

No. 7. — *Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California, in Charge of ALEXANDER AGASSIZ, carried on by the U. S. Fish Commission Steamer "Albatross," during 1891, LIEUT.-COMMANDER Z. L. TANNER, U. S. N., Commanding.*

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## VI.

*Preliminary Descriptions of New Species of Crustacea.*<sup>1</sup> By WALTER FAXON.

### ORDER PODOPHTHALMIA.

#### SUBORDER DECAPODA.

#### Family MAIIDÆ.

##### *Euprognatha granulata*, sp. nov.

Carapace coarsely granulate; two erect blunt spines in median line of carapace, one on the gastric, the other on the cardiac area; a transverse row of four or five small tubercles in front of the gastric spine; a spine near the middle of each branchial area, with a smaller lateral spine below and a little in advance of it; the hepatic area bears a short blunt spine on its most prominent part; there are, besides, three or four prominent tubercles on the angle which divides the hepatic and pterygostomian regions. The antennary spine is very long, reaching beyond the rostral horns; the three horns of the rostrum (interantennular and lateral) are about equal in length; the supra-orbital spines are well developed, and, like the antennary and three rostral spines, are conspic-

<sup>1</sup> Figures of all the species described in this paper will appear in the final report, whose publication is deferred pending the preparation of the lithographic plates. A record of the stations occupied by the "Albatross" during her cruise of 1891 will be found in Bull. Mus. Comp. Zool., Vol. XXIII. No. 1, pp. 4-8.



ously granulated. The post-orbital spines are even more coarsely tuberculated. When viewed from above their margins appear laciniated. Surface of abdomen thickly set with bead-like tubercles; the first segment bears a prominent granulated spine, and there is a rudimentary spine on each of the three following segments. Chela slender, covered with small tubercles; the remaining segments of the cheliped and the ambulatory appendages are furnished with small spines, tubercles, and scattered curled setæ.

Length of carapace, 7 mm.; breadth, 6 mm.

Station 3369. 52 fathoms. 2 females.

### *Anamathia occidentalis*, sp. nov.

Carapace pyriform, furnished with spines and tubercles which are arranged as follows: four on the gastric region (two in the median line, two lateral); the posterior median has the form of a tubercle, from which a low blunt keel runs back to the cardiac region; one on the cardiac region, one (tubercle) on the intestinal region, one on each hepatic region, five on each branchial region. Of the branchial spines the one near the middle projects upward and forward, the longest spine of the carapace, one half as long as the rostral horns. In addition to these spines and tubercles there are four or five small tubercles on the outer border of the pterygostomian region. Rostrum produced into two divergent awl-shaped horns, which are more than one fourth the length of the carapace. Pre-orbital spines acute, post-orbital processes obtuse. Chelipeds twice as long as the carapace, not much more robust than the ambulatory limbs; chela little longer than the merus, the basal part cylindrical, distal part gradually widening to the base of the fingers; fingers smooth, slightly curved, less than one half as long as the basal portion; prehensile edges regularly dentate, closing throughout their length. The merus of all the legs has a small tubercular projection at the distal end above, most prominent on the anterior pair. The carpus of the chelipeds has two low ridges on the outer face. Abdomen seven-jointed.

Length of carapace without the rostral horns, 45 mm.; length of rostral horns, 12 mm.; breadth of carapace, 38 mm.

Station 3404. 385 fathoms. 1 male.

### MAIOPSIS, gen. nov.

Carapace subtriangular, as broad as long, spinose; rostrum produced anteriorly into two divergent horns with an accessory spine upon their outer margins; interorbital space broad. Eyes small, eyestalks slender, retractile within the orbits. Orbits large, with a forward aspect, incomplete below, the upper margin prominent, with two deep fissures, and supra-ocular spines. Epistome short. Basal segment of antennæ very broad, with three prominent spines upon its anterior margin; flagellum of the antennæ widely separated



from the cavity of the orbit by a broad process of the basal segment. Merus of outer maxillipeds notched at the antero-internal angle. Legs of moderate length; carpus of chelipeds elongated, not carinated; chela elongated and slender, fingers canaliculate within, but not spoon-shaped at their tips, their prehensile edges meeting throughout most of their length, not distinctly toothed; ambulatory legs spinose. Abdomen (male) seven-jointed, terminal joint short and broad.

This genus is proposed for the reception of an interesting Maioid dredged in 182 fathoms on the west coast of the Isthmus of Panama. It combines in one form characters of the genera *Maia*, *Cyclomaia*, *Paramithrax* (subg. *Leptomithrax*), and *Schizophrys*. In its general aspect it bears a close resemblance to *Maia*, and the likeness is enhanced by the small eyes and slender eyestalks, the elongated wrist and hand, and the short epistome. It differs from *Maia* in having a much broader carapace, a less deeply cloven rostrum, spinose legs, supra-ocular spines, and trenchantly in the exclusion of the antennal flagellum from the orbit by a process of the basal segment of the antenna. In the latter regard it agrees with the genus *Cyclomaia*, the basal segment of the antenna being very broad, three-spined on its distal border, and giving off a process which separates the flagellum from the orbit by a wide interval; it also agrees with *Cyclomaia* in having a short epistome, a short and broad terminal abdominal segment, and supra-ocular spines. It differs from *Cyclomaia* by having a subtriangular carapace, longer rostral spines, and a less abruptly declivous front. It is like *Paramithrax* and *Schizophrys* in the exclusion of the basal antennal segment from the orbit, but this segment is much broader than in these genera, and three-spined; moreover, *Maiopsis* differs from *Paramithrax* and *Schizophrys* in having a more broadly triangular carapace, supra-ocular spines, slenderer wrist and hand, less deeply cleft rostrum, and spinose ambulatory legs. Like *Schizophrys*, it has an accessory spine on each rostral horn. In the shape of the carapace *Maiopsis* is intermediate between *Maia* and *Cyclomaia*. In the form of the fingers it stands between *Maia* and *Paramithrax* on the one side, and *Schizophrys* and *Cyclomaia* on the other, as the fingers, though canaliculate within, are but slightly excavated at the tips. The synthetic character of the species upon which this genus is based suggests the propriety of ultimately extending the scope of the old genus *Paramithrax* so that it may embrace this form, together with *Cyclomaia* and *Schizophrys*.

***Maiopsis panamensis*, sp. nov.**

Dorsal surface of carapace thickly set with spines of various sizes and scattered hooked setæ. The largest spines are distributed as follows: five on the gastric region, one on the genital, one on the cardiac, four on the intestinal, and about seven on each branchial region. Margin of carapace armed with twelve prominent spines, three of which are on the hepatic region. The sternum is ornamented with small tubercles along each side of the abdomen. The



first abdominal segment is furnished with a bidentate tubercle. Legs covered with numerous spiny tubercles; the meri armed with three or more prominent spines at the distal end. Chela long and slender, the tubercles of the hand smaller than on the other parts of the legs; fingers nearly smooth. A deep pit at base of movable finger.

Length from base of rostrum to posterior margin of carapace, 112 mm.; breadth, 113.5 mm.; length of rostrum, 22 mm.; length of rostral horns, 11 mm.; breadth between eyebrows, 38 mm.; length of cheliped, 156 mm.

Station 3355. 182 fathoms. 1 male.

### Family PARTHENOPIDÆ.

#### *Lambrus hassleri*, sp. nov.

This is the Pacific coast representative of *Lambrus pourtalesii* Stimps. (*L. verrillii* Smith) of the east coast of North America. It differs from the latter species as follows: the carapace is broader in proportion to its length; the branchial regions are more expanded and inflated, the inflation extending farther in toward the cardiac area so as to involve the oblique row of small tubercles; that is to say, this row of tubercles, which in *L. pourtalesii* lies low down in the fossa between the branchial and cardiac regions, is raised up, in *L. hassleri*, on the swell of the branchial region. The spines on the edges of the chelipeds, moreover, are not lacinated to such a degree as in *L. pourtalesii*.

Length of a female specimen, 27 mm.; breadth, including lateral teeth, 38 mm.

Station 3368. 66 fathoms. 1 female.

“ 3427. 80 “ 1 male, 1 female.

This species was previously obtained during the voyage of the “Hassler” at Magdalena Bay, Lower California, August 14, 1872. The specimens then obtained were apparently picked up dead on the shore.

### Family CANCRIDÆ.

#### *Xanthodes sulcatus*, sp. nov.

Carapace granulated, granulation heaviest on the lower surface, and near the borders of the upper surface. Deeply impressed grooves separate the gastric from the branchial regions, and the mesogastric from the lateral gastric lobes. The groove which continues in the median line to the front, anteriorly to the mesogastric lobe, is crossed a short distance behind the frontal margin by a transverse groove, which meets on each side another groove running parallel to the upper margin of the orbit. In this way there are marked off a pair of frontal and a pair of orbital areolets. The frontal margin is nearly straight,



finely denticulate, and separated from the orbital areolets by a groove. Antero-lateral border of the carapace armed with four spines or teeth, E, N, T, S, of Dana's nomenclature, there being no tooth at the external orbital angle; of these teeth the first is the smallest, the third the largest, and the second and fourth are of about equal size; the margins of all the teeth are denticulate. The chelipeds are short and unsymmetrical; the merus is granulated on its outer face, spinulose on the upper edge, and grooved near the articulation with the carpus. The carpus is granulated on its outer side, and furnished with a median internal tooth. The meri of the ambulatory appendages are spinulose along their upper edges.

Length of carapace, 8 mm.; breadth, 11 mm.

Station 3355. 182 fathoms. 1 male, 1 female.

" 3391. 153 " 1 male, 3 females.

### *Panopeus latus*, sp. nov.

Carapace broad, convex in antero-posterior direction, granulated, especially on the hepatic, branchial, and cardiac regions; areolations well marked and protuberant. Front divided by a small median incision into two slightly convex lobes, whose edges are simple and not produced into teeth at the lateral angles. Antero-lateral margin cut into five teeth; post-orbital tooth small, separated from the second tooth by a shallow granulated sinus; the third tooth is the broadest, and rounded off at the apex; the fourth is the most salient, and acute; the fifth is very small, and acute; all the teeth have crenate or else spinulose margins. The margin of the orbit is minutely crenulate; its upper part is marked by two closed fissures; the external hiatus of the orbit has the form of a triangular notch; the lower margin is produced to form an obtuse tooth at the inner angle. The subhepatic region is granulous, but not provided with a tubercle. The merus of the third pair of maxillipeds is also granulated. The carpus of the chelipeds is rough with small tubercles, grooved along the distal margin of the outer side, and armed internally with a small blunt tooth; the hands are robust, inflated, smooth except near their articulation with the carpus where scattering granules appear; upper and lower margins rounded; fingers long, down-curved, smooth, canaliculate, their cutting edges irregularly armed with small and rather sharp teeth, without any prominent basal tooth; when closed the fingers are separated by a slight gape, and their tips cross one another; the color of the fingers in alcoholic specimens is very light brown. The chelæ of the right and left sides are unequal in size, but similar in shape. The ambulatory appendages are setose, their merus joints furnished with small teeth along their upper edges. The seventh segment of the sternum in the male is entirely concealed by the base of the abdomen. The coxæ of the fifth pair of legs are in contact with the third abdominal segment. The penultimate segment of the abdomen has concave sides, the terminal segment is broad and rounded.



Length of carapace, 6.5 mm.; breadth, 10.25 mm.

Station 3397. 85 fathoms. 1 male.

In this species the carapace is short, the posterior margin wider than usual in the genus. In its general aspect it recalls *P. xanthiformis* A. M. Edw.; the meri of the ambulatory legs are denticulated on their upper margins as in *xanthiformis*, but in *latus* the carapace is much broader and more convex in an antero-posterior sense, the front is less prominent and destitute of lobes at the lateral angles, the carpal tooth is blunt, etc.

### *Panopeus tanneri*, sp. nov.

Carapace moderately convex both lengthwise and transversely, smooth and polished in the central and posterior part, coarsely granular on the anterior gastric and hepatic regions. The gastric and hepatic areas are well marked off by depressions. Front nearly straight, divided by a median triangular fissure, and projecting as a blunt tooth at each lateral angle; a double edge is formed by a groove which runs along the front, the lower edge projecting farther forward than the upper edge; both upper and lower edges are finely granulate. The antero-lateral margins of the carapace are cut into triangular teeth; the first and second of these teeth are small, coalesced, connected by a shallow sinus; the third and fourth are of about an equal size; the fifth is much smaller; all the teeth are granulous on their anterior border, smooth on posterior border; the depressions between the third and fourth and the fourth and fifth teeth are continued in as furrows for some distance on the carapace, finally uniting and meeting the cervical furrow. The upper margin of the orbit forms a tooth at the inner angle above and outside of the external marginal tooth of the front; there is a closed fissure near the middle of the superior orbital border; the external fissure is a triangular notch; a blunt tooth at the inner angle of the lower margin. There is no subhepatic tubercle. A transverse row of tubercles on the front of the eyestalk (when viewed retracted within the orbit) just inside the eye. Chelipeds unsymmetrical; carpus squamoso-rugose, with a slight transverse groove, and armed with a prominent but not very sharp internal tooth; propodus robust, superior border rounded and squamoso-tuberculate, outer surface smooth, fingers of larger chela gaping, movable finger armed with a blunt tooth at base; fingers of smaller chela slenderer, without prominent teeth; fingers of both hands black, hooked at extremities, tips crossing. Base of abdomen entirely covers the sternal segments; penultimate segment of abdomen short, posterior angles prolonged backward; last segment short, pentagonal. In young specimens the granules of the carpus and propodus are more numerous and sharper pointed.

Length of carapace, 6.25 mm.; breadth, 10 mm.

Station 3405. 53 fathoms. 5 male (3 adult, 2 young).

" 3368. 66 " 1 male.



## Family PORTUNIDÆ.

*Achelous affinis*, sp. nov.

Carapace moderately convex both longitudinally and transversely, the frontal region depressed, horizontal; surface rugose, granular, and pubescent. Front not prominent, composed of four blunt teeth, not counting the internal angle of the orbit; the two teeth near the median line are equilaterally triangular, separated from one another by a triangular notch; the next teeth on the outer side are separated from those within by a shallow sinus, and fall off abruptly on the outer side into a deep notch which separates the front from the inner orbital angle. The two middle teeth of the front are a trifle longer than the lateral teeth. The tooth formed by the projecting inner orbital angle does not attain the level of the frontal teeth; it is double, the orbital margin just outside of it being slightly folded, raised, and projected forward so as to form a secondary tooth similar to that in *A. spinimanus*, but not so well marked. The antero-lateral margin of the carapace is nine-toothed, including the tooth at the outer orbital angle; the posterior tooth is hardly larger than those in front of it; the posterior margin of these teeth is convex. The anterior edge of the merus of the chelipeds is armed with five spines. The carpus has an internal and a smaller external spine. There is a spine on the propodus at the base at the point of articulation with the carpus, and another on the upper margin a little distance back of the articulation with the dactylus. The distal edge of the merus of the fifth pair of legs is spinulose.

Length, 25 mm.; breadth, 39 mm.; length of merus of chelipeds, 24 mm.; length of propodus, including digit, 33 mm.; length of internal carpal spine, measured from distal margin of carpus, 3.3 mm.

Station 3379. 52 fathoms. 5 males, 4 females.

" 3390. 56 " 1 male.

A large number were also taken in the tow-net at the surface at the following stations: Off Mala Point; Hydr. 2627; Nos. 3355, 3371, 3382, 3386, 3398; 50 miles south of Guaymas.

The specimens taken at the surface are small, and much darker in color than those that came up in the trawl, but show no structural differences. I take them to be the same species in the pelagic stage of its existence.

This species is very closely related to *Achelous depressifrons* Stimps., from the Atlantic side of the continent. Compared with *A. depressifrons* it is broader, and the curve formed by the front and the antero-lateral margin of the carapace forms an arc with a longer radius; the lateral lobe of the front is broader; the tooth of the inner orbital angle is double, as above described; the teeth of the antero-lateral margin have broader bases, and the anterior one at the outer orbital angle is not so prominent; the protuberances on the cardiac and branchial areas are less prominent; the internal carpal spine is shorter, and the distal margin of the merus of the fifth pair of legs is denticulate behind the articulation of the carpus.



## Family CORYSTIDÆ.

## TRACHYCARCINUS, gen. nov.

Carapace pentagonal, moderately convex, lateral margins long, nearly straight toothed. Front narrow, produced, three-toothed. Orbits large, with forward aspect, imperfect, with two hiatuses above, one below, and one at the inner angle; lower wall formed chiefly by the carapace. Anterior margin of buccal cavity not distinctly defined, epistome short, ridges of the endostome developed. Sternum long and rather narrow. Abdomen of male narrow and five-jointed, the third, fourth, and fifth segments consolidated. Eyestalks very small, retractile within the orbits. Antennules longitudinally folded. The antennæ lie in the inner hiatus of the orbit; their basal segment is but slightly enlarged, not filling the hiatus at the inner angle of the orbit, nor attaining to the front, subcylindrical, unarmed, imperfectly fused with the carapace; the second segment is longer and slenderer than the first, the third segment about equal to the second in length, but slenderer; all these segments are furnished with long and coarse setæ; the whole antenna is less than one half as long as the carapace. The ischium of the outer maxillipeds is produced at its antero-internal angle; the merus of the same appendages is rounded at the antero-external angle, obliquely truncated but not emarginated at the antero-internal angle, where it articulates with the following segment. Legs of moderate length. Right and left chelipeds very unequally developed in the male. Dactyli of ambulatory legs styliform, straight, slender, longer than the penultimate segments.

The pentagonal shape of the carapace recalls the genus *Telmessus* White. But in *Telmessus* the front is divided by a median notch, the orbit is much more complete, the basal segment of the antenna sending off an external process that completely fills the hiatus at the inner angle of the orbit. In the structure of the orbit and antennæ, and in the shape of the merus of the outer maxillipeds, *Trachycarcinus* is much like *Hypopeltarium* Miers (*Peltarion* Jacq.).

*Trachycarcinus corallinus*, sp. nov.

Carapace irregularly pentagonal, clothed with a dark brown pubescence, and bearing flattened tubercles of ivory whiteness arranged in groups, as follows: two anterior lateral and one posterior median, on the gastric region; four, disposed in two pairs, on the cardiac region; five or six on each branchial region; and one, of a crescentic shape, on each hepatic region. Each group of tubercles resembles the crown of a complex molar tooth whose cusps have been worn down to a common level. Front tridentate, the median tooth twice as long as the lateral. Walls of the orbit furnished with four teeth separated by deep hiatuses; these teeth are a pre-ocular, median superior, post-ocular, and sub-



ocular. Antero-lateral border of carapace armed with three prominent teeth; another minute tooth just back of the largest posterior lateral tooth. Eye-stalks slender; eyes small, unpigmented, with imperfectly faceted cornea. Chelipeds asymmetrical in the male; in adults the larger claw is naked, smooth, and ivory-white, like the tubercles on the carapace; the merus has a few small teeth along its upper margin, most of them near the two ends of the segment; the upper margin of the carpus is armed with one strong tooth, and is denticulated along its whole length; the propodus is short, the immovable finger bent down at an obtuse angle with the lower border of the palm; the dactylus is furnished with small tubercles on its upper border; both fingers are armed with large blunt teeth on their opposed edges. The smaller claw is slenderer than the large claw, and its fingers are proportionally longer. In the female both chelipeds are of approximately equal size, and resemble both in size and shape the smaller cheliped of the male. The ambulatory limbs are unarmed, but clad with coarse setæ.

Length of carapace, 26 mm.; breadth, 27 mm.

Station 3353. 695 fathoms. 1 female.

" 3356. 546 " 5 males, 4 females.

" 3418. 660 " 1 male.

### Family GECARCINIDÆ.

#### *Gecarcinus malpilensis*, sp. nov.

Carapace very broad and convex anteriorly, flattened and narrowed posteriorly; surface microscopically granulated; antero-lateral margin rounded, not denticulated; the median gastric furrow is well marked; the furrow separating the gastric from the branchial regions does not extend forward far enough to separate the gastric from the hepatic area; the so called genital area is separated by a pronounced groove from the branchial and cardiac regions, but not from the gastric; there is a deep indentation at the anterior extremity of the lateral genital furrows; the furrows bounding the cardiac region on either side are moderately developed. Front deflexed at right angles to the axis of the body, deep, concave above the margin, margin not reflexed, granulated. The merus of the outer maxillipeds is five-sided, outer side convex, distal slightly notched, antero-internal straight and parallel to the long axis of the body, forming an obtuse angle with the postero-internal margin, which is slightly concave. Merus and carpus of chelipeds devoid of spines or teeth. Dactylus of the ambulatory legs furnished with six rows of spines.

Length, 55 mm.; breadth, 76 mm.; width of hind border of carapace, 19 mm.; width of front, 11 mm.; depth of front, 7 mm.

Malpelo Island, March 5. 1 male.

This species is very distinct from any previously described. Compared with the previously known species from the Pacific coast, it is nearest to *G. quadratus*



De Saussure, but the outline of its carapace is very different; in this regard it is similar to *G. ruricola* from the eastern coast. Moreover, the front is narrower, deeper, and bent down at a sharper angle than in *G. quadratus*, and the merus of the outer maxillipeds is very different in shape from that of *G. quadratus* or any other known species.

### Family PINNOTHERIDÆ.

#### *Pinnixa panamensis*, sp. nov.

Male. — Carapace short and very broad, smooth and punctate for the most part, granulated at the sides. The lateral angles form a prominent shoulder, back of which the carapace diminishes rapidly in width. A transverse depression involves the hinder part of the gastric and the fore part of the cardiac regions. This depression is bounded behind by a ridge which extends across the carapace between the bases of the last pair of thoracic appendages. Back of this ridge the carapace is deflected at an angle of about forty-five degrees. Front depressed, divided by a median notch into two not prominent lobes; margin setose. The chelipeds are small, with very robust carpus and hand, destitute of spines, but furnished with some setæ along their edges; carpus squamose on the anterior and superior parts of the outer side; propodus not broader than the carpus, compressed laterally; a row of tubercles along the superior border forms a sort of crest; a longitudinal row of setiferous squamous tubercles runs lengthwise of the hand from the proximal end, stopping short of the base of the immobile finger; the surface between this and the dorsal crest is thickly beset with tubercles, but below it the surface is almost smooth down to a row of tubercles which runs along the inferior margin; immovable finger straight, the dactylus closing against it throughout its length; dactylus furnished with long setæ on the upper margin; no prominent teeth or tubercles on the cutting edge of either finger. First and second ambulatory limbs of moderate length, nearly naked, with slender and straight dactyli; last three segments tuberculate on superior margin. Third pair very much enlarged; the merus has a convex anterior border, and is pubescent on the anterior third of the upper surface; posterior margin double, spinulose. Fourth ambulatory legs very small, not reaching beyond the distal end of the merus of the third pair; upper surface smooth. Dactyli of penultimate and last pairs of legs short, acute, set at an angle with the propodi so as to form prehensile hooks. End joint of abdomen broader than the preceding joint, semicircular. The dactylus of the outer maxillipeds articulates with the propodus near the distal end of the latter. The carapace is 5 mm. long by 10 mm. broad.

The female is larger than the male, the carapace is more highly polished, the transverse depression not so pronounced, and the appendages are more thickly clothed with setæ. Length of carapace, 6.3 mm.; breadth, 13 mm.

Panama, March 12. 4 males, 6 females ovig.



**Family MATUTIDÆ.*****Osachila lata*, sp. nov.**

Carapace laterally expanded; three low obtuse protuberances on the gastric region, one on the cardiac, three or four on the branchial. Front prominent, bilobed, the lobes separated by a completely closed fissure. Antero-lateral margin of carapace sharp; behind the point where the subhepatic ridge joins the margin, the margin is divided into five obscure lobes, each of which is denticulate. Merus of chelipeds tuberculous along the upper edge and outside of it; carpus tuberculate externally, distal and superior margins produced to a cristiform tooth which continues back upon the carpus the crest on the superior border of the propodus; propodus tuberculate on the outer face, superior border denticulate and cristate. Edges of ambulatory limbs slightly cristate, dactyli pubescent on distal portion.

Length, 24.5 mm.; breadth, 32 mm.

Station 3427. 80 fathoms. 1 male.

**Family DORIPPIDÆ.*****Æthusa ciliatifrons*, sp. nov.**

Carapace broader than long, branchial regions much inflated; surface granulated on the branchial and cardiac regions, pubescent on the gastric region. Front and anterior part of the lateral border ornamented with long upturned cilia. Front between the orbits divided by a triangular median sinus and two slightly shallower lateral sinuses into four triangular teeth of equal length. Branchio-cardiac lines deeply impressed, meeting together in the median line in front of the heart. Eyes small, mounted on very short peduncles, just reaching, when extended, to the angles of the orbital sinuses. Chelipeds equal, small and slender; chela smooth, not more robust than the carpus; fingers longer than the palm, laterally compressed, curved inward, longitudinally grooved, thin prehensile edges straight and regularly denticulated. Ambulatory appendages very long (the second longer than the first), naked and minutely granulated; propodus slightly shorter than the merus, compressed, grooved longitudinally on both the upper and lower faces; dactylus one half longer than the propodus, flattened, curved, grooved and ribbed longitudinally, its upper edge very sharp. Last two pairs of thoracic limbs densely clothed with setæ. Sternum rather coarsely granulated. Conspicuous red transverse bands adorn the chelipeds and first two pairs of ambulatory appendages.

Length of a male (carapace), 26.5 mm.; breadth, 29.5 mm.

Station 3387. 210 fathoms.

" 3389. 153 "

" 3391. 259 "

" 3396. 127 "



*Æthusa pubescens*, sp. nov.

Carapace a little broader than long, densely pubescent; frontal margin ciliated; cardiac area open in front, the branchio-cardiac lines not meeting one another in the median line; front four-toothed, the median teeth more widely, but less deeply, separated from each other than from the lateral; the antero-lateral angles reach the level of the frontal teeth. Eyes as in the last described species (*Æ. ciliatifrons*). Chelipeds equal, small, with pubescent merus and naked carpus and hand; fingers longer than palm, compressed, curved, gaping at base. Ambulatory appendages similar to those of *Æ. ciliatifrons*, but free from granulation. Abdomen (of female) very broad, pubescent.

Length, 26 mm.; breadth, 29 mm.

Station 3367. 100 fathoms. 1 female.

This species resembles *Æ. ciliatifrons*, but the median notch of the front forms a more open angle in *Æ. pubescens*, and the sinus separating the front from the external orbital angle is not so deep. The branchio-cardiac lines do not meet in front of the cardiac area, and the cardiac area is not so much sunken below the level of the branchial regions; the branchial areas, moreover, are not so convex, nor is the cardiac region so uneven. The whole surface is densely pubescent, and the abdomen of the female is much broader. The fingers too are different, inasmuch as they are separated by quite an interval at base. The first and second pairs of ambulatory limbs are imperfect in the only specimen at hand, but they are very similar, as far as they go, to the corresponding appendages of *Æ. ciliatifrons*.

*Æ. pubescens* may prove to be the full-grown state of *Æ. lata* Rathbun, the description of which has just appeared in Proc. U. S. Nat. Mus., Vol. XVI, p. 258, 1893.

*Æthusina smithiana*, sp. nov.

In this species the carapace is longer than broad, and is not much narrowed anteriorly. The front is four-toothed, the middle pair of teeth large, triangular, separated from one another by a wide triangular sinus which is broader than the antennular sinus; between these teeth the margin is bent down till it meets the epistoma below; the lateral teeth of the front are spiniform and shorter than the middle teeth. The surface of the carapace is clothed with a short pubescence, and is lightly granulous; the branchio-cardiac grooves are well marked. The post-orbital teeth are spiniform, and they project far beyond the extremity of the small eyestalks. The eyes are smaller than the extremity of their peduncles. The chelipeds are equal, smooth, naked, unarmed; the merus cylindrical, the carpus short and rounded; the fingers about equal in length to the body of the chela, compressed, prehensile edges sharp and not provided with distinct teeth or tubercles. The ambulatory legs are nearly naked, the second pair more than twice the length



of the carapace, the dactylus longer than the propodus. The last two pairs of legs terminate in short recurved claws, which are setose on the posterior edge. The sexes do not seem to differ in any marked degree.

Length of carapace (male), 9.3 mm.; breadth, 8 mm.

Station 3370. 134 fathoms. 3 females.

" 3380. 899 " 2 males.

This species is nearly related to *Æ. abyssicola* Smith, but its carapace does not diminish so much in width anteriorly, the external frontal spines are less developed, the external orbital spine is much longer and brought forward so that the orbits face more to the front. From *Æ. challengerii* Miers it differs in the greater development of the frontal and external orbital spines.

### *Cymopolia tuberculata*, sp. nov.

Carapace very broad, subpentagonal, branchial regions swollen. Front four-toothed, the teeth blunt, separated from each other by narrow sinuses which are rounded at the bottom; the two middle teeth are longer than the lateral ones, and the median sinus is deeper than the two lateral. The antero-lateral margin of the carapace is four-toothed, counting the prominent tooth at the external angle of the orbit; the posterior tooth of the series is the smallest. The upper margin of the orbit has three deep fissures defining two triangular teeth; the lower margin of the orbit has two fissures enclosing a broad truncate tooth or lobe; there is also a broad and prominent lobe just below the inner orbital angle; above this lobe is a single tooth at the inner angle. The surface of the carapace is ornamented with granulated tubercles; the parts between the tubercles are more finely granulated, and when viewed under a lens are found to be furnished with fine hairs. The chief tubercles are disposed as follows: one pair on the frontal region behind the margin; four in a transverse row on the anterior part of the gastric area, and five on the posterior part of the same area arranged thus : ' ; of these the posterior pair is the smallest; four in a transverse line on the cardiac region and one median behind the transverse series; about six on each branchial area; six just anterior to the straight posterior margin of the carapace (three on each side). There are three small tubercles on each eye-stalk near the margin of the cornea. The chelipeds are small, slender, equal; the carpus tuberculose, the fingers as long as the hand proper, curved downward and inward, crossing at the tip, their prehensile edges finely denticulate in small specimens, nearly entire in larger ones. The second and third ambulatory limbs are very long, the second slightly longer than the third; their merus joints are granulated and costate above, and armed with a prominent spine at the antero-distal angle and a smaller one each side at the point of articulation with the carpus; this holds good of all three pairs of ambulatory appendages; the carpi are carinate on their anterior margin, with a vestige of a tooth at each end of the carina; the anterior edge of the propodus is also carinate. The ambulatory legs are ornamented with trans-



verse bands of red, three of which cross the merus. The abdomen and sternum are granulated.

Length, 13 mm.; breadth, 18 mm.; length of ambulatory leg of second pair, 34 mm.; merus of do., 9.3 mm.; carpus, 5.6 mm.; propodus, 9 mm.; dactylus, 7.5 mm.

Station 3355. 182 fathoms. 4 males, 1 female.

*Cymopolia zonata* Rathbun (Proc. U. S. Nat. Mus., XVI. 259, 1893), lately described from the Gulf of California, 40 fathoms, differs from *C. tuberculata* as follows. The carapace is narrower and more quadrangular. The median lobes of the front are small and inconspicuous, while the lateral lobes are very broad and are separated from the median lobes by a slight, shallow notch. In *C. tuberculata* the four frontal lobes take on the form of prominent triangular teeth, clearly separated from each other by deep triangular sinuses. The antero-lateral margin of the carapace is three-toothed in *C. zonata*, four-toothed in *C. tuberculata*. The tubercles near the posterior margin of the carapace are more elongated in the former species than in the latter. The hand of the former is much broader, and is armed with prominent spiny tubercles. Finally the meri of the ambulatory legs are much shorter in *C. zonata*, and are armed at the distal end with a blunt triangular tooth, while in *C. tuberculata* this tooth is transformed into a long sharp spine, and a pair of smaller spines is present, one on each side of the proximal end of the carpus.

### Family RANINIDÆ.

#### *Raninops fornicata*, sp. nov.

Carapace very convex from side to side, naked, smooth or nearly so, punctate. Rostrum acute, lightly carinate, the carina extending backward for a short distance on the carapace. Superior margin of orbit armed with three acute teeth, the second of which is curved forward; the anterior tooth is separated from the rostrum by a deep rounded sinus, from the second tooth by an angular notch; the second tooth is separated from the third by a nearly straight interval; the third tooth lies some distance in front of the posterior end of the orbit. Back of the orbit there is a strong procurved spine on the margin of the carapace. Eyestalks compressed, equal in length to one half the width of the carapace. Second segment of the third maxilliped equal to the third joint, crossed by a piliferous line; third segment notched at the antero-internal angle. Cheliped: merus unarmed, microscopically spinose above, setose below; carpus minutely rugoso-spinulose, the superior distal angle projecting as a sharp tooth; propodus lightly rugose, upper and lower borders margined, unarmed, palmar edge irregularly and inconspicuously toothed; dactylus without any prominent tooth. The dactylus of the fourth pair of legs has a very convex internal border, the dactylus of the fifth is long, narrow, and spatulate. Abdomen setose; telson obtuse at the end.

Length of carapace, 12 mm.; breadth, 8.6 mm.

Station 3369. 52 fathoms. 1 specimen.



**Family LITHODIDÆ.*****Rhinolithodes cristatipes*, sp. nov.**

The carapace is subtriangular in outline, its surface devoid of setæ, but covered with low squamiform tubercles; the whole gastric area is raised into a conical prominence; there is also a prominent crescentic rounded ridge on each branchial region, enclosing the cardiac area in a deep fossa open only behind. The rostrum is straight and conical, with a vertical plate projecting below from the proximal half down between the eyestalks; this plate is toothed anteriorly but does not reach forward nearly to the tip of the rostrum. The antero-lateral margin of the carapace is five-toothed; the second, third, and fourth of these teeth give rise to long thread-like cilia. There is another tooth at the angle between the postero-lateral and posterior margins; posterior margin straight. The upper surface of the eyestalk is covered with small tubercles and a blunt spine projects over the cornea. The movable scale of the antenna is spiniform and bears two blunt spinules on the outer side and two smaller ones on the inner. The chelipeds are unequal (the right being the larger); coxa granulated, setose on the lower inside margin; lower margin of the merus armed with three or four blunt teeth, superior margin toothed, internal distal border setose, external distal border forming a bilobed crest; outer face of carpus squamous, margins cristate, the internal crest expanded and cut into setiferous lobes; propodus tuberculated without, smooth within, toothed and setose on superior margin; immobile finger, as well as the dactylus, excavated within, setose; the larger claw has blunt teeth on the fingers, while the fingers of the smaller claw have nearly straight cutting edges. The ambulatory appendages have cristiform anterior margins from the merus to the propodus inclusive; the crest of the carpus is entire, but that of the merus is bilobed, of the propodus trilobed; the posterior margins of these appendages are dentate and more or less setose, the dactyli are provided with curved acute black tips, and with pencils of hair especially on anterior margins. The abdomen is indurated, with three rows of tuberculated plates.

Length of carapace, 16.5 mm.; breadth, 16.5 mm.

Station 3354. 322 fathoms. 1 male.

I have seen neither specimen nor figure of the type of this genus, *Rhinolithodes wossnesenskii* Brandt, from the coast of Alaska, and the specimen above described possibly does not belong to the same genus. Brandt's generic diagnosis (Bull. Phys.-Math. Acad. Sci. St. Pétersbourg, VII. 174, 1849) appears to include specific as well as generic characters. The specimen above described conforms to Stimpson's diagnosis of the genus (Proc. Acad. Nat. Sci. Phila., 1858, p. 231): "Abdomen scutis triseriatis obsessum. Antennarum aciculum margine spinosum. Pedes mediocres."



*Echinocerus diomedæ*, sp. nov.

Carapace subpentagonal, gastric and branchial regions inflated, the whole surface beset with tubercles which give rise to minute setæ. There is one rather more prominent tubercle in the depression on each side of the gastric area. Rostrum short, three-spined; one of the spines is median and inferior, two are paired near the base above; in one of the two specimens obtained the median spine is toothed below. The antero-lateral margin of the carapace is irregularly toothed. Eyestalks spinulose above, with one prominent spine projecting forward over the cornea. The movable scale or spine of the antenna is spinulose on each side (four or five spines on each margin). The merus of the cheliped bears a spine on the inner side at the distal end; the carpus is smooth outside, the inner border expanded into a seven-toothed crest setose within, the outer border straight, naked, and keeled; the chelæ are of unequal size (the right being the larger), setose, spiny on the upper edge; fingers spoon-shaped within, setose and somewhat gaping. Ambulatory appendages: the meri are spinose on their edges; the anterior border of the carpus of the first pair is furnished with a crest whose edge is even and entire; the propodus of the first pair is crested along the proximal half of its anterior border, while the distal half is armed with two or three teeth; the carpus and propodus of the second and third pairs are toothed on the anterior margin, the propodus of the third pair is also toothed on the posterior margin; all the segments are hirsute, especially the dactyli. When the legs are closely folded against the sides of the carapace a wide interval is left between the carpi of the cheliped and first pair of ambulatory appendages, bounded by the opposite crests of these segments, and forming a passage for the admission of water to the gills. This orifice is similar to that seen in *E. foraminatus* Stimps., but it is not so perfectly formed. The apex of the abdomen (in the female) is turned to the right (most strongly in the larger specimen); the marginal plates are wanting on the left side; all the abdominal appendages excepting the first are aborted on the right side.

Length, 64 mm.; breadth, 71 mm.

Station 3384. 458 fathoms. 1 female.

Station 3394. 511 fathoms. 1 female ovig.

In this species the acicle of the antenna is spinous on the margins only, as in *E. foraminatus* Stimps.

*Paralomis aspera*, sp. nov.

Carapace pentagonal, as broad as long; gastric, cardiac, and branchial regions well defined and prominent; whole surface of carapace and abdomen thickly beset with papillæ or tubercles, each one of which is encircled with a crown of stiff setæ. Rostrum short, indistinctly tripartite, multispinose. A sharp dark-tipped spine at the external orbital angle, another at the antero-lateral angle of the carapace, and four or five, irregularly arranged, on the margin of the branchial region.



The dorsal face of the second abdominal segment consists of a single plate, undivided by longitudinal sutures, with a deep depression on each side of the middle. The following segments are unsymmetrical on the two sides of the unique type specimen (female), the abdomen being twisted to the right. The lateral margins of these segments are laciniated.

Eyestalks spinulose above; eyes very black, with downward aspect. Distal segment of antennule much longer than the antecedent segment, tuberculous above. Antennæ of moderate length; outer margin of first segment spinulose; second segment spinulose, and produced on the outer side to a long spine, movable acicle reaching to the distal end of the peduncle, spinose, the longer spines marginal, one spinule on the lower side and another on the upper side near the base; penultimate and ultimate segments of peduncle bear small setiferous tubercles. Right cheliped more robust than its fellow, thickly beset with strong spines. Ambulatory legs long, robust, spinose like the chelipeds; their basal segments are wellnigh covered by the overlapping margin of the abdomen (in the female).

Length of carapace, 113 mm.; length of rostrum, 9 mm.; breadth of carapace, 113 mm.; length of posterior ambulatory legs, 255 mm.; merus, 68 mm.; carpus, 39 mm.; propodus, 72 mm.; dactylus, 56.5 mm.

Station 3353. 695 fathoms. 1 female.

This species, like the one next described, is much longer legged than *P. granulosa* (Jacquinot), the type of the genus. In this regard it is more like the two "Challenger" species described by Henderson. The specimen above described was infested with a huge *Peltogaster* 36 mm. in breadth.

### *Paralomis longipes*, sp. nov.

Male. — Carapace triangular; gastric, cardiac, and branchial regions well defined, protuberant; the most prominent part of the cardiac area reaches a higher level than the branchial areas; whole surface of carapace thickly covered with blunt papillæ; viewed under a lens each tubercle is seen to be encircled with a ring of short, stiff setæ; one of the tubercles, situate in front of the centre of the gastric region, assumes a spiny form. Rostrum furnished with three prominent spines, one median and inferior, two lateral and superior; the latter are not so long as the inferior spine; there is, too, a spinule on the lower side of the inferior spine, and a still smaller one above, between the roots of the superior pair. There are two pairs of long spines on the anterior margin of the carapace, one at the external orbital angles, the other at the antero-lateral angles of the carapace. There are also three or four prominent spines on the side of each branchial area. Eyestalks spinulose above. Basal segment of the antenna armed with an external spine, the second segment with several spines, the most prominent of which is on the outer side; acicle furnished with five prongs or spines, the largest median, the others lateral; flagellum much longer than the carapace. Cheliped of moderate size (the right one has been lost from



the only male specimen obtained), coxa tuberculate on the lower face, the following segments armed with strong spines, fingers excavated within, slightly gaping, penicillate, cutting edges entire. Ambulatory appendages very long, second and third pairs of about equal length and longer than the first pair; all of them armed, like the chelipeds, with spines; the spines tend toward a regular arrangement in longitudinal rows, and the spaces between the spines are smooth and naked, i. e. nearly free from spinules, tubercles, or setæ. Second segment of abdomen composed of a single calcified plate, marked by a deep hollow on each side of the middle; the other segments of the abdomen are of a leathery, semi-membranaceous consistency, and are made up of five longitudinal rows of plates, viz. one median row, flanked by a row on each side, the latter in turn bounded externally by a marginal series; whole surface of abdomen verrucose.

Length of carapace, including rostrum, 84 mm.; breadth, 78 mm.; breadth between the antero-lateral angles of carapace, 34 mm.; length of last ambulatory appendages, 242 mm.; merus, 76 mm.; carpus, 36 mm.; propodus, 64 mm.; dactylus, 47 mm.

In the female the right chela is larger than the left, and the prehensile edges of the fingers are furnished with blunt teeth. The abdomen is asymmetrical, the apex turned to the right, the marginal plates absent from the left side; the right side bears but one ovigerous appendage (the first). The abdomen nearly conceals the basal segments of the thoracic legs, which in the male are almost entirely exposed.

Station 3371. 770 fathoms. 1 male, 1 female ovig.

The egg measures 2 mm. in diameter.

#### *Lithodes panamensis*, sp. nov.

Carapace subpyriform, of about equal length and breadth; gastric and branchial regions very convex; a deep depression on each side at the anterior limit of the branchial areas, and another between the gastric and cardiac areas. Rostrum cylindrical, terminating in three spines or teeth, one of which is median, the other two lateral; a long horn, slightly upcurved, is given off from the lower side of the proximal end of the rostrum. The whole surface of the carapace is rough with low warty protuberances; the gastric region bears two pairs of spines, the anterior pair separated by a greater interval than the posterior pair. Two small spines on each branchial area, and two on the intestinal region. The orbit is bounded externally by a prominent spine, and there are five more spines on the lateral border of the carapace, viz. one at the antero-lateral angle, one on the hepatic region, and three on the branchial. Besides these there is a rudimentary lateral spine near the anterior limit of the branchial region. The posterior margin of the carapace is tuberculated, not spinose. The third segment of the antennular peduncle is equal to the first segment in length, and considerably longer than the second segment. The



antennæ are about equal in length to the carapace without the rostrum; the second segment is armed with a long and sharp external spine; there is, moreover, on the antenna of the right side a movable thorn-like acicle equal in length to the last two segments of the peduncle together; the acicle is armed with a small tooth on the external margin midway between the base and the tip. There is no trace of an acicle on the left antenna. As the type specimen is the only one obtained, it is impossible to tell whether the acicle is normally present or absent. The last segment of the peduncle is nearly twice as long as the penultimate segment. The chelipeds are furnished with scattered tubercles, a few of which assume a spiny form. The left cheliped is rather slenderer than its fellow. The ambulatory legs are long and rather slender, their meri sparsely furnished above with tubercles, which tend to a spiny form on the anterior and posterior margins; at the distal end of the anterior margin of the meri there is a prominent spine-like tooth; the carpi and propodi are armed with teeth, chiefly on the anterior margins; the dactyli are equipped with four short spines (two superior and two lateral) near the proximal end. The abdominal segments (of the female) are roughened by low tubercles, and dentate on their margins. The lateral teeth of the marginal plates of the right side are drawn out into long spines. The tergal plate of the second abdominal segment is completely fused with the epimera, showing no trace of an intervening suture. The marginal (episternal?) plates of this segment are bounded within by a distinct suture.

Length of carapace, excluding rostrum, 79 mm.; rostrum, 14 mm.; breadth of carapace, 79.5 mm.; length of posterior pair of ambulatory legs, 193 mm.; merus, 58.5 mm.; carpus, 31 mm.; propodus, 54 mm.; dactylus, 33 mm.

Station 3384. 458 fathoms. 1 female.

This species finds its nearest relative in *L. murrayi* Henderson (Rep. Challenger Anomura, p. 43, Plate IV.), from the distant Prince Edward Island in the Southern Ocean. The latter species differs from *L. panamensis* in having a much longer rostrum, which is forked at the end, a more oval and spiny carapace, shorter external antennal spine, more spinose legs, etc.

### Family PAGURIDÆ.

#### *Cancellus tanneri*, sp. nov.

Differs from *C. canaliculatus* (Herbst) in having a much shorter and broader abdomen, in the lobate character of the marginal crests of the first and second pairs of legs, in the pubescence of the thorax and abdomen, and in the shortness of the antennæ. From *C. typus* M. Edw., it is distinguished by having the anterior border of the carapace less deeply incised on either side of the rostrum, and the telson squarely truncated posteriorly, not notched in the middle; the coxæ of the last pair of legs, too, present a very different shape, since they lack the prominent anterior lobe observable in *C. typus*. *C. parfauti* A. M. Edw.



et Bouv., compared with *C. tanneri*, displays longer eyestalks, while the thorax and abdomen are less pubescent, and the coxal segments of the posterior legs are much more protuberant.

Length of carapace, 7 mm.; breadth, 5 mm.; length of eyestalk, 3 mm.

Station 3368. 66 fathoms. 1 male.

Found in a cavity in a piece of dead coral rock.

The abdomen in the unique type specimen is not quite symmetrical, but this may be an individual peculiarity resulting from the shape of the cavity in which the animal lived.

### ***Pylopagurus longimanus*, sp. nov.**

Carapace smooth, naked, polished; rostrum short, triangular, subacute, advanced farther than the rounded lateral angles. Abdomen longer than cephalothorax. Eyestalks equal in length to the first two segments of the antennular peduncle. Ophthalmic segment uncovered. Ophthalmic scales separated by a considerable interval, triangular, their tips split in a horizontal plane so that they end in two acute teeth, one above the other, the lower tooth the longer. Last segment of antennular peduncle very long and slender (much longer than the eye-stalk). Right cheliped of enormous size, much exceeding the whole body in length; the outer face of the merus is nearly smooth, the lower and inner faces granulated; carpus very large, equalling in length all the preceding segments combined, its surface granular, the granules assuming the form of small spinulose tubercles on the dorsal face, which is limited within by a row of larger teeth. Chela irregularly oval, the external side flattened to form an opercular facet, which is thickly set with granules and surrounded with a margin of denticles. Left cheliped very small, its segments more hairy than those of the right; basal part of propodus short and swollen, the fingers long, gaping at the base; the outer or upper faces of the propodus and dactylus are granulated, and definitely bounded by a line of regularly arranged granules on the outer margin of the dactylus and the inferior margin of the propodus; the inner or lower face of the chela is pretty free from granules, but is furnished with numerous setæ, those on the dactylus being grouped in conspicuous tufts or pencils. Penultimate pair of thoracic appendages almost perfectly chelate, its rasp restricted to the distal part of the claw, broad, and composed of many rows of scales.

The legs are yellowish, banded and mottled with red.

Length of carapace, 10 mm.; eyestalk, 4 mm.; right cheliped, 34.5 mm. (merus, 8 mm.; carpus, 11 mm.; propodus, 14.8 mm.; dactylus, 10 mm.).

In younger, smaller specimens the chelipeds are shorter in proportion to the length of the body, and the major claw is shorter, broader, and of a more regular oval form. A specimen, whose carapace is 6.5 mm. long, gives the following dimensions for the right cheliped: total length, 16.5 mm.; merus, 4.5 mm.; carpus, 5.5 mm.; propodus, 7.5 mm.; dactylus, 4.5 mm.



Station 3368. 66 fathoms. 5 males.

Resembles *P. unguatus* (Studer), but readily distinguished from that species by the great size of the right cheliped, the irregularly oval outline of the right chela, the great length of the distal segment of the antennular peduncle, etc.

*Pylopagurus affinis*, sp. nov.

This species is nearly related to *P. unguatus*, from which it differs in the following respects. the eyestalks are longer, and narrower at the distal end; the external prolongation of the second segment of the antenna is longer and slenderer; the upper margin of the carpus of the right cheliped is armed with two or three spines, the largest of which is close to the anterior border; the outer face of the carpus is smooth save where a light tubercular ridge runs along the middle. In *P. unguatus* this face of the carpus is thickly covered with spinulose granules which assume larger proportions and a uniserial arrangement on the superior and inferior margins. On extending the comparison to the large chela, further differences between the two species become apparent. In both species the external face is flat, covered with minute spinulose granules, and surrounded by a border of sharp spines; but in *P. affinis* the marginal spines are larger and more irregular, and the flat opercular facet is not sharply defined at the proximal end by the regular arrangement of the marginal spines as in *P. unguatus*; instead, one finds the marginal series of spines broken down at this point, thus effacing any distinct limit between the opercular face of the chela and the articular surface which connects the propodus with the carpus. The inner or lower surface of the large chela is smooth in *P. affinis*, granulated in *P. unguatus*. The left cheliped is quite different in the two species: in *P. affinis* the several segments of which it is composed give rise to long setæ, which give the appendage a very hairy appearance when contrasted with *P. unguatus*; the inferior border of the chela is conspicuously toothed, while in *P. unguatus* it is entire. The ambulatory legs are more hairy in the Pacific species than in *P. unguatus*, and their carpal joints are not so distinctly dentate on the superior border. The rasps of the fourth pair of legs are multiserial in both species. The telson is symmetrical, subcircular in outline, its posterior border convex and entire; in *P. unguatus*, the telson has a deep and wide posterior median notch.

Length, about 12 mm.; length of carapace, 4.5 mm.

Station 3397. 85 fathoms. 1 male.

There are three simple unpaired abdominal appendages on the left side, in the type specimen. The vasa deferentia are extruded from the base of the fifth legs on each side. They appear as slender threads, the one on the right side much longer than its fellow, and twisted into a small bunch.



*Pylopagurus hirtimanus*, sp. nov.

This species closely resembles *P. rosaceus* A. M. Edw. et Bouv.,<sup>1</sup> from the West Indian seas. Compared with the type of *P. rosaceus* it presents the following differences. The eyestalks are a little slenderer, and together with the ophthalmic scales are separated by a wide interval in which the antennules lie, exposed from above. In *P. rosaceus*, on the contrary, the ophthalmic stalks and scales are closely approximated, concealing the antennules beneath. The outer face of the right chela is ornamented with conical tubercles, whose bases are expanded into circular plates; these plates are closely packed over the surface of the chela, so that no interstices are left between them; their borders are cut into a large number of minute radiating processes; on the basal half of the propodus the tubercles give rise to long setæ, which render that part of the claw conspicuously hirsute, in contrast with the distal part which is naked; furthermore, on the distal half of the propodus, especially on the concave surface of the immovable finger, the tubercular processes tend to become obsolete, leaving only the basal circular radiate plate; the bases of the conical teeth along the outer margin of the hand and the movable finger are expanded at the base into flattened roundish surfaces with radiate margins; these surfaces form a conspicuous outer border to the hand; the inner face of the hand is tuberculated. In *P. rosaceus* the tubercles of the outer face of the chela are encircled by rounded granules much less numerous than the radiating points in *P. hirtimanus*; the tubercles are so loosely arranged that numerous interstices are apparent between them; the hairs on the basal half of the hand are not so well developed as in the Pacific species; the whole outer face of the immovable finger is strongly tuberculated, the teeth of the lower margin are not expanded into conspicuous plates, and the inner face of the chela is nearly smooth. The carpus in *P. hirtimanus* is armed with larger spines on the internal margin, is more hairy, and more coarsely granulated on its inner, inferior, and outer surfaces than it is in *P. rosaceus*. The left chela is comparatively smaller than in *P. rosaceus*, is more strongly toothed along the internal margin of the propodus and dactylus, and exhibits, besides, most of the above specified peculiarities of the right claw. The primary branch of the unpaired abdominal appendages is shorter and broader than in *P. rosaceus*. The rasp on the propodus of the fourth pair of legs is uniserial, as in *P. rosaceus*.

Length of carapace of largest male, 12 mm.; length of carapace in front of cervical groove, 7 mm.; breadth across the branchial regions, 9.5 mm.; length of large claw, 11 mm.; breadth of large claw, 7 mm.

Station 3367. 100 fathoms. 2 males, 1 female.

“ 3368. 66 “ 5 males, 5 females.

A good deal of the color is still preserved in alcohol. The lower surface of the eyestalk is quite a deep red, while the upper surface is a pale yellow. The

<sup>1</sup> Mem. Mus. Comp. Zool., XIV. No. 3, p. 97, Plate VII. Figs. 10-17, 1893.



merus and carpus of the chelipeds and all the segments of the ambulatory legs from the ischium to the dactylus inclusive are banded transversely with bright red on a yellowish ground.

*Catapagurus diomedææ*, sp. nov.

The carapace is smooth and naked, and divided into an anterior and posterior section by the cervical groove. The anterior margin projects slightly between the eyestalks, forming a blunt rudimentary rostrum. The gastric region is sharply defined, and presents an indistinct longitudinal furrow on each side of the median line; it is lightly convex in both directions. The branchial regions of the right and left sides are strongly inflated and sharply separated from each other by a re-entrant angle formed by the curving forward of the posterior border of the carapace on each side of the median line.

The eyestalks are rather long and slender, being about equal in length to the anterior section of the carapace. The ophthalmic scales are very small and minutely bifid at the tip. The third segment of the antennular peduncle is about two thirds the length of the eyestalk, and increases in diameter from the base to the distal end; the superior flagellum is rather longer than the distal segment of the peduncle, and its enlarged ciliated basal portion forms rather more than one third of its whole length. The inferior flagellum is about one half as long as the superior, and is composed of about eleven segments. The peduncle of the antenna surpasses the eyestalk by one half the length of its distal segment; the acicle is long and slender, tipped with a few setæ; it reaches forward a little beyond the eye; the flagellum reaches beyond the tips of the ambulatory legs. The chelipeds are nearly alike in shape and size; their segments are clothed with long setæ, which assume a tomentose appearance on the chelæ; the carpus is about equal in length to the chela, its inner face is perpendicular, the inner margin of the upper side is armed with seven small spines; there is also a spine at the distal end of the superior margin of the carpus; the chela is short and thick, the fingers about the same length as the basal portion of the propodus, slightly down-curved, meeting throughout their length, working horizontally. The ambulatory legs are of nearly equal length, surpassing the chelipeds, setose, the carpus armed with a sharp tooth at the distal end of its upper side; the propodus is twice as long as the carpus, the dactylus is considerably longer than the propodus, and, like that segment, is distinctly curved; it is tipped by a small horny nail. The fourth pair of legs is but slightly subcheliform; the rasp is formed of a single row of scales. There are three small rudimentary appendages on the left side of the abdomen; the first and second of these are two-branched, the secondary branch being exceedingly minute.

The sexual tube, which issues from the coxal segment of the last thoracic appendage of the right side, is very long in this species.

Length of carapace, 5.5 mm.; abdomen, 8 mm.; cheliped, 12.5 mm.; last ambulatory leg, 17.5 mm.; ocular peduncle, 2.5 mm.



Station 3355. 182 fathoms. 1 male.

This species differs much from the more typical species of *Catapagurus*, *C. sharreri* A. M. Edw. and *C. gracilis* Smith, in the shortness of its chelipeds and ambulatory limbs, the symmetry of its chelipeds, and the length of the protruded vas deferens. It is more nearly related to *C. australis* Henderson (Challenger Anomura, p. 76, Plate VIII. Fig. 1). It would seem to have a close general likeness to *Pagurodes piliferus* Henderson, but the gills in *C. diomedea* are of the phyllobranchiate type.

### ***Spiropagurus occidentalis*, sp. nov.**

The carapace is smooth and naked except on the sides of the branchial regions, where a few hairs arise; the branchial regions are swollen, membranaceous, and covered with a network of white lines; the cardiac region is long and narrow; the portion of the carapace in front of the cervical groove is calcified, produced in the median line anteriorly to form a short, broad, and obtuse rostrum, which does not conceal the ophthalmic segment; the lateral teeth are acute, and project as far as the rostrum does; they form a sharp demarkation between the front and the oblique antero-lateral border of the carapace.

The ophthalmic scales are triangular, with simple tips. The ocular peduncles are enlarged at the distal end, hardly overreaching the distal end of the second segment of the antennular flagellum and the third segment of the antennary flagellum. The last segment of the antennular peduncle is more than twice as long as the penultimate segment. The second segment of the antennal peduncle is produced externally into a long, sharp tooth; the antero-internal angle is likewise armed with a small spine; the acicle is long, sharp, curved, and furnished with setæ, as are also the several joints of the peduncle.

The chelipeds are subequal, the right chela being appreciably larger than the left; the ischium is armed with about five denticles along the internal margin; the inner margin of the merus is armed with the same number of rather larger teeth; the inner margin of both of these segments is furnished with long and slender setæ; the surface of the carpus is rough with setiferous rugæ, and is armed with scattered spinules upon its upper face and with a row of larger spines along the internal margin of the upper face. The external face of the propodus is armed with spines which are regularly arranged in five longitudinal rows; only at the distal end of the propodus, at the base of the fingers, do these spines lose their regular serial arrangement; from the bases of these spines spring long setæ; the fingers are acute, tuberculo-spinose and setose, like the hand. The fingers of the left hand are longer in proportion to the palm than those of the right hand. The ambulatory legs are rather robust, and longer than the chelipeds; their lateral surfaces are smooth; the upper margins of the carpi are armed with a row of little spines, and the corresponding margins of the propodi are denticulated; the dactyli are longer than the propodi, but not so long as the propodus and carpus combined; the anterior pair of ambulatory



legs differs from the posterior pair in having the dactylus and propodus a little shorter, and the lower edge of the merus more hairy and minutely spinulose. The telson is deeply cut by a broad median notch in its hind margin into two lobes, the left of which is the larger. The margins of both lobes are spinose.

There is (in the alcoholic specimens) a narrow red ring around both fingers near their tips, a broader band of the same color around the base of the fingers, and a red patch on the inner side of the anterior face of the hand.

Length of carapace, 6.5 mm.; greatest breadth of carapace, 6 mm.; length of ocular peduncles, 2.3 mm.

Station 3368. 66 fathoms. 1 male.

" 3379. 52 " 1 male.

This species, like *S. iris* A. M. Edw., is characterized by the spiny armature of the chelipeds. It differs from *S. iris* by having a smaller number of spines upon the anterior face of the chela, and in their arrangement in a few definite longitudinal rows, the surface between the rows being spineless and reticulated. The chela does not display the lively iridescence so striking in Milne Edwards's species, nor are the ophthalmic scales bidentate at the end. The merus of the third maxilliped is not armed with a distal spine, as in *S. iris*.

#### *Paguristes fecundus*, sp. nov.

The anterior or gastric section of the carapace is smooth in the central and hinder parts, rugose near the front, and tuberculose in the antero-lateral region, where a few of the tubercles assume a spiny form; from the tubercular surface spring long slender setæ. The anterior margin of the carapace is produced in the median line so as to form an acute triangular rostrum, which projects beyond the subacute lateral processes; between the rostrum and the lateral processes the anterior border is concave and thickened so as to form a rim. The anterior gastric lobes are clearly defined anteriorly.

The ocular peduncles are long and cylindrical, reaching considerably beyond the antennal peduncle, but not quite so far as the antennular peduncle. The ophthalmic scales are of moderate size and bidentate at the tip, the external tooth very minute. The antennal acicle reaches almost to the end of the peduncle; it is setose, and armed with six spines, two of which form a terminal fork, the others being marginal. The external prolongation of the second antennal segment is narrow, setose, and minutely spinulose; there is, moreover, a spinule on the upper face of this segment behind the base of the acicle; the antennal flagellum is very short (about equal in length to the anterior section of the carapace). The third pair of maxillipeds are closely approximated at the base; their merus joints are armed with three or four denticles on the lower margin, and one at the distal end of the upper margin.

The chelipeds are short and of like size and shape; the merus is smooth within, rugose without; the two inferior margins are armed with minute black-tipped spinules. The carpus is tomentose and spinulose, the largest



spines occurring along the superior border; the hand is both spinulose and pubescent, but the hair is less dense upon the fingers than upon the basal portion of the hand, which is short and swollen below; the fingers are short, excavated within, and terminate bluntly in a dark corneous nail. The ambulatory limbs are pubescent, particularly on the upper and lower margins; the distal end of the merus, and also the carpus, propodus, and dactylus, are armed with numerous spines; the most prominent of these spines are arranged in a row along the upper border of the carpus and propodus; the dactylus is about equal in length to the propodus and carpus together. The legs of the fourth pair are furnished with long hairs on their upper margin, and there are a few spines on the upper margin of the carpus; the propodus is rather longer than the dactylus, and the rasping surface on its lower margin occupies two thirds of its length. The last pair of legs is much less hairy than the preceding pair; the rasping surface, which is truncate posteriorly, falls a little short of reaching the middle of the hand. The telson is divided by a pair of lateral incisions and a median one into four lobes, those on the left side the larger; the pair of terminal lobes are obscurely toothed on their margins.

Length of carapace, 9.5 mm.; breadth, 7 mm.; length of ocular peduncle, 4 mm.

Station 3368. 66 fathoms. 2 females ovig.

This species is nearly related to *P. lymani* A. M. Edw. et Bouv.,<sup>1</sup> of the West Indian region, and to *P. subpilosus* Hend.,<sup>2</sup> of New Zealand. From the former it is distinguished by the more prominent and acute rostrum which overhangs the ocular segment, by the smaller number of spines on the antennal acicle, and by the armature of the telson, the margin of which is ornamented with obscure teeth, while in *P. lymani* it is furnished with numerous spines whose tips are horny and dark colored. From *P. subpilosus* it differs in having shorter eyestalks and antennal acicle, fewer spines on the antennal acicle, a longer and narrower external prolongation of the second joint of the antenna, and a differently shaped telson.

The ovisacs of both specimens are large and filled with eggs.

### Family PORCELLANIDÆ.

#### *Petrolisthes agassizii*, sp. nov.

In the shape of the carapace and the front this species bears a close resemblance to *Petrolisthes sexspinosus* (Gibbes) and *P. occidentalis* Stimps., but the transverse ridges are more broken anteriorly, while posteriorly they extend without interruption across the whole width of the carapace, being here more perfectly developed than in the two species above named. The carpus and claw,

<sup>1</sup> Mem. Mus. Comp. Zool., XIV. No. 3, p. 49, Plate IV. Figs. 13-22, 1893.

<sup>2</sup> Challenger Anomura, p. 77, Plate VIII. Figs. 2, 2 a, 1888.



moreover, are longer and narrower; the anterior margin of the carpus is three-toothed instead of five-toothed. The squames of the carpus and claw do not tend to widen out into ridges or folds either on the upper or lower face, but preserve the form of close-set imbricated scales over the whole surface, including the space between the longitudinal depressions of the carpus and along the depressed line of the propodus. The form of the carpus approaches nearer to that of *P. armatus* (Gibbes), but the present species may be readily distinguished from *P. armatus* by the prominent rugæ of the carapace and the squames of the chelipeds. From *P. edwardsii* (Sauss.) it is distinguished by its longer chelipeds, by the ridges of the hinder part of the carapace extending clear across the carapace without interruption, etc. The ridges of the frontal lobes are much more strongly developed in *P. agassizii* than in any of the allied species.

Carapace 5 × 5 mm.; cheliped, 34 mm.

One male, taken with *Petrolisthes occidentalis* Stimps. on the reef at Panama, at low tide, March 12.

### *Pachycheles panamensis*, sp. nov.

Carapace subcircular, of equal length and breadth; upper surface flattened, granulate, and setose, especially on the gastric and anterior part of the branchial regions; posterior portions of the branchial regions lightly rugose. Front broad, produced to a rounded median lobe, lateral portions straight, inner orbital angle rounded, not produced; outer orbital angle projecting as a triangular tooth between the eye and the base of the antenna. Lateral border of the carapace with a concavity behind the antenna; the margin is slightly raised as a rim which is lost in one of the branchial rugæ before reaching the hind border of the carapace; hind border slightly concave. Chelipeds: unequal, the right being the larger; upper surface of the merus rugose and setose, under surface smooth, internal distal angle produced as a denticulated tooth; carpus short and broad, upper surface tuberculous and setose, internal border armed with a large tooth at the base, followed by one or two smaller teeth, lower surface smooth and naked; upper surface of the propodus furnished with small tubercles which bear stiff bristles, inner margin rounded, not toothed, outer margin granulated, lower surface convex, naked and polished near the centre (where the surface is reticulated in the larger claw), squamoso-granular and setose near the edges; fingers gaping, crossing at tips, toothless on both the inner and outer margins (or at most slightly denticulated on the outer margin). Ambulatory appendages setose.

Length of carapace, 6.5 mm.; breadth, 7 mm.; breadth of frontal margin, 2 mm.

Panama, March 12. 1 female ovig.

*Pachycheles rudis* Stimps. is a larger species, with the posterior margin of the carapace more concave (the concavity having almost the shape of a triangular



notch); the carapace and chelipeds are less setose than in *P. panamensis*, the anterior margin of the carpus not prominently toothed, and there is a strong protuberance near the middle of the upper surface of the propodus. In *P. tuberculipes* Lockington, the central part of the front is triangular and deeply furrowed along the median line, the chelipeds and ambulatory legs are knobbed so as to present "a mass of tubercles above." *P. panamensis* appears to be near *P. barbatus* A. Milne Edwards, from the Azores, but in the latter species the front is broader and the carpus more denticulated.

## Family GALATEIDÆ.

### *Pleuroncodes monodon* (M. Edw.)?

Compared with Milne Edwards's figure of *P. monodon* (Ann. Sci. Nat., 3<sup>e</sup> sér. Zool., XVI. Plate XI. Figs. 6-9), the "Albatross" specimens present a more obese appearance; their greatest width is across the cardiac region, while in the figure of *P. monodon* it is near the posterior end of the carapace; the cardiac area, too, in the examples before me, is sunk below the level of the rest of the carapace, and the transverse piliferous lines are more broken at this point, as well as on the gastric region, than appears to be the case in *P. monodon*, to judge from the figure referred to. Unless these discrepancies are due to the inaccuracy of Milne Edwards's draughtsman, the "Albatross" specimens belong to a new species.

Station 3385.	286 fathoms.	16 males, 7 females.
" 3386.	242 "	9 males, 14 females.
" 3396.	259 "	2 males, 2 females.
" 3423.	94 "	18 males, 11 females.

### *Munida obesa*, sp. nov.

In this species we see an approach to the genus *Pleuroncodes*, as the sides or latero-inferior walls of the carapace are somewhat swollen, so that they show a little when the animal is viewed from above. The basal joint of the antennæ, too, is more exposed from above than it is in the typical species of *Munida*. The lateral rostral spines, or supra-ocular spines, are curved upward more than the median rostral spine, and the three are nearly parallel, the lateral spines reaching about half way to the tip of the median; all three are microscopically spinulose on their upper edge. There are two pairs of spines on the anterior part of the gastric region in line with the lateral rostral spines. Of these two pairs the anterior is the larger. There is also a longitudinal line of spinules in the median line between the two pairs just spoken of. There are, in addition to these, several small spines irregularly arranged on each side of the gastric region. The cardiac area is somewhat sunk below the level of



the surrounding parts; its anterior margin is denticulated, with a larger spine on each side. The lateral margins of the carapace are armed with ten or eleven spines, the one on the antero-lateral angle being the longest. The second abdominal segment is ornamented with a transverse row of eight small spines. The other abdominal segments are normally destitute of spines, but in a few of the many specimens before me there are two or four small spinules on the third segment. The pleuræ of the third, fourth, and sixth abdominal segments are acute, the rest blunt. The eyes are large, and are provided with rather long cilia on the edge of the cornea. The basal joint of the antenna is armed with a long and sharp spine which reaches forward beyond the eyes; the second joint also has a long spine on each side. The chelipeds are long and hairy; the merus, carpus, and basal part of the propodus are spiny, the fingers long, slender, the cutting edges straight and finely spinulose. The ambulatory appendages are setose, the upper and lower edges of the merus are spinulose and there is, moreover, a row of spinules on the outer surface, this external line of spinules being best developed on the proximal end of the segment. The carpus is armed with small spines on the upper margin, and one spine on the distal end of the lower margin; the penultimate and terminal joints are unarmed.

Length, 65 mm.; length of carapace, 34.5 mm.; breadth of carapace between epimeral sutures, 21 mm.; length of rostrum, 11 mm., length of cheliped, 84 mm., merus, 26 mm., carpus, 10 mm., basal portion of chela, 18 mm., dactylus, 21 mm.

Station 3389. 210 fathoms. 2 males, 7 females.

“ 3355. 182 “ 5 young.

### *Munida refulgens*, sp. nov.

In this species the setæ on the ridges of the thorax and abdomen and on the legs are resplendent with iridescent hues. The rostrum is long, triangular in cross section, the upper surface scabrous, the lateral margins armed with two to four spines which are generally placed unsymmetrically on the two sides. The supra-ocular spines are short. There is a transverse line of spinules back of the base of the rostrum, the two which lie on either side of the median line being larger than the others. Seven marginal spines on each side of the carapace, the ones at the antero-lateral angles the largest. There are no spines on the abdominal segments. The abdominal pleuræ are acute. The basal joint of the antenna has a plate-like expansion, but is not spinose; the second joint is furnished with an external spine. Chelipeds very long, squamose, and clothed with silky setæ; the merus has a row of spines on the upper margin, another on the inner side, and a row of smaller ones on the outer side; the carpus is provided with three or four spinules at the distal end; the chela is slender, the outer finger flattened, ribbed above, the outer edge rather convex and expanded toward the base; cutting edges of fingers finely denticu-



lated. The anterior border of the merus and carpus of the ambulatory appendages is spinose. The general color in life is red. In the alcoholic specimens the color is retained in the chelæ and particularly in the rostrum.

Dimensions of largest specimen (male). Length, 91 mm.; length of carapace, including rostrum, 43 mm.; breadth of carapace, 34 mm.; length of cheliped, 211 mm., merus, 90 mm., carpus, 15 mm., basal part of chela, 56 mm., dactylus, 42 mm.

Station 3367. 100 fathoms. 13 males, 18 females (7 ovig.).

" 3378. 112 " 15 males, 19 females (14 ovig.).

" 3379. 52 " 1 young.

" 3427. 80 " 1 young.

In *M. iris* A. M. Edw., the setæ are iridescent, as in this species, but the rostrum lacks the lateral spines and the supra-ocular spines are much longer, reaching beyond the eyes; from *M. irrasa* A. M. Edw., our species differs in the shape of the hand, in the relatively shorter median rostral spine provided with lateral spines, etc.

### *Munida propinqua*, sp. nov.

The carapace of this species is rather flat; the rostral spines are scabrous, the lateral reaching to a point beyond the eyes; there is a prominent spine on the gastric area behind each lateral rostral spine, another on each side behind and external to these, and a pair of very small ones on the median line at the base of the rostrum; besides these there are about four small spines on the anterior half of the carapace. The anterior lateral angle of the carapace is truncated, the lateral border seven-spined. The pleuræ of the abdomen are rounded, short, and broad; the second abdominal segment is furnished with a transverse row of about eight spines, the rest of the segments being destitute of spines; the terga of the second to the fourth segments are very smooth behind the central transverse fossæ. The first joint of the antenna is armed with a long spine, the second joint with one on each side. There is a minute spine at the antero-inferior angle of the carapace. The chelipeds are robust, setose, and spiny; merus spiny on upper and inner parts; carpus spiny on all sides; The hand is furnished with two rows of spines on the lower side, another along the middle of the outer face, and three irregular series along the upper side; both the fingers are spinulose. Ambulatory limbs setose, spinose along the superior and inferior edges. In small specimens the lateral spines of the rostrum may be shorter than the eyestalks.

Length, 84 mm.; carapace (including the rostrum), 45.5 mm.; breadth, 26 mm.; length of cheliped, 96 mm.

Station 3384. 458 fathoms. 11 males, 6 females (1 ovig.).

" 3394. 511 " 1 male.

" 3404. 385 " 1 male juv.

This species resembles *M. miles* A. M. Edw., but the carapace of *M. propinqua* is flatter, the cardiac area is more distinctly circumscribed by a furrow,



the abdomen bears spines only on the second segment, and the abdominal segments are not so much sculptured.

*Munida gracilipes*, sp. nov.

Carapace rather flat and quadrangular. Lateral spines of rostrum less than one half the length of the rostrum, shorter than the ocular peduncle. Four spinules on the gastric area arranged in the form of a square, — two behind each lateral rostral spine; a longitudinal row of obsolescent spinules in the median line from base of rostrum to the cardiac area; one spine on the cardiac region, a pair on the intestinal region, and one on each side of the cardiac region just back of the cervical suture. The lateral margins of the carapace are armed with about seven spines, the first of which is the largest. The second abdominal segment is armed with a transverse row of six spines, the third with a row of four, the fourth with a row of four and one median spine behind the transverse row. This is the normal arrangement, but in one specimen out of the four there is an additional pair of spines on the second and third segments back of the transverse row. The pleuræ of the third, fourth, and fifth abdominal segments are acute. Eyes very large, reniform. The chelipeds are very long and slender, the merus spinose (the chief of the spines being on the inner side of the joint); the carpus also is spinose. The hand has about eight spines on the upper margin and one on the lower; there are several acute spines on the outer border of the movable finger, the cutting edges of the fingers are straight, finely denticulated or spinulose.

Length, 24 mm.; breadth, 8 mm.; length of cheliped, 34 mm.

Station 3391. 153 fathoms. 4 specimens.

This species is very near to *M. stimpsoni* A. M. Edw., but the carapace is flatter, less granulated, more quadrangular in outline, with more evident transverse rugæ; the lateral rostral horns are shorter, the eye larger, the transverse ridges on the abdominal somites fewer in number; the lateral spines of the carapace and the abdominal spines are better developed, the cardiac area narrower and bounded by more distinct furrows.

*Munida microphthalma* A. M. Edw.?

Bull. Mus. Comp. Zool., VIII. 51, 1880.

Station 3370. 134 fathoms. 1 female ovig. Length, 20 mm.

Only one specimen of *M. microphthalma* has been returned to this Museum from Paris. It is a very small specimen, without chelipeds. The "Albatross" specimen differs from this one in having the rostral median spine less upturned. The chela, compared with that of *M. microphthalma*, as figured by Henderson (Rep. Challenger Anomura, Plate III. Fig. 4), has no spine on the outer margin of the dactylus, and the row of spines on the outer face of the hand is obsolete.



*M. microphthalmus* was taken by the "Blake" among the West Indies in 573-1030 fathoms, and by the "Challenger" in the same region in 390 fathoms, north of the Kermadec Islands in 600 fathoms, and near Ascension Island in 425 fathoms.

***Galacantha rostrata* A. M. Edw.**

*Galacantha rostrata* A. M. Edw., Bull. Mus. Comp. Zool., VIII. 52, 1880.

*Galacantha bellis* HEND., Ann. Mag. Nat. Hist., 5th Ser., XVI. 418, 1885; Rep. Challenger Anomura, p. 167, Plate XIX. Fig. 6, 1888.

Station 3362.	1175 fathoms.	1 male.
" 3400.	1322 "	3 males, 2 females (1 ovig.).
" 3413.	1360 "	1 female.

The "Albatross" specimens differ from the typical West Indian form in the greater divergence of the lateral spines, the anterior being more nearly parallel with the axis of the body; the abdomen is smoother toward the central part of the segments; the dorsal spine of the fourth abdominal segment is smaller. There is considerable variation among different individuals, and the characters pointed out by Henderson to distinguish *G. bellis* can hardly be deemed of specific value. The color in life is red, paler and yellowish toward the middle of the carapace. *G. rostrata* has been collected in the West Indian seas in from 1098 to 1591 fathoms, and off Juan Fernandez in 1375 fathoms (*G. bellis* Hend.).

***Galacantha diomedææ*, sp. nov.**

Rostrum without lateral spines; distal part turned upward at an angle of less than  $95^{\circ}$  in most specimens, but in some cases the inclination is greater; basal part marginate, the margin running for some distance along the anterior edge of the carapace; a slight keel runs back from the rostrum to the median gastric spine. Gastric spine smaller than in *G. rostrata*; anterior lateral spine much longer than the posterior; there is an additional small spine on the side of the carapace, just behind the cervical suture. Anterior half of the carapace ornamented with setiferous squamous tubercles; on the posterior half of the carapace the tubercles assume the form of interrupted transverse ridges. The median spines of the abdomen are small, diminishing successively in size from the first to the third, which is obsolete in some examples. Upper surface of abdomen rather hairy, the pleuræ tuberclose, angles rounded. The legs are rough with granular setose tubercles. There are two prominent spines at the distal end of the carpus of the chelipeds, and one at the distal end of the carpus and merus of the ambulatory limbs. The antennæ are twice and a half as long as the body.

Dimensions of a female specimen. Length of body, 79 mm.; length of carapace, 39 mm.; breadth of carapace, not including the lateral spines, 25 mm.

This species runs into a well marked variety, in which the anterior lateral spines, as well as the median gastric spine, are very much smaller than in the



typical form. This variety may be called *Galacantha diomedæ parvispina*. At one station (3429) both forms were obtained at the same haul.

This species differs from *G. rostrata*, *areolata*, *spinosa*, and *talismanii* in the rugose nature of the sculpture of the hinder half of the carapace. In the relative proportion of the anterior and posterior lateral spines it agrees with *G. spinosa*.

Station 3357.	782 fathoms.	1 female juv.
" 3363.	978 "	3 males, 3 females ovig.
" 3364.	902 "	1 female.
" 3366.	1067 "	3 males, 1 female ovig.
" 3371.	770 "	5 males, 2 females (1 ovig.).
" 3373.	1877 "	1 male.
" 3393.	1020 "	3 males.
" 3407.	885 "	2 males, 1 female.
" 3429.	919 "	1 male.

Var. *parvispina*.

Station 3418.	660 fathoms.	1 male.
" 3419.	772 "	1 female ovig.
" 3424.	676 "	1 male.
" 3429.	919 "	1 male.
" 3435.	859 "	18 males, 17 females (6 ovig.).
" 3436.	905 "	6 males, 4 females (3 ovig.).

In both *G. rostrata* and *G. diomedæ* there is a curious sexual difference. In the male the proximal half of the telson is furnished on each side with long amber-colored setæ, which are entirely wanting in the female. The same difference between the sexes is found in some species of *Munidopsis*.

*G. diomedæ* is often infested with parasites. One of the males from Station 3371 bears a *Pellogaster*, while seven specimens (5 males, 2 females) of var. *parvispina* house a *Bopyrus* in the left branchial chamber.

The eggs of this species measure  $3 \times 2.5$  mm.

***Munidopsis*<sup>1</sup> *vicina*, sp. nov.**

Near *M. ciliata* Wood-Mason, from which it differs as follows. It is a very much smaller species, the adult ovigerous female being only twenty-nine millimeters long; the anterior margin of the propodus of the ambulatory appendages bears two very prominent spines. The telson lacks the pair of long and narrow plates which lie on each side of the small central plate in *M. ciliata*. As in *M. ciliata*, the carapace is covered with squamous tubercles, the rostrum is curved slightly upward, and the chela is short.

Length, 29 mm.; breadth, 9.5 mm.

Station 3360. 1672 fathoms. 1 female.

" 3382. 1793 " 1 female ovig.

<sup>1</sup> The genus *Munidopsis*, as here understood, includes *Galatodes*, *Orophorrhynchus*, and *Elasmonotus* of A. Milne Edwards, and *Anoplomotus* of Smith.



**Munidopsis agassizii**, sp. nov.

The carapace of this species is moderately convex, with a deep transverse depression across the anterior part of the cardiac area. The rostrum is long, slightly upturned, and armed near the middle with a pair of lateral spines. The gastric area has four pairs of spines, the anterior pair the largest. The cardiac area bears two or three pairs of spines. The lateral margins of the carapace carry from six to eight spines each, and there is a longitudinal series of small spines within the margin on the branchial area. A small spine is situated on the anterior margin between the eye and the antenna. The posterior border of the carapace is ornamented with six (in one specimen seven) spines. There are also several spines on the sides of the carapace below the epimeral suture. There is a very small spine over each eye. The antennæ are shorter than the body, the first joint bears a long external spine, the second joint two lateral spines, the third joint two lateral spines and one superior. The chelipeds are long and slender, the merus and carpus have no long spines, the propodus carries four spines on the upper edge and several rudimentary spinules, the fingers are spinulose, their cutting edges straight and denticulated. The ambulatory appendages have spiny meri and carpi, the longest spines being one at the distal superior border of each of these joints. The second, third, and fourth abdominal segments bear four spines each. The abdominal pleuræ are rounded.

Length, 23 mm.; length of carapace, 12.4 mm.; breadth of carapace, 8 mm.; length of rostrum, 4.5 mm.

Station 3389. 210 fathoms. 1 male, 1 female.

This species bears a general resemblance to *M. erinacea* (A. M. Edw.) and *M. spinifera* (A. M. Edw.). It differs from both these in having a flatter carapace marked by a deeper transverse depression across the cardiac area, in having a larger number of spines on the sides of the carapace, and in the presence of spines on the pterygostomian regions and a small but distinct spine over the eye. It also has strong spines on the superior edge of the hand which are wanting in *M. erinacea* and *M. spinifera*. In the possession of three pairs of gastric spines it agrees with *M. spinifera*, but differs from *M. erinacea*.

**Munidopsis villosa**, sp. nov.

The whole surface of the body and limbs is beset with setæ, which arise from low squamous tubercles and transverse rugæ on the carapace, and from the transverse ridges of the abdominal segments. The rostrum is triangular, the distal half upturned, cylindrical, and pointed, the proximal half naked below and slightly carinated in the median line. A pair of short, stout, blunt spines on the gastric region. One spine at antero-lateral angle of the carapace, one on margin of the hepatic area, and a rudimentary one on the side of the



branchial region. There is a medium spine on the second, third, and fifth abdominal segments, and a rudiment of one on the fourth. The abdominal pleuræ have rounded external angles. The eyes are freely movable and destitute of spines. The second antennal segment is armed with a prominent external spine. The chelipeds are robust, setose, and granulate; the merus has a short superior spine and two lateral spines at the distal end; the carpus is similarly equipped, though on one side the superior spine is obsolescent; the chela is broad and strong, the fingers excavated, denticulated on their cutting edges and at their tips. The merus of the first pair of ambulatory appendages has an external distal spine; the carpus of all the ambulatory limbs has two longitudinal ridges, and that of the first and second pair has a spine on the upper border at the distal end of the joint.

Length, 55 mm.; breadth, 18 mm.; length of carapace, 31 mm.; rostrum, 8 mm.

Station, 3394. 511 fathoms. 1 male.

#### *Munidopsis hystrix*, sp. nov.

Carapace setose and thickly covered with small spiny tubercles; three spines of special prominence on the gastric area disposed in the form of a triangle with apex directed backward; one on the cardiac area; two (rarely six) on the hind margin of the carapace; one on each branchial area. There is a spine at the external angle of the orbit, and the lateral margin of the carapace is spinose. The rostrum is long, lightly curved upward from the base to the tip, and armed with from two to five spines on each side; these spines are unsymmetrically arranged on the two sides. The second, third, and fourth abdominal segments are conspicuously two-ridged; the second segment has a pair of small spines on the anterior ridge, and another pair nearer the median line on the posterior ridge; the third segment also has a pair of spines on the anterior ridge, and in some specimens a third spine in the median line on the posterior ridge. The abdominal pleuræ are truncate. The chelipeds are long, very spiny from the proximal end of the merus to the base of the fingers; the chief spines of the propodus are on the upper margin of the segment; there are two spines near the base of the dactylus. The ambulatory appendages are long, setose, and spinose except the dactylus joint. A spine over the eye. Antennæ shorter than the body; a spine on the outer side of the first segment, one on each side of the second and third segments, and one on the upper side of the third segment.

Length of ovigerous female, 47 mm.; length of carapace, 25 mm.; breadth, 15 mm.; rostrum, 8 mm.

Station 3417. 493 fathoms. 1 male, 2 females ovig.

" 3424. 676 " 4 females (2 ovig.).

" 3425. 680 " 7 males, 5 females (2 ovig.).



*Munidopsis sericea*, sp. nov.

The whole surface of the body and limbs is covered with a silky pubescence. The rostrum is long, curved gently upward, convex above, but not carinated, armed with a prominent spine on each side near the middle, and with three more minute spinules near the base. Gastric region swollen, armed with two conical spines and ten or twelve small spinuloid tubercles. The cardiac region has a prominent transverse ridge near the centre, in front of which is a deep depression separating it from the gastric region; the ridge is armed with a pair of short spinules. There is a small spine on the anterior border between the eye and the antenna, a large one at the antero-external angle, three on the border of each hepatic region (the middle of one of these is the largest), and one small one on the border of each branchial region just behind the cervical suture; there are besides about ten sharp tubercles on each branchial area, and five or six pairs of spinules on the posterior margin of the carapace. Pterygostomian regions granulated. There is a pair of spines on the second, third, and fourth abdominal segments; besides these there are several small spinules on the terga and pleuræ of these segments; the pleuræ are rather narrow, with rounded lateral angles. The chelipeds are wanting in the unique specimen. The ambulatory appendages are spinulose, the spinules of the dactyli restricted to the hind margin. The eye is provided with a very minute spine. The antennæ are rather longer than the body, the basal joint has a short external spine, a longer one at the lower internal angle, and a small one at a higher level on the inner side. The latter spine shows, when the animal is viewed from above, between the eyestalk and the antenna. The subsequent segments of the antenna are armed as usual in this genus.

Length, 39 mm.; length of carapace, 12 mm.; length of rostrum, 8 mm.; breadth of carapace, 12 mm.

Station 3394. 511 fathoms. 1 male.

*Munidopsis margarita*, sp. nov.

In this species the rostrum has a gentle upward curve near the tip; it is carinate above, and minutely spinulous on the margins. The surface of the carapace is rough with squamous tubercles and forward-pointed spines. The gastric and cardiac regions are prominent, and separated from one another by a deep depression; a pair of spines on the gastric, and one spine on the cardiac region, attain a special prominence. A long sharp spine outside the eye forms the outer wall of a well marked orbit. There are eight spines on each lateral margin, six on the posterior (including those at the postero-lateral angles). The branchial areas are iridescent. Second abdominal segment: the anterior transverse ridge, which is broken down in the centre, bears on each side a prominent hooked spine, which is enlarged at the base and denticulated on the outer margin; the posterior ridge is furnished with three hooked spines; the



pleuræ of this segment bear each a broad, flattened, forward-pointing tooth with denticulated edges; when the animal is viewed from above, this tooth appears to form the lateral extremity of the pleura, which really lies below it, and is rounded. Third abdominal segment: both ridges are spiny and denticulate, three spines being specially prominent on each ridge. Fourth abdominal segment: armed with but one small median spinule. The sides of the carapace below the epimeral sutures are covered with spiny tubercles, and display an iridescent lustre. The eye has two spines projecting over the cornea from the inner side; the posterior of these spines is very minute. The antennæ are very slender and about as long as the carapace; the first and second joints are provided with a prominent external spine, the third joint with three spines, viz. one external, one internal, and one superior. The chelipeds are absent in both the specimens. The ambulatory appendages are spinulose on all the segments except the dactyli, which are finely serrate on the hind margin. The legs, and more especially the sternum, are iridescent, like mother of pearl. This iridescence is seen in a less degree in several other species of this genus.

Length, 20 mm.; length of carapace, 11 mm.; breadth, 7 mm.; length of rostrum, 3.5 mm.

Station 3404. 385 fathoms. 1 male, 1 female.

### *Munidopsis crinita*, sp. nov.

The whole surface is clothed with long setæ, which are longest and densest on the chelipeds and ambulatory appendages. The rostrum is very broad at the base and ends in three points, the middle of which is the longest; the rostrum is slightly carinate in the median line. The carapace is roughened by low setiferous ridges. The antero-lateral angles are obliquely truncate; a spine over the antennæ, and four on the lateral margin, the last one just behind the cervical suture, the third one obsolescent; hind margin unarmed. A pair of spines on the gastric region, behind the base of the rostrum. The abdomen is devoid of spines, and there is no spine over the eye. The antennæ are slender, shorter than the body; the basal joint is provided with a long spine on the external side, and another on the internal side; the second joint has an external spine, the third an internal one. Chelipeds: merus five-spined; carpus with one prominent spine; hand unarmed, broadest at base of fingers, cutting edges of fingers toothed. Ambulatory limbs setose, hind border of dactyli spinulose.

Length, 19.5 mm.; carapace, 11.5 mm.; rostrum, 2.6 mm.; breadth of carapace, 7.5 mm.

Station 3384. 458 fathoms. 1 female.

This species resembles *M. rosacea* (A. M. Edw.), *M. latifrons* (A. M. Edw.), and *M. tridens* (A. M. Edw.). From the first (*Comptes Rendus*, XCIII. 934, figured in *Recueil de Figures de Crustacés nouv. ou peu connus*, 1<sup>re</sup> livr.) it differs in having a much shorter rostrum, in the presence of a pair of spines on the gastric region, in the different shape of the hand, the absence of prominent



spines on the meri of the ambulatory legs, and its greater pilosity. From the second (judging from Milne Edwards's short description of that species) it is distinguished by the long setæ, gastric spines, and broader carapace. From the last it differs in being very hairy, etc. *M. rosacea* comes from the north coast of Spain, *M. latifrons* from the Barbadoes, *M. tridens* from St. Kitts.

***Munidopsis ornata*, sp. nov.**

Carapace convex, the whole upper surface, including the rostrum, thickly covered with low squamous tubercles; seen under a magnifying power the surface of each tubercle is seen to be made up of a number of secondary scale-like prominences; the tubercles are not lengthened out transversely to form ridges on any part of the surface; two of the tubercles on the gastric region take on a spiny character. The rostrum is nearly horizontal, triangular in cross-section, the margins serrate; the anterior border of the carapace is convex between the eyes and the antennæ, but has no spine at this point; lateral border four-toothed, one of the teeth lying at the antero-lateral angle, two on the hepatic region, and one on the edge of the branchial region behind the cervical suture; the posterior border is delicately festooned, but not armed with spines. The abdomen is spineless, its surface punctate, anterior half of the pleuræ of the second segment tuberculate, all the pleuræ rounded. The eye has a transverse granulated tubercle running over the cornea from the inner side. The antennæ are very slender, and do not exceed the carapace in length. The chelipeds are moderately robust; the merus tuberculate and armed with a row of short spines along the upper edge; the carpus spino-tuberculate, with two longitudinal furrows on the outer side; the hand almost smooth on the inner side, outer side and superior surface roughened with low tubercles; fingers a little curved upward, spoon-shaped at the denticulate and setose tips. Ambulatory appendages: meri flattened, tuberculate, upper edge produced to a spinose carina; the carpi have three denticulate ridges; propodi scabrous, with an irregular row of spines on under side; the dactyli have black tips, and are finely spinulose on their posterior edges.

Length, 23 mm.; length of carapace, 12 mm.; breadth, 8 mm.; length of rostrum, 3 mm.

Station 3404. 385 fathoms. 1 male.

***Munidopsis scabra*, sp. nov.**

The rostrum is triangular, slightly curved upward, carinated above, the lateral edges and the carina lightly denticulated. The carapace is covered with squamous setiferous tubercles which end in spiny points. There is a transverse row of six more prominent spiny tubercles on the gastric region. The posterior border of the carapace is ornamented with a denticulated rim (about eight denticles). There is a spine between the eye and the antenna



below the anterior margin of the carapace. The abdomen is devoid of spines, the pleuræ have truncated lateral angles. A spine projects over the cornea of the eye. The antennæ are shorter than the body; a spine on the outer side of the basal joint, one on each side of the second joint, and one on each side and one on superior margin of third joint. The chelipeds are long, spinose, except the fingers; hand long, the basal part longer than the fingers. All the joints of the ambulatory appendages are spiny except the dactyli.

Length (ovigerous female), 40 mm.; length of carapace, 13.5 mm.; breadth, 14 mm.; rostrum, 5 mm.

Station 3424. 676 fathoms. 2 males, 1 female ovig.

" 3425. 680 " 1 male, 1 female ovig.

### *Munidopsis tanneri*, sp. nov.

Carapace flat, quadrangular, covered with squamous setiferous tubercles which have a tendency to develop spiny points on the gastric region. This is especially true of a transverse row of six on the anterior part of that region. The rostrum is triangular and horizontal. There is a prominent spine on each side of the anterior margin of the carapace between the eye and the antenna, another at the antero-lateral angle, and two or three on the side of the hepatic area; the hind border of the carapace is denticulated. A small spine over the eye. Antennæ shorter than the body; one spine on the outer side of the first joint, two lateral and one superior on the second and third joints. Cheliped (present in only one specimen) long, slender; merus and carpus many-spined; propodus spiny along the upper and lower margins; tips of fingers enlarged and denticulated. Ambulatory limbs: a prominent row of spines on the upper edge of the merus and carpus, propodus and dactylus devoid of spines. Abdomen without spines; pleuræ narrow, angles rounded.

Length, 41 mm.; length of carapace, 23.5 mm.; breadth, 15.5 mm.; rostrum, 6 mm.

Station 3396. 259 fathoms. 2 males, 1 female (1 male with *Bopyrus*).

" 3397. 85 " 1 male.

This species is nearly related to *M. scabrosa*, but differs from the latter species in having the carapace broader and flatter, with squamous tubercles which are not produced into points except a few on the gastric area. The spine between the eye and the antenna is longer; the propodi of the ambulatory legs are smoother, with no well-developed spines.

### *Munidopsis hamata*, sp. nov.

Body and limbs clothed with short, scattered setæ. Rostrum long, curved slightly upward, basal half furrowed longitudinally, with a row of short spines on each side of the furrow; infero-lateral edges of rostrum also furnished with small spines. Carapace quadrangular, anterior border forming a right angle with lateral border, both borders spinulose; lateral border with an indentation



at anterior boundary of hepatic area; a deep depression back of each hepatic area and another across the anterior part of the cardiac region; the upper surface of the carapace is adorned with spinulose tubercles, and a median longitudinal row of more prominent spines runs along the gastric and cardiac regions; the anterior spine of the cardiac region overhangs the transverse depression, the posterior spine of the row springs from the hinder rim of the carapace. There is a median hooked spine on the tergum of the second, third, fourth, and fifth abdominal segments and many spiny tubercles irregularly disposed on these segments; the pleuræ of the third to the sixth abdominal segments are narrow but blunt, those of the second to the fifth are costate. The ocular peduncle is movable and devoid of a spine. The antennæ are about as long as the body; the basal joint has an inferior and a small external spine; the second joint also bears an external spine. The chelipeds are long and slender; all the joints from the ischium to the propodus are equipped with longitudinal rows of small spines; the chela is not broader than the basal part of the propodus, the fingers are straight, their prehensile edges denticulate. The ambulatory appendages are spinulose.

Length of male, 49 mm.; length of carapace, 25 mm.; breadth of carapace, 14 mm.; length of rostrum, 9 mm.; length of cheliped, 47.5 mm.; merus, 15 mm.; carpus, 5.5 mm.; chela, 19 mm.

Station 3394. 511 fathoms. 13 males, 16 females ovig.

" 3395. 730 " 3 males.

#### *Munidopsis aspera* (HEND.).

*Elasmonotus asper* Hend., Ann. Mag. Nat. Hist., 5th ser., XVI. 416, 1885; Rep. Challenger Anomura, p. 163, Plate XIX. Fig. 4, 1888.

Station 3357. 782 fathoms. 1 female ovig.

" 3358. 555 " 1 male.

" 3370. 134 " 1 female.

" 3402. 421 " 2 males, 5 females (3 ovig.).

" 3403. 384 " 1 male.

" 3406. 551 " 2 males.

This species is subject to considerable variation. In the specimens from Stations 3402, 3403, and 3406 the tubercles of the carapace are more numerous and less spiny than in those secured at the other stations. The ambulatory appendages of all the "Albatross" examples are apparently more spiny than in the types from the "Challenger." The latter came from the Straits of Magellan, 245 fathoms.

#### *Munidopsis quadrata*, sp. nov.

Carapace quadrangular, the anterior and lateral margins forming a right angle; upper surface flat, spineless, but furnished with low squamiform tubercles.



Rostrum curved upward, broad at base, narrowing anteriorly to form a long, sharp acumen. Central part of gastric region prominent above the hepatic region, from which it is separated by a deep pit. A prominent transverse ridge on cardiac region, forming the posterior wall of a deep fossa. Antero-lateral angles rounded. Second segment of abdomen armed with a median spine which is curved forward; third and fourth segments with a very prominent ridge which bears an acute median tooth; pleuræ of second segment faintly tuberculate, the others narrow with the external angles rounded but not truncate. Eye spineless, almost concealed by the base of the rostrum. Antennæ about as long as the carapace; a conspicuous spine on the upper side of the third segment. Cheliped long, tuberculate with the exception of the fingers; chela slender, fingers not gaping. Ambulatory legs tuberculate with the exception of the dactyli, which are furnished with small teeth on the posterior margin.

Length of body, 29 mm.; length of carapace, 15.5 mm.; breadth of carapace, 9 mm.; length of rostrum, 6 mm.; length of cheliped, 30 mm.

There is some variation in the length and upward curvature of the rostrum among the different specimens. A female, from station 3424, differs markedly from the males in having the tubercles on the carapace and appendages much more strongly developed.

Station 3424. 676 fathoms. 2 males, 1 female ovig.

" 3425. 680 " 1 male.

#### **Munidopsis depressa, sp. nov.**

Closely allied to *M. hamata*, but differs as follows. The cephalothorax is more swollen, so that the sides of the carapace are visible below the epimeral sutures when the animal is viewed from above. The median row of spines on the carapace consists of a smaller number of spines (two on the gastric region, one on the cardiac region, and one on the posterior margin). The spinules of the lateral margin of the carapace are less developed. The depression on the carapace involves the gastric region to a greater degree. The anterior margin of the carapace is not so straight, and it is not spinuliferous. The antero-lateral spine is more prominent, the eyes smaller, and the antennæ shorter (shorter than the carapace). There is, moreover, no spine on the fifth abdominal segment.

Length, 32 mm.; carapace, 19 mm.; rostrum, 5 mm.; breadth of carapace, 12.5 mm.

Station 3425. 680 fathoms. 1 male.

#### **Munidopsis carinipes, sp. nov.**

Carapace quadrangular, flat, marked by a median tuberculated ridge on the gastric and cardiac regions; sides converging a little from front backward; the antero-lateral angles form a rounded shoulder. Rostrum broad at base, nearly horizontal, sides converging near tip, which is blunt; upper surface nearly



flat, lightly granulated. The rest of the upper surface of the carapace has a coarser granulation. There is a conspicuous hooked tooth on the third and the fourth abdominal segment, and in some specimens there is a rudimentary one on the second and the fifth segment; the teeth on the third and fourth segments have denticulated margins in adult specimens; abdominal pleuræ long and narrow. Chelipeds very long, lightly tuberculate; chela long, slender, fingers rather short, smooth, with straight denticulated prehensile margins. The meri of the ambulatory legs granulated, superior border produced to a keel, the edge of which is entire; the lower margin of the meri is also entire; the carpi have three tuberculated ridges, one superior, two external; the propodi are lightly tuberculated; dactyli smooth, their hind margin armed with about five teeth. Eye spineless, nearly hidden under the rostrum. Antennæ shorter than the carapace, first, third, and fourth joints armed with an external spine.

Length, 30 mm.; carapace, 16 mm.; breadth, 9.5 mm.; rostrum, 5 mm.; cheliped, 40 mm.; merus, 13 mm.; carpus, 4.5 mm.; propodus, 17 mm.; dactylus, 7 mm.

Station 3353. 695 fathoms. 2 males, 1 female ovig.

Near *M. longimana* (*Elasmonotus longimanus* A. M. Edw.), from which it differs in having the rostrum more nearly plane, the merus of the cheliped much less strongly tuberculated, the meri of the ambulatory limbs more strongly carinated, with lower margin entire instead of denticulate; the spine on antennal peduncle is more prominent, while the tooth on the second segment of the abdomen is absent or at best rudimentary.

Two specimens (male) of *Elasmonotus longimanus* A. M. Edw., and one (female) *E. brevimanus* A. M. Edw., have been returned to Cambridge from Paris. I suspect that these may prove to be the male and female of one species. The chelipeds of the female specimen of *M. cristatipes* are lost.

### *Munidopsis hendersoniana*, sp. nov.

In this species, as in *M. armata* (*Elasmonotus armatus* A. M. Edw.) and *M. marginata* (*Elasmonotus marginatus* Hend.), the lateral margins of the carapace are extended as sharp crests overhanging the sides of the body. The upper surface of the carapace is rather flat, and is clothed with a close short pubescence; the sides are nearly parallel. The rostrum is long, acute, nearly horizontal, the upper surface roof-shaped. There is an acute tooth on the anterior margin of the carapace external to the eyestalk and another at the antero-lateral angle; otherwise the carapace is unarmed. The eyestalks are immovable and prolonged into a long horn one half as long as the rostrum; seen from above, the eyestalks appear like lateral spines of the rostrum. The eye is rudimentary, occupying the basal part of the lower side of the peduncle. The antennæ are shorter than the body, the basal joint armed with a well developed inferior spine. The chelipeds are short robust and tomen-



tose; there is a spine at the distal superior angle of the ischium and another near the distal end of the lower internal edge; five spines along the superior margin of the merus and two inferior distal spines; the carpus bears a superior proximal tooth together with three teeth on the distal margin; the chela is short and stout, the hand without teeth or spines; the fingers are very thick and short, meeting one another only at their spoon-shaped denticulated tips; there is a rounded tubercle at the base of the inner margin of the immovable finger; the outer margin of this finger is denticulated. Ambulatory limbs: five to seven spines on the superior and external inferior margins of the meri (those on the superior margin the largest); upper edge of carpus three- to four-spined; propodi and dactyli unarmed. Abdomen without spines.

Length, 37 mm.; carapace, 20 mm.; rostrum, 6.5 mm.; breadth of carapace, 12 mm.; length of cheliped, 28 mm.

Station 3393. 1020 fathoms. 3 males, 1 female (with *Pellogaster*).

Nearly related to *M. edwardsii* (*Elasmonotus edwardsii* Wood-Mason, Ann. Mag. Nat. Hist., 6th series, VII. 201, 1891) of the Bay of Bengal, but easily distinguished from that species by the lateral margins of the carapace, which in Wood-Mason's species are divided into two lobes, but in *M. hendersoniana* are entire.

### *Munidopsis inermis*, sp. nov.

In this species the whole surface of the body and appendages is naked and free from spines and tubercles. The carapace is rather flat above, with subparallel sides; the gastric region is protuberant and separated from the hepatic and cardiac areas by conspicuous furrows. The surface of the carapace is punctate and lightly granulate and rugose on the branchial regions. The rostrum is triangular, blunt at the apex, bent strongly downward, and slightly carinate above. The antero-lateral angle is rounded, and a rounded lobe projects from the anterior margin above the base of the antenna. The abdomen is smooth, naked, devoid of spines and ridges; the abdominal pleuræ are rounded. Ocular peduncle free, spineless. The peduncle of the antenna is also destitute of spines; the flagellum is wanting in the only specimen obtained. The chelipeds are also missing. The ambulatory appendages are smooth, unarmed; the dactyli long (equal to the propodi in length), slightly curved, acute at the tips. The appendages of the third, fourth, and fifth abdominal segments are simple and rudimentary. The merus of the third maxilliped is short, its antero-internal margin three-toothed; the palpus of this appendage is nearly as long as the merus and ischium combined.

Length, 12 mm.; carapace, 6 mm.; breadth, 4 mm.

Station 3354. 322 fathoms. 1 male.

This species nearly resembles *M. polita* (*Anoplomotus politus* Smith), but the carapace of the former is longer and narrower, the rostrum is curved more strongly downward, and the propodi of the ambulatory limbs are much shorter in proportion to the dactyli.



***Uroptychus nitidus occidentalis*, subsp. nov.**

Differs from the typical *Uroptychus nitidus* (A. M. Edw.)<sup>1</sup> as follows: the branchial regions are more swollen, giving to the posterior half of the carapace a more convex lateral outline; the rostrum is shorter, the chelipeds shorter and more robust, the fingers shorter in proportion to the length of the basal part of the propodus; the branchial regions are more distinctly margined. It approaches in some respects *U. uncifer* (A. M. Edw.), in which the rostrum and chelipeds are still shorter. In some specimens of *occidentalis* there are a few low tubercles on the inner side of the proximal end of the merus and ischium of the chelipeds, — a condition similar to that in *U. australis* Hend. which may be considered a variety of *U. nitidus*. *U. politus* Hend., another closely related form, is distinguished by its short antennal acicle.

Length of body of a female, 29 mm.; length of carapace, 15 mm.; length of rostrum, 4 mm.; breadth of carapace between antero-lateral spines, 5 mm.; breadth across the branchial region, 10 mm.; length of cheliped, 44.5 mm.; merus, 11 mm.; carpus, 12.5 mm.; chela, 17.5 mm.; dactylus, 6 mm.

Station 3384. 458 fathoms. 2 males, 2 females ovig.

***Uroptychus pubescens*, sp. nov.**

Carapace, without including rostrum, broader than long, pubescent; a transverse row of spines across the gastric region from one side of the carapace to the other; lateral border of carapace spinulose; the anterior margin has a deep concavity above the eye, outer angle of the concavity armed with a spine. Rostrum one half as long as the rest of the carapace, bent downward a little, acute, with entire setiferous margins. Eye small, not broader than the eye-stalk, with brown pigment. Abdomen naked, smooth, pleuræ subacute. Antennæ equal in length to the carapace with the rostrum; acicle shorter than the peduncle. Chelipeds long, all the joints as far as the fingers spinulose, the spinules with broad bases; propodus not broader than the carpus; carpus equal in length to the basal portion of the propodus; fingers straight, a slight tooth near the base of the dactylus; the tips of the fingers cross. Meri of ambulatory legs minutely spinulose on the superior margin, distal end of propodus spiniform on the hind margin, whole hind margin of dactylus armed with spines; all the joints of the ambulatory limbs are furnished with long setæ.

Length (female), 44 mm.; breadth, 17.5 mm.; length of carapace, 21 mm.; length of rostrum, 7.5 mm.; length of cheliped, 57 mm.; merus, 12 mm.; carpus, 15 mm.; chela, 24 mm.; dactylus, 9.3 mm.

Station 3354. 322 fathoms. 2 females ovig.

“ 3355. 182 “ 1 female ovig.

This species is more nearly related to *U. insignis* Hend. than to any other described species.

<sup>1</sup> Bull. Mus. Comp. Zool., VIII. 62, 1880.



**Uroptychus bellus, sp. nov.**

Carapace broad, branchial regions inflated, upper surface naked, smooth, and polished; the branchio-cardiac lines meet in the median line of the carapace; the anterior margin has a concavity above the eye, forming an orbit with a spinule at its external angle. There is one spine at the antero-lateral angle, one on the margin of the hepatic area, and eight on the margin of the branchial region; the branchial spines decrease in size posteriorly. The rostrum is long, tapering, acute at the apex, and concave at the base above. The abdomen is smooth, the pleuræ subacute. The eyestalks are short and stout, the eye not wider than the peduncle, black. The antennæ are very slender, shorter than the carapace, the acicle considerably shorter than the peduncle. Chelipeds very long, naked except for a few setæ on the fingers, polished; the ischium bears a spine on the superior margin and several others on the lower side; the merus and carpus are armed with spines arranged in longitudinal rows; there is a row of spines on the upper margin of the propodus (the row is double at the proximal end), another series on the outer face reaching from the proximal end about half-way to the distal end, and another still shorter row of more rudimentary spines just outside the latter series; the fingers are separated by a gap; their prehensile edges are denticulate, with one or more prominent teeth near the base of the dactylus. Ambulatory appendages: meri and carpi of the first and second pairs spinulose along the upper edge, these joints being spineless on the third pair. All of the ambulatory appendages are subchelate, the distal end of the propodus being enlarged and furnished with spines against which the spined dactylus closes.

Length (male), 17 mm.; carapace, 10.5 mm.; rostrum, 4.5 mm.; breadth of carapace, 7.7 mm.; cheliped, 31 mm.; merus, 7 mm.; carpus, 9 mm.; chela, 14 mm.; dactylus, 5 mm.

Station 3354. 322 fathoms. 1 female ovig.

" 3355. 182 " 1 male.

**Family AXIIDÆ.****Axius crista-galli, sp. nov.**

Near *Axius acutifrons* (*Eiconaxius acutifrons* Bate), but differs in the following regards. The margin of the rostrum is armed with prominent teeth. The median carina of the rostrum, entire or at most but slightly serrate in the former species, is here cut into about seven prominent teeth. The larger claw differs from the corresponding organ in *A. acutifrons* in lacking the serration on the superior margin of the propodus, in the presence of a strong tubercle on the anterior border of the hand between the bases of the fingers, and in the absence of prominent teeth on the prehensile edges of the fingers.

Length, 24.5 mm.; length of carapace, 10 mm.

Station 3359. 465 fathoms. 3 males, 1 female.

The female carries eighteen eggs of large size ( $2 \times 1.5$  mm.).



## Family CALOCARIDÆ

## CALASTACUS, gen. nov.

Abdomen long, enlarged in the middle, narrowed at each extremity, pleuræ broad and rounded. Cephalothorax laterally compressed, rostrum long, acute; eyes rudimentary, subglobose, unpigmented, unfaceted. Second antenna on a horizontal line with the first antenna; the second segment armed with a long external spine (stylocerite) and a still longer articulated style-shaped scale (scaphocerite). Third maxilliped pediform. First and second pairs of legs chelate. First abdominal appendages of male modified to serve as sexual organs (gonopods). Outer branch of swimmerets divided near the posterior margin by a diagonal suture. Telson long, quadrangular. Gills composed of a central stem which bears two rows of filaments. Branchial formula:

Somite	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	
Epipods . . . .	1	1	1	1	1	1	0	= 6
Podobranchiæ . .	0	1	1	1	1	0	0	= 4
Arthrobranchiæ .	0	2	2	2	2	2	0	= 10
Pleurobranchiæ .	0	0	0	0	0	0	0	= 0

Differs from *Calocaris* in having a long styloid scaphocerite appended to the peduncle of the external antennæ.

*Calastacus stilirostris*, sp. nov.

Carapace naked, punctate; apex of rostrum turned a little upward; two strong spines turned upward and forward at base of rostrum; a light median carina runs along the back from the base of the rostrum, fading out before reaching the hind border of the carapace. Chelipeds long, symmetrical on the two sides; coxa furnished with a small spine on the anterior border of the distal end; ischium armed with from one to four spines on the lower margin; merus laterally compressed, armed with a spine on the upper edge near the distal end and a variable number (four to eight) of spines on the lower edge. Carpus triangular, unarmed. Chela: upper and lower margins sharp, the upper armed with five to seven spines, inner and outer faces with a few scattered spinules; fingers with denticulate prehensile edges and curved crossed extremities. Second pair of legs furnished with small chelæ.

Length of carapace, 22.2 mm.; rostrum, 5.5 mm.; abdomen, 30 mm.; cheliped, 39 mm.; chela, 17 mm.

Station 3418. 660 fathoms. 9 males.



### Family ASTACIDÆ.

#### *Nephropsis occidentalis*, sp. nov.

Pubescent. Carapace cylindrical, the branchial regions convex. Rostrum densely ciliated on the margins, armed with a pair of lateral teeth near the middle; a double row of prominent granulations on the dorsal surface, diverging posteriorly and continued backward for some distance on the gastric region. A small, blunt papilla in the median line of the gastric area, a pair of acute teeth near the anterior margin at the base of the rostrum, and another pair just above the insertion of the second pair of antennæ; a small papilla in the median line on the intestinal region. Abdominal pleuræ rather longer-pointed than in *N. stewarti*, but not so much so as in *N. agassizii* and *N. atlantica*; their anterior borders are finely denticulated, but are destitute of spinous processes. Telson armed with a sharp spine in the median dorsal line, near the proximal end.

Length, 119 mm.; carapace, 51 mm.; rostrum, 14 mm.; second antenna, 225 mm.

Station 3418. 660 fathoms. 23 males, 32 females.

" 3424. 676 " 2 males.

### Family ERYONTIDÆ.

#### *Willemoesia inornata*, sp. nov.

Similar to *W. leptodactyla*, but readily distinguished from it by the small number of spines on the margin and dorsal ridges of the carapace. The armature may be formulated thus:—

Marginal . . . . .	5 to 8 — 2 to 3 — 0 to 6
Median ridge . . . . .	1 to 5 — 0

The marginal spines which lie behind the cervical groove, if found at all, are but rudimentary, while there are no spines on the submarginal carina or along the lateral boundaries of the cardiac area, where they are present in *W. leptodactyla*. The third maxilliped bears only a slender epipod; the membrane that connects this limb with the body carries a small, but perfectly formed gill (arthrobranchia). According to Spence Bate, this gill is absent in *W. leptodactyla*.

Station 3374. 1823 fathoms. 8 males, 6 females.

" 3381. 1772 " 1 male, 1 female ovig.

" 3382. 1793 " 2 males, 4 females (1 ovig.).

" 3399. 1740 " 2 males, 1 female.

" 3400. 1322 " 1 female.



*Polycheles*<sup>1</sup> *tanneri*, sp. nov.

Orbital sinus rounded at the bottom, outer margin spinulose. Median carina of carapace furnished with two anterior rostral spines, followed by five (or six) spines in front of the cervical groove, the fourth (or fifth) of which is double. The arrangement of these spines may be thus formulated: 2. 1. 1. 1. 1. 2. 1 (or, 2. 1. 1. 1. 2. 1). Back of the cervical groove the spines of the median carina are 2. 2. 2. Marginal spines of carapace arranged as follows: 5—3—13 or 14). A longitudinal row of four small spinules on the anterior division of the carapace midway between the median and marginal rows, and a row of twelve or fifteen on the branchial regions inside the margin of the carapace. There are, besides, two or three spines on each side of the hind margin of the carapace, and a few along the cervical groove.

Resembles *P. nanus* (Smith), but differs in the number of spines on the median and sublateral carinæ of the carapace, in the existence of a spine on the antero-external angle of the first and second abdominal pleuræ, and in the greater number of spines on the merus, carpus, and propodus of the chelipeds. *P. nanus*, moreover, is described as having the posterior pair of thoracic appendages chelate in the male, while in the males of *P. tanneri* that I have examined these appendages are simple. Compared with the types of *P. agassizii* (A. M. Edw.), the carapace of the present species is broader and fewer-spined on the margins; the first and second abdominal pleuræ are armed with an anterior lateral spine; the rostral spine is double; and the orbital sinus is broad and rounded at the bottom. *P. agassizii*, like *P. tanneri*, has non-chelate posterior legs in the male.

Station 3354.	322 fathoms.	1 male.
" 3402.	421 "	2 males, 1 female.
" 3403.	384 "	12 males, 14 females.
" 3409.	327 "	1 female.

*Polycheles sculptus pacificus*, subsp. nov.

Differs from the Atlantic *P. sculptus* Smith as follows. The carapace is broader in proportion to the breadth of the abdomen, the lateral margins converging strongly at the posterior end, where, in *P. sculptus*, they continue nearly parallel to one another; there is a small spine on each branchial region inside of and on a level with the second spine of the submarginal carina, which spine is entirely wanting in *P. sculptus*; the spine on the anterior border of the ophthalmic lobe is larger and blunter; the pleuræ of the second abdominal somite have a different shape, their anterior margins being in line with the anterior margin of the tergum, whereas in *P. sculptus* they form a strong obtuse angle with that margin.

<sup>1</sup> The genus *Polycheles*, as here defined, comprehends *Polycheles*, *Pentacheles*, and *Stereomastis* of Bate.



These differences, although slight, are constant, and should be recognized in our nomenclature, if any significance is attached to geographical variation.

The last thoracic appendages are chelate in the adult female, while they are but imperfectly so in breeding males; that is, in the male the "thumb" is very much shorter than the index.

Station 3353.	695 fathoms.	1 male.
" 3392.	1270 "	1 female.
" 3393.	1020 "	3 males, 3 females.
" 3394.	511 "	12 males, 20 females.
" 3418.	660 "	1 male, 1 female.
" 3419.	772 "	1 female.
" 3424.	676 "	1 female ovig.

### *Polycheles granulatus*, sp. nov.

Carapace long oval, broadest across the anterior branchial region; dorsal surface granulated, but nearly devoid of spines; there are two small rostral spines, and back of these, on the low granulated median carina, lies another pair followed by one or two spinules on the gastric area. The submarginal ridge is incurved and composed of minute spinulose granules. Orbital notch narrow, armed with a spine at its internal angle and with another at its external angle. Marginal spines thus disposed: 9 (or 10) — 3 — 15. The anterior abdominal pleuræ are rounded, gradually becoming acute as one passes backward to the sixth. The posterior thoracic legs in the sole specimen seen (a female) end in a small but perfect chela.

Length, 99.5 mm.; length of carapace, 45 mm.; greatest width of carapace, 37 mm.; length of cheliped, 118 mm.; ischium, 19 mm.; merus, 33 mm.; carpus, 22 mm.; basal part of propodus, 14.5 mm.; dactylus, 22 mm.

Station 3380. 899 fathoms. 1 female.

### *Eryonicus cæcus* BATE?

Station 3375.	1201 fathoms.	1 male, 62.5 mm. long.
" 3377.	764 "	1 female, 40 mm. long.
" 3383.	1832 "	1 juv., 37 mm. long.
" 3388.	Surface to 400 fathoms, submarine tow-net.	4 juv., 19-29 mm. long.

Bate's description of *E. cæcus* was drawn up from a single immature specimen, 13 mm. long, in which the first abdominal appendages were undeveloped. The largest of the "Albatross" specimens is a sexually mature male with well developed gonopods. It differs from Bate's specimen in having much shorter spines upon the carapace and abdomen; the spines of the lowest series on the branchial region decrease in length posteriorly, while in the type specimen the posterior spines in this row are the longest. Whether these discrepancies are



due to difference in age, or whether they denote specific diversity, cannot be determined until more mature specimens are obtained from the Atlantic. In the smallest of the "Albatross" specimens (which have attained a length of 19 mm.) the spines, especially those of the abdomen, are relatively longer than in the adult, though not so long as in the type described by Bate.

As regards the ophthalmic sinuses and lobes, the genus *Eryonicus* is like *Polycheles* (*Pentacheles*).

### *Eryonicus spinulosus*, sp. nov.

In this species the spines of the carapace, instead of being wellnigh limited to nine longitudinal ridges, as in *E. cæcus*, are thickly strewn over the whole surface. The intervals between the spines give rise to slender hair-like setæ. This is the arrangement of the spines of the median carina of the carapace :

2. 1. 1. 1. 2. 1. 1. — 2. 2. 1. 2.

The sublateral carina bears fourteen small spines, the lateral,

5 — 2 — 13 or 14.

The uppermost of the two carinæ below the lateral is denticulated anteriorly and armed with a spine at the front end behind the second antenna. The lowest ridge carries twelve spines, which increase slightly in length posteriorly. The rostral spines are very small, but on each side of the rostrum the front margin of the carapace is produced so as to form a pair of horns over the base of the first pair of antennæ. The abdomen is ornamented with seven longitudinal rows of spines, one dorsal and median, the others paired and lateral. The lowest of the lateral rows is on the upper part of the pleuræ.

Length, 37 mm.; carapace, 21 × 17 mm.; abdomen, 17 mm.

Station 3403. 384 fathoms. 1 specimen.

## Family GNATHOPHYLLIDÆ.

### *Gnathophyllum panamense*, sp. nov.

Closely related to *G. elegans* of the Mediterranean Sea, but distinguished by a prominent conical protuberance, pigmented with black, on the upper part of the cornea. In *G. elegans* this tubercle is wanting or reduced to the merest vestige, discernible only by aid of a lens. The rostrum of *G. panamense* is furnished with seven teeth above, and one below. Color entirely different from that of *G. elegans*. The ground tint is dark brown, ornamented with a multitude of light blue spots, amongst which are sixteen red spots. Rostrum, eyes, and antennæ whitish, flagellum of second antenna orange. The fifth and sixth abdominal segments, the telson, and the swimmerets are also white. Basal joints of second pair of chelipeds violet, the merus, carpus, and fingers whitish, basal part of propodus orange. Third, fourth, and fifth pairs of legs violet.

Panama, March 12. 1 female ovig.

*G. fasciolatum* Stimps., from Australia and Amboyna, agrees closely in



form with *G. elegans*, but differs wholly in the pattern of its color marks from both *G. elegans* and *G. panamense*. *G. zebra* Richters, from Mauritius, is without much doubt the same as *G. fasciolatum*. Ortmann has lately recorded a *Gnathophyllum* from Tabiti as a new species, *G. pallidum*. It differs from *G. fasciolatum* only in the absence of color marks, — a difference due possibly to the action of alcohol.

## Family CRANGONIDÆ.

### *Sclerocrangon atrox*, sp. nov.

Of the described species of *Sclerocrangon*, *S. ferox* G. O. Sars comes nearest to this species. These are some of the chief points of difference. In *S. ferox* the upturned rostrum is simple, while in *S. atrox* a long acute tooth is given off from its ventral side, a tooth which reaches as far forward as the tip of the rostrum. In the former species the dorsal carinæ of the sixth abdominal segment bear two pairs of well developed spines, while in the latter species one finds but one pair of very small spines at the posterior end of the carinæ. The pleural spines of the abdomen are much longer in the former than in the latter, and on the fifth somite there are four to five spines on each pleura against two in *S. atrox*. The eyes are much smaller in *S. ferox*, and lack the spine above the cornea seen in *S. atrox*.

Length of the largest specimen (a female), 162 mm.

Station 3418. 660 fathoms. 3 males, 2 females (1 ovig.).

“ 3424. 676 “ 4 females.

### *Sclerocrangon procax*, sp. nov.

Nearly related to *S. agassizii* Smith, from the Atlantic side of the continent. The rostrum of *S. procax* is longer than in *S. agassizii*, and inclined upward at a much sharper angle; the same is true of the antero-lateral spines of the carapace. The most conspicuous difference is found in the anterior spine of the median carina of the carapace, which is much longer and nearly erect in *S. procax*. The two flagella of the first antenna in the male, *S. procax*, are subequal, while in the male *S. agassizii* the outer flagellum is much longer than the inner; the scale of the second antenna, moreover, is narrower in the former species than in the latter, and the terminal segment of the inner branch of the second abdominal appendage in the male bears on its inner margin a short blunt stylamblys, which is wanting in *S. agassizii*. In neither of these species is this segment produced into a lobe at the base of its outer margin, as it is in the more typical species of *Sclerocrangon*, e. g. *S. ferox* and *S. atrox*.

Length, 49 mm.

Station 3380. 899 fathoms. 1 male juv.

“ 3418. 660 “ 2 males, 3 females.

“ 3435. 859 “ 2 females ovig.

“ 3436. 905 “ 1 female.



*Pontophilus occidentalis*, sp. nov.

Allied to *P. abyssi* Smith and *P. batei*.<sup>1</sup> From the former it differs in having a shorter rostrum, larger eyes, and more strongly developed carinæ on the carapace. From the latter it also differs in its shorter rostrum armed with two pairs of lateral teeth; in the presence of a sharp spine on the sternum between the second pair of legs; in the length of the antennal scale, which in *P. occidentalis* is equal to the distance from the tip of the rostrum to the cardiac spine; in the shortness of the second pair of legs, which reach only half way to the distal end of the merus of the first pair; and in the absence of the spine on the outer margin of the merus of the first pair of legs.

The eyes are as large as in *P. gracilis* Smith (much exceeding the rostrum), but they are nearly colorless, and unfaceted, as in *P. abyssi* and *P. batei*.

Length, 73 mm.; carapace, 21 mm.

Station 3361. 1471 fathoms. 2 specimens.

"	3363.	978	"	2	"
"	3366.	1067	"	1	"
"	3381.	1772	"	4	"
"	3382.	1793	"	5	"
"	3392.	1270	"	1	"
"	3398.	1573	"	2	"
"	3413.	1360	"	4	"
"	3414.	2232	"	1	"
"	3415.	1772	"	2	"

*Paracrangon areolata*, sp. nov.

Rostrum long, acute, upturned, inferior margin armed with two spines. A prominent carina extends the length of the carapace in the median dorsal line; it is armed with four spines, three on the gastric, one (obsolescent) on the cardiac region. Orbit incomplete, bounded externally by a slender spine. Just below the base of the second antenna the antero-lateral angle of the carapace is drawn out into another rather stronger spine. Just behind this, and from a little higher level, a strong, sharp horn is directed outward and forward; this horn is in continuity with a rounded ridge which runs inward to the external orbital spine. A longitudinal carina on each side of the gastric region, armed with a small spine a little way behind the middle; from this spine another ridge runs upward and inward, meeting the median carina at the base of the third spine. The branchial regions are traversed by a series of ridges which

<sup>1</sup> *Pontophilus gracilis* Bate, Rep. Challenger Macrura, p. 487, 1888. This name having been previously employed for another species by Smith (Bull. Mus. Comp. Zool., X. 36, 1882), I have substituted the name *Pontophilus batei* for *P. gracilis* of Bate.



anastomose in such a way as to divide these regions into cells of different sizes; they are armed with three small spines, the anterior of which is the spina hepatica.

The thoracic sterna are armed with two median spines, one of which is situated on the somite which normally bears the second pair of legs (absent in this genus), the other on the somite behind this. Abdominal pleuræ acute.

Chelipeds of moderate length, with a spine on each side of the distal end of the carpus, and another long and acute one at the antero-internal angle of the propodus.

Length, 85 mm.

Station 3424. 676 fathoms. 2 males, 3 females (1 ovig.).

" 3425. 680 " 1 male.

## Family GLYPHOCRANGONIDÆ.

### *Glyphocrangon alata*, sp. nov.

Rostrum armed with a pair of lateral spines on a level with the anterior end of the eye; posterior to this pair of spines follows a variable number of smaller marginal spines (three to five on each side). The anterior half of the rostrum is unarmed, although ciliated on the margin. A light spinulose carina runs along the median line of the rostrum from the base to the anterior third (in some specimens this carina is obsolete). On each side of the median line there are, on the basal part of the rostrum, four or five small spinules.

Carapace and abdomen thickly tuberculated. On the antero-lateral regions of the carapace, and on the abdominal pleuræ, the tubercles assume a spiny character. For the rest, the tubercles are mostly compressed, their tops truncate and more or less eroded. It is further to be noted that these tubercles are arranged in longitudinal rows, and that six of these rows on each side of the carapace form, by their prominence, imperfect carinæ, corresponding in position to those commonly found in species of this genus. Between the external orbital spine and the spine at the antero-lateral angle of the carapace lies a strong spinous tooth, acute at the end and vertically compressed, its base broadening out in such a fashion that the whole tooth forms an acute, wing-like expansion. This is, in fact, the greatly developed anterior part of the fourth carina (counting from the median dorsal line). Behind it the carina continues as a low toothed ridge. A median interrupted dorsal carina runs along the abdomen, broken up into two teeth on the base of the telson.

Length, 116 mm.

Station ? 12+ specimens.

" 3395. 730 fathoms. 1 "

" 3418. 660 " 2 "



*Glyphocrangon spinulosa*, sp. nov.

Rostrum long, acute, margins armed with vertically flattened spinous teeth from base to the level of the anterior extremity of the eyes, beyond which point the margins are unarmed; the anterior pair of the lateral spines are the largest. A median longitudinal row of smaller spines extends from the anterior boundary of the gastric area to the anterior fourth of the rostrum; anteriorly, these spines are confluent at their bases, forming a carina which is continued forward beyond the spines to the tip of the rostrum. Just inside the marginal spines is an irregular longitudinal row of very small spinules on each side of the rostrum.

The carapace is thickly covered with spinules which are laterally compressed. Along six longitudinal lines on each side of the carapace the spines are larger, more flattened, forming interrupted carinæ. The third carina (reckoning from the dorsal line) ends anteriorly at the deep branchio-hepatic sulcus. The fourth carina is especially prominent on the hepatic region, where it is broken up into two or three prominent teeth. The two lowermost carinæ are obsolescent. The anterior margin of the carapace is produced into a large external orbital spine, directed obliquely upward and outward. The hind margin of this spine is furnished with a variable number of spinules.

The abdomen, like the carapace, is spinulose on the dorsum and pleuræ. An interrupted carina extends the length of the median dorsal line. On the sixth segment this carina is toothed along its edge. The second to the fourth abdominal pleuræ are armed with two spines curved outward and backward, the anterior one being the larger. The fifth pleura is likewise armed with two spines, but in this case the posterior spine is the larger. The sixth pleura ends posteriorly in a single spine directed outward at a greater angle than those of the more anterior somites. The median dorsal abdominal carina is continued along the basal part of the telson as a line of four or five teeth, which decrease in size from before backward.

Length, 105 mm.

Station 3353. 695 fathoms. 11 specimens.

"	3418.	660	"	91	"
"	3419.	772	"	1	"
"	3424.	676	"	19	"
"	3425.	680	"	1	"
"	3435.	859	"	2	"

*Glyphocrangon sicarius*, sp. nov.

Rostrum as long as the rest of the carapace, armed with a pair of short, blunt, lateral teeth, a little in advance of the front of the eyes, and with another pair of obsolescent ones at the root. Between these two pairs of teeth the margins of the rostrum are concave and slightly raised. From the anterior



teeth the rostrum tapers regularly to the point. The upper surface is plane and smooth. A slight median carina, most obvious near the tip, runs through the whole length of the rostrum from the anterior end of the gastric area to the tip; the lateral margins are slightly rimmed. The lower surface of the rostrum is longitudinally grooved, and wholly devoid of a median keel.

Orbital spine rather short and thick, directed a little outward and upward. The spine at the antero-external angle of the carapace is also short and thick, slightly exceeding in length the orbital spine. From its base a low keel extends backward over the hepatic area, — a keel unarmed with spines, but broken into two tubercles, the hinder of which is the more prominent. In the small triangular area between this keel and the gastro-hepatic sulcus are several tubercles disposed for the most part in a single row. The gastric region is free from tubercles in the median line save one minute one at the anterior boundary near the base of the rostrum; but on either side, this region is ornamented with tubercles; these are not spiny, nor do they tend to form very well marked carinæ. On the branchial regions there are three carinæ on each side; the uppermost of these is broken up into five or six tubercles; the top of these tubercles, as well as those of the other carinæ on the branchial and hepatic areas, exhibit a corroded surface, and a similar appearance is manifest on the whole lower surface of the carapace where it is bent beneath the thorax. The abdomen is irregularly bestrewn with low tubercles. The telson is straight and much shorter than the rostrum; it is furnished with a small, laterally compressed tooth in the median dorsal line at base; both the dorsal carinæ and the lateral margins are obsoletely dentate along their basal half.

Length, 124 mm.; length of rostrum from tip to anterior gastric groove, 30.5 mm.; length of carapace, including rostrum, 58 mm.

Station 3382. 1793 fathoms. 2 specimens.

### Family PANDALIDÆ.

#### *Heterocarpus vicarius*, sp. nov.

This is the Western representative of *H. gibbosus* Bate, from the Philippine Islands. It differs from that species as follows. The carapace is very much longer both in proportion to its height and to the length of the rostrum, and its dorsal margin is not so convex. The teeth on the upper edge of the rostrum are more numerous and closely set. The lateral carinæ of the carapace are more prominent. The third abdominal somite forms a sharper angle or knee. Finally, the antennular flagella are longer and subequal in length.

Length, 110 mm.; rostrum, 26 mm.; carapace, including rostrum, 55 mm.

Station 3385. 286 fathoms. 49 specimens.

"	3386.	242	"	91	"
"	3389.	210	"	7	"
"	3396.	259	"	68	"



**Heterocarpus hostilis, sp. nov.**

Similar to *H. alphonsi* Bate, from off the Philippine Islands and Japan, but readily distinguished from that species by the stronger upward curve of the rostrum, by the presence of but one tooth in the median dorsal line of the carapace back of the base of the rostrum, and by the *two* spines on the third abdominal segment.

Length, 197 mm.; rostrum, 70 mm.; carapace, including rostrum, 108 mm.

Station 3353. 695 fathoms. 22 specimens.

"	3363.	978	"	24	"
"	3364.	902	"	3	"
"	3371.	770	"	20+	"
"	3380.	899	"	6	"
"	3393.	1020	"	8	"
"	3395.	730	"	2	"

**Heterocarpus affinis, sp. nov.**

Very similar to *H. hostilis*, from which it differs in the following particulars. The rostrum is much shorter; measured from the tip to the posterior limit of the orbit, it about equals the rest of the carapace in length. There are fewer teeth on its dorsal margin (five or six); the number of teeth on its lower margin varies from six to ten. The median dorsal line of the carapace is more convex, and it is armed, back of the base of the rostrum, with two acute teeth, where there is but one tooth in *H. hostilis*.

It bears a resemblance, further, to *H. dorsalis* Bate, collected by the "Challenger" in the Banda Sea, but it may be at once distinguished from the Oriental species by its shorter rostrum and the presence of two median teeth on the third abdominal segment.

*H. affinis* and *H. hostilis* belong to different geographical areas. *H. affinis* is the more northern form, found off Acapulco and Cape Corrientes, while *H. hostilis* was obtained in the Gulf of Panama.

Station 3418. 660 fathoms. 13 specimens.

"	3424.	676	"	5	"
"	3425.	680	"	9	"

**Family NEMATOCARCINIDÆ.****Nematocarcinus agassizii, sp. nov.**

The rostrum is one fifth longer than the rest of the carapace (in some small specimens only equal to the rest of the carapace), slender, nearly horizontal for the basal two fifths of its length, the remaining portion gently upturned and ending in a very acute point; its upper margin is continued backward in the



form of a carina, which becomes obsolete on the hinder part of the gastric region; this carina is pectinate, or armed with close-set, forward-pointing teeth on the anterior part of the gastric region; the teeth are continued on the upper margin of the rostrum through one third or two fifths of its length, the distal third or three fifths of the rostrum being entirely free from teeth above; the lower edge of the rostrum is ciliated above the eyes and armed with three (rarely four) teeth, separated by wide intervals, on the distal half.

The third abdominal segment is somewhat prolonged posteriorly over the next segment, but the hind margin is rounded off and does not form a prominent tooth. The telson is tipped with three pairs of spines, the intermediate pair the longest; there are, besides, about six pairs of small spines on the dorsal side of the telson.

The flagella of both the antennules and antennæ are prodigiously developed, the antennule being nearly twice, the antenna more than twice, the length of the whole body including the rostrum; excepting the proximal part of the organ, the annuli of the antennary flagellum are enlarged at the distal end, giving a beaded appearance to the flagellum. The antennal scale reaches rather more than half-way to the end of the rostrum; it is truncate at the distal end and armed externally with an apical spine.

The legs have the characteristic shape and proportions of the genus. The dactyli of the third and fourth pair are slender, acute, somewhat curved, and invested by a pencil of long hairs. The dactyli of the fifth pair are stouter but very short, and hidden in the tuft of hairs which arises from the distal end of the propodus.

The outer blade of the swimmeret slightly surpasses the telson. It is fringed with long hairs along the internal and distal margin, and furnished with a minute tooth and a movably articulated spine on the external border near the distal end. The inner blade is a trifle shorter than the telson; it is also fringed along its whole margin with long hairs.

Dimensions of a female specimen. Length of body, rostrum included, 139 mm.; length of rostrum, 35 mm.; length of carapace, rostrum included, 61 mm.; length of telson, 20 mm.; length of antennule, 267 mm.; length of antenna, 315 mm.; length of antennal scale, 19 mm.

This species, like all the *Nematocarcini*, is very fragile. The long and slender rostrum is often broken off during life, and the attempt to restore it sometimes results in an abnormally small and otherwise monstrous rostrum, which might easily be mistaken for a specific character if ample material were not at hand.

Station 3353.	695 fathoms.	2 specimens.
" 3354.	322 "	4 "
" 3358.	555 "	90 "
" 3359.	465 "	2 "
" 3364.	902 "	4 "
" 3370.	134 "	8 "
" 3380.	899 "	7 "
" 3384.	458 "	1 "



Station 3393.	1020 fathoms.	8 specimens.		
" 3395.	730 "	3 "		
" 3406.	551 "	1 "		
" 3407.	885 "	14 "	(1 bopyrized).	
" 3418.	660 "	4 "		
" ?	?	24 "		

### Family MIERSIIDÆ.

#### *Acanthephyra cristata*, sp. nov.

Differs from *A. debilis* A. M. Edw. (= *A. gracilis* Smith) in having a much shorter and fewer-spined rostrum, two pairs of longitudinal lateral carinæ on the carapace, a dorsal carina on the fourth abdominal segment, and by the absence of a series of denticles on the posterior margin of the dorsum of the fourth and fifth abdominal segments.

From *A. lanceolata* (*Systellaspis lanceolata* Bate) it also differs by having the rostrum shorter, the lateral and dorsal carinæ of the carapace more prominent, and by the absence of a prominent tooth on the anterior margin of the first abdominal segment.

This species, like *A. debilis* and *A. lanceolata*, has no carina on the dorsal surface of the fifth and sixth abdominal segments.

Length, 78 mm.; rostrum, 13 mm.; carapace, including rostrum, 27.5 mm.

Station 3361. 1471 fathoms. 1 specimen.

" 3381. 1772 " 1 "

#### *Acanthephyra cucullata*, sp. nov.

The integument is soft, membranaceous, and transparent in alcohol. The carapace is carinated in the median dorsal line anteriorly; this carina is furnished with seven minute teeth, and is continued forward to a very small acicular rostrum, which hardly reaches forward to the end of the eyes; the infero-lateral margins of the orbit are continued downward for some distance nearly parallel with one another in a nearly vertical direction, and then suddenly diverge and trend backward, forming the upper wall of the orbit; a sort of hood is thus formed of the anterior part of the carapace, overhanging the facial region. The infra-orbital angle is rounded, not spiniferous. The antennal spine is acute, and advanced forward of the infra-orbital angle. The branchiostegian spine is small and continuous with a longitudinal carina that runs along the branchial region of the carapace. A low fold or ridge marks the upper boundary of the branchial region.

The abdomen is carinated in the median dorsal line on the second to the sixth segment inclusive; the carina is most prominent on the third segment,



where it is produced into a strong posterior tooth which overhangs the anterior part of the fourth segment; the three following segments are furnished with minute posterior teeth. The posterior half of the telson in the unique specimen at hand is missing; there is one pair of minute marginal spines at the hind end of the remaining proximal half. The eyes and eyestalks are well developed, the stalks broadening toward the distal end, and projecting a slender blunt process on the inner side close to the cornea; the eye itself is as broad as the distal end of the peduncle.

The basal segment of the antenna is armed with an acute external spine; the antennal scale is long, gradually narrowing distally to the apex, which is furnished with a small spine.

The thoracic appendages have the form characteristic of the genus *Acanthephyra*, and appear to offer no important specific characters.

Length, 87 mm.; carapace, 27 mm.; antennal scale, 16 mm.

Station 3381. 1772 fathoms. 1 male.

### *Notostomus fragilis*, sp. nov.

Dorsal line of carapace convex and keeled from anterior to posterior margin, anteriorly produced into a short, acute rostrum, which does not exceed the eyestalks in length; the dorsal carina is armed with seven or eight minute teeth on the anterior gastric region and the basal portion of the rostrum; lower margin of rostrum unarmed. A longitudinal carina on each side of the carapace begins near the orbit, above the infra-orbital spine, and runs back to the posterior margin; another carina runs obliquely downward and backward, dividing the branchial from the hepatic regions. The inferior lateral carina is obsolete except for a short distance behind the spine which lies near the anterior margin of the carapace behind the base of the second antenna.

The abdomen is strongly compressed, the third, fourth, fifth, and sixth segments dorsally carinated; the carina terminates in a small tooth at the hind end of the fourth, fifth, and sixth segments; on the fourth segment the carina is divided into two parts by a deep notch about two thirds of the distance from the anterior to the posterior margin of the segment. The telson is channelled on the dorsal side, and is tipped with two long spinous setæ.

The eyestalks taper from the base to the tip; their outer and upper margins are nearly straight, but their inner and lower surfaces are swollen; on the inner side of each stalk, a little way behind the eye, there is a blunt tubercle. The eye itself is small and black. The integument of the eyestalk is transparent, and when held to the light discloses the optic ganglion within, giving off a nerve to the retina and another to the tubercle on the inner side of the stalk.

The basal segment of the antennule is armed with a very small but sharp external spine. The outer side of the second antenna, on the contrary, is unarmed. The antennal scale is very broad, oval, and furnished with a small



spine on the external border, near the distal end. The third maxillipeds are robust; they reach forward far beyond the end of the antennal scales; their terminal segment is triangular in cross section. The first pair of legs are also robust, about equal in length to the third maxillipeds, and their chela is strong, with fingers about equal to the hand in length. The second pair of legs are longer but much weaker than the first pair, the carpus and propodus much elongated, and the fingers not more than a third as long as the hand. The ischium and merus of both the first and the second pair are flattened, and the same compression is seen in the three following pairs of legs, which have the form and proportions characteristic of the genus. The inner branches of the swimmerets are about the length of the telson, while the outer branches are rather longer.

Length, 70 mm.; carapace, 30 mm.; telson, 14 mm.; antennal scale, 11 mm.

Station 3371. 770 fathoms. 1 specimen.

In this specimen the integument is soft and membranaceous, and the carapace is so collapsed that it is difficult to restore its true outline. In several respects this species shows an approach to the genus *Hymenodora*, e. g. the soft integument, small eye, and the reduction of the rostrum.

### **Notostomus westergreni, sp. nov.**

Similar to *N. patentissimus* Bate, with which it agrees in nearly all the details of carinæ, etc., but it differs much from Bate's species in its general form and proportions, the carapace being longer in proportion to its height, and less convex along the dorsal line than it is in *N. patentissimus*. The rostrum, besides, is armed with many more spines (at least twelve) on its inferior margin. Bate says that in *N. patentissimus* the antennal carina terminates in the posterior margin of the carapace, where it is confluent with the lowermost, submarginal carina. This is not the case in *N. westergreni*.

Length, 127 mm.; length of carapace, including rostrum, 61 mm.; height of carapace, 31 mm.

Station 3399. 1740 fathoms. 1 male.

### **Family PASIPHAEIIDÆ**

#### ***Pasiphaeia cristata americana*, subsp. nov.**

This form is closely allied to *P. cristata* Bate, dredged by the "Challenger" in 315 fathoms, near the Fiji Islands. The "Albatross" specimens differ in some respects from the Fiji specimen. They may be considered a geographical race of the same species.

On comparing the two forms it appears that the carapace of the "Albatross" specimens is considerably longer in proportion to the length of the whole body



than it is in the Fiji form, and that the dorsal crest is smaller and somewhat differently shaped. The fifth and sixth abdominal segments are much shorter in proportion to the length of the telson in the former. The antennular peduncle is only one third as long as the carapace, while in the typical *P. cristata* it is about one half as long as the carapace. Furthermore, the flagellum of the antenna in the former is longer than the body, whereas in the latter it is described as being only one half as long.

Length 65 mm.; carapace, 22 mm.; telson, 7.5 mm.

Station 3385. 286 fathoms. 4 specimens.

" 3396. 259 " 2 "

" 3403. 384 " 2 "

" 3406. 551 " 3 "

### *Pasiphaeia magna*, sp. nov.

This species is second only to *P. princeps* Smith in dimensions. It is most similar to *P. tarda* Kröyer, from the North Atlantic. Differs from the latter species by having the dorsal line of the carapace more convex, the posterior part of the carapace higher in proportion to the anterior part, the dorsal keel of the carapace rounded except on the anterior gastric region, and the anterior rostrum-like tooth longer and differently shaped. The proportional length of the segments of the third pair of legs appears to be quite different in the two species: in *P. tarda*, according to Kröyer, the propodus and dactylus are of equal length and four times as long as the carpus, while in *P. magna* the dactylus is even shorter than the carpus, which is itself only one sixth as long as the propodus. In *P. tarda*, following Kröyer, the lower margin of the second segment of the second pair of legs is furnished with three spines; in *P. magna* this margin is unarmed but for the tooth at its distal end.

Length, 145 mm.; carapace, including the anterior dorsal tooth, 55 mm.

Station 3384. 458 fathoms. 1 specimen.

## Family PENEIDÆ.

### *Sicyonia affinis*, sp. nov.

This species is the Pacific coast representative of *Sicyonia edwardsii*<sup>1</sup> of the Atlantic coast of America. It agrees with *S. edwardsii* in the form and dentition of the carapace, but differs in the form and sculpture of the abdominal segments. In *S. edwardsii* the first four abdominal segments are rugose, and ornamented on the sides with two deeply impressed transverse lines, followed by another less deeply incised near the hind margin of each segment; moreover the pleuræ of these segments are angulated below. In *S. affinis* these

<sup>1</sup> *Sicyonia edwardsii* Miers, Ann. Mag. Nat. Hist., 5th series, VIII. 367, 1881; *Sicyonia carinata* (Olivier) Milne Edwards, Ann. Sci. Nat., XIX. 344-346, Plate IX. Fig. 9, 1830; nec *Sicyonia carinata* (Oliv.).



segments are smooth, the impressed lines are absent with the exception of the hinder one of the deeply cut pair, and the pleuræ are broadly rounded below; the peduncle of the second antenna is not much over one half the length of the antennal scale, and the whole appendage is but little longer than the carapace.

Length, 62 mm.; carapace, 20 mm.

Station 3367. 100 fathoms. 1 male, 1 female.

" 3369. 52 " 1 male.

" 3378. 112 " 2 females.

" 3379. 52 " 1 female.

The color in life, as shown in a sketch made by Mr. Westergren, is light greenish yellow, banded with vermilion on the branchial regions and abdomen. Appendages red, antennary flagellum transversely banded with light and dark. The coloration is quite different from that of *S. edwardsii* as given by Dana (Crust. U. S. Explor. Exped., p. 602).

### *Sicyonia picta*, sp. nov.

Rostrum a little shorter than the eyestalks, laterally compressed, elevated, armed with six teeth, three superior, three terminal; inferior margin ciliated. Carapace carinate in the median dorsal line; the carina is furnished with two teeth, one minute, on the anterior part of the gastric region at the base of the rostrum, the other larger, over the cardiac region. An infra-orbital and an hepatic spine are present. General surface of carapace punctate and sparsely clothed with setæ. Abdominal segments smooth, with a median dorsal carina which rises into a strong tooth on the first segment directed upward and forward; on the fifth and sixth segments the carina is drawn out into an acute tooth which is directed horizontally backward. The pleuræ of the abdominal segments are margined and armed with a tooth on the lower border; on the second, third, and fourth segments the tooth is hamate, being directed outward and backward. The general surface of the abdomen is smooth, with a transverse groove on each side of the segments. The telson is channelled above, acute at the tip, and armed with a pair of small lateral spines near the distal end. The eyes are very large, horizontally flattened. Basal segment of antennule armed with two spines on its exterior border; flagella shorter than the peduncle. The peduncle of the second antenna reaches about two thirds of the way to the end of the scale; the flagellum is about equal to the abdomen in length; the basal segment of the peduncle is furnished with a long and acute external spine. The sternum is armed with a long spine between the bases of the second, third, and fourth pairs of legs, as is usual in species of this genus. The last pair of abdominal appendages are a little shorter than the telson.

Length, 70 mm.; carapace, 24 mm.

Station 3355. 182 fathoms. 1 male.

" 3387. 127 " 6 males, 4 females.



On the hinder part of each branchial region there is a dark (in alcohol) ring of pigment. *S. ocellata* Stimpson and *S. penicillata* Lockington are similarly ornamented. The flagellum of the antenna is banded alternately with light and dark color, and there are traces of color on the margins of the rostrum, the dorsal carinæ, and appendages.

*Peneus balboæ*, sp. nov.

Integument thin and membranaceous, its surface thickly beset with minute squamiform tubercles. The rostrum of the sole specimen procured is broken off a little short of the anterior end of the eye; on the upper margin of the part remaining, and on the median line of the gastric region there is a series of eight slender acute teeth, three of which lie behind the orbit. Rostrum continuous posteriorly with a sharp, non-sulcated carina which becomes obsolete before reaching the posterior margin. Suborbital angle prominent, but not armed with a spine; a small branchiostegian spine projects from the margin on a level with the second antenna. Neither the cervical nor any other grooves are apparent on the carapace. A faint longitudinal ridge runs along the side of the carapace on a level with the orbit; this carina is most conspicuous on the gastric region. Another longitudinal ridge runs from the suborbital angle, dividing into two branches near the middle of the carapace. A third ridge extends from the branchiostegian spine to the lower branch of the ridge last noted. Fourth, fifth, and sixth abdominal segments dorsally carinated, the sixth armed with a small horizontal spine. The fourth, fifth, and sixth segments are also ornamented with a lateral ridge. Eyestalks short; eyes large, globular, black.

Length, 93 mm.; carapace, exclusive of rostrum, 29.5 mm.

Station 3371. 770 fathoms. 1 female.

*Solenocera agassizii*, sp. nov.

Similar to *S. siphonocera* (Philippi), but different from that species in having the two antennular flagella much shorter and subequal, and a larger number of teeth on the upper margin of the rostrum and gastric region. Comparison of a specimen fifty-seven millimeters long with *S. siphonocera* of equal size from the Bay of Naples shows that in the former the antennular flagella are but four fifths the length of the carapace, and that there are eight teeth on the rostrum and gastric region, while in the Neapolitan specimen the antennular flagella are as long as the distance from the tip of the rostrum to the middle of the third abdominal segment (two fifths longer than the carapace), and there are but six teeth on the rostrum and gastric region. Moreover, not only is the upper flagellum broader (1 m.) and blunter in *S. agassizii* than in *S. siphonocera* (where it is only  $\frac{1}{3}$  m. in breadth), but is also subequal in breadth to the lower flagellum, while in the Mediterranean species the upper flagellum is conspicuously narrower than the lower one.



In full-grown specimens of *S. agassizii*, which attain a length of 150 mm., the antennular flagella are only one half as long as the carapace, or even less. The flagellum of the second antenna is very slender and enormously long, — more than two and two thirds times the length of the whole body. The number of teeth on the rostrum and gastric region is nine.

Length of an adult female, 149 mm.; carapace with rostrum, 54 mm.; rostrum, 13.5 mm.; second antenna, 410 mm.

Station 3389. 210 fathoms. 2 males, 8 females.

“ 3391. 153 “ 5 males, 6 females.

A *Solenocera* has been recently recorded from the Bay of Bengal by Mr. J. Wood-Mason.<sup>1</sup> In this species the antennular flagella are described as being shorter and broader than in any previously described species. As no other characters are mentioned, it is impossible to tell whether it is the same as the “Albatross” species. When the remoteness of the localities is considered, it seems hardly warrantable to assume the identity of the East Indian and American species of a comparatively shallow-water genus.

#### *Peneopsis diomedææ*, sp. nov.

Integument hard, firm, and smooth. Rostrum long, nearly horizontal, except near the tip, where it is bent up slightly, acute, armed with four teeth above. A dorsal carina, armed with one tooth on the posterior part of the gastric region, runs the length of the carapace. Cervical groove very deep, but not cutting the dorsal carina. Another deep groove runs backward, and then diagonally upward from the cervical groove toward the posterior border of the carapace, stopping just short of the posterior margin. Antennal region well defined by the cervical groove below and a gastro-antennal groove above. A strong antennal tooth on the margin of carapace, below the orbit, another at the infero-lateral angle, a third just behind the groove that marks the posterior limit of the antennal region, and a fourth on the hinder edge of the cervical groove. Above and behind the last mentioned tooth the cervical groove is indented, and the upper angle of this indentation tends to assume the form of a small tooth or spine.

Fourth, fifth, and sixth abdominal segments carinate on the median dorsal line, and produced to teeth posteriorly. Telson deeply grooved on dorsal side, and armed with a pair of spiniform lateral teeth near the tip. The antennules with their long flagella surpass the whole body in length; the prosartema is oval, foliaceous, reaching forward as far as the posterior border of the upper face of the cornea. The exopods of the second maxillipeds are very small, not longer than the short ischial segment of the limb. Upon the appendages back of these, the exopods are reduced to the merest rudiments, discernible only by the use of a lens. In some individuals, indeed, the exopods of the posterior appendages are altogether wanting.

<sup>1</sup> *Solenocera herti* Wood Mason, Ann. Mag. Nat. Hist., 6th ser., VII. 188, 1891.



Length, 215 mm.; carapace, 101 mm.; rostrum, 42 mm.; antennal scale, 33 mm.; telson, 33 mm.

Station 3353.	695 fathoms.	2 females.
" 3358.	555 "	1 male.
" 3384.	458 "	3 females.
" 3393.	1020 "	3 females.
" 3394.	511 "	3 males, 1 female.
" 3395.	730 "	1 male, 1 female.

### *Haliporus nereus*, sp. nov.

Integument membranaceous. Carapace lightly granulated. Rostrum about one third the length of the rest of the carapace, horizontal, armed with six teeth above, ciliated below. Median dorsal line of carapace carinate, with two teeth on the posterior half of the gastric region. The antennal, branchiostegian, and hepatic spines are present, besides one behind the branchiostegian, and another still farther back on the hind border of the cervical groove. Orbital region definitively bounded by an hepatic and a gastro-hepatic sulcus. The hindmost of the lateral spines of the carapace lies in the anterior angle of a triangular field enclosed by branches of the cervical groove; from the infero-posterior angle of this triangle two carinæ run backward along the branchial area; the upper one ends at the postero-lateral margin of the carapace, the lower one meets the inferior submarginal carina of the branchial area before attaining the posterior border. These two carinæ, with the submarginal ridge of the carapace, enclose a long oval area on each branchial region. Third to sixth abdominal segments carinated; on the sixth segment the carina ends in a small tooth. Eyestalks about one half the length of the rostrum; eyes large, black, much broader than their stalks.

In the female there is a large process, covered with stiff hairs, and flattened on the inner side, developed from the base of the third pair of legs. Behind this process lies a pair of flat, setiferous sternal processes. Between the legs of the fourth pair there hangs in the median line a nearly vertical curtain-like partition, notched on the free lower margin, and flanked by two lower blunt setiferous tubercles. The sternum of the posterior thoracic segment has a slightly elevated median longitudinal ridge, and a low transverse ridge at the posterior boundary of the segment.

Length, 81 mm.; carapace, 31 mm.; rostrum, 8 mm.

Station 3353.	695 fathoms.	1 female.
" 3366.	1067 "	1 female.
" 3382.	1793 "	2 females.
" 3398.	1573 "	2 females.
" 3399.	1740 "	1 male.
" 3400.	1322 "	2 females.
" 3407.	885 "	1 female.
" 3413.	1360 "	1 male, 2 females.



*Haliporus doris*, sp. nov.

A larger and more robust species than *H. nereus*, with a stronger upward curve to the rostrum. The tubercular processes of the third pair of legs, together with the sternal tubercles immediately behind them, are very like the corresponding structures in *H. nereus*. But here the likeness between the sexual parts of the females of the two species ends. Betwixt the legs of the fourth pair there is a transverse diaphragm consisting of a median tongue, concave on its front face, its lower edge entire, supported on each side by a strong blunt triangular process, of equal height with the median tongue-like plate. Between the bases of the fifth pair of legs, in place of the low longitudinal ridge seen in *H. nereus*, there is, in this species, a large setiferous trigonal tooth, acute at the tip, equalling in height the transverse partition on the sternum of the antecedent segment. The posterior median angle of this tooth abuts against the low transverse ridge that forms the posterior limit of the last thoracic sternum.

Length, 104 mm.; rostrum, 10 mm.; whole carapace, 42 mm.

Station 3414. 2232 fathoms. 4 females.

“ 3415. 1879 “ 1 female.

*Haliporus thetis*, sp. nov.

Integument membranaceous. Rostrum rather less than one third as long as the rest of the carapace, curved strongly upward, upper margin convex, armed with five teeth. A distinct carina, bearing three teeth, runs the length of the median line of the gastric area, from the base of the rostrum to the cervical groove. Back of the cervical groove this carina continues on as a low blunt ridge to the posterior border of the carapace. Posteriorly, this ridge gives off two pairs of lateral branches, which course diagonally backward to the posterior margin of the carapace, marking off two triangular fields on the cardiac region, one enclosed within the other. The spinous armature of the carapace consists of an antennal, a very small branchiostegal, an hepatic, and a lateral spine on the posterior edge of the cervical groove. The spine which lies a little way behind the branchiostegian spine in *H. nereus* and *H. doris* is lacking in this species. Antennal and orbital regions well defined. All the segments of the abdomen are carinate along their median dorsal line. The pleuræ are shallow and rounded. A longitudinal furrow on each side of the abdominal segments. Eyestalks one half the length of the rostrum; eyes large, black, broader than their stalks.

Length, 94 mm.; rostrum, 9 mm.; carapace, including rostrum, 33 mm.

Station 3413. 1360 fathoms. 1 female.



*Aristæus occidentalis*, sp. nov.

Similar to *A. antennatus* (Risso) of the Mediterranean Sea. By comparison with Duvernoy's figures of *A. antennatus* it appears that the Pacific species has a longer, more strongly upturned rostrum, and that it differs furthermore in having the sixth abdominal segment carinated and toothed, and in having much longer abdominal appendages. As in *A. antennatus*, there is no epipod on either the last or the next to the last pair of legs.

Length, 158 mm. ; rostrum, 49 mm. carapace, including rostrum, 85 mm.

Station 3403. 384 fathoms. 1 male.

" 3410. 331 " 2 females.

*Hemipeneus triton*, sp. nov

This species, like *H. spinidorsalis* Bate, is remarkable for the long, curved thorn on the dorsal side of the third abdominal segment. It differs from *H. spinidorsalis* in having a much shorter rostrum, and longer, more flattened outer antennular flagella. The rostrum is shorter than in any previously described species, being much shorter than the eyestalks ; it is furnished with from two to four teeth above. The sixth abdominal somite is longer than in *H. spinidorsalis*. Another difference between the two species affects the inner branch of the second abdominal appendages of the male ; in both species this branch is triple ; in *H. spinidorsalis* the anterior piece is a horny plate, concave within and furnished with setæ on its distal border ; the middle piece has the form of a long triangular tooth, shorter than the anterior plate ; the posterior piece is a longer multiarticulate flagellum, homologous with the inner branch of the following pairs of appendages. In *H. triton*, the middle tooth-like process is developed into a broad plate which exceeds in length the anterior plate.

Length, 127 mm. ; carapace, 44.5 mm. ; rostrum, 6 mm.

Station 3360. 1672 fathoms. 1 female.

" 3374. 1823 " 1 male, 5 females.

" 3381. 1772 " 3 males, 1 female.

*Benthescymus tanneri*, sp. nov.

In this species the carina on the fifth and sixth abdominal segments terminates posteriorly in a small acute tooth, whereas in *B. altus* Bate these segments are devoid of teeth, the posterior margin rising to form a peculiar transverse ridge. *B. brasiliensis* Bate differs from *B. tanneri* in having the carapace higher, with more convex infero-lateral borders, the third, fourth, and fifth abdominal segments toothed, the sixth toothless, and in the absence of the tooth or tubercle on the sternum between the abdominal appendages of the



first pair. *B. bartletti* Smith, from the Atlantic side of the continent, resembles *B. tanneri* in many respects, but is distinguishable at a glance by the long spine on the dorsum of the fifth abdominal segment. *B. moratus* Smith, another allied species, differs in having a distinct hepatic spine, a much broader merus joint to the second maxilliped, in the presence of small exopods at the bases of all the thoracic appendages, etc.

Color in life, deep red, with a large patch of bright blue on the back of the second, third, and fourth abdominal segments; eyes black.

Length, 112 mm.; carapace 44.5 mm.; rostrum, 8 mm.

Station 3358.	555 fathoms.	3 males, 2 females.
" 3362.	1175	" 1 male, 1 female.
" 3363.	978	" 3 males, 5 females.
" 3364.	902	" 2 males.
" 3365.	1010	" 1 female.
" 3366.	1067	" 1 male, 1 female.
" 3376.	1132	" 2 females.
" 3377.	764	" 1 male.
" 3380.	899	" 1 male.
" 3384.	458	" 27 males, 36 females.
" 3393.	1020	" 2 males, 3 females.
" 3400.	1322	" 1 female.
" 3403.	384	" 1 male, 1 female.
" 3404.	385	" 1 female.
" 3407.	885	" 5 females.
" 3410.	331	" 2 males, 3 females.
" 3411.	1189	" 1 male, 1 female.
" 3418.	660	" 7 males, 8 females.
" 3424.	676	" 1 male.
" 3425.	680	" 1 male.
" 3435.	859	" 3 males, 2 females.
" 3436.	905	" 5 females.

### Family SERGESTIDÆ.

#### *Sergestes inous*, sp. nov.

Near *S. mollis* Smith. Besides differences of minor importance, the following structural difference is apparent: in *S. mollis* the posterior pleurobranchia of the antepenultimate thoracic segment is replaced by a small simple lamella, which is concealed beneath the following gill, while in *S. inous* the said pleurobranchia is well developed and unconcealed.

Length 113 mm.; carapace, 34.5 mm.

Station 3380. 899 fathoms. 1 female.



**Sergestes phorcus**, sp. nov.

Carapace devoid of spines; rostrum cristiform, short, subquadrate, the anterior margin produced to a short point in the middle. Second, third, and fourth abdominal segments lightly sulcate in the median dorsal line; sixth somite armed with a minute posterior dorsal spine. Eyestalk shorter than proximal segment of the antennular peduncle; eye subspherical, much wider than its stalk. First and second segments of the antennular peduncle of equal length, the third considerably shorter. Thoracic appendages much like those of *S. robustus* Smith.

Length, 65 mm.; carapace, 21 mm.

Station 3382.	1793 fathoms.	1 male.
" 3386.	242 "	1 female.
" 3388.	1168 "	2 females.
" 3401.	395 "	1 female.
" 3437.	628 "	1 female.

**Sergestes halia**, sp. nov.

A small species, in which the cervical groove is nearly obliterated on the dorsal part of the carapace, and the posterior transverse furrow, which in some species of *Sergestes* forms the front boundary of the cardiac area, is obsolete. A sharp spine near the antero-lateral margin of the carapace, and another on the hepatic area. Rostrum cristiform, tapering to a slender, acute point, which overreaches the eye. A longitudinal ridge runs from the base of the antenna backwards, dividing at the hepatic spine into a superior and an inferior branch; the former forms the upper boundary of the branchial area, the latter courses along the middle of the branchial area and fades out before reaching the posterior border of the carapace. Abdominal segments unarmed.

Length, 29 mm.; carapace, 9.3 mm.

Station 3388. Surface to 400 fathoms (submarine tow-net). 3 males.

## SUBORDER SCHIZOPODA.

## Family LOPHOGASTRIDÆ.

**Gnathophausia dentata**, sp. nov.

In this species a thin triangular crest, produced at the apex to a spine, is found at the base of the rostrum, over the anterior part of the gastric region; a minute denticle near the anterior, and another near the posterior end of the crest. The lower spine of the infero-posterior angle of the carapace is reduced to a mere tooth, obsolete in some specimens. Antennal scale very broad (breadth equal to one half the length.)

Distinguished from *G. gracilis* W.-Suhm by the prominent dentate gastric



crest, the small size, or even absence, of the lower spine of the infero-posterior angle of the carapace, the greater breadth of the antennal scale, etc.

*Gnathophausia gracilis*, var. *brevispinis* Wood-Mason, agrees with *G. dentata* in the obsolescence of the lower posterior spine, but I infer from Wood-Mason's short description that this variety conforms to the type of *G. gracilis* as regards the gastric teeth, antennal scale, etc.

Length, 60 mm.; carapace, including rostrum and dorsal spine, 33 mm.; rostrum, 14 mm.; dorsal spine, 4 mm.

Station 3361.	1471 fathoms.	1 specimen.
" 3375.	1201 "	1 "
" 3400.	1322 "	1 "
" 3406.	551 "	1 "
" 3411.	1189 "	1 "

### Family EUCOPIIDÆ.

#### *Eucopia sculpticauda*, sp. nov.

Frontal margin very prominent, forming a three-sided blunt rostrum, which projects between the eyestalks and wholly conceals the subjacent ocular segment. Anterior part of the telson deeply furrowed for a little less than one half its length, the furrow bounded on each side by an elevated, rounded ridge; a low median keel, beginning in the anterior furrow, runs back to the hind end of the telson; a constriction near the hind end divides off a terminal plate, which is broadly rounded at the end, its lateral margin concave; the whole dorsal face of the telson, from the posterior end of the anterior ridges to the terminal plate, is beautifully ornamented with a network of ridges like honey-comb.

Length, 66 mm.; carapace, measured from lower angle of orbit to posterior end of the lateral wings, 23 mm.

Station 2619 Hydr.	1000 fathoms.	1 female juv.
" 3407.	885 "	1 female.
" 3413.	1360 "	1 male.

### Family MYSIDÆ.

#### *Petalophthalmus pacificus*, sp. nov.

Similar to *P. armiger* W.-Subm,<sup>1</sup> but different in some particulars. The rostrum is more prominent and triangular; there is a median tooth on the

<sup>1</sup> Amongst the material dredged by the "Blake" in the Atlantic in 1877-78, I find the female of *P. armiger*. It agrees closely with the male, harring the usual sexual differences, viz. the presence of an incubatory pouch, and the simple structure of the caudal limbs; the mandibular palp, carapace, telson, etc., are as in the male. The brood-pouch consists of six pairs of incubatory lamellæ. The Schizopod described by Suhm as the female of *P. armiger* is apparently a *Boreomysis*. It may be called *Boreomysis suhmi*.



carapace behind the base of the rostrum ; the caudal limbs are simple in the male.

Length, 31 mm.

Station 2637 Hydr. 700 fathoms. 1 male.

### SCOLOPHTHALMUS, gen. nov

Carapace rostrate, small, covering only the anterior part of the thorax, leaving the last two thoracic segments exposed. Abdomen slender, cylindrical, sixth segment the longest. Eyestalks transformed to sharp spines, visual elements wanting. Antennular peduncle rather long and robust. Antennal scale elongate, oval ; proximal fourth of outer edge smooth, naked, terminating in an angle which bears a strong seta ; the rest of the outer edge fringed with hairs like the inner edge. Mandibular palpi reaching to about the middle of the antennular flagellum, terminal segment narrowly oblong. Second maxillæ with inner basal part expanded, three-lobed, terminal segment expanded at distal end, triangular. First maxillipeds without an exopod, but furnished with a well developed epipod. Second maxillipeds of moderate length, subpediform. Legs long and slender, antepenultimate pair reaching forward beyond the base of the antennal scale. Marsupial pouch of the female composed of seven pairs of incubatory lamellæ. Telson large, apex truncate, not incised. Outer plates of the swimmerets (uropods) not divided by a transverse suture.

### *Scolophthalmus lucifugus*, sp. nov.

Frontal margin of carapace produced so as to form an acute rostrum ; anterolateral margins oblique, armed with two spines, one behind the external margin of the antennule, the other at the anterior inferior angle. Cervical sulcus well marked, with a distinct linguiform dorsal area behind it. Posterior lateral wings short and rounded. Abdominal segments smooth and cylindrical, sixth segment nearly as long as the two antecedent segments combined. Telson broad, truncate. Eyes atrophied, their peduncles assuming the form of spines. Antennal peduncles one half as long as the carapace, second and third segments about equal in length, a little longer than the first, the third slenderer than the first and second ; the flagella are equal to or rather longer than the peduncle, and present a uniform structure of small articulations, the basal part of the outer flagellum not being expanded. The antennal scale and mandibular palpi are described in the generic diagnosis ; the antennal scale is equal in length to the antennular flagellum. Abdominal limbs (of the female) simple, increasing in length posteriorly, the fifth pair distinctly two-jointed. Inner branch of uropods slender, lanceolate, surpassing the telson and the outer branch, the latter of which is oval and divided by transverse suture.

Length, 42 mm.

Station 3400. 1322 fathoms. 1 female.



**CERATOMYSIS**, gen. nov.

Cephalothorax robust. Carapace short (leaving the last two segments of the thorax exposed), spinose; frontal margin truncate, not forming a rostrum, armed at the external angles with a pair of long horn-like spines; a conspicuous notch at the anterior end of the lateral margin serving as an excurrent orifice from the respiratory chamber. Abdomen slender, cylindrical, spinose; sixth segment not much longer than the fifth. Eyes absent, their stalks taking the form of slender styles, whose tips are soft and delicate, perhaps serving as tactile organs. Antennular peduncle rather short; flagella much longer than the peduncle, flattened and fringed with long setæ on their margins. Antennal scale linear, ciliated on both margins. Mandibular palpi reaching beyond the antennular peduncle; terminal segment long oval, margins fringed with long setæ. First maxillipeds devoid of an exopod. Distal segment of second maxillipeds oval, ciliate. Legs long and slender, propodi not segmented. Seven pairs of incubatory lamellæ in the female. Fifth and sixth abdominal limbs elongated in the female. Telson linear, setose on the margin. Both branches of the uropods linear, setose on each margin, subequal, shorter than the telson; outer branch not divided by a transverse suture.

**Ceratomysis spinosa**, sp. nov.

In front of the cervical groove are three long erect spines in the median line, the foremost of which is on the frontal margin; there is, besides, a spine on each side of the carapace in a transverse line with the middle one of the median row; behind the cervical groove there is one spine in the median line near the posterior margin of the carapace, two on each side of the tongue-shaped dorsal area, and a long row of six on each side, in line with the lateral spines of the gastric area. Abdomen armed with five longitudinal rows of spines (one median, four paired and lateral). Telson very long and narrow, nearly equalling the length of the remaining portion of the abdomen.

Color in life, milk-white.

Length, 36 mm.; carapace, 9 mm.

Station 3357. 782 fathoms. 1 female.