 402.—DANA, U. S. Expl. Exped. Crust., i, 208.

*Chlorodius inæqualis*, AUDOUIN, Explic. des. pl. de Savigny.—SAVIGNY, Desc. de l'Égypte. Crust., pl. v, f. 7.

*Chlorodius Edwardsii*, HELLER, Sitzungsberichte der Wiener Akademie, Bd., xliii, 336.

*Cancer (Xantho) lividus*, DE HAAN, Faun. Japon., 48, pl. xiii, f. 6.

*Cancer (Xantho) affinis*, DE HAAN, l. c. 48, pl. xiii, f. 8.

Locality: Hawaiian Islands.

## ERIPHIDÆ.

## ERIPHINÆ.

TRAPEZIA MACULATA, (*M'Leay*) Dana.

*Trapezia maculata* DANA, U. S. Expl. Exped. Crust., i, 256, pl. xv, f. 4.—STIMPSON, Proc. Acad. Nat. Sci. Philadelphia, 1858, 37; Ann. Lyc. Nat. Hist. N. Y., vii, 219.

*Trapezia maculatus*, KRAUSS, Südaf. Crust., 36.

*Trapezia guttata*, RÜPPELL, Krabben des rothen Meeres, 27.—HELLER, Crust., Novara Exped., 25.

*Trapezia tigrina*, EYDOUX & SOULEYER, Voy. de la Bonita, pl. ii, f. 4.

*Grapsillus maculatus*, M'LEAY, Crust. of Smith's Illust. Zool. S. Africa, 67.

Locality: Hawaiian Islands.

## PORTUNIDÆ.

## LUPINÆ.

NEPTUNUS SANGUINOLENTUS, (*Herbst*) De Haan.

*Neptunus sanguinolentus*, DE HAAN, Faun. Japon. Crust., 38.—ALPH. M. EDWARDS, Arch. du Mus. d'Hist. Nat. de Paris, 1860, x, 319.—HELLER, Crust. Novara Exped., 26.

*Lupa sanguinolenta*, DESMAREST, Crust., 99.—M. EDW., Hist. Nat. des Crust., i, 451; et Cuv. Règn. Anim. pl. x, f. 1.—DANA, U. S. Expl. Exped. Crust., i, 271.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, 38.

*Portunus sanguinolentus*, FABR., Suppl. Entom. syst., 365.—LATR., Encyclop. Method, x, 190.

*Cancer palagicus*, FABR., Mant. Ins., i, 318.—LIN., Syst. Nat., ed. Gmelin.

*Cancer sanguinolentus*, HERBST, Krabben und Krebse, i, 161, pl. 8, f. 56, 57.

Locality: Hawaiian Islands.

THALAMITA ADMETE, (*Herbst*) Latr.

*Thalamita admete*, LATR., Règn. Anim. de Cuvier, 2 ed., iv, 33.—M. EDWARDS, Hist. Nat. des Crust., i, 459; et Règn. Anim. de Cuv. Atlas Crust., pl. ix, f. 2.—DANA, U. S. Expl. Exped. Crust., i, 281, pl. xvii, f. 5.—ALPH. M. EDWARDS, Arch. du Mus., 1860, x, 356.—HELLER, Crust. Novara Exped., 28.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, 39.

*Portunus admete*, LATR., Nouv. Diet. d'Hist. Nat., xxviii, 44.

*Cancer admetus*, HERBST, Krabben und Krebse, pl. 57, f. 1.

Locality: Hawaiian Islands.

## THALAMITA INTEGRÁ, Dana.

*Thalamita integra*, DANA, U. S. Expl. Exped. Crust., i, 281, pl. xvii, f. 6.—ALPH. M. EDWARDS, Arch. du Mus., x, 356.—STIMPSON, Proc. Acad. Nat. Sci. Phila. 1858, 39.

Locality: Hawaiian Islands.

The resemblance between the two preceding species of *Thalamita* is very close, and at first sight they may be very readily confounded; yet their differences are well marked and constant. In collecting them, the two kinds were thrown together as belonging to the same species; but when their specific characters were once recognized, there was no difficulty in separating the one from the other. The *integra* is much more abundant in the harbor of Honolulu, than the *admete*. In a lot of twenty-seven, collected from that locality, there were twenty-two of the former and five of the latter.

The following are the chief points of difference between the two species. In *integra* there are two spines on the superior edge of the hand; one, sharp-pointed, is situated on the middle of the border, and its base is continuous with an abrupt ridge running to the base of the hand; the second spine, usually blunt and eroded in the adult, but sharp-pointed in the young, is placed on the extreme distal angle of the upper border, and is also continuous by its base with another abrupt ridge, which extends toward the middle of the hand, but which is interrupted at the base of the first spine. The position of this second spine is a point of great diagnostic importance. Exterior to the superior edge is another spine, more or less worn down, the base of which coalesces with a rounded ridge, running toward the base of the hand; in front of and a little superior to the last, at the angle, is a slight prominence; there is a fourth spine at the base of the hand near the carpal articulation. The surface of the hand is smooth.

In *admete* there are likewise two spines on the superior border of the hand; but their arrangement is somewhat different. The outer one is not placed on the extreme distal angle of the hand, but is posterior to it; and the ridge which extends to the base of the hand, from the spine on the middle of the border, is serrated. The other spines on the hands have exactly the same arrangement as in *integra*. The superior surface of the hand is sparsely and coarsely granular; the inferior border finely granular.

The carapace furnishes some additional characters. In *integra* the



front is not on a straight line throughout its entire length, in the majority of cases. The crest of the base of the outer antennæ is not denticulated. Dana states that the "median region is not crossed by any raised lines;" while his figure shows them. They were present in all the specimens examined by me, and in this respect the species does not differ from *admete*. Anterior to the line crossing the middle region, and on either side of the median line of the body are two slight prominences; posterior to the median line is another, "which reaches to the posterior tooth on either side." The antero-lateral margin is four-toothed as in *admete*; only occasionally do we find a fifth tooth developed. The carapace is more convex.

The manner in which the carapace of the *admete* differs from the above description is briefly, as follows: The lines on the surface of the carapace are more prominent; in place of the two prominences anterior to the line crossing the median region of the body are two short serrated lines; and there are, in addition to these two, others of the same character, anterior to the extremities of the median transverse line. The carapace is more compressed, and "the crest of the base of the outer antennæ is evenly and short denticulated."

#### THALAMITA PYRMNA, (*Herbst*) *M. Edw.*

*Thalamita pyrmna*, M. EDWARDS, Hist. Nat. des Crust., i, 461.—DE HAINX, Faun. Japon. Crust., 43, pl. xii, f. 2.—ALPH. M. EDWARDS, Arch. du Mus. d'Hist. Nat., 1860, x, 360.

*Thalamita crassimana*, DANA, U. S. Expl. Exped. Crust., i, 284, pl. xvii, f. 9.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, 39.

*Portunus pyrmna*, LATREILLE, Nouv. Dict. d'Hist. Nat., xxviii, 44.

*Cancer pyrmna*, HERBST, Krabben und Krebse, pl. lvii, f. 2.

Locality: Palmyra Island, North Pacific.

The crest of the base of the outer antennæ differs somewhat from the description of it given by Dana. This distinguished carcinologist states, that the crest is irregularly divided. On the left side the crest bears three teeth; two of which are sharp and prominent, and the third is quite small. The latter is situated at the base of the inner prominent tooth. On the right side there have been three prominent teeth, but their apices are broken off, and the crest has the appearance of being "irregularly divided," as is shown in Dana's figure. The anterior margin of the arm is armed with four spines; the fourth—counting them in the same precedence as in the two species of the genus discussed above—

at the outer angle, is short and sometimes broken off. In every other respect the specimens examined are identical with the description and figure given by Dana. The fourth tooth on the antero-lateral margin is smaller than the rest, but the difference is not so great as is pictured in the figure.

*ACHELOUS GRANULATUS*, (*M. Edw.*) *Alph. M. Edwards.*

*Achelous granulatus*, ALPH. M. EDWARDS, Arch. du Mus. d'Hist. Nat. de Paris, 1860, x, 344.

*Amphitrite speciosa*, DANA, U. S. Expl. Exped. Crust., i, 276, pl. xvii, f. 1.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, 39.

*Amphitrite gladiator*, DE HAAN, Faun. Japon. Crust., 65, pl. xviii, f. 1 (et non pl. 1).

*Lupa granulata*, M. EDWARDS, Hist. Nat. des Crust., i, 454.

Locality: Fanning Group of Islands, North Pacific.

*CARCINUS MÆNAS*, (*Linn.*) *Leach.*

*Carcinus mænas*, LEACH, Melac. Podophth. Brit., pl. v; Edinb. Encyclop., vii, 429; Trans. Linn. Soc., xi, 314; Encyclop. Britann. Suppl., i, 410.—AUDOUIN, dans l'ouvrage de Savigny, Egypte. Crust., pl. iv, f. 6.—M. EDWARDS, Hist. Nat. des Crust., i, 434.—GOULD, Report on the Invertebrata of Massachusetts, 321.—DE KAY, Nat. Hist. N. Y., Crust., 8, pl. v, f. 5-6.—BELL, British. Crust., 76.—ALPH. M. EDWARDS, Arch. du Mus. d'Hist. Nat. de Paris, 1860, x, 391.—HELLER, Crust. Novara Exped., 30.

*Carcinus granulatus*, SMITH, Report of Commissioner of Fish and Fisheries, 312, 547.

*Portunus mænas*, LEACH, Edinb. Encyclop., vii, 390.—COSTA, Fauna del regno di Napoli, Crust. g. Portuno., 7.

*Cancer granulatus*, SAY, Jour. Acad. Nat. Sci. Phila., 1817, i, 61.

*Cancer mænas*, LINN., Syst. Nat., xii, i, 1043.—PENNANT, Brit. Zoöl., iv, 3, pl. iii, f. 3.—BASTER, op. subst. ii, 19, pl. ii.—HERBST, Krabben und Krebse, pl. vii, f. 46.—FABRICIUS, Entom. Syst. Suppl., 11, 450; 41, 334, 3.—LATREILLE, Gen. Crust. et Insect., 1, 30, 2.

Locality: Hawaiian Islands.

This is the first well-authenticated instance, to my knowledge, where the genus *Carcinus* is recorded as coming from the Pacific regions. In the museum of the Academy of Natural Sciences of Philadelphia, there is a specimen labeled from Australia, with an interrogation mark. It is probable that all the specimens obtained from this region have only been stragglers from the Atlantic. The Hawaiian Islands, where the last came from, have been thoroughly ransacked by collectors for this kind of life; and, had the species been common, it could not have well eluded the search so long. That it is a wandering crab, almost cosmopolitan in

its range, is seen by glancing at the extent of country that is embraced in its wanderings. It is common on the coasts of France and England; it is found in the Baltic Sea, along the shores of the Mediterranean, and in the Red Sea. It is by no means an uncommon crab along the whole extent of the eastern coast of the United States, and Heller records it as coming from the shores of Brazil.

I am able to detect some differences, amounting probably to a slight geographical variation, among the specimens coming from these widely separated localities. Those from the American coast differ from the European in having a slight increase in the convexity of the carapace, with coarser granulations over its surface. The teeth of the front are also much more prominent. In the European specimens the projections of the front hardly amount to more than undulations; while in those from this side they are teeth-like. An increased development in the same direction is observed in the individual from the Hawaiian Islands. If what I have stated here should hold good through a large series of specimens, it will be an interesting instance of progressive development from east to west, where the difference in the local conditions are less pronounced than from north to south in corresponding degrees of longitude.

ASSECLA, *nov. gen.*

Carapace convex, broader than long, smooth and shining; front broad, produced, broadly triangular; antero-lateral and postero-lateral borders nearly equal in length; the latter converging posteriorly; antero-lateral border five-lobed; hiatus at the internal angle of the orbit completely closed by a process from the base of the external antenna; the movable part of the antenna excluded from the hiatus; a process from the front descends to meet the process from the base of the external antenna. The third joint of the external maxillipeds longer than broad at the base; broader at the base than at the apex, irregularly quadrilateral; inner angle of the base somewhat projecting. A prominent ridge on the palate; the ridge is not produced to the anterior margin of the buccal area. Basal article of the external antennæ large, nearly longitudinal. Arm not projecting beyond the carapace; hand short, carinated; tarsus of the posterior pair of legs flattened, subovate, or lanceolate-ovate; very slightly modified into a swimming apparatus.

In respect to the development of its natatorial feet this genus bears the same relation to *Lissocarcinus*, as *Carcinus* does to *Platyonichus*.

ASSECLA HOLOTHURICOLA, *n. sp.*

Carapace broader than long, surface smooth and shining; the antero-lateral and postero-lateral borders very nearly of the same lengths; front broad, produced, broadly triangular, on a higher level than the antero-lateral border, and continuous with the superior margin of the orbit; anterior margin somewhat sinuous; the antero-lateral border thin, everted, five-lobed; second lobe the broadest; the free margins of the lobes straight; the angles slightly rounded; the divisions separated only by fine incisions; the gastric region of the carapace elevated; the antero-lateral parts much excavated. The lateral projection at the junction of the antero- and postero-lateral borders more tooth-like than lobular, and more projecting than the other lobes, thick and obtuse; a high, prominent ridge running from its apex, at first, inward and slightly backward, and then inward and forward on the swollen portion of the carapace, terminating abruptly at the junction of the middle with the lateral third of the breadth of the carapace; a flattened, scarcely prominent ridge anterior to and parallel with the preceding, terminating at the bottom of the lateral sulcus. The prominent edge of the postero-lateral border converging posteriorly. The post-orbital angle of the first lobe not rounded, rectangular; a fissure on the superior margin of the orbit near the external angle; the inferior margin entire, finely granular; a fissure at the outer angle; the inner angle projecting as a prominent tooth. Areolations on the surface of the carapace indistinct; a shallow depression extending to the apex of the front, and on either side of this is a broad prominence (2 F and 1 M consolidated); 2 M and 3 M consolidated; 1 P slightly prominent. Central line of the body high and convex, sloping toward the sides, which are concave. The first and second joints of the external antennæ cylindrical; the apex of the second joint on a level with the frontal margin.

The third joint of the outer maxillipeds longer than broad; inner margin oblique; superior margin straight; angles prominent; irregularly rectangular in outline, broader at the base than at the top. Inferior regions finely pubescent; the pubescence only seen under the lens.

Hand strongly bicarinated on the superior surface; a well-marked ridge on the middle of the external surface; above the preceding is a flattened, nearly obsolete ridge; the inferior surface smooth; a high crest along the whole length of the upper edge of the movable finger; at the base of the crest, on either side, is a sulcus, extending the entire length of the finger; the inner and outer surfaces of both fingers deeply

grooved; thumb slightly deflexed on the palm; apices of fingers pointed, beaked, and overriding when closed; cutting-edges strongly toothed; five prominent, conical teeth on each edge; sometimes two smaller ones between second and third, and third and fourth; carpus carinated above; two ridges on the external surface; an obtuse spine projecting from the anterior part of the inner surface; the ridges on the carpus sinuous; arm smooth, and not projecting beyond the lateral border of the carapace.

The posterior legs compressed; contracted at the articulation of the third and fourth articles; the fifth article and all the tarsi, except those of the last pair of legs, furrowed on their anterior and posterior surfaces; on the anterior surface of the tarsi the two furrows, the one above and the other below, separated by a prominent ridge, become continuous at the proximal extremity around the base of the ridge; the fifth joint and tarsus of the last pair compressed to a greater degree than the corresponding joints of the preceding legs; tarsus very much flattened, not grooved, oblong-ovate; apex corneous, hooked; a few short and fine hairs on the lower border of the tarsi; at the base of the tarsus of the last pair, and at the distal extremity of the fifth joint below, is a tuft of hairs.

Abdomen of female broadly ovate, and composed of seven pieces.

Color: The whole upper surface of the carapace purple, with the following exceptions: a narrow line of white around the entire free margin of the carapace, following the incisions between the lobes on the antero-lateral border; a round spot of the same color at the anterior superior angle of the orbit, and a short oblong spot, commencing at the apex of the front, extending its whole length; a round spot on the apex of the projecting lateral tooth, and another, similar, on the carapace just anterior to the termination of the lateral ridge. The arrangement of the colors on the legs is somewhat peculiar. Ground color purple; the distal extremities of the third and fifth joints, and the proximal end of the fourth, white. The purple color extends over the whole hand, except at the base of the movable finger, and on the palm opposite the articulation of the finger; the carinae white; a ring of purple around the carpus; the proximal extremity white, and a spot of the same color on the distal end above; the upper surface of the arm purple.

Length, 0.45 inch; breadth, 0.56 inch; ratio of length to breadth, 1: 1.2

Locality: Palmyra Island, North Pacific. Taken from the cloacal dilatation of the alimentary tract of a *holothurian*. This is the first in-

stance on record where a crustacean of the family *Portunidae* has been found living as a "free messmate" in another animal. Others possessing this habit have belonged, without exception, to families much lower in the scale of classification. The elaborate system of coloration, and the asperities on the surface of the carapace of this crab, would incline us to believe that this is not its permanent place of residence. The *Pinnotheridae* are devoid of color-markings, and their shell is more or less rounded, the irregularities of the surface being removed by the constant pressure to which it is subjected by the living walls of their dark abode.

Belonging to this new genus, and closely allied to the above, is *Lissocarcinus orbicularis*, Dana. The arrangement of the colors on the legs is almost identical in the two species; the general shape of the front is similar, and there is the same smooth and shining surface. The *holothuricola*, however, is readily distinguished by its being less orbicular, and more produced transversely, and by the prominent posterior tooth of the antero-lateral border. The third joint of the outer maxillipeds is straight, and almost quadrangular; in *orbiculare* its shape is more irregular. In the latter the antero-lateral margin is a "little reflexed," while in the former it is everted. The shape of the claws and ambulatory feet is the same in both species.

#### PODOPHTHALMUS VIGIL, (*Fabr.*) *Leach.*

*Podophthalmus vigil*, LEACH, Zoöl. Miscell., ii, pl. cxviii.—GUERIN, Icon. du Règne Anim. Crust., pl. i, f. 3.—M. EDWARDS, Hist. Nat. des Crust., i, 467; Règne Anim. de Cuvier, Crust., Atlas, pl. ix, f. 1.—DE HAAN, Faun. Japon., Crust., 44.—ALPH. M. EDWARDS, Arch. du Mus. d'Hist. Nat. de Paris, 1860, x, 420.

*Podophthalmus spinosus*, LAMARCK, Syst. des Anim. sans vertèb., 152; Hist. des Anim. sans vert., v, 157.—LATREILLE, Gen. Crust. et Insect., i, pl. i et ii, f. 1; Hist. Nat. des Crust. et des Insect., vi, 54, pl. xlvi; Règne Anim. de Cuvier, iv, 33; Encyclop. Meth., x, 166.—DESMAREST, Considerat. sur les Crust., 100, pl. vi, f. 1.

*Portunus vigil*, FABRICIUS, Suppl. Entom. Syst., 368, no. 1.

Locality: Fanning Group of Islands, North Pacific.

### MACROPHTHALMIDÆ.

#### OCYPODINÆ.

#### GELASIMUS GIBBOSUS, *Smith.*

*Gelasinus gibbosus*, SMITH, Trans. Connecticut Acad., vol. ii, 140, pl. ii, f. 1, et pl. iv, f. 8; Report of the Peabody Academy of Sciences, 1869, 91.

Locality: La Paz, Lower California.

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OCYPODA CERATOPHTHALMA, (*Pallas*) *Fabr.*

*Ocypoda ceratophthalma*, FABR., Suppl. Entom. Syst., 347.—LATR., Hist. Nat. des Crust., vi, 47; Encyclop. Méth., pl. 274, f. 1.—DESMAREST, Consid. sur les Crust., 121, pl. 12, f. 1.—DE HAAN, Faun. Japon., Crust., 29.—M. EDWARDS, Hist. Nat. des Crust., ii, 48; Atlas du Règne Anim. de Cuvier, Crust., pl. 17, f. 1; Mélanges Carcinologiques, 105.—KRAUSS, Südafrik. Crust., 41.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 100.

*Ocypoda brevicornis*, M. EDWARDS, Hist. Nat. des Crust., ii, 48; Mélanges Carcinologiques, 106.—DANA, U. S. Expl. Exped., Crust., i, 326, pl. xx, f. 3.

*Cancer ceratophthalmus*, PALLAS, Spicil. Zoöl. fasc., 83, pl. 5, f. 17.

Locality: Fanning Group, North Pacific.

## GECARCINIDÆ.

## UCAINÆ.

CARDISOMA OBESUM, *Dana.*

*Cardisoma obesum*, DANA, Proc. Acad. Nat. Sci. Phila., 1851, v, 252; U. S. Expl. Exped. Crust., i, 375, pl. xxiv, f. 1.—M. EDWARDS, Mélanges Carcinologiques, 171.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 100.

*Cardisoma urvillei*, M. EDWARDS, Mélanges Carcinologiques, 170.

Locality: Fanning Group. A lateral edge to the carapace is more apparent in the young and in females, than in the adult males. In the former there is a small point, or projection, behind the post-orbital angle. In the females the hands are shorter, the fingers are less attenuated, and their cutting-edges are more closely approximated, and evenly denticulated than in the males.

## GRAPSIDÆ.

## GRAPSINÆ.

METOPOGRAPSUS THUKUHAR, (*Owen*) *M. Edw.*

*Metopograpsus thukuhar*, M. EDWARDS, Annal. des Sci. Nat., 3re Sér. xx, 165; Mélanges Carcinologiques, 131.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 101.—HELLER, Crust. Novara Exped., 43.

*Goniograpsus thukuhar*, DANA, U. S. Expl. Exped. Crust., i, 344.

*Pachygrapsus parallelus*, RANDALL, Jour. Acad. Nat. Sci. Phila., viii, 124.

*Grapsus thukuhar*, OWEN, Crust. Beechey's Voyage, Blossom, 80, pl. xxiv, f. 3.

Locality: Hawaiian Islands.

PACHYGRAPSUS CRASSIPES, *Randall*.

*Pachygrapsus crassipes*, RANDALL, Jour. Acad. Nat. Sci. Phila., viii, 127.—M. EDWARDS, Melanges Carcinologiques, 132.—STIMPSON, Jour. Boston Sci. Nat. Hist., 1857, vi, 27; Proc. Acad. Nat. Sci. Phila., 1858, x, 102.

Locality: Lower California.

GRAPSUS RUDIS, *M. Edw.*

*Grapsus rudis*, M. EDWARDS, Hist. Nat. des Crust., ii, 87; Annal. des Sci. Nat., 3 re Ser. xx, 168; Melanges Carcinologiques, 134.—GIBBES, Amer. Assoc. Advan. Science, 1850, 17.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 102.—HELLER, Crust. Novara Exped., 47.

*Grapsus hirtus*, RANDALL, Jour. Acad. Nat. Sci. Phila., viii, 124.

Locality: Fanning Group.

GEOGRAPSUS CRINIPES, (*Dana*) *Stimp.*

*Geograpsus crinipes*, STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 101.—HELLER, Crust. Novara Exped., 48.

*Grapsus crinipes*, DANA, Proc. Acad. Nat. Sci. Phila., 1851, v, 249; U. S. Expl. Exped., Crust., i, 341, pl. xxi, f. 6.—M. EDWARD, Melanges Carcinologiques, 136.

Locality: Fanning Group. There is less concavity in the posterior border of the epistome in this specimen than is given in Dana's figure. This authority lays particular stress upon this point, but I deem it of minor importance. The specimen agrees in every other particular.

## PINNOTHERIDÆ.

PINNIXIA TUMIDA, *Stimp.*

*Pinnixia tumida*, STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 108.

Locality: Bellañas Bay, Lower California. Removed from the interior of the body of a *holothurian*.

Although separated by the entire width of the Pacific Ocean, yet this specimen agrees in every particular with the description given by Stimpson of a species from the port of Hakodadi, on the island of Jesso. *P. tumida* and *P. faba*, Dana, are the only species of this genus that are characterized by the absence of ridges on the superior surface of the carapace. There is nothing in Dana's description of his species, which came from Puget Sound, which would militate against this being the same; but in the plate a figure of the hand is given, in which the fingers are oblique, as in *tumida*, but there is no hiatus between them, and the



tooth on the middle of the movable finger is wanting, both of which points are very characteristic of *tumida*.

The other species of crustacea which are common to both the Asiatic and American shores of the Pacific are *Trapezia maculata*, *Liomera lata*, *Liomera cinctimana* and *Pachygrapsus crassipes*. The latter, a subterrestrial crab, was obtained by Stimpson from the port of Simoda, Japan. The first three are littoral in their habits, and are Indo-Pacific species. On the American side all of these species have come, so far, from the Lower Californian coast only.

## CALAPPIDÆ.

### CALAPPA TUBERCULATA, *Fabr.*

*Calappa tuberculata*, FABRICIUS, Suppl. Entom. Syst., 345.—HERBST, Krabben und Krebse, 204, pl. 13, f. 78.—GUÉRIN, Iconog. Crust., pl. 12, f. 2.—M. EDWARDS, Hist. Nat. des Crust., ii, 106.—DANA, U. S. Expl. Exped. Crust., i, 393.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 162.—HELLER, Crust. Novara Exped., 69.  
*Calappa hepatica*, DE HAAN, Faun. Japon. Crust., 70.

Locality : Hawaiian Islands.

## HIPPIDÆ.

### BLEPHAROPODA OCCIDENTALIS, *Randall.*

*Blepharopoda occidentalis*, RANDALL, Jour. Acad. Nat. Sci. Phila., viii, 131, pl. vi.—GIBBES, Proc. Amer. Assoc. Advan. Sci., 1850, 187.—STIMPSON, Jour. Boston Soc. Nat. Hist., vi, 46; Proc. Acad. Nat. Sci. Phila., 1858, x, 230.  
*Albunhippa occidentalis*, DANA, U. S. Expl. Exped. Crust., i, 405, 406.

Locality : Lower California.

## PAGURIDÆ.

### CALCINUS TIBICEN, (*Herbst*) *Dana.*

*Calcinus tibicen*, DANA, U. S. Expl. Exped. Crust., i, 457.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 234.—HELLER, Crust. Novara Exped., 87.  
*Pagurus levimanus*, RANDALL, Jour. Acad. Nat. Sci. Phil., viii, 135.  
*Pagurus tibicen*, M. EDWARDS, Hist. Nat. des Crust., ii, 229; Atlas du Règne Anim. de Cuv., Crust., pl. 44, f. 3.  
*Cancer tibicen*, HERBST, Krabben und Krebse, pl. 23, f. 7.

Locality : Hawaiian Islands.

CALCINUS LATENS, (*Randall*) Dana.

*Calcinus latens*, DANA, U. S. Expl. Exped. Crust., i, 459, pl. 28, f. 11.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 234.—HELLER, Crust. Novara Exped., 88.  
*Pagurus latens*, RANDALL, Jour. Acad. Nat. Sci. Phila., viii, 135.

Locality: Hawaiian Islands.

In alcoholic specimens the color of the carpus and anterior surface of the arm is red, with white spots. Some of the spots on the superior surface of the carpus are slightly elevated. In few of the specimens the red color of the carpus is very faint. The basal portion of the tarsi of the posterior legs, in some cases, is brownish-red, and in others purplish.

## CLIBANARIUS ZEBRA, Dana.

*Clibanarius zebra*, DANA, U. S. Expl. Exped. Crust., i, 465, pl. 29, f. 5.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 235.

Locality: Hawaiian Islands.

## CENOBITIDÆ.

CENOBITA OLIVIERI, *Owen*.

*Cenobita olivieri*, OWEN, Crust. Beechey's Voy. Blossom, 84.—DANA, U. S. Expl. Exped., Crust., i, 470.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 232.—HELLER, Crust. Novara Exped., 82.

*Pagurus clypeatus*, OLIVIER, Encyclop. Méth. Ins., viii, 643, pl. 311, f. 1.

Locality: Fanning Group.

We found this crab to be most abundant on Palmyra Island. They climbed the trees and bushes, dragging after them the heavy shell of the *Turbo argyrostoma*, which they use to the exclusion of all other shells. It is probable that they climb the trees for the purpose of feeding on the mosses and lichens that grow thereon.

CENOBITA PANAMENSIS, *Streets*.

*Cenobita panamensis*, STREETS, Proc. Acad. Nat. Sci. Phila., 1871, xxiii, 241.  
*Cenobita intermedia*, STREETS, Proc. Acad. Nat. Sci. Phila., 1871, xxiii, 241.

Locality: Lower California.

When describing the type of this species in 1871, I stated that the tarsus of the third leg of the left side was shorter than the corresponding leg of the right side. As this difference is not observable in the present specimen, which agrees with *panamensis* in every other respect, it was doubtless nothing more than an individual variation. The tarsus of the third leg, left side, is slightly longer than that of the right side,

which is the case in *C. intermedia*. The failure of the principal point of difference between the species necessitates their union under one name. I therefore retain *panamensis*, and reduce *intermedia* to the status of a synonym.

The color is better defined in the recent specimen. The external surface of the larger hand is brown, except at the superior margin and at the posterior inferior angle; the upper half of the external surface of the carpus, both sides, of the same color as the hand; the lower half uncolored, or slightly stained with orange; a large spot of orange on the anterior, truncated surface of the arm. The fourth article of the posterior legs is marked in the same manner as the carpus, with the addition of a deep line of purple at the lower edge of the brown, which extends from the center of the article to its articulation with the third article; a brownish, or purplish, spot at the base of the fifth article. This spot is wanting on the last leg of the left side. The third joint of the last pair is purplish; the tarsi brownish-orange. The carapace anteriorly purplish; two patches of the same color posteriorly on each side. The peduncles of the eye a deep buff.

Total length of the carapace 1.00 inch.

#### BIRGUS LATRO, *Leach*.

*Birgus latro*, LEACH, Trans. Linn. Soc., xii—M. EDWARDS, Hist. Nat. des Crust., ii, 246; Atlas du Règne Anim. de Cuv., pl. 43, f. 1.—QUOY & GAIMARD, Voy. de l'Uranie, pl. 80.—DANA, U. S. Expl. Exped. Crust., i, 474, pl. 30, f. 5.—STIMPSON, Proc. Acad. Nat. Sci. Phila., 1858, x, 232.—DARWIN, Naturalist's Voyage Around the World, 462.

*Cancer latro*, HERBST, Krabben und Krebse, ii, 34, pl. 24.

*Cancer crementatus*, RUMPHIUS, Mus., pl. 4.—SEBA, iii, pl. 21, figs. 1 et 2.

Locality: Washington, or New York Island, Fanning Group. Common. Confined to this one island of the group. At one time this giant land-crab was supposed to be restricted to a single group of islands in the Pacific, south of the equator; in recent times, however, its habitat has been widely extended, so that there is hardly a group, either north or south of the equator, where it is not found. They live in holes in the ground; and they line the bottoms of their burrows with the fine fibers of the cocoanut-husk. The unwary native, in seeking to rob the crab of its soft bed, occasionally finds his fingers imprisoned in its vise-like grip. It is interesting to know that in such an emergency a gentle titillation of the under soft parts of the body will cause it to immediately loose its hold. So tenacious is their grasp that I have seen them

hang suspended from a tree for more than an hour, holding on to a stick which had been thrust between their claws. The wonderful stories about these crabs climbing the trees after coconuts are purely fictitious. They eat the nuts after they have fallen to the ground, first stripping off the husk, and then breaking through the shell at the end containing the eyes.

### CRANGONIDÆ.

#### CRANGON FRANCISCORUM, *Stimp.*

*Crangon franciscorum*, STIMPSON, Proc. California Acad. Nat. Sci., 1856, i, 89; Jour. Boston Soc. Nat. Hist., 1857, vi, 495, pl. 22, f. 5; Crust. and Echin. Pacific coast of N. Amer., 55.

Locality: San Francisco Bay, California.

### PALÆMONIDÆ.

#### HIPPOLYTE GIBBOSUS, *M. Edw.*

*Hippolyte gibbosus*, M. EDWARDS, Hist. Nat. des Crust., ii, 378.—DANA, U. S. Expl. Exped. Crust., i, 565, pl. 36, f. 4.—HELLER, Crust. Novara Exped., 120.

Locality: Hawaiian Islands.

There are seven teeth along the under margin of the rostrum, instead of six, which is the number given by Dana.

#### PALÆMON ACUTIROSTRIS, *Dana.*

*Palæmon acutirostris*, DANA, U. S. Expl. Exped. Crust., i, 590, pl. 39, f. 1.

Locality: Hawaiian Island.

### SERGESTIDÆ.

#### SERGESTES MACROPHthalmus, *Stimp.*

*Sergestes macrophthalmus*, STIMPSON, Proc. Acad. Nat. Sci. Phila., 1860, xii, 46.

Locality: North Pacific Ocean.

There is no doubt about the identity of this species. It is very easily identified by the arrangement of the spines on the cephalothorax and abdomen. In addition to the supra-orbital and hepatic spines, there is one on the middle of the dorsal surface of the carapace, at its posterior extremity; this spine is small and erect. There is an oblique spine on the posterior dorsal extremity of the fourth, and of the fifth abdominal segments; that on the fourth is the larger. No other species of this genus presents this peculiar arrangement of dorsal spines. But Stimp-

son makes no mention of spines on the other segments of the abdomen. They were evidently broken off in his specimen, as they are on some of the segments of the present specimen, which, however, shows a greater number than he states to be present. No evidence of spines were seen on the first and second segments; but at the posterior extremity of the dorsal surface of the third is an erect spine, similar to the one on the posterior extremity of the carapace. The sixth segment has an oblique spine at its extremity, which is smaller than those on the two preceding segments. An un mutilated specimen will doubtless show the first and second segments to be armed with erect spines similar to that on the third, and on the extremity of the carapace.

### SERGIA, *Stimp.*

*Sergia*, STIMPSON, Proc. Acad. Nat. Sci. Phila., 1860, xii, 46.

In certain of its characters *Sergia* recalls *Lucifer*; while in others it is strongly related to *Sergestes*. Its own peculiar characters are in its fourth and fifth pairs of feet, which are long; and the dactylus is palmiform. Its body is elongated like *Lucifer*, but not so attenuated, and there is the same extension of the antennary segment anterior to the buccal region, which is carried to so great a degree in *Lucifer*. And again, as in the latter genus, there is a spheroidal auditory body imbedded in the base of the peduncle of the internal antennæ.

### SERGIA REMIPES, *Stimp.*

*Sergia remipes*, STIMPSON, Proc. Acad. Nat. Sci. Phila., 1860, xii, 46.

Carapace very much elongated, depressed, subcylindrical; a lateral view shows nearly the same vertical diameter from the front to the extremity of the sixth abdominal segment; the cervical suture distinct; the length of the antennary segment anterior to this suture equals more than half the length of the carapace proper; no hepatic spine. Front slightly projecting and broadly rounded; the outer angles, over the eyes, rounded and projecting, shorter than the front. Eye subfungiform, short, its length less than one-third the length of the carapace; it extends very little beyond the apex of the basal article of the peduncle of the inner antennæ. Antennary scale broad, extending nearly midway the last joint of the antennary peduncle; inner margin and apex furnished with closely-set plumulose cilia; a spine on the outer margin below the apex.

The second and third pairs of external maxillipeds pediform, elongate; the three terminal joints of the second pair thickened, bent backward; the third pair very long, exceeding the length of the thoracic feet, and extending anteriorly to about the apex of the inner antennary peduncle. The maxillipeds, and the six anterior thoracic feet, furnished with long, simple setæ. The fourth and fifth pairs of thoracic feet slenderer than the preceding, cylindrical, more sparsely furnished with setæ; setæ plumulose; dactylus flattened, subovate; fifth pair shorter than the fourth; fourth almost as long as the carapace. Abdominal feet long and narrow; first pair nearly as long as the carapace; the length of the peduncle almost equals the length of the rami; the length of the feet decreases posteriorly, while the diameter of the peduncle increases; the margins of the rami densely covered with long, plumulose cilia. Abdomen longer than the cephalothorax; the five anterior segments subequal; the sixth long, equals the lengths of the fourth and fifth combined; fifth unarmed above; the posterior margin of the sixth, above and below, acute; inferior border furnished with long, plumulose cilia. The external margin of the outer caudal lamella armed with an aculeate spine near the posterior extremity. The margins of all the caudal appendages, except the external margin of the outer lamella anterior to the spine, furnished with long, equidistant, feathery cilia.

A comparison of the above description with that given by Stimpson shows that they agree in every particular, except in the length of the eyes—which he distinctly states reaches to the apex of the penultimate article of the antennary peduncle—and in the character of the front. Concerning the latter, he says, “rostrum minutely spinous, acute, curved, dorsum armed with a tooth or spine.” Neither the spine nor the spiniform rostrum, are observable in the present specimen. The eyes were somewhat shrunken, and the front was probably mutilated in the surface tow-net in which the animal was caught. When the author states that the spines are minute, in a specimen only a half an inch long that requires a microscope to examine any part of its structure, they must be exceedingly small, and are very apt to be broken off by the rush of the water through the net. If these differences are found to be constant, this will constitute a distinct species; but I am not willing to found it upon the examination of a single specimen.

Locality: North Pacific Ocean.

Caught June 28, 1873, in latitude 30° north, longitude 145° west.

## LUCIFERIDÆ.

LUCIFER ACESTRA, *Dana*.

*Lucifer aestra*, DANA, U. S. Expl. Exped. Crust., i, 671, pl. 44, f. 9.

Locality: North Pacific Ocean.

Male caught June 28, 1873, in latitude 30° north, longitude 146° west; female, May 9, 1873, in latitude 4° north, longitude 127° west.

After an examination of the genus *Sergia* there is no longer any doubt in my mind, that the place for *Lucifer* is with the lower Macroura rather than with the Schizopoda. The propriety of even elevating it to the dignity of a separate family is questionable.

I make the following addition to the characters already pointed out as distinguishing the sexes of this species. In the females the extremity of the internal margin of the outer caudal lamella projects beyond the apex of the spine at the extremity of the external margin; in the male this margin is not produced at all, but is truncated. The truncated surface is rounded, and slopes forward and inward from the base of the spine.

## EUPHAUSIDÆ.

## EUPHAUSIA GIBBOSA, n. sp.

Carapace short rostrate; rostrum broad, triangular, on a lower level than the superior surface of the carapace; the superior surface behind the rostrum gibbous, elevated slightly above the rest of the surface. Inner antennæ three-jointed, about three times as long as the eye; the first joint as long as the second and third together; its apex above produced into a long spine, which reaches half the length of the following joint, and directed upward and somewhat forward; the apex of second joint also produced, but spine shorter and directed more forward; second and third joints subequal; a tuft of long hairs at the apex of the last joint; the flagellum long, and with antenna about as long as the body. The antennary scale oblong, as long as the base of the antenna; the apex furnished with long, curved cilia; flagellum of the outer antenna about as long as that of the inner pair. The feet slender; the last three joints longer than the one next preceding; the penult and antepenult subequal; the ultimate a little more than half the length of the penult; the setæ long and plumulose; the palpus about one-third the length of the leg, those on the anterior legs longer. Branchiæ ramose. The

sixth abdominal segment as long as the two preceding; the caudal segment longer than the lamellæ; the two subapical barbs salient.

The tumid, hunched appearance of the anterior portion of the carapace, and the spines at the apices of the first and second basal joints of the inner antennæ, are characters which have not been mentioned in any previously-described species of this genus. They are very characteristic of this species, and will serve readily to distinguish it from all others.

Length, .45 of an inch.

Locality: North Pacific Ocean. Latitude 30° north; longitude 145° west. Caught June 28, 1873.

• CYRTOPIA ROSTRATA, Dana.

*Cyrtopia rostrata*, DANA, U. S. Expl. Exped. Crust., i, 648, pl. 43, f. 2.

Locality: North Pacific Ocean. Latitude, 3° north; longitude, 128° west. Collected May 10, 1873.

Several specimens of this species were obtained, and they are all more rudimentary in form than that described by Dana. I failed to detect the slightest evidence of branchiæ. These organs were rudimentary in Dana's specimen; and in another genus—*Furcilia*, which is very closely allied, and more rudimentary still—they are entirely absent. In one instance the carapace was excavated behind, across the dorsum, as in the latter genus. All the specimens, but one, showed the apex of the first joint of the inner pair of antennæ prolonged at its outer and inner angle beyond the summit of the following joint, to about the same extent as it is carried in some species of *Furcilia*. The abdominal feet were rudimentary. The gibbous eyes, the long acute beak, and the anteriorly projecting tooth on the lateral border of the carapace were present in all. The facts cited above add greater weight to the testimony already adduced, that the place for Dana's provisional genus *Furcilia* is near *Cyrtopia*, in the family *Euphausiidae*.

## MYSIDÆ.

### MYSINÆ.

SIRIELLA GRACILIS, Dana.

*Siriella gracilis*, DANA, U. S. Expl. Exped. Crust., i, 658, pl. 44, f. 1.

Locality: North Pacific Ocean. Latitudes 20° and 30° north; longitudes 149° and 145° west. Collected May 19 and June 28, 1873.



In all the specimens collected, the abdominal appendages were well developed, with stout oblong bases, and with two subequal, multiarticulate, ciliate rami, somewhat longer than the base. There is also present an oblong scale at the apex of the basal portion of the first pair of antennæ. Both these characters are said by Dana to be wanting; and their presence assimilates the genus more closely with *Promysis* and *Macromysis*.

## COROPHIIDÆ.

### CLYDONINÆ.

#### CLYDONIA LONGIPES, Dana.

*Clydonia longipes*, DANA, U. S. Expl. Exped. Crust., ii, 835, pl. 55, f. 7.—SP. BATE, Cat. Amphi. Crust., 284, pl. xlvii, f. 9.

Locality: North Pacific Ocean. The exact locality was lost.

The specimen in our collection is unmutilated; and, consequently, shows those parts intact that Dana stated were wanting in his. Concerning the antennæ, he says: "Only two were observed, and these were long, straight, stout, rigid organs, lying side by side, and, excepting the basal joints, hardly articulated, or only indistinctly so." The presence of but two antennæ was not an anomalous condition, but an accidental one, owing to mutilation. Commenting on the above statement, Sp. Bate says: "The author does not state which pair of antennæ are absent. The superior pair are probably rudimentary." Our specimen shows two pairs of antennæ occupying their normal positions, and those described by Dana are not the inferior, but the superior pair.\*

The inferior pair are longer, and more slender organs than the superior, and are folded upon themselves, and partly hidden under the body. They arise from the under and outer surface of the first segment of the cephalothorax, posterior and external to the superior pair. The first basal joint is short and stout, more than twice the breadth of the second, which is oblong in shape and longer than the first; the third article is cylindrical, half the breadth of the second and twice as long. At its articulation with the second basal joint, it is bent obliquely upward between the basal portion of the superior pair. The flagellum is very long, and attenuated toward its extremity, multiarticulate. It extends forward to near the middle of the superior pair, where it is folded back upon itself

\* I will state, for the benefit of future collectors in this field, that my collection was preserved unmutilated by mounting the specimens, as soon as caught, in cells upon glass slides.

beneath the body. The apex of the flagellum reaches nearly to the posterior extremity of the cephalothorax when in this folded condition. The total length of the inferior pair is one-third greater than the superior pair.

The other parts that were mutilated in Dana's specimen were the posterior stylets. A description of these will therefore complete the account of the entire animal.

The outer caudal lamellæ are longer than the inner; both are lanceolate in shape, and serrated along their edges. The two stylets terminating the caudal segment are linear, and of the same length as the outer caudal lamellæ. Two short stylets articulate with the outer edge of the first just above the middle, and reach exactly half way to the terminal point. The fifth and sixth abdominal segments are much narrower than the preceding, and are apparently consolidated.

## H Y P E R I D Æ .

### HYPERINÆ.

#### LESTRIGONUS RUBESCENS, Dana.

*Lestrigonus rubescens*, DANA, U. S. Expl. Exped. Crust., ii, 984, pl. 67, f. 9.—SP. BATE, Cat. Amphi. Crust., 290, pl. xlviij, f. 5.

Locality: North Pacific Ocean. Latitude 1° north; longitude 122° west. Collected May 7, 1873.

My reasons for retaining the genus *Lestrigonus* will be given under *Hyperia tricuspidata*.

#### HYPERIA TRICUSPIDATA, n. sp.

Head large, deeper than broad, irregularly quadrangular from a lateral view, excavated in front. Eyes large, occupying most of the lateral portion of the head. Superior antennæ shorter than the head, stout; base short, four-jointed; first joint longest, distal end enlarged; the second, third, and fourth short, together shorter than the first; flagellum broader than the peduncle, oval, acute at the apex, about three times as long as the base, uniaarticulate; a few long auditory cilia at apex; a single row of short hairs on the inferior surface. Inferior antennæ rise from the inferior portion of the head, near the buccal region; more than twice as long as the superior pair; peduncle four-jointed; first and second joints long; first about half the length of the second, extending to the anterior margin of the head, but not exposed beyond it; second joint

slender, cylindrical, and the entire length of its upper border closely set with short, equidistant hairs, curled at their tips; third and fourth joints short, subequal, about one-quarter the length of the second, a few hairs on their upper surface; flagellum linear-lanceolate, in length almost equal to the second joint of the base, unarticulate, pointed, with seven or eight slight serrations along the superior edge, one or more hairs at each serration. The second joint is directed upward and outward, and the third, fourth, and flagellum are bent downward, nearly at a right angle with the second. When the animal is at rest, the inferior antennæ are evidently folded up, in this manner, in the concavity in the front of the head.

The two pairs of gnathopoda unequal and unlike; the first pair shorter, and more robust than the second; meros produced antero-inferiorly, at its extremity a number of stiff hairs, slightly curled at their tips; carpus broad, produced inferiorly, but not anteriorly, with its anterior edge straight, and armed at the inferior angle with two stout spines or bristles; propodus shorter than the carpus, and about one-half as broad; dactylus very minute. The second pair has none of the joints produced; meros short, about one-fourth the length of the carpus; the latter slender and cylindrical; propodus shorter than the carpus, and about the same breadth, with its distal extremity slightly produced on either side of the dactylus to an acute point, which is almost as long as the short dactylus. This arrangement probably compensates for the lack of the subchelate development of the carpus.

The depth of the thorax decreases slightly posteriorly. The five pairs of thoracic feet subequal; the two anterior pairs directed forward, with the last two joints flexed backward; the three posterior pairs directed backward, with the tarsus and claw flexed forward; a few short hairs set equidistant along the posterior margin of the two anterior, and on the anterior margin of the three posterior, pairs of legs.

The peduncles of the anterior abdominal appendages broadly elliptical, decreasing in size posteriorly. Of the three posterior pairs of abdominal appendages the ultimate are the longest; the preceding pairs nearly subequal; the rami of the antepenult (external) the longest, of the ultimate pair the shortest; rami serrated. Telson short, lanceolate.

Another specimen, a female with an incubatory pouch attached containing young, was captured at the same time as the one just described; and while the two differ widely in some respects, they have in common

the essential specific character that immediately distinguishes *H. tricuspidata* from all others of the same genus; namely, the peculiar structure of the second pair of gnathopoda. The head is larger in the female, but the general shape is the same; the thorax is shorter and deeper, and the last segment is much narrower; the abdomen is also narrower. The character of the superior antennæ is the same in both, except that in the female they are much smaller, and the joints are more plainly visible. The inferior antennæ, however, are quite different. They do not extend at all, or very slightly, beyond the anterior margin of the head. The first basal joint is very short, and broader than the following; the second long, and reaches nearly to the anterior margin of the head; the third joint is rudimentary; and the fourth is apparently obsolete. The flagellum is small, about one-third the length of the first joint, lanceolate in shape, and with two or three stout cilia at its apex. The shortening is chiefly due to the diminished length of the first joint of the peduncle. The posterior pair of thoracic legs are slenderer and shorter than the preceding pairs. The peduncles of the anterior abdominal appendages are ovate, instead of being elliptical; the posterior appendages show no differences.

Length of male .30 inch; of female, .25 inch.

I cannot think that these differences are anything more than sexual, on account of the strong specific resemblance there is between the specimens. Carcinologists generally have adopted the conclusion that *Lestrignonus* is the male sex of *Hyperia*, but at no time, I think, has there been sufficient evidence at hand to justify this conclusion. I know no better reason for the supposition, than that they are occasionally found associated together, joined with the fact that certain others of the *Hyperidea* show a similar sexual difference; namely, in the length of the antennæ. In the *Lestrignonus*, however, there is not only a difference in the length, but a total change in the structure of the antennæ. What is here held to be a male bears no resemblance to a *Lestrignonus*, but has all the generic characters of a *Hyperia*; and, while there is a modified growth, as in the former genus, the development of the antennæ is the same in both individuals.

*Young*.—Head narrow, quadrilateral. Superior antennæ short and stout, and situated nearer the superior margin of the head than in the adult; the first basal joint as long as the three terminal ones; the second longer than the third, and their breadth less than that of the first; the fourth joint small, and either rounded or broadly triangular, with

rounded apex; flagellum minute, linear, uniaarticulate, with one or two cilia crowning the apex, as long as, or longer than, the flagellum. The inferior antennæ are represented by a small rounded tubercle, tipped by a cilia; situated just beneath the superior pair.

Thoracic feet ten in number, stout; claws strongly hooked. Gnathopoda rudimentary, neither pair produced at the carpus, or at the meros; readily distinguished from the following thoracic feet by their more slender development.

Locality: North Pacific Ocean.

## VIBIINÆ.

### VIBILIA EDWARDSI, *Sp. Bate.*

*Vibilia edwardsi*, SP. BATE, Cat. Amph. Crust., 300, pl. xlix, figs. 6 and 7.

Locality: North Pacific Ocean. Latitude 4° north; longitude 127° west. Collected May 9, 1873.

The flagellum of the superior antennæ, with its anterior margin oblique, and fringed with a row of short spines, is highly characteristic of this species.

## PHRONIMIDÆ.

### PHRONIMINÆ.

#### PHRONIMA PACIFICA, n. sp.

Head large, broad and rounded on the top, tapering below to the oral apparatus, and excavated in front. Eyes both on the dorsal and lateral surfaces of the head. Thorax narrower than the head, its vertical diameter decreasing rapidly posteriorly; the last segment much longer than any of the preceding segments. Abdomen attenuated. Superior antennæ shorter than the head, two-jointed; first joint short; the second about twice as long as the first, with a few cilia at its apex. First pair of gnathopoda having the meros produced, and with the inferior margin furnished with minute spinules, one of which, larger and longer than the rest, at the apex; the superior border of the carpus arched, produced antero-inferiorly, and very slightly anteriorly; produced part not reaching half the length of the propodos; the anterior margin closely set with acute, triangular teeth; one at the inferior apex, long and slender; the inferior margin finely serrated; propodos about the same length as the superior border of the carpus, cylindrical, arcuate, slightly taper-

ing toward the distal extremity, finely serrated on the inferior surface, and three or four longer spines on the superior surface; dactylos short, about one-fourth the length of the propodos, curved, and notched on the under surface, posterior to the apex; on either side of the base is a wing-like plate. The second pair of gnathopoda longer than the first pair, and the antero-inferior angle not produced to the same extent; in other respects they are similar. The first pair of thoracic feet shorter than the second, and much longer than the gnathopoda; the posterior margin of the carpus and propodus of both pairs minutely spinulose; dactylus minute. The third pair chelately developed; carpus large, irregularly quadrilateral, almost as broad as long, the inferior surface rounded, and the antero-inferior angle produced as a long tooth; on the middle of the anterior surface is a large crenulated tubercle, from which rise five or six long, straight hairs. In specimens from the .15 to the .20 of an inch long, there are, in the position of the tubercle, two or three sharp, prominent teeth, springing from a slightly-raised base; and the angle of the carpus is less projecting in the same specimens. Propodus bowed; when flexed on the carpus reaching to the apex of the tooth at the inferior angle—in smaller specimens somewhat longer; a low convexity on the inferior surface opposite the crenulated tubercle of the carpus; the prominence not crenulated; inferior surface bimarginate. Dactylus present, minute. The posterior apex of the coxa of the third pair acute, prominent; the meros projecting posteriorly and rounded. The two posterior pairs of thoracic feet subequal, shorter than any of the preceding pairs. Telson rudimentary.

Length of the larger specimens, .40; smaller, .15 of an inch.

Locality: North Pacific Ocean. Latitudes  $4^{\circ}$  and  $21^{\circ}$  north; longitudes  $127^{\circ}$  and  $151^{\circ}$  t. Collected May 9 and 20, 1873.

This species is distinguished from *P. sedentaria* by the broadly-quadrate form of the carpus of the third pair of thoracic feet, and by having the carpus of the gnathopoda less produced anteriorly. In other respects they are similar. The shape of the hand more nearly resembles the hands of *P. custos* and *P. borneensis*; but it is distinguished from both of the latter, by the character of the anterior surface of the carpus and of the propodus. In the latter both the carpus and propodus are furnished with a crenulated tubercle; in *custos* the tubercle is single and tooth-like. There is a striking resemblance between the propodus, and the anterior surface of the carpus of the third pair of thoracic feet, of the smaller specimens of *pacifica*, and the corresponding parts of *P.*

*atlantica*, which is said to be the female of *sedentaria*; the broad band, however, separates them.

It is a remarkable fact, that in all the species of *Phronima* that have been described, even from widely-separated localities, the variation is very slight indeed.

#### ANCHYLONYX, nov. gen.

Head moderately large, broad and rounded at the top, tapering inferiorly to the oral apparatus, and excavated in front. Eyes on the lateral and dorsal surfaces of the head. Both pairs of antennæ present, long; base of the superior pair long and stout, three-jointed; inferior pair slender, four-jointed; flagellum very attenuated and elongated. Thorax broad, somewhat compressed; segments six. Abdomen narrow. The gnathopoda not subchelate, nor much reduced in size, when compared with the following feet; the first and second pairs of thoracic feet long, slender; carpus and meros linear. The third pair enlarged; carpus and meros dilated, with the anterior margin armed with teeth; propodus flexes on the carpus, impinging against the teeth on its anterior margin; dactylus fused with the propodus. The fourth and fifth pairs of feet subequal, shorter than the preceding. The three posterior pairs of abdominal appendages biramous, lanceolate; rami pointed.

This genus is very closely allied to *Phronima*. It differs only in the character of the antennæ, the gnathopoda, and in the less perfectly developed chelæ of the third pair of thoracic feet. The shape of the head, the thorax, and the abdomen are almost identical, and there are likewise eye-facets on the dorsal surface of the head. The mandibles are without appendages; and the first and second, and the fourth and fifth pairs of thoracic feet are similar to those of the genus above named, as are also the three posterior pairs of abdominal appendages. A pair of wing-like plates exist at the base of the dactylus of both pairs of gnathopoda. These, I believe, have previously been peculiar to *Phronima*. The character of the gnathopoda and the third pair of thoracic feet allies the genus with *Primno*; in the structure of its antennæ it differs essentially from both.

*Anchylonyx* forms a bond of union between the two subfamilies of Bate's—the PHRONIMIDES and PHROSIMIDES, which are founded upon the structure of the three posterior pairs of abdominal appendages in the different genera representing the family PHRONIMIDÆ. In his arrangement he separates *Primno* from *Phronima*, which, together, con-

stitute Dana's subfamily PHRONIMINÆ. The fact that the two genera come together again, and mingle their characters in *Anchylonyx*, rather proves that the position which Dana assigned to them is the correct one, and that the characters which he used for the subdivision of the family are of more importance, than those adopted by Bate.

ANCHYLONYX HAMATUS, n. sp.

Head of moderate size, rounded above and pointed below, deeply concave in front. The lateral lenses of the eye arranged in the form of a rosette, and situated in a rounded projection on the lower portion of the head, directly above the origin of the inferior antennæ. A number of solitary lenses scattered over the lateral and dorsal surfaces of the head, and connected by long and filamentous nerve-fibers with the inferior eyes. The superior antennæ nearly as long as the cephalothorax; first joint of base short and broad; second extremely short, about one-third the length of the first; third joint slightly longer than the head, lanceolate, inferior edge densely hairy, apex inferiorly produced; first and second joints of the flagellum subequal, together about as long as the third; third and fourth subequal; remainder of flagellum lost. Inferior antennæ more slender than the superior pair, very long; flagellum very much attenuated, filamentous, one-half, or more than one-half, the length of the body; peduncle four-jointed—three of which are exposed beyond the anterior margin of the head; first joint short and broad; second longer than the rest, slightly oval; fourth narrower, bent slightly upward; joints of flagellum elongate—the first the longest; the remainder subequal. The under surface of the flagella of both pairs furnished with long, equidistant hairs.

Segments of the thorax six; the first and second soldered together; the five anterior subequal; the sixth (the seventh normal) narrows posteriorly, and is nearly as long as the two preceding. First pair of gnathopoda shorter and slenderer than the second; meros of the same length as the preceding joint, slightly produced inferiorly at the distal extremity—the produced portion finely serrated below and anteriorly, at the angle one of the serrulations produced to a fine acicular spine; carpus long, at inferior apex a slender spine; propodos somewhat shorter than the carpus, arched; dactylus about one-half the length of the propodos, arched, acute, notched below the apex, with a wing-like plate on either side of base. The carpal and meral joints of the second pair of gnathopoda neither produced, nor spiniferous; dactylus less than one-half the length of the



propodos; with these exceptions the second pair is similar to the first. First and second pairs of thoracic feet longer than the third; the first pair longer than the second; the external surface of the coxæ ridged along the middle, with posterior angles acute, spinous; all the joints narrow and elongate; claw anchylosed with the tarsus, and fixed at a right angle to it; the apex of the tarsus produced in the form of a long, straight, acute spine. The third pair of thoracic feet enlarged, more robust than the others, with coxa ridged on the middle of the external surface, and with the anterior and posterior margins armed with short, stout spines; meros slender, convex posteriorly, and anteriorly concave; anterior surfaces of the carpus and meros armed with long, sharp teeth—three on the latter, and seven on the former; the fifth tooth, counting from the base of the carpus, much larger and longer than the others; carpus somewhat clavate in shape, the anterior extremity enlarged; propodus about half the length of the carpus, arched; dactylus small, anchylosed, fixed at a right angle to the propodos. Fourth and fifth pairs of feet sub-equal, shorter than the preceding, with the anterior angles of coxæ spinous; in other respects similar to the preceding.

Abdomen narrow; the three anterior segments gradually diminishing in length posteriorly; the fourth very narrow. The peduncles of the anterior appendages broadly oval; the rami short and slender, multi-articulate; the posterior appendages slender, lanceolate, biramous, acute; the outer pair extending half way the rami of the terminal pair; the inner pair short, terminating at the commencement of the rami of the outer pair. Telson minute, rudimentary.

Length, .40 of an inch.

Locality: North Pacific Ocean. Latitude  $34^{\circ}$  north; longitude  $150^{\circ}$  west. Collected June 25, 1873.

## PHROSININÆ.

### ANCHYLOMERA THYROPODA, Dana.

*Anchylomera thyropoda*, DANA, U. S. Expl. Exped. Crust., ii, 1004, pl. 68, f. 10.—SP. BATE, Cat. Amph. Crust., 325, pl. lii, f. 6.

Locality: North Pacific Ocean.

I identify this species with Dana's, which came from the Atlantic Ocean, on account of the peculiar form of the antennæ. These organs are curved downward and outward, and are closely applied to the surface of the head. In one specimen the antennæ were absent altogether;

and I, therefore, do not believe their small size and peculiar form to be due to age; their presence is rather a sexual characteristic.

The inferior distal angle of the propodos of the third and fourth pairs of thoracic feet is produced, and when the joint is flexed this projection impinges against the antero-inferior angle of the carpus. This character is not mentioned in Dana's description. In other respects they are almost identical.

Length, .10 to .15 of an inch.

## PLATYSCELIDÆ.

### PLATYSCELUS BATEI, n. sp.

Head, when viewed from above, broadly rounded; the center of the anterior margin produced in the form of a beak, which is directed downward. The peduncle of the superior antennæ truncated; the inferior distal extremity furnished with two bunches of auditory cilia, one posterior to the other; flagellum two-jointed. Inferior antennæ short, four-jointed; first joint the longest; second and third subequal; fourth joint broadly rounded at apex, longer than the third; terminating in a minute flagellum, acute and curved at the apex, and base broader. The whole antenna is concealed beneath the lateral portion of the head. The thorax narrower at either extremity than in the middle, somewhat barrel-shaped when seen from above; first and second segment short, almost concealed in the middle of the dorsum by the overriding of the third. The first pair of gnathopoda shorter and slightly stouter than the second; in other respects they are similar; shorter and more robust than the following thoracic feet; neither carpi nor mera produced anteriorly, the latter broader than the former, neither serrated; the inferior margins furnished with a few long setæ; propoda about the same length as the carpi, narrower, cylindrical, not serrated; dactyla short. The first pair of thoracic feet shorter than the second; coxæ of both pairs elongate, somewhat clavate; the mera, carpi, and propoda subequally long; dactyla short, curved. Coxa of third pair subelliptical, not serrated; apex obtusely rounded; anterior margin furnished with five or six short, equidistant setæ; the remaining five joints articulating with coxa subapically, together as long as the coxa; at the inferior apex of the third joint is a single long seta. Coxa of the fourth pair broad, arcuate posteriorly, and excavate anteriorly; distal extremity obtusely rounded at the apex,

and oblique posteriorly; the ischium short, articulating with the posterior margin of coxa near the center, and opposite the angle formed by the posterior oblique margin; the remaining joints about one-third the length of the coxa; the first joint following the ischium longer than the three terminal ones; the inferior margin produced anteriorly; all finely serrated on the posterior margin. Of the fifth pair the coxa only developed; membranous, broad, about one-third the length of the coxa of the fourth pair. Abdomen narrower than the thorax; segments gradually decreasing in breadth posteriorly; longer than the thoracic segments. Posterior abdominal appendages foliaceous, biramous; the details of their structure similar to those of *P. rissoina*. Telson broadly triangular, apex obtuse.

Length, .12 of an inch.

Locality: North Pacific Ocean. Latitude  $21^{\circ}$  north; longitude  $151^{\circ}$  west. Collected May 20, 1873.

This species is closely related to *P. rissoina*; the differences are chiefly in the structure of the gnathopoda, and of the third and fourth pairs of thoracic feet. The gnathopoda bear a striking resemblance to those of the young of *P. serratus*, but as the rest of the structure of the animal shows no evidence of immature development, this is undoubtedly their normal adult condition.

I dedicate the species to the eminent English carcinologist, C. Spence Bate, who, more than any other writer on the subject, has helped to elucidate this order of Crustacea.

#### AMPHIPRONOË SERRULATA, n. sp.

Head rounded; superior surface slightly convex, longer than the inferior surface; antero-inferior angle obliquely rounded, less projecting than the antero-superior; front hollowed; eyes diffused, covering the greater portion of the lateral surfaces of the head. Superior antennæ short, peduncle three-jointed; the third joint large, slightly produced antero-inferiorly; inferior surface convex, and densely covered with long hairs; flagellum articulating with superior margin of third joint subapically, triarticulate, having at the apex of each articulus two or more long auditory cilia. Inferior antennæ five-jointed, folded four times, and concealed beneath the head; first three joints subequal; fourth about two-thirds the length of the preceding; fifth very short; margins of all the joints shortly ciliate. The three anterior segments of the thorax narrower than the following; the four posterior subequal, gradually in-

creasing in length posteriorly. First pair of gnathopoda having the meros broad distally; carpus broad, antero-inferiorly produced nearly to the apex of the propodos; the apex of the produced portion obtuse, finely serrulated on both margins; propodos oblong-ovate, slightly longer than the produced angle of the carpus, inferior margin serrulated; dactylus short. Second pair of gnathopoda longer than the first; carpus produced inferiorly, but not anteriorly; antero-inferior angle obliquely rounded and sharply serrated; propodos longer than the carpus, the superior margin arcuate, inferiorly straight, not serrated; dactylus half the length of propodos, slender, arcuate. First and second pairs of thoracic feet long, all the joints following the coxæ closely serrated along their flexible margins; claws long, slender, acute, almost as long as the preceding joint. Third pair having coxa dilated, and anterior margin nearly straight, the posterior broadly convex; the remaining joints, resembling the corresponding joints of the first and second pairs, longer than the coxa, and articulating with its apex near the anterior angle. Fourth pair having the coxa more dilated than the third, form similar; the remaining joints shorter than the coxa, but with the flexible margins serrated like the preceding pairs; the coxa of the fifth pair broad, much smaller than the two preceding; ischium rudimentary; the remaining joints obsolete. Segments of the abdomen much longer than those of the thorax, decreasing in length and breadth posteriorly; the posterior lateral angles of the three anterior segments produced, acute; the fourth and fifth segments do not coalesce; the fifth is extremely abbreviated, but distinct; on account of its small size the antepenultimate and penultimate caudal lamellæ appear to rise together from the postero-inferior angle of the fourth segment, but in reality they do not; the penultimate pair rises from the fifth; these lamellæ are subequal, with peduncles short and rami long, extending almost to the extremity of the ultimate pair, ovate-lanceolate, acutely serrated on both margins; peduncles of ultimate pair very short, rami similar to the preceding, extending a short distance beyond the extremity of the telson. The latter triangular, apex obtuse.

Length, .15 of an inch.

Locality: North Pacific Ocean. Latitude  $21^{\circ}$  north; longitude  $151^{\circ}$  west. Collected May 20, 1873.

## OXYCEPHALIDÆ.

OXYCEPHALUS TUBERCULATUS, *Sp. Bate.*

*Oxycephalus tuberculatus*, SP. BATE, Cat. Amph. Crust., 343, pl. liv, f. 5.

Locality: North Pacific Ocean. Latitude  $5^{\circ}$  north; longitude  $128^{\circ}$  west. Collected May 10, 1873.

Although taken in a widely-distant locality, there is no doubt of the identity of this species with that described by Bate. The row of dorsal tubercles, one anterior and one posterior, on each segment of the body, the structure of the second pair of gnathopoda, and the rudimentary character of the posterior pair of thoracic legs—falling short of the base of the preceding pair—at once determines the species. They also agree in the minor details of structure, as far as they are given by the author. The head and first thoracic segment were wanting in his specimen. I will therefore supply the omission in his description by an account of the parts as they exist in the present specimen.

Head not quite as long as the first five segments of the thorax, broad, inferior margin broadly convex; rostrum more than half the length of the head, triangular, acute; eyes large, covering the whole of the lateral surfaces of the head; the superior antennæ broad, compressed; peduncle three-jointed; first joint longer than the second; the latter short; the third longer than the first and second, and having on the upper surface near the apex a few auditory cilia; flagellum uniaarticulate, short, slender, slightly bent upward, and apex furnished with a few long auditory cilia. Inferior antennæ absent in the specimen. The first pair of gnathopoda shorter than the second, but similar to them in other respects; carpus produced anteriorly nearly to the apex of the propodos, margins furnished with a few long setæ, not serrated; propodos subovate; dactylus nearly half as long as the propodos. The flexible margins of the following thoracic feet furnished with a few setæ, or hairs.

Length, .40 of an inch.

## LEPTOCOTIS, nov. gen.

Animal long and slender. Head large and produced anteriorly into a rostrum; narrowed behind the eyes; the constricted portion short, and not narrower than the thorax; under surface excavated anteriorly on each side for the reception of the superior antennæ. Superior antennæ short, sickle-shape. Inferior antennæ five-jointed, folded upon them-

selves four times, and concealed beneath the head; first and second joints distally enlarged. An elongate mandibular appendage. Gnathopoda short, and complexly chelate. Third and fourth pairs of thoracic feet having the coxæ dilated; the fifth pair small. Fourth and fifth abdominal segments fused into one; sixth small. Caudal appendages long, biramous. Telson cylindrical, long.

This genus exhibits a remarkable blending of the characters of *Oxycephalus* and *Rhabdosoma*. The general form of the animal is that of *Oxycephalus*; the short neck and elongated rostrum show a tendency toward *Rhabdosoma*. Both pairs of antennæ, the abdomen, and caudal appendages are identical with the corresponding parts in the latter genus; while the three posterior thoracic feet are a repetition of the former. A similarly elongated mandibular appendage is observed in *Rhabdosoma whitei*.

#### LEPTOCOTIS SPINIFERA, n. sp.

Head long, with the rostrum longer than the thorax; vertical diameter of the head greater posteriorly than anteriorly; the superior surface on a higher level than the dorsum of the thorax; abruptly constricted behind the eyes and in front of the first thoracic segment; the inferior border slightly convex; the under surface hollowed out on each side anteriorly in the form of fossæ for the reception of the superior antennæ; supra-fossal margin arched and slightly elevated; rostrum long, acute, slightly arched. Eyes covering the whole of the lateral and dorsal surfaces of the head posterior to the superior antennæ. Superior antennæ sickle-shaped; peduncle broad, three-jointed, with margins densely hairy, particularly the inferior margin; second joint short; the third longer than the first and second together, compressed, bent forward at its articulation with the second joint, and its anterior inner apex produced as a long, acute process, which is almost at a right angle with the main portion of the joint; base of process enlarged; flagellum articulating with the anterior surface of the base of the process, and shorter than the process, biarticulate, each articulus having three or four long auditory cilia. Inferior antennæ five-jointed, folded upon themselves four times, and hidden in a groove on the under surface of the head; the first, second, and third joints equal in length; the first and second enlarged at their distal extremities; fourth joint a little shorter than the preceding; fifth very short, with one or two auditory cilia at its apex. The mandibular appendage long, slender,

reaching nearly to the apex of the first joint of the inferior antennæ; first joint long; second and third short.

Thorax seven-jointed; segments increasing in length posteriorly; epimerals long, broadly ovate, transversely rugose. Gnathopoda short, chelate; the second pair longer than the first; carpus of first pair scarcely produced anteriorly, anteriorly and inferiorly serrated; propodos broad, serrated on inferior margin; dactylus half the length of the propodos, arched, with a minute spine about the middle of the inferior surface, antagonizing with the extremity of the carpus. Second pair having the carpus more produced anteriorly than the first, extending to, or slightly beyond, the apex of the propodos, and terminating in a long, fine point; propodos and dactylus similar to the first pair. First and second pairs of thoracic feet shorter than the third, slender; third and fourth pairs having the coxæ dilated; the fourth more dilated than the third, and the remaining joints shorter, and closely serrated along the entire anterior margin—the first joint coarsely serrated, the next finely, and the third intermediate between the two preceding—the other feet not serrated; fifth pair rudimentary, coxa dilated, small, with the remaining joints not half as long as the coxa of the preceding pair.

Abdomen having the three anterior segments normal, subequal; fourth and fifth fused into one; sixth short; the dorsal surface of each segment marked by a shallow, transverse depression near the anterior extremity of the joint; that on the fourth segment deeper than those preceding it; a long, acute spine, pointing upward, on each side of the fifth, directly above the articulation of the outer caudal lamella. Caudal appendages long, cylindrical, serrated along their inner margins, biramous; outer pair longer than the two following; ultimate short, reaching further than the inner. Telson long, cylindrical, extending beyond the extremities of the lamellæ.

Length, .50 of an inch.

Locality: North Pacific Ocean. Latitude 29° north; longitude 157° west. Collected June 16, 1873.

## CALANIDÆ.

### CALANINÆ.

#### CALANUS SANGUINEUS, *Dana*.

*Calanus sanguineus*, DANA, U. S. Expl. Exped., Crust., ii, 1070, pl. 73, f. 11.

Locality: North Pacific Ocean. Latitude 21° north; longitude 153° west. Collected May 21, 1873.

## CALANUS MUNDUS, Dana.

*Calanus mundus*, DANA, U. S. Expl. Exped. Crust., ii, 1071, pl. 74, f. 2.

Locality: North Pacific Ocean. Latitude 21° north; longitude 153° west. Collected May 21, 1873.

The specimens of *C. mundus* were taken at the same time with the *C. sanguineus*. A similar statement is made by Dana. The differences pointed out by that writer were observable in the present specimens, yet they probably have a closer relationship than he gives to them.

## EUCALANUS ELONGATUS, Streets.

*Calanus elongatus*, DANA, U. S. Expl. Exped. Crust., ii, 1079, pl. 75, f. 1.

Locality: North Pacific Ocean. Latitude 1° north; longitude 122° west. Collected May 7, 1873.

The general shape of *E. elongatus* and *E. attenuatus* is so very different from the form of the typical *Calanus*, that I think we are justified in considering them under a distinct generic title. I adopt that which Dana suggested for *attenuatus*, in consequence of "the multiarticulate character of the smaller branch of the posterior antennæ." This character, I am disposed to believe, belongs to *elongatus* as well as to *attenuatus*; at least, a specimen examined by me shows unmistakable evidence of it.

## PONTELLINÆ.

## CANDACE ETHIOPICA, Dana.

*Candace ethiopica*, DANA, U. S. Expl. Exped. Crust., ii, 1115, pl. 78, f. 5.

Locality: North Pacific Ocean. Latitude 21° north; longitude 153° west. Collected May 21, 1873.

Our specimens differ from Dana's *ethiopica* in some respects, but they evidently do not constitute a new species. The cephalothorax is five-jointed, instead of four, the second joint being short; the right posterior angle of the last joint has a minute projection on its outer side near the apex. This projection was not observed on the left side, and it was only present in the single male specimen. The sixteenth joint of the anterior antennæ, or that one following the geniculation, presents both extremities closely pectinated, while there is a short space in the middle that is bare; the proximal extremity of the following joint shows a few short pectinations. The abdomen is five- or six-jointed, and on the right side of the first segment is an acute spinous process, black at the tip.



The female presents the following differences. There is no geniculation, nor pectinations, on the right anterior antenna; the acute posterior angles of the cephalothorax are produced equally, and bent slightly outward, the right not black at the tip. The abdomen is four-jointed; the second joint is the largest, rounded laterally and gibbous below, and the posterior lateral angle on each side is produced into short acute processes; in the center of the protuberance below is a deep black spot.

It will be observed that some of the characters mentioned above belong to *Candace curta*. The females show a decided likeness to the same sex of *C. pachydactyla*. The only difference of any importance that I can see in the three species, is in the structure of the right posterior foot of the male. Future research will probably determine them to be but a single species with individual variations. The structure of the right anterior antenna of the male is a strong specific character.

#### PONTELLINA DETRUNCATA, Dana.

*Pontellina detruncata*, DANA, U. S. Expl. Exped. Crust., ii, 1143, pl. 80, f. 7.

Locality: South Pacific Ocean. Latitude 10° south; longitude 110° west. Collected May 1, 1873.

#### PONTELLA FERA, Dana.

*Pontella fera*, DANA, U. S. Expl. Exped. Crust., ii, 1169, pl. 82, f. 5.

Locality: South Pacific Ocean. Latitude 23° south; longitude 94° west. Collected April 24, 1873. Specimen male.

### CORYCÆIDÆ.

#### CORYCÆINÆ.

#### ANTARIA OBTUSA, Dana.

*Antaria obtusa*, DANA, U. S. Expl. Exped. Crust., ii, 1230, pl. 86, f. 13.

Locality: North Pacific Ocean. Latitude 5° north; longitude 128° west. Collected May 10, 1873.

The claw of the anterior feet is not as long as the preceding joint; the caudal stylets are about one-third the length of the abdomen, and the two external setæ, instead of being but little more than the diameter of the stylets in length, equal one-half, or more than one-half, their length.

COPILIA MIRABILIS, *Dana*.

*Copilia mirabilis*, DANA, U. S. Expl. Exped. Crust., ii, 1232, pl. 86, f. 14.

Locality: South Pacific Ocean. Latitude  $8^{\circ}$  south; longitude  $113^{\circ}$  west. Collected May 2, 1873.

The cephalothorax increases in breadth behind the conspicilla to about the middle of the first segment, where there is a slight angle. Posterior to this angle, the sides of the segment are very nearly parallel. Abdomen is five-jointed. The first and second articulations are nearly obsolete; the third and fourth distinct. The posterior extremities of the third and fourth joints are surrounded by a ring of minute spines; the fifth joint is slender, longer than all the preceding together; at each outer angle of the posterior extremity of the fifth joint is a short spine, and likewise one above and one below on each side. The caudal stylets are long and divergent, with a short, slender seta on their outer margin at the junction of the upper-fourth with the lower three-fourths of their length; the extremity is furnished with four setæ, those at the angles short and slender; the two middle ones long and stout.

SAPPHIRINA CORUSCANS, *Dana*.

*Sapphirina coruscans*, DANA, U. S. Expl. Exped. Crust., ii, 1243, pl. 87, f. 6.

Locality: North Pacific Ocean. Latitude  $1^{\circ}$  north; longitude  $122^{\circ}$  west. Collected May 7, 1873.

Body ten-jointed; the tenth small, concealed beneath the ninth. Caudal lamellæ having a tooth on the inner side near the apex. In this latter character it resembles *S. orientalis* and *S. ovalis*.

# BOTANY.\*

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*Plants of the Pacific Islands.*

## CRUCIFERÆ.

LEPIDIUM OAHUENSE, *Cham. & Schlecht.*

Localities: Palmyra and Washington Islands. Common.

## MALVACEÆ.

SIDA DIELLI, *Gray.*

Locality: Christmas Island.

## ZYGOPHYLLACEÆ.

TRIBULUS CISTOIDES, *Linn.*

Locality: Christmas Island.

## SIMARUBACEÆ.

SURIANA MARITIMA, *Linn.*

Localities: Christmas and Palmyra Islands. Common on all the islands of the Fanning Group.

## LUGUMINOSÆ.

CANAVALIA GLANDIFOLIA.

Locality: Washington Island.

## FICOIDEÆ.

SESUVIUM PORTULACASTRUM, *Linn.*

Locality: Christmas Island.

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\* Dr. Gray's paper has not been received up to the time of going to press; and we are, therefore, obliged to exclude the plants from the peninsula of Lower California from this Bulletin. An account of them will be published elsewhere.

## GOODENOVIACEÆ.

SCÆVOLA PLUMIERA, *Vahl.*

Locality: Christmas Island. A low, spreading shrub, branching from the ground. Flowers white, with purple edges; resembling the flower of a *Lobeliaceæ*.

## BORRAGINACEÆ.

HELIOTROPIUM ANOMOLUM, *Hook. & Arn.*

Locality: Christmas Island.

## NYCTAGENIACEÆ.

BOERHAAVIA HIRSUTA, *Linn.*

Locality: Christmas Island.

## CYPERACEÆ.

SCIRPUS RIPARIUS.

Locality: Washington Island. Covering the surface of the shallow fresh-water lagoons of that island.

## FILICES.

POLYPODIUM AUREUM, *Sw.*

Localities: Palmyra and Washington Islands. Common.

PTERIS AQUILINA, var. CAUDATA, *Linn.*

Locality: Oahu.

ASPLENIUM NIDUS, *Linn.*

Localities: Palmyra and Washington Islands. Very abundant on the windward side of the former.

ASPLENIUM POLYPODIODES, *Mett.*

Locality: Oahu.

NEPHROLEPIS EXALTATA, *Schott.*

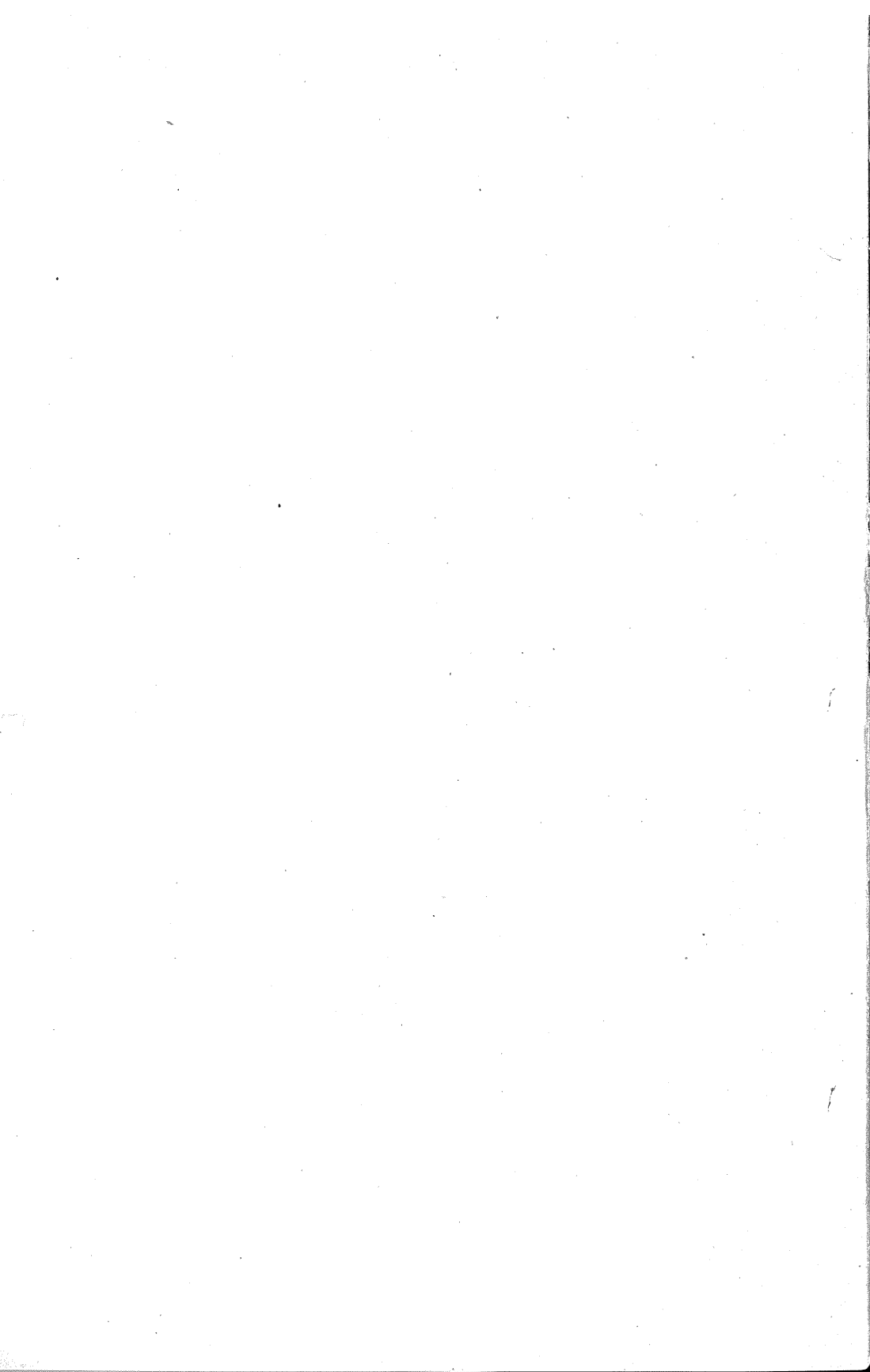
Locality: Washington Island. Not growing on Palmyra.

DAVALLIA TENUIFOLIA, *Sw.*

Locality: Oahu.

DAVALLIA SPELUNCEA, *Baker.*

Locality: Oahu.



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