

UCIDES CORDATUS, FEMALE, NATURAL SIZE



GONIOPSIS CRUENTATA, MALE, NATURAL SIZE

## THE BRACHYURA AND MACRURA OF PORTO RICO.

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The creatures described in the following paper belong to the well-known class of crustaceans, and to that division in which the eyes are mounted on stalks, usually movable, and the walking feet are ten in number.

The terms Brachyura and Macrura are here used in a limited sense, as defined by Dana, Stimpson, and Bate. In the Brachyura, or true crabs, the carapace or main part of the shell is usually wide and more or less flattened; the front part often projects to form a beak or rostrum; the antennæ are inconspicuous; the abdomen is small, bilaterally symmetrical, and folded under the carapace; of the five pairs of thoracic legs, the first pair are furnished with claws and are commonly larger than the remaining ones, which are similar.

The Macrura, or shrimps and lobsters, are elongated—that is, the carapace is longer than wide, and either subcylindrical or compressed; the rostrum is usually present, and often prominent; the antennæ are well developed; the abdomen or tail is longer than the carapace and is extensile; any or none of the relatively slender thoracic legs may be chelate.

Crabs and shrimps may be found along the seashore on the sandy and muddy bottoms, under stones, in crevices of rocks, corals, and sponges, in shells of living bivalve mollusks, in tubes of annelids, and on the tests of sea-urchins. They may be taken with the dredge and tangle from all depths of the sea; some species swim at the surface, others frequent brackish water at the mouths of rivers. Fluvial crabs and shrimps occur in rivers and streams and along their banks, occasionally in ditches or among roots of trees, while the true land crabs may inhabit localities remote from salt or fresh water.

The only systematic list of Porto Rican decapodous crustaceans is that made by John Gundlach in his "Apuntes para la Fauna Puerto-Riqueña, VI, Crustaceos."<sup>1</sup> Fifty-two species are there enumerated, of which 37 are Brachyura and 8 are Macrura. The following list contains 162 Brachyura and 59 Macrura. These species were, with few exceptions, taken by the naturalists of the *Fish Hawk* in 1899. An examination has been made, also, of specimens collected by Dr. L. Stejneger, Dr. C. W. Richmond, and Mr. Paul Beckwith, of the U. S. National Museum; Mr. A. B. Baker, of the

<sup>1</sup> *Anales Soc. Españ. Hist. Nat.*, XVI, 115-133, 1887.

National Zoological Park; Mr. G. M. Gray, of Woods Hole, Mass., and Mr. L. M. McCormick, of the Glen Island Museum.

The crustaceans dredged by the *Fish Hawk* represent the fauna of the coast to a depth of 225 fathoms, although the majority of the species come from within the 100-fathom line. Our list also includes the fauna of the fresh waters and land crabs. One genus and 14 species of Brachyura and 1 genus and 13 species of Macrura are described as new. The types are in the U. S. National Museum.

The definitions of families and genera have been in large part quoted or condensed from other authors. The division into families is mainly that of Stebbing.<sup>1</sup>

In connection with the work on Porto Rican species, a large number of specimens of the same species in the West Indian collection of the National Museum have been determined, and the localities noted.<sup>2</sup>

List of dredging stations of the U. S. Fish Commission steamer *Fish Hawk* about the island of Porto Rico at which Brachyura and Macrura were collected.

| Station No. | Date.   | Locality.                        | Depth.          | Bottom.                | Dredging instruments. |
|-------------|---------|----------------------------------|-----------------|------------------------|-----------------------|
|             | 1899.   |                                  | <i>Fathoms.</i> |                        |                       |
| 6051        | Jan. 13 | Off entrance to San Juan Harbor. | 45              | Sand, mud              | Tangle.               |
| 6054        | Jan. 16 | San Juan Harbor                  | 4½ to 5½        | do                     | Dredge and tangle.    |
| 6055        | Jan. 18 | Off Aguadilla                    | 137             | Sand, mud, and shells. | Dredge.               |
| 6057        | Jan. 19 | Mayaguez Harbor                  | 4½              | Sticky mud             | Do.                   |
| 6058        | Jan. 19 | do                               | 7½              | do                     | 7-foot beam trawl.    |
| 6059        | Jan. 19 | do                               | 7               | do                     | Do.                   |
| 6060        | Jan. 19 | do                               | 12              | do                     | Dredge.               |
| 6061        | Jan. 20 | do                               | 12 to 18        | Sand, mud              | 11-foot beam trawl.   |
| 6062        | Jan. 20 | do                               | 25 to 30        | Sand, mud, and shells. | Dredge.               |
| 6063        | Jan. 20 | do                               | 75 to 76        | Rocky, sand, and coral | 11-foot beam trawl.   |
| 6064        | Jan. 20 | do                               | 22 to 33        | Sand, mud              | Dredge.               |
| 6065        | Jan. 20 | do                               | 4 to 6          | Coral                  | Do.                   |
| 6066        | Jan. 20 | do                               | 161 to 172      | Sand, mud              | 11-foot beam trawl.   |
| 6067        | Jan. 20 | do                               | 97 to 120       | Coral                  | Dredge.               |
| 6070        | Jan. 21 | do                               | 220 to 225      | Rocky                  | 9-foot beam trawl.    |
| 6072        | Jan. 25 | Off Punta de Melones             | 7½              | Coral, sand, shells    | Tangle.               |
| 6073        | Jan. 25 | do                               | 8               | (?)                    | Dredge.               |
| 6074        | Jan. 25 | Off Puerto Real                  | 8½              | Coral, sand            | Tangle.               |
| 6075        | Jan. 25 | Off Boca Prieta                  | 8½              | do                     | Do.                   |
| 6076        | Jan. 26 | Off Gallardo Bank                | 10              | do                     | Do.                   |
| 6079        | Feb. 6  | Off St. Thomas                   | 20 to 23        | Coral                  | Do.                   |
| 6080        | Feb. 6  | do                               | 20              | do                     | Dredge.               |
| 6084        | Feb. 8  | Off Vieques Island               | 11              | Coral, sand, shells    | Tangle.               |
| 6085        | Feb. 8  | do                               | 14              | Coral, sand            | 7-foot beam trawl.    |
| 6086        | Feb. 8  | Off Culebra Island               | 14½             | do                     | Dredge.               |
| 6087        | Feb. 8  | do                               | 15½             | do                     | Tangle.               |
| 6089        | Feb. 8  | Off Vieques Island               | 21              | Coral                  | Do.                   |
| 6090        | Feb. 8  | Off Culebra Island               | 16              | do                     | Do.                   |
| 6091        | Feb. 8  | Off Vieques Island               | 15              | do                     | Do.                   |
| 6092        | Feb. 8  | do                               | 16              | do                     | Do.                   |
| 6093        | Feb. 8  | Off Culebra Island               | 15              | do                     | Do.                   |
| 6094        | Feb. 8  | Off Vieques Island               | 12              | do                     | Do.                   |
| 6095        | Feb. 8  | do                               | 12½             | do                     | Do.                   |
| 6096        | Feb. 8  | do                               | 6               | do                     | Do.                   |
| 6097        | Feb. 8  | Off Humacao                      | 10              | do                     | Do.                   |
| 6098        | Feb. 8  | do                               | 12½             | do                     | Do.                   |
| 6099        | Feb. 8  | do                               | 9½              | do                     | Do.                   |

<sup>1</sup> A History of Crustacea, 1893.

<sup>2</sup> This is, however, not true of the *Alpheidae*, as the National Museum collection of that family has recently been sent to Dr. H. Coutière, of the Museum of Natural History, Paris, for study.



## Suborder BRACHYURA. The Crabs.

*Key to the Porto Rican tribes and families of the suborder Brachyura.*

- A. Buccal frame quadrate; efferent branchial channels opening at sides of endostome.
- B. Carapace usually quadrilateral. Frontal region curved downward. Verges of the male inserted either in sternal plastron or in the basal joints of fifth pair of legs, thence passing through channels in sternum beneath the abdomen.....Tribe *Catometopa*
- C. Carapace hard and firm. Front, orbits, and eye-stalks not very small. Buccal frame quadrate anteriorly.
- D. Last pair of legs not remarkably short nor subdorsal.
- E. Carapace moderately convex or depressed; branchial regions not greatly dilated.
- F. Third maxillipeds with palpus articulated usually at front inner angle of merus. Front of moderate width or very narrow. Eye-stalks often greatly elongate.....Family OCYPODIDÆ
- F'. Third maxillipeds with palpus articulated at apex or front outer angle of fourth. Front usually broad. Eye-stalks of moderate size.....Family GRAPSOIDÆ
- E'. Carapace very convex, especially dilated over and in front of branchial regions; antero-lateral margins entire and strongly arcuate. Last joint of walking legs often armed with longitudinal rows of spines.....Family GECARCINIDÆ
- D'. Last pair of legs very short and subdorsal.....Family PALCIDÆ
- C'. Carapace more or less membranaceous. Front, orbits, and eye-stalks very small. Buccal frame arcuate anteriorly. Species of small size.....Family PINNOTHERIDÆ
- B'. Carapace not quadrilateral. Verges of male inserted in basal joints of fifth pair of legs.
- C. Carapace broad, short, rounded anteriorly, without projecting frontal rostrum.....Tribe *Cyclometopa*
- D. Terminal joints of last pair of legs not flatly expanded.
- E. Terminal joints of last pair of legs usually spinuliferous. Species fluviatile, or living in damp earth away from the sea.....Family POTAMONIDÆ
- E'. Terminal joints of last pair of legs usually unarmed. Species marine.....Family PILUMNIDÆ
- D'. Terminal joints of last pair of legs usually flatly expanded. Front well separated from inner orbital angles.....Family PORTUNIDÆ
- C'. Carapace usually triangular, with projecting pointed or spined rostrum.....Tribe *Oxyhychea*
- D. Basal joint of antennæ well developed, inserted beneath the eyes, and usually forming a great part of infraocular space.....Family MAHIDÆ
- D'. Basal joint of antennæ very small, and with the next joint embedded in the narrow gap between front and inner orbital angle.....Family PARTHENOPIIDÆ
- A'. Buccal frame usually triangular, narrowed forward; efferent channels opening at middle of endostome. Verges of male inserted in basal joints of fifth pair of legs.....Tribe *Oxytomata*
- B. Last one or two pairs of feet not articulated higher up than the preceding pairs.
- C. Afferent channels to branchiæ opening behind pterygostomian regions and in front of chelipeds.
- D. Palpus of the outer maxillipeds not concealed.....Family CALAPPIDÆ
- D'. Palpus of the outer maxillipeds concealed behind triangular acute merus.....Family MATUTIDÆ
- C'. Afferent channels to branchiæ opening at antero-lateral angles of endostome.....Family LEUCOSIDÆ
- B'. Last one or two pairs of feet articulated higher up than preceding pairs.....Family DORIPPIDÆ

## Tribe CATOMETOPA or GRAPSOIDEA.

Carapace broad anteriorly, often subquadrate, sometimes subglobose, truncate or arcuate anteriorly, but not rostrate. Front bent downward. Epistome short, often almost linear. The pairs of branchiæ are usually fewer than nine in number; the efferent channels open at the sides of the endostome. The male verges are inserted either in the sternal plastron or in the basal joints of the last pair of legs, thence passing through channels in the sternum beneath the pleon.

## Family OCYPODIDÆ Leach, 1819.

Carapace in general moderately convex, either caneroid or trapezoidal, with antero-lateral margins straight or arcuate, the branchial regions not generally dilated. The front is of moderate width or very narrow. The orbits and eye-stalks are of moderate size or greatly developed. The chelipeds in the adult male are in general of moderate size, sometimes slender and elongate. The seventh joint in the walking legs is styliform, without strong spines. The pleon does not always cover the whole width of the sternum between the last pair of legs.



*Key to the Porto Rican genera of the family Ocypodidae.*

- A. Carapace trapezoidal or quadrate. Eye-stalks elongate.  
 B. Lateral margins entire.  
 C. Eye peduncles stout; chelæ in male somewhat unequal..... *Ocypode*  
 C'. Eye peduncles slender; chelæ in male extremely unequal..... *Uca*  
 B'. Lateral margins toothed.  
 C. Antennæ excluded from the orbit by internal suborbital lobe..... *Euryplax*  
 C'. Antennæ not excluded from the orbit..... *Tetraplax*  
 A'. Carapace with antero-lateral margins areolate. Eye-stalks of moderate length.  
 B. Carapace rectangular posteriorly.  
 C. Antero-lateral margin not dentate..... *Chasmocarcinus*  
 C'. Antero-lateral margin dentate..... *Spicocarcinus*  
 B'. Carapace caneroid in form; postero-lateral margins converging posteriorly.  
 C. Chelipeds with palm more or less angular. Fingers elongate..... *Eucratopsis*  
 C'. Chelipeds with palm robust. Fingers short..... *Panoplax*

**Genus OCYPODE Fabricius.**

*Ocypode* Fabricius, Entom. Sys., Suppl., 312, 1798.

Orbits very large and open, extending all along the anterior margin on either side of the narrow and deflexed front. Eye-stalks large, the large corneæ covering much of the lower surface of this terminal joint. Chelipeds in the adult male are unequal and well developed, and the palm has a vertical series of short raised lines or tubercles on the inner surface, which form a stridulating ridge.

**\* *Ocypode albicans* Bose. Sand Crab; Ghost Crab.**

*Ocypoda albicans* Bose, Hist. Nat. Crust., I, 196, pl. 4, f. 1, 1802.

*Ocypode arcuarius* Say, Jour. Phila. Acad. Sci., I, 69, 1817.

*Ocypode arenaria* Miers, Ann. Mag. Nat. Hist. (5), X, 384, pl. XVII, figs. 7, 7a, 7b, 1882; Rathbun, Ann. Inst. Jamaica, I, 26, 1897.

*Ocypode albicans* Rathbun, Proc. Wash. Acad. Sci., II, 134, 1900.

Carapace coarsely granulate toward the sides, finely granulate on middle and posterior portions. Antero-lateral angles acute and prominent. Eyes rounded at the distal extremity. Stridulating ridge narrow, tuberculate. Ambulatory legs compressed, with long, yellow, marginal hairs.

Dimensions of male from Nassau: Length, 34 mm.; width, 41 mm.

From Long Island to Brazil; Bermudas. Porto Rico (Gundlach). Taken by the *Fish Hawk* party at Nassau, Bahamas, and the following Porto Rican localities: San Juan, Aguadilla, Puerto Real, Playa de Ponce, Hucares, Fajardo, and Ensenada Honda, Culebra.

The *Ocypode rhombea* listed by Gundlach probably does not differ specifically from his *Ocypode arenaria*.

Found on sandy beaches, where they dig holes at and above high-water mark. They live on refuse thrown up by the tide, and are partly nocturnal. Their color is that of the sand, and they are very swift of movement.

**Genus UCA Leach. Fiddler Crabs.**

*Uca* Leach, Edin. Encyc., VII, 430, 1814 (not *Uca* Latreille, 1819); Rathbun, Proc. Biol. Soc. Wash., XI, 154, 1897.

*Gelasimus* Latreille, Nouv. Diet. Hist. Nat., XII, 517, 1817.

Orbits extending all along the anterior margin of the carapace on either side of the comparatively narrow front. Eye-stalks long and slender. Chelipeds in the adult male strikingly unequal; in the female small and equal.

*Key to the Porto Rican species of the genus Uca.*<sup>1</sup>

- A. Front wide, for the genus.  
 B. Oblique ridge on inner surface of palm terminating at carpal cavity.  
 C. The two rows of tubercles on inner surface of palm at base of dactylus are divergent from below upward and leave a considerable space between them..... *mordax*  
 C'. The two rows of tubercles at base of dactylus are subparallel and near together..... *pugnax rapax*  
 B'. Oblique ridge not terminating at carpal cavity, but continued to near superior margin of palm..... *leptodactyla*  
 A. Front very narrow, but not linear nor spatuliform..... *thayeri*

<sup>1</sup> Gundlach recognizes the presence of the fiddler crab in Porto Rico under the name "*Gelasimus vocator*."

**Uca mordax** (Smith).

*Gelasimus mordax* Smith, Trans. Conn. Acad. Sci., II, 135, pl. II, f. 3, pl. IV, f. 4, 4a, 1870.  
*Uca mordax* Rathbun, Proc. U. S. Nat. Mus., XXII, 276, 1900.

Front broad and shallow; width at base or posteriorly about one-third the width between the anterior angles of the carapace; anterior margin almost straight. Lateral margin of carapace strongly curved inward anteriorly and forming blunt angles. Palm elongate, narrow toward the carpus; the oblique ridge on its lower inner surface is usually tuberculate and very much thickened, being several tubercles in width. In the Porto Rican specimens these tubercles are almost obsolete except at the proximal end of the ridge. The two rows of tubercles at the base of the dactylus on the inner surface of the palm are not parallel, but diverge from each other toward the upper margin.

A large species, over an inch in width. Length of male from Hucares, 16.4 mm.; width 27 mm.

From the Bahamas and the West Indies to Rio de Janeiro; Liberia (?). Rio Bayamon, above Palo Seco, 2 females; Hucares, 4 males.

**Uca pugnax rapax** (Smith).

*Gelasimus rapax* Smith, Trans. Conn. Acad. Sci., II, 134, pl. II, f. 2, pl. IV, f. 3, 1870.

Front with arcuate margin; width at base or posteriorly about two-sevenths the width between anterior angles of carapace. Lateral margin curved inward anteriorly, forming acute angles. Palm proportionally shorter and proximally broader than in *U. mordax*; the oblique ridge on its lower inner surface is formed of large tubercles and does not terminate so near the carpus as in *U. mordax*, and consequently is more oblique to the lower margin. The two rows of tubercles at base of dactylus are near together and subparallel. Smaller than *U. mordax*, usually less than an inch in width. Measurements of male from Boqueron Bay: Length, 14.5 mm.; width, 22.5 mm.

The subspecies which I designate under the name of *Uca pugnax rapax* is a West Indian form of fiddler, differing from the common *U. pugnax* of the east coast of the United States chiefly as follows: In *U. pugnax* the superior orbital border or eyebrow is nearly vertical and barely visible in a dorsal view, while in *U. pugnax rapax* the eyebrow is more oblique and readily visible from above. In *U. pugnax* the space between the dactylus and carpal cavity is coarsely granulate; in *U. pugnax rapax* finely granulate.

Florida Keys to Rio de Janeiro. In Porto Rico at Cataño; San Juan; Boqueron Bay, very numerous; Ensenada Honda, Culebra; Hucares, numerous; Fajardo.

The typical form of *U. pugnax* extends from Provincetown, Mass., to Georgia.

Frequents salt marshes. Taken in the mangrove swamps at San Juan Bay, Porto Rico.

**Uca leptodactyla** Rathbun.

*Uca leptodactyla* (Guérin ms.) Rathbun in Rankin, Ann. N. Y. Acad. Sci., XI, 227, 1898.

A small species, a little over a third of an inch wide, thicker and more cylindrical than any other of the Porto Rican species of *Uca*. The front at its base or posteriorly is about one-fourth the width between anterior angles of carapace. These angles are directed obliquely outward. The oblique ridge on lower half of inner surface of palm does not terminate at the carpal cavity, but is continued by an angular turn to near the superior margin of palm. This upper half of the ridge is parallel to the tubercular ridge at base of dactylus. Fingers of great claw very slender and delicate. Ambulatory legs light colored and marked with small dark spots, which form in part transverse bands.

Length of male from San Juan, 6 mm.; width, 9.8 mm.

Bahamas and West Indies to Santos, Brazil. Porto Rico: San Antonio Bridge, San Juan; Boqueron Bay; Ensenada Honda, Culebra; Fajardo.

**Uca thayeri** Rathbun.

*Uca thayeri* Rathbun, Proc. Washington Acad. Sci., II, 134, pl. VIII, figs. 1 and 2, 1900.

Carapace very broad in its anterior fourth, narrowing rapidly in its posterior three-fourths; antero-lateral angles almost rectangular, blunt; sometimes the carapace is narrower at orbital angles than a little behind that point, caused by the curving inward at lateral angle of one or both lateral margins. Dorsal furrows deep, especially the cervical and the transverse gastro-cardiac furrow; less deep are the obliquely longitudinal branchial furrow and the postorbital. Surface finely and densely granulate through the lens, and tomentose, the hair retaining particles of mud. Front very narrow, not linear nor spatuliform, but subtriangular, at base or posteriorly less than one-fifth the width between the antero-lateral angles of the carapace, anteriorly truncate or nearly so; sides oblique and almost straight;

superior orbital surface or eyebrow shallow, not varying much in length throughout its width; margins finely granulate. Inferior margin of orbit with large truncate tubercles, increasing in size and distance apart toward the outer extremity.

Large cheliped very heavy. Merus and carpus elongate, thick, rugose on the outer surface, and without armed margins. Outer surface of palm coarsely tuberculate on its upper half, the tubercles gradually becoming fine granules below; upper and lower margins set off by deep grooves. Inner surface of palm with a ridge marked by a single line of large tubercles, leading obliquely upward from the lower margin to the carpal cavity, where it turns at a little less than a right angle and is continued less than halfway to the upper margin, or when continued farther the tubercles are obsolete. On the palm at the base of the dactylus are two tuberculate lines, the distal one very short; both are slightly oblique to the lower margin. In full-grown males the fingers are very long, the lower margin of the propodus sinuous, the pollex bent down for its distal third. The dactylus equals or overreaches the pollex. The prehensile tubercles are irregular, but not strikingly so. The dactylus is roughened at its base on the upper side and has a short longitudinal groove on the outer side below the upper margin. The smaller cheliped is rather long, the fingers longer than the palm and somewhat gaping to the tips. Meral joints of ambulatory legs dilated and very broad, especially those of second and third pairs.

Old males show a tendency to widen behind the antero-lateral angles; this tendency is stronger on the side of the large claw. In males which are young or have not reached their fullest development the pollex of the large chela is straight, not bent down, and the lower margin of the propodus is convex, not sinuous. The meral joints of the ambulatory legs are wider in the female than in the male, as is the case in other species of the genus.

Male, length, 17.2 mm.; width, 27.5 mm.

Jamaica; Brazil at Natal, Rio Grande do Norte, also Rio Parahyba do Norte, São Matheos and Victoria. Porto Rico: Rio Bayamon above Palo Seco, 2 adult males with straight propodi, 1 adult female; Fajardo, 1 male, 1 female, both small but mature, large cheliped of male missing.

#### Genus EURYPLAX Stimpson.

*Euryplax* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 60, 1859; Bull. Mus. Comp. Zool., II, 150, 1871.

Carapace transverse, broad; antero-lateral margin very short, dentate; front nearly half as broad as the carapace; ocular peduncles of moderate length; antennal flagellum excluded from the orbit by a process of the basal joint, which joins the front. Palpus of the endognath of the outer maxillipeds articulating with the merus at its inner angle.

Verges of the male arising from coxæ of fifth pair of feet and passing through canals in the sternum. Sternum partially exposed in the sinus of the abdomen between its second and third segments. All the segments of abdomen distinct. Chelipeds heavy, not very unequal.

Only one species known from West Indian region, viz, *E. nitida* Stimpson, the type of the genus.

#### *Euryplax nitida* Stimpson.

*Euryplax nitidus* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 60, 1859; Smith, Trans. Conn. Acad. Sci., II, 162, 1870.

*Euryplax nitida* Stimpson, Bull. Mus. Comp. Zool., II, 150, 1871; Kingsley, Proc. Acad. Nat. Sci. Phila., XXXI, 399, 1879.

Carapace smooth and shining, convex fore and aft, as well as from side to side; antero-lateral margin less than half as long as the postero-lateral, and armed with three strong teeth including the angle of the orbit; carapace widest at the third tooth. Front deeply notched on each side at the insertion of the antennæ; inter-antennal margin nearly straight. Chelipeds in the male with a round pit at anterior distal corner of lower surface of merus; this pit is surrounded by a fringe of long hair; a sharp curved spine near the distal end of the upper surface of the merus. Carpus with a sharp inner spine; inner surface pilose. Ambulatory legs slender. Carapace of female narrower. Chelipeds more nearly equal. Merus without pit and surrounding hair.

The dimensions of two specimens are as follows:

| Sex.  | Locality.             | Length. | Width at third tooth. | Width at orbital tooth. |
|-------|-----------------------|---------|-----------------------|-------------------------|
| Male, | Cedar Keys, Fla ..... | 15      | 24.9                  | 20.8                    |
| Fem.  | Marco, Fla.....       | 15      | 24                    | 20.8                    |

West coast of Florida and Florida Keys to 49 fathoms (Stimpson); St. Thomas (Stimpson). Off Vieques, 14 fathoms, coral, sand, shells, station 6085, 1 small male.



Genus **TETRAPLAX**, nov.

Carapace quadrilateral; lateral margins dentate, somewhat converging posteriorly. Front about one-third the width of the carapace, margin nearly straight. Orbital margins nearly transverse. Eye-stalks elongate and of moderate thickness. Antennae entering the orbit. Buccal cavity wider in front than behind. Maxillipeds not completely filling the cavity; palpus articulating at the front inner angle of merus, which is slightly notched. Abdominal segments in male narrower than the sternum; third to fifth segments fused. Chelipeds unequal, heavy, angular; fingers pointed. Ambulatory legs long, slender, compressed; dactyli of last pair concave upward and outward.

Type, *Frevillea quadridentata* Rathbun, a species described from the female only. Having recently compared the male with the male of *F. barbata* A. Milne Edwards, I find the species generically distinct. *Frevillea* has very oblique orbital margins, terminating in a prominent antero-lateral spine, very stout eyes, while the abdomen of the male is very broad at base, covering the sternum.

**Tetraplax quadridentata** Rathbun.

*Frevillea quadridentata* Rathbun, Bull. Labor. Nat. Hist. State Univ. Iowa, IV, p. 287, pl. VIII, f. 1, 1898.

Carapace thick, about three-fourths as long as wide, covered with a short, dark-colored pubescence; when this is removed, the regions can be made out. Front about one-third the width of carapace, deflexed, edge thin, from above appearing slightly emarginate. Superior margin of orbit sloping outward and slightly backward to outer orbital tooth; a notch toward inner end, and another next outer tooth. The inferior margin has a notch next the outer tooth and a tooth at inner angle, between which and the antenna there is a triangular opening. Antero-lateral margin with three teeth besides the orbital; their outer edges are finely denticulate; the three teeth are very nearly in a line parallel to middle line of crab; orbital tooth less projecting. Postero-lateral margins longer than antero-lateral, and moderately converging. The sutures between the third and fourth, and fourth and fifth segments of abdomen of male are partially indicated. Terminal segment rounded at extremity. Chelipeds subequal, rather heavy. Merus with a spine on its superior margin at its distal third. Carpus with an inner spine and an anterior fringe of hair. Hand smooth and shining, finely granulate above, upper margin acute and very finely granulate. Lower outer margin of pollex with a granulated costa. Dactylus with two superior granulated costae and a superior fringe of hair.

The dimensions of three specimens from San Juan Harbor are as follows:

| Sex.                  | Length. | Width. | Width at antero-lateral angles. | Width of front. |
|-----------------------|---------|--------|---------------------------------|-----------------|
| Male.....             | 8.3     | 10.3   | 9                               | 3.5             |
| Ovigerous female..... | 8.1     | 10.4   | 9.1                             | 3.6             |
| Male.....             | 5.8     | 6.8    | 6.4                             | 2.5             |

San Juan Harbor,  $4\frac{1}{2}$  to  $5\frac{1}{2}$  fathoms, sand, mud, station 6054, 2 males, 1 female; Mayaguez Harbor, 12 fathoms, sticky mud, station 6060, 1 male. One specimen only, a female, had been taken previously by the *Albatross* at Curaçao. Three of the Porto Rican specimens are larger than the type and show that the species becomes relatively narrower as it increases in size.

Genus **CHASMOCARCINUS** Rathbun.

*Chasmocarcinus* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 284, 1898.

Carapace thick, broadest posteriorly, tapering anteriorly, without antero-lateral angles, the lateral margins forming a curve continuous with the anterior margin. Front narrow, bifid. Orbits marginal, oblong; eyes movable. Pterygostomial region with a horizontal suture as in *Scalopidia*. Antennula with basal joint very large and hemispherical. Epistome nearly perpendicular, its margin projecting below the maxillipeds. Maxillipeds widely separated throughout their length, longitudinally placed. Merus suboval, the palpus articulating at the antero-internal angle. Abdomen much narrower at base than the sternum; third, fourth, and fifth segments coalesced in the male. The sexual appendages pass to the coxae through ducts visible between the sternal segments. Abdominal segments distinct in the female. Chelipeds with merus trigonal, carpus quadrate, manus short and broad, fingers long and slender. Ambulatory legs slender, subcylindrical, the third pair the longest, the second next, the fourth the shortest. Dactylus of last pair recurved.

*Chasmocarcinus cylindricus*, sp. nov.

Length of carapace less than three-fourths its posterior width. Fronto-orbital width about half width of carapace. Carapace subcylindrical, almost level from side to side. Anterior half of lateral margin marked by a sharp granulated line. Sutures visible about cardiac region. At inner angle of the branchial region there is a depression from which various shallow wrinkled furrows radiate. Surface covered with a short pubescence. Front a little wider than either orbit; margin subtruncate, upper surface with a median depression, which in a dorsal view makes the margin appear bifid. Margin of orbit concave, directed obliquely outward and a little forward. Right cheliped larger than the left. Carpus with inner angle rounded, and without a tooth. Manus of larger cheliped about one-half wider than that of smaller in the male, and much more swollen, its fingers gaping at base; in the female the hands are more nearly equal and the fingers do not gape. Ambulatory legs narrow, fringed with hair.

The following are the dimensions of two specimens:

| Locality.         | Sex.        | Length. | Width. | Fronto-orbital width. |
|-------------------|-------------|---------|--------|-----------------------|
| Station 6061..... | Male .....  | 4.6     | 6.5    | 3.5                   |
| Station 6059..... | Female..... | 6.7     | 9.5    | 4.7                   |

This species is distinguished at a glance from the three previously described, by its broader and more cylindrical carapace.

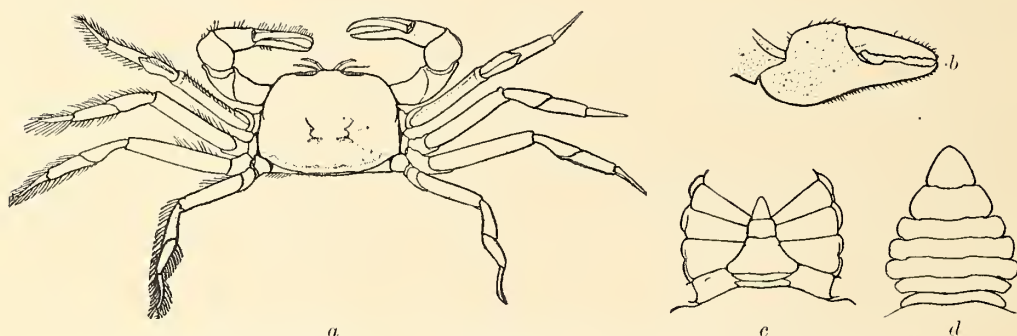


FIG. 1.—*Chasmocarcinus cylindricus*. (a) Female, dorsal view,  $\times 2$ . (b) Large chela of male,  $\times 2.66$ . (c) Abdomen of male,  $\times 4$ . (d) Abdomen of female,  $\times 4$ .

Type locality, Mayaguez Harbor, Porto Rico, 12 to 18 fathoms, sand, mud, station 6061, 4 males, 2 females (Cat. No. 23765). Other Porto Rican localities are off Aguadilla, 137 fathoms, sand, mud, and shells, station 6055, 1 female; Mayaguez Harbor, 7 fathoms, sticky mud, station 6059, 1 female; Mayaguez Harbor, 75 to 76 fathoms, rocky, sand, and coral, station 6063, 1 male, 3 juv.; Mayaguez Harbor, 161 to 172 fathoms, sand, mud, station 6066, 2 males, 2 females.

Genus *SPEOCARCINUS* Stimpson.

*Speocarcinus* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 58, 1859.

Carapace longitudinally convex, almost semicylindrical, transversely nearly flat; posteriorly narrowing very little, anteriorly margins arcuate and dentate. Front less than half the width of carapace. Orbits marginal, oblong, eyes movable. Outer maxillipeds moderately separated from each other; merus subquadrate, with a notch at antero-internal angle for the insertion of palpus. First two abdominal segments narrow, exposing largely the sternal segment; third segment much wider, but still not extending to coxal joints of legs; third, fourth, and fifth segments coalesced. Chelipeds short, thick. Ambulatory legs narrow, smooth, compressed; dactyli long, ciliate.

**Speocarcinus carolinensis** Stimpson.

*Speocarcinus carolinensis* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 59, pl. 1, figs. 1, 2, and 3, 1859; Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 281, 1898.

Carapace punctate, obsolete granulated toward margins. Gastric region well defined. Antero-lateral region 5-toothed, including angle of orbit; second tooth shallow, rounded, and not distinctly separated from first. Third, fourth, and fifth teeth well marked, sharp, separated by clearly marked U-shaped sinuses. Front about one-third width of carapace, with a median notch; the two lobes slightly oblique and sinuous. Merus of chelipeds with a strong tooth above near distal end; carpus with a blunt tooth at inner angle; hand smooth, punctate. Dactylus of last pair of ambulatory legs curved upward. Surface pubescent except that of the fingers. Lines of hairs on the hands and fingers and the margins of the ambulatory legs.

Male, station 6074: Length, 6.5 mm.; width, 8.5; width between outer angles, 6; width of front, 3. Female, station 6074: Length, 7.5; width, 9.8; width between outer orbital angles, 6.5; width of front, 3.2 mm.

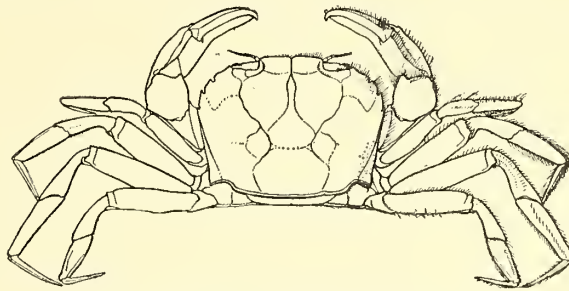


FIG. 2.—*Speocarcinus carolinensis*, female,  $\times 2.33$ .

Charleston Harbor, S. C. (type locality), in subterranean galleries excavated in mud at low-water mark by other crustaceans or by large worms. Tortugas, dredged. Mayaguez Harbor, Porto Rico, 12 to 18 fathoms, station 6061, and in 75 to 76 fathoms, station 6063; off Puerto Real,  $8\frac{1}{2}$  fathoms, station 6074.

The Porto Rican specimens are wider than the type, which was measured by Stimpson and is not extant, their lateral teeth are more distinctly separated, and the second tooth more prominent than in Stimpson's figure. The specimen from Tortugas which I referred to *S. carolinensis* in 1898, though smaller than the type, has the same proportions and similar teeth. There is, however, in the Museum of Comparative Zoology, a male from Charleston, S. C., the type locality, which is about the same size as the type specimen, but its proportionate width is intermediate between the type and the Porto Rican specimens, while the teeth are prominent and well separated, as in the latter.

**Genus EUCRATOPSIS** Smith.

*Eucratopsis* Smith, Trans. Conn. Acad. Sci., II, 35, 1869.

Carapace convex in an antero-posterior and a transverse direction, narrowing considerably posteriorly, antero-lateral margins with large teeth. Front less than half the width of carapace. Orbits and maxillipeds similar to those of *Speocarcinus*. Third abdominal segment not in contact with coxæ of fifth pair of feet in typical species; third, fourth, and fifth segments coalesced. Chelipeds short, thick; palm angular, with a distinct superior marginal line; fingers elongate.

**Eucratopsis spinidentata** (Benedict).

*Eucratopax spinidentata* Benedict, Johns Hopkins Univ. Cir., XI, No. 97, p. 77, 1892; Rathbun, Ann. Inst. Jamaica, I, 26, 1897. *Eucratopsis spinidentata* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 281, 1898.

Carapace finely granulate and pubescent. Regions distinctly marked. Front less than one-third the width of carapace, bilobed, lobes slightly rounded. Orbit slightly wider than frontal lobe. Lateral teeth five, including orbital; the second shallow and separated from the first by only a slight sinus; third rounded, obtuse, and little projecting; fourth and fifth prominent, spiniform. Merus of chelipeds with a superior tooth near distal end; carpus with two spiniform teeth, one at inner angle, the other below. Palm smooth on outer face, granulate above; fingers slightly bent down in the larger cheliped, more so in the smaller cheliped. Teeth of fingers irregular; when closed the fingers leave a slight gape proximally. Ambulatory legs pubescent and with hairy margins. Dactyli of last pair slightly recurved and bent upward.

Length of male from Boqueron Bay, 11 mm.; width between penultimate marginal teeth, 15.5 mm.; width between outer orbital angles, 9.8 mm.; width of front, 4.8 mm.

Jamaica (Benedict, Rathbun); Trinidad; Monos Island, off Trinidad; Puerto Real and Boqueron Bay, Porto Rico.



Genus **PANOPLAX** Stimpson.

*Panoplax* Stimpson, Bull. Mus. Comp. Zool., 11, 151, 1871.

Carapace arcuate anteriorly, quadrate posteriorly; front advanced; antero-lateral margin dentate. Merus of outer maxillipeds with inner posterior margin notched; also the inner anterior angle notched for articulation of palpus. Chelipeds heavy, palm robust; fingers short. Ambulatory legs narrow. First segment of abdomen of male is wide, covering the sternum; the second narrower, exposing the sternum; the third wider than second, but still not reaching the coxæ of fifth pair of feet.

**Panoplax depressa** Stimpson.

*Panoplax depressa* Stimpson, Bull. Mus. Comp. Zool., 11, 151, 1871.

Carapace depressed, regions fairly well marked, surface finely punctate, granulate along the lateral teeth; two oblique epigastric lobes. Front with two rounded lobes. Superior orbital margin with two notches; orbit as wide as each frontal lobe. Lateral teeth five, including orbital; the second shallow, separated from first by a shallow sinus; the third large, blunt, outer margin very arcuate; fourth triangular, with a spiniform tip; fifth very small, not projecting beyond general outline. Postero-lateral margins moderately converging posteriorly. Chelipeds unequal; merus and carpus granulate toward the margins; merus dentate on superior margin; carpus oblong, with a stout blunt tooth at the inner angle and a few tubercles below it; an anterior transverse groove. Hands smooth and rounded, punctate; fingers dark brown, color not extending to palm; prehensile teeth broad, low, a larger one at base of dactylus; no gape. In the female the upper surface of the manus is flattened, with traces of two longitudinal carinae and an intermediate furrow. Meral joints of ambulatory legs roughened on anterior margins, following joints hairy.

Length of male, 6.8 mm.; width, 9.5 mm.; width between outer orbital angles, 6.5 mm.; width of front, 3 mm.

East and Middle Keys, Tortugas, 5 to 7 fathoms (type locality); Jamaica. Porto Rico: Mayaguez Harbor, 4 to 6 fathoms, station 6065; off Punta de Melones, 7½ fathoms, station 6072; off Humacao, 9½ fathoms, station 6099; Ensenada Honda, Culebra.

Family **PALICIDÆ** Rathbun, 1898.

Carapace broadly transverse, subquadrate; antero-lateral margins dentate. Fronto-orbital width great, front dentate. Orbits and eyes large. Buccal cavity quadrate; outer maxillipeds not covering it; ischium strongly produced forward on the inner side; merus small, subtriangular, with a notch on the inner distal side for the articulation of the palpus. Afferent channels to branchiae opening at bases of chelipeds; efferent channels at antero-external angles of buccal cavity. Chelipeds of moderate size, often unequal in the male; usually tuberculate or granulate. Next three pairs of feet long, slender, and rough. Last pair very short and slender, subdorsal, smooth. Abdomen of male much narrower than the sternum.

This family contains only one genus.

Genus **PALICUS** Philippi.

*Cymopolia* Roux, Crust. Médit. (page 77), 1828. (Name preoccupied.)

*Palicus* Philippi, Zweiter Jahresber. d. Vereins f. Naturk. in Cassel, 11, 1838.

Characters of the family.

*Key to the Porto Rican species of the genus Palicus.*

- A. Abdomen and sternum with conspicuous laminiform expansions, visible in a dorsal view.....*alternatus*  
 A'. Abdomen and sternum without conspicuous laminiform expansions, visible in a dorsal view.....*sica*

**Palicus alternatus** Rathbun.

*Palicus alternatus* Rathbun, Proc. Biol. Soc. Wash., XI, 95, 1897.

Carapace subquadrate, coarsely granulate. Front with four distinct lobes, the median pair smaller and more deeply separated from each other than from outer pair. Superior orbital lobes subquadrate; outer margin of outer orbital tooth nearly straight; median lobe of inferior margin most advanced at

its inner angle. Lateral teeth two, broad, lobate, obtuse; in large specimens a third very small tooth or tubercle behind the second.

There are two forms of the male in this species. In one the appendages of first segment of abdomen are strong and twisted, tip bilobed, inner lobe thinner and longer than outer. In the second form the appendages are weaker and not twisted, the tip less spreading. In the first form, the chelipeds are very unequal, the left always slender and weak, the right large and heavy. Both chelipeds tuberculate and pubescent. Carpus covered with irregular laminiform lobes; manus surmounted by a double crest of same. Width of right manus at its distal end equals one-half length of carapace. Pollex very short. Dactylus strongly bent down, overlapping pollex at tip. Left manus a little more than one-third width of right, enlarging but little toward the long and rather narrow fingers. In the second form of the male the right manus is about twice the width of left and its fingers are also long and slender. In the female the hands are more nearly equal. The second ambulatory leg is about twice the length of carapace; the first reaches about the middle of propodus of second; the third reaches about middle of dactylus of second. The meri are rough with squamose tubercles, and have two longitudinal grooves on upper surface and one on anterior surface. The anterior margin terminates in a blunt rectangular tooth in the second and third pairs; in the first pair this tooth is produced outward toward the carpus. Posterior margin of the dactyli concave as a whole, but nearly straight for the proximal two-thirds.

Dimensions of male, form I: Length, 6.6 mm.; width, 7.6 mm.; length of second ambulatory leg, 14 mm.; length of merus, 4.4 mm.; carpus, 2.2 mm.; propodus, 3.6 mm.; dactylus, 3.2 mm. Male, form II: Length, 11 mm.; width, 13.2 mm.

Off St. Thomas, 20 to 23 fathoms, station 6079, *Fish Hawk*, 1 male, form I, and 1 young female. From off Cape Hatteras to the Gulf of Mexico, 24 to 60 fathoms.

#### ***Palicus sica* (A. Milne Edwards).**

*Cymopolia sica* A. Milne Edwards, Bull. Mus. Comp. Zool., VIII, 29, 1880 (part).

*Palicus sica* Rathbun, Proc. Biol. Soc. Wash., XI, 97, 1897.

Carapace granulate, many of the granules forming clusters on the more elevated regions. Front with four small tuberculiform teeth, the median the most prominent, separated from each other by a deep triangular notch and from the lateral teeth by very broad shallow sinuses. The tooth of the superior orbital border nearest preorbital is arcuate; the next narrower, also obtuse. The median suborbital lobe is subtriangular and much less advanced than inner lobe. The lateral margin of carapace bears three small thickened teeth. Just above posterior margin a sinuous line of tubercles. First segment of abdomen with a narrow carina on either side behind the postero-lateral angle of carapace. Second carinated throughout its width, the carina much longer in center. Third segment carinated, but much less sharply. A carina on sternum, in a line with suture between second and third abdominal segments, extends well outwardly, but not so far posteriorly as the second abdominal. These carinae form horizontal plates, visible in a dorsal view, excepting that of the third abdominal segment in the male. Chelipeds slender and feeble. Ambulatory legs of moderate length, the third very little shorter than second, the first very slender and reaching about midway of carpus of second; merus of second pair long and comparatively narrow; of second and third pairs with longitudinal rows of spinules, and a deep groove on anterior half; anterior distal angles subrectangular.

Length of adult female, 9.8 mm.; width, 13.5 mm. The width varies from 1.25 times its length in small specimens to 1.39 times its length in large ones.

Mayaguez Harbor, 97 to 120 fathoms, station 6067, 1 young male. From the Gulf of Mexico and Florida Keys to Barbados and Grenada, 60 to 117 fathoms.

#### Family GECARCINIDÆ Milne Edwards, 1837. Land Crabs.

Carapace dorsally very convex, especially dilated over and in front of the branchial regions, with the antero-lateral margins usually entire and strongly arcuate. The front is of moderate width and strongly deflexed. The orbits and eye-stalks are of moderate size. The third maxillipeds have the fifth joint articulated at the front outer or near the front inner angle or at the apex of the fourth, which sometimes completely conceals it. The chelipeds in the adult male are powerful, usually unequal. The seventh joint in the walking legs is nearly always granulated and armed with longitudinal rows of spines. The pleon of the male usually covers the whole space between the bases of the last pair of walking legs.

*Key to the Porto Rican genera of the family Gecarcinidae.*

- A. Palpus of outer maxillipeds inserted on inner face of merus near its summit and concealed under the joint. . . . . *Gecarcinus*  
 A'. Palpus of outer maxillipeds inserted at external angle of merus and exposed to view.  
 B. Inner edges of ischium and merus of outer maxillipeds in one line ..... *Ucides*  
 B'. Inner edges of ischium and merus of outer maxillipeds forming a reëntering angle ..... *Cardisoma*

**Genus GECARCINUS Leach.**

*Gecarcinus* Leach, Edin. Encyc., VII, 430, 1814.

Carapace oval, not high, but much swollen laterally; lateral margin not distinctly marked. Front very strongly recurved downward. Orbits deep, oval, and without a notch on the external margin. Inner antennæ almost entirely concealed under the front. Buccal cavity nearly circular. External maxillipeds very wide, with a wide space between them; the merus as large as the ischium, and covers entirely the small, two-jointed palpus which is inserted on its inner face. Margins of feet armed with spiniform teeth.

***Gecarcinus lateralis* (Fremenville).**

*Ocypoda lateralis* Fremenville, Ann. Sci. Nat. (2), III, 224, 1835.

*Gecarcinus lateralis* Guérin, Icon. Règne Anim., pl. V, f. 1.

Carapace four-fifths as long as wide. Median and cervical sutures deep. Lateral border with a few spinules near orbit. Lower margin of orbit denticulate. Inner border of merus of outer maxillipeds without a distinct notch. Chelipeds very unequal; carpus without teeth on its inner margin. Fingers gaping. Dactyli of ambulatory legs armed with four rows of spines.

Length of male, Vieques, 40.3 mm.; width, 50 mm.; width between outer orbital angles, 25.6 mm.; width of front near lower margin, 10.5 mm.

Bahamas; Florida Keys to United States of Colombia and Venezuela; Bermudas. Porto Rico: Arroyo, under logs on land 20 feet above high water; Caballo Blanco Reef, Vieques; Mayaguez (Gundlach).

**Genus UCIDES Rathbun.**

*Uca* Latreille, Nouv. Dict. Hist. Nat., xxxv, 96, 1819 (not *Uca* Leach, 1814).

*Ucides* Rathbun, Proc. Biol. Soc. Wash., XI, 154, June 9, 1897.

*Oedipleura* Ortmann, Zool. Jahrb., Syst., x, 334, 1897.

Carapace oval and very high. Front very narrow, strongly inclined and almost semicircular. Orbits rather large and open outside below the external angle. Buccal cavity of rhomboidal form; merus and ischium of external maxillipeds quadrilateral, almost the same size, with a straight inner border. Palpus articulated at outer angle of merus and applied against its anterior border. Dactyli of ambulatory legs not spinous.

***Ucides cordatus* (Linnaeus). Plate I.**

*Cancer cordatus* Linnaeus, Amoen. Acad., VI, 414, 1763.

*Ucides cordatus* Rathbun, Ann. Inst. Jamaica, I, 25, 1897, and synonymy.

Carapace of male three-fourths as long as broad. Lateral margin a line of indistinct granules. Chelipeds very unequal, the larger one very long and strong, both armed on inner surface with strong spines, especially along margins; fingers spoon-shaped at tips, those of large chela widely gaping. Ambulatory legs densely fringed with long hair. Female considerably narrower than male; lateral marginal line very prominent; chelipeds short and subequal; ambulatory legs sparsely hairy.

Length of male, Rio de Janeiro, 54 mm.; width, 70 mm.; width between outer orbital angles, 43.4 mm. Length of female, San Juan, 32 mm.; width, 40.5 mm.; width between outer orbital angles, 28.5 mm.

Porto Rico: San Juan; Rio Bayamon, above Palo Seco; Porto Rico (Gundlach). Cuba; Jamaica; St. Thomas; Surinam; Brazil.

**Genus CARDISOMA Latreille.**

*Cardisoma* Latreille, Encyc. Méth., Hist. Nat., Insectes, x, 685, 1825.

Carapace very high, squarish. Front very wide and almost straight. Buccal cavity in the form of an elongated square. The ischium of the external maxillipeds is narrow anteriorly, and the merus, a little shorter than the ischium, widens from behind forward in such a way as to form between the maxillipeds a rhomboidal space; the merus is almost heart-shaped, is cut on its anterior border, and has the palpus inserted at its external angle; the palpus is exposed to view. Dactyli of ambulatory legs very spinous.



**Cardisoma guanhumii** Latreille.

*Cardisoma guanhumii* Latreille, Eucyc. Méth., Hist. Nat., Insectes, x, 685, 1825.

Carapace of male very large, about four-fifths as long as wide, much swollen outside lateral margin, which is either faintly or distinctly indicated; a notch behind outer orbital angle. Front wider than orbit, bent down, with a broad median sinus on its margin. The chelipeds are extremely unequal, the larger one very powerful, tuberculate along margins of both chela; fingers of large chela widely gaping. Ambulatory legs spinous. The chelipeds of the female are also unequal, but much less so than in the male.

Length of male from San Juan market, 77 mm.; width, 94 mm.; width between outer orbital angles, 68 mm.; posterior width of front, 28 mm.

Bahamas; Florida Keys to Brazil; Bermudas (Rankin). Porto Rico: Collected by the Fish Commission at Cataño; San Juan market; Rio Bayamon, above Palo Seco. Porto Rico (Gundlach).

Its common name in Porto Rico is "Juey" (San Juan market).

## Family GRAPSIDÆ Milne Edwards, 1837.

Carapace depressed or moderately convex, more or less quadrilateral, with the lateral margins straight or slightly arcuate. Front never very narrow, in general decidedly broad. Orbits and eye-stalks of moderate size. Third maxillipeds with the palpus articulated at the apex or at the front outer angle of the merus. Chelipeds in adult male usually subequal, moderately developed. In the walking legs the seventh joint is styliform, compressed, and either smooth or spiniferous. The pleon at the base usually covers the whole width of the sternum between the last pair of legs.

*Key to the Porto Rican genera of the family Grapsidæ.*

- A. Antennæ covered by the front.
  - B. External maxillipeds without a piliferous ridge.
    - C. Antennæ excluded from the orbit ..... *Goniopsis*
    - C'. Antennæ entering the orbit.
      - D. Merus of maxillipeds longer than broad.
        - E. Fingers spoon-shaped at tips ..... *Grapsus*
        - E'. Fingers acute ..... *Geograpsus*
      - D'. Merus of maxillipeds as broad as long ..... *Pachygrapsus*
  - B'. External maxillipeds with a piliferous ridge.
    - C. Lateral margins straight.
      - D. Carapace elongate, very narrow behind ..... *Aratus*
      - D'. Carapace transverse, usually quadrate ..... *Sesarma*
    - C'. Lateral margins arcuate and entire ..... *Cyclograpsus*
- A'. Antennæ visible from above.
  - B. Merus of maxillipeds large, as broad as ischium ..... *Plagusia*
  - B'. Merus of maxillipeds small, much narrower than ischium ..... *Percnon*

## Genus GONIOPSIS de Haan.

*Goniopsis* de Haan, Fauna Japon., p. 5, 1833; p. 33, 1835.

Carapace flat; front vertical, over half as wide as carapace; sides straight, with one tooth. Sub-orbital lobe broad, reaching the front and excluding the antenna from the orbit. External maxillipeds narrow; merus and ischium of equal length.

**Goniopsis cruentata** (Latreille). *Mangrove Crab*. Plate 1.

*Grapsus cruentatus* Latreille, Hist. Nat. Crust., vi, 70, 1803.

*Grapsus (Goniopsis) cruentatus* de Haan, Fauna Japon., 33, 1835.

Front granulate, suprafrontal lobes four, margins crenulate, orbits entire above, two notches below on outer half. Carapace with oblique ridges on branchial regions, transverse ridges anteriorly. Anterior margin of merus of chelipeds expanded, dentate, the upper and lower margins with spiniform tubercles, as is also the upper margin of carpus. Hands with spiniform tubercles above and below, the middle of the outer surface smooth, the inner surface with scattered prominent tubercles. Thumb

and finger subexcavate, the latter spinose above. Ambulatory feet compressed and armed with stiff black bristles. Posterior angle of merus of last pair rounded, in the other feet dentate.

Dimensions of male: Length, 48 mm.; width, 57.5 mm.; width of front, 28.6 mm.

Bahamas and Florida Keys to Rio de Janeiro; Pensacola in fish stomach; Bermudas; West Africa, west coast of Nicaragua (Kingsley). Porto Rico: Rio Bayamon, above Palo Seco; Hincares; Ensenada Honda, Culebra; San Juan (G. M. Gray coll.); Mayaguez (Gundlach). Also taken at Nassau, Bahamas, by the *Fish Hawk*.

Very abundant on the mangrove roots and a conspicuous object with its dark reddish-brown body and almost white palms.

**Genus GRAPSUS Lamarck.**

*Grapsus* Lamarck, Sys. Anim. sans Vert., 150, 1801.

Sides arcuate, with one tooth behind the orbital angle. Front narrow, deflexed. Antennae entering the orbit. External maxillipeds narrow, widely gaping; merus oblong. Fingers of chelipeds excavate.

***Grapsus grapsus* (Linnaeus).**

*Cancer grapsus* Linnaeus, Sys. Nat., 10th ed., i, 630, 1758.

*Cancer (Grapsus) grapsus* Latreille, Règne Anim. Cuvier, iii, 16, 1817.

Carapace depressed, transversely plicate, folds anteriorly broken up into squamiform tubercles. Frontal crest four-lobed, median lobes the larger, their margins subtuberculate. Frontal margin crenulate, regularly arcuate. Lateral margin very arcuate. Inferior border of orbit with a deep fissure. Inner border of ischium and merus of cheliped spinous, lower margin of merus spino-tuberculate, outer surface plicate. Carpus with distant tubercles, its inner margin with a laminate spine. Hand above tuberculate and with a large distal tooth, externally with longitudinal ridges, below with oblique folds. On the inner surface the tubercles and folds are less prominent. Fingers of moderate length, tips excavate. Ambulatory feet compressed, last two joints spinose.

Dimensions of male: Length, 57 mm.; width, 65.5 mm.; width between outer orbital angles, 45.5 mm.; width of front, 24.5 mm.

Porto Rico: San Juan; Aguadilla; Boqueron Bay; Guanica Bay; reefs at Ponce; Arroyo; Hucares; Caballo Blanco Reef, Vieques; Quebradillas (Gundlach). Distributed throughout the Tropics.

**Genus GEOGRAPSUS Stimpson.**

*Geograpsus* Stimpson, Proc. Acad. Nat. Sci. Phila., x, 101, 1858.

Carapace depressed, sides curved anteriorly, straight behind, one tooth behind the angle of the orbit. Front less than one-half width of carapace, strongly deflexed. Internal suborbital lobe of moderate size, reaching the front. Antennae entering the orbit. Outer maxillipeds narrow, merus scarcely shorter than ischium. Fingers of chelipeds acute.

***Geograpsus lividus* (Milne Edwards). Land Crab.**

*Grapsus lividus* Milne Edwards, Hist. Nat. Crust., ii, 85, 1837.

*Geograpsus lividus* Stimpson, Ann. Lyc. Nat. Hist. N. Y., vii, 230, 1860.

Carapace much broader than long, depressed. Plications nearly transverse. Frontal lobes prominent, front deflexed, its margin nearly straight. Sides of carapace slightly arcuate. Orbit with a deep fissure below. Merus of chelipeds with transverse rugae above and below, its inner margin expanded, proximally denticulate, distally with larger teeth. Carpus granulate, a short spine on the inner margin. Hand and dactylus tuberculate above, externally and below with short, oblique rugae; fingers acute. Distal angle of meral joints of last pair of ambulatory feet rounded.

Dimensions of male: Length, 24.8 mm.; width, 30.2 mm.; width between outer orbital angles, 24.5 mm.; width of front below, 12 mm.

Florida Keys to Sabanilla, United States of Colombia; Bermudas (Verrill); Lower California to Chile; James Island, Galapagos. Porto Rico: Puerto Real; Ponce, on reefs; Hucares; Ensenada Honda, Culebra; Vieques (Dr. L. Stejneger, March 28, 1900).

Genus **PACHYGRAPSUS** Randall.

*Pachygrapsus* Randall, Jour. Acad. Nat. Sci. Phila., VIII, 127, 1839.

Carapace somewhat narrowed behind and with transverse striae. Sides entire, or with one or two teeth. Front more than half the width of the carapace, moderately deflexed. Inner suborbital lobe small, allowing the antennæ to enter the orbit. External maxillipeds widely gaping; merus as broad as long.

*Key to the Porto Rican species of the genus Pachygrapsus.*

A. Superior margin of palm and movable finger entire..... *transversus*  
 A'. Superior margin of palm and movable finger denticulate..... *gracilis*

**Pachygrapsus transversus** Gibbes.

*Grapsus transversus* Gibbes, Proc. Amer. Assoc. Adv. Sci., III, 181, 1850.

*Pachygrapsus transversus* Gibbes, Proc. Amer. Assoc. Adv. Sci., III, 182, 1850.

Carapace depressed, shining, with transverse plicæ, oblique on the branchial region. Sides strongly converging posteriorly, slightly arcuate, with one tooth behind the orbital angle. Frontal lobes prominent, front sinuous. Merus of chelipeds with transverse rugæ, inner margin denticulate; carpus rugose, with an inner rounded tubercle. Hand minutely granulate, a longitudinal ridge on lower outer surface, margins rounded; dactylus with upper margin smooth. Postero-distal angle of the merus of the ambulatory legs dentate.

Dimensions of male: Length, 11.3 mm.; width at lateral tooth, 14.8 mm.; width at outer orbital angles, 14.5 mm.; width of front below, 8.3 mm.

Bahamas and Florida Keys to Rio de Janeiro; Bermudas; West Africa; Oriental region; Galapagos Islands; California to Peru. Porto Rico: San Juan, on beach; Mayaguez, on reefs; Puerto Real; Boqueron Bay; Guanica Bay; Guanica, on reefs; Ponce, on reefs; Arroyo; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra; Fajardo.

**Pachygrapsus gracilis** (Saussure).

*Metopograpsus gracilis* Saussure, Mém. Soc. Phys. Hist. Nat. Genève, XIV, 443, pl. II, f. 15, 1858.

*Pachygrapsus gracilis* Stimpson, Ann. Lye. Nat. Hist. N. Y., x, 113, 1871.

Carapace much as in *P. transversus*, but with no folds on the cardiac region; lateral margins nearly straight, with one tooth. Frontal lobes nearly obsolete; front very broad, nearly horizontal, regularly arcuate and minutely crenulate. Hand and dactylus of cheliped spined or toothed above.

Dimensions of male: Length, 12 mm.; width at lateral tooth, 16 mm.; width at outer orbital angles, 15.5 mm.; width of front, 10 mm.

Bahamas; Florida; West Indies; Yucatan; Sabanilla, United States of Colombia; Rio Parahyba do Norte, Brazil; Bermudas. Porto Rico: Boqueron Bay (*Fish Hawk*); San Juan (G. M. Gray coll.). Also taken at Nassau, Bahamas, by the Fish Commission party.

Genus **ARATUS** Milne Edwards.

*Aratus* Milne Edwards, Ann. Sci. Nat. (3), XX, 187 (153), 1853.

Carapace trapezoidal, elongate, narrow behind; sides straight, entire. Front deflexed, very broad. External maxilliped with an oblique piliferous ridge crossing the merus and ischium; merus elongate; apex rounded. Ambulatory feet compressed, the dactyli very short.

**Aratus pisonii** Milne Edwards. *Mangrove Crab.*

*Sesarma pisonii* Milne Edwards, Hist. Nat. Crust., II, 76, pl. XIX, figs. 4 and 5, 1837.

*Aratus pisonii* Milne Edwards, Ann. Sci. Nat. (3), XX, 187 (153), 1853.

Carapace transversely arcuate, branchial regions obliquely plicate. Regions well marked. Front vertical, its margin two-lobed. Merus of chelipeds triquetral, margins denticulate, inner margin slightly expanded distally. Carpus externally granulate. Hands everywhere granulate, the outer surface of palm and fingers ornamented with pencils of stiff black hairs.

Dimensions of male: Length, 23 mm.; width, 24.5 mm.; width of front, 16.7 mm.

Florida to Brazil; west coast of Nicaragua; Ecuador. Porto Rico: Mayaguez, in fresh water; Boqueron Bay; Puerto Real; Hucares, where it was seen climbing mangrove trees. Also taken at Nassau, Bahamas. San Juan, Porto Rico (Gundlach); also collected by G. M. Gray.



Genus **SESARMA** Say.

*Sesarma* Say, Jour. Phila. Acad. Sci., 1, 76, 1817.

Carapace thick, quadrate; lateral margins straight, and entire or toothed. External maxillipeds with an oblique piliferous ridge crossing ischium and merus; the merus elongate, its apex rounded. Antennae entering the orbit.

*Key to the Porto Rican subgenera of the genus Sesarma.*

A. Lateral margins with a tooth behind the orbital angle.....*Sesarma*  
 A'. Lateral margins entire.....*Holometopus*

Subgenus **SESARMA** Say.

Lateral margins of carapace with a tooth behind orbital angle. No pectinated ridges on upper surface of the palm.

**Sesarma (Sesarma) curaçaoense** de Man.

*Sesarma curaçaoensis* de Man, Notes Leyden Mus., xiv, 257, pl. x, f. 6, 1892.

Carapace wide; superior frontal lobes faintly marked; lateral teeth prominent and separated by a deep notch. Surface finely punctate and with scattered bunches of fine pubescence. Eyes reaching the extremity of the outer angle of the orbit. Propodus of cheliped in male very short and deep; dactylus strongly arched.

Dimensions of male: Length, 12.2 mm.; anterior width, 15.1 mm.; posterior width, 14.9 mm.; superior frontal width, 8.9 mm.; length of propodus of cheliped, 12 mm.; greatest depth of same, 7.8 mm.

Curaçao; Jamaica; Cuba. One male was taken in Porto Rico, but is without indication of special locality.

Subgenus **HOLOMETOPUS** Milne Edwards.

*Holometopus* Milne Edwards, Ann. Sci. Nat. (3), xx, 187 (153), 1853.

Lateral margins of the carapace entire. No pectinated ridges on the upper surface of the palm.

**Sesarma (Holometopus) ricordi** Milne Edwards.

*Sesarma ricordi* Milne Edwards, Ann. Sci. Nat. (3), xx, 183 (149), 1853.

Carapace broader than long, and broader posteriorly than anteriorly. Granules of anterior and antero-lateral regions few and small, and scarcely visible to naked eye. Front about 3.5 times as wide across the superior lobes as it is high; sides concave. Appendages of first abdominal segment transversely arcuate and fringed with hair. Carpus of chelipeds rugose. Hands smooth to eye, showing numerous fine granules under the lens. Ambulatory legs long and slender, merus of third pair being 3 or more times as long as broad in adults, less than 3 times as long as broad in small specimens.

Dimensions of male: Length, 14.4 mm.; anterior width, 15.5 mm.; posterior width, 15.2 mm.; width of front on a level with the superior orbital lobes, 8.3 mm.

Florida Keys to Sabanilla and Trinidad; Bermudas (Verrill). Porto Rico: Puerto Real; Boqueron Bay; Hucare; Ensenada Honda, Culebra. It is probably this species which Gundlach reports from Bayamon as *Sesarma cinerea*.

Genus **CYCLOGRAPSPUS** Milne Edwards.

*Cyclograpsus* Milne Edwards, Hist. Nat. Crust., II, 77, 1837.

Carapace anteriorly deflexed; sides arcuate, entire; front about half the width of carapace. Antennae not excluded from orbit. Merus of external maxillipeds about as long as the ischium; its external angle well marked, the palpus articulating with the anterior margin; merus and ischium crossed by an oblique piliferous ridge.

**Cyclograpsus integer** Milne Edwards.

*Cyclograpsus integer* Milne Edwards, Hist. Nat. Crust., II, 79, 1837.

Carapace for the most part smooth and punctate; granulate near front and antero-lateral angle. Lateral margins marked by a raised granulate line. Inferior border of orbit separated from external angle by a deep cut; no postorbital furrow. Merus of chelipeds with a faint subterminal lobe on

upper margin. Outer surface of merus and inner margin of carpus granulate. Otherwise the chelipeds are smooth and unarmed. Propodal and terminal joints of ambulatory legs spinous.

Dimensions of male: Length, 10 mm.; anterior width, 8.6 mm.; posterior width, 12.2 mm.; width of front below, 4.5 mm.

Florida; Bahamas; West Indies; Sabanilla, United States of Colombia; Brazil; Bermudas. Porto Rico: Beach at San Juan; reefs at Ponce; Ensenada Honda, Culebra; Hucares.

#### Genus **PLAGUSIA** Latreille.

*Plagusia* Latreille, Gen. Crust., 1, 33, 1806.

Carapace much flattened and with numerous tubercles. Antennules exposed in deep longitudinal sinuses of the front and visible in a dorsal view. Outer maxillipeds with merus joint well developed, as wide as ischium. Merus joints of ambulatory legs spined near distal end. Male genital appendages of first pair without a terminal claw.

#### **Plagusia depressa** (Fabricius).

*Cancer depressus* Fabricius, Sys. Ent., 406, 1775.

*Plagusia depressus* Say, Jour. Phila. Acad. Sci., 1, 100, 1817.

Carapace broader than long; surface covered with depressed tubercles margined with short setae. A series of about six prominent acute tubercles arranged in an arc across front of gastric region. Lateral margins three-spined behind orbit. Frontal margin tuberculate between antennules, with two blunt teeth between antennule and orbit. Outer orbital spine strong. Terminal segment of the abdomen in male with sides distinctly convergent. Chelipeds with tuberculate crests above, fringed with setae. The lobe above the bases of the second and third ambulatory legs broad and regularly dentate.

Male: Length, 38 mm.; width, 39.5 mm.; width between outer orbital angles, 24 mm.

Known from Charleston, S. C., to Brazil; from the Mediterranean to St. Helena and South Africa; Bermudas (Verrill). Porto Rico: Arroyo (*Fish Hawk*); San Juan (Gundlach).

#### Genus **PERCNON** Gistel.

*Acanthopus* de Haan, Fauna Japon., 5, 1833; 29, 1835. (Name preoccupied.)

*Percnon* Gistel, Naturg. Thierreichs, p. VIII, 1848.

*Leiolophus* Miers, Cat. Crust. New Zealand, 46, 1876.

Carapace remarkably flattened, with smooth naked ridges on its upper surface, but without numerous tubercles. Antennules exposed in deep longitudinal sinuses of the front and visible in a dorsal view. Outer maxillipeds with merus joint very small and much narrower than preceding joint. Merus joints of ambulatory legs with a series of spines on their upper margins. Male genital appendages of the first pair not twisted, with a terminal hook.

#### **Percnon planissimum** (Herbst).

*Cancer planissimus* Herbst, Naturg. Krabben u. Krebse, III, pt. 4, p. 3, pl. LIX, f. 3, 1804.

*Leiolophus planissimus* Miers, Cat. Crust. New Zealand, p. 46, 1876.

*Percnon planissimum* Rathbun, Proc. U. S. Nat. Mus., XXII, 281, 1900.

Carapace suborbicular, longer than broad, antero-lateral margin with three teeth besides the orbital. Front with four spines between antennules, three spines between antennule and orbit. Merus and carpus of chelipeds spinous. Hands in male strong; palms compressed and considerably dilated, much broader than the wrist, not sulcated on upper margins. Greatest width of abdomen of male exceeding its length to base of last segment. Ambulatory legs with transverse bands of color.

Male: Length, 22 mm.; width, 20 mm.; width between outer orbital angles, 13.7 mm.

Playa de Ponce Reef, Porto Rico. Distributed throughout the West Indian region to Brazil; Bermudas (Verrill); Azores; west coast of Spain and Portugal; west and south Africa; Oriental region from Mauritius to Japan, and Sandwich Islands; Clarion Island, Mexico; Cape St. Lucas; Chile.

## Family PINNOTHERIDÆ Milne Edwards, 1837.

Carapace often more or less membranaceous, antero-lateral margins entire or very slightly dentate. Front, orbits, and eye-stalks very small. Buccal frame usually arcuate anteriorly. Outer maxillipeds with the fourth joint well developed, and usually the third also, the fifth articulating usually at the apex or at front inner angle of the fourth. Chelipeds in adult male small or moderately developed. Walking legs slender, with the seventh joint styliiform, unarmed. The pleon of the male in general does not cover the whole width of sternum between the last pair of legs.

Crabs of small size, living often in shells of bivalve mollusks, in or on the tests of Echini, and in tubes of worms.

*Key to the Porto Rican genera of the family Pinnotheridæ.*

- A. Dactyli of ambulatory legs simple, acute.  
 B. Third ambulatory leg very little, if any, longer than the other legs ..... *Pinnotheres*  
 B'. Third ambulatory leg longer and stronger than the others, usually considerably so. .... *Pinnaxa*  
 A'. Dactyli of first, second, and third pairs of ambulatory legs bifurcate ..... *Dissodactylus*

## Genus PINNOTHERES Latreille.

*Pinnotheres* Latreille, Hist. Nat. Crust., III, 25, 1802.

Carapace smooth, subglobose, more or less membranaceous, very little wider than long. Orbits small, nearly circular. Front narrow, with the anterior margin nearly straight. Antennules obliquely transverse; merus large, usually curved, last joint of palp joined to inner margin of preceding one. Ambulatory legs not differing remarkably in length and of moderate length.

*Key to the Porto Rican species of the genus Pinnotheres.*

- A. Dactylus of endognath cylindrical, about half as long as propodus. .... *ostrearius*  
 A'. Dactylus of endognath subspatulate, considerably more than half as long as propodus. .... *guerini*

***Pinnotheres ostrearius*, sp. nov. Oyster Crab.**

Carapace very thin and yielding, transversely oblong-orbicular, broad behind, about one-sixth broader than long; furrow on either side of gastric region rather deep; cardiac region less deeply outlined; surface smooth and shining. Front rounding downward, slightly projecting, margin truncate. Orbits circular, eyes partly visible in a dorsal view. Widest part of merus of maxilliped considerably behind distal extremity. Carpal joint oblong, and a little more than one-third the greatest width of merus; propodal joint about as long as carpal and a little narrower; last joint attached near proximal end of the inner margin of propodus, and very slender, cylindrical, and about one-half length of propodus. Chelipeds smooth; palm rapidly increasing in width from proximal to distal end; fingers cylindrical, half as long as palm, somewhat hairy, edges meeting and tips crossing when closed. First ambulatory leg stouter than the others; second pair the longest; first and third subequal,\* the fourth pair reaches about the middle of propodus of third pair.

Dimensions of female: Length, 7.2 mm.; width, 8.6 mm.

Type locality, Mayaguez, in an oyster from near Cabo Rojo, 2 females, one of which is ovigerous (Cat. No. 23767).

This species is very close to *Pinnotheres ostreum* Say, which inhabits the oyster of the eastern United States; it differs, however, in its softer integument, less orbicular outline, less swollen hands, and, above all, in the form of the outer maxilliped; the last joint in *P. ostreum* is much smaller.

***Pinnotheres guerini* Milne Edwards.**

*Pinnotheres guerini* Milne Edwards, Ann. Sci. Nat. (3), XX, 219 (185), pl. XI, f. 9, 1853.

*Pinnateres guerini* von Martens, Arch. f. Naturg., XXXVIII, 105, 1872.

Maxillipeds wide; palp very large, dactylus large and subspatulate. Hands smooth, short and punctate (Milne Edwards). Carapace nearly 1.5 times broader than long (von Martens).

Porto Rico, in oysters (Gundlach); Cuba (Milne Edwards, von Martens).

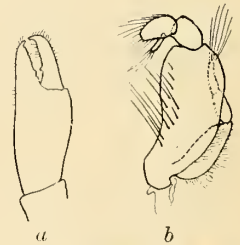


FIG. 3.—*Pinnotheres ostrearius*, female. (a) Chela,  $\times 8$ . (b) Maxilliped,  $\times 12.8$ .



## Genus PINNIXA White.

*Pinnixa* White, Ann. Mag. Nat. Hist., xviii, 177, 1846.

Carapace much wider than long; integument usually firm. Front narrow, nearly transverse. Orbits broadly ovate or nearly circular, with a wide inner hiatus which is partly occupied by the basal antennal joints. Antennules transversely or obliquely plicated in wide fossettes which communicate with each other beneath the front. Eye-stalks very short. Epistome linear-transverse. Ischium of maxillipeds small, merus large, distal portion of outer margin convex; palp joined to summit of merus; third joint articulated on inner side of the preceding one near base. Chelipeds of moderate size; merus trigonous; carpus smooth; hand large, compressed. Second ambulatory legs larger than first; third pair largest of all; fourth pair much shorter than third and relatively stouter than first and second. Abdomen in both sexes 7-jointed and narrower at base than the width of last sternal segment.

*Pinnixa minuta*, sp. nov.

Carapace of male less than twice as wide as long; a line connecting the lateral angles is behind the gastro-cardiac suture; the middle portions of the lateral margins are subparallel to each other. The regions are separated by deep furrows, the gastric, cardiac, and branchial regions being separately convex; the cardiac region is less than twice as wide as long and without a crest; upper surface finely granulate, the antero-lateral margins coarsely granulate. Front truncate and non-projecting. Antennae longer than the width of front. Merus of the maxillipeds longitudinal; propodus of palpus about 1.5 times as long as wide; dactylus spatulate. Chelipeds granulate; palm stout, 1.5 times as long as wide; the fingers are two-thirds as long as the palm and gape slightly. The ambulatory legs are

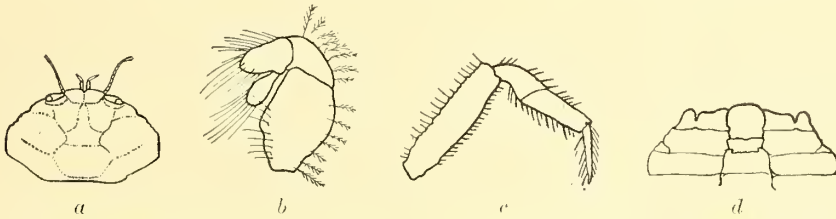


FIG. 4.—*Pinnixa minuta*, male. (a) Outline of carapace,  $\times 10$ . (b) Maxilliped, much enlarged. (c) Third ambulatory leg,  $\times 13.33$ . (d) Last three abdominal segments,  $\times 13.33$ .

margined with broad bands of spinuliform granules; first two pairs narrow, with very slender dactyls; third pair much larger, but similar; fourth pair the narrowest and slightly overreaches merus of third pair; its dactylus is shorter and relatively stouter. Sternum granulate along margins of segments. Abdomen oblong, with sixth and seventh segments narrowest; sixth shorter than third, fourth, or fifth, which are subequal; seventh transversely oblong, its distal margin gently arcuate. The surface shows a few granules. Surface of carapace, chelipeds, and legs pubescent.

Dimensions of male: Length, 1.3 mm.; width, 2.3 mm.

Type locality, Mayaguez Harbor, 161 to 172 fathoms, station 6066; one male (Cat. No. 23768).

## Genus DISSODACTYLUS Smith.

*Dissodactylus* Smith, Trans. Conn. Acad. Sci., II, 172, 1870.

*Echinophilus* Rathbun, Amer. Nat., xxxiv, 590, 1900

Carapace broader than long, pentagonal, broad behind, broadest at antero-lateral angles; surface smooth, not areolated; front narrow, horizontal, its margin continuous with arcuate antero-lateral margins. Eyes minute, superior margin of orbit slightly or not at all emarginate. Antennules transverse. Epistome usually very short, so that the labial border approaches very near to front, leaving only a narrow space, which is nearly filled by the antennule. The labial border is not interrupted in the middle by any projection or emargination and is continuous with lateral margin of buccal area. Palate without longitudinal ridges. Ischium and merus of maxillipeds coalescent; palpus composed

of only two segments, of which the terminal one is large. Chelipeds of moderate size; fingers longitudinal. The ambulatory legs are small and differ little in length; dactyli of three anterior pairs bifurcate, those of posterior pair simple. In the male the sternum is flat and very broad, breadth between posterior legs much more than twice as great as breadth of basal segments of abdomen. Male abdomen narrow and only three-jointed, the first and second segments anchylosed, and the third, fourth, fifth, and sixth also united in one piece; in the female abdomen the segments are all free.

I recently established the genus *Echinophilus* on a cursory examination of specimens called *E. mellita*, supposing the palpus of the maxillipeds to consist of three joints instead of two; now having discovered my error, I place the type species, as well as the one here described, in the genus *Dissodactylus*.

*Dissodactylus encopei*, sp. nov.

The carapace is about 1.4 times as wide as long, the posterior width is but little less than the greatest width and much greater than the antero-lateral margins. The dorsal surface is naked and polished, is convex antero-posteriorly, and slightly so in the opposite direction. The antero-lateral margins are marked by a distinct line, which, after turning the lateral angle, runs up a little on the dorsal surface. The frontal and antero-lateral margins have also a fringe of fine hair. Posterior margin slightly concave at the middle, convex toward the sides. The inner distal angle of the terminal segment of maxilliped fits against the inner angle of the merus joint; this angle is thickened and densely clothed with hairs. Outer surface of chelipeds crossed by a few short oblique ridges, from which short appressed hairs proceed distally; margins on inner surface of segments also fringed

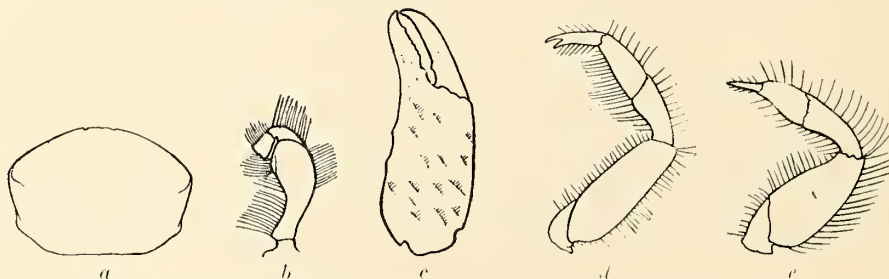


FIG. 5.—*Dissodactylus encopei*, male. (a) Outline of carapace,  $\times 4$ . (b) Maxilliped,  $\times 12.8$ . (c) Chela,  $\times 10.66$ . (d) Fourth leg,  $\times 10.66$ . (e) Fifth leg,  $\times 10.66$ .

with hair, while a longitudinal row of hairs is near the lower margin. Arm short, nearly as broad as long, and of about the same size as wrist; hand thick and subcylindrical; fingers nearly as long as palm and feebly dentate; they fit closely together, curve inward, and the tips are bent toward each other, and cross. Ambulatory legs short (their length less than width of carapace), and rather narrow and smooth, with hairy margins. Dactyli of first three pairs bifid at extremity. Dactyli of last pair simple, styliform, and acute. First segment of male abdomen narrower than second, being scarcely more than one-third the width of adjacent sternum; margins of second segment slightly convex; the segment tapers toward extremity; terminal segment equilaterally triangular and obtuse.

Length of male, 4.6 mm.; width, 6.6 mm. Length of female, 5 mm.; width, 7 mm.

Several specimens of this species were taken at Stann Creek, 38 miles south of Belize, British Honduras, by the Rev. W. A. Stanton, S. J.; they were attached to the lower surface of *Encope emarginata* (Leske); Cat. No. 23430, types.

A single young male, 27 mm. wide, was taken by the *Fish Hawk* in 11 fathoms, off Vieques, station 6084. It agrees with the types, except as to the ambulatory legs, which are relatively wider; a larger series is necessary to determine its identity with certainty.

This species has quite a different aspect from the type species, *D. nitidus*, being much wider, more convex, with the bifurcation of the dactyli less deep and less conspicuous. *D. mellita* is a convex species but somewhat narrower than *D. encopei*, being 1.33 broader than long; dactyli more deeply bifurcate. It is probable that the bifurcation of the dactyli is for the purpose of more ready attachment to foreign bodies, as two of the species are known to be commensal with sea-urelins.

## Tribe CYCLOMETOPA or CANCROIDEA.

Carapace usually broader than long, regularly arched in front, and not rostrate. Epistome short and transverse; outer maxillipeds with the fifth joint articulated at the inner front angle of the fourth. Branchiæ nine; efferent channels opening at the sides of the endostome or palate. Genital organs of male inserted at bases of last pair of trunk legs.

## Family POTAMONIDÆ Ortmann, 1896. Fresh-water Crabs.

Carapace more or less dilated at branchial regions. Third maxillipeds with palpus articulated at or near front inner angle of merus or at its apex. Terminal segments of walking legs usually spinuliferous. The verges of the male pass directly through the basal joint of the fifth pair.

Species fluviatile or living in damp earth away from the sea.

Genus *EPILOBOCERA* Stimpson.

*Epilobocera* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 234, 1860.

Carapace transversely oval. Side margins tuberculate or dentate. Epigastric lobes and cervical suture present. Front inclined, generally bilobed, either straight or slightly arched, and with or without a superior margin. Inner suborbital lobe always present. Outer maxillipeds with merus of endognath broader than long, its outer margin either arcuate or angular. Exognath exceeding in length ischium of endognath. A tooth or spine in efferent branchial channel. Dactyli of ambulatory legs with numerous slender spines.

*Epilobocera sinuatifrons* (A. Milne Edwards).

*Boscia sinuatifrons* A. Milne Edwards, Ann. Soc. Entom. France (4), VI, 205, 1866.

*Pseudochelphusa sinuatifrons* Smith, Trans. Conn. Acad. Sci., II, 147, 1870.

*Epilobocera sinuatifrons* Rathbun, Proc. U. S. Nat. Mus., XXI, 529, 1898.

Carapace very broad; cervical sutures very deep; epigastric lobes prominent. Front narrow, with a superior crest, which projects beyond inferior and is nearly straight, emarginate at middle and tuberculate; lower margin sinuous, a little deeper at outer ends. Orbits about 1.5 times as wide as long, tuberculate, with a large outer notch. Antero-lateral margin with small, irregular, blunt teeth, the one behind cervical suture a little larger; margin also interrupted a little ways behind the orbit. Merus of outer maxilliped subquadrate, with an antero-external angle. Exognath slightly overlapping merus of endognath. Tooth of efferent branchial channel short and broad. Chelipeds very heavy and very unequal, especially in the male. Merus with upper margin rounded, rugose; inner margin with stout blunt teeth increasing in size distally; lower margin tuberculate. Carpus with an inner tooth, blunt and spiniform. Palm of larger hand swollen, of smaller with nearly parallel margins. Dactylus longer than upper margin of palm. Fingers stout, covered with large, dark granules, their prehensile edges not meeting when closed, and armed with stout and irregular teeth with white tips. Meri of ambulatory legs roughened above; carpal joints spinous distally; propodal joints spinous on margins; dactyli with five rows of large spines.

Dimensions of male: Length, 53.7 mm.; width, 94 mm.; width at outer orbital angles, 44.2 mm.; width of front at superior crest, 24 mm.; length of larger palm above, 36.5 mm.; width, 37 mm.; length of dactylus, 48.3 mm.

Porto Rico: Caguas, Río Grande; San Juan market (*Buragina*). Also taken by Dr. L. Stejneger and Dr. C. W. Richmond at Plantation Catalina, El Yunque, 800 feet altitude, and by L. M. McCormick at Caves of Aguas Buenas. Also known from Santa Cruz Island.

This is probably the only species of the family occurring in Porto Rico, although Gundlach states that his specimens of *Epilobocera* were labeled "*E. cubensis*" by von Martens.

Local name *Buragina*; *Buruquena* (Gundlach).

## Family PILUMNIDÆ Leach, 1819.

## XANTHIDÆ Alcock, 1898.

Carapace commonly transverse and convex, with the antero-lateral margins arcuate, and armed with several lobes, teeth, or spines. The front is of moderate width, in general not projecting over the first antennæ and the bases of the second, the latter being seldom excluded from the inner hiatus of the orbits.



*Key to the Porto Rican genera of the family Pilumnidae.*

- A. The ridges that define the efferent branchial channels, if present, are usually low and are confined to the posterior part of endostome, never reaching to anterior boundary of buccal cavern.
- B. Fronto-orbital border less than half the greatest width of carapace.
- C. Antero-lateral borders of carapace sharp, crest-like; upper border at least of arms, and of fourth, fifth, and sixth segments of legs sharp and crest-like. . . . . *Platypodia*
- C'. Antero-lateral borders of carapace and upper borders of legs not crest-like.
- D. Antero-lateral borders entire up to a strong lateral epibranchial tooth. . . . . *Carpilius*
- D'. Antero-lateral borders divided into lobes or teeth.
- E. Carapace usually conspicuously lobulate, granulate, and hairy; chelipeds and legs also granulate and hairy. . . . . *Actra*
- E'. Carapace, chelipeds, and legs not sharply granulate and hairy.
- F. Fingers sharp-pointed, not hollowed . . . . . *Cycloxanthops*
- F'. Fingers blunt-pointed, hollowed at tip . . . . . *Xanthodius*
- B'. Fronto-orbital border half or more than half the greatest width of the carapace. (True of American species of *Liomera*).
- C. Carapace transversely oval.
- D. Ambulatory legs with upper margins spiny or roughly granular . . . . . *Xanthias*
- D'. Ambulatory legs with upper margins smooth or nearly so.
- E. Antero-lateral teeth strong, greatly projecting. Carapace deeply areolated. . . . . *Leptodius*
- E'. Antero-lateral teeth small, little projecting. Carapace slightly or not at all areolated.
- F. Carapace crossed by transverse, broken, granulated lines. . . . . *Eurypanopeus*
- F'. Carapace without transverse granulated lines.
- G. Three suture lines near the outer angle of the orbit. Fingers somewhat hollowed at tip. . . . . *Liomera*
- G'. No suture lines near the outer angle of the orbit. Fingers acute, not hollowed at tip. . . . . *Eucratodes*
- C'. Carapace more or less hexagonal, or subquadrate.
- D. Ambulatory legs spinulous.
- E. Antero-lateral margin cut into five teeth or lobes, including the outer orbital. . . . . *Chlorodiella*
- E'. Antero-lateral margin with second and fifth normal spine or tooth reduced or wanting. . . . . *Micropanope*
- D'. Ambulatory legs not spinulous.
- E. Large cheliped very broad and heavy, more or less cristate above . . . . . *Glyptoplar*
- E'. Chelipeds of moderate size.
- F. Front very narrow and advanced. Postero-lateral margins strongly converging. Carapace hexagonal. . . . . *Hexapanopeus*
- F'. Front of moderate width. Postero-lateral margins not strongly converging. Carapace subquadrate. . . . . *Eupanopeus*
- A'. The ridges that define the efferent branchial channels extend to anterior boundary of buccal cavern and are often very strong.
- B. Fronto-orbital border just about half or less than half greatest breadth of carapace, which is broad and transversely oval.
- C. The basal antennal joint does not nearly reach the front. . . . . *Menippe*
- C'. The basal antennal joint reaches the front.
- D. Anterior margin of merus of outer maxillipeds notched at orifice of efferent branchial channel. . . . . *Ozius*
- D'. Anterior margin of merus of outer maxillipeds not notched. . . . . *Eurytium*
- B'. Fronto-orbital border much more than half greatest breadth of carapace.
- C. Merus of external maxillipeds as long as or longer than broad.
- D. Fronto-orbital border about two-thirds greatest breadth of carapace. . . . . *Pilumnus*
- D'. Fronto-orbital border much more than two-thirds greatest breadth of carapace.
- E. Basal antennal joint as broad as long; arm scarcely projecting beyond lateral border of carapace . . . . . *Eriphia*
- E'. Basal antennal joint longer than broad; at least half of arm projects beyond carapace . . . . . *Melybia*
- C'. Merus of external maxillipeds about twice as broad as long . . . . . *Domestia*

**Genus CARPILIUS Leach.**

*Carpilius* Leach in Desmarest, Diet. Sci. Nat., xxviii, 228, 1823.

Carapace broad, very convex in both directions, smooth (except for some coarse pitting inside the frontal and antero-lateral border), with no indication of regions; its antero-lateral borders strongly arched, thick, entire, smoothly molded; its postero-lateral borders strongly convergent, straight, with a prominent tubercle at angle of junction with antero-lateral. Front moderately broad (less than a third the greatest width of carapace), deflexed, three-lobed, the middle lobe prominent, the edges of all thickened. Orbital margins entire, the upper margin thickened and forming a well-marked blunt tooth at its junction with the antero-lateral margin. Eyes on short, thick stalks. Antennules folding obliquely; inter-antennular septum broad. Basal joint of antennae long, flat, running up into an oblique cleft between margin of front and infra-orbital plate; antennary flagellum very small, less than half diameter of orbit and lodged in said cleft. Merus of external maxillipeds with its anterior border very oblique. Chelipeds massive, smooth, unequal in both sexes; fingers bluntly pointed, those of

larger cheliped with one or two molariform teeth, those of smaller cheliped with a blunt cutting edge. Legs smooth. Abdomen of male six-jointed, third and fourth somites fused with obliteration of sutures, fifth somite also immovably adherent to fourth.

**Carpilius corallinus** (Herbst).

*Cancer corallinus* Herbst, Natur. Krabben u. Krebse, 1, 133, pl. v, f. 40, 1783.

*Carpilius corallinus* Leach in Desmarest, Consid. sur les Crust., 104, 1825.

Front almost vertically deflexed, median lobe entire in large specimens, bilobate in small ones, and separated from the lateral lobes on either side by a deep U-shaped sinus. Immovable finger of large cheliped with two teeth; movable finger with a single larger tooth. Legs compressed.

Color of carapace brick red, somewhat wine-colored, or coral red, covered with yellow spots. Legs veined with brown. Claws spotted. Fingers and nails brown. (A. Milne Edwards.)

Dimensions of male: Length, 108.2 mm.; width, 143.8 mm.; fronto-orbital width, 53 mm.; width of front, 37.2 mm. This is the largest West Indian species of crab.

Bahamas; West Indies; Goyanna Stone Reef, Brazil; Fernando Noronha (Pocock). Porto Rico; Ensenada Honda, Culebra; market at San Juan (Gundlach).

**Genus LIOMERA** Dana.

*Liomera* Dana, Am. Jour. Sci. (2), XII, 124, 1851.

Carapace extremely broad, strongly convex in both directions, transversely barrel-like, either smooth or with the regions very faintly indicated; its antero-lateral borders thick, either entire or divided into four broad shallow rounded lobes, of which the first two are almost coalescent; its postero-lateral borders very strongly convergent, straight or a little concave. Front from three-sevenths to less than a fourth the breadth of carapace, obliquely deflexed, grooved and notched on middle line. Orbits small, with the three suture lines near outer angle usually distinct; eye-stalks short and thick. The antennules fold nearly transversely. Basal antennal joint broad and short, merely touching the front; flagellum lodged in orbital hiatus. Anterior edge of merus of external maxillipeds a little oblique. Fingers of chelipeds somewhat hollowed at tip. Abdomen of male five-jointed, the third to fifth somites being fused.

*Key to the Porto Rican species of the genus Liomera.*

- A. Large hand three times as wide as small one ..... *longimana*  
 A'. Large hand twice as wide as small one ..... *dispar*

***Liomera longimana*** A. Milne Edwards.

*Liomera longimana* A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. Paris, 1, 221, pl. XII, f. 7, 1865 (figure incorrect; hands represented of equal size); Crust. Rég. Mex., 240, pl. XLVI, f. 1, 1879.

Carapace about three-fifths as long as broad, thick, very convex, regions very faintly marked; antero-lateral margin showing four shallow lobes or teeth, the last two most distinct. Front a little less than a third the breadth of carapace, distinctly bilobed, and with a separate tooth at outer end below orbital angle; a transverse fringe of hair behind the lobes. Antennal flagellum longer than greatest diameter of orbit. Chelipeds extremely unequal in both sexes, smooth, conspicuously punctate; arm projecting beyond carapace; larger cheliped heavy, hands with subparallel margins; the smaller hand very slender, about one-third the width of larger. Fingers moderately gaping. Larger wrist nearly as broad as long, inner angle blunt; smaller wrist much longer than broad, without an inner angle. Legs compressed, almost smooth, hairy.

Male: Length, 7.3 mm.; width, 12.4 mm.; fronto-orbital width, 7.4 mm.; frontal width, 3.5 mm.

Florida Keys; West Indies; Vera Cruz, Mexico. Playa de Ponce Reef, Porto Rico.

***Liomera dispar*** (Stimpson).

*Chlorodius dispar* Stimpson, Bull. Mus. Comp. Zool., II, 140, 1871.

*Leptodius dispar* A. Milne Edwards, Crust. Rég. Mex., 271, 1880.

*Liomera dispar* Rathbun, Ann. Inst. Jamaica, 1, 13, 1897.

Carapace about three-fourths as long as broad, thick, convex, covered with a short pubescence easily rubbed off; regions not defined; an anterior median furrow, also a furrow separating the front from orbital angle; antero-lateral margins almost entire, three lobes faintly discernible. Front about one-third width of carapace, bimarginate, margin convex, median notch small, external angle not projecting. Eyes very short and stout. Antennal flagellum shorter than greatest diameter of orbit. Chelipeds less unequal than in *L. longimana*, the smaller hand not so slender, about half the width

of larger. Smaller wrist similar in shape to larger and has an inner tooth. The black color of thumb runs back a little on the hand, forming a convex outline. Otherwise resembling *L. longimana*.

Male: Length, 2.9 mm.; width, 4 mm.; fronto-orbital width, 3.2 mm.; frontal width, 1.7 mm.

Cuba; Jamaica; Bermudas. From Arroyo, Porto Rico, on Lighthouse Reef, 1 male and 1 young female. Rare.

#### Genus **PLATYPODIA** Bell.

*Platypodia* Bell, Trans. Zool. Soc. London, 1, 336, 1835.

*Lophactea* A. Milne Edwards, Ann. Sci. Nat. (4), xviii, 43, 1862.

Carapace moderately broad, convex in both directions, with regions generally well delimited and subdivided into lobes, and the surface generally (not always) granular; the antero-lateral borders have an independent crest-like edge, generally thin and sharp and distantly fissured; the postero-lateral borders rather concave. Front a little deflexed, about a fourth the greatest breadth of carapace in extent, grooved and emarginate in middle line. Orbits large, the three suture lines near outer angle distinct. Eyes on short thick stalks. Antennules folding obliquely transversely; inter-antennular septum broad. Basal joint of antennæ short, touching front only; flagellum lodged in orbital hiatus. Merus of external maxillipeds with front edge a little oblique. Chelipeds equal in both sexes; fingers not hollowed at tip. Long joints of legs with sharp crest-like upper borders. Abdomen of the male five-jointed, the third to fifth somites being fused.

#### *Platypodia spectabilis* (Herbst).

*Cancer spectabilis* Herbst, Natur. Kralben u. Krebse, II, 153, pl. xxxvii. f. 5, 1794.

*Cancer lobata* Milne Edwards, Hist. Nat. Crust., 1, 375, 1834.

*Lophactea lobata* A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. Paris, 1, 249, pl. xvi, figs. 3, 3a, 1865.

*Platypodia spectabilis* Rathbun, Ann. Inst. Jamaica, 1, 13, 1897.

Surface lobulated, granulate. Antero-lateral crest extending very far back and continued by a small transverse crest on carapace in line with cardiac region; marginal crest cut by three narrow fissures; postero-lateral borders concave. Front deflexed, presenting two oblique truncate lobes in a dorsal view. In a front view these lobes are concave. Hands short, compressed, surmounted by a sharp, entire crest; outer surface covered with granules, irregularly placed on upper portion, but forming three or four longitudinal lines on lower part. Fingers pointed, channeled, their prehensile borders denticulate, also a broad lobe at base of immovable finger. Ambulatory legs short, compressed; nails very sharp. Suture lines faintly visible between the third, fourth, and fifth abdominal segments in the male.

Color, chocolate brown, with some yellow spots bordered with blue and black; similar spots on chelipeds. Legs red, with tricolored bands of yellow, blue, and black. Eggs reddish yellow. (A. Milne Edwards.)

Length of female, 13 mm.; width, 19.3 mm.; fronto-orbital width, 9 mm.; width of front, 5 mm.

Gulf of Mexico; Florida Keys; West Indies; Bermudas; Fernando Noronha (Pocock). Porto Rico: Puerto Real; Guanica Bay; Culebra.

#### Genus **LEPTODIUS** A. Milne Edwards.

*Leptodius* A. Milne Edwards, Ann. Sci. Nat. (4), xx, 284, 1863.

Carapace broad, suboval, moderately convex anteriorly, flat in posterior half; regions well delimited and fairly well lobulated in the anterior two-thirds, but not posteriorly. Antero-lateral borders arched, very long, not very thick, cut into five well-developed teeth, including the orbital angle; postero-lateral borders moderately convergent, not concave. Fronto-orbital border more than half the greatest width of carapace; front a fourth or more than a fourth the greatest width of carapace. Front little deflexed, rather prominently sublaminar, notched in middle line, separated from supra-orbital margin by a notch. Orbital margin with two suture lines above and one more distinct just below outer angle; usually a prominent tooth at inner angle of lower edge of orbit. Eyes on short thick stalks. Basal antennal joint short, meeting the front at inner angle of flagellum, which is about as long as orbit and is lodged in orbital hiatus. Anterior edge of merus of external maxillipeds nearly transverse, with commonly a small tooth near the antero-internal angle. Chelipeds unequal in both sexes; fingers spoon-shaped, or hollowed out at the tips. Legs compressed, the upper edges rather sharp. Abdomen of male five-jointed, the third to fifth somites fused.



**Leptodius floridanus** (Gibbes).

*Chlorodius floridanus* Gibbes, Proc. Amer. Assoc. Adv. Sci., III, 175, 1850.

*Leptodius floridanus* A. Milne Edwards, Crust. Rég. Mex., 268, pl. XLIX, f. 2, 1880.

Lobules of carapace flattened, crossed by small transverse lines a little granulous or punctate, and separated by shallow grooves. Frontal lobes truncate and with a transverse groove. First three antero-lateral teeth obtuse or subacute, last two pointed. Merus of chelipeds short, not surpassing carapace; wrist and upper portion of hand rugose; the fingers touch only at their extremities; there is a tuft of hairs in the hollow. Legs hairy on margin. Color variable; sometimes a grayish green, sometimes yellow with red spots. Fingers black. (A. Milne Edwards.)

Length of male, 20.2 mm.; width, 31 mm.; fronto-orbital width, 17 mm.; frontal width, 7.9 mm.

Bahamas; Florida Reefs to Brazil; Bermudas. Porto Rico: Reefs at Guanica; Ponce; Playa de Ponce Reef; Arroyo; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra; San Juan (G. M. Gray).

**Genus XANTHODIUS** Stimpson.

*Xanthodius* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 52, 1859.

Carapace very broad, oval, very convex anteriorly, flat in posterior half; the regions deeply limited, and deeply lobulated in anterior two-thirds. Antero-lateral borders arched, longer than in *Leptodius*, thick, cut into four rounded lobes or thickened, blunt, little-projecting teeth, exclusive of orbital angle, which is inconspicuous; postero-lateral borders nearly straight. Fronto-orbital border less than half the greatest width of carapace; front about a fourth the greatest width of carapace. Front more deflexed, but less prominent than in *Leptodius*; otherwise similar. Orbits very small; the two upper suture lines very faint; tooth at inner angle of lower edge not prominent. Eye-stalks short and thick. Inner orbital hiatus narrow, the antennal flagellum lodged in it. Merus of outer maxillipeds considerably broader than long. Chelipeds unequal in both sexes; surface eroded in reticulating lines; fingers spoon-shaped. Legs short, compressed. In the abdomen of male the third to fifth segments are fused.

**Xanthodius parvulus** (Fabricius).

*Cancer parvulus* Fabricius, Ent. Sys. auct. et emend., II, 451, 1793.

*Chlorodius americanus* Saussure, Mém. Soc. Phys. Hist. Nat. Genève, XIV, 430, pl. I, f. 5, 1858.

*Leptodius americanus* A. Milne Edwards, Crust. Rég. Mex., 269, 1880.

*Xanthodius parvulus* Rathbun, Ann. Inst. Jamaica, I, 15, 1897.

Lobules of carapace prominent and roughened with punctæ. Outer orbital angle small and inconspicuous; there are, besides, four blunt teeth; posterior marginal line of last tooth continued half way back on postero-lateral margin. Front bimarginate, lobes of upper margin truncate, of lower concave. Arm of chelipeds scarcely exceeding carapace; wrist and hand rugose above and with some irregular depressions. Legs very finely granulate and slightly hairy.

Length of male, 15 mm.; width, 24.5 mm.; fronto-orbital width, 11.4 mm.; frontal width, 6 mm.

Bahamas; Florida Reefs; West Indies; Curaçao; Fernando Noronha (Pocock); Bermudas (Verrill). Ponce, Porto Rico.

**Genus CYCLOXANTHOPS** Rathbun.

*Cycloxanthus* A. Milne Edwards, Ann. Sci. Nat. (4), XX, 278, 1863.

*Cycloxanthops* Rathbun, Proc. Biol. Soc. Washington, XI, 164, 1897.

Carapace broad; front horizontal, prominent, and divided by a median fissure into two lamellar lobes, and separated from the internal orbital angles by a deepish notch. Orbits small; two fissures in the supra-orbital margin; external orbital angles inconspicuous, continuous with the antero-lateral borders. Antero-lateral borders very long, strongly curved, extending far backwards. Basal antennal joint short, but touching the front at its inner angle; flagellum inserted in orbital hiatus. Merus of the external maxillipeds subquadrilateral. Fingers sharp-pointed, not hollowed. The abdomen of male consists of five movable pieces.

**Cycloxanthops denticulatus** (White).

*Xantho denticulatus* White, Ann. Mag. Nat. Hist. (2), II, 285, 1848. A. Milne Edwards, Crust. Rég. Mex., 252, pl. XLV, f. 2, 1879.

*Cycloxanthops denticulatus* Rathbun, Ann. Inst. Jamaica, I, 14, 1897.

Width of carapace about 1.5 times length; regions well marked; surface punctate and pitted; the anterior portion lobulate, the lobules rugose. Antero-lateral borders having eight or ten small tuber-

culiform teeth. Front feebly divided into two lobes, nearly straight and with a tuberculiform tooth at the outer angle. Pterygostomian regions and merus of the outer maxillipeds granulose and rugose. Chelipeds strong, unequal, their upper surface rugose and eroded. Wrist with two tubercles at inner angle. Fingers strong, pointed, gaping in large cheliped.

Color, light purplish red, bright red, or orange red; fingers black.

Dimensions of male: Length, 14.5 mm.; width, 22.8 mm.; fronto-orbital width, 9.5 mm.; frontal width, 5 mm. Greatest width at antepenult tooth of lateral margin.

Bahamas; Florida Keys to Brazil; Bermudas. Porto Rico: Caballo Blanco Reef, Vieques; Hucares; Fajardo; San Juan (Gundlach).

**Genus EUPANOPEUS Rathbun. Mud Crabs.**

*Panopeus* Milne Edwards, Hist. Nat. Crust., 1, 403, 1834. (Name preoccupied.)

*Eupanopeus* Rathbun, Bull. Labor. Nat. Hist. State Univ. Iowa, IV, 273, 1898.

Carapace of moderate width, length two-thirds to three-fourths the width, moderately convex, the regions fairly well delimited, crossed by broken transverse lines on anterior half. Antero-lateral borders horizontal or slightly upturned, shorter than postero-lateral, arcuate, tending to subquadrate, cut into five teeth, including orbital angle, which is more or less fused with the next tooth; the third, fourth, and fifth are usually well-marked and distinctly dentiform; outer margin of all the teeth sublaminar; postero-lateral borders moderately convergent, straight. Fronto-orbital border more than half the greatest width of carapace. Front between a third and a fourth the greatest width of carapace. Front horizontal or slightly deflexed, laminar, with a median notch, and two sinuous lobes, separated from the more elevated inner angle of orbit by a notch. Orbital margin with two small but distinct V-shaped notches above, continued backward by closed fissures, and a broad notch below outer angle. A prominent tooth at lower inner angle. Orbits transversely oblong, not tightly filled by the eyes. Inner portion of anterior margin of basal joint touches the front; outer angle of joint is prolonged into the broad orbital hiatus, but does not exclude flagellum from orbit. Merus of outer maxillipeds transverse, its anterior margin more or less sinuous. Chelipeds unequal in both sexes; the merus has a superior subterminal tooth; the carpus a tooth at the inner angle; fingers acute; movable finger of large cheliped with large basal tooth. Legs rather thick, compressed. Abdomen of male 5-segmented.

*Key to the Porto Rican species of the genus Eupanopeus.*

- A. A distinct groove along anterior margin of carpus of cheliped.
  - B. Front grooved. Third segment of abdomen of male not reaching coxal joints of fifth pair of feet.....*bermudensis*
  - B'. Front not grooved. Third segment of abdomen of male reaching the coxal joints.
    - C. Second antero-lateral tooth broad, lobiform.....*occidentalis*
    - C'. Second antero-lateral tooth narrow, tuberculiform.....*herbstii*
- A'. Carpal groove wanting or very indistinct.
  - B. Width of carapace about 1.5 times length.....*herbstii*
  - B'. Width of carapace about 1.3 times length.....*americanus*

***Eupanopeus herbstii* (Milne Edwards).**

*Panopeus herbstii* Milne Edwards, Hist. Nat. Crust., 1, 403, 1834; Benedict & Rathbun, Proc. U. S. Nat. Mus., XIV, 358, pl. XIX, figs. 1 and 2, pl. XXIII, figs. 10-12, 1891.

*Eupanopeus herbstii* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 273, 1898.

Carapace nearly or quite 1.5 times as wide as long. Regions well marked, convexity variable, surface coarsely granulate. First (or orbital) tooth of lateral margin triangular, blunt, little prominent; second tooth separated from first by a shallow rounded sinus, and larger and nearly as advanced as first, either blunt-pointed and with arcuate outer margin, or lobiform; third and fourth teeth still larger, prominent, with arcuate outer margins and acute tips, the third directed obliquely inward, the fourth forward or slightly inward; fifth tooth shorter, with acute tip and straight outer margin; a transverse ridge continued inward from its anterior margin. Front about two-sevenths the greatest width of carapace; middle portion of margin advanced only a little beyond outer angles. Chelipeds heavy, granulate; carpus without a groove parallel to distal margin. Dark color of thumb in large chela continued more or less on palm. Third segment of abdomen of male reaching coxæ of fifth pair of feet; terminal segment oblong, rounded at end.

A very large specimen measures 40 mm. long by 62 mm. wide; one of medium size, a female, is 28 mm. long, 40.6 mm. wide; fronto-orbital width, 23.2 mm.; width of front, 11.5 mm.

From Rhode Island to Brazil; Bermudas. Porto Rico: San Juan; Puerto Real, in a mangrove swamp; reefs at Ponce; Ensenada Honda, Culebra; San Juan and Mayaguez (Gundlach).

**Eupanopeus occidentalis** (Saussure).

*Panopeus occidentalis* Saussure, Rev. Mag. Zool. (2), IX, 502, 1857; Benedict & Rathbun, Proc. U. S. Nat. Mus., XIV, 360, pl. XX, f. 3, pl. XXIII, f. 14, 1891.

*Eupanopeus occidentalis* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 273, 1898.

Differs from *E. herbstii* as follows: Gastric region more elevated, independently convex. Second tooth of lateral margin narrower and separated by a deeper sinus from first tooth; third to fifth teeth thicker, more prominent and more widely separated from each other, third tooth with anterior and exterior margins subequal. Front more advanced. Carpus of chelipeds with a groove parallel to distal margin. Dark color on thumb not continued on palm. Ambulatory legs a little longer and more slender. Abdomen of male wider, especially noticeable at penult segment.

In alcohol the chelipeds have a pinkish tinge not seen in *E. herbstii*.

Male: Length, 20 mm.; width, 27.2 mm.; fronto-orbital width, 16 mm.; width of front, 8.4 mm. South Carolina to Pernambuco; Bermudas. Hucars, Porto Rico, 2 females, 1 with *Sacculina*.

**Eupanopeus americanus** (Saussure).

*Panopeus americanus* Saussure, Rev. Mag. Zool. (2), IX, 502, 1857; Mém. Soc. Phys. Genève, XIV, 432, pl. 1, f. 8, 1857.

*Panopeus arcuolatus* Benedict & Rathbun, Proc. U. S. Nat. Mus., XIV, 361, pl. XXI, f. 3, 1891.

*Eupanopeus americanus* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 273, 1898.

The carapace is narrower (width 1.3 times length) and flatter than in *E. herbstii*. The transverse rugae are numerous. Sinus between first and second lateral teeth deepish; other teeth broad, rather blunt, third tetragonal, fourth with anterior margin at right angles to median line. Lobes of front with more oblique margins than in *E. herbstii*. Chelipeds similar to those of *E. herbstii*; a faint carpal groove may be present. Tooth at base of dactyl longer than in *E. herbstii*. Abdomen of male narrow, as in *E. herbstii*, but in shape resembling that of *E. occidentalis*.

Male: Length, 19.5 mm.; width, 26.3 mm.; fronto-orbital width, 15.5 mm.; width of front, 7.5 mm. Bahamas to Brazil. Arroyo, Porto Rico; 1 male.

**Eupanopeus bermudensis** (Benedict & Rathbun).

*Panopeus wurdemannii* Benedict & Rathbun, Proc. U. S. N. M., XIV, 372, pl. XXIV, f. 6 and 7, 1891 (not *P. wurdemannii* Gibbes).

*Panopeus bermudensis* Benedict & Rathbun, Proc. U. S. N. M., XIV, 376, pl. XX, f. 2, pl. XXIV, figs. 14 and 15, 1891.

*Eupanopeus bermudensis* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 273, 1898.

A smaller species than any other *Eupanopeus* taken at Porto Rico. The carapace more deeply areolated than any of above; a well-marked transverse line on branchial region on a level with last lateral sinus; also several shorter granulate ridges, and granules toward front and antero-lateral margins; otherwise smooth. Second tooth of lateral margin lobiform, separated from first by a rather shallow sinus; third and fourth large, with arcuate outer margins, third obtuse, fourth subacute; fifth narrow and pointed. The front has a thick, obliquely beveled edge, obscurely grooved, deflexed; in a dorsal view the lobes are nearly straight, oblique, but in a front view very sinuous. The carpus of chelipeds has a well-marked groove; fingers strongly bent down and usually light horn-colored with white tips; the color extends partially on palm also. Legs slender and delicate. Third segment of abdomen of male narrow, with rounding posterior corners, not reaching coxæ of fifth pair of feet.

Length of male, 5.8 mm.; width, 8 mm.; fronto-orbital width, 5.5 mm.; width of front, 2.8 mm.

Bermudas; Florida Keys to Brazil. Porto Rico: Mayaguez; Boqueron Bay; Guanica Bay; Arroyo, on Lighthouse Reef; Ensenada Honda, Culebra. Also taken at Nassau, Bahamas; 1 specimen having the genital appendages of a male, and an abdomen with seven segments, as in an immature female.

**Eupanopeus hartii** (Smith).

*Panopeus hartii* Smith, Proc. Boston Soc. Nat. Hist., XII, 280, 1869; Trans. Conn. Acad. Sci., II, pp. 5 and 34, pl. 1, f. 5, 1869.

*Eupanopeus hartii* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 273, 1898.

Carapace little convex, rugose, regions very distinctly marked. First and second antero-lateral teeth small, tuberculiform, separated by a U-shaped sinus. Remaining teeth rather narrow, thickened; tips tuberculiform. Front little advanced and with a small but distinct tooth at the orbital end. Carpus of chelipeds rugose and with a deep anterior groove. Color of fingers not continued to the palm. Abdomen of male reaching coxal joints.

Length of male, 8.6 mm.; width, 12.6 mm.; fronto-orbital width, 8.6 mm.; width of front, 4.1 mm. A small species, but larger than *E. bermudensis*.

Florida Keys to Brazil. Porto Rico: Boqueron; Mayaguez; Mayaguez Harbor.



## Genus EURYPANOPEUS A. Milne Edwards.

*Eurypanopeus* A. Milne Edwards, Crust. Rég. Mex., 318, 1880.

Carapace rather broad, length about two-thirds the width, oval, depressed or slightly convex, the regions usually crossed by fine transverse broken granulated lines, but on the whole the carapace is smoother than in *Eupanopeus*. Antero-lateral borders horizontal or slightly upturned, as long as or slightly shorter than postero-lateral, arcuate, cut into five (including orbital) shallow teeth or lobes usually projecting little if at all beyond the general line of carapace. Second tooth low and rounded and rather closely fused with orbital. Fronto-orbital border more than half, and front a third or a little less than a third the greatest width of carapace. Front less advanced than in *Eupanopeus*; otherwise front and orbits much as in that genus. Orbital hiatus and basal joint of antenna narrower than in *Eupanopeus*. Chelipeds unequal in both sexes; the fingers may be acute or spoon-shaped or different on the two chelipeds of same species. Abdomen of male has usually the third, fourth, and fifth segments fused (only the fourth and fifth fused in *E. dissimilis*).

*Eurypanopeus abbreviatus* (Stimpson).

*Xantho parvulus* Milne Edwards, Hist. Nat. Crust., 1, 395, 1834 (not *Cancer parvulus* Fabricius, 1793).

*Panopeus abbreviatus* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 211, 1860.

*Panopeus politus* Smith, Trans. Conn. Acad. Sci., II, pp. 3 and 34, pl. 1, f. 4, 1869.

*Panopeus parvulus* Benedict & Rathbun, Proc. U. S. Nat. Mus., XIV, 369, pl. XXI, f. 1, pl. XXIII, figs. 2 and 3, 1891.

*Eurypanopeus varvuis* A. Milne Edwards, Crust. Rég. Mex., 322, pl. LIX, f. 5, 1880.

*Eurypanopeus abbreviatus* A. Milne Edwards, Crust. Rég. Mex., 320, pl. LIX, f. 3, 1880. Rathbun, Ann. Inst. Jamaica, 1, 19, 1897.

Carapace granulate on anterior third and along antero-lateral margins; an oblique granulated ridge on hepatic region, another parallel to it on the branchial region opposite last lateral sinus; a few transverse lines on gastric region. First and second antero-lateral teeth separated by a very shallow sinus; other teeth separated by shallow notches, the third with almost straight outer margin, the fourth slightly arcuate, fifth small and blunt. Front less than a third the width of carapace, little advanced, a narrow open median notch, lobes sinuous, more produced toward middle. Chelipeds finely granulate and pitted; fingers pointed; those of large cheliped gaping, dactylus with a large basal tooth. Dark color of pollex running from between bases of fingers obliquely to lower margin of manus. Third segment of abdomen of male extends to coxæ of last pair of legs.

Length of male, 11.7 mm.; width, 18.4 mm.; fronto-orbital width, 9.3 mm.; width of front, 4.9 mm.

Bahamas; Florida Keys to Brazil. Porto Rico: Ponce; Arroyo; Ensenada Honda, Culebra; Hucares.

## Genus HEXAPANOPEUS Rathbun.

*Hexapanopeus* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 273, 1898.

Carapace narrow (the length three-fourths or more of width), hexagonal, regions well delimited. Antero-lateral margin arcuate, about as long as postero-lateral, five-toothed, teeth prominent, orbital or first tooth partly fused with second, fourth tooth very prominent, fifth sometimes much smaller and almost postlateral in position. Postero-lateral margins strongly converging. Fronto-orbital border from half to three-fourths the greatest width of the carapace. Front from a fourth to about a third the greatest width of the carapace. Front advanced, with a median notch and oblique, sinuous or straight lobes, separated from inner orbital angle by a notch. Orbital margin with a well-marked lobe between sinuses above; otherwise the orbits are similar to those of *Eupanopeus*. Basal joint of antenna narrow, as in *Eurypanopeus*.

The Porto Rican species are small.

Distinguished from *Eurypanopeus* chiefly by the hexagonal, narrow carapace with produced front and very convergent postero-lateral margins.

Key to the Porto Rican species of the genus *Hexapanopeus*.

- A. First and second antero-lateral teeth separated by a very shallow rounded sinus.  
 B. Fifth antero-lateral tooth almost obsolete.....*caribbaeus*  
 B'. Fifth antero-lateral tooth well developed.....*hemphilli*  
 A'. First and second antero-lateral teeth separated by a deepish V-shaped sinus.....*quinquedentatus*

**Hexapanopeus caribbæus** (Stimpson).

*Micropanope caribbea* Stimpson, Ann. Lyc. Nat. Hist. N. Y., x, 108, 1871.

*Eurypanopeus caribbæus* Rathbun, Ann. Inst. Jamaica, 1, 20, 1897.

*Hexapanopeus caribbæus* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, iv, 273, 1898.

Carapace with regions well marked; protogastric, branchial, and cardiac regions elevated; gastric and branchial crossed by prominent transverse granulated lines. A well-marked sinus between first and second lateral teeth, which are small and blunt; third and fourth large and prominent; third acute, fourth spiniform; carapace widest at fourth tooth, fifth minute. Fronto-orbital border two-thirds and front one-third the width of carapace. Front produced, median notch a well-marked V, lobes sinuous. Eyes large. Chelipeds finely granulate, a few tubercles on carpus, fingers elongate, strongly bent down, sharp, finely dentate (dactylus with a larger tooth at base), not gaping, the color of pollex continued extensively on palm. Ambulatory legs slender.

A small species. A male of good size measures 8.3 mm. long; 11.6 mm. wide; fronto-orbital width, 7.5 mm.; frontal width, 3.9 mm.

Jamaica; St. Thomas; Trinidad; Sabanilla, United States of Colombia. Porto Rico: Boqueron Bay; Hucares.

**Hexapanopeus hemphillii** (Benedict & Rathbun).

*Panopeus hemphillii* Benedict & Rathbun, Proc. U. S. Nat. Mus., xiv, 374, pl. xxiv, figs. 12 and 13, 1891.

*Hexapanopeus hemphillii* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, iv, 273, 1898.

Carapace with regions distinctly indicated, epigastric lobes prominent, a few blunt transverse ridges, surface also finely granulate. First and second teeth small but well separated. Third to fifth teeth thickened, blunt, dentiform, fifth smaller than others, but still of fair size. Fronto-orbital border five-sevenths and frontal border more than one-third of greatest width of carapace. Median notch a deep narrow V, lobes nearly straight viewed from above, denticulate. Chelipeds granulate, very unequal; carpus uneven, with an anterior groove, inner tooth strong. Manus with a deep superior groove, surface rugose above. Fingers of large cheliped strong (dactylus with large basal tooth), those of smaller cheliped longer, slenderer, and deflexed; color not extending on palm.

Length of large male, 5.5 mm.; width, 7 mm.; fronto-orbital width, 5 mm.; frontal width, 2.5 mm.

Florida Keys; St. Thomas. Mayaguez Harbor and Puerto Real, Porto Rico.

**Hexapanopeus quinquedentatus**, sp. nov.

Carapace deeply areolated, the regions separately convex, granulate; epigastric lobes prominent. The antero-lateral margin has five well-marked teeth, second separated from first by a deeper sinus than is usual in this and allied genera. Third, fourth, and fifth teeth larger, similar to one another, thickened, subacute. Front with a median V, lobes slightly oblique, nearly straight. Chelipeds not very heavy, slightly unequal in male, equal in female, coarsely granulate. Carpus uneven; a short and very deep anterior groove. Manus deeply grooved above; fingers deeply grooved, the intervening ridges partly granulate; tips acute; fingers not gaping; dactylus of larger cheliped of male with a large basal tooth. Legs granulate along anterior margin. There are seven distinct segments in abdomen of male (at least in immature specimens), while in other species of the genus, the third to fifth are fused.

The largest specimen taken is a female, 5.5 mm. long; 7.4 mm. wide; fronto-orbital width, 5 mm.; frontal width, 2.4 mm.

Type locality, Mayaguez, 1 female (Cat. No. 23769). Also taken at Mayaguez Harbor, 12 fathoms, station 6060, 1 female; off Puerto Real, 8½ fathoms, station 6074, 1 immature male; off Boca Prieta, 8½ fathoms, station 6085, 1 immature male.

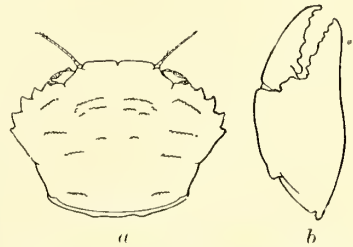


FIG. 6.—*Hexapanopeus quinquedentatus*.  
(a) Female, outline of carapace,  $\times 4$ . (b)  
Male, right chela,  $\times 10$ .

Genus **MICROPANOPE** Stimpson.

*Micropanope* Stimpson, Bull. Mus. Comp. Zool., II, 139, 1871.

Carapace of moderate width, slightly convex, regions usually lightly indicated, granulous or spinulous toward frontal and antero-lateral borders. Antero-lateral borders arcuate, shorter than postero-lateral, armed usually with five teeth or spines, of which the last is much reduced and the second also reduced or altogether wanting. Postero-lateral borders moderately converging. Fronto-orbital width great, three-fourths or more than three-fourths width of carapace. Front more than one-third the width of carapace. Front bilobed, outer angle rectangular, blunt, and situated below and in advance of inner orbital angle. Upper orbital margin with two small open notches and an intermediate lobe; inferior margin with a large outer notch; inner tooth prominent. Inner orbital hiatus wide; basal segment of antennae not reaching, or barely reaching, prolongation from front. Chelipeds unequal in both sexes, and usually roughened by sharp granules or spinules. Fingers pointed. Legs slender, usually spinulous above. Abdomen of male with third to fifth segments fused.

Small species, living in deepish water.

*Key to the Porto Rican species of the genus Micropanope.*

- A. Fronto-orbital width more than four-fifths of entire width of carapace ..... *lobifrons*  
 A'. Fronto-orbital width seven-tenths of entire width of carapace ..... *xanthiformis*

**Micropanope lobifrons** A. Milne Edwards.

*Micropanope lobifrons* A. Milne Edwards, Crust. Rég. Mex., 327, pl. LIII, f. 3, 1880.

Carapace almost smooth; some very small granules on gastric lobes and on branchial region; regions faintly indicated. Front wide and formed of two rounded lobes. Antero-lateral borders five-toothed, first or orbital tooth small; second triangular and about the same size; third and fourth spiniform, most prominent, the third the larger; fifth almost obsolete. Chelipeds covered with small pointed granules; an inner carpal spine; fingers deeply grooved. Ambulatory feet long, spinulous.

Length of male, 3.3 mm.; width, 4.3 mm.; fronto-orbital width, 3.7 mm.; width of front, 1.7 mm.

Off Montserrat, 88 fathoms (type locality); off Habana; near Aspinwall, 34 fathoms; off St. Thomas, 20 to 23 fathoms, station 6079, *Fish Hawk*.

**Micropanope xanthiformis** (A. Milne Edwards).

*Panopus xanthiformis* A. Milne Edwards, Crust. Rég. Mex., 353, pl. LIII, f. 4, 1880.

*Micropanope xanthiformis* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 274, 1898.

Carapace depressed, coarsely granulous on anterior half; regions well marked; an oblique ridge on hepatic region. Front deflexed; lobes separated by narrow fissure; margins sinuous, on the whole convex, with a distinct rectangular outer corner. Orbits wide, margin finely crenulate. Five antero-lateral teeth; second small, blunt, in adults considerably larger than postorbital angle, in the young obsolete; third and fourth large, acute; last very small and pointed; teeth with granulous margins. Chelipeds rugose with very fine granules. Arm with a row of spines above; wrist with a deep anterior groove and two inner spines, one smaller and below the other; hand roughened on its upper and proximal portions, a deep groove above. Fingers deeply grooved; dactylus of large hand with large basal tooth. Meral joints of legs with a row of spines above, other joints spinulous.

Length of male, 7 mm.; width, 10 mm.; fronto-orbital width, 7 mm.; frontal width, 3.7 mm.

From Cape Hatteras, N. C., to Cape Frio, Brazil, in 15 to 182 fathoms. Off Puerto Real, Porto Rico, 8½ fathoms, station 6074, 1 young specimen.

Genus **GLYPTOPLAX** Smith.

*Glyptoplax* Smith, Trans. Conn. Acad. Sci., II, 164, 1870.

Carapace narrow, hexagonal, deeply areolated, front prominent, antero-lateral margin dentate. Chelipeds short and stout; manus more or less crested above, the upper proximal angle often very prominent; ambulatory legs slender and smooth. First segment of abdomen of male reaches coxae of fifth pair of feet; second segment is shorter and exposes a portion of sternum; third segment may or may not reach coxal joints; third, fourth, and fifth segments coalesced.

This genus inclines toward the *Catometopa*.



**Glyptoplax pusilla** (A. Milne Edwards).*Micropanope pusilla* A. Milne Edwards, Crust. Rég. Mex., 327, pl. LIV, f. 4, 1880.*Glyptoplax pusilla* Rathbun, Jour. Inst. Jamaica, II, 628, 1899.

Surface very finely granulate. Front with a median emargination; lateral lobes sinuous. A distinct lobe on superior orbital margin between the two fissures. Second normal tooth of lateral margin obsolete; third and fourth dentiform, prominent; fifth tooth slight, situated on postero-lateral margin. Carpus of chelipeds with a tooth at inner angle and a groove parallel to anterior margin; manus with superior proximal angle prominent, margined; height of larger palm nearly as great as its length; pollex scarcely deflexed; fingers unevenly dentate, fitting closely together, the dactylus having a large basal tooth; color of pollex does not extend quite to palm. The smaller cheliped differs considerably in size and has the fingers bent down, dactylus without a large basal tooth. The third abdominal segment reaches coxæ of fifth pair of feet. Length of male, 4 mm.; width, 5.2 mm.

Gulf of Mexico, 17 to 35 fathoms; Oyster Bay, Florida; Jamaica. Porto Rico: Mayaguez Harbor, 4 to 6 fathoms, station 6065; off Humacao,  $9\frac{1}{2}$  to  $12\frac{1}{2}$  fathoms, stations 6098 and 6099; off Vieques, 6 to 16 fathoms, stations 6085, 6091, 6092, and 6096; off Culebra,  $14\frac{3}{4}$  to 15 fathoms, stations 6086 and 6093; off St. Thomas, 20 fathoms, station 6080. The female from this haul has a rhizocephalic parasite on the abdomen.

**Genus ACTÆA** de Haan.*Actæa* de Haan, Fauna Japon., pp. 4 and 18, 1833.

Carapace convex fore and aft, slightly convex or flat from side to side, usually broad, regions well demarcated by deep grooves and again subdivided into lobules, which are usually convex and granular. Antero-lateral borders usually four-lobed, but lobes shallow and often indistinct. Postero-lateral borders usually concave, always short, not strongly convergent. Front between a third and a fourth the greatest width of carapace, deflexed, cleft in middle line into two lobes. Upper edge of orbit tumid, usually with two fissures or sutures; a third below outer orbital angle; eye-stalks short and thick. Antennules folding obliquely or nearly transversely. Basal antennal joint usually stopping at angle of deflexed front, but often prolonged beyond this, toward or nearly into orbit; flagellum about as long as orbit and lodged in the orbital hiatus. Merus of external maxillipeds with anterior border little oblique. Chelipeds equal in both sexes; fingers either acute or blunt-pointed, sometimes hollowed out at tip. Abdomen of the male five-jointed, somites three, four, and five fused.

*Key to the Porto Rican species of the genus Actæa.*

- A. Carapace, chelipeds, and legs granulous, not spinous.  
 B. Lobules of carapace very markedly isolated and very convex.....*rufopunctata nodosa*  
 B'. Lobules of carapace not remarkably isolated.  
 C. Fingers deeply grooved and granulated.....*setigera*  
 C'. Fingers smooth.....*bifrons*  
 A'. Carapace, chelipeds, and legs spinous.....*acantha*

**Actæa rufopunctata nodosa** (Stimpson).*Actæa nodosa* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 203, 1860.*Actæa rufopunctata* var. *nodosa* Miers, Challenger Rept., Zool., XVII, 122, 1886.

Carapace broad, ovoid, its extreme length not quite three-fourths, but more than two-thirds its extreme breadth; its surface broken by deep and broad grooves into numerous (about twenty-seven, excluding those around the orbits and the front) very convex lobules, which are covered very closely with large vesiculous granules; grooves filled with a dense short felt, with longer hairs sometimes interspersed, against which the lobules stand out like islands. Exposed surface of carpal and propodal joints of chelipeds and legs lobulated in same style as carapace. Front strongly deflexed, but somewhat prominent and rather sharply bilobed. The tumid supraorbital margin broken by two cross grooves and separated from lower margin of orbit by a fissure. Antero-lateral borders cut into four rounded lobules of nearly equal size by deepish fissures. Outer angle of basal antennal joint in contact with inner angle of lower edge of orbit. Edges of legs and of arm fringed with coarse hair. Lower outer surface of hand with granules arranged in lines. Fingers blunt-pointed, hollowed out at tip.

Length of female, 12 mm.; width, 17.5 mm.; fronto-orbital width, 9 mm.; frontal width, 5 mm.

Florida Reefs; West Indies; Bahia, Brazil (Miers). Porto Rico: Off Vieques, 6 fathoms, station 6096; Ensenada Honda, Culebra; Fajardo.

This form is perhaps not subspecifically distinct from *A. rufopunctata* of the Oriental and East Atlantic regions, but I have not the material to determine this point.

**Actæa setigera** (Milne Edwards).

*Xantho setiger* Milne Edwards, Hist. Nat. Crust., I, 390, 1834.

*Actæa setiger* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 51, 1859.

Carapace wide, ovoid, covered with short, stiff yellow hair and with granules; strongly lobulated anteriorly. Antero-lateral border divided into four lobes, which do not project beyond the general outline of the carapace. Postero-lateral borders concave. Median notch of front large. Basal antennal joint short, not prolonged into orbit. Pterygostomian regions finely granulous. Chelipeds hairy and very granulous; fingers slightly deflexed, black, this color extending in full-grown males upon external and internal surfaces of palm almost to articulation with wrist; in females the fingers only are black. Fingers grooved, intervening ridges granulous on the proximal half; tips acute. Legs covered with hairs; meral joints of first three pairs smooth outside and granulous on margins; of last pair, granulous on outside also; two following joints granulous; dactyls long, granulous, and terminating in a sharp nail. Abdomen of the male long and narrow.

Length of male, 16 mm.; width, 24.2 mm.; fronto-orbital width, 11.5 mm.; frontal width, 6 mm.

Bahamas; Florida Keys; West Indies; Bermudas. Porto Rico: Playa de Ponce Reef; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra; San Juan (G. M. Gray).

**Actæa bifrons** Rathbun.

*Actæa bifrons* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 262, pl. IV, figs. 3 and 4, 1898.

Allied to *A. setigera*; carapace narrower and flatter; areolations similar, granulation finer, marginal lobes more angular; hairs dark brown. Front with a double edge, the inferior slightly in advance of superior, but scarcely noticeable in a dorsal view; the two lobes of superior margin slightly arcuate, margin denticulate or granulate; lower margin viewed from in front sinuous; surface between the two margins concave. Epigastric region coarsely granulate. Eyes larger than in *A. setigera*; inferior orbital margin with a prominent tooth at inner angle. The chelipeds differ from those of *A. setigera* in having the fingers longer in proportion to the palm, more strongly bent downward, pollex wider at base than dactylus. Fingers horn color (the color extending one-third the length of palm in male) and almost smooth, being marked with lines of shallow pits; tips acute.

Length of female, 5.3 mm.; width, 7.5 mm.; fronto-orbital width, 4.7 mm.; frontal width, 2.6 mm.

Off Aspinwall, 34 fathoms (type locality); off Vieques, 12 fathoms, station 6094; Ensenada Honda, Culebra.

**Actæa acantha** (Milne Edwards).

*Cancer acanthus* Milne Edwards, Hist. Nat. Crust., I, 379, 1834.

*Actæa acantha* A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. Paris, I, 278, pl. XVII, f. 1, 1865.

*Actæa spinifera* Kingsley, Proc. Acad. Nat. Sci. Phila., XXXI, 1879, 392, 1880.

Carapace and feet covered with long hairs; lobules of anterior portion of carapace very prominent, covered with pointed tubercles or spinules, between which are deep smooth grooves. Frontal lobes rather well advanced, separated by a relatively broad median cut. Margin of front and orbits armed with spines. Antero-lateral margin cut into five lobes, each armed with three or four spines; outer orbital angle also spinulous. Postero-lateral borders concave. Posterior margin marked by rows of tubercles. Basal article of antenna spinulous. Merus of outer maxillipeds tuberculous, margins denticulate. Chelipeds subequal. Wrist and hand covered with spines; fingers short, spinulous, blunt, and somewhat hollowed out at tips; white at tips, remainder black, the black color extending in old males over nearly the whole hand. Ambulatory feet spinous.

Length of female, 16 mm.; width, 24.2 mm.; fronto-orbital width, 12.5 mm.; frontal width, 6.5 mm.

Florida Keys; Jamaica; Guadeloupe; Fernando Noronha (Pocock). Off Gallardo Bank, Porto Rico, 10 fathoms, station 9076.

**Genus XANTHIAS** Rathbun.

*Xanthodes* Dana, Proc. Acad. Nat. Sci. Phila., VI, 75, 1852. (Name preoccupied.)

*Xanthias* Rathbun, Proc. Biol. Soc. Washington, XI, 165, 1897.

Carapace thick, but somewhat depressed, moderately broad, suboval, regions delimited and to a certain extent areolated in anterior two-thirds. Fronto-orbital border considerably more than half the greatest width of carapace in extent. Front broad, bilobed. Antero-lateral border cut into three

or four lobes or teeth besides the orbital. Orbital margin with the three grooves either fairly distinct or quite indistinct. Basal antennal joint broad and very short; the flagellum, which is rather longer than orbit, lodged in orbital hiatus. Anterior edge of merus of external maxillipeds almost transverse. Chelipeds either equal or unequal in both sexes; the arm in repose is nearly or quite hidden beneath carapace; fingers pointed, not hollowed at tip. Legs stoutish, more or less hairy and granular or spiny along the upper border. Abdomen of male five-jointed.

***Xanthias nuttingi* Rathbun.**

*Xanthias nuttingi* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 271, pl. IV, f. 1, 1898.

Carapace suboval, convex in an antero-posterior direction, nearly flat in a transverse direction; anterior half rough with scaly granules; regions distinct. Front convex and having two lobes with granulate margins, separated by a V-shaped sinus. Antero-lateral margin with three sharp-pointed teeth besides the orbital, which is obliquely truncate and not prominent; posterior tooth smallest. Margin of orbits and of lateral teeth granulate. Second normal tooth of this genus (or that next the orbital) obsolete in this species. Outer fissure of orbit broad and V-shaped. Chelipeds heavy, unequal, arm spinulose on upper edge; wrist covered with bead-like tubercles, with a deep anterior groove and a small inner tooth terminating in a spinule. Larger hand in male with upper and about two-thirds of outer surface ornamented with bead tubercles; lower third and distal extremity smooth and shining; fingers broad, not gaping, brown with light tips; dactylus with a large basal tooth; color of pollex not running back on the manus, but forming a line with articulation of dactylus. Smaller hand almost entirely covered with tubercles, which grow smaller toward distal and lower margin; upper margin with a longitudinal groove; fingers deeply grooved. Upper margins of ambulatory legs tuberculate or granulate. The females differ in having the whole outer surface of the larger as well as the smaller tuberculate.

Color in alcohol, speckled with blue; larger patches of blue on anterior gastric and cardiac region.

Male: Length, 4 mm.; width, 5.5 mm.; fronto-orbital width, 4 mm.; frontal width, 2 mm.

Bahama Banks; Gulf of Mexico and Caribbean Sea, 21 to 25 fathoms; Jamaica; off Cape St. Roque, Brazil, 20 fathoms. Porto Rico: Mayaguez Harbor, 25 to 30 fathoms, station 6062, and 4 to 6 fathoms, station 6065; off Boca Prieta,  $8\frac{1}{2}$  fathoms, station 6075; Playa de Ponce Reef; off St. Thomas, 20 fathoms, station 6080; off Vieques, 14 fathoms, station 6085; off Humacao,  $9\frac{1}{2}$  to  $12\frac{1}{2}$  fathoms, stations 6098 and 6099.

**Genus EUCRATODES A. Milne Edwards.**

*Eucratodes* A. Milne Edwards, Crust. Rég. Mex., 346, 1880.

Carapace oval, of moderate width, antero-lateral margins arcuate, feebly dentate, postero-lateral slightly converging. Fronto-orbital width about two-thirds the greatest width of carapace. Frontal lobes entire. No upper or outer fissures on orbital margin. Basal article of antennae short, just touching a prolongation of front; the flagellum lies in the orbital hiatus. Antennules folded transversely. Buccal cavity broad; margin of epistome with two notches on each side; endostome without ridge. Merus of outer maxillipeds subquadilateral, notched at inner angle for articulation of palpus. Chelipeds of moderate size and nearly equal; fingers pointed. Ambulatory legs slender, smooth; dactyli elongate. Third, fourth, and fifth segments of abdomen fused; third segment angular at sides, reaching coxae of fifth pair of feet.

***Eucratodes agassizii* A. Milne Edwards.**

*Eucratodes agassizii* A. Milne Edwards, Crust. Rég. Mex., 347, pl. LXI, f. 1, 1880; Bull. Mus. Comp. Zool., VIII, 14, 1880.

Carapace thick, very convex in an antero-posterior direction, slightly convex transversely; regions scarcely indicated; surface smooth to naked eye, but under the lens it is punctate and obscurely granulate, except along antero-lateral margin, where the granules are plainly seen. Antero-lateral margin obscurely five-toothed, first or orbital tooth small; second rounded and separated from the first by a shallow sinus, as in species of *Eurypanopeus*; third larger, but little prominent; fourth most prominent; fifth small. Front slightly bilobed; a short closed median fissure; margin thin. Lower surface of carapace coarsely granulate. The arm has a superior subterminal tooth, the wrist a blunt inner tooth. Surface of chelipeds similar to that of carapace; lower surface of palms coarsely granulate. Dactylus of large hand with a large basal tooth. The brown color of the thumb covers only its distal half. The chela figured by Milne Edwards is the smaller of the two; the larger is more swollen.



Color, pale yellow; fingers brown (A. Milne Edwards).

Dimensions of male: Length, 6.2 mm.; width, 8.5 mm.; fronto-orbital width, 5.5 mm.; frontal width, 2.8 mm. A young male measures 3.3 mm. long by 4.2 mm. wide.

The specimen described by A. Milne Edwards was intermediate in size and also in proportionate width between the two taken by the *Fish Hawk*. It will be seen that our largest example is considerably wider than the type, also more oval and shows two additional lateral teeth. In the smaller example, the second lateral tooth is scarcely distinguishable; the fifth almost obsolete. I have little doubt, therefore, that these are the veritable *Eucratodes agassizii*, a rare species, not having been recorded since its original description.

Off Aguadilla, 137 fathoms, station 6055; Mayaguez Harbor, 161 to 172 fathoms, station 6066.

In regard to the type locality, the west coast of Florida, 100 fathoms, is the locality accompanying the original description; but in the Bull. Mus. Comp. Zool., VIII, 14, the locality is given as lat. 21° 14' N., 100 fathoms, Stimpson, collector. This entry is probably a corrected one. Dr. Stimpson made a series of dredgings in the Yucatan Channel while on the U. S. Coast Survey steamer *Bibb*.

#### Genus CHLORODIELLA Rathbun.

*Chlorodius* Milne Edwards, Hist. Nat. Crust., I, 399, 1834. (Not *Chlorodius* Leach in Desmarest, 1823.)  
*Chlorodiella* Rathbun, Proc. Biol. Soc. Washington, XI, 157, 1897.

Carapace depressed, flat, hexagonal, the regions partially or not at all demarcated, surface smooth and almost unbroken, except sometimes anteriorly and on branchio-hepatic region, near antero-lateral border, where there may be some broad transverse wrinkles. Fronto-orbital border varying from about two-thirds to more than three-fourths the greatest breadth of carapace. Front almost straight, emarginate in middle line, extremely broad (between a third and a half the greatest breadth of carapace), its outer angles separated from the supra-orbital margin by a groove. Antero-lateral borders cut into four lobes or teeth. Postero-lateral borders rather longer than the antero-lateral. Orbit with two suture lines above and one at the outer angle; eyes on short thick stalks. Basal antennal joint large, extending upwards and outwards into gap between front and orbit; flagellum in crevice-like orbital hiatus. Merus of external maxillipeds with anterior border almost transverse. Chelipeds unequal, long, more than twice the length of carapace, half or more of arm projecting beyond edge of carapace; fingers large, broadened, and deeply hollowed at tip. Legs spinulous. Abdomen of male consisting of five joints, the third to fifth somites being fused.

#### *Chlorodiella longimana* (Milne Edwards).

*Chlorodius longimanus* Milne Edwards, Hist. Nat. Crust., I, 401, 1834.  
*Chlorodiella longimanus* Rathbun, Ann. Inst. Jamaica, I, 14, 1897.

Gastric region faintly indicated. Smooth transverse ridges on the epigastric, protogastric, hepatic, and anterior branchial regions. Postorbital and branchio-hepatic furrows deep. Antero-lateral borders cut into four teeth besides orbital, the first two obtuse and tuberculiform, the last two longer and acute. Front with a double edge, the upper one truncate, feebly notched in middle, the lower one with a deeper notch, and oblique lobes projecting beyond upper; outer corners turned down to meet antennal joint. Anterior margin of merus of outer maxillipeds has a moderately deep sinus. Chelipeds very long; two-thirds of arm projects beyond carapace, its anterior margin armed with four or five teeth or spines; wrist smooth and bearing a spine or a tubercle at inner angle; hand long and smooth; fingers stout and black, the black color of pollex extending a little on hand. Legs granulous above and hairy.

Dimensions of male: Length, 14 mm.; width, 22.5 mm.; fronto-orbital width, 14.4 mm.; width of front, 7 mm.; approximate length of cheliped, 46 mm.

Florida Reefs; West Indies; Curaçao. Porto Rico: Mayaguez; Ponce; Arroyo, on Light-house Reef; Ensenada Honda, Culebra; San Juan (Gundlach), also collected by G. M. Gray.

#### Genus MENIPPE de Haan.

*Menippe* de Haan, Fauna Japon., pp. 4 and 21, 1833.

Carapace broad, transversely oval, moderately convex fore and aft, very slightly so from side to side; regions, except gastric, little defined. Antero-lateral borders long, strongly arched, cut into four teeth besides orbital; postero-lateral borders slightly shorter than antero-lateral, convergent; posterior border short. Front narrow, a fifth or less than a fifth the greatest breadth of carapace, rather prominent, almost horizontal, cut into two lobes, the outer angle of each of which forms a distinct

tooth. Orbit with three grooves near the outer angle well marked; inner orbital angles, both upper and lower, well pronounced. Eyes on short, thick stalks. Side edges of front not turned down, and the short basal antennal joint does not nearly reach the front, so that the cavities of orbits and antennules are not properly separated; next antennal joint just reaches front, and the long antennary flagellum stands in orbital hiatus. Antennules fold nearly transversely. Anterior edge of merus of external maxillipeds oblique and a little sinuous but not excised. Ridges of endostome complete, but low and faint. Chelipeds massive, a little unequal in both sexes; fingers stout, pointed, not hollowed. Abdomen of male singularly broad, all seven segments distinct.

#### **Menippe nodifrons** Stimpson.

*Pseudocarcinus rumphii* Milne Edwards, Hist. Nat. Crust., 1, 408, 1834. (Not *Cancer rumphii* Fabricius, Ent. Sys., Suppl., 336, 1798.)

*Menippe rumphii* Dana, Crust. U. S. Expl. Exped., 1, 179, 1852.

*Menippe nodifrons* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 53, 1859.

Gastric region distinct and lightly subdivided into three lobes; between it and the front are four large tubercles forming a quadrilateral, the anterior pair farther apart than posterior. A low indistinct elevation, nearly parallel with curve of antero-lateral border, crosses either branchial; another ridge, less distinct, crosses gastric and hepatic regions. Surface closely granulate and coarsely pitted. Front is a little more than a fifth of greatest breadth of carapace, and consists of two prominent round-pointed lobes, outside of each of which are two smaller rounded lobes; the inner of these is sometimes obliterated in the old. Antero-lateral border rather sharp and divided into four prominent lobes, of which the first two are broadly rounded, last two dentiform, obtuse, strongly projecting; from the last one a ridge extends obliquely inward on carapace. Chelipeds finely granulate and with distinct pits; inner angle of wrist bluntly prominent. Legs stout, granular above; upper border of carpal joints and both borders of propodi hairy; dactyli more thickly hairy.

Dimensions of male: Length, 46.2 mm.; width, 67 mm.; width of front, 14.3 mm.

From Indian River, Florida (U. S. Fish Commission), and Gulf of Mexico to Brazil. Mayaguez (Gundlach, as *Menippe rumphii*). I have seen no specimen of this from Porto Rico; it is undoubtedly the species noted by Gundlach, but not *Cancer rumphii* Herbst.

#### **Genus OZIUS** Milne Edwards.

*Ozius* Milne Edwards, Hist. Nat. Crust., 1, 404, 1834.

Carapace broad, transversely oblate-oval, moderately convex fore and aft, slightly convex or nearly flat from side to side; the regions, except gastric, little defined; the surface smooth or granular, often rugose anteriorly. Antero-lateral borders of good length, strongly arched, usually broadly crenate or lobulate; postero-lateral borders convergent, about as long as or shorter than antero-lateral. Front rather broad (considerably more than a fourth the greatest breadth of carapace), obliquely deflexed, cut into four lobules or teeth of about equal size, separated from orbit by a notch. Orbits deep, rather small, the grooves near outer angle inconspicuous; eyes on short, thick stalks. The antennules fold nearly transversely. Basal antennal joint prolonged between side of front and orbital plate; the flagellum, which is very small (about half the major diameter of the orbit in length), stands in orbital hiatus. The ridges of the endostome, defining the expiratory channels, are very strong, and the opposed margin of the merus of the external maxillipeds is notched, usually very deeply, so that a permanent expiratory orifice results. Chelipeds massive, unequal in both sexes; the fingers of good length, pointed, not hollowed. The abdomen of the male consists of seven segments.

#### **Ozius reticulatus** (Desbonne & Schramm).

*Lagostoma reticulata* Desbonne & Schramm, Crust. Guadeloupe, 34, pl. IV, f. 6, 1867.

*Ozius reticulatus* A. Milne Edwards, Crust. Rég. Mex., 278, pl. LV, f. 3, 1880.

Carapace more than 1.5 times as wide as long; deeply corroded along the antero-lateral borders, covered with depressed granules. Front bimarginate. Antero-lateral margin somewhat crenate in front and having behind indications of three teeth. Claws corroded. Fingers dentate, those of larger claw gaping, and with a large basal tooth on the dactyl.

Wine color or a dirty rose, with spots of fawn color. Fingers brown.

Male: Length, 15 mm.; width, 23.8 mm.; fronto-orbital width, 9.7 mm.; frontal width, 5.8 mm.

West Indies; Sabanilla, United States of Colombia. Ensenada Honda, Culebra (*Fish Hawk*).

Genus *PILUMNUS* Leach.

*Pilumnus* Leach, Trans. Linn. Soc. London, XI, 309 and 321, 1815.

Carapace and legs generally thickly covered with hair. Carapace transversely oval or subquad-rilateral, declivous anteriorly, flat posteriorly, not greatly broader than long; the regions, as a rule, but moderately plainly demarcated and areolated. Antero-lateral borders not longer, but commonly shorter than postero-lateral, and cut into teeth which, very commonly, are spiniform. Front usually about a third the greatest breadth of carapace, but sometimes broader. It is cut into two lobes, the outer angle of each of which commonly forms an independent dentiform or spiniform lobule separated from supra-orbital angle by a groove or notch. The orbits generally have a gap or fissure just below outer angle, and one or two gaps or notches in upper border; inner lower orbital angle commonly sharp and prominent. Eyes moderately long and slender. The antennules fold transversely. Basal antennal joint short, either not quite touching the front or just touching it by its inner angle; the flagellum, which is planted in the orbital hiatus, is long, usually very much more than major diameter of orbit. Ridges of endostome, defining expiratory channels, are usually plain, but not very high; anterior border of merus of external maxillipeds almost transverse and not notched. Chelipeds stout, the fingers coarse, short, and pointed. Legs usually stout and of moderate length. The abdomen of male consists of seven separate segments.

*Key to the Porto Rican species of the genus Pilumnus.*

- A. Carapace for the most part concealed by a short, thick pubescence, which when removed discloses tubercles on the hepatic regions and, usually, on the gastric also.
- B. Frontal lobes concave, entire ..... *reticulatus*  
 B'. Frontal lobes convex, and granulate or denticulate.
- C. Outer surface of palms more or less hairy.
- D. Entire outer surface of palms tuberculate ..... *gemmatus*  
 D'. Outer surface of palms partially smooth and naked.
- E. Antero-lateral projections, after the pubescence is removed, spiniform, curved, sharp ..... *pannosus*  
 E'. Antero-lateral projections, after the pubescence is removed, dentiform, short, obtuse ..... *holosericus*
- C'. Outer surface of palms wholly naked or free from hair ..... *nudimanus*
- A'. Carapace, when covered by a short, thick pubescence, not having the gastric region tuberculate.
- B. Outer surface of larger hand only partially covered with tubercles or spines.
- C. Carapace covered with hair ..... *floridanus*  
 C'. Carapace naked on posterior half ..... *dasypodus*
- B'. Outer surface of larger hand entirely covered with tubercles or spines.
- C. Four lateral spines, including the orbital ..... *brasiliensis*  
 C'. Three lateral spines, the orbital missing ..... *marshi*

*Pilumnus reticulatus* Stimpson.

*Pilumnus reticulatus* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 214, 1860.

*Pilumnus tessellatus* A. Milne Edwards, Crust. Rég. Mex., 295, pl. LI, f. 2, 1880.

Carapace, upper surface of chelipeds, and also the legs clothed with short, thick setæ, closely arranged in reticulating lines, inclosing small, naked, polygonal areolæ, which on anterior half of carapace and on chelipeds are mostly each occupied by a tubercle projecting forward, but flattened on its superior and posterior surface. About twelve tubercles on carapace, excluding marginal ones, and fifteen or more on each cheliped. On the legs the naked areolæ form deep cavities not occupied by tubercles; about two areolæ occupy width of leg. Some much longer and larger clavate setæ are dispersed among the short ones which clothe the general surface. Margins of frontal lobes oblique and concave. Antero-lateral margin with four teeth (including the orbital) similar to the tubercles; there is also a subhepatic and a subbranchial tubercle. Three projecting teeth on lower margin of orbit, the inner one very large. Lower and distal two-thirds of outer surface of larger palm and half of smaller palm smooth and naked. Fingers also smooth; only a few setæ at base of dactylus.

Length of male, 8 mm.; width, 11 mm.

Jamaica; St. Thomas; Curaçao; Desterro and Pernambuco, Brazil (A. Milne Edwards). Porto Rico: Mayaguez; Playa de Ponce Reef; Arroyo; Puerto Real.

*Pilumnus gemmatus* Stimpson.

*Pilumnus gemmatus* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 214, 1860. (Not *P. gemmatus* A. Milne Edwards.)

Carapace rather narrow, covered, as also are the chelipeds and legs, with a short, close pubescence (with occasional stout and long cylindrical setæ), which does not conceal boundaries of regions and



the small red beads or tubercles scattered on anterior half of carapace, upper and outer surfaces of chelipeds, and upper surface of legs. Frontal lobes subtriangular, granulate on margin, more advanced near median line; interspace V-shaped. Antero-lateral projections four, short, stout and blunt or subacute. Upper orbital margin with a few red tubercles; lower margin finely denticulate, a small outer notch. Entire outer surface of both hands tuberculate, the tubercles growing smaller toward lower margin. Both fingers deeply grooved; tubercles on upper portion of basal half of dactylus; a few on outer surface of pollex. Outer lower margin of arm with a broad band of tubercles and granules.

Length of male, 7.8 mm.; width, 10.4 mm.

Tortugas; St. Thomas; Curaçao. Taken by the *Fish Hawk* at Ensenada Honda, Culebra, and off St. Thomas, 20 to 23 fathoms, station 6079.

#### ***Pilumnus pannosus* Rathbun.**

*Pilumnus gemmatus* A. Milne Edwards, Crust. Rég. Mex., 290, pl. LI, f. 4, 1880. (Not *P. gemmatus* Stimpson, 1860.)

*Pilumnus pannosus* Rathbun, Proc. U. S. Nat. Mus., XIX, 142, 1896.

Resembles *P. gemmatus* Stimpson. Carapace wider and less quadrate than in *P. gemmatus*, entirely covered with a soft, thick pubescence, which is not evenly distributed; here and there are longer, irregular, club-shaped setae, which give the crab a very ragged appearance. Anterior half of carapace and upper surface of chelipeds and legs dotted with bead-like tubercles, larger than in *P. gemmatus*. Frontal lobes subtriangular, granulate on the margin, more advanced near median line; interspace V-shaped. The antero-lateral projections look like shallow lobes until pubescence is removed, when they are seen to be triangular, well-separated spines with slender tips pointing forward. Upper margin of orbit with two tuberculiform spines near inner angle and two between those and outer angle; lower margin with a row of short, stout, blunt spines or tubercles of unequal size, and a V-shaped notch next the outer angle.

The upper portion of hands tuberculate, but greater part of outer surface smooth and naked; smaller hand almost entirely covered with tubercles and granules; its lower distal portion bare. The pollex is smooth, and there are but a few tubercles on the dactylus near its articulation. Fingers with shallow grooves, which in the larger cheliped consist of shallow punctae. Outer lower margin of the arm smooth for its proximal half. Ambulatory legs pubescent and bordered with fringes of club-shaped setae mixed with long fine hairs.

Length of male, 8.6 mm.; width, 12 mm.

Bahama Banks; Gulf of Mexico; Florida Keys; Jamaica; St. Thomas. Reefs at Ponce, Porto Rico.

#### ***Pilumnus holosericus* Rathbun.**

*Pilumnus holosericus* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 268, pl. v, f. 1, 1898.

Allied to *P. gemmatus* and *P. pannosus*. Carapace more oval than in those species. Surface covered with a short, smooth velvety pubescence which does not conceal boundaries of areolations. On either side of gastric region is a tuft of long hairs. Antero-lateral teeth shorter than in *P. gemmatus* and *P. pannosus* and blunt, even when pubescence is removed. Tubercles of carapace and chelipeds smaller and more numerous than in allied species. Larger hand with lower and distal portion of outer surface bare and unarmed, but this space is smaller than in *P. pannosus*. Fingers shorter than in that species. Smaller hand with entire outer surface pubescent and hairy. Ambulatory legs pubescent and fringed with long hairs.

Length of male, 6.1 mm.; width, 8.3 mm.

Bahamas; St. Thomas; St. John. Porto Rico: Mayaguez, on coral reef; Puerto Real; Boqueron Bay, on coral reef; reefs at Ponce; Arroyo.

#### ***Pilumnus nudimanus*, sp. nov.**

Carapace covered with a short, dense pubescence (easily rubbed off) among which are a few tufts of longer stout setae on the frontal, gastric, and anterior branchial regions. On hepatic region is an oblique row, parallel to antero-lateral margin, of five or six small, reddish-brown bead-like tubercles, visible amid pubescence. Antero-lateral margin armed with three spines, stout at their base, but sharp at ends, which are hooked forward. Upper orbital margin has two or three bead-like tubercles similar to those of hepatic row; lower margin finely granulate or crenulate. Median sinus of front V-shaped, margins of lobes outside the sinus obliquely convex and finely granulate; the outer frontal tooth is

small, with a reddish tubercle at tip. Upper margin of arm has a strong distal, subterminal tooth. The wrist is densely pubescent except in a narrow groove parallel to distal margin, and bears also a number of large tubercles of which there are in large cheliped about twenty-six behind groove and eleven in front of it. Hands very unequal in female, and naked, but sparingly dotted on the outer surface with tubercles, except on lower third of larger hand, which is smooth. Pollex short and thick; dactyli with tubercles above near their base. Legs long-hairy, upper surface of carpal and propodal segments flattened and paved with depressed pear-shaped tubercles.

Dimensions of ovigerous female: Length, 6 mm.; width, 8.8 mm.

Type locality, Arroyo; one female (Cat. No. 23770).

A young specimen also was taken at Arroyo on the Light-house Reef.

This species in the arrangement of tubercles on the carapace, in the bare and tuberculated palmus, and in the peculiar vertically flattened ambulatory legs, differs from all others found in America.

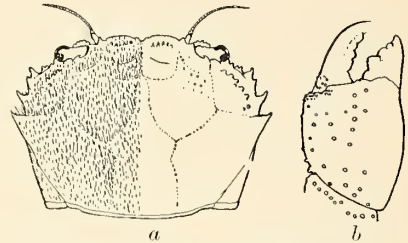


FIG. 7.—*Pilumnus nudimanus*, female. (a) Carapace,  $\times 4$ . (b) Large chela,  $\times 5.33$ .

#### *Pilumnus floridanus* Stimpson.

*Pilumnus floridanus* Stimpson, Bull. Mus. Comp. Zool., 11, 141, 1871.

*Pilumnus lacteus* A. Milne Edwards, Crust. Rég. Mex., 292, pl. LI, f. 5, 1880. (Not *P. lacteus* Stimpson, 1871.)

Carapace covered with a short pubescence and a few longer fine hairs, a transverse series of which, across the frontal region, forms a somewhat conspicuous feature; there are also a few long clavate setae. Below the ciliated line the front is naked and its margin unarmed; its lobes are most strongly projecting near median sinus. Margin of orbit unarmed above, but armed below with eight or ten spiniform teeth. Antero-lateral margin with four spines, including orbital. A subhepatic spinule. No spines on hepatic region above. Whole outer surface of wrists and of smaller hand spinous; spines arranged in longitudinal rows on hands, on larger palm becoming obsolete near the lower and digital margins. Legs spinous.

Length of male, 7 mm.; width, 9.6 mm.

Distributed from the Gulf of Mexico to St. Thomas; Bahama Banks; to a depth of 30 fathoms. Porto Rico: Mayaguez Harbor, 25 to 30 fathoms, station 6062; off St. Thomas, 20 to 23 fathoms, station 6079; off Vieques, 16 fathoms, station 6092.

#### *Pilumnus dasypodus* Kingsley.

*Pilumnus dasypodus* Kingsley, Proc. Boston Soc. Nat. Hist., XX, 155, 1879.

*Pilumnus vinaccus* A. Milne Edwards, Crust. Rég. Mex., 283, pl. L, f. 2, 1880.

Carapace on its anterior two-thirds covered with long, fine hair with occasional stouter setae interspersed; upper part of chelipeds and surface of legs similarly clothed. Anterior half of carapace roughly granulate. Antero-lateral margin armed with four long, sharp spines curved slightly forward. Frontal lobes more advanced toward the middle than toward outside and armed with short spines. Orbital border spinous. Chelipeds very unequal, spinous and granulate, except lower and distal two-thirds of hand, which is smooth and naked. The movable fingers have only a bunch of spinules and hairs at base. Legs spinous above.

Brownish wine color; feet brighter. Fingers and extremity of spines brown (A. Milne Edwards).

Dimensions of male: Length, 6.5 mm.; width, 9.1 mm.

Gulf of Mexico to Rio de Janeiro. Porto Rico: Mayaguez; Boqueron Bay; Puerto Real; reefs at Ponce; Ensenada Honda, Culebra.

#### *Pilumnus brasiliensis* Miers.

*Pilumnus brasiliensis* Miers, *Challenger* Rept., Zool., XVII, 151, pl. XIII, f. 2, 1886.

Carapace rather narrow, smooth, covered with short hair, and on anterior two-thirds rather thinly clothed with long, fine hairs; chelipeds and legs similarly clothed. Antero-lateral margin armed with four sharp spines; between the first and second a smaller spinule. Frontal lobes strongly deflexed,

margins convex, spinulose; a small spine or spinule on tooth forming the outer angle, although Miers says this is obsolete. Orbital margin spinulose; inner half of lower margin spinous. Upper and outer surface of chelipeds clothed with spines, covering the palms (where they are arranged in longitudinal series) and basal portion of dactyli. Legs spinous above.

Dimensions of female: Length, 6 mm.; width, 7.7 mm.

Off Bahia, Brazil, 7 to 20 fathoms (type locality). Porto Rico: Off Vieques, 6 to 16 fathoms, stations 6085, 6091, 6092, 6096; off Culebra, 14½ fathoms, station 6086.

*Pilumnus marshi*,<sup>1</sup> sp. nov.

This species in its general appearance is so like *P. brasiliensis* that at first glance one might take them to be the same. The carapace is, however, narrower, and the antero-lateral margin shorter, being only a little more than half the length of postero-lateral margin, whereas in *P. brasiliensis* the antero-lateral is nearly as long as the postero-lateral. There are only three lateral spines in our species, the spine at the outer angle of orbit being absent. The posterior of the spines is small and appressed, while in *P. brasiliensis* it is similar in size and direction to the other spines. The corneal extremity of the eye is much larger in our species. Fingers of chelipeds longer and more deeply grooved. Legs considerably longer than in the allied species; for example, the merus of last pair when flexed reaches farther forward than tip of penult antero-lateral spine; in *P. brasiliensis* the same joint fails to reach tip of posterior spine.

Length of male, 5.5 mm.; width, 7 mm. Length of female, 5.7 mm.; width, 7.1 mm.

Type locality, off St. Thomas, 20 to 23 fathoms, station 6079, 1 male (Cat. No. 23771). Also taken at the next station, 6080, near the last, in 20 fathoms, 1 female.

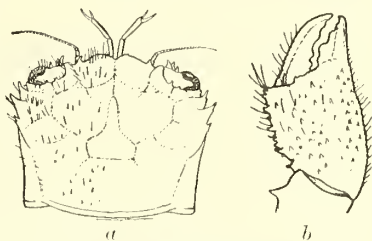


FIG. 8.—*Pilumnus marshi*, male. (a) Carapace,  $\times 4$ . (b) Large chela,  $\times 4$ .

Genus EURYTIUM Stimpson.

*Eurytium* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 56, 1859.

Carapace broad (length about two-thirds width), convex, regions lightly marked, without transverse raised lines. Antero-lateral borders regularly arcuate, shorter than postero-lateral, cut into five shallow teeth, the second tooth rounded and intimately fused with first. Fronto-orbital border over half the width of carapace. Front from a fourth to almost a third the width of carapace. Front deflexed, two rounded lobes separated by a shallow notch. Superior margin of orbit with two short and inconspicuous fissures; lower margin with a deep rounded sinus outside, and two lobes, of which the inner and smaller is slightly more advanced than outer. Basal antennal joint broad and in contact with front; the flagellum stands in orbital hiatus. The ridge on the endostome which defines the efferent branchial channel is well marked, and continued to margin of epistome. Chelipeds massive and rounded, unequal in both sexes. The abdomen in male is five-jointed.

Allied to *Eupanopeus*, *Eurypanopeus*, etc., but distinguished by its oval and almost smooth carapace, without ridges, and by its palatal ridge.

*Eurytium limosum* (Say).

*Cancer limosa* Say, Jour. Phila. Acad. Sci., I, 446, 1817.

*Panopeus limosus* Milne Edwards, Hist. Nat. Crust., I, 404, 1834.

*Eurytium limosum* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 56, 1859; A. Milne Edwards, Crust. Rég. Mex., 332, pl. LX, f. 2, 1850.

Carapace very convex in an antero-posterior direction; surface smooth to eye, but under lens granulate, the granules coarser near frontal and antero-lateral margins; two feeble epigastric lobes. Front one-fourth the width of carapace. Antero-lateral margin about two-thirds the length of postero-lateral, bordered by a raised line of granules; second tooth lobiform, separated from first by a shallow sinus;

<sup>1</sup> In honor of Mr. M. C. Marsh, one of the naturalists of the expedition to Porto Rico.



third and fourth not prominent, outer margins arcuate; the fifth more prominent and dentiform, subacute. The granules of chelipeds fine and reticulate; no carpal groove; fingers pointed, color of fingers not continued on palm.

Color of carapace, a brilliant purplish blue; wrist and hand bluish; proximal upper half of movable finger pink; remainder of finger porcelain white; lower portion of chelipeds and also the carpal tooth yellow.

Length of male, 22 mm.; width, 32.8 mm.; fronto-orbital width, 17.4 mm.; frontal width, 8.1 mm. New York to Brazil; Bermudas. Ensenada Honda, Culebra.

#### Genus *ERIPHIA* Latreille.

*Eriphia* Latreille, Nouv. Dict. Hist. Nat., x, 404, 1817.

Carapace thick and deep, approaching a quadrilateral shape, very little convex or nearly flat, not remarkably broader than long. Antero-lateral borders slightly curved, much shorter than postero-lateral, and meeting the latter, not at a strong angle, as in most cancrids, but at a very open and imperceptible angle; though spinate, they are not cut into lobes. Fronto-orbital border extremely broad, much more than three-quarters the greatest breadth of carapace; the front, which is therefore broad also, is strongly deflexed, almost straight, cut in the middle, the outer part on each side broadly in contact—far beyond limits of antennal base—with a singularly broad prolongation of infra-orbital plate. The orbits, which are deep and oval, are therefore completely closed and widely separated from the antennæ. Basal antennal joint very small, short, and broad; flagellum long, more than major diameter of large orbit. The antennules fold transversely. The crests of endostome, defining the expiratory canals, are strong, and the canal is completed below by the foliaceous process of first maxillipeds, the anterior edge of that process being concave. Oblique anterior border of merus of external maxillipeds not notched. Chelipeds massive, unequal in both sexes; fingers stout, pointed, not hollowed. The abdomen of the male has all seven segments separate.

#### *Eriphia gonagra* (Fabricius).

*Cancer gonagra* Fabricius, Sp. Ins., 505, 1781.

*Eriphia gonagra* Milne Edwards, Hist. Nat. Crust., I, 426, pl. xvi, figs. 16 and 17, 1834.

Carapace of moderate width, regions clearly marked on anterior two-thirds; postorbital grooves very deep; a transverse granulated line in front of epigastric lobes, another line across protogastric and hepatic lobes; a line of tubercles parallel to antero-lateral margins; these last armed with six spiniform teeth. Front very wide, deflexed, and divided into four lobes; the two median wider and more advanced than the lateral, truncate, with a finely granulated border; lateral lobes slightly concave in dorsal view. Fronto-orbital suture very sinuous; below it a line of large tubercles. Chelipeds strong, swollen, unequal. Hand covered with large, round, flattened, squamiform tubercles, more elevated on the small hand than on the large. The larger movable finger has a large rounded tooth at its base. Wrist covered with less prominent tubercles. Legs clothed with fine, stiff hairs on the last three segments.

Color, reddish brown or yellowish brown; the spines and margins of front and orbits orange; tubercles on upper half of claws dark red or blue, on lower half yellow; legs light yellow with fine red dots.

Male: Length, 26.5 mm.; width, 38.7 mm.; fronto-orbital width, 30 mm.; width of front, 19 mm.

South Carolina (Rankin); Florida Keys to Brazil; Bahamas; Bermudas. Porto Rico: Mayaguez, on coral reef; Boqueron Bay; Ponce reefs; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra; Hucars; Aguadilla (Gundlach).

#### Genus *MELYBIA* Stimpson.

*Melybia* Stimpson, Bull. Mus. Comp. Zool., II, 144, 1871.

Carapace rather narrow, subquadrate, slightly convex, regions faintly marked. Antero-lateral margins very short, with four teeth or spines, including the orbital. Fronto-orbital width great, about five-sixths the greatest width of carapace. Front about two-fifths the width of carapace. Front depressed, bilobed, separated by a notch from inner orbital angle. Orbits large, completely filled by stout eyes; two superior notches in margin, and a broader notch below on outside. Basal joint of antenna narrow, reaching a process of front and closing the orbital hiatus. Outer maxillipeds much

smaller than buccal cavity; the exognath is half the width of endognath. Chelipeds unequal, long and strong, the arm reaching far beyond earapace, spinulose. Legs long and narrow, spinulose; dactyli long. Abdomen of male with third to fifth segments fused.

**Melybia thalamita** Stimpson.

*Melybia thalamita* Stimpson, Bull. Mus. Comp. Zool., II, 144, 1871.

Carapace somewhat convex, slightly pubescent; surface nearly even, minutely granulated. First tooth of antero-lateral margin small, sometimes bifid at tip; second and third teeth long, spiniform; fourth small, spiniform. Median notch of front large, V-shaped; margins of lobes nearly straight, sloping backward toward orbit. Margin of orbit minutely crenulated. Merus of chelipeds armed with spines on upper and inner margin. Carpus spinulose on outer surface; three spines along inner margin, middle one the longer. Manus with a double row of spines above. Fingers two-thirds as long as palm, broad, compressed, not gaping. Ambulatory legs sparsely hairy; merus with a row of spines on the anterior margin; one spine near distal end of posterior margin in the first three pairs. Dactylus nearly as long as propodus.

Length of male, 6.9 mm.; width, 9.8 mm.

Florida Straits to Aspinwall, 15 to 201 fathoms. Off Culebra, 15 to 15½ fathoms, stations 6087 and 6093; off Vieques, 12½ fathoms, station 6095.

**Genus DOMEZIA** Eydoux & Souleyet.

*Domezia* Eydoux & Souleyet, Voy. *Bonite*, I, Crust., 234, 1842.

Carapace somewhat transversely oval, but much contracted posteriorly, flat, somewhat hairy, with no trace of regions. Fronto-orbital border not much less than greatest breadth of carapace. Front profusely spinate, the spines being sharp and a little curved. The antero-lateral borders pass backward with but little outward slope, a little shorter than concave and convergent postero-lateral borders, and armed with a number of sharp curved spines. The orbits are at antero-lateral angles of carapace and do not conceal the eyes; their edge shows no fissures nor sutures; their upper and lower inner angles are broadly in contact, or almost in contact, so as to exclude antennae. The antennules fold nearly transversely. The basal antennal joint hardly reaches the front, though its outer angle is produced toward front; the flagellum is short, hardly as long as orbit. Buccal cavern broad; crests of endostome not very strong, nor is the foliaceous process of first maxillipeds produced far forward; external maxillipeds very long, merus remarkably broad and short. Chelipeds somewhat unequal, short, and not very massive; arm almost entirely hidden by carapace; fingers compressed, pointed. Legs stout, especially meropodites. The abdomen of the male has all seven segments distinct and separate.

**Domezia hispida** Eydoux & Souleyet.

*Domezia hispida* Eydoux & Souleyet, Voy. *Bonite*, pl. II, figs. 5 to 10, 1841 (?).

*Domezia hispida* Eydoux & Souleyet, Voy. *Bonite*, I, Crust., 235, 1842.

Carapace covered with light-colored hairs; antero-lateral border with five or six (including orbital angle) acute dark-tipped spines, and several similar spines on carapace just inside antero-lateral border, and also just inside spiny fronto-orbital border. Orbital margin and prominent edge of the epistome finely denticulate. Merus of external maxillipeds extremely broad and short, with an elevated patch of denticles on outer surface. Chelipeds a little unequal; the arm, wrist, hand, and dactylus are all studded with acute spines. Legs stout, of moderate length; anterior surface of last four joints fringed with hairs, anterior edge of merus spinate, as also, but much less distinctly, is the anterior edge of the carpus and propodus.

Length of male, 6.6 mm.; width, 9.3 mm.

Florida Reefs; West Indies; Pernambuco and Alagoas, Brazil; Cape Verde Islands; Senegal; islands of the Pacific and Indian oceans. Porto Rico: Mayaguez, on coral reef; Puerto Real; Playa de Ponce Reef; Ensenada Honda, Culebra; off Vieques, 16 fathoms, station 6092; off Humacao, 10 fathoms, station 6097; San Juan (G. M. Gray, coll.).

## Family PORTUNIDÆ Leach, 1819; Miers, 1886.

Carapace depressed, moderately transverse, and usually widest at the last antero-lateral marginal spine. Front horizontal. Orbits and eye-stalks of moderate length. Lateral teeth usually from five to nine. Last trunk legs usually adapted for swimming, with terminal joint ovate, flatly expanded.

*Key to the Porto Rican genera of the family Portunidæ.*

- A. Movable portion of antennæ not excluded from orbit.  
 B. A longitudinal ridge on the palate.  
 C. Outer maxillipeds not remarkably advanced; segments of palp subcylindrical.  
 D. Abdomen of male triangular.....*Portunus*  
 D'. Abdomen of male  $\perp$ -shaped.....*Callinectes*  
 C'. Outer maxillipeds remarkably advanced; last two segments of palp compressed and lamellate.....*Lupella*  
 B. No longitudinal ridge on the palate.....*Arenæus*  
 A'. Movable portion of the antenna excluded from orbital cavity by a prolongation of basal joint of antenna...*Charybdtella*

## Genus PORTUNUS Fabricius.

*Portunus* Fabricius, Entom. Sys., Suppl., 325, 1798.  
*Lupa* Leach, Edin. Encyc., VII, 390, 1814. (Not *Lupa* de Haan, 1833.)  
*Lupania* Rafinesque, Amer. Monthly Mag., III, 272, Aug., 1818.  
*Neptunus* de Haan, Fauna Japon., pp. 3 and 7, 1833.

Carapace transverse, usually broad, and depressed or little convex, often with surface areolated. Front proper well delimited from inner supra-orbital angles and cut into from three to six—usually four—teeth; its breadth is from a sixth to a fifth the greatest breadth of carapace (lateral epibranchial spines not included). Antero-lateral borders oblique, arched, longer than postero-lateral, cut into nine teeth (including outer orbital angle), of which the ninth may be enlarged. The orbit usually has two fissures or sutures in upper border, which border is less prominent than lower border, so that the orbit very often has a dorsal inclination; the lower border has a fissure or suture near the outer angle, inner angle dentiform and usually very prominent. The antennules fold transversely. The basal antennal joint is peculiarly short and has its antero-external angle produced to form a lobule or spine extending into the orbit; the flagellum, of moderate length, stands in orbital hiatus. Epistome short or even linear, sometimes prolonged in middle line to form a spine lying below interantennular septum. Buccal cavity squarish, broader than long, efferent branchial channels almost always well defined. Palpus of outer maxillipeds subcylindrical. Chelipeds longer, usually much longer than any of legs, and massive; arm with spines; both inner and outer angles of wrist spiniform; palm prismatic, costate, and usually with spines, fingers usually nearly as long as the palm and strongly toothed. Ambulatory legs compressed; in last pair merus and carpus are short and broad; propodus and dactylus typically foliaceous and paddle-like for swimming. Abdomen of male triangular, five-jointed, the third, fourth, and fifth segments being fused; the first segment in both sexes is almost entirely concealed beneath carapace.

*Key to the Porto Rican subgenera and species of the genus Portunus.*

- A. Carapace wide; antero-lateral margin the arc of a circle with long radius, whose center is near posterior margin of carapace.....Subgenus *Portunus*  
 B. First eight lateral spines or teeth subequal.....*ventralis*  
 B'. Second, fourth and sixth lateral spines or teeth smaller than the others.....*sulcatus*  
 A'. Carapace narrow; antero-lateral margin the arc of a circle with short radius, whose center is near center of cardiac region.....Subgenus *Achelous*  
 B. Carapace with rounding posterior corners.  
 C. No spine on the basal joint of swimming feet.  
 D. Superior outer surface of manus with a longitudinal tuberculated ridge.  
 E. Frontal teeth six (exclusive of the inner orbital).....*spinimanus*  
 E'. Frontal teeth four (exclusive of inner orbital).....*depressifrons*  
 D'. Superior outer surface of manus iridescent, and without a longitudinal tuberculated ridge.....*ordwayi*  
 C'. An erect spine on the basal joint of swimming feet.....*sebae*  
 B'. Carapace with sharp posterior angles.....*spinicarpus*

## Subgenus PORTUNUS.

Carapace very wide, the antero-lateral margin being the arc of a circle with long radius, whose center is near posterior margin of carapace. Last spine of antero-lateral margin usually much larger and longer than the others.



**Portunus ventralis** (A. Milne Edwards).

*Neptunus ventralis* A. Milne Edwards, Crust. Rég. Mex., 215, pl. XI, f. 3, 1879.

Carapace of moderate width, very uneven, covered with a short pubescence, out of which arise the granulations of the elevated portions of carapace. Front slightly advanced. The two middle teeth are smaller than the lateral; the projection from epistome is visible between them; inner orbital angles blunt. Antero-lateral teeth small, widely separated, very granulous at base, their points directed more forward than usual. Lateral spine as long as the space occupied by the three last teeth and directed obliquely backward. Pterygostomial regions covered with hairs, which conceal the granulations. Merus of outer maxillipeds little advanced and bordered on front and sides with a prominent margin. Merus of chelipeds with four anterior spines and a posterior distal spine; carpus with an inner and an outer spine; three spines on manus, one next the carpus, the others on upper margin at distal and near distal end. Ambulatory legs short.- Merus of swimming feet without a spine.

Dimensions of male: Entire length, 15 mm.; entire width, 30 mm.; width at sinus in front of lateral spines, 23.7 mm.

Guadeloupe (type locality). Porto Rico: Mayaguez; off Puerto Real,  $8\frac{1}{2}$  fathoms, station 6074; Boqueron Bay; Ponce reefs; Ensenada Honda, Culebra.

**Portunus sulcatus** (A. Milne Edwards).

*Neptunus sulcatus* A. Milne Edwards, Crust. Rég. Mex., 216, pl. XXXIX, f. 3, 1879.

Very similar to *P. ventralis*. Carapace more even. Second, fourth, and sixth teeth noticeably smaller than the others; the lateral spine curves forward.

Dimensions of female (one of type lot): Entire length, 10.5 mm.; entire width, 21.2 mm.; width at sinuses in front of lateral spine, 15.7 mm.

Coast of Brazil, lat.  $11^{\circ} 49' S.$ , long.  $37^{\circ} 27' W.$ , 12 to 17 fathoms, *Hassler* (type locality); Cape Frio, Brazil (Copenhagen Mus.); off Georgia and northern Florida (Copenhagen Mus.); Gulf of Mexico and Caribbean Sea, at the surface. Mayaguez, Porto Rico, 1 young male.

**Subgenus ACHELOUS** de Haan.

*Achelous* de Haan, Fauna Japon., pp. 3 and 8, 1833.

Carapace narrow, the antero-lateral margin being the arc of a circle with short radius, whose center is near center of cardiac region. Last spine of antero-lateral margin usually not much if any larger than the others.

**Portunus (Achelous) spinimanus** Latreille.

*Portunus spinimanus* Latreille, Nouv. Dict. Hist. Nat., XXVIII, 47, 1819.

*Portunus (Achelous) spinimanus* de Haan, Fauna Japon., 8, 1833.

*Achelous spinimanus* A. Milne Edwards, Crust. Rég. Mex., 230, pl. XXXIX, f. 2, 1879.

Carapace pubescent, sculptured, the raised parts covered with granulations. The nine teeth of antero-lateral borders are about equal except the last, which in the old surpasses the others a little, and in the young is considerably longer. Inner orbital angles bifid; the median teeth of the front are more advanced than the others. All the frontal teeth are acute. Merus of outer maxillipeds very long and slightly excavate for articulation of palpus. Chelipeds strongly developed in adult male; arm with four spines in front and one behind; wrist and hand armed with two spines each. Hand elongate, with five tuberculated ridges on outer and upper surface. Merus of swimming feet short, wide, and unarmed.

Dimensions of male: Length to sinus, 52.5 mm.; extreme length, 54.2 mm.; extreme width, 90 mm. This is the largest of the West Indian species of this genus.

From Virginia to Rio de Janeiro, Brazil; Gulf of Mexico; Bermudas (Rankin). Porto Rico: Mayaguez; Mayaguez Harbor, 7 fathoms, station 6059; Boqueron Bay; Puerto Real.

**Portunus (Achelous) depressifrons** Stimpson.

*Achelous depressifrons* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 223, 1860; A. Milne Edwards, Crust. Rég. Mex., 230, pl. XI, f. 4, 1879.

Carapace convex behind and in the median region, but flattened toward the anterior and lateral borders. Width about 1.5 times the length. Surface rugose and pubescent. Antero-lateral border ciliated; teeth equal, the last scarcely longer than the next. Front very little produced; median part divided into four almost equal teeth. Inner orbital tooth simple. Superior border of orbit cut by two

fissures. Chelipeds triangular prismatic, pubescent; arm ciliated and armed with five spines in front and a spine at its outer extremity. Carpus slender, provided inside with a slender, sharp spine and a smaller spine on outside. Hand remarkably short and compressed, a raised crest above, a spine near wrist and another near finger; surface finely scabrous. Finger surmounted by a border of hairs. Ambulatory legs slender; those of first pair ciliated below; those of second and third pairs smooth; last pair much shorter than third.

Carapace speckled and marbled with grayish purple, more brilliant toward middle; a dark median spot on the intestinal region; hairs of fingers of the chelipeds red, denticulations carmine (A. Milne Edwards). Of the six specimens taken by the *Fish Hawk* and preserved in alcohol, two, a male and a female, have much darker carapace than the others. In these as well as in a smaller light-colored specimen, the ambulatory legs of first pair are much darker than the other legs; fringe of hair on their lower and anterior edge crimson. Similar hairs border the inner margin of the carpus and the upper margin of the dactylus of the chelipeds; prehensile teeth also crimson.

Dimensions of male: Entire length, 24.7 mm.; entire width, 39.7 mm.

South Carolina; Bahamas; Florida Reefs; Caribbean Sea; Bermudas. *Culebra (Fish Hawk)*.

**Portunus (Achelous) ordwayi** Stimpson.

*Achelous ordwayi* Stimpson, Ann. Lyc. Nat. Hist. N. Y., vii, 224, 1860.

*Neptunus ordwayi* A. Milne Edwards, Crust. Rég. Mex., 217, pl. xl, f. 2, 1879.

Carapace narrow. Surface pubescent, and with rounded granulations on raised portions and near lateral borders. Front much advanced, rather narrow, and with four narrow teeth besides the sharp orbital angles; the median exceed a little the lateral, which are turned slightly outward. Orbits large, their superior border very concave. Of the antero-lateral teeth the first are wider at base than the last; the ninth is twice as long as the preceding in full-grown specimens, and its point is curved forward a little. Postero-lateral borders short and very concave. The epistomial spine does not exceed the front. Merus of outer maxillipeds strongly narrowed forward, its inner angle cut obliquely for insertion of palpus. Chelipeds small, but armed with very sharp spines; on the margins are long hairs which nearly conceal the spines. The arm has four spines in front and one behind, the wrist with one long spine inside and a small spine outside; hand surmounted with two spines, one above articulation with the preceding article, the other near anterior third of upper margin. This margin is in the form of a raised carina. Three other carinae on outer surface of palm. Fingers narrow and channeled. The ambulatory feet are compressed and have very long and styliform dactyli. Sternal plastron rugulose, as are also the first segments of the abdomen.

Red or pale brown in dots; gastric region usually very deep crimson. Some mother-of-pearl reflections especially noticeable on the upper surface of the hands (A. Milne Edwards).

Length of female, to sinus, 25 mm.; extreme length, 26.2 mm.; extreme width, 40.3 mm.

Bahamas; Florida Straits; Gulf of Mexico; Antilles; Abrolhos Islands, Brazil; Bermudas. Porto Rico; Mayaguez; off *Culebra*, 14 $\frac{3}{4}$  fathoms, station 6086; off *Vieques*, 16 fathoms, station 6092; off *Humacao*, 12 $\frac{1}{2}$  fathoms, station 6098.

**Portunus (Achelous) sebæ** (Milne Edwards).

*Lupca sebæ* Milne Edwards, Hist. Nat. Crust., i, 455, 1834.

*Neptunus sebæ* A. Milne Edwards, Arch. Mus. Hist. Nat. Paris, x, 329, pl. xxviii, f. 2, 1861.

Carapace convex in middle, sloping gradually down to lateral margins. Width, exclusive of spines, about 1.5 times length. Antero-lateral teeth sharp, tips turned forward, lateral spine longer than the space occupied by the three next teeth. Of the four frontal teeth, the median pair are blunt, more advanced than the second pair, which are acute. The inner orbital tooth is also acute, its outer margin sinuous. Merus of chelipeds with five anterior spines and one posterior subterminal spine. Carpus with a long inner spine and a short outer one. Manus compressed, with a long spine at articulation with carpus, and two superior spines, one of which is terminal and one at distal third of upper margin. Ambulatory legs narrow; swimming feet with an erect spine on basal joint (peculiar to this species); merus with a posterior distal spine.

On either side of carapace near middle of postero-lateral margin there is a large circular red spot.

Dimensions of male: Entire length, 29.5 mm.; entire width, 55.2 mm.; width at sinus in front of lateral spine, 42.5 mm.

North Carolina; Gulf of Mexico; Antilles; Brazil; Bermudas. Puerto Real and Boqueron Bay, Porto Rico.

**Portunus (Achelous) spinicarpus** Stimpson.

*Achelous spinicarpus* Stimpson, Bull. Mus. Comp. Zool., II, 148, 1871.

*Neptunus spinicarpus* A. Milne Edwards, Crust. Rég. Mex., 221, pl. XI, f. 1, 1879.

— Carapace narrow, slightly pubescent, surface uneven. Antero-lateral teeth very sharp and slender. Lateral spine very long and slender, about half the length of lateral border. Front slightly advanced, teeth small, sharp, triangular; median surpassing a little the lateral. A notch in inner orbital tooth above flagellum. Postero-lateral angles sharp. Chelipeds long and feeble. Merus armed in front with four large spines, a fifth spine at end of posterior margin. Wrist with an unusually long spine, reaching anterior third of the hand, or even beyond end of palm. Palm with only two small spines. Swimming feet large and strong, merus with infero-distal angle spinulose. Sternum finely granulate; abdomen smooth.

Dimensions of male: Length to sinus, 20.5 mm.; extreme length, 21.2 mm.; extreme width, 45.2 mm.; width to sinus in front of lateral spine, 32.5 mm.

From North Carolina to Sabanilla, United States of Colombia, and Trinidad, 13 to 150 fathoms. Mayaguez Harbor, Porto Rico, 75 to 76 fathoms, station 6063.

**Genus CALLINECTES** Stimpson.

*Callinectes* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 220, 1860.

The genus *Callinectes* is opposed to *Portunus* by having the abdomen of the male very narrow, L-shaped, and the merus of the outer maxillipeds strongly produced outwardly at antero-external angle. The different species also agree in having strong antero-lateral teeth, the last being considerably stronger than the others, and in the stout chelipeds, the manus having five external costæ and not more than two teeth or spines.

*Key to the Porto Rican species of the genus Callinectes.*

- A. Frontal teeth two (excluding the inner orbital) ..... *spidus acutidens*  
 A'. Frontal teeth four (excluding the inner orbital).  
 B. Appendages of first abdominal segment of male much shorter than abdomen.  
 C. Lateral spine more than twice the length of preceding tooth.  
 D. Intramedial region broad, its anterior width about three times its length..... *ornatus*  
 D'. Intramedial region narrow, its anterior width about twice its length.  
 E. Appendages of first abdominal segment of male greatly exceeding third segment..... *danze*  
 E'. Appendages exceeding third segment but little, or not at all..... *marginatus*  
 C'. Lateral spine less than twice the length of preceding tooth..... *exasperatus*  
 B'. Appendages reaching the extremity of abdomen..... *bocourti*

**Callinectes spidus acutidens** Rathbun.

*Callinectes spidus acutidens* Rathbun, Proc. U. S. Nat. Mus., XVII, 354, pls. XIII and XIV, f. 2, 1895.

Carapace moderately convex. Granules prominent, crowded on inner branchial and cardiac regions, more scattered on anterior half of carapace. Length of intramedial region about one-half its anterior width. A transverse granulate ridge on protuberant cardiac lobes. Two triangular frontal (interantennal) teeth, each having on its inner margin a low ill-defined tooth whose outer margin is transverse. Subfrontal and suborbital spines acuminate. Lateral teeth broad at base, narrowing abruptly to long, acuminate tips; margins granulate. Last two teeth very long; lateral spine more than three times the length of preceding tooth. Penultimate segment of abdomen of male much constricted in its proximal half, widening at both extremities. Terminal segment obtuse, lateral margins convex proximally, slightly concave or straight distally. Appendages of first segment reach nearly to or beyond extremity of abdomen, near together for their proximal half, with only a slight outward curve; distal portions widely divergent except at tips. Abdomen of adult female very broad, margins of last three segments separately convex; terminal segment longer than wide. Costæ of cheliped very prominent and strongly granulate. The granules of inner margin of merus extend upon upper surface of distal half. Two carpal spines, one at outer angle and a shorter one close to propodal spine.

Length of male, 49 mm.; total length, 50.8 mm.; width, 121 mm.; length of lateral spine, 16 mm.; of preceding tooth, 5 mm.

Santa Cruz and Rio de Janeiro, Brazil; Escondido River and Greytown, Niagarua; St. Johns River, Palatka, Florida; Lake Palourde, Morgan City, Louisiana (not typical). Porto Rico: Arroyo, 1 young male; Mayaguez Harbor, 7 fathoms, station 6059, 1 adult female, without chelipeds.



**Callinectes ornatus** Ordway.

*Callinectes ornatus* Ordway, Boston Journ. Nat. Hist., VII, 571, 1863. Rathbun, Proc. U. S. Nat. Mus., XVIII, 356, pls. XV; XXIV, f. 3; XXV, f. 2; XXVI, f. 2; XXVII, f. 2, 1895.

Carapace rather convex; depressions shallow; length of intramedial area much less than half its anterior width. Surface finely and rather evenly granulated. Frontal (inter-antennal) teeth four, the two outer obtuse, margins slightly concave; inner teeth small. Subfrontal tooth a prominent spine. Suborbital tooth a broad arcuate lobe. Lateral teeth shallow and broad; margins convex at base, concave in terminal half; posterior margins longer than anterior; tips acute in first five or six teeth, acuminate in remainder. Lateral spine about 2.5 times preceding tooth, directed forward. Abdomen of male with penultimate segment widest at proximal end, its margins slightly concave. Appendages reach middle of penultimate segment; proximally they curve inward and touch or overlap each other; distal portions straight and divergent, widening a little behind slender tip. Abdomen of female very broad at proximal end, tapering more rapidly to terminal segment than in any other species.

Dimensions of male: Length to sinus, 49 mm.; entire length, 51 mm.; width, 105 mm.; length of lateral spine, 10.6 mm.; of preceding tooth, 4 mm.

South Carolina to Victoria, Brazil; Bermudas. Porto Rico: Mayaguez; Mayaguez Harbor, 7 fathoms, station 6059; Boqueron Bay; Puerto Real; Guanica; Playa de Ponce; Arroyo; Ensenada Honda, Culebra; Hucares; Fajardo.

**Callinectes danæ** Smith.

*Luça dicantha* Dana, Crust. U. S. Expl. Exped., I, 272, 1852; pl. XVI, f. 7, 1855.

*Callinectes danæ* Smith, Trans. Conn. Acad. Sci., II, 7, 1869. Rathbun, Proc. U. S. Nat. Mus., XVIII, 357, pl. XVI; XXIV, f. 4; XXV, f. 3; XXVI, f. 3; XXVII, f. 3, 1895, and synonymy.

Intramedial region narrow. Front with two distinct median teeth, small, subacute; lateral teeth narrow, acute. Of the antero-lateral teeth of carapace, the second to sixth, inclusive, do not trend forward, posterior margin of each tooth not much longer nor more convex than anterior; all teeth acute, the seventh and eighth especially so; eighth tooth directed forward. Lateral spine more than three times length of preceding tooth. Suborbital tooth rather long and narrow. Penultimate segment of abdomen of male very broad at proximal end. The appendages reach to middle or beyond middle of penultimate segment and taper regularly to tips; they sometimes touch each other proximally, but more often are separated. Abdomen of female similar to that of *C. ornatus*, but wider in its fifth and sixth segments. Costæ of chelipeds very closely set with fine granules interspersed with larger ones.

Length to sinus, 55.5 mm.; greatest length, 57.5 mm.; width, 131.5 mm.; length of lateral spine, 16.3 mm.; of preceding tooth, 4.5 mm.

From Indian River Inlet, Florida, to Brazil. Porto Rico: San Juan; Rio Bayamon, above Palo Seco; Mayaguez; Mayaguez Harbor, 7 to 7½ fathoms, stations 6058 and 6059; Hucares; Arecibo (C. W. Richmond, coll.).

**Callinectes marginatus** (A. Milne Edwards).

*Neptunus marginatus* A. Milne Edwards, Arch. Mus. Hist. Nat. Paris, X, 318, pl. XXX, f. 2, 1861.

*Callinectes larratus* Ordway, Boston Jour. Nat. Hist., VII, 573, 1863. Rathbun, Proc. U. S. Nat. Mus., XVIII, 358, pl. XVII; XXIV, f. 5; XXV, f. 4; XXVI, f. 4; XXVII, f. 4, 1895.

*Callinectes marginatus* Rathbun, Proc. Biol. Soc. Washington, XI, 149, 1897, and synonymy.

Areolations well marked; granules coarse; length of intramedial area a little less than half its anterior width. Front four-toothed; median teeth small, more prominent than in *C. ornatus*; lateral teeth obtuse, broader and more arcuate than in *C. ornatus*. Suborbital tooth prominent, arcuate, curved upward. Antero-lateral margin little arched; teeth well separated by deep rounded sinuses; the second to fifth, inclusive, have convex posterior margins; first three or four teeth obtuse, the remainder sharp. Lateral spine between 2 and 2.5 times the length of preceding tooth. Terminal portion of abdomen of male slender; penultimate segment wider at proximal than at distal end, margins slightly concave; appendages very short, overreaching third segment but little, or not at all. Abdomen of female much narrower than in any other species; terminal segment much longer than wide. Costæ of manus prominent, with medium granules.

Dimensions of male: Length to sinus, 43.5 mm.; entire length, 44.5 mm.; width, 96.5 mm.; length of lateral spine, 9.5 mm.; of preceding tooth, 4 mm.

Florida Keys and Bahama to Bahia, Brazil; west coast of Africa, from Cape Verde Islands to St. Paul de Loanda. Porto Rico: San Antonio Bridge, San Juan; Mayaguez; Puerto Real; reefs at Ponce; Ensenada Honda, Culebra; Hucares; Fajardo.

**Callinectes exasperatus** (Gerstecker).

*Lupea exasperata* Gerstecker, Arch. f. Natur., xxii, pt. 1, 129, 1856.

*Callinectes tumidus* Ordway, Boston Jour. Nat. Hist., vii, 574, 1863. Rathbun, Proc. U. S. Nat. Mus., xviii, 359, pl. xviii: xxiv, f. 6; xxv, f. 5; xxvi, f. 5; xxvii, f. 5, 1895.

*Callinectes caespervatus* Rathbun, Proc. Biol. Soc. Washington, xi, 150, 1897.

Carapace very convex; depressions deep; length of intramedial area no more than half its anterior width. Frontal teeth four, triangular, tips rounded, the two median large and prominent, but not so far advanced as lateral. Submedian tooth short, exceeding the front but little. Suborbital lobe rounded. Antero-lateral margin very arcuate; teeth broad, the first six very convex on posterior margins and obtuse, the next two acute; of the eight teeth, the fifth is the largest; the sixth and seventh next in size. Lateral spine less than twice the length of preceding tooth. Penultimate segment of male abdomen similar in shape to that of *C. ornatus*, but much shorter; appendages reaching to about middle of penultimate segment, tips incurved. In the abdomen of the female the penultimate segment is shorter than fifth and its margins are very arcuate. Spine at distal end of merus and carpal spine are almost obsolete, being replaced by blunt prominences. A blunt tooth on anterior margin of the carpus just below inner angle. Coste of manus coarsely and sparingly tuberculate.

Dimensions of male: Length to sinus, 61.5 mm.; entire length, 63.6 mm.; width, 118.5 mm.; length of lateral spine, 7.9 mm.; length of preceding tooth, 5 mm.

Florida Keys to Rio de Janeiro, Brazil. Porto Rico: San Antonio Bridge, San Juan; Cataño, San Juan Harbor; Rio Bayamon, above Palo Seco; Mayaguez; Puerto Real; Hucares.

**Callinectes bocourti** A. Milne Edwards.

*Callinectes bocourti* A. Milne Edwards, Crust. Rég. Mex., 226, 1879 (var. of *Callinectes diacanthus*). Rathbun, Proc. U. S. N. M. xviii, 360, pl. xix; xxiv, f. 7; xxv, f. 6; xxvi, f. 6; xxvii, f. 6, 1895. Proc. Biol. Soc. Washington, xi, 151, 1897.

Very convex; areolations prominent; coarsely granulate, except along lateral margin, where the carapace is smooth. Intramedial region very long, its length about equal to its posterior width. Front with four large rounded teeth, the median the smaller and a little less advanced or quite as advanced as lateral. Suborbital tooth short, triangular, narrow, obtuse. Antero-lateral teeth very broad, acute, the last two or three spiniform. Lateral spine short, usually less than twice the length of preceding tooth. Penultimate segment of abdomen in male constricted in its proximal portion, widening at both extremities; terminal segment long; appendages reaching to end of abdomen, with a double curve; tips crossing. The sternum has a deep longitudinal groove in front of abdomen. Abdomen of female very long, especially the penultimate segment; terminal segment much longer than wide. Coste of chelipeds with depressed granules, often appearing to the eye almost smooth. Carpal and distal meral spine usually normal, though sometimes in old specimens reduced to blunt projections. A broad, blunt tooth on anterior margin of carpus just below inner angle.

Dimensions of male: Length to sinus, 69.5 mm.; entire length, 72.5 mm.; width, 140 mm.; length of lateral spine, 10 mm.; length of preceding tooth, 7 mm.

Barbados; Honduras to Rio de Janeiro; west coast of Africa from Senegal to Chinchexo.

Porto Rico: Cataño, San Juan Harbor; Rio Bayamon, above Palo Seco; Aguadilla; Mayaguez on coral reef; Hucares.

*Lupea diacantha*, recorded by Gundlach, represents one or more species of *Callinectes*; common name "Jaiba" (Gundlach).

**Genus LUPELLA** Rathbun.

*Lupea* de Haan, Fauna Japon., 11, 1833. (Not *Lupea* Leach, 1814.)

*Lupeella* Rathbun, Proc. Biol. Soc. Washington, xi, 155, 1897.

Closely allied to *Portunus*. Inner suborbital angle remarkably prominent and firmly united with a prolongation from basal joint of antenna. Outer maxillipeds extend far beyond front; merus rounded in front, its outer angle obtuse and strongly produced; last two segments of palpus flattened and laminate. Abdomen of male narrow, third segment narrowing rapidly toward distal end. Transverse sutures of posterior half of sternum interrupted either side of abdomen, under which they do not pass. Median suture of sternum crosses the four posterior segments.

**Lupella forceps** (Fabricius).

*Cancer forceps* Fabricius, Ent. Sys. auct. et emend., II, 449, 1793.

*Lupa forceps* Leach, Zool. Misc., I, 123, pl. LIV, 1814.

Carapace flat, hexagonal, finely granulate. Epigastric and epibranchial lines rather well marked. Posterior margin very wide. Antero-lateral margin armed with eight very small, sharp teeth, separated by wide sinuses; lateral spine long, slender, and extending directly outward. The front (between antennæ) is four-toothed, middle pair small and subacute, outer pair longer and obtuse. Inner orbital teeth broad, obtuse; epistomal tooth short, not surpassing the front. Chelipeds smooth and remarkably long and slender; the arm equals width of carapace near base of lateral spines, hand twice as long. Anterior border of arm with four to six spines; posterior border with a spine at extremity. Wrist with a spine at inner angle, another on outer surface. Hand cylindrical, slender, with a spine above articulation with carpus and another above articulation with dactylus. Fingers very slender, almost filiform, with numerous small teeth on their occludent edges. Ambulatory legs very compressed; merus of swimming pair short, almost orbicular, armed above and below with a terminal spine; propodus elongate; dactylus oval. In young males the fingers are shorter, and in females still shorter.

Dimensions of male: Length of median sinus, 19 mm.; extreme width, 48.4 mm.; width at sinus, between lateral spine and next tooth, 33.5 mm.

West Indies. Uncommon. Porto Rico: San Juan Harbor, between Palo Seco and Cataño; Mayaguez, in seine; Mayaguez Harbor, 7 to 7½ fathoms, stations 6058 and 6059; off Puerto Real, 8½ fathoms, station 6074; Mayaguez and San Juan (Gundlach).

**Genus ARENÆUS** Dana.

*Arenæus* Dana, Am. Jour. Sci. (2), XII, 130, 1851.

Closely allied to *Portunus*, with which it is sometimes united. Differs in having the palate smooth or without a longitudinal ridge. Superior fissures of orbit open, V-shaped. Abdomen in male narrower than in typical *Portunus*, yet not ⊥-shaped as in *Cullinectes*.

**Arenæus cribrarius** (Lamarck).

*Portunus cribrarius* Lamarck, Hist. Nat. Anim. sans Vert., v, 259, 1818.

*Arenæus cribrarius* Dana, Crust. U. S. Expl. Exped., I, 290, 1852; pl. XVIII, f. 2, 1855.

Carapace wide and almost smooth to the naked eye, but through the lens it appears closely covered with fine granulations. Front narrow, much less advanced than outer orbital angles and armed with six teeth (between the orbits), the two median more prominent than intermediate ones, which are partly coalesced with median; outer pair obtuse, wide, and separated from preceding by a wide cut. Superior border of orbit divided into three lobes by two wide incisions; inferior orbital border much advanced at inner end. Antero-lateral teeth wide and covered below with hairs which screen the interspaces; the first narrower than the last; lateral horn strong, pointed, and a little longer than space occupied by two last teeth. Inferior orbital border interrupted by a wide external fissure. Pterygostomial regions, epistome, and antennal region covered with hairs. Endostome smooth. Merus of outer maxillipeds narrowing much distally. Chelipeds short. Three spines arm the merus in front; one spine, almost tuberculiform, is at a little distance from end on posterior border. Wrist with two spines, one inside, the other out. Hand short and swollen, crossed by granulous carinæ and surmounted by two short spines, one above articulation with wrist, the other above movable finger. Ambulatory feet not long, their last articles very wide. Swimming feet very stout, the merus somewhat rounding and unarmed. Sternum smooth, abdomen of male triangular, margins a little sinuous, last article very pointed.

Carapace and cheke violet or yellowish brown, covered with a multitude of round spots, either white or light yellow (A. Milne Edwards). These spots are present in alcoholic specimens.

Dimensions of male: Length to median sinus, 44.5 mm.; length to tip of median pair of teeth, 46.2 mm.; entire width, 103.6 mm.; width to sinus in front of lateral spine, 80.5 mm.

From New Jersey to Rio de Janeiro; Gulf of Mexico. Porto Rico: San Juan Harbor at Palo Seco and between Palo Seco and Cataño; Mayaguez; Boqueron Bay; Playa de Ponce; Arroyo; Vieques; Aguadilla and San Juan (Gundlach).



Genus **CHARYBDELLA** Rathbun.

*Cronius* Stimpson, Ann. Lyc. Nat. Hist. N. Y., vii, 225, 1860.

*Charybdella* Rathbun, Proc. Biol. Soc. Washington, xi, 166, 1897.

Carapace narrow. Front wide; front proper (excluding the inner orbital angle) six-toothed. Antero-lateral border cut into nine teeth alternately large and small. Basal article of antenna produced into orbital sinus so as to separate flagellum from orbit.

*Key to the Porto Rican species of the genus Charybdella.*

A. Hand armed with four spines ..... *rubra*  
 A'. Hand armed with two spines ..... *tumidula*

**Charybdella rubra** (Lamarck).

*Portunus ruber* Lamarck, Hist. Nat. Anim. sans Vert., v, 260, 1818.

*Cronius ruber* Stimpson, Ann. Lyc. Nat. Hist. N. Y., vii, 225, 1860.

*Achelous ruber* A. Milne Edwards, Arch. Mus. Hist. Nat. Paris, x, 345, pl. xxiii, f. 1, 1861.

*Charybdella rubra* Rathbun, Proc. U. S. Nat. Mus., xxii, 291, 1900.

Carapace hexagonal, smooth, and pubescent. Front cut into eight teeth, the two median more advanced and larger; directed forward; those of second pair more pointed, directed slightly outward and separated from those of third pair by a deep cut; third pair sharp, directed forward, and not deeply separated from those of fourth pair, which constitute the inner orbital angles and are broad and blunt. Basal article of external antennae carries a spine below insertion of movable portion. Of the antero-lateral teeth or spines the ninth is scarcely longer than first, third, fifth, and seventh; intermediate spines strikingly smaller. Merus of chelipeds armed in front with from four to six spines of unequal size and at extremity of its posterior border with a very small spine. Wrist with granulous crests, a large spine inside and three small spines on outer face. Hand crossed by granulous carinae and armed above with four spines alternately placed, two on inner border and two on outer border of upper surface.

The general color is a violet red, more or less marbled; extremity of all the spines black (A. Milne Edwards).

Dimensions of male: Length to sinus, 40 mm.; extreme length, 42.5 mm.; extreme width, 68.8 mm.

Charleston Harbor, S. C., to Brazil; Acapulco; San Salvador, Central America; Panama; West Africa from Cape Verde Islands to Loanda. Porto Rico: San Antonio Bridge, San Juan; San Juan Harbor, in fish trap; Mayaguez; Arroyo.

**Charybdella tumidula** (Stimpson).

*Achelous tumidulus* Stimpson, Bull. Mus. Comp. Zool., ii, 149, 1871.

*Neptunus tumidulus* A. Milne Edwards, Crust. Rég. Mex., 218, 1879.

*Cronius bispinosus* Miers, *Challenger* Rept., Zool., xvii, 188, pl. xv, f. 2, 1886.

Carapace narrower than in *C. rubra*, pubescent, granulated toward margins. Last spine of antero-lateral border half again as long as seventh spine. The small alternate spines diminish in the following order: Second, fourth, sixth, eighth. Front convex, prominent, projecting much beyond level of outer angles of orbits; teeth rounded, the two middle ones being smaller than second pair and most prominent, separated from second pair by a rather broad, shallow sinus; a narrow sinus between second and third pairs. Third pair very slightly separated from inner angle of orbit. The separation of the antennal flagellum from the orbit by a process from the basal joint is not so well marked as in *C. rubra*. Chelipeds rather short; merus armed with three large and one small spine on the front edge; spine of outer extremity of posterior edge of merus almost obsolete. Inner spine of carpus long, reaching a third the length of palm. Only one spine on superior margin of hand; another at articulation of carpus. On the merus joint of posterior pair of ambulatory legs is a denticulated extero-inferior margin, but no spine.

Dimensions of male: Length to sinus, 20 mm.; extreme length, 21 mm.; extreme width, 31.2 mm.

Bahamas; Florida Reefs, 37 to 40 fathoms (Stimpson), to Bahia, Brazil, in shallow water (Miers). Porto Rico: Mayaguez; Mayaguez Harbor; Boqueron; off Vieques, 14 fathoms, station 6085. Small specimens only.

Stimpson's description does not agree in all respects with the above, as his type was only a quarter of an inch wide. In such small specimens the lateral spine is longer and the notch above the antenna is obsolete.

## Tribe OXYRHYNCHA or MAIOIDEA.

Carapace narrowed anteriorly and rostrate, with the hepatic regions small, the branchial large. Epistome generally large. Buccal frame quadrate, with anterior margin straight. Nine pairs of branchiæ, with the efferent channels opening at the sides of the endostome. The afferent channels open behind the pterygostomian regions, in front of the bases of the chelipeds. First antennæ longitudinally folded. Third maxillipeds with the fifth joint articulated at the apex or at the front inner angle of the fourth. Genital organs of male inserted at bases of last pair of trunk legs.

## Family MAIIDÆ Leach, 1817.

Basal joint of antennæ well developed. Chelipeds usually not a great deal longer or more massive than the other legs.

*Key to the Porto Rican genera of the family Maiidæ.*

- A. Basal joint of antennæ extremely slender throughout and usually long. Eyes without orbits and not concealed.  
 B. Carapace elongate, narrowed in front. External maxillipeds somewhat pediform, with the palp large and coarse, the merus often narrower than ischium. Basal joint of antennæ usually subcylindrical.  
 C. Rostrum extremely long. Dactyli of ambulatory legs longer than the propodi ..... *Stenorynchus*  
 C'. Rostrum short. Dactyli of ambulatory legs shorter than the propodi ..... *Podochela*  
 B'. Carapace usually subtriangular. External maxillipeds with the merus at least as broad as ischium and the palp small. Basal joint of antennæ flattened or concave ventrally.  
 C. No postocular spine or tooth ..... *Epinus*  
 C'. A postocular spine or tooth.  
 D. Eye-stalks long and slender ..... *Eucinelops*  
 D'. Eye-stalks not long and slender.  
 E. Carapace depressed, the branchial regions considerably flattened posteriorly and laterally, so that their lateral margins are visible from above for nearly their whole length.  
 F. Postocular spine usually large. Hepatic region rather remote from the eye ..... *Collocles*  
 F'. Postocular spine small. Hepatic region approximating the eye ..... *Batrachonotus*  
 E'. Carapace higher and more convex, branchial regions not remarkably flattened, their lateral margins for the most part invisible in a dorsal view.  
 F. Rostrum bifid or notched ..... *Euprogmatha*  
 F'. Rostrum simple.  
 G. No spine on upper margin of orbit ..... *Anasinus*  
 G'. A spine on upper margin of orbit ..... *Inachoides*  
 A'. Basal joint of antennæ not extremely slender, often very broad. Eyes with orbits, or capable of concealment.  
 B. Basal joint of antennæ truncate-triangular. Eyes without true orbits; eye-stalks very short, concealed beneath a supraocular spine.  
 C. Antennæ concealed beneath the rostrum ..... *Epiattus*  
 C'. Antennæ not concealed beneath the rostrum ..... *Acanthonyx*  
 B'. Basal joint broad, usually either extensively produced outward or with 1 or 2 distal spines. Eyes with orbits.  
 C. Orbits rudimentary, with a large, blunt, cupped postocular process into which the eye is retractile, but is not completely concealed. Eye-stalks short.  
 D. Carapace oval-oblong ..... *Chorinus*  
 D'. Carapace subtriangular.  
 E. Carapace armed with spines or prominent tubercles ..... *Scyramathia*  
 E'. Carapace almost smooth ..... *Pelia*  
 C'. Orbits complete, often tubular, completely concealing retracted eye.  
 D. Meral joints of ambulatory legs with continuous laminate expansions.  
 E. Carapace very high in middle; height greater than half the width ..... *Hemus*  
 E'. Carapace not high; height less than half the width ..... *Thoc*  
 D'. Meral joints of ambulatory legs without continuous laminate expansions.  
 E. Fingers spoon-shaped at tips.  
 F. Carapace suboblong or suboval, very broad in front. Orbits directed forward ..... *Pitho*  
 F'. Carapace subtriangular, narrow in front. Orbits directed obliquely forward.  
 G. Orbits entire ..... *Telcaphrys*  
 G'. Orbits dentate or spined ..... *Mithrae*  
 E'. Fingers acute at tips.  
 F. Carapace with a series of lateral spines or teeth ..... *Stenocionops*  
 F'. Carapace without a series of lateral spines or teeth.  
 G. Rostral horns contiguous.  
 H. Horns long and slender ..... *Leptopisa*  
 H'. Horns short, broad and flat ..... *Lissa*  
 G'. Rostral horns not contiguous.  
 H. Preorbital spine extremely long ..... *Picrocroides*  
 H'. Preorbital spine not extremely long.  
 J. Orbits tubular, projecting ..... *Macrocaloma*  
 J'. Orbits with closed fissures, but not distinctly tubular and projecting ..... *Microphrys*

Genus **STENORYNCHUS** Lamarck.

*Leptopodia* Leach, Zool. Misc., II, 15, 1815. (Not *Leptopodia* Leach, Edin. Encyc., VII, 431, 1814.)

*Stenorynchus* Lamarck, Hist. Nat. Anim. sans Vert., v, 236, 1818 (part). (Not *Stenorbhynchus* Latreille, 1825, nor *Stenorynchus* Milne Edwards, 1834.)

Carapace triangular, longer than broad. Rostrum very slender, flattened, longer than the carapace, its lateral margins spinuliferous. Orbits not defined; postorbital spine small. Eyes short and not retractile. Basal joint of antenna very slender; flagellum for the most part concealed beneath the rostrum. Epistome very large. Ischium of external maxillipeds produced at its antero-internal angle; merus somewhat obcordate, bearing the next joint at its external angle. Abdomen in male six-segmented, in female five-segmented. Chelipeds long and slender, with merus, carpus, and palm subcylindrical; fingers much shorter than palm, inner margins dentate. Ambulatory legs extremely long and slender, especially the dactyli. All the legs spinuliferous.

**Stenorynchus sagittarius** (Fabricius). *Arrow Crab; Araña del mar.*

*Cancer sagittarius* Fabricius, Ent. Sys. emend. et auct., II, 442, 1793 (part).

*Leptopodia sagittaria* Leach, Zool. Misc., II, 16, pl. 67, 1815.

*Stenorynchus saicornis* Lamarck, Hist. Nat. Anim. sans Vert., v, 237, 1818.

*Stenorynchus sagittarius* Rathbun, Proc. Biol. Soc. Wash., XI, 158, 1897.

Carapace naked. Length of rostrum varying from slightly longer than carapace to twice as long. Propodus of cheliped usually about 2.6 times the length of dactylus, but varies from 2.5 to 4 times. Ambulatory legs of first pair from 8 to 8.6 times the length of carapace.

Carapace striped with bands of white, brown, and black, which extend backward from median line to posterior margin. Fingers blue, their teeth orange. Spines of rostrum and feet orange red.

Dimensions of male: Length of carapace and rostrum, 45.3 mm.; length of rostrum, 23.2 mm.; width of carapace, 19 mm.

From off Cape Hatteras, North Carolina, to Rio de Janeiro, Brazil; Bermudas; Mediterranean; West Africa. It has been found in depths varying from 2 to 814 fathoms, but occurs usually in less than 50 fathoms. Porto Rico: San Antonio Bridge, San Juan; Mayaguez Harbor, 75 to 76 fathoms, station 6063; off Vieques, 6 fathoms, station 6096.

Genus **ODOCHELA** Stimpson.

*Podochela* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 194, 1860.

Carapace somewhat depressed, elongate; gastric region narrow, swollen. Rostrum arcuate or triangulate, sometimes prolonged in a spine, or very short and bilobed. Eyes with short, stout pedicels, which terminate above in a prominent tubercle; cornea oblique, more projecting above than below. Postorbital tooth remote from eye and either well developed or reduced to a granule. Basal article of antennae very narrow, longitudinally sulcate in middle. Sternum of male either nearly smooth or deeply channeled between the segments; of female concave, deep, margins elevated, laminate, forming a capsule. Abdomen of male with last two segments, of female with last three segments, coalesced. Chelipeds of moderate length, merus curved, trigonal; palm either slender or dilated. Ambulatory legs slender, subprehensile.

*Key to the Porto Rican species of the genus Podochela.*

- A. Rostrum thick, flat underneath ..... *macrodera*  
 A'. Rostrum thin, hollow underneath ..... *riisei*

**Podochela macrodera** Stimpson.

*Podochela macrodera* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 196, 1860; A. Milne Edwards, Crust. Rég. Mex., 191, pl. xxxiv, f. 3, 1879.

Cardiac region depressed, bearing one low tubercle; gastric region with two median tubercles; hepatic region swollen, its tubercle very small; a small tubercle on pterygostomian region. Rostrum short, thick, subtriangular, obtuse, flat above, margins inclined. Basal antennal joint much narrower anteriorly than posteriorly, margins thick and convex, united for anterior third. Sternum of male with smooth convex segments separated by shallow grooves; in front of the abdomen are two white-



tipped tubercles. First abdominal segment in male, and first and second in female, with a white median tubercle. Chelipeds of male stout, propodi much dilated, fingers widely gaping. Ambulatory legs of first pair about 2.5 times, of second pair about 1.66 times, of fourth pair about 1.33 times the length of carapace. Propodus of last three pairs scythe-shaped; that is, the distal portion, or that against which the dactylus folds, is curved.

Dimensions of male: Length, 15.2 mm.; width, 11 mm.

Bahamas; Florida Keys; West Indies. Depth, 2 to 14 $\frac{3}{4}$  fathoms. Porto Rico: Off Vieques, 14 fathoms, station 6085; off Culebra, 14 $\frac{3}{4}$  fathoms, station 6086.

#### ***Podochela riisei* Stimpson.**

*Podochela riisei* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 196, pl. II, f. 6, 1860.

Carapace with a cardiac and a gastric spine; a gastric tubercle in front of spine; also a flattened spine on the hepatic region pointing downward. Rostrum hood-shaped, with a median carina. Supra-orbital margin thickened. Postorbital tooth small, tuberculate; behind and below it a small tubercle. Basal antennal joint deeply concave, with thin laminate margin, forming a subacute angle anteriorly; broader posteriorly, postero-lateral angle dilated. Pterygostomian ridge laminate. Sternum of male with segments flattened, separated by deep grooves; area in front of abdomen protuberant, bituberculate. Chelipeds in both sexes slender, manus not dilated, fingers in contact. First pair of ambulatory legs much stouter than the others, about 3 times the length of carapace; second, third, and fourth pairs decreasing regularly in length, the second pair a little more than twice, the fourth pair nearly 1.6 times the length of carapace; propodi thickened distally, dactyli slightly curved. Carapace and legs ornamented with tufts of curled hair.

Dimensions of male: Length, 14.6 mm.; width, 11.2 mm.

From Cape Hatteras to Florida Keys; Gulf of Mexico; Bahamas; West Indies; Bermudas. Depth, 3 to 49 fathoms. South of Pernambuco, 30 to 350 fathoms (Miers). Off St. Thomas, 20 to 23 fathoms, station 6079; off Vieques, 6 to 15 fathoms, stations 6091 and 6096 (*Fish Hawk*).

#### **Genus *ÆPINUS* Rathbun.**

*Apocremnus* A. Milne Edwards, Crust. Rég. Mex., 184, 1878. (Name preoccupied.)

*Æpinus* Rathbun, Proc. Biol. Soc. Wash., XI, 163, 1897.

Carapace short, wide behind, very narrow in interorbital region. Rostrum short, subtruncate, with a median emargination. Upper orbital border very high; no postorbital angle. Eye peduncles short, with a flat upper surface, a tubercle on anterior margin and another at emargination of cornea. Extremity of basal article of antenna visible at sides of front; its outer distal angle sharp. Merus of maxillipeds somewhat L-shaped, produced at anterior outer angle and posterior inner angle. The last two abdominal segments in male and the last three in female are coalesced. Chelipeds short and feeble. Ambulatory legs short; meral, carpal, and propodal joints thickened in middle; dactyli slender, folding against propodi.

#### ***Æpinus septemspinosus* (A. Milne Edwards).**

*Apocremnus septemspinosus* A. Milne Edwards, Crust. Rég. Mex., 185, pl. xxxv, f. 5, 1879.

*Æpinus septemspinosus* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 254, 1898.

The carapace and feet bear a few hooked hairs. Gastric region very narrow and high; it, as also the cardiac region, is surmounted by a very stout erect spine; a third median spine, shorter and directed backward, is situated on first article of abdomen. Each branchial region carries an erect spine. Two shorter spines directed forward surmount orbital border. The gastric region bears, in front of median spine, three or four small tubercles, one or two median, and one lateral; outside these there is a triangular laminate tooth or spine. Otherwise the surface is smooth. The hepatic region terminates below in a laminate tooth; subbranchial margin dentate. Front very short and formed of two rounded lobes separated by a narrow cut. Antennulary fossettes extend nearly to extremity of front, separated by a partition developed inferiorly in a triangular tooth. Basal article of antenna very deep, with a prominent crest below, which near the anterior end bifurcates, the longer, outer branch continuing to epistome where it terminates in a lobe. Exognath of outer maxillipeds toothed on outer margin. Sternum of male with prominent transverse crests. Abdomen of female 11-tted, and with a smooth median carina; terminal portion tuberculate. Chelipeds granulate; margins of merus

tuberculate; palms slender; fingers gaping slightly in male. Ambulatory legs tuberculate below; dactyli hairy.

Length of carapace of male, 10 mm.; width, 8 mm.

Gulf of Mexico; Florida Straits; Bahama Banks. Depth, 14 $\frac{3}{4}$  to 37 fathoms. Off St. Thomas, 20 to 23 fathoms, station 6079; off Culebra, 14 $\frac{3}{4}$  to 15 $\frac{1}{2}$  fathoms, stations 6086, 6087, 6093; off Vieques, 15 to 21 fathoms, stations 6089, 6091, 6092.

**Genus EUCINETOPS Stimpson.**

*Eucinetops* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 191, 1860.

Carapace oblong. Rostrum small, bifid, little deflexed. Eyes very long, reaching much beyond the margins of the carapace. Orbits small, inclosing only base of eye peduncles; external angle acute, spiniform; superior margin with one fissure, without teeth and spines. Antennular fosse not deep, round, margins obtuse. Basal article of external antennae small, armed at external angle with a minute tooth or spine; movable part depressed, first and second articles very broad. Epistome very short or wanting. Buccal cavity very broad anteriorly. Merus of outer maxillipeds longer than broad, outer front angle prominent; palpus swollen at base; exognath reaching beyond endognath anteriorly.

**Eucinetops blakiana Rathbun.**

*Eucinetops blakiana* Rathbun, Proc. U. S. Nat. Mus., XIX, 13, 1896.

Antero-lateral margins slightly converging anteriorly, nearly straight. Surface uneven; median regions elevated, hepatic region depressed, separated from branchial by a deep hollow and a marginal sinus. Antero-lateral margin tuberculate, a spine at postero-lateral angle; a few additional tubercles on upper surface of branchial region. Front depressed, with two rounded lobes, tipped with a small, sharp spine and separated by a V-shaped sinus. Outer orbital tooth longer than broad, acute, upturned, separated from upper margin of orbit by a narrow, rounded sinus. Eye-stalks filling orbit, tapering to near cornea; tip slightly enlarged. Antero-external lobe of first movable joint of antennae moderately developed, not reaching end of rostrum. Abdomen composed of seven free segments in both sexes; in the male constricted at fifth segment; sixth segment with convex lateral outlines; seventh rounded, broader than long. Chelipeds small, smooth, and shining; merus subtrigonal; carpus with a tubercle above, near merus; hands compressed, margins converging toward fingers. Ambulatory legs subcylindrical; dactyli very slender and much curved. Carapace and ambulatory legs clothed with hair.

Length of female, 6.4 mm.; width, 4.6 mm.

Arroyo; one immature female. This specimen differs from the types in having a small spine at outer angle of basal joint of antennae. In the types the tooth at that angle is more strongly developed in the male than in the two adult females. Port Royal, Jamaica (type locality); Bahama Banks.

**Genus COLLODES Stimpson.**

*Collodes* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 193, 1860.

Carapace ovate-triangular. Rostrum short, entire or bifid. Postorbital process large, triangular, separated from supraorbital arch by a deep, open, marginal fissure. Eyes of moderate length, partially retractile. Basal joint of antenna with a terminal tooth or spine and two margins more or less dentate, the inner margin in a plane at right angles to the outer; flagellum longer than rostrum. Merus of outer maxillipeds obovate, deeply cut on distal margin, strongly produced at outer and inner angles. Chelipeds of moderate length; merus trigonal, curved. Ambulatory legs of moderate length, the first pair a little more than twice the length of carapace; second pair about the same length as first, sometimes longer; third pair usually shorter than either; fourth pair the shortest. Dactyli styliform, capable of being folded against penultimate joints, and so forming a sort of anchor by which the animal can attach itself to foreign substances.

Abdomen of male with six, of female with five segments. Surface usually hairy, the hairs collecting and retaining particles of mud; upper surface of legs furnished with curved hairs, lower surface with long, straight hairs or bristles.

*Key to the Porto Rican species of the genus Collodes.*

|   |                |
|---|----------------|
| A. Carapace more or less granulate..... | <i>inermis</i> |
| A'. Carapace smooth .....               | <i>levis</i>   |

**Collodes inermis** A. Milne Edwards.

*Collodes inermis* A. Milne Edwards, Crust. Rég. Mex., 179, 1878, pl. XXXII, f. 1, 1879.

Carapace flattened, coarsely granulate on frontal region, the posterior portion of the carapace including the most protuberant part of cardiac region and the outer and lower portions of the branchial and hepatic regions; a few granules in center of gastric region; otherwise smooth; no spines nor tubercles on median line. Rostrum with two blunt teeth separated by a narrow sinus. Interantennular tooth small. Postorbital tooth subtriangular, anterior margin convex, posterior somewhat concave. Sternum granulate; abdomen nearly smooth, first segment with a median tubercle. Basal joint of antenna narrows anteriorly, its outer margin denticulate; the vertical plate near its inner margin is thick and unarmed, and anteriorly forms a rounded lobe. Chelipeds smooth; palm thick; fingers gaping, irregularly toothed. Ambulatory legs very slender, especially terminal joints.

Length of male, 8.7 mm.; width, 7 mm.

Brazil, lat. 11° 49' S., long. 37° 27' W. (type locality); Martinique (Aurivillius). Depth, 8½ to 30 fathoms. Porto Rico: Mayaguez Harbor, 12 to 18 fathoms, station 6061; off Puerto Real, 8½ fathoms, station 6074.

**Collodes levis**, sp. nov.

Carapace narrow, moderately convex, pubescent, smooth, without spines, tubercles, or granules. Rostrum with a median sulcus, margin having a minute emargination forming two small lobes. Interantennular tooth little developed. Postorbital tooth very small for the genus, reaching only about one-third the length of the eye-stalk. The basal antennal joint has the vertical plate along inner margin strongly protuberant anteriorly and entire; outer margin feebly denticulate. Chelipeds feeble, smooth; palm subcylindrical; fingers as long as palm, entire, slightly gaping. Sternum and abdomen smooth, pubescent.

Dimensions of male: Length, 5.4 mm.; width, 4 mm.; ovigerous female, length, 5.5 mm.; width, 4.6 mm.

Off Vieques, 15 fathoms, station 6091; three females, types (Cat. No. 23772). Off Culebra, 14¾ to 15½ fathoms, stations 6086 and 6087, 1 male, 1 female; off Vieques, 16 fathoms, station 6092, 1 female.

**Genus BATRACHONOTUS** Stimpson.

*Batrachonotus* Stimpson, Bull. Mus. Comp. Zool., II, 122, 1871; A. Milne Edwards, Crust. Rég. Mex., 180, 1878.

Carapace triangular, broadly expanded behind, especially in male; surface rough with granulations; gastric, cardiac, and branchial regions strongly protuberant; cervical depressions deep and broad, giving carapace a superior outline much like that of a frog's back. Rostrum very short, scarcely projecting beyond the walls of antennular fossa, slightly emarginated at the middle. Basal joint of antennae with dentate margins and a small tooth or spine at anterior extremity. Postorbital spine small, close to eye. Merus of outer maxillipeds broad, with prominent outer and inner front angles. Last two segments of abdomen in male and last three in female anchylosed. Ambulatory legs of first pair very long in male, more than twice as long as those of second pair; posterior pairs very short. In the female all the ambulatory legs are short. Dactyli rather long.

This genus is very closely allied to *Collodes*, from which it differs chiefly in its carapace, broader posteriorly, its smaller postorbital tooth, in shape of the hepatic region, which is angular in outline instead of rounded, the anterior margin being at right angles to median line, in the merus of the maxillipeds, which has the inner lobe more produced and transverse than in *Collodes*, and in the great length of the first ambulatory legs of the male.

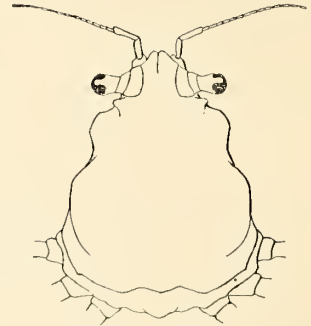


FIG. 9.—*Collodes levis*, female, outline of carapace, × 5.



*Key to the Porto Rican species of the genus Batrachonotus.*

- A. Regions surmounted by a spine.....*fragosus*  
 A'. Regions not surmounted by a spine.....*brasiliensis*

**Batrachonotus fragosus** Stimpson.

*Batrachonotus fragosus* Stimpson, Bull. Mus. Comp. Zool., 11, 122, 1871.

Male: Carapace coarsely tuberculate, especially on protuberant portions. Cardiac, gastric, and branchial regions each surmounted by a stout spine. First segment of abdomen with a spine. Two large tubercles on intestinal region just above posterior margin, and many tubercles on the margin of the branchial region; also a short spine on subhepatic and on pterygostomial region. Rostrum formed of two rounded lobes separated by a shallow notch; its margin and the supraorbital margin denticulate. Abdomen and sternum granulate, except for a transverse smooth area between bases of chelipeds.

Chelipeds a little longer than carapace, spinulose; ischium with a distal spine; manus slightly compressed; fingers nearly as long as the palm, gaping for nearly their whole length, a large tooth in middle of pollex.

Females smaller, narrower behind and wider in front than males, tuberculation of carapace more uniform, cardiac area devoid of a spine, intestinal region without large tubercles. First ambulatory leg very little longer than the second, about 1.5 times length of the carapace. Abdomen tuberculate or granulate.

Dimensions of male: Length, 7.8 mm.; width, 7 mm.

Off Cape Hatteras to Florida Straits and Gulf of Mexico in a depth of 9½ to 30 fathoms. Off St. Thomas, 20 to 23 fathoms, station 6079; off Vieques, 14 to 16 fathoms, stations 6085, 6091, 6092; off Culebra, 14¾ to 15 fathoms, stations 6086 and 6093; off Humacao, 9½ fathoms, station 6098.

**Batrachonotus brasiliensis** Rathbun.

*Batrachonotus brasiliensis* Rathbun, Proc. U. S. Nat. Mus., xvii, 54, 1894.

Male: Carapace tuberculate or coarsely granulate on the protuberant portions, smooth between; devoid of spines; two larger tubercles just above the posterior margin and near the median line; also one on the subhepatic and on the pterygostomial region. Otherwise as in *B. fragosus*.

The female differs from male, as in the species *B. fragosus*, in being relatively wider across hepatic regions; the two large tubercles near posterior margin are wanting.

Dimensions of male: Length, 4.5 mm.; width, 4 mm. Female with eggs: Length, 7 mm.; width, 6 mm.

Off Rio de Janeiro, dredged (type locality); San Juan Harbor, Porto Rico, 4½ to 5½ fathoms, station 6054, 1 male. This is the only specimen known except the type.

**Genus EUPROGNATHA** Stimpson.

*Euprognatha* Stimpson, Bull. Mus. Comp. Zool., 11, 122, 1871.

Carapace pyriform. Rostrum short, with two small teeth or horns. Interantennular spine usually present, pointing forward and downward at a much lower level than rostrum. Basal antennal joint narrowly triangular, with an outer and an inner granulate or dentate crest; armed at anterior extremity with a slender spine reaching forward as far or nearly as far as do the rostral horns; movable part of antennae exposed from its insertion. A spine or tubercle on orbital arch. Eye peduncle short, with a tubercle at the emargination of cornea. Postocular spine reaching beyond extremity of eye. Merus of external maxillipeds somewhat L-shaped, strongly produced beyond insertion of palpus in front and at postero-inner angle. Abdomen of male with last two segments coalesced.

Chelipeds with palms dilated; fingers in the male slightly gaping. Ambulatory legs of first pair much the longest, the others decreasing regularly in length. Dactyli long and slender, more than half the length of propodal joints. These crabs are almost naked, the ambulatory legs with a few curled setae above.

*Key to the Porto Rican species of the genus Euprognatha.*

|    |  |                     |
|----|--|---------------------|
| A  | Interantennular spine equaling or surpassing the front ..... | <i>rastellifera</i> |
| A' | Interantennular spine not equaling the front .....           | <i>gracilipes</i>   |

**Euprognatha rastellifera** Stimpson.

*Euprognatha rastellifera* Stimpson, Bull. Mus. Comp. Zool., II, 123, 1871; A. Milne Edwards, Crust. Rég. Mex., 183, 1878, pl. XXXIII, f. 2, 1879; Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 253, 1898.  
*Euprognatha rastellifera spinosa* Rathbun, Proc. U. S. Nat. Mus., XVII, 55, 1894.

Carapace granulate, a tubercle or spine on the gastric, cardiac, and each branchial region and on supraorbital margin. Postorbital projection dentiform, tapering to a slender point. Frontal teeth short, triangular; basal antennal joint terminating in a slender spine directed obliquely forward and equally advanced with the front. Interantennular spine inclined downward, equaling or surpassing the front. A few small spines on sides of branchial and on hepatic and pterygostomial regions. Sternum regularly granulated, except on concave portion between the chelipeds. Chelipeds nearly twice as long as carapace, granulate or spinous; manus swollen; fingers more than half the length of palm, gaping, though narrowly, for two-thirds their length. Ambulatory legs granulate, with tufts of curled setae and often small spines.

Length of male, 14.4 mm.; width, 12 mm.

From off Marthas Vineyard to the Gulf of Mexico and Caribbean Sea, in 15 to 387 fathoms. Mayaguez Harbor, Porto Rico, 220 to 225 fathoms, station 6070, 1 male, of the form described by me in 1894 as *E. rastellifera spinosa*, which may, however, represent the typical species.

**Euprognatha gracilipes** A. Milne Edwards.

*Euprognatha gracilipes* A. Milne Edwards, Crust. Rég. Mex., 184, 1878; pl. XXXV, f. 3, 1879.

Branchial region less swollen and hepatic region more prominent than in *E. rastellifera*. Carapace densely granulous, the granules of varying size and intermixed with tubercles, of which there are five in a transverse row on gastric region. Gastric, cardiac, and branchial regions tipped with a cylindrical spine; a smaller abdominal spine. Hepatic region with a stout spine. Margins of branchial region and pterygostomial ridge armed with smaller spines and tubercles. Front having a deep median groove and terminating in two small triangulate teeth; spines of antennal joint slender, equaling or not quite reaching front; interantennal spine very short. Supraorbital arches very thick and well-marked, tipped with a spine directed diagonally forward and outward. Postorbital spines also much more oblique than in *E. rastellifera*. A wide prominent lobe diagonally across sides of epistome. Sternum covered with large tubercles. Sternum extended over bases of legs, forming crenate border around posterior portion of carapace. Chelipeds about 1.5 times the length of carapace, slender, granulate. Margins of merus with short triangular spines. Fingers very slender and gaping. Ambulatory legs also with sharp granules, and tufts of curled hair above.

Length of male, 8 mm.; width, 6.2 mm.

Gulf of Mexico, Florida Straits, and Caribbean Sea; depth 69 to 201 fathoms. Mayaguez Harbor, Porto Rico, 75 to 120 fathoms, stations 6063 and 6067.

**Genus ANASIMUS** A. Milne Edwards.

*Anasimus* A. Milne Edwards, Crust. Rég. Mex., 350, 1880.

Carapace pyriform, very convex, armed with spines; rostrum simple, pointed, directed upward. Eyes large. Postorbital spine prominent. Supraorbital spine present. Basal article of outer antenna long and narrow, terminating in a spine. Exognath of outer maxillipeds broad posteriorly, very narrow anteriorly; merus of endognath narrow at its base, deeply cut at its antero-internal angle for insertion of palpus, and strongly auriculate behind insertion. Chelipeds of moderate length, the palms swollen in male; fingers long, slender, and curved inward. Ambulatory legs very slender, of nearly equal length in typical forms and more than twice the length of carapace; dactyli long and in typical species unarmed.

**Anasimus fugax** A. Milne Edwards.

*Anasimus fugax* A. Milne Edwards, *Crust. Rég. Mex.*, 350, pl. XXXI A, f. 1, 1880.

Carapace longer than broad and bearing on median line three erect spines; the first on gastric region; the second, of same size, on anterior cardiac lobe; the third, smaller, surmounts posterior cardiac lobe. (This one is obsolete in our specimen, which is smaller than the type.) The first article of the abdomen carries a fourth spine. Protogastric lobes and branchial regions armed with a spine. Surface of carapace irregularly granulate; rostrum about one-fourth the entire length of carapace, spinulose above. Upper orbital border armed with a spine. Basal article of antenna with a terminal spine; a spine on line of anterior margin of eyes; a few smaller spines and spinules on margins; flagellum long. Interantennular septum prolonged downward in a strong triangular tooth. The anterior feet of the male are clothed with stiff and distant hairs and bear a number of spines, chiefly on the margins; fingers of chelæ in contact except at very base. Ambulatory legs cylindrical, smooth, and hairy, the first two pairs of same length, the third and fourth a little shorter. Sternal plastron and abdomen granulate. Abdomen of female very wide.

Dimensions of male: Length of carapace, 13 mm.; width, 9 mm.; total width with the feet extended, 75 mm. (A. Milne Edwards.) Length of Porto Rican male, 7.6 mm.; width, 5.1 mm.

Santa Cruz, 115 fathoms; Barbados, 56 and 82 fathoms. Mayaguez Harbor, 97 to 120 fathoms, station 6067, 1 male.

**Genus INACHOIDES** Milne Edwards & Lucas.

*Inachoides* Milne Edwards & Lucas, *d'Orbigny's Voy. dans l'Amér. Mérid.*, vi, part 1, 4, 1843.

Carapace longer than broad; cardiac, branchial, and gastric regions swollen. No preorbital spine. Postorbital tooth present, though sometimes very small. Rostrum short and simple, with triangular base, terminating in a spine. Basal antennal joint with an antero-external tooth; flagellum exposed from its insertion. Merus of outer maxillipeds cut at the antero-internal angle for insertion of palpus; antero-external angle rounded. Abdomen of male with six segments, of female with five. Chelipeds enlarged; palms swollen. Ambulatory legs slender, of medium length, the first pair the longest; subprehensile, the propodal joints more or less enlarged distally; dactyli curved, folding against the propodi.

**Inachoides intermedius** Rathbun.

*Inachoides intermedius* Rathbun, *Proc. U. S. Nat. Mus.*, xvii, 57, 1894.

Carapace smooth above, or nearly so, punctate; regions well marked. Rostrum sulcate, tipped with a short spine. Postorbital tooth minute. A tubercle on margin of hepatic region, on pterygostomian, and on subbranchial. Basal antennal joint with a blunt tooth at antero-external angle. Sternum of male with a large tubercle on either side between bases of chelipeds. Abdomen of female smooth, punctate, with a median carina. Chelipeds of the male twice as long as carapace, of female a little longer than carapace; a few tubercles on manus, which is subcylindrical; fingers in male two-thirds as long as palm, in female equal to palm; gaping; each with a large basal tooth. Ambulatory legs hairy; carpal and propodal joints considerably enlarged distally; dactyli falciform.

Dimensions of male: Length, 7.3 mm.; width, 5.1 mm.

Off Rio de Janeiro, Brazil, dredged (type locality). Porto Rico: Mayaguez; Boqueron Bay.

**Genus EPIALTUS** Milne Edwards.

*Epialtus* Milne Edwards, *Hist. Nat. Crust.*, i, 344, 1834.

Carapace broad, pentagonal or hexagonal, almost smooth, with two or more lateral projections, sometimes very largely developed. Rostrum broad, triangular or oblong, bifid or entire. Eyes small. Preorbital tooth either present or absent; postorbital small, minute, or wanting. Abdomen of male with six or seven segments; of female with five or seven segments. Basal joint of antenna triangular; movable part concealed beneath rostrum. Merus of outer maxillipeds broad, subquadrate, notched at antero-internal angle where the palpus is articulated. Chelipeds strong; fingers with tips excavate or spoon-shaped; in the male either gaping or in contact. Ambulatory legs stout, subcylindrical, diminishing successively in length from first to fourth; propodi sometimes with an inferior tooth or bunch of setæ; dactyli with two rows of spinules beneath.



**Epialtus bituberculatus** Milne Edwards.

*Epialtus bituberculatus* Milne Edwards, Hist. Nat. Crust., i, 345, pl. xv, f. 11, 1834; A. Milne Edwards, Crust. Rég. Mex., 139, pl. xxvii, figs. 1, 2, and 3, 1878, and synonymy; Rathbun, Proc. U. S. Nat. Mus., xvii, 1894, 67.

*Epialtus sulcirostris* Stimpson, Ann. Lye. Nat. Hist. N. Y., vii, 198, 1860; A. Milne Edwards, Crust. Rég. Mex., 141, pl. xxvii, f. 6, 1878.

?*Epialtus longirostris* Stimpson, Ann. Lye. Nat. Hist. N. Y., vii, 199, 1860; A. Milne Edwards, Crust. Rég. Mex., 141, pl. xxvii, f. 5, 1878.

?*Epialtus minimus* Lockington, Proc. Cal. Acad. Sci., vii, July 17, 1876, p. 77 (15), 1877.

*Epialtus dilatatus* A. Milne Edwards, Crust. Rég. Mex., 140, pl. xxvii, f. 4, 1878.

Carapace subpentagonal, with two tubercles on gastric region and two lateral teeth or lobes very variable in shape and relative size. In the typical form the lobes are separated by a shallow sinus, the carapace is distinctly widest at the posterior lobe, the rostrum is triangular, obtuse and entire. In the varieties the width at the hepatic region may equal that at the branchial region, the anterior lobe is much more prominent and may be either broad and obtuse or narrow and spiniform. Sometimes one lobe or both has a tubercle on its anterior margin. The rostrum varies in length and shape, and may be either triangular or oblong, and entire or emarginate, sometimes constricted near the base. In the typical form the preorbital teeth are obsolete, but are present, though small, in some of the varieties. Postorbital tooth wanting. Abdomen of male with fourth and fifth segments fused.

Chelipeds variable; propodus in typical form wide, of moderate length, widening slightly toward the distal end; dactylus with a tooth near its base; in the varietal forms the hand may be cristate and widening rapidly toward the fingers. The propodi of the ambulatory legs have a tuft of setae on the under side proceeding from a slight prominence nearer distal than proximal end, but are without the strong tooth near base represented in the description and figure of *E. brasiliensis* given by Dana.

In 1894 (*loc. cit.*) I gave in detail the variations in the specimens in the National Museum, and I incline to think that the species is subject to as much variation as is *Menethius monoceros* Latreille, six varieties of which are given by Dana under as many specific names.

Dimensions: Puerto Real, male, length, 9.6 mm.; width, 8 mm.; ovigerous female, length, 7.1 mm.; width, 6 mm.

From Indian River, Florida, to Rio de Janeiro; from Southern California to Chile. Porto Rico: Mayaguez, 1 female (near the *longirostris* form); Puerto Real, 1 male, 1 female, 1 juv. (*dilatatus* form); Arroyo, 1 male, 6 juv. (*brasiliensis* form); Ensenada Honda, Culebra, 1 male (near the *longirostris* form); Fajardo, 1 female (*brasiliensis* form).

**Genus ACANTHONYX** Latreille.

*Acanthonyx* Latreille, Encyc. Méth., Hist. Nat., Insectes, x, 698, 1825.

Carapace elongate, almost smooth, lateral margins toothed, the anterior tooth much enlarged. Rostrum with two flattened divergent horns. Orbits small, entirely filled by the large eye peduncles. A preorbital tooth. Antennae visible at the sides of the rostrum. Merus of outer maxillipeds transverse, dilated at the antero-external angle, notched at the antero-internal angle. Legs short, rather stout. Chelipeds in male enlarged. Ambulatory legs decreasing in length successively from first to fourth pair, compressed; propodi dilated, the posterior margin concave and setose near end, at broadest part forming a blunt tooth against which the dactylus fits like a claw; dactyli spinous on their inner margin. Abdomen of male with six or seven segments.

**Acanthonyx petiverii** Milne Edwards.

*Acanthonyx petiverii* Milne Edwards, Hist. Nat. Crust., i, 343, 1834; Dana, Crust. U. S. Expl. Exped., i, 128, pl. v, f. 6, 1852.

*Acanthonyx emarginatus* Milne Edwards & Lucas, d'Orbigny's Voy. l'Amér. Mérid., vi, pt. 1, p. 9, 1843; ix, pl. v, f. 2, 1847.

*Acanthonyx debilis* Dana, Am. Jour. Sci. (2), xi, 272, 1851; Crust. U. S. Expl. Exped., i, 127, 1852; pl. v, f. 5, 1855.

Carapace oblong, antero-lateral angles subrectangular, obtuse, frontal region triangular. Two small teeth on margin of branchial region. Carapace almost smooth; three obscure setiferous tubercles on gastric region, one on the cardiac, and one on the intestinal region; these tubercles are obsolete in the female, but the setae remain. Lateral teeth and rostrum setiferous. Rostrum short, deflexed, bifid. Preorbital lobes obtuse, elevated. No postorbital tooth. Basal joint of antennae unarmed, the second and third joints subcylindrical, attaining end of rostrum; flagellum very slender. Chelipeds with merus subtriangulate; carpus with an external crest and two or three setiferous tubercles; manus

enlarged and compressed; fingers finely dentate, gaping to the extremity in male, almost entirely closed in female. Ambulatory legs with tufts of setae on extremities of joints; meri and carpi with a few setiferous tubercles on anterior or upper margin. Abdomen with fourth and fifth segments coalesced in both sexes.

Length of male, 18 mm.; width, 12.5 mm.

Bahamas; West Indies; Brazil; Cape St. Lucas to Chile. Arroyo, Porto Rico; Aguadilla (Gundlach).

**Genus CHORINUS (Leach MS.) Latreille.**

*Chorinus* (Leach MS.) Latreille, Encyc. Méth., Hist. Nat. Insectes, x, 139 and 699, 1825.

Carapace oblong-oval. Rostrum with two slightly divergent horns. Preorbital spine stout, postorbital small, dentiform, remote from the orbit. Two superior orbital spines. Basal antennal segment short and narrow; flagellum short, concealed beneath the rostrum. Outer maxillipeds with the ischium advanced at the antero-internal angle; merus rhomboidal, outer angle much produced, antero-internal margin oblique, ending posteriorly in a slight tooth. Abdomen (of male at least) with seven segments. Chelipeds elongate. Ambulatory legs of first pair long, remaining pairs very short.

**Chorinus heros (Herbst).**

*Cancer heros* Herbst, Natur. Krabben u. Krebse, n, 165, pl. XLII, f. 1, 1796.

*Chorinus heros* (Leach MS.) Latreille, Encyc. Méth., Hist. Nat., Insectes, x, 139, 1825. Milne Edwards in Cuvier's R. Anim., Disciples ed., Crust., 85, pl. XXIX, f. 2.

Carapace pubescent, convex, posterior two-thirds smooth, anterior third deflexed, covered with short, blunt tubercles or spines, from which proceed a tuft of coarse hairs; these tubercles are continued part way on the rostrum. Rostral horns stout, more or less incurved, about one-third the length of remainder of carapace, furnished with long hairs, which are very abundant on inner margin. Preorbital spines about one-third the length of rostral horns, curved and directed forward. Marginal spines two, one gastric and one hepatic, the former the longer, flattened, both curved. Above the orbit are two tubercles or stout spines, the anterior the larger and more or less compound. The branchial region has a few tubercles at anterior angle and on its antero-lateral margin. Subhepatic and pterygostomian regions tuberculate. Basal antennal joint with a stout spine at its extremity and a tubercle on lateral margin, and in the same line there is a tubercle near angle of buccal cavity; first two joints of flagellum flattened, the first joint widening at its distal extremity. Chelipeds naked and smooth, attaining a length of 1.5 times the length of the carapace in the male; merus cylindrical; manus compressed and slightly dilated, the palmar portion about twice the length of fingers. Fingers gaping slightly for their distal third. Ambulatory legs stout, pubescent and hairy, the first pair attaining a length greater than that of carapace; second, third, and fourth pairs much shorter and decreasing regularly in length.

Length of male, according to the figure given by Milne Edwards, 64 mm.; width, 36.2 mm.; length of horns, 14.2 mm.

Florida Keys; West Indies; Rio Vermelho, Bahia, Brazil; Bermudas. Porto Rico: San Antonio Bridge, San Juan; Caballo Blanco Reef, Vieques; off Vieques, 14 to 16 fathoms, stations 6085 and 6092; off Humacao, 9½ fathoms, station 6099. Specimens mostly very young. Aguadilla (Gundlach).

**Genus SCYRAMATHIA A. Milne Edwards.**

*Amathia* ROUX, Crust. Médit., pl. III, 1828, with accompanying description. (Name preoccupied.)

*Scyramathia* A. Milne Edwards, Comptes Rendus de l'Acad. Sci. Paris, xci, 356, 1880.

*Anamathia* Smith, Proc. U. S. Nat. Mus., vii, 1884, 493 (1885).

Carapace subtriangulate, with posterior margin rounded; armed with spines or spines and tubercles. Preorbital spine usually present; postorbital lobe present. Basal antennal joint slender and either unarmed or with one or more spines. Merus of outer maxillipeds truncated distally, and slightly produced at the antero-external angle. Chelipeds usually slender, often greatly elongated in the male. Ambulatory legs slender and elongated.

**Scyramathia hystrix** (Stimpson).

*Amathia hystrix* Stimpson, Bull. Mus. Comp. Zool., II, 124, 1871. A. Milne Edwards, Crust. Rég. Mex., 134, 1878; 200, pl. XXVIII, f. 1, 1879.

*Anamathia hystrix* Smith, Proc. U. S. Nat. Mus., VII, 1884, 493 (1885).

Carapace convex, covered with a tuberculiform pubescence and armed with sixteen long, slender, and sharp spines—two rostral; four median, of which two are gastric, one cardiac, and one intestinal; one gastric spine on either side of the median line; one hepatic on the margin; and three branchial, of which one is on the margin. Preorbital spine slender and much shorter than other dorsal spines; postorbital lobe slightly developed. Basal antennal joint with a spine at antero-external angle, a longer spine at the antero-external angle of buccal cavity. Chelipeds slender and weak, shorter and very little stouter than ambulatory legs; merus cylindrical, with a terminal spine; carpus with an outer spine; manus slightly compressed and widening distally. Fingers toothed throughout their length, very little gaping. First ambulatory leg much the longest; all very slender; the meral joints terminate in a spine.

Dimensions of male: Length, including rostrum, 31.2 mm.; excluding rostrum, 18 mm.; breadth including lateral spines, 24.1 mm.; excluding spines, 12.1 mm. (Stimpson.)

Florida Straits; West Indies. Depth, 82 to 387 fathoms. Mayaguez Harbor, Porto Rico, 220 to 225 fathoms, station 6070; 1 female.

**Genus PELIA** Bell.

*Pelia* Bell, Proc. Zool. Soc. London, III, 170, 1835.

Carapace pyriform, swollen, without tubercles and covered with a thin coating of soft hair. Rostrum well developed, composed of two rostral horns, united at base, divergent at their extremity. Upper orbital border smooth, without a spine. Basal article of antennae long, slender, and forming only an incomplete floor of orbit; it is advanced beyond orbital border and appears on borders of rostrum; flagellum well developed. The eye folds back into a fossette hollowed from the base of a tubercle limiting anterior boundary of hepatic region. Merus of outer maxillipeds notched at front inner angle for insertion of palpus. Chelipeds rather long, but feeble; fingers sharp-pointed, finely denticulate and in contact in their terminal half; movable finger with a large tooth near its base, which fits into an excavation in the pollex; the arm has a superior crest. First pair of ambulatory feet much longer than the others; last pair very small; meral joints much compressed, and having a prominent crest above; dactyli unarmed. Abdomen of male narrow, with seven segments.

**Pelia mutica** (Gibbes).

*Pisa mutica* Gibbes, Proc. Amer. Assoc. Adv. Sci., III, 171, 1850.

*Pelia mutica* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 177, 1860; A. Milne Edwards, Crust. Rég. Mex., 73, pl. XVI, f. 2, 1875.

Regions elevated, especially gastric and cardiac, which is surmounted by a rounded prominence. Lateral border entire. Rostrum almost two-fifths as long as rest of carapace; a furrow on its basal portion; horns more or less divergent. Basal antennal joint with or without a small spine at its outer extremity. Chelipeds in male about as long as body.

Dimensions of male: Length, 9.5 mm.; width, 5.8 mm.

Vineyard Sound to the west coast of Florida; Florida Straits. Porto Rico: Mayaguez; Boqueron Bay; off Boca Prieta, 8½ fathoms, station 6075; off St. Thomas, 20 to 23 fathoms, station 6079. Porto Rico is beyond the recorded limit of this species, which is, however, doubtfully distinct from *P. rotunda* A. Milne Edwards, of the South American coast, from Brazil to Patagonia.

**Genus HEMUS** A. Milne Edwards.

*Hemus* A. Milne Edwards, Crust. Rég. Mex., 88, 1875.

Carapace thick and swollen; longer than wide. Rostrum small; no preorbital spines; orbit incomplete below. Second and third articles of the external antennae remarkably wide and flat; the multiarticulate flagellum inserted at the external angle of the third article. Merus of outer maxillipeds long and little dilated outwards; exognath very wide in its basal and middle portion, narrowing toward its extremity. Chelipeds small; fingers slightly gaping, strongly bent inward toward their extremity, but scarcely spoon-shaped. Ambulatory legs short, but very strong; merus ornamented with cristiform prolongations; dactyli strong, much curved, without denticulations below.



**Hemus cristulipes** A. Milne Edwards.

*Hemus cristulipes* A. Milne Edwards, Crust. Rég. Mex., 88, pl. XVI, f. 1, 1875.

Body and feet almost completely smooth. The rostrum is wide, short, bicarinated above, bent downward, and bifurcated at its extremity. Upper orbital border unarmed, but having a narrow fissure; the postorbital cavity into which the eye can be retracted is incomplete. Basal article of outer antennæ wide, short, and not spinulose; a notch separates it from lower border of carapace. The carapace sparsely granulous; very swollen, especially in cardiac region, which is markedly prominent. Postorbital portion wide; gastric region high; branchial regions elliptical, bearing on each side two subacute prominences directed outward; the first stronger than second. Chelipeds of male very small and smooth. First pair of ambulatory legs longer and stronger than the others; fifth very small. Merus of all the legs very wide, having above a crest and below a lamellar prolongation with a crenulate and arcuate border; other joints of feet small. Abdomen of both sexes with seven free segments, the last elongate in the male.

Dimensions of female: Length, 7 mm.; width, 5.7 mm.

Gulf of Mexico; Central America. Depth, 8½ to 27 fathoms. Porto Rico: Off Boca Prieta, 8½ fathoms, station 6075; off Vieques, 15 fathoms, station 6091 off Culebra, 15 fathoms, station 6093.

**Genus THOE** Bell.

*Thoe* Bell, Proc. Zool. Soc. London, III, 170, 1835.

*Platypes* Lockington, Proc. Cal. Acad. Sci., VII, Mar. 20, 1876, p. 41 (1), 1877.

Carapace of moderate width, thick, lobulate; fronto-orbital region wide; rostrum small; no pre-orbital spine; orbital border unarmed. Basal article of antenna large; second article rather flat and attached to first joint near rostrum, but at a great distance from orbit. Exognath of outer maxillipeds very wide in middle. Sternal plastron almost circular. Chelipeds long and usually strong; hand compressed; fingers spoon-shaped, gaping in the adult. Ambulatory feet wide, decreasing rapidly in length from the first to the fourth; meral joints with longitudinal crests; last two joints short and nodose.

*Key to the Porto Rican species of the genus Thoe.*

A. Carapace and basal antennal joint without spines ..... *puella*  
 A'. Carapace with postero-lateral spines; basal antennal joint with two distal spines ..... *aspera*

***Thoe puella*** Stimpson.

*Thoe puella* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 178, 1860; A. Milne Edwards, Crust. Rég. Mex., 122, pl. XIX, f. 3, 1873.

Antero-lateral margins straight or nearly so; lobulations of dorsal surface well marked, covered with bunches of granules crowded together. Rostral horns separated by a deep, narrow fissure. Antennæ fringed with long hair; basal joint as wide as long, with antero-external angle a blunt tooth. Arm and wrist of chelipeds covered with fine granulations, the arm with a line of tubercles on upper margin; hand smooth and shining except near articulation, where it is granulate, superior margin sharp for its proximal half; fingers finely serrulate within; a tooth near base of dactyl in male; fingers rather widely gaping in adult male; narrowly gaping in adult female. The posterior laminate crests on meral joints of ambulatory legs longer than anterior and about twice as wide; their upper surfaces concave, margins undulate and finely crenulate; carpal joints have a bilobed anterior crest and a tooth on posterior margin; propodal joints with a narrow crest on each side and a blunt spine above.

Color, reddish, or a brilliant red, with yellow spots (A. Milne Edwards).

Dimensions of male: Length, 10.4 mm.; width, 9 mm.

Florida Keys; West Indies. Reefs at Ponce, Porto Rico.

***Thoe aspera***, sp. nov.

Carapace more elongate than in *T. puella*, the gastro-cardiac suture is farther back, or halfway between posterior margin of carapace and posterior margin of orbit. Lobules separated by shallower depressions than in *T. puella*; protogastric and mesogastric lobules surmounted by high, acute tubercle; cardiac lobule with a similar but lower tubercle. Postero-lateral angle with a short spine; above and anterior to the spine, a sharp tubercle; another on each side of the middle near posterior margin; and in front of these last still another on branchial region. Rostral horns curving slightly inward and separated by a large V-shaped sinus. Basal antennal joint narrower than in other species of genus, considerably longer than broad and armed distally with two spines, outer one above inner, both visible in a dorsal view; outer margin concave, a longitudinal crest at outer third; both crest and

margin finely crenulate. Cheliped of male (perhaps not fully developed) rather feeble. The arm, wrist, and proximal fourth of palm are finely granulate; the arm has sharp granulated margins. The greater part of palm is smooth and shining; three times as long as wide; the fingers gape slightly for two-thirds their length and are finely denticulate. Crests of meral joints of ambulatory legs of about equal width; anterior crest has one or two teeth, the posterior one has a rectangular distal prolongation. The carpal joints have a triangular inner tooth and a narrow outer crest. Surface sparingly pubescent; some longer hairs form lines on rostrum and in the depressions of carapace.

Dimensions of male: Length, 10 mm.; width, 8.2 mm.

A male and a young female were taken at Ensenada Honda, Culebra (Cat. No. 23773). This species is readily distinguished by its spines and sharp tubercles and elongate basal antennal joint.

#### Genus LISSA Leach.

*Lissa* Leach, Zool. Misc., II, 69, 1815.

*Lissula* Rafinesque, Amer. Monthly Mag., III, 272, Aug., 1818.

Carapace very convex; surface very uneven; mesogastric region especially elevated, sides of gastric and branchial regions steep. Preocular spine or tooth present. Horns of rostrum flattened, truncate, outer extremities of anterior margin forming a small lateral lobe. Orbit with a superior and an inferior closed fissure; eyes when retracted fitting into cup-shaped inconspicuous postorbital lobe. Basal joint of antennae much enlarged, entire, distal margin of outer portion united with front margin of carapace. Ischium of outer maxillipeds inwardly strongly advanced; merus subtriangular, dilated outwardly; a very shallow sinus at articulation of palpus. Chelipeds with palm compressed, sometimes carinated; fingers gaping at base in the male. Ambulatory legs of moderate length, decreasing rapidly in size from the first to last, either cristate or nodose; dactyli unarmed.

#### *Lissa bicarinata* Aurivillius.

*Lissa bicarinata* Aurivillius, Kongl. Sv. Vet. Akad. Handl., Bd. 23, No. 4, 54, 1889; Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 255, 1898.

Carapace with two rounded median prominences, one gastric and one cardiac, the former much larger and higher. From the gastric prominence two ridges run divergently backward to postero-lateral angles of carapace. Both the median prominences and ridges are indistinctly tuberculate. Posterior outline areolate and separated from blunt postero-lateral angles by a broad rounded sinus. Sides of branchial and gastric regions steep. Outer margin of branchial region with a broad and shallow tooth at its middle. Outer margins of hepatic regions almost parallel. Rostrum wide, deflexed, subtruncate, widening at extremity, which is four-lobed; median lobes rounded and separated by a narrow U-shaped fissure; outer lobes smaller, blunt, slightly less advanced than median. Upper surface of rostrum slightly concave in a longitudinal direction. There is a short, acuminate preorbital spine directed obliquely upward. Legs furnished with triangular laminate crests.

Dimensions of ovigerous female: Length, 9.5 mm.; width, 9.2 mm.

Bahama Banks; St. Bartholomew (Aurivillius). Mayaguez Harbor, 4 to 6 fathoms, station 6065; off Vieques, 12½ fathoms, station 6095.

#### Genus TELEOPHRYS Stimpson.

*Teleophris* Stimpson, Amer. Jour. Sci. (2), XXIX, 133, 1860.

Allied to *Mithrax*, but distinguished by the character of the orbits, which have the superior and exterior margins entire, and not armed with tubercles or spines. There is sometimes an indication of a superior fissure entirely closed up, but no trace of an exterior one. Basal joint of external antennae rather narrow for the group to which this genus belongs, tapering anteriorly, armed with a slight tooth at antero-exterior angle and another still smaller at middle of outer margin. Merus of outer maxillipeds broader than ischium, three-fourths as long, and notched at internal angle for reception of palpus. Legs cristate.

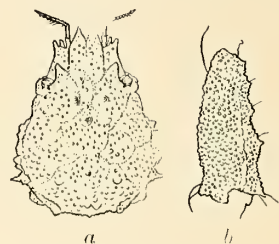


FIG. 10.—*Thoe aspera*, male. (a) Carapace,  $\times 2.5$ . (b) Merus of an ambulatory leg of right side,  $\times 6$ .

**Teleophrys ornatus**, sp. nov.

Carapace longer than broad; two median tubercles, one gastric and one cardiac; a stout subcreet spine on branchial near postero-lateral angle; three very small spines on lateral margin of branchial region; a tubercle on margin of hepatic region; two stout tubercles above posterior margin; lateral margin granulated; a few other tubercles and tufts of hair scattered on carapace. Rostral teeth small, blunt; preorbital lobes smooth, rounded, prominent; two faint sutures evident in upper margin of orbit. Basal joint of antenna with an antero-external tooth and a tubercle on outer margin. Cheliped of female very feeble; upper margin cut into laminate lobes; wrist also ornamented with about five similar lobes; hand smooth, tapering distally; fingers gaping a very little at base. Ambulatory legs with a margin before and behind of irregular laminate lobes, on meral, carpal, and propodal segments; dactyli about as long as propodi, strongly curved, acuminate, denticulate.

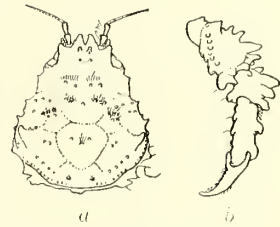


FIG. 11. — *Teleophrys ornatus*, female. (a) Carapace,  $\times 4$ . (b) Ambulatory leg,  $\times 8$ .

This species differs from *T. cristulipes* chiefly in its longer carapace and in the more elaborate crests on the legs, which are present on the posterior as well as the anterior margin.

Length of female, bearing eggs, 5.6 mm.; width, 4.7 mm.

One female from Mayaguez Harbor in 4 to 6 fathoms, station 6065 (Cat. No. 23774).

**Genus MITHRAX** Latreille.

*Mithrax* Latreille, Règne Anim. de Cuvier, III, 23, 1817.

*Trachonites* Latreille in Desmarest, Diet. Sci. Nat., XXVIII, 263, 1823.

*Mithraculus* White, List Crust. Brit. Mus., 7, 1847.

Carapace subtriangular, either broader than long or slightly longer than broad. The front has two small rostral horns, often pointed, beside which are other spines or prominences, either preorbital or antennal. Orbital borders more or less spinous or tuberculous. Basal article of antenna wide, armed in front with two or three strong spines; second article inserted outside the orbit, at base of rostrum. Merus of outer maxillipeds wide and dilated outwardly; exognath wide. Sternal plastron almost circular. Chelipeds long and strong, especially in male; fingers deeply hollowed out at tip, gaping considerably when shut. Ambulatory legs robust, armed with spines and terminated by hooked fingers, and often armed with spines on lower surface. Abdomen of male formed of seven free segments.

*Key to the Porto Rican species of the genus Mithrax.*

- A. Carapace without oblique parallel branchial sulci.
  - B. Manus with spines or spinules.
    - C. Carapace nearly naked ..... *spinosissimus*
    - C'. Carapace covered with setae.
      - D. Granules of carapace concealed by the dense setae, which are all alike ..... *pilosus*
      - D'. Granules of carapace not concealed by the setae, which are of two kinds and varying in length ..... *plumosus*
  - B'. Manus without spines.
    - C. Rostral horns blunt or tuberculiform.
      - D. Antero-lateral prominences four.
        - E. Carapace and wrist smooth or nearly so.
          - F. Basal antennal joint with two teeth or spines ..... *hispidus*
          - F'. Basal antennal joint with three teeth or spines ..... *levimanus*
        - E'. Carapace and wrist distinctly tuberculate.
          - F. Rostral horns about as long as broad ..... *depressus*
          - F'. Rostral horns shorter, broader than long ..... *pleuracanthus*
      - D'. Antero-lateral prominences three; postero-lateral one ..... *ruber*
    - C'. Rostral horns sharp.
      - D. Rostral horns short.
        - E. Four lateral spines ..... *hemphilli*
        - E'. Two lateral spines ..... *holderi*
      - D'. Rostral horns long and slender ..... *aculicornis*
- A'. Carapace with oblique parallel branchial sulci.
  - B. Antero-lateral margin spined.
    - C. Carapace longer than broad ..... *cineticmanus*
    - C'. Carapace broader than long ..... *forceps*
  - B'. Antero-lateral margin lobed.
    - C. Carapace slightly broader than long. Postero-lateral angle rounded ..... *sculptus*
    - C'. Carapace much broader than long. Postero-lateral angle angular ..... *coryphe*



**Mithrax acuticornis** Stimpson.

*Mithrax acuticornis* Stimpson, Bull. Mus. Comp. Zool., II, 116, 1870; A. Milne Edwards, Crust. Rég. Mex., 98, 1875.

*Mithrax (Nemausa) acuticornis* Rathbun, Proc. U. S. Nat. Mus., XV, 260, pl. XXXVII, f. 1, 1892.

*Nemausa rostrata* A. Milne Edwards, Crust. Rég. Mex., 81, pl. XVII, f. 4, 1875.

Carapace longer than broad, armed especially on posterior and lateral portions with sharp spines and spinules. Antero-lateral margin with four slender, sharp spines, the first three of which have a smaller anterior spine; a short postero-lateral spine. Rostral horns in large specimens two-fifths as long as remainder of carapace, in small specimens relatively shorter; slender, acuminate, diverging. Preorbital spine acute, obliquely ascending; postorbital spine equally long; two shorter spines above and two below the orbit. Antennal joint with a long antero-external spine, a third or more as long as the rostrum; an outer spine much shorter; a third but extremely short spine at the base of the second joint. Arm and wrist armed with very sharp spines; hand smooth. Meral and carpal joints of ambulatory legs spinous, the spines forming two marginal rows on upper surface.

This species has a strong resemblance to young *M. spinosissimus*.

Dimensions of male: Entire length of carapace, 21.4 mm.; entire width, 14.2 mm.

Gulf of Mexico and Caribbean Sea, 12 to 121 fathoms; Bermudas. Mayaguez Harbor, 25 to 30 fathoms, station 6062, 1 young female.

**Mithrax spinosissimus** (Lamarck).

*Maia spinosissima* Lamarck, Hist. Nat. Anim. sans Vert., v, 241, 1818.

*Mithrax spinosissimus* Milne Edwards, Mag. Zool., II, pls. 2 and 3, 1832.

Carapace covered with spines more or less elongate, which tend to disappear in very large individuals; surface between spines smooth. Rostrum formed of two short and slightly divergent horns. Preorbital spines sharp and directed a little upward. Two spines on basal article of external antennae. Orbital border cut into five or six additional spines. Antero-lateral margin armed with five or six large spines, of which the first two are bifurcate. Chelipeds very large. Arm and wrist spiny. The upper border of the hand has a double row of spines, which become blunt or tuberculiform with age; the inner face has two or three tubercles near the wrist. Ambulatory legs very spinous. Merus of external maxillipeds deeply cut at its inner angle.

Color, vinous red, with yellowish tints (A. Milne Edwards).

Dimensions of male: Entire length, 131.4 mm.; entire width, 136 mm. This is the largest species of the genus. Young specimens are more elongate (longer than broad) and have longer horns.

Bahama Banks; Florida Keys; West Indies. Bayamon (Gundlach); San Juan (G. M. Gray).

**Mithrax pilosus** Rathbun.

*Cancer aculeatus* Herbst, Natur. Krabben u. Krebse, I, 248, pl. XIX, f. 104, 1790. (Not *C. aculeatus* O. Fabricius, 1750.)

*Mithrax aculeatus* Milne Edwards, Mag. Zool., II, 1832.

*Mithrax pilosus* Rathbun, Proc. U. S. Nat. Mus., XV, 262, pl. XXXIX, 1892.

Carapace wider than long in specimens of large size, but in small specimens the length and width are more nearly equal. It is covered, as well as the legs, with plumose setae, which are crowded and conceal the surface; when removed, they disclose flattened granules. Carapace also furnished with spinose tubercles as follows: Three, small, arranged longitudinally each side of median line just behind rostrum; four transversely on gastric region in two distant pairs; one further back on median line of gastric; three forming a triangle on cardiac; nine or ten scattered on each branchial region; four in an arcuate row above posterior margin. Lateral spines five (the fifth postero-lateral), stout, triangular, tips hooked forward, the first ones often double or triple, especially in specimens of large size. Rostral horns strongly incurved at tips. Preocular spine prominent, upturned. Three other orbital teeth—one above, one below, one external. Basal antennal joint with a long antero-external spine, hooked inward; on outer margin a triangular tooth; another at insertion of second joint. Chelipeds large; arm and wrist very spiny; hand with a few tubercles or spines on superior margin near wrist. Ambulatory legs stout; meral and carpal joints spiny.

Dimensions of male: Entire length, 113.2 mm.; entire width, 124 mm.

Bahamas; Florida Keys to Venezuela; West Indies. Porto Rico: Reefs at Guanica; reefs at Ponce; Culebra; Aguadilla (Gundlach).

***Mithrax plumosus*, sp. nov.**

*Mithrax aculeatus* Rathbun, Proc. U. S. Nat. Mus., xv, 264, 1892. (Not *M. aculeatus* (Herbst) Milne Edwards.)  
*Mithrax verrucosus* variety, Rathbun, Ann. Inst. Jamaica, i, 9, 1897.

Carapace wide, little swollen, and covered with very flat and crowded granules, with some raised tubercles toward lateral and frontal margins; surface covered (but not sufficiently to obscure the granulation) with plumose bristles and tufts of longer, stiffer bristles arising from each tubercle. Rostral horns short, truncate, interspace wider than horn. Preorbital tooth blunt, directed a little outward. Basal article of antenna with three blunt spines; the orbital border has, besides, four blunt spines. Antero-lateral margin armed with four slender subacute spines, of which the first three are double; the anterior of each double spine is the smaller; a short postero-lateral spine. Inner margin of arm and wrist armed with sharp spines; upper surface spinous; arm with five or six sharp spines on outer margin; hand with a few spinules on upper surface near wrist. Palm and fingers otherwise smooth, naked, and shining. The rest of the chelipeds and also the ambulatory legs hairy like carapace. Meral and carpal joints of ambulatory legs spinous. Young specimens have the rostral horns relatively longer and sharper; the hand is rougher than in the adult and hairy at the proximal end.

This species I at first mistook for *M. aculeatus* (Herbst), and later thought it might be a variety of *M. verrucosus*, to which it is most closely related. *M. aculeatus* (Herbst), now *M. pilosus*, is furnished with much stronger lateral spines and the setæ covering the surface are denser and all of the same character. *M. verrucosus*, on the other hand, has the carapace bare or nearly so, and the hand and upper surface of the wrist are unarmed; the young have the rostral horns relatively shorter than the adult, while the reverse is true in *M. plumosus*. This species is of more frequent occurrence than either of those with which it has been confounded.

An ovigerous female from Puerto Real measures 30 mm. long, including horns, and 35.8 mm. wide, including spines. This specimen may be taken as the type (Cat. No. 23775). Also found in Porto Rico at Boqueron; reefs at Ponce; Arroyo; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra; Fajardo. Bahamas; Florida Keys; West Indies; Fernando Noronha.

***Mithrax hispidus* (Herbst).**

*Cancer hispidus* Herbst, Natur. Krabben u. Krebse, i, 247, pl. xviii, f. 100, 1790.  
*Mithrax hispidus* Milne Edwards, Mag. Zool., ii, 1832; A. Milne Edwards, Crust. Rég. Mex., 93, pl. xxi, f. 1, 1875.

Carapace swollen, considerably wider than long, smooth, except for some low, rounded prominences chiefly toward the outer margin of the branchial region. Gastric tubercles very faint. Front wide; horns short, obtuse, interspace U-shaped, as wide as either horn. Preorbital angles blunt, slightly produced. Basal joint of antenna with two teeth, inner one nearly reaching line of rostrum, the other smaller, on orbital border; besides, the orbit has four tubercles on margin, two superior, much smaller than external or inferior tubercle. Lateral margin armed with five spiniform teeth; the first obtuse, often bifid at extremity; the second longer, sharp and double, curving forward; third and fourth more slender and about the same length; fifth postero-lateral, much smaller, and situated higher up on carapace. Subhepatic region with two tubercles; a number of tubercles, some of them pointed, are on the subbranchial and pterygostomian regions. Arm with four or five spines on upper margin; two on inner margin; and a few tubercles on the upper surface. Wrist smooth; inner margin evenly rounded. Hand smooth; fingers narrowly gaping; a broad, low tooth near the base of the dactylus. In young specimens the tubercles of the carapace are more protuberant.

Dimensions of male: Length, 86.5 mm.; width, including spines, 114 mm.

Bahamas; Florida Keys; West Indies; Venezuela; Bahia and Abrolhos Islands, Brazil; Bermuda. Guanica, Porto Rico; San Juan (Gundlach).

***Mithrax lævimanus* Desbonne & Schramm.**

*Mithrax lævimanus* Desbonne & Schramm, Crust. Guadeloupe, 7, pl. 1, figs. 1 and 2, 1867; A. Milne Edwards, Crust. Rég. Mex., 94, pl. xxi, f. 2, 1875.

Resembles *M. hispidus*; the carapace smooth, and having only a few rounded prominences, but narrower; the front also is narrower and much more produced. Preorbital projections rounded. The basal article of antenna bears three blunt spines, one below insertion of next article, one stronger

at antero-external angle, the third equally large at antero-internal angle. Orbital border with only three tubercles. Lateral margins armed with five almost cylindrical spines, which are simple and directed almost forward; the first and fifth are smallest; the fifth is post-lateral. Three strong projections on branchial regions. Wrist with a large tubercle on inner margin; otherwise the feet resemble those of *M. hispidus*. Sternal plastron deeply hollowed anteriorly for seventh abdominal segment; sixth abdominal segment very wide in its anterior part. Merus of outer maxillipeds longer and much less deeply cut at its inner angle than in *M. hispidus*.

Carapace a violet brown; claws and feet spotted with a wine-colored violet (A. Milne Edwards).

Dimensions of male: Length, 65 mm.; extreme width, 78 mm. (A. Milne Edwards).

Guadeloupe (type locality). This species was not found by the *Fish Hawk* party, nor is it recorded by Gundlach, but I chanced to note in the Museum at Berlin, in 1896, a small male, labeled "Porto Rico. Gundlach." The spots on the chelipeds were a striking feature of the preserved specimen.

***Mithrax depressus* A. Milne Edwards.**

*Mithrax depressus* A. Milne Edwards, Crust. Rég. Mex., 96, pl. xx, f. 4, 1875

Closely allied to *M. hispidus*. Carapace narrower across branchial regions; antero-lateral margins more arcuate than in *M. hispidus*, that is, after curving well outward anteriorly, they turn inward near lateral angle more than in that species. Tubercles of carapace prominent; on gastric region there are five tubercles in a transverse row, and in front of these two pairs of tubercles, the anterior pair at base of the rostral horns; on mesogastric region are two tubercles on each side in a transverse line; on branchial region the four principal tubercles form a rhomboid; in front of anterior of these tubercles are two or three smaller ones; near posterior margin of branchial region are about eight unequal tubercles forming two irregular rows. Space between the rostral horns U-shaped and narrower than either horn. Anterior of lateral branchial spines more swollen than in *M. hispidus* and blunter; spine on its front margin is reduced, tubercles above are enlarged; tubercles present on second and third branchial spines also. Arm with two blunt spines on anterior margin, the distal one large, proximal one small. Otherwise as in *M. hispidus*.

Dimensions of male: Length, 43.5 mm.; width, 51 mm.

Bahamas; Florida Keys, to 19 fathoms; West Indies; off Cape St. Roque, Brazil, 20 fathoms; off the Abrolhos, Brazil, 30 fathoms (*Hassler*); Bermudas. Porto Rico: Huecares, 2 males; young specimens were taken at the following stations: Off Puerto Real, 8½ fathoms, station 6074; off St. Thomas, 20 to 23 fathoms, stations 6079, 6080; off Vieques, 6 to 14 fathoms, stations 6085, 6096; off Culebra, 15 to 16 fathoms, stations 6090, 6093; off Humacao, 9½ to 12½ fathoms, stations 6098, 6099.

***Mithrax pleuracanthus* Stimpson.**

*Mithrax pleuracanthus* Stimpson, Bull. M. C. Z., II, 116, 1871; A. Milne Edwards, Crust. Rég. Mex., 95, pl. xx, f. 3, 1875.

*Mithrax hispidus* Rathbun, Proc. U. S. Nat. Mus., XV, 265, 1892 (part).

In 1892 (*loc. cit.*) I believed *M. pleuracanthus* to be synonymous with *M. hispidus*; since then I have reconsidered the question and have examined more material, including type specimens of *M. depressus*, and have come to the conclusion that these three species can be maintained. The differences are very subtle, and not evident without careful study. The form of the carapace in *M. pleuracanthus* resembles that of *M. hispidus*; the third or posterior branchial spine is longer, and the second spine shorter, than the first; there are several tubercles about the base of each lateral spine. The tubercles of the carapace are well marked as in *M. depressus*. The two tubercles of each pair on the mesogastric region are confluent. The rostral horns of *M. pleuracanthus* are shorter and wider than in *M. hispidus* or *M. depressus*, and the interspace is narrower and inclines toward the triangular. The arm has on its anterior margin either a single spine, or a spine with a tubercle on its proximal slope. I may add that in young specimens these differences are less evident, making it almost impossible to separate the species with certainty.

Dimensions of male: Length, 33.6 mm.; width, 40.7 mm.

Florida Keys; West Indies; Gulf of Mexico. Depth, 3 to 125 fathoms. Porto Rico: Off Vieques, 14 fathoms, station 6085, 1 male, 3 young; off Humacao, 12½ fathoms, station 6098, 1 young; San Juan (G. M. Gray).



**Mithrax ruber** (Stimpson).

*Mithraculus ruber* Stimpson, Bull. Mus. Comp. Zool., II, 118, 1871.

*Mithraculus nudus* A. Milne Edwards, Crust. Rég. Mex., 110, pl. XXIII, f. 2, 1875.

*Mithrax ruber* Miers, Challenger Rept., Zool., XVII, 87, 1886.

*Mithrax nudus* Miers, loc. cit.

Carapace much wider than long; surface naked, polished, and uneven. A few smooth, rounded prominences are on branchial region; some small depressed tubercles are arranged in transverse rows on gastric region, and larger ones occur on cardiac and branchial regions. The lateral protuberances are four, the first two blunt, the last two sharp, spiniform, the third largest and most produced, the fourth post-lateral; a tubercle on anterior slope of the second tooth, a spine in the interval between second and third. Frontal horns very short, thickened, upturned, blunt; interspace narrow. Behind the horns two small prominences. Margin of orbit thickened, especially the preorbital lobe; a small tooth on upper margin; otherwise entire. Basal antennal joint rather narrow, with two lobes, one large and thick at antero-external angle and further advanced than preorbital lobe, the other small, on outer margin. Chelipeds strong; arm with a single lobe at proximal end of anterior margin, four spines on posterior margin, and two spines on upper surface; wrist almost smooth; hand smooth; fingers denticulate except at base; the movable finger in the full-grown male bears a strong tooth near its proximal third; fingers gaping. Ambulatory legs spinous and hairy.

Entire length of ovigerous female from Arroyo, 13 mm.; entire width, 15.8 mm.

Mayaguez, on coral reef, one male; Playa de Ponce Reef, two young; Arroyo, on Lighthouse Reef, 1 female, 1 young. Cuba (Stimpson); Guadeloupe (Geneva Museum).

**Mithrax hemphilli** Rathbun.

*Mithrax hemphilli* Rathbun, Proc. U. S. Nat. Mus., xv, 263, pl. XXXVII, f. 2, 1892.

Carapace oblong-triangular, covered with strong tubercles and granules. The largest tubercles are arranged as follows: One on either side of the middle, in a line with posterior margin of orbit; a transverse row of four on protogastric lobes; three median mesogastric; one genital; a line of three on the cardiac forming a transverse curve concave forward; behind these, one on median line; from seven to eight on branchial region, those most posterior being spinous; four spinous tubercles on intestinal region forming a transverse curve concave to posterior margin; the two tubercles at extremities of this curve are continuous with a line of granules which borders the posterior margin. The two central protuberances of the marginal line are small tubercles. Numerous smaller tubercles and granules scattered or clustered about the larger tubercles; a row of granules just within and parallel to posterior margin of mesogastric region. Rostrum rather long for the genus, horns acute, curving inward at tip; outer margin finely denticulate. Preocular tooth long, acute, elevated, the tips being in a horizontal line with posterior margin of rostral sinus. The two sinuses of upper orbital margin are triangular and inclose a subtriangular, truncate tooth. Four antero-lateral spines, stout, conical, and embossed with granules and tubercles; also a few intermediate and much smaller spines; a short post-lateral spine just above margin. Basal joint of antenna armed with four spines and teeth; a long, slender spine at anterior outer angle, overreaching preorbital spine; a shorter spine or tooth on outer margin, forming one of two on the margin of orbital floor; at the base of the first movable joint a spiniform tooth just visible in a dorsal view; obliquely behind this is another tooth, succeeded by four others which cross the subhepatic region. Chelipeds rather feeble; arm with an upper and outer row of spines and four or five rows of tubercles; wrist tuberculous; hand smooth, with parallel margins; fingers showing only a small hiatus at base when closed. Ambulatory legs spinous; the spines on the meral joints strong.

Dimensions of male: Entire length, 19.8 mm.; entire width, 19.9 mm.

Indian Key, Florida; Rio Formoso, Pernambuco; Abrothos Islands, Brazil. Ensenada Honda, Culebra, 2 males, 1 female.

**Mithrax holderi** Stimpson.

*Mithrax holderi* Stimpson, Bull. Mus. Comp. Zool., II, 117, 1871; Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 259, pl. III, f. 2, 1898.

Carapace oblong, covered with unequal, prominent tubercles, and with large, crowded punctæ. Frontal horns depressed, nearly horizontal, narrow, short, acute. Basal antennal joint with three spines, antero-external long, nearly as advanced as the rostrum and directed obliquely upward and

outward; outer spine small; a third spine or sharp tooth is placed at insertion of second joint. Orbital spines and teeth five, exclusive of antennal; preorbital acute, elevated, curved inward. Antero-lateral margin with two prominent spines—one hepatic, the other at branchial angle; between them are two clusters of tubercles; in front of and behind branchial spine is a small spine or spinule. Inferior regions of carapace covered with tubercles, which become spinulose on subhepatic region. Arms of chelipeds with blunt spines above; hands unarmed. Ambulatory legs flattened above and hairy; meral and carpal joints armed with two rows of spines.

Dimensions of female: Entire length of carapace, 21.5 mm.; entire width, 21.2 mm.

Tortugas, 7 fathoms; St. Croix; St. John. Off Vieques, 21 fathoms, station 6089, 1 young specimen.

***Mithrax cinctimanus* (Stimpson).**

*Mithraculus cinctimanus* Stimpson, Amer. Jour. Sci., XXIX, 132, 1860; Ann. Lyc. Nat. Hist. N. Y., VII, 186, 1860; A. Milne Edwards, Crust. Rég. Mex., 112, pl. XXIII, f. 3, 1875.

*Mithrax cinctimanus* Miers, Challenger Rept., Zool., XVII, 87, 1886.

Carapace longer than broad and covered, especially on posterior two-thirds, with small, rounded lobules. Branchial regions obliquely sulcate. Rostral horns short, rather narrow, and widely separated. Inner angle of orbit prominent, acute. Antero-lateral margin with four small teeth, often tuberculiform. Basal joint of antenna very broad, with an antero-external spine, not exceeding upper preorbital tooth. Arm tuberculous, two spiniform teeth on inner margin; wrist smooth, two tubercles on inner margin; palm somewhat dilated; fingers gaping; a tooth on dactylus near its base; sometimes a smaller one on pollex near spoon. Ambulatory legs a little rough, sparsely hairy, hairs fine and chiefly on last three joints.

Color, yellowish, with a large brown spot covering a large part of the cardiac region. Claws and feet spotted with brown and white; often the dark shade forms a broad band on the hand, whence the specific name.

Dimensions of male: Length, 18.2 mm.; width, 17.7 mm.

Gulf of Mexico; Florida Reefs; West Indies; Curaçao. Guanica Bay, Porto Rico, on coral reef.

***Mithrax forceps* (A. Milne-Edwards).<sup>1</sup>**

*Mithraculus forceps* A. Milne Edwards, Crust. Rég. Mex., 109, pl. XXIII, f. 1, 1875.

*Mithraculus hirsutipes* Kingsley, Proc. Boston Soc. Nat. Hist., XX, 147, 1879; Proc. Acad. Nat. Sci. Phila., XXXI, 389, pl. XIV, f. 1, 1879.

*Mithrax forceps* Miers, Challenger Rept., Zool., XVII, pp. 87, 88, 1886.

Carapace comparatively smooth, large specimens with scattered punctures, small ones deeply sculptured. Three grooves run diagonally backward from near first, second, and fourth sinuses of lateral margin; of the intervening ridges thus formed, the two anterior are not broken up into lobules, as in *M. sculptus*. Six or seven depressed tubercles along margin and on posterior part of branchial region, two or three along outer margin of hepatic region, and two pairs on frontal region directly behind lobes of rostrum. Median notch of front broadly V-shaped. Antero-lateral teeth four, acute, slender, separated by broad rounded sinuses, the first the shortest and in large specimens subacute, the remainder sharp and directed forward, the second usually the longest and largest. Sometimes a small postero-lateral tooth. Arm with five spines or spiniform tubercles on upper margin, two on inner face just below margin; on the inner margin two prominent teeth. Carpus smooth, sometimes unarmed, often with a short spine or tubercle on inner margin anterior to inner angle, giving appearance of a double tooth. Fingers widely gaping in male; dactylus with a large tooth one-third distance from proximal end, or instead a few minute teeth; the pollex may have from one to three small teeth or tubercles in the middle. Ambulatory legs distinctly spinny and fine-hairy.

Color, cinnamon or reddish-brown.

Dimensions of male: Length to base of rostral lobes, 30.5 mm.; width, without spines, 35 mm.

From North Carolina to the Abrolhos Islands, Brazil; Bermudas; in 1 to 17 fathoms. Porto Rico: Mayaguez Harbor; off Gallardo Bank, 10 fathoms, station 6076; off Vieques, 6 to 16 fathoms, stations 6085, 6091, 6092, 6096; off Culebra, 15 to 15½ fathoms, stations 6087, 6093; off Humaçao, 9½ to 12½ fathoms, stations 6098, 6099.

<sup>1</sup> Mr. Rankin, in Ann. N. Y. Acad. Sci., XII, 532, 1900, uses the name *M. hirsutipes* Kingsley as having priority. The Crustacea of the Mission Scientifique, by A. Milne Edwards, appeared in sections from 1873 to 1880, as indicated on the wrappers of the separate parts. According to the Bibliographie de la France for 1875, pp. 57 to 120 (including the description of *M. forceps*) were issued December 4 of that year.

**Mithrax sculptus** (Lamarck).

*Maia sculpta* Lamarck, Nat. Hist. Anim. sans Vert., v, 242, 1818.

*Mithrax sculptus* Milne Edwards, Mag. Zool., II, pl. v, 1832.

Carapace broader than long, with rounding margins. Front broad, little advanced, formed of two small tubercles separated by a narrow notch. Inner orbital angles obtuse and very slightly produced. The orbital border bears three small tubercles—one superior, one external, the other inferior. Basal article of antenna very wide, much expanded outwardly, forming a part of floor of orbit; its antero-external angle is tuberculiform and scarcely more advanced than superior inner orbital angle. Posterior two-thirds of the carapace nodose; branchial regions crossed by oblique sulci, the intervening elevations being broken up into irregular lobulations. Antero-lateral margins cut into four rounded lobes, which in the young are more or less pointed. Carapace and chelipeds naked and shining.

Chelipeds enlarged in the male; the arm has two spiniform tubercles in front; carpus smooth; hand compressed; dactylus as long as palm; fingers widely gaping, each provided with a large tooth, that is near the base in the dactylus, but in the middle of the gape in the pollex; in the female the fingers gape less and are without large teeth. Ambulatory legs somewhat spinous and covered with a brush-like coating of stout and slender setae.

Color, sage green or bluish green, in alcohol.

Dimensions of male: Length, 21.2 mm.; width, 24.2 mm.

Bahamas; Florida Keys to Brazil, to a depth of 20 fathoms; abundant on coral reefs. Porto Rico: Boqueron Bay; Guanica Bay, on coral reef; Ponce reefs; Arroyo; Caballo Blanco Reef, Vieques; Ensenada Honda, Culebra; Fajardo; San Juan (G. M. Gray); Aguadilla (Gundlach).

**Mithrax coryphe** (Herbst).

*Cancer coronatus* Herbst, Natur. Krabben u. Krebsc. I, 184, pl. XI, f. 63, 1785. (Not *Cancer coronatus* Molina, 1782.)

*Cancer coryphe* Herbst, op. cit., III, Heft 2, p. 8, 1801.

*Mithrax (Mithraculus) coronatus* Miers, Jour. Linn. Soc. London, XIV, 667, 1879.

*Mithrax coryphe* Rathbun, Ann. Inst. Jamaica, I, 11, 1897.

Carapace much wider than in *M. sculptus*, about one-third wider than long; antero-lateral and postero-lateral margins forming a right angle; lobulated anteriorly as well as posteriorly, and more deeply than in *M. sculptus*. Front narrower than in *M. sculptus*; basal antennal joint much narrower. Margins of arm tuberculate; wrist uneven. Carapace and chelipeds naked except on the frontal lobes, but not shining.

Dimensions of male: Length, 14 mm.; width, 19.4 mm.

Bahamas; from Florida to Brazil to a depth of 30 fathoms. Porto Rico: Puerto Real; Boqueron Bay, on coral reef; reefs at Ponce; Arroyo; Ensenada Honda, Culebra.

**Genus MICROPHRYS** Milne Edwards.

*Microphrys* Milne Edwards, Ann. Sci. Nat. (3), XVI, 251, 1851.

Carapace broadly subpyriform and somewhat depressed, with dorsal surface uneven and tuberculated, with a small lateral epibranchial spine; preocular spine sometimes not developed. Orbits small, circular, with closed fissures. Spines of rostrum slender and more or less divergent. Abdomen seven-jointed. Eyes small. Basal antennal joint considerably dilated and armed with a long spine at antero-external angle, which is visible in a dorsal view; the movable joints and the flagella are not concealed by the rostral spines. Merus of outer maxillipeds distally truncated, the antero-external angle somewhat produced and rounded and the antero-internal angle emarginate.

Chelipeds of moderate size, with the palm compressed and more or less enlarged; fingers of the male gaping. Ambulatory legs rather short, with arms and wrists sometimes armed with spines; dactyli slightly curved.

*Key to the Porto Rican species of the genus Microphrys.*

- A. No lateral laminiform processes on carapace. One branchial spine.....*bicornutus*  
 A'. Two lateral laminiform processes, one hepatic, the other branchial. Two branchial spines.....*platysoma*



**Microphrys bicornutus** (Latreille).

*Pisa bicornuta* Latreille, Encyc. Méth., Hist. Nat., Insectes, x, 141, 1825.

*Microphrys bicornutus* A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat., VII, 247, 1872; Crust. Rég. Mex., 61, pl. XIV, figs. 2-4, 1873, and synonymy.

Carapace not very hairy, all raised parts covered with rounded tubercles; a single small, epibranchial spine directed outward. No preocular spine. Basal antennal joint with a tooth on the outer margin behind spine. The line of tubercles along posterior margin is strongly curved upward near the middle. The arm has a few rounded tubercles above. Chelipeds spotted, the spots not disappearing in alcohol. Fingers moderately gaping. Ambulatory legs fringed with hair; a little rough on the margins. The species varies much in the amount of tuberculation and in the length and divergence of the horns.

Color, yellowish brown.

Dimensions of male: Length, 27 mm.; width, 21 mm.; length of horns, 4.3 mm.

Bahamas and Florida Keys to Brazil; Bermudas. A very common species on coral reefs. Porto Rico: Mayaguez, on coral reef; Mayaguez Harbor; Boqueron Bay; Puerto Real; Guanica Bay, on coral reef; reefs at Ponce; Arroyo; Caballo Blanco Reef, Vieques; Culebra; Hucars; Fajardo; San Juan (G. M. Gray coll.); Agnadilla (Gundlach).

**Microphrys platysoma** (Stimpson).

*Milnia platysoma* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 180, 1860.

*Microphrys platysoma* A. Milne Edwards, Crust. Rég. Mex., 62, 1875.

Carapace depressed, tuberculate and granulate; two laminiform processes on antero-lateral margin, one on hepatic region, the other on branchial, the latter not projecting in an imbricated manner; between these processes and below their level there is a spine; two branchial spines, one of which is on the postero-lateral angle and the other farther in but on the same transverse line. On the posterior margin is a row of tubercles which grow larger toward the middle. Rostral horns slender, directed forward, about one-sixth the length of rest of carapace. Antennal spines about half the length of rostral; preocular spine acute, half the length of antennal. The arm has a dentated laminate superior crest; wrist tuberculate; palm less than twice as long as broad; fingers widely gaping, the pollex being strongly curved downward. The ambulatory legs are sparsely hairy and have a few spines and tubercles; propodal joints with a prominent rounded distal laminiform process for articulation of dactylus.

Dimensions of male from Lower California: Length, 17.2 mm.; width, 13.7 mm.; length of rostral horns, 2.5 mm.

Mayaguez Harbor, 4 to 6 fathoms, station 6065; Boqueron Bay, on coral reef; off Vieques, 14 fathoms, station 6085. This species has not before been found on the Atlantic coast. Stimpson described it from Cape St. Lucas, and Professor Bouvier records it from Lower California. The Porto Rican specimens have been compared directly with some of those collected by Mr. Diguët in Lower California.

**Genus STENOCIONOPS** Leach.

*Stenocionops* Leach in Desmarest, Dict. Sci. Nat., XXVIII, 266, 1823.

*Periceca* Latreille, Encyc. Méth., Hist. Nat., Insectes, x, 699, 1825.

Carapace subpyriform, rather convex, with dorsal surface uneven, tuberculated or spinous; lateral margins armed with a series of long spines; preocular spine well developed. Rostrum composed of two strong spines which are not deflexed and are divergent from base; orbits tubular, not strongly projecting; eyes small, retractile within orbits. Basal antennal joint considerably enlarged, armed with one or two small distal spines or tubercles not visible in a dorsal view. The merus of outer maxillipeds with distal margin truncate, antero-internal angle emarginate, antero-external angle rounded or subacute. Chelipeds in adult male well developed; palm elongate and subcylindrical or somewhat compressed, not dilated or enlarged; fingers either without any or with a moderate intermarginal hiatus at the base when closed. Ambulatory legs moderately elongated, with joints subcylindrical, without spines; dactyli nearly straight. Abdomen in male distinctly seven-jointed.

**Stenocionops furcata** (Olivier).

*Cancer furcatus* Olivier, Encyc. Méth., Hist. Nat., Insectes, vi, 174, 1791.  
*Cancer cornudo* Herbst, Natur. Krabben u. Krebse, III, pt. 4, p. 6, pl. LIX, f. 6, 1804.  
*Pericera cornudo* Latreille, Cuvier's Règne Anim., ed. 2, IV, 59, 1829.  
*Stenocionops furcata* Rathbun, Ann. Inst. Jamaica, 1, 6, 1897.

Body and feet covered with dark brown hairs, some of which are stiff and hooked. Carapace not very uneven; some rounded prominences on gastric and cardiac regions; this last also with two median projections, the first very small; the other, large, suberect, and curved, overhangs the posterior border. Frontal horns large, very divergent at base; distally often subparallel or even somewhat converging; on each side a superior orbital spine. The lateral margins bear, besides the very sharp external orbital angle, four very large, sharp spines, one hepatic and three branchial. Basal article of antenna armed in front with a spine which does not reach beyond orbital border.

The chelipeds attain in the male a considerable size and are nodose; arm spined above; hand long, cylindrical, and granulate. Fingers about half as long as palm, gaping for their basal half; a tooth on dactylus near its base.

Length of large male from tip of rostrum to tip of posterior spine, 146.5 mm.; width, including spines, 93 mm.; length of rostrum, about 53 mm.; length of cheliped, 215 mm.

Mayaguez Harbor, 25 to 30 fathoms, station 6062, 2 large males, 1 large female; off Punta de Melones,  $7\frac{1}{4}$  fathoms, station 6072, 1 young specimen; Ensenada Honda, Culebra, 1 young specimen; off Vieques, 14 fathoms, station 6085, 1 very young. San Juan (Gundlach). Ranges from Georgia to Bahia, Brazil.

**Stenocionops furcata cœlata** (A. Milne Edwards).

*Pericera cœlata* A. Milne Edwards, Bull. Soc. Philom. (7), II, 224, 1878.  
*Pericera cœlata* A. Milne Edwards, Crust. Rég. Mex., 200, pl. XV A, f. 3, 1879.  
*Pericera cornuta cœlata* Rathbun, Proc. U. S. Nat. Mus., xv, 244, 1892.

Differs from typical form of species in its more uneven carapace, in the greater divergence of the horns, which are straight, and in the relatively greater width across orbits. Not very sharply set off from *S. furcata*.

Gulf of Mexico and Caribbean Sea, 21 to 175 fathoms. Off Vieques, 15 fathoms, station 6091, one male. It is possible that some of the young specimens enumerated under *S. furcata* belong here.

**Genus MACROCELOMA** Miers.

*Macroceloma* Miers, Jour. Linn. Soc. London, XIV, 665, 1879.

Carapace subpyriform, but broadened anteriorly by projecting orbits; dorsal surface unarmed, or tuberculated, or with a few long spines; margins without a series of elongated lateral spines, but often with a strongly developed lateral epibranchial spine, preceded by some smaller spines. Spines of rostrum well developed. Eyes retractile within roomy projecting tubular orbits. Antennæ have the basal joint considerably enlarged and armed distally with one or two spines. Mobile portion of antenna sometimes concealed by rostrum, sometimes exposed. Merus of external maxillipeds broader than ischium and notched at internal angle for insertion of palp. The chelipeds in the male have the palms enlarged and the fingers either arched and meeting only at tip, or in contact throughout. Ambulatory legs rather short.

*Key to the Porto Rican species of the genus Macroceloma.*

- A. Basal antennal joint with one spine.
  - B. Carapace without a strong transverse spinous and tuberculated ridge connecting epibranchial spines.
    - C. Rostral horns separated at base by a narrow sinus.
      - D. Antennal spine large. Epibranchial spines short, broad, and blunt ..... *trispinosum*
      - D'. Antennal spine small. Epibranchial spines longer, acute ..... *diacanthum*
    - C'. Rostral horns separated at base by a broad U-shaped sinus ..... *diplocanthum*
  - B'. Carapace with a strong, transverse, spinous and tuberculated ridge connecting the epibranchial spines. .... *subparallelum*
- A'. Basal antennal joint with two spines. .... *concauum*

**Macroceloma trispinosum** (Latreille).

*Pisa trispinosa* Latreille, Encyc. Méth., Hist. Nat., x, 142, 1825.

*Pericera trispinosa* Guérin, Icon. Crust., pl. 8, f. 3; A. Milne Edwards, Crust. Rég. Mex., 52, pl. xv, f. 2, 1873.

*Macrocaloma trispinosa* Miers, Jour. Linn. Soc. London, xiv, 665, 1879.

Body and feet covered with very short, brown hairs which form a sort of velvet. Carapace thick and very swollen, wide at line of orbits, narrowing in hepatic portion, widening again posteriorly. The gastric region bears posteriorly a large rounded tubercle, little prominent. Some protuberances of similar nature on epibranchial lobes and on anterior cardiac lobe. Front formed of two flattened horns which at first are parallel, but separate gradually toward extremity. Inner angle of basal article of antenna surpasses greatly the frontal margin, and forms, on each side of rostral horns, a broad spine directed obliquely outward; flagellum small and hidden under front. Metabranial lobes prolonged laterally in a strong, flattened spine directed outward and a little backward. A similar but smaller projection on middle line of posterior margin. Chelipeds of male not strong; arm long, nodose; hand relatively short; movable finger lightly furrowed above. Ambulatory legs short, feeble, and a little nodose. Length of male, 44 mm.; width, 40.5 mm.

From North Carolina to Bahia, Brazil; Bermudas. Porto Rico: Mayaguez Harbor; off St. Thomas, 20 to 23 fathoms, station 6079; off Culebra, 15½ fathoms, station 6087; Ensenada Honda, Culebra; Aguadilla (Gundlach).

**Macroceloma subparallelum** (Stimpson).

*Pericera subparalela* Stimpson, Ann. Lyc. Nat. Hist. N. Y., vii, 182, 1860; A. Milne Edwards, Crust. Rég. Mex., 54, pl. xiii, f. 3, 1873.

*Macrocaloma subparalela* Miers, Challenger Rept., Zool., xvii, 79, 1886.

Carapace less swollen and less thick than in *M. trispinosum*, covered, as well as feet, with a short, yellowish pubescence, in the midst of which are some longer, stiff, and hooked hairs, forming a border beginning at extremity of rostral horns and continued to branchial regions. Rostral horns almost parallel, curving down a little and separated to base by a wide, deep sinus. Inner angle of basal joint of antenna much smaller than in *M. trispinosum* and scarcely visible outside the rostral horns; flagellum small and entirely concealed. Hepatic regions more swollen than in *M. trispinosum*; metabranial lobes produced outward and backward in two triangular spines, connected by a transverse line of elevations on branchial and cardiac regions, which increase in prominence and sharpness with age. The sternum bears some transverse, oval depressions on each article. Chelipeds strong, hand short and high. Ambulatory legs small.

Dimensions of male: Length, 40 mm.; width, 35 mm.

West Indies. Porto Rico: Guanica Bay, on coral reef; Playa de Ponce Reef; Fajardo.

**Macroceloma diacanthum** (A. Milne Edwards).

*Pericera diacantha* A. Milne Edwards, Crust. Rég. Mex., 57, pl. xv, f. 3, 1875 (*diacantha* on plate).

*Macrocaloma diacantha* Miers, Challenger Rept., Zool., xvii, 79, 1886.

This species is intermediate between *M. trispinosum* and *M. diplacanthum*; it differs from the first in its longer, sharper, and more divergent horns, in its well-developed and very sharp postero-lateral spines, in the sharp spine on the posterior part of the urocardiac lobe, and in the width of the basal article of the external antennæ. It differs from *M. diplacanthum* in the divergence of the rostral horns, in the short spines on the margin of the orbit in front and behind, and in the character of the lateral horns, which are not enlarged at their extremity.

Dimensions of male: Length, 33.7 mm.; width, 29 mm.

Majores, 12 fathoms; Kingston Harbor, Jamaica; off Cape St. Roque, Brazil, 20 fathoms. Off Boca Prieta, Porto Rico, 8½ fathoms, station 6075.

**Macroceloma diplacanthum** (Stimpson).

*Pericera diplacantha* Stimpson, Ann. Lyc. Nat. Hist. N. Y., vii, 183, 1860; A. Milne Edwards, Crust. Rég. Mex., 55, pl. xiii, f. 2, 1873.

*Macrocaloma diplacantha* Miers, Challenger Rept., Zool., xvii, 79, 1886.

Allied to *M. subparallelum*. The carapace, however, is narrower, more swollen, and the tubercles on the gastric, branchial, and cardiac regions are more clearly marked; rostral horns longer and more slender. Inner angle of basal article of antennæ shorter, so that it does not show in front of orbit. Orbits tubular; outer margin entire. Lateral spines of carapace wide, lamellar, bifid at their extremity,



having the appearance of two spines, one above the other, soldered together; no elevated transverse ridge connecting these spines, and only a tubercle on the median line behind the carapace. Chelipeds of male longer than those of *M. subparallelum*; hands with small papillose tubercles above and inside. Ambulatory legs slender.

Dimensions of male: Length, 37 mm.; width, 29 mm.

Bahamas; West Indies. Depth, 3 to 13 fathoms. Porto Rico: Playa de Ponce Reef; Ensenada Honda, Culebra.

#### **Macroceloma concavum Miers.**

*Macroceloma concava* Miers, *Challenger Rept.*, Zool., XVII, 81, pl. x, f. 2, 1886.

*Macroceloma concavum* Rathbun, Proc. U. S. Nat. Mus., XXI, 576, 1898.

Body and legs covered with a short, close pubescence, with some longer curled hairs. Carapace very convex, deeply concave upon hepatic regions; dorsal surface armed with ten spines, disposed as follows: Three small spines in a triangle upon gastric region, of which the posterior and median one is the largest; two small spines on cardiac region, one on intestinal region close to posterior margin; a spine on dorsal surface of each branchial region and a rather strong lateral spine; a few tubercles in front of median gastric spine. Lateral margins of carapace tuberculated, the tubercles continued in an oblique series over pterygostomian regions nearly to antero-external angle of buccal cavity. Spines of rostrum strongly deflexed, short, flat, nearly straight, divergent, separated by a triangular interspace. The tubular orbits are laterally much elongated and bear small spines or tubercles, placed one in front of and one behind the eye, and between them above and below two tubercles. Basal antennal joint equaling in width the base of rostrum and bearing several tubercles on outer margin, and two spines, one at distal extremity and one on outer margin. Chelipeds in male rather slender and elongate, arm unevenly granulate and tuberculate on margins; wrist with a small tubercle on inner margin; palm slightly compressed, not dilated nor carinated, granulated on its inner surface; fingers about half as long as palm, bent downward, curved, meeting only toward the tips, and minutely denticulated on their inner margins.

Dimensions of adult female from station 6091: Entire length, 37 mm.; greatest width, 33.2 mm.; width at orbits, 21.5 mm.; length of rostral spines, 4.4 mm.

Brazil: Off Cape St. Roque, 20 fathoms; Bahia, shallow water (Miers); Fernando Noronha, 7 to 20 fathoms (Miers). Off Vieques, 12½ to 15 fathoms, stations 6091 and 6095.

There are three closely allied West Indian species with elongated tubular orbits and two antennal spines: *M. eutheca* (Stimpson), in which the rostral spines are separated by a U-shaped sinus, and the orbits are prolonged far beyond the antennal spines; *M. concavum* Miers, described above, and *M. intermedium* sp. nov.<sup>1</sup>=*M. eutheca* Rathbun, 1892,<sup>2</sup> not Stimpson, which, like *M. concavum*, has a triangular space between the horns, but lacks the anterior cardiac spine and has a greater breadth across the base of the rostrum.

#### **Genus LEPTOPISA Stimpson.**

*Leptopisa* Stimpson, Bull. Mus. Comp. Zool., II, 114, 1871.

Carapace narrow, oblong, tuberculated, with an epibranchial spine, but no lateral series of spines. Orbits complete, short, tubular. Spines of rostrum long and slender. Basal joint of antenna enlarged, armed with spines distally; movable part of antennae very slender and partly hidden by rostrum. Buccal cavity very wide; merus of outer maxillipeds strongly dilated laterally, wider than ischium and notched at inner angle. Chelipeds slender, elongate. Ambulatory legs decreasing regularly in length, the first pair very long, last pair very short.

Closely allied to *Macroceloma*, from which it differs chiefly in its narrow carapace, long horns, and short orbital tubes.

#### **Leptopisa setirostris Stimpson.**

*Tiarinia setirostris* Stimpson, Bull. Mus. Comp. Zool., II, 114, 1871.

*Leptopisa setirostris* Stimpson, Bull. Mus. Comp. Zool., II, 114, 1871, in text.

*Macroceloma tenuirostra* Rathbun, Proc. U. S. Nat. Mus., XV, 252, pl. XXXIII, f. 1, 1892.

Carapace covered with a short pubescence, and numerous depressed tubercles; cardiac region with a prominent tubercle; mesogastric region with one less high; intestinal region with two short median spines; a short, sharp spine at postero-lateral angle of branchial region; lateral margins nearly straight, tuberculate; sides perpendicular. Orbit with a short preocular and postocular spine and an inferior tubercle on margin of antennal joint. Rostral horns about half as long as rest of carapace,

<sup>1</sup>Type, U. S. Nat. Mus. Cat. No. 9492, off Habana, 163 fms., station 2323, *Albatross*. <sup>2</sup>Proc. U. S. Nat. Mus., XV, 251, 1892.

slender, tapering, granulate, slightly convex to each other, leaving a narrow interspace at base and toward extremity. Basal antennal joint with two short distal spines—one at insertion of second joint, the other terminating a longitudinal ridge and just visible beside rostrum in a dorsal view. Chelipeds tuberculous; palm slightly compressed, three times as long as wide; fingers slightly gaping in male, the dactylus with a broad basal tooth. Ambulatory legs pubescent.

Dimensions of male: Entire length, 22 mm.; length of rostral horns, 7.5 mm.; branchial width, including spines, 10 mm.; without spines, 8.5 mm.; width between tips of preocular spines, 6 mm.

Specimens were taken by the *Fish Hawk* as follows: Off St. Thomas, 20 to 23 fathoms, stations 6079, 6080; off Culebra, 15 to 15½ fathoms, stations 6087, 6093; off Vieques, 15 to 16 fathoms, stations 6091, 6092; off Humacao, 12½ fathoms, station 6098. Previously collected at Florida Keys, 2 to 9 fathoms (Stimpson); between Jamaica and Haiti, 23 fathoms; St. Thomas; off Cape St. Roque, Brazil, 20 fathoms.

#### Genus **PICROCEROIDES** Miers.

*Picroceroides* Miers, Challenger Rept., Zool., XVII, 77, 1886.

Carapace narrow and rounded behind, constricted behind the orbits, which are tubular and project laterally. The width at the orbits equals or exceeds the greatest width at branchial regions. The orbits have a long preocular and a short postocular spine and are emarginate above and below. Rostral horns long, slender, and widely separated at base. Abdomen seven-jointed and transversely ridged in both sexes; in the male the ridges correspond to similar elevations on the sternum, which are rounded and separated by deep depressions. Epistome transverse. Antennular fossettes small, deep, and well defined. Basal joint of antenna considerably enlarged and armed with an oblique keel immediately behind the next joint; following joints slender. Outer maxillipeds small; merus joint distally truncate, antero-external angle obtuse, antero-internal angle emarginate.

Chelipeds moderately elongate, rather slender; palms slightly compressed and more than twice as long as broad; fingers with an intermarginal hiatus at base. Ambulatory legs very slender and of moderate length, joints subcylindrical, unarmed; dactyli slightly arcuate.

#### **Picroceroides tubularis** Miers.

*Picroceroides tubularis* Miers, Challenger Rept., Zool., XVII, 77, pl. x, f. 1, 1886.

Carapace moderately convex, much longer than broad, but little dilated at branchial regions. Frontal space concave; gastric region somewhat elevated and obscurely tuberculated; the cardiac region bears a rounded prominence and the intestinal region a slender spine; the cervical and branchio-cardiac sutures are continuous and form a longitudinal sinus, separating the branchial from gastric and cardiac regions. The tubular orbits project laterally to a remarkable degree, and each bears a very long preocular and a small postocular spine, and has two notches in the inferior and one in superior margin. Rostral spines in adult male four-fifths the length of remainder of carapace; very slender, slightly curved, and remote from each other at base. The basal antennal joint has, besides the antero-internal crest, two small teeth on margin of orbit and a third on distal margin.

Chelipeds unevenly granulated; the outer surface of palm has a slight longitudinal depression near upper surface; the dactylus has a strong tubercle near its base. Carapace and ambulatory legs rather thinly pubescent; the margins of rostrum and of the free peduncular joints of antennæ have some longer hairs, some of which are clavate.

Dimensions of male: Length of rostrum, exclusive of horns, 22.5 mm.; breadth at branchial regions, 15.4 mm.; breadth between tips of postocular spines, 17 mm.

Off Habana, 33 fathoms; between Jamaica and Haiti, 23 fathoms; Fernando Noronha and Bahia, shallow water (Miers). Off St. Thomas, 20 to 23 fathoms, station 6079 (*Fish Hawk*).

#### Genus **PITHO** Bell.

*Pitho* Bell, Proc. Zool. Soc. London, III, 172, 1835.

*Othonia* Bell, Trans. Zool. Soc. London, II, 55, 1836.

*Pyloronus* Gistel, Natur. Thierreichs, p. x, 1848. (Substituted for *Pitho* Bell, said to be preoccupied by *Pytho* Fabricius.)

*Engycomaria* Gistel, loc. cit. (Substituted for *Othonia*, preoccupied.)

*Microrynchus* Desbonne in Desbonne & Schramm, Crust. Guadeloupe, 20, 1867.

Carapace truncate in front; frontal region wide; rostrum very short, formed of two small teeth. Orbits small, tubular, and deep; eyes slender. Outer antennæ short; basal article lamellose, forming floor of orbit; second article flat, short, and broad, especially in terminal portion; third article flat,

but smaller; flagellum very small. Carapace oblong-oval, antero-lateral and postero-lateral borders forming together a slightly arcuate line. Merus of outer maxillipeds dilated outwardly and very slightly notched on inner side for insertion of palpus. Chelipeds with fingers spoon-shaped; hands more or less compressed. Ambulatory legs stout and rather short; dactyli sharp and spinulose below. Abdomen of male narrow and formed of seven articles. Straight, stiff hairs border the antennae and are arranged in a series of tufts on the pterygostomian regions.

*Key to the Porto Rican species of the genus Pitho.*

- A. Antero-lateral teeth obtuse (in the adult); second antennal segment with its outer lobe strongly produced laterally ..... *aculeata*  
 A'. Antero-lateral teeth acute.  
 B. Carapace covered with granules tipped with hairs; lateral teeth diminishing in size from the first to last, the second and third not united at base ..... *mirabilis*  
 B'. Carapace with no conspicuous granules. Lateral teeth not diminishing in size from the first to last, second and third more or less united at base.  
 C. Second lateral tooth much reduced. Carapace almost smooth. Chelipeds of adult male very elongate, cylindrical ..... *anisodon*  
 C'. Second lateral tooth but slightly reduced. Carapace tuberculate. Chelipeds of adult male less elongate, broad, heavy ..... *therminieri*

An "*Othonia nova species*, von Martens," is recorded by Gundlach from Aguadilla; it may be one of the above species.

***Pitho aculeata* (Gibbes).**

*Hyas aculeata* Gibbes, Proc. Amer. Assoc. Adv. Sci., III, 171, 1850.

*Othonia aculeata* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 49, 1859; Rathbun, Proc. U. S. Nat. Mus., XV, 255, pl. XXXIV, figs. 1 and 2, 1892.

*Pitho aculeata* Rathbun, Ann. Inst. Jamaica, I, 7, 1897.

Carapace a little longer than broad, almost smooth above in adult, more or less tuberculous and granulous in young. Width between outer orbital angles two-thirds of entire width. Preorbital and external orbital angles subacute. Antero-lateral margins armed with five teeth (exclusive of orbital angle) more or less triangular, obtuse in the old, acute in young, the second and third coalesced at their base, the fourth and fifth small. Frontal teeth small, flat, triangular, obtuse. Basal article of antennae wide; that portion of its anterior margin situated outside of the insertion of the second article is denticulate; a deep groove between this crest and frontal border, a second groove on the carapace parallel to first. Second article with an outer lobe much produced laterally. Chelipeds strong in the full-grown male, about 1.5 times as long as carapace; arm angular, with three depressed tubercles on upper margin; wrist with a smooth longitudinal crest; palms compressed, about 1.5 times as long as wide; fingers widely gaping for their distal two-thirds, with a tooth near base of dactyl. Chelipeds in the young male and in the female short and weak; fingers evenly dentate and in contact. The carpal joints of the ambulatory legs have a broad, deep groove on the outer surface. Appendages of first segment of abdomen in the male are brown in color for their distal half, the brown parts in contact for half their length, diverging at extremities in slight curves convex to each other, each appendage terminating in a right-angled hook, the point of which is directed toward median line of carapace.

Dimensions of male: Length, 27.5 mm.; width, 26 mm.; width across orbits, 17 mm.

Florida Keys; Bahamas; West Indies. Porto Rico: Boqueron Bay; Culebra.

***Pitho anisodon* (von Martens).**

*Othonia anisodon* von Martens, Arch. f. Natur., XXXVIII, 83, pl. IV, f. 3, 1872.

*Othonia therminieri* Rathbun, Proc. U. S. Nat. Mus., XV, 255, pl. XXXIV, figs. 3 and 4, 1892. (Not *O. therminieri* Schramm.)

*Pitho anisodon* Rathbun, Ann. Inst. Jamaica, I, 8, 1897.

Allied to *P. aculeata*. Front much narrower, width between outer orbital angles but little more than half the entire width; rostrum more advanced and less deflexed. A slighter groove runs from tip of inner upper angle of orbit to base of rostrum. Orbital angles less advanced and less conspicuous, though more acute. Second article of antenna with a shorter outer lobe, directed forward. Antero-lateral teeth sharp, the last two of good size, the second much reduced. Carapace smoother and more



pubescent. Chelipeds of full-grown male from 1.5 to nearly 2 times as long as carapace; palms longer and narrower (3 times as long as wide); arm more cylindrical, less angled and nearly smooth; wrist nearly smooth. Carpal joints of ambulatory legs longer and slenderer with a shallow groove on outer surface. Appendages of abdomen of male with the distal third of a light brown color, gradually tapering and arranged in form of a lyre, widely spreading at tips.

Dimensions of male: Length, 30.5 mm.; width, 29 mm.; width across orbits, 16.2 mm.

From Florida to United States of Colombia and Guadeloupe. Culebra.

#### *Pitho therminieri* (Schramm).

*Othonia therminieri* Schramm, Crust. Guadeloupe, 20, 1867; A. Milne Edwards, Crust. Rég. Mex., 116, pl. xxiv, f. 5, 1875. (Not *O. therminieri* Rathbun, 1892.)

*Othonia carolinensis* Rathbun, Proc. U. S. Nat. Mus., xv, 256, pl. xxxv, figs. 1 and 2, 1892.

*Pitho therminieri* Rathbun, Ann. Inst. Jamaica, 1, 8, 1897.

Carapace rough with tubercles of different sizes, as broad as long in the adult male, longer than broad in other forms, very narrow behind in males, much wider in females. Fronto-orbital width about half the entire width in adults, wider in the young. Frontal teeth slightly more advanced than orbital angles. Second and third lateral teeth subequal; fourth and fifth much reduced. Second joint of antenna similar to that of *P. anisodon*, but wider.

Chelipeds similar to those of *P. aculeata*. Appendages of abdomen of male in contact at about three-fifths the distance from distal end, then separating slightly in faint curves concave to each other, and again converging before they finally spread out at tips; distal three-fifths yellow, very slender, tapering gradually to a fine point.

Dimensions of male: Length, 25 mm.; width, 25 mm.; fronto-orbital width, 13 mm.

Mayaguez Harbor, 97 to 120 fathoms, station 6067; off Vieques, 14 fathoms, station 6085. It is extremely doubtful if the specimen labeled "Station 6067" came from the depth indicated.

The species ranges from Charleston, South Carolina, to Cape St. Roque, Brazil, in from 1 to 20 fathoms.

#### *Pitho mirabilis* (Herbst).

*Cancer mirabilis* Herbst, Natur. Krabben u. Krebse, II, 152, pl. xxxvii, f. 3, 1794.

*Othonia rotunda* Rathbun, Proc. U. S. Nat. Mus., xv, 258, pl. xxxvi, f. 1, 1892.

*Pitho mirabilis* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, iv, 258, 1898.

Carapace as broad as long, widest at fourth antero-lateral tooth, much swollen in both directions, transversely rising abruptly from bases of lateral teeth, longitudinally rising in almost an equal curve from behind the front and from posterior margin. Regions faintly indicated. Carapace covered with granules more thickly set on posterior half; long, fine hairs proceed from top of granules. Along the outer margins of the gastric lobes, bunches of granules beset with coarse hairs form a broad line which is continued to rostrum. Rostral teeth sharp, produced beyond orbital angles. Preorbital tooth obtuse, less produced than postorbital, which is subacute. Antero-lateral teeth usually five, acute, separated to their bases, the first the largest, the others as a rule decreasing in size to the last, the tips making a single curve. Anterior margins of teeth thickened. Antero-lateral margin marked by inconspicuous granules irregularly placed, giving the teeth the appearance of being themselves minutely dentate. Basal article of the antenna with a sharp, longitudinal groove through the middle; tooth at distal extremity slightly more produced than upper inner angle of orbit and visible in a dorsal view; outer lobe of second article directed forward; third article as broad as long. Abdomen and sternum minutely pubescent; abdominal appendages in male diverging slightly at distal ends, hooked at tips.

Chelipeds in both sexes slender, longer than ambulatory legs, finely punctate, upper margin with thinly scattered hairs; arm angular, a few small tubercles on the upper margin; hand slightly tapering distally; fingers in male gaping for the proximal third, a tooth on dactyl; in the female, fingers evenly dentate and in contact for nearly their whole length, a slight gape at proximal end. Ambulatory legs very hairy above, first pair reaching to about middle of manus.

Length and width of female, 17.5 mm.; width of front, 9.8 mm.

Key West; Bahama Banks. Puerto Real, Porto Rico.

## Family PARTHENOPIDÆ Milne Edwards, 1834; White, 1847.

Basal joint of antenna very small and embedded between the front and the floor of the orbit. Chelipeds vastly longer and more massive than the other legs.

*Key to the Porto Rican genera of the family Parthenopidæ.*

- A. Carapace not laterally expanded over the ambulatory legs.  
 B. Carapace tuberculate.  
 C. Carapace convex. Pterygostomian and subhepatic regions not deeply excavated.....*Lambrus*  
 C'. Carapace depressed. Pterygostomian and subhepatic regions excavated, this excavation forming, when the echelipeds are retracted, passages to the efferent branchial apertures.....*Platylambrus*  
 B'. Carapace smooth (except for a few strong spines).  
 C. Carapace high, without a strong lateral spine.....*Solenolambrus*  
 C'. Carapace depressed, with a strong lateral spine.....*Leiolambrus*  
 A'. Carapace more or less expanded to form a vault in which the ambulatory legs are concealed.  
 B. Carapace greatly expanded both laterally and posteriorly. Pterygostomian region smooth, not ridged...*Cryptopodia*  
 B'. Carapace expanded laterally, but not posteriorly. Pterygostomian and subhepatic regions traversed by a granular ridge.....*Heterocrypta*

Genus **LAMBRUS** Leach.

*Lambrus* Leach, Trans. Linn. Soc. London, XI, pp. 308 and 310, 1815.

Carapace either broadly triangular or ovate-pentagonal with short, pointed front. Surface granular, tubercular, or spiny. Eyes inclosed in distinct orbits, with a suture above and hiatus below, the hiatus occupied by the second joint of antennal peduncle. The antennules fold obliquely. Antennæ small; their basal joint, which is extremely short and does not reach the front, is wedged in between the antennular fossa and the large lobe that constitutes floor of orbit. Buccal frame usually quadrangular, sometimes a little narrowed in front; completely closed by the external maxillipeds. Chelipeds usually of immense size and length, out of all proportion to the short, slender ambulatory legs; arm and hand usually prismatic with the borders strongly dentate; fingers much shorter than palm and abruptly curved inward and a little downward.

Genus **Lambrus agonus** Stimpson.

*Lambrus agonus* Stimpson, Bull. M. C. Z., II, 131, 1871; A. Milne Edwards, Crust. Rég. Mex., 151, 1878, pl. XXVIII, f. 3, 1879

Carapace ovate-pentagonal, about one-fifth broader than long, with rounded sides, without angles; a moderate postorbital constriction. Depressions between regions not remarkably deep. Surface coarsely punctate or eroded, with numerous granules and tubercles; the larger tubercles more or less spiniform and arranged as follows: Five on gastric region, of which four are near the middle in a transverse line, and another, larger, on median line behind them; three in a longitudinal row on cardiac region; one on each side of urocardiac lobe; five on each branchial region, the posterior one being prolonged in a spine; one on each hepatic region. The antero-lateral margin of branchial region is armed with six small teeth; below and behind the last three is a short denticulate crest; below this, a stout spine. Rostral tooth narrow and produced; a few denticles at its base on either side. Several spines on outer margin of orbit and a small spine on upper surface of eye. A conical tubercle on each side of sternum near base of chelipeds; another on coxal joint of chelipeds. The second segment of abdomen has a sharp transverse crest, forming a lobe in the center and a tooth on each side. Chelipeds very long and slender (the arm about 1.33 times the width of the carapace), their upper surface finely rugose. An irregular row of dentiform tubercles near the middle of the upper surface of arm and wrist and nearer the outer margin of hand; inner and outer margins of arm and wrist with similar tubercles. Upon the upper margin of hand a series of eighteen or twenty irregular teeth, increasing generally in size to a point near the fingers, when they diminish; on the outer margin four to six larger teeth and many intermediate smaller ones. Ambulatory legs long, for the genus (the first one reaching end of wrist), slender, bare, and almost smooth, having only some faint indications of spinules on upper margins of meral joints.

Dimensions of male: Length of carapace, 17.5 mm.; width, 20.8 mm.

Gulf of Mexico; Florida Reefs and Caribbean Sea; 25 to 84 fathoms. Mayaguez Harbor, 75 to 76 fathoms, station 6063.

Genus **PLATYLAMBRUS** Stimpson.

*Platylambrus* Stimpson, Bull. Mus. Comp. Zool., II, 129, 1871.

Closely allied to *Lambrus*, of which it may be only a subgenus. Carapace strongly carinated or tuberculated, broadly triangular (considerably broader than long), with rounded sides and a broad

but sharp-pointed projecting rostrum; no postocular constriction. Chelipeds with arm and hand straight, sharply trigonal, the edges of these joints, as also outer edge of carpus, being very sharply and stoutly serrated. In the typical species the carapace is much flattened and the pterygostomian and subhepatic regions strongly excavated quite to the infero-exterior margin of the orbit, forming, when the chelipeds are retracted, covered afferent passages, the external apertures of which are seen between the base of the finger of cheliped and margin of orbit.

**Platylambrus serratus** (Milne Edwards).

*Lambrus serratus* Milne Edwards, Hist. Nat. Crust., 1, 357, 1834.

*Platylambrus serratus* A. Milne Edwards, Crust. Rég. Mex., 156, pl. XXX, f. 1, 1878, and synonymy.

Carapace about 1.5 times as broad as long, depressed; the furrow separating the gastric from the branchial regions is deep; elevations of the carapace ornamented with numerous unequal tubercles, some of which on the branchial region are sharp. Rostrum short and narrow. Antero-lateral margins cut into seven or eight triangular teeth, and terminating posteriorly in a large flat spine, directed nearly straight outward. Postero-lateral border armed with three short erect spines, the last of which limits the posterior border. A large median tubercle on posterior border. Chelipeds long (the length of arm equaling width of carapace without spines) and flattened; lower face smooth; outer margin cut into triangular, sharp teeth, of which nine, alternately large and small, are on the hand; teeth of inner margin smaller and more numerous (15 or 16 on the hand); upper surface showing a few tubercles on the hand, but more on the arm, where there is an obliquely longitudinal row. The first ambulatory leg does not reach end of arm; these legs are slightly spinulose, but in the main, smooth.

Color, rosy gray, sometimes spotted with black; fingers carmine, teeth bordered with black (A. Milne Edwards).

Dimensions of male: Length, 18.5 mm.; width, 27.8 mm.

From North Carolina to Gulf of Mexico and West Indies, 5 to 30 fathoms. Mayaguez Harbor, 1 young male.

**Genus LEIOLAMBRUS A. Milne Edwards.**

*Leiolambrus* A. Milne Edwards, Crust. Rég. Mex., 148, 1878.

Carapace hexagonal, considerably broader than long, with a strong spine near middle of its lateral margin. Surface depressed, smooth, or nearly so, with three low longitudinal elevations, one median, the others branchial. Front subtruncate, with a minute median point. Orbits with a closed fissure above, a large V-shaped fissure below toward outside, and an inner hiatus in which is lodged the antenna. Basal joint of antenna very small. Antennules folding almost longitudinally. Buccal frame narrowing a little forward, loosely covered by external maxillipeds; these last have an anteriorly tapering ischium, a merus with a semicircular antero-external outline, antero-internal angle rectangularly notched; merus and ischium of the endognath (not the exognath) bordered with long hairs which form a ventral covering to the afferent channels of the branchiæ. Chelipeds very long, sharply trigonal, somewhat unequal; marginal teeth small and numerous. The fingers gape in the larger claw. First pair of ambulatory legs the shortest.

***Leiolambrus nitidus*, sp. nov.**

Carapace about three-fifths as long as broad, antero-lateral and postero-lateral margins subequal; the surface is coarsely punctate in elevated regions, smooth in depressions, a little granulous along summit of branchial, cardiac, and posterior part of mesogastric. Margin of front feebly tridentate, not advanced beyond antennular fossettes. Orbits wider than long and completely filled by large eyes. Antero-lateral margin obscurely toothed, the teeth having denticulate margins. Lateral spine strong, acuminate, directed either outward or somewhat backward, and slightly upward. A small tubercle on postero-lateral margin at end of branchial ridge. Extremities

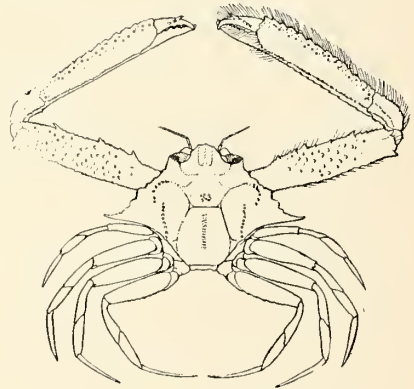


FIG. 12.—*Leiolambrus nitidus*, male,  $\times 2.5$ .



of posterior margin either angular or marked with a small tooth. Inner lobe of orbital floor produced nearly to line of front. Chelipeds narrow, lower surface smooth, upper surface with a scant marginal fringe of hair. Arm with upper surface convex and scabrous, anterior margin armed with many small denticulated teeth, of which three or four are noticeably larger and sometimes spiniform; posterior margin evenly denticulate and terminating in a spine. Outer margin of wrist denticulate, inner margin granulate, a longitudinal line of granules through middle of upper surface. Hand with denticulate inner and outer margins, with granules along outer margin of upper surface. Thumb not bent down or in, prehensile edge with three or four large teeth. Movable finger spinulous on upper surface; a spine at terminal third directed distally; prehensile edge finely toothed. Fingers of larger claw with a small gape. Last three pairs of ambulatory legs reaching beyond end of arm; first pair barely reaching dactylus of second. Legs almost smooth; lower margins of meral joints very finely denticulate. The third, fourth, and fifth abdominal segments in the male fused; all separate in the female.

Male: Length of carapace, 6.4 mm.; width, 10.3 mm.; length of cheliped, about 20 mm.

Mayaguez Harbor, 12 to 18 fathoms, station 6061; 3 males, 5 females, types (Cat. No. 23776). Mayaguez Harbor, 7 to 12 fathoms, stations 6058, 6059, and 6060; San Juan Harbor,  $4\frac{1}{2}$  to  $5\frac{1}{2}$  fathoms, station 6054.

Up to this time no representative of this genus had been taken in the Atlantic; the type species, *L. punctatissimus* (Owen), from Lower California, has a much smaller lateral spine, larger postero-lateral and posterior spines, and smaller orbits.

#### Genus SOLENOLAMBRUS Stimpson.

*Solenolambrus* Stimpson, Bull. Mus. Comp. Zool., II, 132, 1871.

Carapace pentagonal, more or less broad than long; posterior side of pentagon much the shortest, the other four sides about equal. Margin acute on all sides, forming a slight crest. The upper surface is naked, glossy, strongly convex, and bears four protuberances—one gastric, one cardiac, and two branchial. Gastric and cardiac protuberances more or less triangularly pyramidal; branchial protuberance armed with an acute ridge running obliquely to postero-lateral margin of carapace. Frontal region slightly convex, no protuberance on orbital region. Rostrum short and blunt or faintly tridentate. Orbits round, a closed fissure above. Basal joint of external antennæ about as long as next joint. Epistome concave. From the antero-external angle of the buccal area a sharp, elevated, crenulated ridge extends to outer base of cheliped, separating concave pterygostomian from subhepatic region, which is also concave and channel-like. When retracted, the extremity of hand of cheliped covers pterygostomian region, forming the afferent passage. External maxillipeds fit accurately the buccal area and closely against each other within; exognath concave, forming part of wall of afferent channel, which is defined within by a slight, elevated ridge on outer side of ischium of endognath; the merus has a prominent antero-external angle, its surface concave toward antero-interior angle; no notch for insertion of palpus, which, except at origin, is concealed behind the other joints of endognath. The chelipeds resemble those of *Lambrus*, except that the fingers are very small and the dactylus is generally at right angles with palm when retracted. Terminal joints of ambulatory legs acuminate. Third, fourth, and fifth joints of male abdomen soldered together.

#### Key to the Porto Rican species of the genus *Solenolambrus*.

- A. Postero-lateral margin of carapace unarmed between branchial ridge and posterior margin ..... *typicus*  
 A'. Postero-lateral margin with a spine between branchial ridge and posterior margin..... *deccmspinosus*

#### *Solenolambrus typicus* Stimpson.

*Solenolambrus typicus* Stimpson, Bull. Mus. Comp. Zool., II, 133, 1871; A. Milne Edwards, Crust. Rég. Mex., 159, 1878; pl. xxviii, f. 4, 1879.

Carapace one-eighth broader than long. Surface coarsely punctate. Protuberances of gastric and cardiac regions triangularly pyramidal and acute, with the ridges forming the angles crenulated; the posterior ridge in the median line of carapace, the other two diverge from each other in front. Cardiac pyramidal symmetrical, each of its triangular sides being equal; gastric protuberance not symmetrical, the posterior ridge being a short, steep slope, the two anterior ridges being long and

inclosing a gradual, somewhat convex, slope toward front. Ridge of branchial region also crenulated and bent at middle at an obtuse angle, almost a right angle. In the male each protuberance of carapace is surmounted by an acute spine, while in the female the apical angles are not thus acute. Margin of carapace more or less distinctly crenulated, especially antero-lateral margin, at the outer or posterior end of which are three small and not very well-marked teeth. Antero-lateral margin concave anteriorly, convex posteriorly. Posterior margin straight, lateral angles sharply defined and even spiniform in male. Eyes rather large, with a minute tubercle on anterior side of extremity. Basal joint of external antennæ somewhat longer than next joint. Epistome of moderate length. External maxillipeds naked; ischium tuberculated near outer margin and near extremity. Sternum with a few tubercles between bases of chelipeds. Chelipeds long, naked, except some inconspicuous setæ on crest of hand. Merus with denticulated margins and with surface above for the most part smooth and glossy, but with a few tubercles near the margins. Carpus with five denticulated crests. Hand trigonous, with ten strong teeth on inner crest, twelve to fourteen small granulated teeth on outer margin, and fifteen teeth increasing regularly in size toward extremity on lower margin; upper surface with two rows of tubercles, inner surface with two rows, and outer surface with three rows; all the tubercles ornamented with from two to five granules. Fingers very small, between a fourth and a fifth the length of palm; dactylus when flexed almost at right angle with palm. Ambulatory legs compressed, naked, polished, with a laminiiform crest above; the merus joints of posterior pair have a crest below, which has a lobe-like expansion at inner extremity. Abdomen tuberculated at sides, that of male tapering slightly.

Dimensions of male: Length, 9.2 mm.; width, 10 mm.

Mayaguez Harbor, 75 to 76 fathoms, station 6063; off Punta de Melones, 8 fathoms, station 6073. Previously collected at Little Bahama Bank; Gulf of Mexico; Florida Reefs; Cuba; in depths of 50 to 338 fathoms.

***Solenolambrus decemspinus* Rathbun.**

*Solenolambrus decemspinus* Rathbun, Proc. U. S. Nat. Mus., XVII, 84, 1894.

Closely allied to *S. typicus*. Antero-lateral margin convex; area between the two anterior gastric ridges narrower than in *S. typicus*; gastric and cardiac prominences terminating in slender spines. Eight additional dorsal spines—two on each branchial ridge, of which the posterior or marginal is the longer, one at each posterior angle, and one on postero-lateral margin midway between the last and branchial spine. Surface finely punctate. Sternum smooth between bases of chelipeds. Terminal segment of abdomen of male much longer and distally narrower than in *S. typicus*, its sides deeply concave. Merus of the outer maxillipeds narrower and more produced at antero-external angle than in *S. typicus*. Chelipeds similar to those of *S. typicus*. The second, third, and fourth pairs of ambulatory legs more or less cristate below.

Dimensions of male: Length, 6 mm.; width, 7 mm.

Off entrance to San Juan Harbor, 45 fathoms, station 6051, 1 male. Gulf of Mexico, 60 fathoms (type locality).

**Genus *CRYPTOPODIA* Milne Edwards.**

*Cryptopodia* Milne Edwards, Hist. Nat. Crust., I, 360, 1834.

Carapace very broadly triangular, with very large lateral clypeiform vaulted expansions which conceal the ambulatory legs and are prolonged posteriorly far beyond base of abdomen. A ridge extends from gastric region across branchial region to the postero-lateral margin. Rostrum nearly horizontal, spatuliform and very prominent. Pterygostomian regions smooth, not ridged. Orbits very small, nearly circular, with a suture in superior margin. Epistome well developed; antennular fossæ narrow and somewhat oblique. Eyes very small and retractile. Basal antennal joint slightly dilated, not nearly reaching internal orbital hiatus, which is filled by the second joint. Buccal cavity and external maxillipeds small. Merus of maxillipeds distally truncated, antero-external angle produced. Chelipeds allied to those of *Lambrus*. Ambulatory legs with the fourth, fifth, and six joints more or less cristate.

***Cryptopodia concava* Stimpson.**

*Cryptopodia concava* Stimpson, Bull. Mus. Comp. Zool., II, 137, 1871; A. Milne Edwards, Crust. Rég. Mex., 168, pl. XXIX, figs. 1 and 2, 1878.

Carapace a little broader than long; antero-lateral margins twice as long as postero-lateral and meeting them at an obtuse angle; postero-lateral margins converging posteriorly very slightly, posterior margin straight in female, very slightly emarginate in male. Gastro-branchial ridges granulate;

margin cut into small truncate teeth separated by closed fissures and with denticulate margins. The lateral expansions do not quite cover the feet when extended. Surface smooth and shining. Front triangular and flattened. Merus of maxillipeds triangular, its internal angle truncate. Upper surface of arm and hand of cheliped dilated toward middle; margins with a few obscure teeth, also denticulate. Crests of legs denticulate. Sternum very concave in front; a deep hollow fits terminal segment of abdomen; on each side of this hollow is a strong dentate crest prolonged to basal article of cheliped.

Dimensions of male: Length, 6.5 mm.; width, 7.7 mm.

Off St. Thomas, 20 fathoms, station 6080, 1 female (*Fish Hawk*). Gulf of Mexico, Florida Keys, and Bahama Banks, 19 to 34 fathoms.

**Genus HETEROCRYPTA Stimpson.**

*Heterocrypta* Stimpson, Ann. Lyc. Nat. Hist. N. Y., x, 102, 1871.

Differs from *Cryptopodia* in having posterior border of carapace slightly overlapping abdomen but not distinctly produced; lateral clypeiform expansions less produced, so that the legs when even moderately extended can be seen beyond them; pterygostomial and subhepatic regions traversed by a granular ridge which runs parallel to antero-lateral border from angle of buccal cavity to base of chelipeds.

*Key to the Porto Rican species of the genus Heterocrypta.*

- A. Length of carapace two-thirds or less of the width .....*granulata*  
 A'. Length of carapace nine-tenths of the width .....*lapidea*

***Heterocrypta granulata* (Gibbes).**

*Cryptopodia granulata* Gibbes, Proc. Amer. Assoc. Adv. Sci., III, 173, 1850.

*Heterocrypta granulata* Stimpson, Ann. Lyc. Nat. Hist. N. Y., x, 102, 1871.

Carapace very wide, length two-thirds the width; the branchial ridge runs almost parallel to antero-lateral margin, except on gastric region, where it is transverse; from either end of this transverse portion a longitudinal crest runs forward to upper margin of orbit. A large dome-like elevation on cardiac region, granulated at summit. General surface smooth and punctate; margins crenulate. Portion of margin between antero-lateral margin and the branchial ridge straight. The posterior margin forms with the preceding an angle scarcely perceptible except in a rear view. Rostrum broad, blunt, and deflexed, margins rounded. Lower surface is granulous. Merus of outer maxillipeds notched at inner angle. Chelipeds unequal, rather short and heavy. Upper surfaces of arm and hand dilated toward middle; margins irregularly denticulate. Fingers of larger cheliped gape, those of smaller do not. Merus of last pair of feet barely visible in a dorsal view. Third, fourth, and fifth segments of abdomen of male are fused; sixth segment has a sharp posterior, appressed spine, the tip of which lies between two tubercles on fifth segment.

Dimensions of female: Length, 14.5 mm.; width, 21 mm.

Vineyard Sound to the west coast of Florida; West Indies. Mayaguez, 1 male.

***Heterocrypta lapidea*, sp. nov.**

Carapace much narrower than in *H. granulata*, the length being nine-tenths of the width; some of the granules of branchial ridges are thrown up in tubercles, one at gastric terminus of either ridge; a well-defined angle at other end of branchial ridge; margin concave between this angle and end of antero-lateral margin. A median furrow across front and anterior gastric region. Chelipeds longer and narrower than in *H. granulata*; margins of arm subparallel; dentation of margins stronger but similar to that of *H. granulata*.

Dimensions of female: Length, 5.9 mm.; width, 6.6 mm.; length of outer margin of arm and hand, each 4 mm.

One female taken at St. Thomas by the *Albatross* during a West Indian cruise (Cat. No. 20324, type). Mayaguez, 1 young specimen.

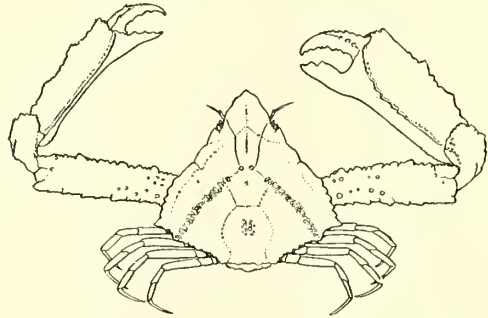


FIG. 13.—*Heterocrypta lapidea*, female,  $\times 4$ .



## Tribe OXYSTOMATA or LEUCOSOIDEA.

Carapace with antero-lateral margins arcuate or orbiculate; sometimes subglobose or more or less oblong, with subparallel margins. Epistome much reduced. Buccal frame more or less triangular, produced and narrowed forward, with margins anteriorly convergent. Six to nine pairs of branchiæ. Efferent channels opening at middle of endostome, which is produced forward. Afferent channels open either behind pterygostomial regions and in front of chelipeds, or at antero-lateral angles of palate. First antennæ folded longitudinally or obliquely. The genital organs of the male are exerted either from the bases of the fifth pair of legs or from surface of sternal plastron.

## Family CALAPPIDÆ Milne Edwards, 1837; De Haan, 1837; White, 1847.

The afferent channels to branchiæ open behind pterygostomial regions and in front of chelipeds. Antennæ small. Outer maxillipeds not completely closing the buccal cavern and with the palpus not concealed by merus joint. Verges of male exerted from bases of fifth pair of legs.

*Key to the Porto Rican genera of the family Calappidæ.*

- A. Carapace with a postero-lateral shield-like expansion or series of broad serrations, forming a vault beneath which the four ambulatory legs can be completely or largely concealed in flexion. Basal joint of antennæ much dilated.....*Calappa*  
 A'. Carapace without any trace of a postero-lateral shield-like expansion. Basal joint of antennæ slender.....*Cycloëis*

## Genus CALAPPA Fabricius

*Calappa* Fabricius, Entom. Sys., Suppl., 309, 1798.

Carapace strongly convex, rounded in front, much broadened behind by a pair of clypeiform expansions or wings, beneath which the ambulatory legs are concealed in flexion. Front small, somewhat triangular, projecting usually little or not at all beyond level of orbits, bilobed. Orbits small, circular; eye-stalks short and thick. Antennulæ nearly vertical. Basal joint of antennæ very broad and filling a wide hiatus at inner angle of orbit. Outer maxillipeds not meeting, but leaving exposed mandibles and, in front of them, lamellar processes from first pair of maxillipeds. These processes form the bases of two channels separated by a deep vertical septum extending to antennular fossæ. Chelipeds very large, and in flexion fitting closely the front half of carapace, forming a sort of buckler. The merus has externally and near its distal end a transverse wing-like expansion. Hand strongly compressed, its upper border forming a high dentate crest. Chelipeds equal except for the fingers, which on one hand have outside near the base a stout projecting lobule. Abdomen in adult with the third, fourth, and fifth segments fused.

*Key to the Porto Rican species of the genus Calappa.*

- A. Posterior margin of carapace with only broad and shallow teeth.  
 B. No deep hollow between gastric and hepatic regions.....*flammea*  
 B'. A deep hollow between gastric and hepatic regions.....*gallus*  
 A'. Posterior margin of carapace with a pair of spines near the middle.....*sulcata*

**Calappa flammea** (Herbst). Plate 2.

*Cancer flammea* Herbst, Natur. Krabben u. Krebse, II, 161, pl. XL, f. 2, 1794; III, pt. 3, p. 19, 1803.

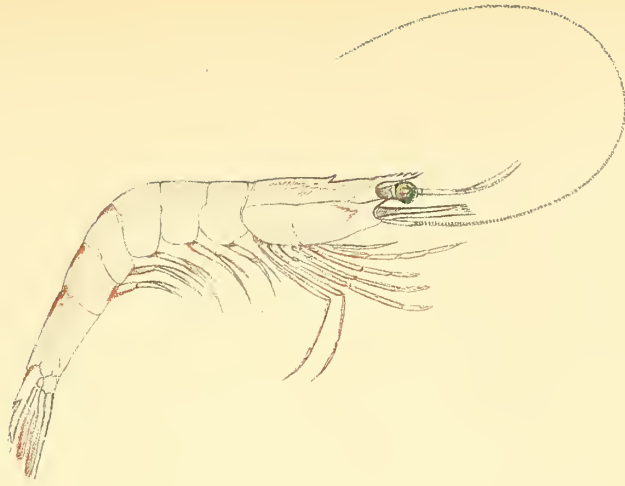
*Calappa flammea* Bose, Hist. Nat. Crust., I, 185, 1802; Miers, Challenger Rept., XVII, 284, pl. XXIII, f. 1, 1886.

*Calappa marmorata* Latreille, Hist. Nat. Crust., v, 392, 1803. (Not *C. marmorata* Fabricius.)

Extreme length of carapace about two-thirds extreme breadth. Carapace, outer surface of wing-like expansion of the arm, upper surface of wrist, and outer surface of palm covered with coarse granules, more closely placed on anterior than on posterior half of carapace, and forming several longitudinal rows of flattened tubercles. Antero-lateral border crenulate and granulate; posterior border, exclusive of the wings, subentire with beaded edge. Wings well developed, with seven strong teeth with beaded edges, three behind and three in front of postero-lateral tooth. Pterygostomial regions thickly covered with hair. Front with a large notch, projecting little beyond orbits. Endostomial septum extends forward in a strong tooth not reaching level of front. The wing-like expansion at end of arm is conspicuously four-lobed; the crest of palm is eight or nine-toothed; its outer face has several large tubercles and a laminate inferior proximal spine.

Dimensions of female: Extreme length, 80 mm.; width at sinus just in front of wings, 105 mm.; greatest width of carapace, 118 mm.

North Carolina to Sabanilla, United States of Colombia, and Venezuela; Gulf of Mexico; Bermudas; Cape of Good Hope; probably Indian Ocean. Porto Rico: San Juan Harbor; Mayaguez; Boqueron Bay; Arroyo; Fajardo; Ensenada Honda, Culebra; Mayaguez (Gundlach).



PARAPENAEUS AMERICANUS, FEMALE, NATURAL SIZE



CALAPPA FLAMMEA, MALE, NATURAL SIZE





**Calappa sulcata** Rathbun.

*Calappa sulcata* Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 289, pl. IX, figs. 3 and 4, 1898.

Extreme length of carapace about seven-eighths its extreme width. Upper surface of carapace and outer surface of cheliped finely granulate. About seven rows of tubercles on carapace. Antero-lateral border with about fourteen crenulations, granulate on edge. Posterior margin between wings with two prominent acute spines. Wings not strongly developed, having six marginal teeth—two behind and three in front of postero-lateral tooth, which is long and spiniform. Pterygostomial regions slightly hairy. Front litle projecting and with a well-defined notch. Endostomial septum with a short, sharp tooth projecting forward less than one-third distance from mouth to front. Arm expansion four-lobed. Superior crest of hand six to seven-dentate. Outer surface of palm with an irregular, oblique sulcus almost smooth, bordered by tubercles, and an acuminate inferior proximal spine.

Dimensions of female: Extreme length, 21 mm.; width at sinus just in front of wings, 23 mm.; width at posterior lateral spines, 23.8 mm.

Gulf of Mexico, 35 fathoms; off Cape Hatteras, 27 fathoms. Mayaguez Harbor, Porto Rico, 12 to 18 fathoms, station 6061, 1 female, larger than specimens previously collected.

Color in alcohol, a light pinkish brown. There are seven small and narrow rings of dark red; three on the carapace—one median encircling the third median tubercle, counting from the front; one on each branchial region, about the middle of the length of the carapace and encircling the fourth tubercle of the outermost continuous row of tubercles. There is one ring on each wrist and one on each palm near the upper margin and inclosing the tubercle toward the proximal end of the margin; this tubercle is not in the center of the ring, but near its upper periphery.

**Calappa gallus** (Herbst).

*Cancer gallus* Herbst, Natur. Krabben u. Krebse, III, pt. 3, pp. 18 and 46, pl. LVIII, f. 1, 1803.

*Cancer (Calappa) gallus* Latreille, Règne Anim., III, 24, 1817.

*Calappa galloides* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 71, 1859.

Extreme length of carapace nearly five-sixths extreme breadth. Carapace, outer surface of wing-like expansion of the arm, upper surface of wrist, and outer surface of palm are covered with coarse tubercles, which become squamiform on posterior part of carapace. A deep hollow between gastric and hepatic regions. Antero-lateral border of carapace crenulate; posterior border finely beaded and quite unarmed. The clypeiform expansions are well developed and have each about six strong teeth with beaded edges—two teeth behind and three in front of postero-lateral tooth. The pterygostomial regions have only a few scanty hairs. Front emarginate, projecting well beyond orbits and forming a laminar rostrum. Endostomial septum extends vertically from level of front to level of mouth; its anterior border angularly convex. The wing-like expansion of end of arm is conspicuously four-lobed; crest of palm six or seven-dentate.

Dimensions of female: Length, 50.5 mm.; width at sinus just in front of wings, 54.5 mm.; greatest width of carapace, 67 mm.

Islands of the Pacific and Indian Oceans; Red Sea and Persian Gulf; West Africa; Florida Keys to Bahia, Brazil. Porto Rico: Playa de Ponce, on Light-house Reef; off Humaçao, 12½ fathoms, station 6098; San Juan (G. M. Gray, coll.).

**Genus CYCLOËS** de Haan.

*Cycloë's* de Haan, Fauna Japon., 67, 68, 1837.

*Cryptosoma* Milne Edwards, Hist. Nat. Crust., II, 110, 1837; Brullé, Hist. Nat. Iles Canaries, II, pt. 2, Crust., p. 16, 1840.

Carapace heart-shaped or subcircular. Front rather narrow and often emarginate. Orbits large, oval, a distinct suture or a fissure in roof and two gaps in the floor, in one of which the slender basal-antennary joint is lodged. Eyes large, eye-stalks short and thick. Antennules folding obliquely. The external maxillipeds completely close buccal cavity; above them the endostomial efferent branchial channel is closed by lamellar processes from first pair of maxillipeds. The antero-internal angle of merus of external maxillipeds prolonged obliquely forward to form a prominent lobule above articulation of palp. Chelipeds similar to those of *Calappa*. Ambulatory legs compressed and of moderate size. Third, fourth, and fifth segments of abdomen in male fused together; in female all are perfectly distinct.

**Cycloë's bairdii** Stimpson.

*Cycloë's bairdii* Stimpson, Ann. Lyc. Nat. Hist. N. Y., VII, 237, 1860.

Carapace broader than long, regularly convex; median regions well defined. Surface densely and coarsely granulate, uneven, or tuberculate. Front with U-shaped notch. Antero-lateral margin with a

beaded edge, somewhat crenulate; a short tooth at lateral angle. Outer surface of chelipeds granulate and tuberculate; margin of arm expansion with two teeth; a crest on palm continuous with it. Upper margin of palm seven or eight-toothed; surface with two or three longitudinal crests of larger granules near the base.

Dimensions of male: Extreme length, 40 mm.; width, 43.2 mm.; width at lateral tooth, 40.5 mm.

Spanish Wells, Bahamas, 6 fathoms; west Florida, 21½ fathoms; Old Providence; Cape St. Lucas (type locality); Panama Bay, 33 fathoms. Ponce, 1 male, 1 female (*Fish Hawk*).

#### Family MATUTIDÆ McLeay, 1838.

The afferent channels to the branchiæ open behind the pterygostomian regions and in front of the chelipeds. Antennæ small. Outer maxillipeds completely closing the buccal cavern and with the palpus concealed beneath the triangular, acute merus joint. The verges of the male are exerted from the bases of the fifth pair of legs.

##### Genus HEPATUS Latreille.

*Hepatus* Latreille, Hist. Nat. Crust., III, 22, 1802.

Carapace broad, convex, regularly arcuate in front, strongly narrowing behind; hepatic regions very large, branchial regions very small. Front narrow, straight, rather prominent, and situated much above the level of the lateral border of carapace, which is prolonged beneath the orbits to join the margin of buccal cavity. Orbits small, circular, on a level with front. Antennulæ very oblique. Antennæ at inner angle of orbit. Buccal cavity very narrow forward and triangular, extending as far as level of lower border of orbits and entirely covered by outer maxillipeds, of which the merus is triangular and has straight inner margin, under which are concealed the following segments. Chelipeds strong, and when flexed fit closely against lower surface of body. Hands with a superior crest, fingers inclined a little downward and inward. Ambulatory legs smooth, unarmed. Abdomen with seven separate segments.

##### *Hepatus princeps* (Herbst).

*Cancer princeps* Herbst, Natur. Krabben u. Krebse, II, 154, pl. XXXVIII, f. 2, 1794.

*Calappa augustata* Fabricius, Entom. Syst., Suppl., 347, 1798.

*Hepatus fasciatus* Latreille, Hist. Nat. Crust., v, 388, 1803.

Anterior margin of front thick, obtuse. The line which descends obliquely from the external orbital angle to anterior border of carapace is faintly marked. Antero-lateral margins divided into 12 or 13 teeth more or less rectangular, and denticulate on their margins. Outer face of hands with several rows of tubercles. Dactyli with a coating of fur, excepting for a narrow, smooth line on either side. Carapace covered with small, dark-colored spots, often arranged in transversely arcuate lines.

Dimensions of male: Length, 58.5 mm.; width, 85.5 mm.; width between outer orbital angles, 18 mm.; width of front, 14 mm.

Taken at San Juan Harbor in fish trap and at Puerto Real on coral reef. Mayaguez (Gundlach.) Ranges from Georgia to Brazil; Guinea; Cape of Good Hope (Herklots); East Indies (Herbst).

#### Family LEUCOSIIDÆ Leach, 1819.

The afferent channels to branchiæ open at anterior-lateral angles of endostome. Antennæ small. The third maxillipeds completely close the buccal cavern and have the three terminal joints wholly concealed by the triangular fourth joint. The verges of the male are exerted from the sternal plastron.

##### Key to the Porto Rican genera of the family Leucosiidæ.

- A. Carapace ovoid or globular, and smooth or granular, never nodular or eroded.....*Persephona*  
 A'. Carapace polygonal, uneven, nodular or eroded.  
 B. Antennular fossæ in open communication with orbits. Carapace not produced laterally over bases of ambulatory legs.....*Ebalia*  
 B'. Antennular fossæ separated from orbits. Carapace produced laterally over bases of ambulatory legs.  
 C. Posterior portion of the carapace either without deep cavities, or if with cavities they are bridged over by a narrow strip extending from cardiac to branchial region.....*Lithadia*  
 C'. Posterior portion of the carapace with two deep, smooth cavities extending into the interior of carapace and not spanned by a narrow bridge.....*Spelocophorus*

##### Genus PERSEPHONA Leach.

*Persephona* Leach, Zool. Misc., III, pp. 18 and 22, 1817.

Carapace ovoid or globular, terminating posteriorly in three spines—two on, and one in the middle line immediately above, posterior border. Surface of carapace smooth or granular, never nodular or

eroded, the regions not all demarcated. The front is well delimited from the carapace, and although the dentiform prolongations of the septa of the branchial channels may sometimes project beyond it, yet the whole of edge of buccal cavern is never in the adult seen beyond it in a dorsal view. Hepatic region, the side wall of which commonly forms a distinct facet, generally separated from branchial region by a broad notch in antero-lateral margin. The orbits are deep, and although the upper edge is a little emarginate, the retracted eye is completely concealed; the three sutures in the roof and outer wall are very distinct; the floor coincides with roof of buccal cavern. Antennae loosely lodged in gap at the inner canthus of orbit. The antennules fold obliquely. Buccal cavern elongate; the acutely triangular merus of external maxillipeds is not much more than half the length of ischium measured along inner edge; the second segment of the exognath has the outer margin more or less curved. Chelipeds rather massive. Abdomen of the male consists of four or five pieces, that of female of five.

***Persephona punctata* (Linnæus).**

*Cancer punctatus* Linnæus, Sys. Nat., ed. 10, I, 630, 1758 (part).

*Persephona punctata* Stimpson, Ann. Lye. Nat. Hist. N. Y., VII, 70, 1859.

Carapace globular, with three sharp, recurved spines, one at either end of posterior margin and one median just above posterior margin. On the outer surface of carapace are numerous, but not crowded, granules of unequal size, most of which are visible to the naked eye. Regions of carapace ill defined. Front broadly bidentate, and the spiniform angles of the branchial channels can be seen beyond it in a dorsal view. Behind tip of front the antero-lateral boundary of carapace is formed by the side wall of the subhepatic region, which is continuous with upper surface of carapace and bounded below by a line of granules, on which, near posterior end, is a tubercle; this tubercle is smaller in the adult than in the young, where it is dentiform. Between hepatic and branchial regions is a very shallow and ill-defined notch or sinus in margin. Branchial margin marked by a line of bead granules extending as far as the posterior margin, which is on a lower level and also granulate. Maxillipeds granulate. Chelipeds rather stout, about 1.5 times the length of carapace in the adult male. Arm cylindrical and tuberculate and granulate, more coarsely above than below, and proximally than distally. Wrist and hand much smoother, very finely granulate above and below, coarsely granulate along margins. Palm nearly twice as long as wide, flattened, and a little dilated. The fingers (at least the dactylus) are as long as the palm, and curved; their edges are finely denticulate and meet for the greater part of their length. Legs stoutish; propodus of first pair reaches to end of wrist of cheliped; dactyli lanceolate and fringed with stiffish hairs. The third, fourth, and fifth segments of the male abdomen are fused.

Dimensions of male: Entire length of carapace, 36.7 mm.; width, 32.2 mm.

Mayaguez, 1 young specimen. San Juan (Gundlach). Ranges from North Carolina to Sabanilla, United States of Colombia; Gulf of Mexico.

**Genus *EBALIA* Leach.**

*Ebalia* Leach, Mal. Podoph. Brit., text of pl. xxx, 1817.

Carapace rhomboid or pentagonal or hexagonal, usually, but not always, a little broader than long; its regions usually well defined and tumid, tumid portions nodular or granular; its posterior margin is generally a little prominent and either bilobed or with its extreme ends dentiform. In the orbital wall there are, as usual, three sutures, and a gap at inner canthus; edge of roof of orbit considerably emarginate. The antennules fold obliquely or nearly transversely. Antennae minute but distinct. Buccal cavern moderately elongate; the exopodite of external maxillipeds not dilated, its outer edge a little curved; triangular merus of external maxillipeds about three-fourths length of ischium measured along inner border. Chelipeds variable, usually massive; in the typical forms short, not much more than half again as long as carapace, and stout, with short, broad hands not differing much in length from the stout, compressed fingers. The abdomen of the male consists of three or four pieces.

***Ebalia stimpsonii* A. Milne Edwards.**

*Ebalia stimpsonii* A. Milne Edwards, Bull. Mus. Comp. Zool., VIII, 22, 1880.

Carapace hexagonal, a trifle longer than broad; surface more even than usual in this genus; hepatic region depressed, cardiac region swollen, and surrounded by a depression; a postero-lateral lobe in transverse line with cardiac region; posterior border nearly straight, terminating in lobiform angles; surface covered with large, flat, crowded granules, larger on posterior half. Front concave, emarginate.



Chelipeds covered with granules like those on carapace; ambulatory legs slender, covered with smaller granules. Inferior surface of body also granulous.

Dimensions of female: Length, 6.5 mm.; width, 6 mm.

Mayaguez Harbor, 22 to 33 fathoms, station 6064; and 4 to 6 fathoms, station 6065 (*Fish Hawk*). Bahama Banks; west Florida, 29 fathoms; Barbados, 7 to 50 fathoms.

**Genus LITHADIA Bell.**

*Lithadia* Bell, Trans. Linn. Soc. London, XXI, 305, 1855.

Carapace subrhomboidal, with cardiac region produced posteriorly, lateral margins produced over bases of legs; surface very uneven, branchial and cardiac lobes elevated, hepatic region much depressed; the subhepatic region forms a distinct and oblique facet; surface rough with granules or tubercles. Front produced, narrow, upturned, orbits small; a considerable space between edge of lower wall of orbit and free edge of buccal cavern. The merus of external maxillipeds is much more than half the length of ischium measured along inner edge. Outer margin of second segment of exognath nearly straight. Chelipeds rather short and heavy. Abdomen of both sexes with five segments.

***Lithadia pontifera* Stimpson.**

*Lithadia pontifera* Stimpson, Ann. Lyc. Nat. Hist. N. Y., X, 115, 1871.

*Spelæophorus triangulus* A. Milne Edwards, Bull. Mus. Comp. Zool., VIII, 23, 1880.

Carapace one-sixth broader than long in male, one-fifth broader than long in female, widest at anterior lateral angles. Branchial protuberance divided into two—one part connected by a ridge with anterior lateral tooth, the other by a thicker ridge with posterior lateral tooth. A median tuberculated ridge extending from frontal region to cardiac, interrupted at center of carapace. Between cardiac and branchial region on either side is a deep, narrow cavity, bridged over by the meeting of a projection from posterior branchial protuberance. The hepatic region is not very protuberant above and bears a short longitudinal ridge. Entire upper surface granulated. Protuberances of carapace smaller than usual, but prominent, and covered with tubercles or granules much larger than those on the depressed parts. Anterior lateral tooth (that on branchial region forming antero-lateral angle of body) is very large and prominent, and there is a smaller triangular tooth in front of it, pointing downward. Between this latter and the triangular hepatic tooth is a deep sinus. Subhepatic tooth very prominent and tuberculated. Posterior lateral tooth obtusely rounded. Posterior margin thinner than anterior and lateral margins on account of the deep excavation around cardiac region; intestinal region bilobed, but the lobes do not form dentiform projections, the posterior outline being nearly straight when viewed from above, though interrupted at middle. The front has a deep sinus at middle and is somewhat bmarginate. Epistome very short. External maxillipeds granulated. Chelipeds flattened; arm with an outer dentate crest; hand cristate outside and with a short and prominent line of tubercles on inner side near wrist. Ambulatory legs granulate and tuberculate, tubercles acorn-shaped. Sternum of male granulate, abdomen sparsely so and bearing an appressed backward-pointing spine at proximal end of penultimate segment. Abdomen of female densely tuberculate.

Dimensions of male: Length, 6.5 mm.; width, 7.5 mm. Female: Length, 11 mm.; width, 13.1 mm.

Off Culebra, 15½ fathoms, station 6087, 1 male. Barbados (type locality); Key Largo, Florida, among corallines, low tide; off Cape Fear, North Carolina, 15 fathoms; Charlotte Harbor, Florida, 11 fathoms, and Sand Key, Florida, 125 fathoms (A. Milne Edwards).

This species, as well as *Spelæophorus elevatus*, can hardly be separated from *Lithadia*. *S. elevatus* approaches the nearest to *Spelæophorus nodosus*, the type of *Spelæophorus*, which is perhaps not a valid genus.

**Genus SPELÆOPHORUS A. Milne Edwards.**

*Spelæophorus* A. Milne Edwards, Ann. Soc. Entom. France (4) V, 148, 1865.

Carapace wide, triangular, or pentagonal, moderately convex, with the lateral borders prolonged above the bases of the legs. Posterior margin wide and having two deep and smooth cavities, one on each side, which open on the outside by two large oval orifices and are excavated far into the carapace; a suture line above and between the two openings perhaps represents the true posterior margin. Exognath of outer maxillipeds obtuse and shorter than the endognath. Chelipeds short and stout. Abdomen with five segments.

**Spelœophorus nodosus** (Bell).

*Orcophorus nodosus* Bell, Trans. Linn. Soc. London, XXI, 307, pl. XXXIII, fig. 8, 1855.

*Spelœophorus nodosus* A. Milne Edwards, Ann. Soc. Entom. France (4) V, 149, 1865.

*Spelœophorus nodosus* Stimpson, Ann. Lyc. Nat. Hist. N. Y., x, 119, 1871.

Carapace about one-fifth broader than long, pentagonal, postero-lateral angles rounded; surface covered with crowded granules and nodose; an elevated protuberance on hepatic region, a transverse line of nodules across middle of carapace and one above each posterior cavity; a median ridge on gastric region. Hepatic region is thick, its margin rounded; subhepatic region with a prominent bunch of granules; subbranchial region with two similar bunches of granules; branchial margin with a thick anterior lobe and a sharp-edged postero-lateral lobe. Upper wall of posterior cavities thick, lower edge of this wall set in considerably from upper or external edge. Lower posterior margin of carapace bilobed, the lobes more distinctly marked in male than in female. Front thick, bilobed, somewhat bimarginate. Orbit with three closed fissures; a broad space between orbit and buccal cavity. Entire lower surface of carapace, as well as surface of chelipeds and legs, densely granulous. Merus of outer maxilliped more than half the length of ischium; exognath of nearly the same width throughout its length; its outer margin is nearly straight. Arm of chelipeds cylindrical, bilobed on outer margin, proximal lobe narrow and tuberculiform, distal broad. Hands are dilated, outer margin cristate, entire; fingers thin, flat, grooved, fitting closely together. Ambulatory legs cristate, crests dentate or narrowly lobed. The abdomen of the male has on the penult segment a backward-pointing spine at its proximal end. Dimensions of male: Entire length, 12.7 mm.; width, 14.6 mm.

Mayaguez Harbor, 4 to 6 fathoms, one female, station 6065. Type locality unknown; Jamaica (Stimpson, Rathbun); St. Thomas (Copenhagen Mus.); Guadeloupe (Geneva Mus.).

## Family DORIPPIDÆ Milne Edwards, 1837; White, 1847.

Carapace short, so that the first two or three abdominal terga are completely exposed in the dorsal plane of body. The last two pairs of legs are short and feeble, and raised on the dorsal surface of carapace. Antennæ large. The verges of the male are exerted from the sternal plastron. The afferent channels to the branchiæ are found either in front of the bases of the chelipeds or not.

*Key to the Porto Rican genera of the family Dorippidæ.*

- A. The external maxillipeds leave all the anterior part of buccal cavern uncovered..... *Ethusa*  
 A'. The external maxillipeds do not leave any appreciable portion of buccal cavern uncovered..... *Clythrocerus*

Genus **ETHUSA** Roux.

*Ethusa* Roux, Crust. Médit., p. (81), 1828.

Carapace very flat, truncate-oblong and broadest behind, covering little more than first two thoracic sterna, hepatic region small. The front consists of two laminar teeth, each of which is bifid. There is a long, flat tooth or spine at antero-external angle of carapace. The antennules fold obliquely; they are large and project beyond their fosse. The antennæ have a long flagellum; their basal joint is inserted between eye-stalk and basal antennular joint, but on a slightly lower level. The buccal cavern is elongate-triangular and does not extend to the front; the external maxillipeds cover only its basal three-fourths, but the distal part is closed in by stout foliaceous processes of first maxillipeds. The palp of external maxillipeds arises from the summit of the merus and is completely exposed in flexion. The afferent branchial orifices are wide openings immediately in front of bases of chelipeds. Chelipeds in adult male often unequal. First and second pairs of ambulatory legs long and rather stout. The last two pairs short and rather slight; they arise much higher than the other legs, and have a small hook-like dactylus folding backward. The abdomen of male usually consists of five pieces, the third to fifth segments being fused; that of female consists of seven separate segments; the first three segments are visible in a dorsal view.

***Ethusa mascarone americana*** A. Milne Edwards.

*Ethusa americana* A. Milne Edwards, Bull. Mus. Comp. Zool., VIII, 30, 1880.

*Ethusa mascarone americana* Rathbun, Proc. Biol. Soc. Washington, XI, 109, 1897.

Carapace somewhat lyre-shaped; length about one-fifth greater than width in male, one-seventh greater in female; surface smooth and finely pubescent. Regions are well marked; branchial regions moderately swollen; they and the cardiac region are equally high. Spine at antero-external angle of

carapace (also at external orbital angle) broad at base, but slender and acute, projecting obliquely forward not so far as median sinus. The divisions of the frontal teeth are sharp spines well separated and equally advanced. Eye-stalks long, rather slender, extending laterally by the full length of cornea beyond antero-external spines. Chelipeds very unequal in adult male of *E. mascaroni*, probably the same in subspecies. In males which I have examined (all small) the chelipeds are feeble and equal, not so stout as next two pairs of legs. The first pair of walking legs reach to about middle of dactylus of second pair; second pair in male 2.5 times the length of carapace, in the female not so long.

Dimensions of male: Entire length of carapace, 7 mm.; width, 5.8 mm.; female, entire length of carapace, 10.7 mm.; width, 9.4 mm.

Off St. Thomas, 20 to 23 fathoms, station 6079; off Culebra, 14 $\frac{3}{4}$  fathoms, station 6086. Distributed from North Carolina to Florida Keys and Gulf of Mexico, 13 to 37 fathoms; St. Thomas; off Cape St. Lucas, 31 fathoms.

#### Genus *CLYTHROCERUS* A. Milne Edwards & Bouvier.

*Clythrocerus* A. Milne Edwards & Bouvier, Bull. Mus. Hist. Nat. Paris, v, 387, 1899.

Carapace subcircular, broadest at middle, thick, dorsally slightly convex or flat, ventrally very much swollen, posteriorly exposing the first three abdominal segments. Front short and deflexed. Eye-stalks short and rather stout, orbits well defined, with an outer tooth or spine. Antennule folding obliquely and completely retractile in a deep cavity between the front and the inner lower angle of orbit. The antennae are short and partly cover the antennular cavities; their basal joint is enlarged and valviform. The buccal cavern reaches the front and is completely closed below by the outer maxillipeds, the ends of which are sometimes visible in a dorsal view. The palpus of the endognath arises from inner surface of, and is completely hidden behind, the merus. The afferent openings to the branchiae are situated at antero-lateral angles of buccal cavity and at base of antennae. Chelipeds stout. First and second pairs of legs slender, similar, and elongate; the last two pairs short, subdorsal, much more feeble and subprehensile, the dactylus folding back against propodus. In the abdomen of male the fifth to seventh segments are fused, in the female the sixth to seventh are fused.

A. Milne Edwards & Bouvier (*loc. cit.*) separate from *Cyclodorippe* the species *C. nitida* A. Milne Edwards, 1880, as the type of a distinct genus, *Clythrocerus*, on account of the small antennules completely retractile in the orbito-antennal cavity, and the valviform peduncle of the short antennae, which partly covers the antennular cavity.

The species described below, as well as my *Cyclodorippe plana* and *C. granulata*, should probably be included in *Clythrocerus*, although the basal joint is not enlarged to the same extent as in *C. nitidus*.

#### *Clythrocerus perpusillus*, sp. nov.

Carapace a little broader than long; finely and closely granulous; regions slightly marked; surface flat, the front in the same plane; two triangular, blunt frontal teeth, separated by a sinus equal to the reverse of either of the teeth; the emargination of the orbit is a quadrilateral obliquely placed; preorbital angle flat, inconspicuous; postorbital angle a little thickened, dentiform; the eye projects beyond line of orbit. A small, sharp spine, just before middle of lateral margin; half-way between this spine and the orbital angle is a slight indentation. The outer maxillipeds are long, the merus joints projecting between the rostral teeth and visible in a dorsal view. Only one cheliped on the unique specimen (the right one); it is short, about 1.5 times the length of the carapace (when flexed, not visible from above), and stout; the wrist has a prominent antero-external lobe; the hand and movable finger have an inner superior crest; fingers bent strongly inward; thumb stouter than the movable finger; they meet along their closing edges. Second pair of legs exceed the first pair by about the length of dactylus; both pairs slender and flat. In the last two pairs the dactylus is strongly curved and about as long as the curved propodus, against the base of which it fits.

This is a tiny species, the ovigerous female measuring only 2.2 mm. long and 2.5 mm. wide.

Type locality, off Vieques, 15 fathoms, station 6091; 1 female (Cat. No. 23777).

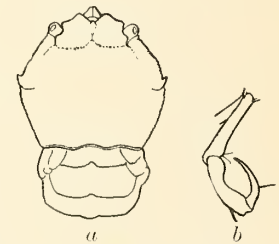


FIG. 14.—*Clythrocerus perpusillus*, female. (a) Outline of carapace,  $\times 10.66$ . (b) Last two joints of fourth leg,  $\times 15$ .



## Suborder MACRURA. The Shrimps and Lobsters.

*Key to the Porto Rican families of the suborder Macrura.*

- A. Body not compressed. Rostrum depressed, often wanting. First abdominal segment shorter and narrower than the following. Abdominal appendages not oar-shaped. The articulation between carpus and propodus at two fixed points.
- B. Third pair of feet not chelate.
- C. Pleon with segments not overlapping.....Tribe *Thalassinidea*  
 D. First pair of trunk-legs unequal.....Family CALLIANASSIDÆ  
 D'. First pair of trunk-legs subequal.....Family AXIDÆ  
 C'. Pleon with segments overlapping.....Tribe *Loricata*  
 D. Carapace flattened; external antennæ flat, short, squamiform.....Family SCYLLARIDÆ  
 D'. Carapace subcylindrical; external antennæ very long and rigid.....Family PALINURIDÆ
- B'. Third pair of feet chelate.....Tribe *Homaridea*; Family HOMARIDÆ
- A'. Body more or less compressed. Rostrum usually compressed. Abdominal appendages oar-shaped. Articulation between the carpus and propodus at only one fixed point.
- B. The epimera of first abdominal segment not covered by those of second. Third pair of feet chelate, usually.
- C. Three pairs of chelæ nearly equal and not very strong.....Tribe *Penæidea*; Family PENÆIDÆ  
 C'. Third pair of chelæ considerably stronger than the first and second pairs.....Tribe *Stenopidea*; Family STENOPIDÆ
- B'. The epimera of first abdominal segment covered by those of the strongly developed second segment.  
 Third pair of feet not chelate.....Tribe *Caridea*
- C. Carpus of second pair of feet subdivided into few or many segments.
- D. Eye-stalks short and usually more or less covered by carapace.....Family ALPHEIDÆ  
 D'. Eye-stalks not covered by carapace.  
 E. First pair of feet more or less chelate.  
 F. Rostrum small. First pair of feet moderately strong.....Family LYSMATIDÆ  
 F'. Rostrum of important size. First pair of feet small.....Family HIPPOLYTIDÆ  
 E'. First pair of feet simple.....Family PANDALIDÆ
- C'. Carpus of second pair of feet not subdivided.
- D. Rostrum long, usually dentate.....Family PALEMONIDÆ  
 D'. Rostrum small or wanting.  
 E. First two pairs of feet subequal and similar.  
 F. Fingers of first and second pairs of feet spoon-shaped. Mandibles without palp.....Family ATYIDÆ  
 F'. Fingers of first and second pairs of feet not spoon-shaped. Mandibles with palp.....Family PASIPHÆIDÆ  
 E'. Second pair of feet much stronger than the first.  
 F. Third maxillipeds pediform.....Family PONTONIDÆ  
 F'. Third maxillipeds with the third segment strikingly broad.....Family GNATHOPHYLLIDÆ

## Tribe THALASSINIDEA.

Carapace short, compressed, and marked with two longitudinal sutures. Rostrum small or wanting. Both pairs of antennæ elongated and furnished with long peduncles, those of the outer pair five-jointed and usually without a scale. First pair of feet more or less chelate; second pair often chelate; third pair always simple. Last segment of the thorax movable. Abdomen long, the segments not overlapping, the side plates feebly developed. Swimming-fan well developed. Branchiæ variable.

## Family CALLIANASSIDÆ Dana, 1852.

Rostrum minute or absent. Eyes small; eye-stalks flattened, sometimes laminate; corneæ not terminal. First pair of trunk-legs unequal, perfectly or imperfectly chelate, the third and fourth pairs simple, the others variable. In the large cheliped, the carpus is formed as if it were a continuation of the propodus; carpus and propodus much wider than merus. Uropods and telson usually broad. Branchiæ filamentous, with the filaments sometimes compressed.

*Key to the Porto Rican genera of the family Callianassidæ.*

- A. Second pair of pleopods differing from following three pairs; pleopods fringed with fine hairs.  
 B. Merus and ischium of maxillipeds dilated, wider than the following joints.....*Callianassa*  
 B'. Merus and ischium of maxillipeds not wider than the propodus, which is dilated.....*Glypturus*
- A'. Second pair of pleopods like the following three pairs, all of these are fringed with articulated membranous filaments.....*Callianidea*

Genus *CALLIANASSA* Leach.

*Callianassa* Leach, Edin. Encyc., VII, 400, 1814.

Integument soft, except of the chelipeds. Eyes triangular or oblong; corneae small. Flagella of antennulae exceeding but little their peduncles. Outer maxillipeds operculiform, with the ischium and merus exceeding in width the carpus and propodus. Second pair of trunk feet chelate; fifth pair with rudimentary chela. Second pair of pleopods slender and filamentous; following three pairs broad and foliaceous. Pleopods fringed with small hairs.

Key to the Porto Rican species of the genus *Callianassa*.

- A. Pollex of large cheliped without a sharp crest on outer surface ..... *marginata*  
 A'. Pollex with a sharp crest on outer surface ..... *minima*

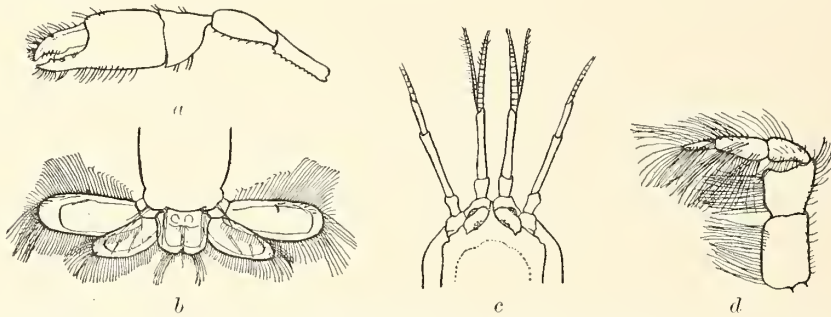


FIG. 15.—*Callianassa marginata*. (a) Large cheliped of a female,  $\times 5.33$ . (b) Tail fan,  $\times 5.33$ . (c) Anterior portion,  $\times 5.33$ . (d) Maxilliped,  $\times 12.8$ .

*Callianassa marginata*, sp. nov.

Carapace a little less than a third of length of body, measured from tip of rostrum to end of telson. Rostrum a conical acuminate spine extending beyond eyes. A short angular projection of the frontal margin just above antennae. The carpal and propodal joints of the outer maxilliped do not exceed half the width of ischium and merus joints. The propodal joint in its proximal portion equals greatest width of carpal joint, but becomes narrower distally. Ischium of large cheliped armed below with irregular slender spines, which become larger toward distal end. Merus narrow, suboval, unarmed. Carpus subtriangular, with very thin, sharp margins, forming very sharp distal angles. Manus with same acute margins. Palm longer than fingers. Fingers with a few shallow teeth on their prehensile edges. The seventh abdominal segment has a median longitudinal groove and is bilobed at extremity, with a small point in the sinus between the lobes. Caudal laminae narrow-oblong, the inner about three-fifths the length of outer. Outer branch of outer plate nearly as long as inner branch and intimately fused with it.

Length of male from tip of rostrum to tip of telson, 18.8 mm.; length of carapace, 5.7 mm.; length of hand of a smaller specimen, female, 3.6 mm.; length of palm, 2 mm.; length of carpus, 1.3 mm.

Types, Mayaguez Harbor, 161 to 172 fathoms, sand and mud, station 6066, 4 specimens, all imperfect (Cat. No. 23778). The largest lacks the chelipeds. Also taken at Mayaguez Harbor, 75 to 76 fathoms, station 6063, and in 22 to 33 fathoms, station 6064; off Aguadilla, 137 fathoms, station 6055.

This species in its unarmed, margined chela resembles *C. longiventris* A. Milne Edwards, from Martinique, but is distinguished by its non-terminal cornea, bilobed tail, small size, etc.

*Callianassa minima*, sp. nov.

Carapace about one-third the length of body. Rostrum a slender spine, a little longer than eye-stalks, and inclined downward. Cornea near end of eye-stalk. Ischial and meral joints of outer maxillipeds rather narrow for the genus, propodal joint not dilated, terminal joint oval-lanceolate. Large

cheliped rather short. Ischium less than twice as long as broad and with two or three faint spinules on its lower margin. Merus oblong-oval, unarmed. Carpus subtriangular with thin upper and lower margins, the distal margin closely articulated with manus. Manus also with thin margins; palm longer than fingers, and longer than broad. Pollex with a sharp crest on outer surface, one-third the distance from prehensile edge and extending a little ways upon palm; prehensile edge with a spiniform tooth at its middle, pointing toward tips of fingers. Dactylus with a broad rounded tooth on proximal third of its cutting edge. Seventh abdominal segment oblong-triangular, with a few lateral marginal spinules on each side. Caudal laminae oval, of about equal length and subequal to telson.

Length of male from tip of rostrum to tip of telson, 9 mm.; length of carapace, 3.1 mm.; length of manus of larger cheliped, 3 mm.; length of palm, 2 mm.; length of carpus, 0.8 m.

This species is smaller than the last and may at once be told by the crest on the pollex and the peculiar dentation of the fingers.

Types, Mayaguez Harbor, 161 to 172 fathoms, sand, mud, station 6066, 2 specimens (Cat. No. 23779). Another specimen was dredged in the same harbor in 25 to 30 fathoms, sand, mud, and shells, station 6062.

#### Genus GLYPTURUS Stimpson.

*Glypturus* Stimpson, Proc. Chicago Acad. Sci., 1, 46, 1866; Ann. Lye. Nat. Hist. N. Y., x, 120, 1871.

Merus and ischium of external maxillipeds not dilated, no broader than propodus and concave on outer surface; ischium armed along middle of inner surface with a sharp, prominent, spinous crest; carpus thick, and only half as broad as propodus, which is greatly dilated within, and truncated, but not grooved, at broad, anterior margin, against which the dactylus folds; dactylus rather stout, compressed, and rather longer than anterior margin of propodus. Mandibles strong, much indurated; corona with its margin unevenly toothed, deeply cleft within, and with basal process as broad and half as high as corona itself, and having also a toothed edge. Appendages to first two joints of abdomen of male nearly similar to corresponding parts in female. Caudal lamellae deeply sculptured. Of the appendages to the penult joint of abdomen, the outer lamellae appear as if composed of two pieces soldered together, the outer one of which overlaps inner; inner lamellae obliquely triangular. Terminal segment of abdomen very small. (Stimpson.)

#### *Glypturus branneri* Rathbun.

*Glypturus branneri* Rathbun, Proc. Washington Acad. Sci., II, 150, pl. VIII, figs. 5-8, 1900.

Dorsal suture very deep. Front with a sharp, acute, depressed rostrum, and on either side above insertion of antennae a shallower subacute projection. Eye-stalks subtriangular, with convex upper surface, and contiguous nearly to their narrow truncate extremities, which are obscurely dentate. Terminal joint of peduncle of the antennule about 1.4 times as long as penult joint. Antennule nearly as long as carapace. Peduncle of antenna more slender than that of antennula; its penult joint reaches middle of terminal joint of peduncle of antennula. Flagellum more than twice as long as that of antennula. Outer maxillipeds similar to those of *G. acanthochirus*; ischium and merus wider, propodus somewhat longer and narrower, dactylus more slender than in that species. Outer surface pubescent, inner margin long-hairy. Large cheliped finely and inconspicuously dentate on its lower margin. Merus twice as wide as ischium. Carpus nearly as wide as the manus and twice as wide as long. Palm nearly as wide as long. The fingers cross when closed. The dactylus has three teeth on prehensile edge. Smaller cheliped with carpus and manus less than half as wide as in larger cheliped, and elongate. Both chelipeds with tufts of long hair on margins. Inner caudal lamella as broad as long. Outer branch of outer lamella completely overlapping and coalesced with inner branch, and only slightly shorter.

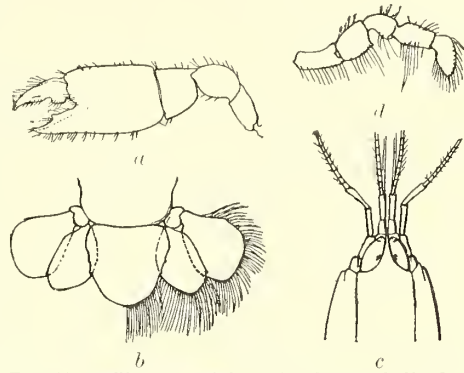


FIG. 16.—*Callinassa minima*. (a) Large cheliped of male,  $\times 8$ . (b) Tail fan,  $\times 13.33$ . (c) Anterior portion,  $\times 15$ . (d) Maxilliped,  $\times 16$ .



This species can be distinguished from *G. acanthochirus* Stimpson and *G. grandimanus* (Gibbes, as *Callianassa*) by its non-spinous front and chelipeds and the subequal length of the two branches of the outer caudal lamella.

Length in median line, exclusive of antennæ, 52.2 mm.; length of carapace, 14.9 mm.; length of carpus and propodus together, measured to end of pollex, 18.5 mm.

Type locality; Mamanguape Stone Reef, Brazil. Porto Rico: Hucares, 1 male.

Genus **CALLIANIDEA** Milne Edwards.

*Isca* Guérin, Ann. Soc. Entom. France (1), 1, 295, 1832. (Name preoccupied.)

*Callianidea* Milne Edwards, Hist. Nat. Crust., II, 319, 1837.

*Callianisea* Milne Edwards, Hist. Nat. Crust., II, 321, 1837.

*Callisea* Dana, Crust. U. S. Expl. Exped., 1, 510, 1852.

Outer maxillipeds slender, pediform. Second pair of pleopods like the following three pairs; in all these pleopods the margins, instead of being fringed with small hairs or cilia, have these modified into soft and flexible articulated membranous filaments. General appearance that of *Callianassa*.

**Callianidea lævicauda** Gill.

*Callianidea lævicauda* Gill, Proc. Acad. Nat. Sci. Phila., XI, 167, 1859.

Rostrum equilaterally triangular, obtusely pointed. A less prominent obtuse tooth is above insertion of antenna; just above the tooth a closed horizontal suture runs back a little on carapace. Transverse suture on the carapace, at about two-sevenths the distance from the posterior margin, is very deep. Posterior margin produced backward at middle in a prominent lobe. The eye plates are thickened except their inner distal third, which is thin, laminate. Cornea small and protuberant and situated near outer margin. Last joint of antennular peduncle longer than penult joint. The two branches of flagellum are of about equal size near the base, the lower is a little longer and tapers to the tip, the upper is thickened in its distal portion. Thickest point at about the sixteenth segment from tip. Antennule nearly as long as carapace. Penult joint of antenna about 1.5 times as long as last joint. Tips of flagella broken off, but the flagella are longer than carapace.

Ischium, merus, and carpus of the outer maxillipeds wider and shorter than in the figures of *C. typha*. The merus has a small spine on its lower margin near distal end. Ischium of large cheliped compressed and dilated anteriorly with articulating surface for the merus oblique. Merus about a third longer than ischium, subovate, flat internally, convex externally above; inferior margin anteriorly tridenticulate and hairy. Carpus vertical, about twice as high as long; its posterior articulating process about as long as broad and divided into two unequal parts by a wide groove on its inner side; it projects acutely below and is there denticulate. Manus oblong, fully three times longer than carpus, with parallel borders; its interno-superior border is provided with a long row of hairs and its superior surface has a few distant fascicles of hair; inferior margin crenulated and on each side a row of fascicles of hair. Digital process of manus about two-thirds as long as manus itself and with five tubercles on its posterior half, the anterior of which is largest; anterior to this it is crenulated, as are also the margins on each side. The dactylus is curved and crosses the pollex, leaving a hiatus; above it is rounded, with a row of hairs on each side, the interior of which is very dense; below the external margin of excavation has a moderate tubercle at its middle, and posteriorly two large ones; internal border anteriorly crenulated; a few pits with fascicles of hair are between the ridges of excavation and on each side.

The second pair of feet is not only long-hairy below, but has the last three joints fringed with hair above. Fourth pair of feet compressed, the fifth subcylindrical. Terminal joint of first pair of abdominal feet lanceolate. The next four pairs of feet have two laminate branches broader and more oval than represented in *C. typha*. The cylindrical filaments with which they are fringed are composed of three joints placed end to end and not branching as in *C. typha*. The inner branch of the caudal lamella has on its carina, two spinules—one at middle, the other at distal end.

This species in its rostriform front resembles *C. mucronata* Kossmann, but is easily distinguished by the character of the abdominal filaments.

Length in median line, exclusive of antennæ, 61.3 mm.; length of carapace, 15.3 mm.; length of carpus and hand together, measured to end of pollex, 25.2 mm.

Ensenada Honda, Culebra, 1 female. Barbados, under rocks, within coral reefs (type locality).

## Family AXIIDÆ Bate, 1888.

Carapace produced to a horizontally flattened point or rostrum. First pair of trunk-legs chelate and subequal; second pair small, chelate, equal; last three pairs simple. First segment of pleon very short. Swimming-fan strong. The outer branch of uropods not longer than the inner. Branchiæ filamentous, cylindrical, and compressed.

Genus *AXIUS* Leach.

*Axius* Leach, Trans. Linn. Soc. London, XI, 343, 1815.

Second joint of outer antennæ with a small, movable spine or scale.

Key to the Porto Rican species of the genus *Axius*.

- A. Rostrum with sides unarmed except at the base.....*defensus*  
 A'. Rostrum armed on one side with three spines, on the other with two.....*inequalis*

*Axius defensus*, sp. nov.

Carapace of female nearly twice as long as high, finely pubescent. Rostrum, long, narrow, acuminate, spiniform, and slightly upturned at tip, armed at base on either side with a sharp spine pointing obliquely forward and upward, just above eye. A small spine above antenna on anterior margin of carapace. From edge of rostrum a sharp lateral carina runs backward on each side about two-thirds the way to cervical suture, armed in its anterior half with two spines, the anterior the larger. The median carina extends to cervical suture, though its posterior fourth is faintly marked; there is a spine at its middle, which is broken off short in the unique specimen. Between the median and lateral crests is a submedian crest intermediate in length and armed with seven or eight irregular spines.

Eyes on short stalks, which are nearly concealed by the rostrum; cornea large and black. Peduncle of antennula overreaches rostrum by length of its last segment; flagella subequal in length and about equal to length of carapace. Distal spine on second segment of antenna at base of acicle very short, not extending beyond end of second segment. The acicle is a little longer, but also very short, not more than one-fifth the length of fourth segment, and has a small spine at its inner base. Fifth segment about half as long as fourth. Flagellum nearly twice as long as carapace. Ischium and merus of external maxilliped armed on lower edge with spines, the distal two of which are long and slender; these joints have also an inner spinous crest.

Chelipeds equal, about 1.5 times as long as the carapace; chelæ about two-thirds as long as the carapace. Ischium and merus armed below with spines; merus with a spine on its upper edge at distal third. Carpus a little longer than wide. Propodus compressed, with sharp edges, about two-fifths as wide as length of palm; margins subparallel; upper margin with a small distal spine. Fingers about two-thirds the length of palm, slender, tips crossing, prehensile edges finely denticulate.

The second pair of legs are slender and do not reach half the length of palm of first pair. Ischium two-fifths the length of merus; carpus three-fifths the length of merus; ischium and merus armed below with a few spines irregularly placed. Propodus a little longer than carpus, the fingers nearly as long as palm. Third and fourth pairs of legs nearly alike and longer and slenderer than the second. Carpus about half as long as propodus and two-fifths as long as merus. Dactylus about two-fifths as long as

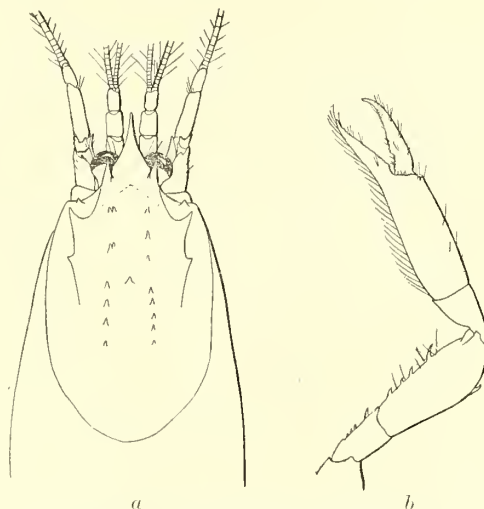


FIG. 17.—*Axius defensus*, female. (a) Anterior portion,  $\times 5$ .  
 (b) Right cheliped,  $\times 3.5$ .

propodus. The merus has an inferior distal spine; the propodus has an inferior row of spinules. Legs of fifth pair even more slender than those of fourth and shorter than those of second. Merus and propodus subequal; carpus about half as long; dactylus about one-third of propodus.

Abdomen much narrower than carapace and not expanded in middle, the sides being nearly straight and parallel. Telson oblong, with sides slightly converging posteriorly, four-fifths as broad as long. The lamellæ of uropods a little longer than telson, longer than broad. Telson armed on lateral margin with four small spines and on dorsal surface with rows of spines extending from near center to anterior and posterior extremities of lateral margin; posterior margin emarginate and having a median spine. Inner lamella with a row of spines on its outer margin and a second row on its longitudinal carina; outer lamella with a row of spines occupying the middle third of outer margin and an oblique row extending from posterior end of marginal row inward and backward to posterior margin; also a few spines on outer half of dorsal surface.

Dimensions of female: Length from tip of rostrum to tip of telson, 28 mm.; length of carapace to tip of rostrum, 11.2 mm.; length of rostrum, 1.5 mm.; height of carapace, 5.8 mm.; width of carapace, 4.5 mm.; length of right cheliped, 15 mm.; length of merus, 5 mm.; length of propodus, 7.4 mm.; length of propodal digit, 3 mm.; length of telson, 3.5 mm.; width of telson, 2.8 mm.

Type, off Boca Prieta, 8½ fathoms, coral, sand, station 6075, 1 female (Cat. No. 23780).

This species, in its narrow, acuminate rostrum, approaches *A. armatus* Smith, but is at once distinguished by the more numerous spines of the carapace.

*Axius inæqualis*, sp. nov.

Allied to *A. defensus*. The rostrum while slender and acuminate is, however, armed on one side with three sharp spines, and on the other side with two. Lateral margins of rostrum continued back on carapace in a carina extending half-way to cervical suture and armed with two sharp spines, one just behind orbit. Median carina with one small spine. A short, faint submedian carina, armed anteriorly with two spinules; also a spinule between these and median carina. Eye-stalks large, dumbbell-shaped, nearly as long as rostrum, with a black cornea. The peduncle of antennula overreaches rostrum by the length of its last segment. Flagella subequal and about equal to length of carapace. Movable acicle of antenna is nearly as long as fourth segment of peduncle; spine at its base is about half as long as acicle. Armature of outer maxillipeds similar to that of *A. defensus*.

Chelipeds equal; merus armed below with slender spines, and also above on distal half; a single spine on distal outer margin. Carpus spinous above; two spinules below. Manus with a row of long spines above; one spine on outer face at base of fingers; lower margin rimmed, entire. Fingers and palm subequal in length. Prehensile edges of fingers dentate; tips crossing; fingers gaping. The rostrum reaches to the middle of the carpus. Abdomen very much narrower than carapace.

Length from tip of rostrum to tip of telson, about 15 mm.; length of carapace, 6 mm.

The two specimens from which this description is made are very imperfect.

Type locality, Mayaguez Harbor, 161 to 172 fathoms, sand, mud, station 6066 (Cat. No. 23781).

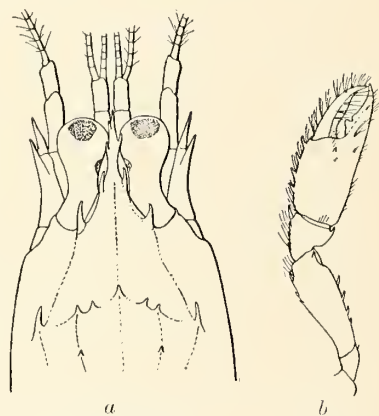


FIG. 18.—*Axius inæqualis*. (a) Anterior portion,  $\times 15$ . (b) Left cheliped,  $\times 8$ .



## Tribe LORICATA.

Body either depressed or subcylindrical. Rostrum broad and short or absent. Antennules with two flagella. Outer antennæ without a scale, first joint of peduncle fused with epistome. Trunk legs six-jointed through coalescence; none of them chelate except the last pair which is sometimes subchelate in the female. First abdominal segment devoid of appendages in both sexes. Posterior portion of telson and uropods flexible. Gills trichobranchiate.

## Family SCYLLARIDÆ White, 1847.

Carapace depressed, orbits excavated in the dorsal surface. Second antennæ short, squamiform. Mandibles with a one-jointed palp. Trunk-legs simple, except the fifth pair in the female, which are minutely chelate. Branchiæ well developed; epipodal plates on the first joint in the first four pairs of trunk-legs have podobranchiæ attached to them as distinct plumes. These limbs have arthrobranchiæ, and the last four segments of the trunk have pleurobranchiæ.

*Key to the Porto Rican genera of the family Scyllaridæ.*

- A. Exognath of outer maxillipeds without a flagellum ..... *Scyllarus*  
 A'. Exognath of outer maxillipeds with a flagellum ..... *Scyllarides*

## Genus SCYLLARUS Fabricius.

*Scyllarus* Fabricius, *Sys. Ent.*, 413, 1775.

*Aretus* Dana, *Crust. U. S. Expl. Exped.*, 1, 516, 1852.

Rostrum very short and truncate; exognath of third maxillipeds without a flagellum; pairs of branchiæ 19 in number.

*Scyllarus americanus* (Smith).

*Aretus americanus* Smith, *Amer. Jour. Sci.* (2), XLVIII, 119, 1869.

*Scyllarus (Aretus) gundlachi* von Martens, *Arch. f. Nat.*, XXXVIII, pt. 1, 123, pl. v, f. 13, 1872.

Carapace with three blunt median prominences, two of which are on the gastric region and one on cardiac region. Anterior prominence composed of two tubercles side by side, half-way between margin of the front and the larger posterior gastric tooth. Cardiac tooth also bifid. First joint of inner antennæ short and dorsally flattened. Posterior margin of abdominal segments with a very slight median emargination. A small species, usually not more than half an inch long.

Off Vieques, 15 fathoms, station 6091. Previously taken at Egmont Key, Fla. (type locality); Cuba (von Martens); off Cape Lookout, N. C., 22 fathoms, station 2608 (*Albatross*); off Cape Fear, N. C., 15 fathoms, station 2622 (*Albatross*); Blackfish Bank, off Charleston, S. C., 12 fathoms (R. E. Earll, coll.); off Key West, Fla., 45 fathoms, station 2318 (*Albatross*); Key Vaccas, Fla., among rocks, between tides (H. Hemphill, coll.); Marco, Fla., 2 fathoms (H. Hemphill, coll.); off northwest end St. Martin's Reef, Florida Banks (J. F. Moser, coll.); Gulf of Mexico, 21 to 33 fathoms, stations 2369 to 2374, 2407 (*Albatross*), and stations 5052, 5078, 5085, 5102 (*Grampus*); St. Thomas, W. I., dredged (*Albatross*); off Cape St. Roque, Brazil, 20 fathoms, station 2758 (*Albatross*).

## Genus SCYLLARIDES Gill.

*Scyllarus* Dana, *Crust. U. S. Expl. Exped.*, 1, 516, 1852. (Not *Scyllarus* Fabricius, 1775.)

*Scyllarides* Gill, *Science*, n. s., VII, 98, 1898.

The rostrum very prominent; exognath of the third maxillipeds ending in a flagellum; pairs of branchiæ 21.

*Scyllarides æquinoctialis* (Lund).

*Scyllarus æquinoctialis* Lund, *Skrivter af Naturhistorie-Selskabet*, II, 2, p. 21, Copenhagen, 1793.

*Scyllarides æquinoctialis* Gill, *Science*, n. s., VII, 99, 1898.

Carapace very convex from side to side, deflexed in the anterior portion. Lateral margins nearly parallel, with a slight indentation about one-fourth the distance from antero-lateral angle. Distance from lateral margin of carapace to inner margin of orbit about two-fifths the distance between orbits. Dorsal surface covered with flat, scale-like tubercles closely crowded together and with short, stiff bristles. Rostrum with two conical contiguous teeth. Inner margin of outer antennæ with erect, conical teeth or spines; second joint much broader than long; terminal joint suborbicular, margin crenate. First abdominal segment with two large reddish submedian spots, which unite anteriorly.

Dimensions of female from Porto Rico: Length of carapace from tip of rostrum, 114.5 mm.; width at anterior angles, 91 mm.; greatest width, 98.5 mm.; length of animal from tip of outer antennæ to tip of telson, about 29 cm.

Porto Rico: Cabo Rojo; San Juan, where it is sold in the market (Gundlach). Bermudas (T. H. Bean, coll.); Florida Keys to Brazil.

#### Family PALINURIDÆ Latreille 1802 (Palinurini); Leach 1814 (Palinurini).

Carapace longitudinally subcylindrical, with orbits for the eyes partially excavated. Second antennæ subcylindrical, with a long, rigid multiarticulate flagellum. Branchiæ as in the *Scyllaridæ*.

##### Genus PANULIRUS White.

*Panulirus* White, List Crust. Brit. Mus., 69, 1847.

No central rostriform tooth; the ocular segment exposed and membranous; flagella of first antennæ long and slender, and their segment produced considerably in advance of frontal margin and generally armed with strong teeth.

##### *Panulirus argus* (Latreille).

*Panulirus argus* Latreille, Ann. Mus. Hist. Nat. Paris, III, 393, 1804.

*Panulirus argus* White, List Crust. Brit. Mus., 69, 1847.

Orbital spines very large, strongly curved. Spines not very thickly placed on the carapace. Antennal segment with four spines, anterior pair a little larger and further from posterior than are the spines of either pair from each other. Exognath of second gnathopod with flagellum reaching quite to middle of third joint. Terminal joints of trunk feet furnished with bristles. Abdominal furrows rather indistinctly interrupted at middle. Epimera with entire anterior margins, posteriorly with a sharp tooth. Color, yellowish and bluish. Abdomen with many small, yellow spots; a large, yellow spot on either side of second and sixth segments.

Length of Porto Rican specimen, measured from the anterior margin of the carapace to the tip of the telson, 42 cm.

Porto Rico: San Antonio Bridge, San Juan; Mayaguez; Boqueron Bay; Arroyo; Hucares; Cabo Rojo; Mayaguez, in the market (Gundlach). From Bahamas and Florida Keys to Brazil; Bermudas.

#### Tribe HOMARIDEA.

First antennæ with two multiarticulate flagella; second antennæ with a scale. Trunk-legs with seven distinct joints; the first three pairs chelate; the first pair largest. Branchiæ well developed.

##### Family HOMARIDÆ Bate, 1888.

Carapace subcylindrical, with a pronounced rostrum. Second antennæ with a long multiarticulate flagellum, and a scale. Segments of pleon dorsally imbricated; first segment with appendages. Outer branch of uropods with a transverse suture. Epipodal plates large, with a well-developed podobranchial plume attached to all the trunk-legs except the last pair.

##### Genus HOMORISCUS,<sup>1</sup> nov.

Rostrum depressed, short, and broad. Eyes small, but well developed. Antennal spine on anterior margin of carapace small. Antennal scale large. Second antennal segment with a spine. Thoracic feet unknown. In the character of the rostrum, this genus differs from all others of the *Homaridæ*. The rostrum resembles that of *Palinurellus*. In the small size of the eyes *Homoriscus* differs from *Homarus*, *Nephrops*, and *Eunephrops*, while the black cornea distinguishes it from *Nephropsis* and *Phoberus*. It agrees with *Nephrops* and *Phoberus* in having a large antennal scale. It is, in fact, a near relation—a little neighbor—of *Homarus*.

##### *Homoriscus portoricensis*, sp. nov.

Carapace of female slightly compressed. Rostrum triangular, acute, sides slightly convex, finely and sharply granulated; upper surface concave. Carapace with seven sharp longitudinal crests; the median occupies posterior two-thirds of carapace; the submedian and supero-lateral crests begin at base

<sup>1</sup> From *ὁμορος*, neighbor, and *-ισκος*, diminutive suffix. By its form, the name *Homoriscus* suggests its affinity to *Homarus*.

of rostrum and are slightly oblique, submedian equaling about half the length of carapace (exclusive of rostrum), the supero-lateral not so long; near posterior end of latter, two or three spinules; both these crests are sharply but finely granulated. The infero-lateral crest begins at antennal sinus of anterior margin of carapace and is about half as long as submedian crest. Orbit semicircular, a little wider than the black cornea which it surrounds; outer orbital angle small and acute; from it the anterior margin runs obliquely backward in a sinuous line to a notch above antenna; from this notch an inconspicuous fissure runs horizontally backward on the carapace to its posterior margin. Just outside the antenna, the anterior margin is produced to a sharp spine, the outer margin of which is thickened, and white and naked, in contrast to remainder of carapace, which is covered with a fine, close pubescence; below the white spine the anterior margin is again notched; inferior angle rounded. Antennule above antennæ. Antennular peduncle very short, rostrum extending to middle of its last segment. First two segments very short, third a little longer, flattened, with a small spine at anterior outer angle. Flagella subequal in length and only a little longer than rostrum. Antennal peduncle a trifle longer than antennular. The second joint extends as far forward as eye and has a spine at its anterior outer angle; it bears a large ovate scale, dentate on its outer margin with four or five spiniform teeth; inner margin fringed with long setæ. Fourth and fifth joints short, subequal, each bearing an outer distal spine. Flagellum nearly as long as the body. In fig. 19*a* the left antenna is shown in its natural position, while the right one is pulled out to show the outline of the scale.

The endognath of the outer maxillipeds has ischium and merus joints armed on inner side with spinules; merus has an outer distal spine; propodus and dactylus subequal in length and longer than carpus. The five pairs of thoracic feet missing.

Abdomen narrower than carapace, gradually tapering posteriorly, smooth, punctate, slightly pubescent. Telson longer than broad, rounded at extremity, sides obscurely bispinulous, dorsal surface partly spinulous. Lateral laminae longer than telson; inner lamina longer than outer; a transverse spinulous line across posterior half; outer half spinulous.

Dimensions of female: Length from tip of rostrum to tip of telson, 14.5 mm.; length of carapace, 6.3 mm.; length of antennal flagellum, 11.5 mm.

Type locality, Playa de Ponce; 1 female (Cat. No. 23782).

### Tribe STENOPIDEA.

Rostrum laterally compressed. Antennules with two flagella, antennæ with a scale. Mandibles with a three-jointed palp. Exopod of third maxillipeds is small, slender, and almost rudimentary. First three pairs of feet chelate, third pair the longest and largest. Branchiæ filamentous. First pair of pleopods one-branched and foliaceous; the uropods and telson have no transverse suture. Contains only one family.

#### Family STENOPIDÆ.

##### Genus STENOPUS Latreille.

*Stenopus* Latreille in Desmarest, Dict. Sci. Nat., XXVIII, 321, 1823.

Second antennæ having a long, flat, obtusely pointed scale. Third pair of legs greatly elongate and strong; fourth and fifth pairs with the antepenult joint subdivided. Telson tapering.

##### *Stenopus hispidus* (Olivier).

*Palæmon hispidus* Olivier, Encyc. Méth., Hist. Nat., Insectes, VIII, 666, 1811; Tabl., pl. CCCXIX, f. 2, 1818.

*Stenopus hispidus* Latreille in Desmarest, Dict. Sci. Nat., XXVIII, 321, 1823.

Rostrum with median dorsal row of six spines bifurcated at extremity, a lateral row of three to five spines on each side of rostrum; no ventral spines. Behind the sixth dorsal spine a double row.

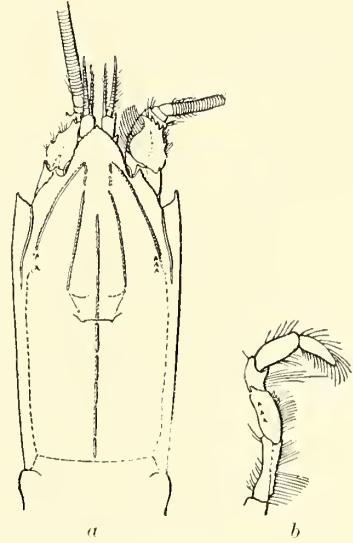


FIG. 19.—*Homoriscus portoricensis*, female.  
(a) Carapace and antennæ,  $\times 10.66$ .  
(b) Maxilliped,  $\times 13.33$ .



Rostrum not reaching to end of peduncle of inner antennæ. Carapace very rough, with firm, sharp spines which are longer on dorsal than on lateral regions. Abdomen thickly armed with outwardly projecting spines. Third pair of legs long, abundantly armed with spines; propodus with about six rows of larger spines and many smaller and less regular intermediate ones.

Total length, 55.2 mm.; length of carapace, 20.2 mm.; of abdomen, 35 mm.; of rostrum to posterior margin of orbit, 6 mm.; of telson, 10.5 mm.

Between San Antonio Bridge and San Geronimo, San Juan, Porto Rico (G. M. Gray). Also occurs at Dry Tortugas, Fla.; Cuba; Jamaica; Bahamas, to a depth of 36 fathoms; Port Castries, St. Lucia; near Monosquillo, *Albatross* station 2142, lat. 9° 30' 15" N., long. 76° 20' 30" W., 42 fathoms; Bermudas; East Indies and South Pacific.

### Tribe PENÆIDEA.

Body laterally compressed. First three pairs of feet usually chelate and not very strong; fourth and fifth pairs always simple. Gills dendrobranchiate.

#### Family PENÆIDÆ Milne Edwards, 1837 (Penæens).

Carapace at sides deeply produced and carried farther back than in the median dorsal line; rostrum laterally compressed, this part at least being carinate. Of the segments of the pleon the first three are usually not longitudinally carinate, but the three that follow are almost always much so. The sides of the first are produced so as to overlap the hind lateral margin of carapace and the front lateral margin of second segment. Telson generally dorsally flattened or grooved. Eye-stalks usually two-jointed. First antennæ with two multiarticulate flagella; the first joint of the peduncle flattened to receive the eye-stalk and laterally strengthened on the outer side by a spine-like process, on the inner by an unjointed appendage often fringed with hairs. Second antennæ with a broad, thin foliaceous scale and a long flagellum. Mandibular palp never more than two-jointed. Third maxillipeds long and pediform. Both the second and third maxillipeds and the three or four following pairs of appendages carry epipodal plates. First three pairs of trunk-legs chelate and similar, the second longer than the first, and the third longer than the second. Extruded ova not definitely attached to the appendages of the mother prior to hatching, as in most other *Macrura*.

#### *Key to the Porto Rican genera of the family Penæidæ.*

- A. Carapace without a median dentate crest.
  - B. Antennular flagella shorter than carapace.
    - C. Endognath of first maxilla greatly elongated and segmented..... *Penæus*
    - C'. Endognath of first maxilla short and unsegmented..... *Parapenæus*
  - B'. Antennular flagella longer than carapace..... *Xiphopenæus*
- A'. Carapace with a median dentate crest..... *Sicyonia*

#### Genus PENÆUS Fabricius.

*Penæus* Fabricius, Entom. Syst., Suppl., 385, 1798.

Distal segment of mandibular palpus much larger than proximal, very broad, and not prolonged into a narrow tip. Endognath of first maxilla greatly elongated and segmented. Endopod of maxilliped slender and composed of four segments, the exopod lamellar and unsegmented; both pairs of gnathopods have well-developed epipods and large exopods; all the pereopods have small exopods, but only the first, second, and third are furnished with epipods; a well-developed pleurobranchia on the fourteenth somite. Antennular flagellæ not longer than carapace.

#### *Penæus brasiliensis* Latreille.

*Penæus brasiliensis* Latreille, Nouv. Diet. Hist. Nat., xxv, 156, 1817.

Carapace with a high median carina extending almost to posterior margin; a deep and broad sulcus on either side of carina. Posterior half of carina with a median sulcus, making it bicarinate. Anterior half of carina arcuate, highest part above orbit; dentate or spinous, with nine teeth, posterior tooth almost half-way back on carapace and remote from the others, six of which are on the rostrum proper. Two or three ventral teeth on rostrum. Rostrum unarmed and horizontal toward extremity. Hepatic spine and antennal spine, carina, and groove well marked. Cervical suture extending only half-way from hepatic spine to dorsal carina. A subhorizontal suture below hepatic spine. The rostrum reaches almost to end of antennular peduncle. This peduncle is very short, stout, and hairy. Abdominal carina on fourth to sixth segments very sharp; on the sixth is a groove either side of it. Telson with a deep median groove and an acuminate extremity.

Length of Porto Rican female, 165 mm.; length of carapace, 62 mm.; of rostrum, 22.6 mm.

A very abundant species in Porto Rico as well as in other parts of tropical America.

Porto Rico: San Antonio Bridge, San Juan; San Juan Harbor between Cataño and Palo Seco; Mayaguez, seined and dredged; Mayaguez Harbor, in 7½ and 75 to 76 fathoms, stations 605S and 6063; Boqueron Bay; Puerto Real; Guanica; Playa de Ponce; Ponce; Aibonito; Arroyo; Hucares; Fajardo. Ranges from Hudson River at Sing Sing, New York (Stimpson), to Rio Grande de Sul, Brazil (Ortmann); Harrington Sound, Bermudas (C. M. Allen, coll.); Bermudas (Verrill); West Africa. The greatest depth is recorded by Faxon, 955 fathoms, *Blake* station 29, west of Tortugas. The northern limit of this species has lately been extended by the discovery of a single specimen at Katama Bay, Marthas Vineyard, by Mr. Vinal N. Edwards, U. S. Fish Commission, September 8, 1900.

#### Genus PARAPENÆUS Smith.

*Parapenæus* Smith, Proc. U. S. Nat. Mus., VIII, 170, 1885.

Endognath of first maxilla short and unsegmented; second gnathopod without an epipod, the fourteenth somite (posterior somite of the pereion) wholly without branchiae. Antennular flagella shorter than carapace.

*Key to the Porto Rican species of the genus Parapenæus.*

A. Rostrum with less than ten dorsal teeth.

B. Sixth segment of pleon less than twice as long as fifth.

C. Surface of pleon naked and glossy. Telson with a small spine on either side near tip.....*constrictus*

C'. Posterior half of pleon pubescent. Telson with a long, slender spine on either side near tip.....*similis*

B'. Sixth segment of pleon twice as long as fifth.....*americanus*

A'. Rostrum with more than ten dorsal teeth.....*megalops*

#### *Parapenæus constrictus* (Stimpson).

*Penæus constrictus* Simpson, Ann. Lyc. Nat. Hist. N. Y., x, 135, 1871.

*Parapenæus constrictus* Smith, Proc. U. S. Nat. Mus., VIII, 174, 1885.

Carapace for the most part pubescent; posterior part of branchial regions and whole of abdomen naked and glossy. Carapace carinated on its anterior three-fourths, bearing a spine behind base of rostrum. A lateral or antennal groove extends three-fifths the length of the carapace. Antennal and hepatic spines large. Rostrum reaching middle of penult joint of antennular peduncle; slightly arched, extremity slightly deflexed; armed dorsally with seven to nine equidistant teeth, diminishing in size toward extremity. Antennular peduncle rather short, extending beyond the eyes as far as length of eyes; very pubescent above. Abdomen carinated from fourth to sixth segment. Telson tapering to a short acuminate tip, armed either side with a short spine.

Dimensions of female: Length from tip of rostrum to tip of telson, 66 mm.; length of carapace, including rostrum, 26.5 mm.; length of rostrum, 10 mm.

Taken at Mayaguez and Boqueron Bay, Porto Rico. Other localities for this species are: Off Chesapeake Bay, 18 fathoms, *Fish Hawk* (Smith); off Cape Hatteras, 7 to 27 fathoms, *Albatross* (Smith); Fort Macon, N. C. (Smith); Beaufort, N. C., 4 fathoms (Stimpson); Charleston Harbor, S. C. (Stimpson); Fort Jefferson, Fla. (Kingsley); Marco Pass (Kingsley); Pensacola, Fla. (J. E. Benedict, coll.); Bermudas (Smith).

#### *Parapenæus similis* (Smith).

*Parapenæus constrictus* variety *similis* Smith, Proc. U. S. Nat. Mus., VIII, 175, 1885.

Allied to *constrictus*: Entire surface of carapace and of the fourth, fifth, and sixth segments of pleon covered with short, stiff setae. Median carina of carapace extending almost to posterior margin and provided with a gastric spine, as in *constrictus*. Rostrum ascending, its anterior third almost horizontal; armed with eight or nine teeth. Antennular peduncle longer than in *constrictus*, its extent beyond the eyes being greater than length of eyes; less pubescent than in *constrictus*. Telson tapering to a very long and slender tip, armed either side its base with a long and very slender spine.

Dimensions of female: Length from tip of rostrum to tip of telson, 80 mm.; length of carapace, including rostrum, 31 mm.; length of rostrum, 13.3 mm. The Porto Rican specimens are all smaller than the above.

Taken by the *Fish Hawk* at 11 stations at the following localities: Mayaguez Harbor, 4½ to 18 fathoms, sticky mud and sand, stations 6057, 6058, 6059, 6061, abundant; Puerto Real, 8½ fathoms,

coral, sand, station 6074; off Vieques, 12 to 16 fathoms, coral, stations 6091, 6092, 6093; off Humaçao, 9½ to 12½ fathoms, stations 6097, 6098, 6099. Previously collected at Orange Bluff, Clearwater Harbor, Florida, 1 to 2 fathoms (H. Hemphill, coll.); Marco, Fla. (H. Hemphill and U. S. Fish Commission); St. Thomas (*Albatross*); Gulf of Paria, 31 fathoms (Smith, type locality).

**Parapenæus megalops** Smith.

*Parapenæus megalops* Smith, Proc. U. S. Nat. Mus., VII, 172, 1885.

Surface of carapace and pleon naked and smooth. Median carina extending only half-way back on carapace; gastric spine remote from rostral teeth. Rostrum elevated, arched, terminal half very slender; armed with from twelve to fifteen dorsal spiniform teeth crowded posteriorly, but becoming more and more remote and smaller near tip; rostrum reaching to tips of antennal scales in females, shorter in males. Antennal, hepatic, and branchiostegal spines well developed. No antennal suture. Eyes extremely large, extending laterally beyond carapace. Antennal peduncles extending not so far beyond eyes as length of eyes; terminal segment longer than penultimate. Median carina of fourth to sixth segments of pleon thin and sharp; telson with a lateral as well as two dorsal carinae.

Dimensions of female: Length from tip of rostrum to tip of telson, 140 mm.; length of carapace, including rostrum, 54 mm.; length of rostrum, 25 mm.

Taken in Mayaguez Harbor in 220 to 225 fathoms on rocky bottom, station 6070. Off South Carolina, 159 fathoms, station 2314 (*Albatross*); off Habana, 213 fathoms, station 2350 (*Albatross*); Gulf of Mexico, 196 fathoms, station 2399 (*Albatross*); off St. Kitts, 208 and 250 fathoms, *Blake* stations 147 and 148 (Faxon); off Grenada, 159 fathoms, *Blake* station 258 (Faxon); off Barbados, 218 to 288 fathoms, *Blake* stations 275, 281, and 283 (Faxon); south of Curaçao, 208 fathoms, *Albatross* station 2125 (Smith); Gulf of Darien, 155 fathoms, *Albatross* station 2143 (Smith).

**Parapenæus americanus**, sp. nov. Plate 2.

The carapace shows the fissures characteristic of *P. fissurus* (Bate)<sup>1</sup> and *P. investigatoris*, Anderson,<sup>2</sup> namely, a linear longitudinal fissure on either side running from the orbit to the posterior margin, and a short transverse fissure crossing branchial margin just above the second pair of feet. Our species is so closely allied to *P. investigatoris* that it may prove to be a subspecies of it. It differs as follows: Branchiostegal spine on anterior margin instead of behind it. The rostrum reaches just to end of first joint of antennular peduncle and in small specimens falls short of it. The rostrum slopes upward at a greater angle than in *P. investigatoris* for its proximal two-thirds; distal third horizontal, not deflexed. Sixth abdominal segment only a little more than twice the fifth in length. Inner branch of antennular flagellum only three-fourths the length of carapace, exclusive of rostrum.

This species is in some respects intermediate between *P. investigatoris* and *P. fissurus*; as in the length and breadth of the sixth abdominal segment and in the length of the antennular flagella. The position of the branchiostegal spine is as in *P. fissurus*.

Dimensions of female: Length, 68.5 mm.; length of carapace, including rostrum, 22 mm.

The type specimens, a female and 3 smaller imperfect females, were taken in the trawl in Mayaguez Harbor, 220 to 225 fathoms, rocky, station 6070 (Cat. No. 23783).

**Genus XIPHOPENEUS** Smith.

*Xiphopeneus* Smith, Trans. Conn. Acad. Sci., II, 27, 1869.

Fourth and fifth pereopods very long, the propodi multiarticulate and flagelliform. Mandibular palpus two-jointed, the distal segment much larger than proximal. Endognath of first maxilla short and unsegmented. Fourteenth somite without branchiæ. Antennular flagella longer than carapace.

**Xiphopeneus kroyeri** (Heller).

*Penæus kroyeri* Heller, Sitz. Ber. Acad. Wiss. Wien, XLV, 1 Abth., 425, pl. II, f. 51, 1862.

*Xiphopeneus hartii* Smith, Trans. Conn. Acad. Sci., II, 28, pl. I, f. 1, 1869.

*Xiphopeneus kroyeri* Smith, Proc. U. S. Nat. Mus., VIII, 188, 1885.

Cervical and branchio-cardiac sulci very distinct, together forming a nearly straight groove from near base of antennæ almost to posterior border. Rostrum very long and slender, equaling or exceeding

<sup>1</sup> *Challenger* Rept., Zool., XXIV, 263, pl. XXXVI, f. 1, 1888.

<sup>2</sup> Ann. Mag. Nat. Hist. (7), III, 279, 1899; Illus. Zool. *Investigator*, Crustacea, part VII, pl. XLII, figs. 1, 1a, 1b.



carapace, unarmed below, basal portion armed above with a thin and high carina which extends back upon the carapace for a short distance, forward as far as the eyes, and armed with five sharp and prominent teeth and at its posterior extremity with another tooth separated by a considerable space. Antennæ long and slender; peduncle with only a very small lamelliform appendage on the inside, which is not foliaceous; flagella very long and slender. Fourth and fifth pairs of thoracic legs very long, the terminal segments very slender and flagelliform.

Length, about 5 inches.

Mayaguez and Arroyo, Porto Rico; plentiful. Caravellas, Province of Bahia, Brazil (Smith); Rio de Janeiro (Heller); Abrolhos (Kingsley); Maccio, State of Alagoás, Brazil (Branner-Agassiz Exped., 1899).

**Genus SICYONIA Milne Edwards.**

*Sicyonia* Milne Edwards, Ann. Sci. Nat., XIX, 344, 1830.

Integument rigid. Carapace surmounted by a median dentate crest. Abdomen carinated above and having several furrows which give it the appearance of being sculptured. Trunk-legs without exopods. Pleopods all single branched.

*Key to the Porto Rican species of the genus Sicyonia.*

- A. Dorsal crest with three teeth on carapace and two on rostrum.....*lævigata*  
 A'. Dorsal crest with two teeth on carapace and three on rostrum.....*dorsalis*

***Sicyonia lævigata* Stimpson.**

*Sicyonia lævigata* Stimpson, Ann. Lye. Nat. Hist. N. Y., x, 131, 1871.

Carapace with three dorsal equidistant teeth. Rostrum long, reaching nearly to end of antennular peduncle; upper margin concave, with two teeth above; extremity upturned, truncate, with two or three spiniform teeth. Antennular peduncle long. External maxillipeds considerably longer than antennal peduncle. Third pair of feet exceeding the external maxillipeds by length of fingers and half the palm. Abdomen with sharp median carina; sides almost smooth, with shallow sulci.

Length of female from tip of rostrum to tip of telson, 40 mm.; length of carapace and rostrum, 16.2 mm.; length of rostrum, 6.8 mm.

The Porto Rican specimens are all smaller than the specimen measured. A few of them have six dorsal teeth instead of five, either four on the carapace proper or three on the rostrum.

Charleston, S. C. (Stimpson); Marco, Fla., 1 to 3 fathoms (H. Hemphill, coll.); Punta Rassa, 1 fathom (H. Hemphill, coll.); Charlotte Harbor (W. H. Dall, coll.); Sarasota Bay (H. Hemphill, coll.); also recorded by Kingsley; off St. Martin's Reef, 17 feet (J. F. Moser, coll.); St. Thomas (*Albatross*); Sabanilla, United States of Colombia (*Albatross*). Porto Rico: Mayaguez, on coral reef; Mayaguez Harbor; off Vieques, 6 to 16 fathoms, stations 6085, 6092, and 6096; off Culebra, 15 and 15½ fathoms, stations 6087 and 6093; off Humacao, 9½ and 12½ fathoms, stations 6098 and 6099.

***Sicyonia dorsalis* Kingsley.**

*Sicyonia dorsalis* Kingsley, Proc. Acad. Nat. Sci. Phila., XXX, 1878, 97 (9).

Carapace with a tooth a little behind the middle and another near rostrum. Rostrum short, reaching slightly beyond eyes, extremity depressed; upper margin arcuate or convex, armed with three teeth above and one below near tip. Antennular peduncle short, the third joint half as long as second. External maxillipeds shorter than peduncle of antennæ. Third pair of feet reaching slightly beyond external maxillipeds. Abdomen deeply carinated and punctate, lateral margins of segments truncate, anteriorly angular, or with a small tooth, the third, fourth and fifth segments in the full-grown individual with a postero-lateral spine.

Dimensions of female: Length from tip of rostrum to tip of telson, 90 mm.; length of carapace and rostrum, 21.5 mm.; length of rostrum, 4.8 mm.

Porto Rican specimens are much smaller than the above.

Pensacola, Fla. (S. Stearns, coll.); Gulf of Mexico, 30 to 88 fathoms, stations 2403 to 2405 (*Albatross*); Fort Jefferson, Fla. (type locality); off Key West, 45 fathoms, station 2318 (*Albatross*); off Carysfort, 60 fathoms, station 2641 (*Albatross*); Straits of Florida, 56 fathoms, station 2639 (*Albatross*); off Habana, 230 fathoms, station 2321 (*Albatross*); Sabanilla, United States of Colombia (*Albatross*); Bermudas, (Verrill). Porto Rico: Mayaguez Harbor, 12 to 18 fathoms, station 6061; off St. Thomas, 20 to 23 fathoms, station 6079; off Vieques, 6 to 16 fathoms, stations 6091, 6092, and 6096.

## Tribe CARIDEA.

Body generally laterally compressed. Antennules with a three-jointed peduncle, usually furnished with an external basal spine and two or three flagella. Antennal scale generally well developed. External maxillipeds generally pediform. One or both of the first two pairs of feet may be chelate, the three posterior pairs always simple. Abdomen long, the sides produced downward. Gills phyllobranchiate.

## Family LYSMATIDÆ (Kingsley, 1878, Lysmatinæ).

## NIKIDÆ Bate, 1888.

Rostrum horizontal with the dorsal surface of the carapace; mandibles without a cutting edge and without palp; first pair of trunk-legs more or less chelate, and stronger than the second, but not so long; second minutely chelate, with carpus subdivided.

Genus *PROCESSA* Leach.

*Processa* Leach, Mal. Podoph. Brit., text to pl. xli, July 1, 1815.

*Nika* Risso, Hist. Nat. Crust. Nice, 84, 1816.

Rostrum short. Antennule biflagellate. Of the flagella of the antennule, one is long, the other short. One of the trunk-legs of the first pair chelate, the other simple. Carpus of second pair elongate, multiarticulate.

*Processa canaliculata* Leach.

*Processa canaliculata* Leach, Mal. Podoph. Brit., pl. xli, and corresponding text, July 1, 1815.

*Nika edulis* Risso, Hist. Nat. Crust. Nice, 85, pl. iii, f. 3, 1816.

*Nika bermudensis* Rankin, Ann. N. Y. Acad. Sci., xii, 536, pl. xvii, f. 2, 1900.

Carapace smooth. Rostrum slender, about half as long as eye-stalks, unarmed except at apex, which is obscurely bifid and furnished with a few long hairs. On the anterior margin of the carapace a spine below the eye. Antennal scale as long as antennular peduncle. Antennal peduncle reaching about to the end of second joint of antennular peduncle. First pair of feet rather stout, reaching a little beyond antennal scale. Right or chelate foot with the palm a little longer than carpus or fingers. Left foot of first pair with dactylus about one-fourth the length of propodus. Remaining feet slender and long. Second pair unequal in length. Meral joints of third and fourth pairs armed beneath with sharp, slender spinules. American specimens have the legs more slender than in the European specimens with which I have compared them. They resemble in that respect the variety of *N. edulis*, which Bell named *N. couchii*.

Europe; Madeira (Stimpson); Japan (Ortmann); off North Carolina, 32 and 25 fathoms, stations 2605 and 2606 (*Albatross*); Marco, Fla., 1 to 3 fathoms (H. Hemphill, coll.); Key West, Fla. (H. Hemphill, coll.); west coast of Florida, 17 and 45 fathoms, stations 5066 and 5119 (*Grampus*); Gulf of Mexico, off Cape San Blas, Fla., 25 and 111 fathoms, stations 2370, 2373, and 2402 (*Albatross*); Old Providence, West Indies (*Albatross*); Bermudas (G. Brown Goode, coll.), also recorded by Rankin. Porto Rico: Boqueron Bay; off Vieques, 12½ fathoms, station 6095.

## Family ALPHEIDÆ Milne Edwards, 1837 (Alphécens); Kingsley, 1878 (Alpheinæ); Bate, 1888.

Rostrum minute or of moderate size; eye-stalks short and usually more or less covered by the projection of the frontal margin of the carapace; mandibles with a cutting edge distinct from the molar process and a one or two jointed palp; first pair of trunk-legs robustly chelate, often unsymmetrical, the second pair long and slender, minutely chelate, with carpus subdivided.

*Key to the Porto Rican genera of the family Alpheidæ.*

A. Eyes covered by carapace.

B. Carapace not cristate.

C. Thoracic feet with epipods. Propodus of large cheliped compressed ..... *Alpheus*

C'. Thoracic feet without epipods. Propodus of large cheliped cylindrical ..... *Synalpheus*

B'. Carapace cristate ..... *Jousseaumca*

A'. Eyes with stalks projecting well in advance of carapace ..... *Automate*

Genus **ALPHEUS** Fabricius, Coutière.

*Alpheus* Fabricius, Suppl. Entom. Syst., 380, 1798; Coutière, Ann. Sci. Nat. (8), Zool., ix, 336, 1899.

Carapace smooth. Rostrum of variable shape. Orbital arches usually very complete, isolated by an orbito-rostral depression and an orbito-antennal sulcus; formed by excessive development of extra-corneal spines, of which the point frequently remains. No pterygostomial spine. Antennules with basal article and spine reduced. Distal article of third maxillipeds drawn out to a point and almost unarmed. Thoracic feet with epipods. First pair with an asymmetry usually very marked. Carpus very short, hemispherical. Chela depressed, of variable form. Third to fifth pairs of feet with propodi strongly spinulous; dactyli usually simple, sometimes lanceolate.

*Key to the Porto Rican species of the genus Alpheus.*

- A. Carapace without median spine at base of rostrum. No long spine between rostrum and eyes.  
 B. Orbit with a small spine on the margin.  
 C. Propodus of large cheliped notched on both margins.  
 D. Basal antennal spine very short, not reaching second segment of antennula. Antennal scale no longer than antennular peduncle.....*macrocheles*  
 D'. Basal antennal spine reaching second segment of antennula. Antennal scale longer than antennular peduncle.....*dentipes*  
 C'. Propodus of large cheliped not notched on margins.....*formosus*  
 B'. Orbit without a spine.  
 C. No basal antennal spine.....*cristulifrons*  
 C'. A basal antennal spine.  
 D. Orbital margin forming a projecting tooth. Both surfaces of large hand with a longitudinal groove, between these grooves a tooth.....*packardii*  
 D'. Orbital margin simply rounded, without a tooth.  
 E. Hands of large cheliped notched on both margins.....*heterochelus*  
 E'. Hands not notched on the margins.  
 F. Hand with two longitudinal grooves on outer surface.....*rostratipes*  
 F'. Hand with one groove on either surface leading from pollex.....*floridanus*  
 A'. Carapace with a median spine at base of rostrum. A long spine between rostrum and eyes.....*armatus*

***Alpheus macrocheles* (Hailstone).**

*Hippolyte macrocheles* Hailstone, Mag. Nat. Hist., viii, pp. 395, 549, 552, 553, 1835.

*Alpheus megacheles* Norman, Ann. Mag. Nat. Hist. (4), ii, 175, 1868.

Rostrum a short, acute spine, much shorter than first antennular segment. Orbital margin with a smaller spine, less advanced than rostrum. Third antennular segment half as long as second. Basal scale broad, triangular, tipped with a spine reaching nearly to second segment. Antennal peduncle longer than antennular. Scale equal or nearly equal to antennular peduncle. Basal spine very short, shorter than antennular scale. Propodus of large cheliped much compressed, with upper and lower margins notched. Distal portion of outer face with three longitudinal furrows; the crest between middle and lower furrows prolonged into a spine between bases of fingers. Superior margin of dactylus with a thin, sharp edge. Smaller cheliped also broad; propodus with both margins notched, upper notch very feeble; outer face marked with shallow grooves, and a spine at base of fingers, similar to those in the large cheliped, but less strong. The carpal joints of the second pair diminish as follows: First, second, fifth, fourth, third; the first or proximal joint being the longest. Length of European specimen, 24.8 mm.

A large chela of a small specimen of this east Atlantic species was taken in Mayaguez Harbor, 161 to 172 fathoms, station 6066. In this claw the distal extremity of the upper margin is spiniform instead of lobiform as in the large European specimens that I have at hand; the superior furrow of the outer face is longer, extending two-thirds the length of the palm. The marginal notches are slight. It is possible that this claw belongs to a distinct species.

*A. macrocheles* is known from Europe and West Africa.

***Alpheus dentipes* Guérin.**

*Alpheus dentipes* Guérin, Exp. Scient. Morée, part. Zool., 39, pl. xxvii, f. 3, 1832.

*Alpheus candeï* Guérin, in La Sagra's Hist. Cuba, 2d part, vii, p. xix, pl. ii, f. 9, 1857.

*Alpheus transverso-dactylus* Kingsley, Bull. U. S. Geol. Survey, iv, 196, 1878.

Rostrum a slender spine, not reaching second antennular segment. Orbital margin with a small spine, less advanced than rostrum; on the margin between rostrum and orbital spine a thin laminae



lobe. Third segment of antennular peduncle half as long as second. Basal scale short and broad, tipped with a spine, and falling far short of second segment. Antennal peduncle longer than antennular, its scale intermediate in length between the two peduncles; spine of scale long, projecting well beyond blade. Basal spine reaching line of anterior margin of first antennular segment. Propodus of large cheliped with upper and lower margins notched. Distal portion of outer face with three longitudinal furrows; crest between middle and lower furrows terminates in a spine between bases of fingers, as in *A. macrocheles*; upper furrow continued posterior to notch by an oblique furrow passing over on to inner face. Superior margin of dactylus somewhat thickened and rounded. Smaller cheliped similar to that of *macrocheles*, but the margins of propodus are deeply notched and the superior groove of the outer face is oblique and confined on inner face, as in the large cheliped. Small chela of female much more slender and with longer fingers than in male. Carpal joints of second pair diminish as follows: First, second, fifth, fourth, third.

Length of European specimen, 25.3 mm.; Porto Rican specimens all very small.

Mediterranean; Cape Verde Islands (Stimpson, as *A. streptochirus*); Bermudas, G. B. Goode (Kingsley); Cuba (Guérin); Key West (Kingsley); Santa Barbara and San Diego (Kingsley). Porto Rico: Puerto Real; Playa de Ponce; Arroyo; Ensenada Honda, Culebra.

#### *Alpheus formosus* Gibbes.

*Alpheus formosus* Gibbes, Proc. Amer. Assoc. Adv. Sci., III, 196, (32), 1850.

*Alpheus poeyi* Guérin, in La Sagra's Hist. Cuba, 2d part, vol. VII, p. XLIX, pl. II, f. 10, 1857.

Rostrum flat, narrow-triangular, beginning at posterior line of the eyes, long-pointed and reaching or nearly reaching second antennular segment. Orbits with a slender spine, much shorter than rostrum. Antennular scale overreaching first segment; second segment a little longer than third. Antennal peduncle longer than antennular; scale a little longer than peduncle. Basal spine reaching only to second antennular segment. Hand of larger cheliped compressed, without notches or grooves. Dactylus about two-fifths the length of palm, moving horizontally. Hand of small cheliped very slender; fingers as long as palm; a spine on inner face of palm, at base of the dactylus. The carpal joints of the second pair diminish as follows: First, fifth, second, third, fourth; the first joint twice the length of second.

Length of ovigerous female, 17.3 mm.

Porto Rico: Mayaguez; Mayaguez Harbor, 4 to 6 fathoms, station 6065; Playa de Ponce; off Humacao, 9½ fathoms, station 6099; Ensenada Honda, Culebra; Fajardo. Key West (Gibbes); Cuba (Guérin); Bermudas (G. Brown Goode, coll.; also recorded by Verrill); Natal to Maceio, Brazil (Branner-Agassiz Exped., 1899).

#### *Alpheus cristulifrons* Rathbun.

*Alpheus obeso-manus* Pocock, Jour. Linn. Soc. London, Zool., xx, 520, 1890 (nec Dana).

*Alpheus cristulifrons* Rathbun, Proc. Washington Acad. Sci., II, 152, 1900.

On the median line between the eyes is a thin sharp crest, terminating in front in a short upturned rostral tooth, only slightly advanced beyond the orbital hoods, which have rounded margins without spines. Second segment of antennular peduncle nearly twice as long as third. Scale very short, not reaching second segment. Antennal scale a little longer than antennular peduncle and a little shorter than antennal peduncle; its thickened outer portion very wide, terminating in a spine, extending considerably beyond the thin inner blade. No basal spine. Propodus of large cheliped almost cylindrical, very slightly compressed, in general appearance smooth. A faint notch on upper margin near dactylus. On the outer side a shallow longitudinal groove across the pollex, which is continued a short distance on palm. Dactylus a little less than half the length of upper margin of palm and moves horizontally. Smaller hand somewhat resembles the larger, except that it is less twisted, less cylindrical, with dactylus and thumb straighter and relatively longer. The carpal joints of second pair diminish as follows: Second, fifth and first, fourth and third; the second being as long as the third, fourth, and fifth together.

Length of an ovigerous female, 16.7 mm.

Porto Rico: Playa de Ponce; Arroyo, on Light-house Reef; Ensenada Honda, Culebra. Fernando Noronha (Pocock); Maceio, Brazil (Branner-Agassiz Exped., 1899).

***Alpheus floridanus* Kingsley.**

*Alpheus floridanus* Kingsley, Bull. U. S. Geol. Survey, iv, 193, 1878.

Rostrum a sharp spine falling far short of the second antennular segment. Orbital margin rounded, without a spine. Second antennular segment very long, more than twice as long as third. Scale very short, its spiniform tip reaching half-way between rostrum and second segment. Antennal scale a little longer than antennular peduncle; antennal peduncle considerably longer. Basal spine very short, less advanced than rostrum. Propodus of chelipeds elongate and much compressed; margin entire; inner and outer surfaces in large cheliped with a broad, shallow groove leading from pollex; surface granulate; dactylus nearly as long as upper margin of palm. Propodus of smaller cheliped much more slender, fingers considerably longer than palm. Carpal joints of second pair diminish as follows: Second, first, fifth and fourth, and third; second nearly as long as third, fourth, and fifth taken together.

Length of Porto Rican specimen, 41.5 mm.

Porto Rico: Mayaguez Harbor, 7 to 18 fathoms, stations 6059 and 6061; Puerto Real; off Puerto Real, 8½ fathoms, station 6074; off Boca Prieta, 8½ fathoms, station 6075; off Humacao, 9½ fathoms, station 6099; Fajardo. Fort Jefferson, Fla. (Kingsley).

***Alpheus heterochælis* Say.**

*Alpheus heterochælis* Say, Jour. Acad. Nat. Sci. Phila., 1, 243, 1818.

*Alpheus heterochælis* Herrick, Mem. Nat. Acad. Sci., v, 372, pl. II (colored), 1891.

Rostrum carinated, slender, either reaching or nearly reaching to end of first antennular segment. Orbital margin rounded, without a spine. Second antennular segment twice as long as third; scale with a slender terminal spine reaching end of first segment. Antennal peduncle as long as or longer than antennular; scale longer than antennular peduncle; basal spine very short, reaching only slightly beyond orbital margin. Chelipeds very unequal. Propodus of larger cheliped much distorted and deeply and irregularly grooved; outer and inner margins with a deep notch near fingers. Dactylus more than half as long as palm, its distal margin almost at right angles to outer. Smaller cheliped very slender, palm slightly notched; fingers proportionally longer than in large cheliped. Carpal joints of second pair diminish as follows: First, second, fifth, third, fourth; the first being equal to the sum of the last three.

Length of Porto Rican specimen, 27.7 mm.

Porto Rico: Mayaguez; Boqueron Bay; Arroyo; off Vieques Island, 16 fathoms, station 6092; Hucares; Ensenada Honda, Culebra. The specimens from Mayaguez, Hucares, and station 6092 have the rostrum more flattened at the base, as in Rankin's *A. lanceirostris*; whether this last has specific value I am unable to determine.

North Carolina to Rio de Janeiro (Kingsley); Bermudas (G. Brown Goode, coll.); Lower California (Lockington); west coast of Nicaragua and Panama (Kingsley); Mamangape to Maceio, Brazil (Branner-Agassiz Exped., 1899).

***Alpheus packardii* Kingsley.**

*Alpheus packardii* Kingsley, Proc. Acad. Nat. Sci. Phila., xxxi, 417, for 1879 (1880).

*Alpheus bermudensis* Bate, Challenger Rept., Zool., xxiv, 547, pl. xcvi, f. 3, 1888.

*Alpheus minus* Herrick, Mem. Nat. Acad. Sci., v, 372, pl. I (colored), 1891 (nec Say).

Rostrum carinated, carina extending behind eyes; extremity spiniform reaching nearly to second antennular segment. Margin of orbit projecting as a blunt tooth. Second antennular segment nearly twice as long as third; scale about as advanced as rostrum. Antennal peduncle and scale subequal, slightly longer than antennular peduncle. Propodus of chelipeds greatly compressed; a triangular, longitudinal groove on both upper and lower surfaces near outer margin; the margin between these grooves forms a tooth near distal end of palm; between this tooth and the dactylus is a notch in the margin; inner margin with shallow sinns. Smaller propodus half as wide as larger and similarly formed; a sharp spine on distal end of outer margin of upper surface. Carpal joints of second pair, diminish as follows: Second, first, fifth, third, and fourth; the second being very slightly greater than first.

Length of Bermudan specimen, 24.5 mm.

Porto Rico: Mayaguez; Boqueron Bay; Playa de Ponce; Arroyo; off Vieques, 6 to 16 fathoms, stations 6085, 6091, 6092, 6095, 6096; off Culebra, 14½ to 15 fathoms, stations 6086, 6093; Ensenada Honda, Culebra; Fajardo.

Beaufort, N. C. (Herrick); Key West (Kingsley); St. Thomas (Bate); Bermudas (Bate and U. S. Nat. Mus.).

***Alpheus rostratipes* Pocock.**

*Alpheus rostratipes* Pocock, Jour. Linn. Soc. London, Zool., xx, 522, 1890.

Carapace cristate between eyes; rostrum spiniform, not reaching second antennular segment. Margin of orbits rounded. Segments of antennular peduncle subequal in length; spine of scale reaching to middle of second segment. Antennal scale equal in length to antennular peduncle; scale with a very broad blade, much shorter than its spine. Antennal peduncle a little longer than antennular; basal spine about as advanced as antennular scale. Merus of large cheliped with a sharp tooth at distal end of superior margin. Propodus compressed, subovate, much higher than fingers; slightly twisted; distal half of outer face with two longitudinal grooves which converge toward thumb; upper margin with a shallow groove. Thumb extremely short; dactylus less than one-third the length of palm. Fingers of smaller cheliped longer than palm. Thumb twice as wide at base as dactylus. Carpal joints of second pair becoming progressively shorter in the following order: First, fifth, second, third, fourth.

A small species, a female with eggs measuring 10.5 mm. in length.

Arroyo, Porto Rico. Type locality, Fernando Noronha (Pocock).

***Alpheus armatus*, sp. nov.**

Carapace of female compressed, high, the height being equal to length exclusive of rostrum; smooth. Rostrum extending nearly to the second segment of peduncle of antennule; narrow, tip acuminate; depressed, upper surface concave from behind forward, lateral margins fringed with bristles; a short blunt median spine at base on a line with bases of eye-stalks; rostrum separated from eye-stalks by a deep groove. Between the base of rostrum and inner base of eye-stalk on each side is a long spine with slender tip; tips convergent, rising a little above level of adjacent part of rostrum and not reaching extremity of eyes. Although the eye-stalks are plainly visible, they are entirely covered by an extension of carapace; cornea large and dark-colored, obtusely pointed in front. Anterior margin of carapace external to the eyes entire. The spine of antennular scale is slender and extends about as far forward as the rostrum. Second joint of peduncle about twice as long as third joint. Outer branch of flagellum thick except at extremity, and a little longer than peduncle; inner branch slender and three times as long as outer. The antennal scale nearly as long as antennular peduncle. It is rounded at the end and has a slender spine separated from the blade by a narrow slit extending half the length of the scale; a short spine at its outer inferior base. Peduncle a little longer than that of antennula; flagellum longer than body. The external maxillipeds reach, when extended, as far as end of antennular peduncle; they are clothed with long hairs.

First pair of feet missing in type specimen; second pair slender (right one present) and as long as outer antennular flagellum; ischium and merus subequal; first joint of carpus about two-thirds as long as merus; second joint half as long as first, a trifle longer than fifth, and twice as long as third or fourth, which are subequal. Digits about equal to palm and also to last carpal joint. The third foot reaches about to last carpal joint of second pair. Merus three times as long as ischium and twice as long as carpus; it has an inferior distal spine. Propodus somewhat shorter than merus, its inferior margin bordered by nine long slender spines. Dactylus short, about one-fourth propodus, curved, with a slender nail. Fourth and fifth pairs of feet similar to third, but slender and shorter; in the fifth pair there are but six propodal spines.

Abdomen smooth and rather short and thick. The telson has two pairs of spines on its dorsal face; extremity slightly arcuate, with a spine on either side. Lateral laminae subequal in length and longer than telson; inner branch suboval and unarmed; outer branch with an irregular transverse suture and a long black spine near outer terminal angle. Basal scale of uropods two-spined.

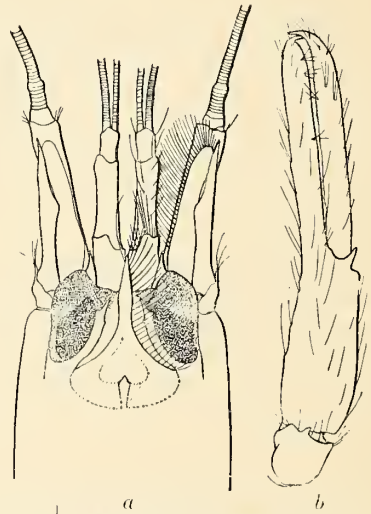


FIG. 20.—*Alpheus armatus*, female. (a) Anterior portion,  $\times 4$ . (b) Small cheliped,  $\times 4$ .



Dimensions of female: Length of body from tip of rostrum to tip of telson, 25 mm.; length of carapace, 9.3 mm.; length of carapace to the median spine at base of rostrum, 6.3 mm.; height of carapace, 7 mm.; width of carapace, 5.5 mm.; length of second pair of feet, 18 mm.

Type locality, Ponce, 1 female (Cat. No. 23784).

This species approaches *A. intrinsecus* Bate, but differs from it and from all other species of the genus in having a median dorsal spine at base of rostrum. A specimen of *A. armatus*, an ovigerous female, larger than the type, was taken in Kingston Harbor, Jamaica, by Dr. J. E. Duerden. The rostro-orbital spine is shorter than in the type, not reaching beyond middle of cornea. The rostrum and antennular scales are equally advanced. Antennal flagellum is 1.5 times the length of body.

The large cheliped is missing, as in the type. The small cheliped has a merus about three times as long as broad, inner margins spinulose, outer margin terminating in a small spine. Carpus short, subspherical, its distal margin on the outer side with a prominent tooth. Palm nearly as long as merus, subcylindrical, narrowing a little distally, somewhat angular, its upper surface with two marginal lines; surface clothed with long hairs which arise from scabrous granules or spinules; palm with a sharp spine on outer and another on inner side of its distal margin. Fingers longer than palm, cylindrical, of equal size, bent downward, tips strongly curved, sharp, crossing each other; prehensile margins very finely denticulate and closing tightly together. Length of carapace, 13.6 mm.

#### Genus *SYNALPHEUS* Bate, Coutière.

*Synalpheus* Bate, Challenger Rept., Zool., XXIV, 572, 1888; Coutière, Ann. Sci. Nat. (8), Zool., IX, 334, 1899.

Carapace smooth. Front tridentate or trispinous, the orbital arches being formed by the well-developed extra-corneal spines, completed frequently by a vertical prolongation from base of rostrum. A pterygostomial spine present. Antennules with basal article the longest; basal spine wide, equal to sum of two first articles. Distal article of third maxillipeds elongate, armed with strong spinules at tip. Thoracic feet without epipods. First pair very asymmetrical. Large cheliped with carpus very short; propodus ovoid, smooth, entire; movable finger very short. Small cheliped with the carpus frequently elongate and cylindrical, palm entire and smooth, fingers exactly joining. In Porto Rican specimens the carpus of the second pair has the first joint twice or more than twice the fifth, and the second, third, and fourth joints very small and subequal. Third to fifth pairs with propodi feebly spinulose; dactyli always bifid, sometimes trianguiculate.

#### Key to the Porto Rican species and subspecies of the genus *Synalpheus*.

- A. Antennular scale overreaching first antennular segment.  
 B. Dactylus of larger cheliped less than half the length of palm..... *minus*  
 B'. Dactylus of larger cheliped at least half as long as palm..... *acutatus*  
 A'. Antennular scale not reaching beyond first antennular segment.  
 B. Basal antennal spine elongate, surpassing the spine of scale..... *levimanus parvifiti*  
 B'. Basal antennal spine shorter than the spine of scale, but still surpassing the first antennular segment.  
*levimanus longicarpus*

#### *Synalpheus minus* (Say).

*Alpheus minus* Say, Jour. Acad. Nat. Sci. Phila., 1, 245, 1818.

*Alpheus tridentulatus* Dana, Crust. U. S. Expl. Exped., 1, 552, 1852; pl. XXXV, f. 4, 1855.

*Alpheus saulegi* Guérin, in La Sagra's Hist. Cuba, 2d part, vol. VII, p. XVIII, pl. II, f. 8, 1857.

*Alpheus peccox* Herriek, Johns Hopkins Univ. Circ., VII, No. 63, p. 37, 1888.

*Alpheus saulegi* var. *brevicarpus* Herriek, Mem. Nat. Acad. Sci., v, 381, pl. IV (colored), 1891.

*Synalpheus minus* Coutière, Bull. Soc. Entom. France, 1898, No. 8, 190, fig. 4.

Rostral and orbital spines present, the rostral reaching to middle of first antennular segment and a little longer than orbital. Antennular scale reaching to about middle of second segment. Antennal scale as long as antennular peduncle, shorter than antennal peduncle. Basal spine reaching to end of antennular segment. Dactylus of large cheliped less than half the length of palm. Carpus of small first cheliped very short, hemispherical.

Length of Porto Rican specimen, 11.5 mm.

Taken by the Porto Rican expedition at Mayaguez Harbor, 4 to 6 fathoms, station 6065; Mayaguez, on coral reef; Puerto Real; Playa de Ponce; Arroyo; off Vieques, 15 to 16 fathoms, stations 6091, 6092;

off Humaçao, 9½ fathoms, station 6099; off Culebra, 15 to 15½ fathoms, stations 6087, 6093; Eisenada Honda, Culebra; off St. Thomas, 20 to 23 fathoms, stations 6079, 6080.

Beaufort, N. C. (Kingsley); to Rio de Janeiro? (Dana); Bermudas (Kingsley); Panama (Kingsley). In green sponges (Herrick); Maceio, Brazil (Branner-Agassiz Exped., 1899).

***Synalpheus lævimanus longicarpus* (Herrick).**

*Alpheus sauleyi* var. *longicarpus* Herrick, Mem. Nat. Acad. Sci., v, 383, 1891.

*Synalpheus lævimanus* var. *longicarpus* Coutière, Bull. Soc. Entom. France, 1898, No. 8, 189, fig. 2.

Rostral and orbital spines similar to those of *S. minus*. Antennular scale not reaching quite to end of first segment. The antennal scale is variable in length and may reach the middle of second antennular segment or to end of third segment. Basal spine of antenna overreaching first antennular segment. The dactylus of the larger cheliped is relatively longer than that of *S. minus*; it is still less than half the length of palm; palm narrower than in that species. Carpus of small cheliped elongate, of variable length, either cup-shaped or subcylindrical.

Length of Bermudan specimen, 15.8 mm. Porto Rican specimens much smaller.

Porto Rico: Mayaguez Harbor, 22 to 33 fathoms, station 6064; off Vieques, 12½ fathoms, station 6095; off St. Thomas, 20 fathoms, station 6080.

Florida Keys, Bahamas, and Antilles, in brown sponge, *Hircina acuta*; Bermudas (G. Brown Goode and George Hawes, coll.).

***Synalpheus lævimanus parfaiti* Coutière.**

*Synalpheus lævimanus* var. *parfaiti* Coutière, Bull. Soc. Entom. France, 1898, No. 8, 191, fig. 3.

Rostral spine. Orbital margins forming blunt lobes almost as far advanced as rostrum. The antennular scale does not reach beyond first segment, but is equal or almost equal to it. The spine of the scaphocerite may be as long as or fall somewhat short of antennular peduncle; its scale is absent in type, but present in specimens before me as a very narrow strip, much shorter than the spine. Basal antennal spine as long as or longer than scaphocerite. The large cheliped in shape and proportions resembles that of *S. minus*; the palm has the strongly projecting distal tooth of *S. lævimanus longicarpus*. The carpus of small cheliped is somewhat longer than that of typical *lævimanus* figured by Coutière, *op. cit.*, fig. 1b.

Length of Porto Rican specimen, 14 mm.

Off Vieques, 14 fathoms, station 6085; off St. Thomas, 20 to 23 fathoms, station 6079. Type locality, Annobon, West Africa.

***Synalpheus neptunus* (Dana).**

*Alpheus neptunus* Dana, Crust. U. S. Expl. Exped., I, 553, 1852; pl. 35, f. 5, 1855.

*Synalpheus neptunus* Coutière, Ann. Sci. Nat. (8), Zool., IX, 15, 1899.

In typical specimens, the front is three-spined, spines subequal. The antennular scale overreaches first antennular segment and extends from one-third to one-half the length of second segment. The antennal scale is longer than antennular peduncle, about as long as antennal peduncle. The basal spine is as long or nearly as long as antennular scale. Dactylus of large cheliped longer than in any other Porto Rican species; it is one-half or more than one-half the length of palm. Carpus of smaller cheliped short.

Specimens from the Bermudas have the rostral spine considerably longer than orbital, reaching one-half the length of basal segment. Dactyli of third, fourth, and fifth pairs of feet trianguiculate, the third nail being rudimentary. Length, 21.3 mm.

In the Porto Rican collection there is but one small specimen, dredged off Gallardo Bank, 10 fathoms, station 6076. This specimen varies considerably from typical ones. The frontal projections are dentiform, short, but still, in relation to the antennular peduncles, they are as advanced as in typical specimens. Antennular scale of normal length. Antennal scale scarcely attaining end of antennular peduncle. Basal spine reduced, not reaching end of first antennular segment. The large cheliped resembles closely that of Bermudan specimens.

Sooloo Sea, 6½ and 9 fathoms, and Fiji Islands (Dana); Red Sea (Heller, Paulson); Bermudas (G. Brown Goode, coll.).

Genus *JOUSSEAUMEA* Coutière.*Jousseaumea* Coutière, Bull. Mus. Hist. Nat. Paris, II, 1896, 281.

Carapace depressed, more or less carinated; rostrum broad and flat. Eyes wholly or almost wholly concealed beneath carapace. First pair of feet asymmetrical; large cheliped with merus elongate; carpus short, cup-shaped; propodus with three or four surfaces; fingers saw-toothed.

*Jousseaumea trigona*, sp. nov.

I have placed this species (which is represented by a single specimen in bad condition) provisionally in *Jousseaumea*, although the chelipeds are not folded under the body and the propodus is three-sided.

Carapace of female with nine sharp longitudinal crests. The median extends from tip of rostrum to near posterior margin of carapace. The next crest extends from margin of orbital hoods about two-thirds the length of carapace; on the posterior third this crest is replaced by a curved crest, which anteriorly turns downward and outward, and then backward, forming a portion of an oval. The third crest begins on a line with lower margin of eye, and a little behind eye, and extends backward and slightly downward to posterior third of carapace; it there forms an obtuse angle and curves slightly upward and backward to near posterior margin. Fourth crest short, arising behind third, and extending barely half-way back on carapace. Fifth crest very short, extending obliquely downward from tip of antennal spine. The rostrum viewed from above is triangular, acute, the tip reaching slightly beyond first segment of antennula; anterior margin of carapace sloping obliquely backward in a sinuous line to lateral angle. Eyes large and entirely covered by carapace. Antennular peduncle short, the second segment a little longer than third. Its scale is as broad at base as peduncle and overreaches a little the penult segment of peduncle. Antennal peduncle a little longer than antennular. Its scale very broad, with almost straight outer margin and not quite so long as antennular peduncle; the distal spine scarcely overreaches the blade.

The outer maxilliped reaches nearly to end of antennal peduncle; it is flattened, with sharp, lateral edges; terminal joint acuminate. The large cheliped extends beyond antennal peduncle by only about two-thirds the length of fingers. Merus triangulate, increasing in size distally; a sharp, longitudinal, and somewhat curved crest on its inner inferior margin. Carpus very short, with a sharp outer tooth. Palm triangulate, with a flat superior surface, a convex infero-outer face, and a narrower flat infero-inner face; three surfaces separated by sharp crests, of which the outer one has a curved tooth at proximal end. Fingers about as long as palm, subcylindrical, the movable or outer larger than immovable or inner; fingers terminating in short, slender horny tips crossing each other. Prehensile edges subentire and ciliate. Smaller cheliped missing. The palm of second pair of feet overreaches slightly the antennal peduncle. The first segment of carpus is equal to second, third, and fourth taken together. These three are subequal. The fifth is 1.5 times the fourth. Palm as long as fifth carpal segment; fingers a little longer than palm. The third pair of feet reach to distal third of fingers of the large cheliped. They are slender. Carpus about half the length of the merus and two-thirds the propodus. Dactylus half as long as the propodus. Propodus with a few spinules on lower margin.

Length of female from tip of rostrum to tip of telson, 13.2 mm.; length of carapace, 5.5 mm.

Type locality, off Vieques, 6 fathoms, coral, station 6096, 1 female (Cat. No. 23785).

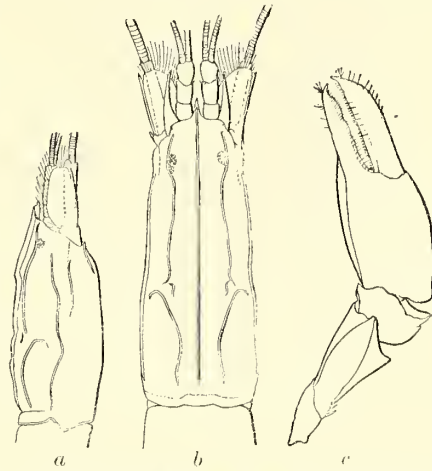


FIG. 21.—*Jousseaumea trigona*, female. (a) Side view of carapace and antennæ,  $\times 6$ . (b) Dorsal view of carapace and antennæ,  $\times 7.5$ . (c) Lower view of left cheliped,  $\times 10$ .



Genus *AUTOMATE* de Man.

*Automate* de Man, Arch. f. Natur., LIII, part 1, 529, 1887.

Carapace compressed, leaving the eyes exposed by a large sinus; armed with a feeble median convexity. Eye-stalks parallel, conical, cornea much reduced. Antennular peduncles extremely elongate, especially the median article; flagellum simple; stylocerite very small. Antennal scale very short; carpal joint very elongate. Third maxillipeds very slender, much longer than antennular peduncles. Anterior feet strong, asymmetrical, especially in the male, compressed, smooth, and entire. Carpus very short, globular. Movable finger of large chela with a molar process penetrating a cavity in the immovable finger. Second pair long; first carpal segment shorter than the second. Remaining feet robust, compressed, unarmed, dactylus simple.

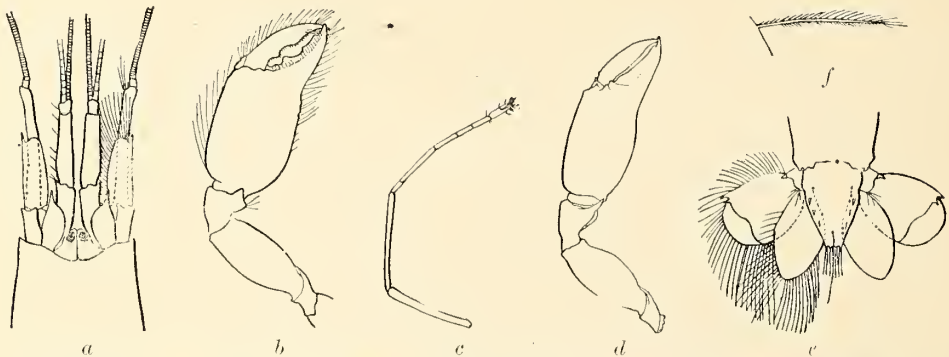


FIG. 22.—*Automate evermanni*. (a) Anterior portion,  $\times 8$ . (b) Cheliped of male,  $\times 8$ . (c) Second leg,  $\times 8$ . (d) Cheliped of female,  $\times 8$ . (e) Tail fan,  $\times 10.66$ . (f) Hair from tail, much enlarged.

*Automate evermanni*, sp. nov.

This species in its carapace and eyes resembles *A. dolichognatha* de Man. The antennular scale is shorter than in *dolichognatha*; antennal scale longer than in that species, in adults reaching two-thirds the length of penult segment of antennular peduncle; its outer margin is straight. The outer maxillipeds reach beyond antennular peduncles by the entire length of terminal joint. The large cheliped of the male resembles that of *dolichognatha* figured by Coutière; the anterior margin of the carpus has a projecting tooth on lower part of outer side; another smaller tooth on upper part of inner side. Lower margin of propodus granulated near its middle. Fingers gaping. Pollex longer than in *dolichognatha*, and dactylus tapering more regularly toward the extremity than in that species. In the female the carpus is longer, the propodus narrower, non-granulate, the fingers do not gape. The smaller cheliped is lacking in all the specimens. In the carpus of second pair of legs the first joint is the shortest, being only between one-third and one-fourth the length of second joint. Third joint a little more than one-half the second, fourth joint a little longer than the first, fifth joint intermediate between the third and fourth. The seventh abdominal segment more tapering than in *dolichognatha*; it has two small spines on each side of its dorsal surface near lateral margin; they are near together and near the middle of the length of segment. The two terminal spines are longer than in the type species. Caudal laminae broader and more oval than in *dolichognatha*.

Dimensions of male: Length from frontal margin of the carapace to tip of seventh abdominal segment, about 14.2 mm.; length of carapace, 4.4 mm.

Type locality, off Aguadilla, 137 fathoms, sand, mud, and shells, station 6055, 2 males, 1 female (Cat. No. 23786). Also taken at Mayaguez Harbor, 12 to 18 fathoms, station 6061.

The specific name is given in honor of Dr. B. W. Evermann, chief naturalist of the Fish Commission expedition to Porto Rico.

## Family HIPPOLYTIDÆ Bate, 1888.

Rostrum of important size; eyes not covered by carapace; the mandibles may have a cutting edge and palp, or be without one or both; first pair of trunk-legs with moderate-sized chelæ; second pair chelate, with the wrist or fifth joint sometimes much and sometimes little subdivided.

*Key to the Porto Rican genera of the family Hippolytidae.*

- A. Carpus of second pair of feet composed of few segments.  
 B. Rostrum large. Carpus of second pair of feet biarticulate or triarticulate.  
 C. Carpus biarticulate. Rostrum suborbicular..... *Platybema*  
 C'. Carpus triarticulate.  
 D. Rostrum cultriform..... *Latrunculus*  
 D'. Rostrum very slender..... *Toxocuma*  
 B'. Rostrum very short. Carpus five-articulate..... *Thor*  
 A'. Carpus of second pair of feet composed of many segments..... *Hippolysmata*

## Genus PLATYBEMA Bate.

*Cyclorhynchus* de Haan, Fauna Japon., 174, 1849. (Name preoccupied.)

*Rhynchocyclops* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 27 (96), 1860. (Name preoccupied.)

*Platybema* Bate, Challenger Rept., Zool., XXIV, 576, 578, 1888.

Carapace dorsally carinated, produced anteriorly to a large, laterally compressed, deep rostrum, which projects below level of dorsal ridge. Pleon generally, but slightly, compressed laterally, having the lateral coxal plates largely developed. Eye-stalks short, stout. First pair of antennæ short, peduncle not reaching to end of scaphocerite; flagella two, short, extending but little beyond extremity of rostrum. Second pair of antennæ having a short and broad scale that narrows toward extremity, is armed with a small tooth on outer margin and fringed with long hairs on inner, and does not reach beyond extremity of rostrum; flagellum about one-half the length of the animal. Mandibles short, strong, cylindrical, without cutting edge or palp. Second maxillipeds six-jointed. First and second pairs of thoracic feet short; first pair robust, having the carpus short and anteriorly excavate to receive extremity of propodus, which articulates with it at the infero-distal angle; second pair slender, carpus biarticulate. Pleopoda biramose, foliaceous, unequal. Telson triangular.

*Platybema rugosum* Bate.

*Platybema rugosum* Bate, Challenger Rept., Zool., XXIV, 579, pl. civ, f. 2, 1888.

*Platybema rugosum* Ortmann, Dec. u. Schiz. Plankton-Exp., 47, 1893.

Robust and dorsally arcuate. Dorsal crest armed with teeth from posterior margin of carapace to under surface of distal extremity of rostrum; posterior teeth larger than rostral. Inner and outer canthus of orbit furnished with a small tooth. Fronto-lateral angle of carapace produced to a prominent point, the lateral walls adorned with spines or tubercles. A straight row of spines extends from fronto-lateral angle to posterior margin of carapace. The surface above this row is furnished with scattered spines. Pleon having the anterior two segments elevated in front so that, when viewed laterally, the elevations resemble teeth; the third and succeeding somites smooth, except sixth, which is dorsally armed with two transverse rows of spines, three across the middle and four on posterior margin. Telson having the lateral and distal margins furnished with small spines.

Dimensions of ovigerous female: Length, 21 mm.; length of carapace and rostrum, 9.5 mm.; length of rostrum, 3 mm.

Mayaguez, on coral reef; off Vieques Island, 16 fathoms, station 6092; off Culebra, 14 $\frac{3}{4}$  to 15 fathoms, stations 6086, 6093; off St. Thomas, 20 to 23 fathoms, station 6079.

Bate (*loc. cit.*) had one specimen said to come from off Culebra Island, 390 fathoms, but some doubt is cast on the correctness of this locality by the statement, on page 859 of the same work, that it was associated with *Leptochela serratorbita* at St. Thomas in shallow water. Ortmann (*loc. cit.*) has noted this discrepancy.

Distribution: Gulf of Mexico, 25 to 38 fathoms, stations 2369 to 2374 (*Albatross*) and stations 5073 and 5093 (*Grampus*); off Dry Tortugas, 26 fathoms, station 2414 (*Albatross*); off Cape Catoche, Yucatan, 24 fathoms, station 2365 (*Albatross*); off mouth of Tocantins, 50 to 100 meters (Ortmann).

Genus **LATREUTES** Stimpson.

*Latreutes* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 27 (96), 1860.

Resembles *Platybema*. Rostrum elongate, more than half the length of carapace, laterally compressed and deep. First pair of antennæ subequal in length to rostrum. Second pair with an acutely pointed scale. Mandibles without cutting edge or palp. Second maxillipeds seven-jointed. Carpus of second pair of feet triarticulate. Pleopoda biramose, branches subequal. Telson tapering to a point.

**Latreutes ensiferus** (Milne Edwards).

*Hippolyte ensiferus* Milne Edwards, Hist. Nat. Crust., II, 374, 1837.

*Latreutes ensiferus* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 27 (96), 1860; Bate, *Challenger* Rept., Zool., XXIV, 583, pl. CIV, f. 1, 1888.

Body slender and but slightly sinuous at third segment of pleon. Carapace dorsally rounded, armed with a small median spine on gastric region. Rostrum nearly as long as carapace, vertically broad, of extreme tenuity, slightly curved upward on upper surface toward apex; extremity serrate, lower margin smooth and curved downward in middle. Antero-lateral angle of carapace serrate, with five to eight small spines. First pair of feet short and robust; merus and carpus each excavate to receive succeeding segment; the upper distal angle of carpus projects over propodus and is tipped with a fascicle of long hairs. The propodus articulates with carpus at lower angle and is broader at this extremity than at dactyloid; dactylus broad and spoon-shaped, corresponding in length with pollex. Second pair of feet longer than first, slender, feeble; carpus triarticulate, central segment the longest, and together the three are longer than propodus, of which the fingers are nearly half the length. Third, fourth, and fifth pairs with long spines on under side of propodi, and a series of small spines on dactyli, which are biunguiculate.

Dimensions of female: Length, 15.5 mm.; length of carapace and rostrum, 6.3 mm.; length of rostrum, 3 mm.

Mayaguez; Boqueron Bay. Common in floating Gulf weed in the North Atlantic.

Genus **TOZEUMIA** Stimpson.

*Tozeuma* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 26 (95), 1860.

Body greatly elongate, lanceolate, diminishing at both ends, compressed. Rostrum slender, very long, sometimes scarcely shorter than rest of body. Antennulæ short, biflagellate. Antennal scale long. Mandibles rather stout, strongly incurved, not divided nor palpigerous. External maxillipeds very short, without exognath or flagellum. Feet short, without epipods; first pair very short, stout, chelate; second pair filiform, chelate, carpus triarticulate. Abdomen armed with teeth on dorsum; last article elongate, almost lanceolate.

**Tozeuma carolinense** Kingsley.

*Tozeuma carolinensis* Kingsley, Proc. Acad. Nat. Sci. Phila., XXX, 1878, 90 (2); Proc. Acad. Nat. Sci. Phila., XXXI, 1879, 413, pl. XIV, f. 8 (1880).

Rostrum a little more than half the length of remainder of body, rounded and unarmed above, at base somewhat flattened and horizontal, distally inclined slightly upward; below serrated, and toward the base lamellate, the teeth becoming more distant toward extremity. A spine on either side at base of rostrum; a second at antero-lateral angle. Outer flagellum of antennulæ thick and much shorter than inner. Antennæ longer than rostrum; scale lanceolate, equaling or exceeding antennulæ, but less than half the length of rostrum. Abdomen strongly geniculated on posterior part of third segment, where there is a somewhat truncated protuberance, more prominent in the male than in female. Posterior margin of fifth segment with a spine on each side; of sixth segment with a lateral spine above telson and a postero-lateral spine. Telson with two pairs of dorsal spinules, posterior margin with two long submedian spinules, and one short spinule on each side.

Dimensions of female: Length, 40 mm.; length of carapace and rostrum, 20.5 mm.; length of rostrum, 13.7 mm.



Boqueron, Porto Rico, 1 specimen.

Fort Macon and Beaufort, N. C. (Kingsley); Charlotte Harbor, Fla. (Kingsley). Specimens are in the National Museum from Cedar Keys, Fla. (Lieut. J. F. Moser, U. S. N., U. S. Coast Survey steamer *Bache*, coll.); off St. Martins Reef, 17 feet (Moser, coll.); Anclote Sponge Station, Tarpon Springs (B. W. Evermann, coll.); Charlotte Harbor (W. H. Dall, coll.); Big Gasparilla (*Grampus*); Punta Rassa, 1 fathom (H. Hemphill, coll.); Marco (*Grampus*), 1 to 3 fathoms (H. Hemphill, coll.); Key West, surface with electric light (*Albatross*); Cape Florida (U. S. Fish Commission); Shamrock Point, Corpus Christi, Tex. (B. W. Evermann, coll.); Andros Bank, Bahamas (F. Stearns, coll.); Jamaica, Cozumel (in seine), Old Providence and St. Thomas (*Albatross*).

**Genus HIPPOLYSMATA Stimpson.**

*Hippolysmata* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 26 (95), 1860.

Carapace provided with a rostrum of moderate length, vertically dilated and dentate. Antennulae furnished with two long flagella. Mandibles strongly incurved, not divided into two parts nor palpigerous. External maxillipeds elongate, provided with an exognath and flagellum; last article slender. First to fourth feet provided with epipods. First pair of feet small, thick, hand oblong, second pair filiform, carpus multiarticulate. Abdomen dorsally smooth.

*Key to the Porto Rican species of the genus Hippolysmata.*

- A. One median spine on carapace posterior to rostrum and anterior to middle.....*moorei*  
 A'. Two or three median spines on carapace posterior to rostrum, the hinder of these spines at middle of carapace.....*intermedia*

***Hippolysmata moorei*, sp. nov.**

Carapace dorsally carinated in anterior half, a spine at anterior fourth. Rostrum reaching the middle of second antennular segment, bent down toward extremity, armed above with three or four teeth, and below with two smaller teeth near extremity. Anterior margin with a strong antennal spine. Eyes very short and stout, the axial diameter not exceeding transverse. Cornea black in alcohol. Antennulae stout; peduncle short; last two segments broader than long; a very slender inner flagellum as long as body, and a stout outer flagellum about two-thirds the length of the carapace and bearing on its outer margin at about the tenth segment (in large specimens) a long slender flagellum similar to innermost one. Antennal scale broad, tapering, truncate, with a very small antero-lateral spine. Peduncle reaching to about the middle of penultimate segment of antennular peduncle; flagellum slender, as long as body. Outer maxillipeds reaching end of antennal scale. First pair of feet with carpus and palm subequal in length; fingers half as long as palm. Carpus of second pair about seventeen-articulate; distal segment about as long as palm; fingers shorter. Telson narrow, blunt-pointed, armed with two pairs of slender spines forming a square near middle, and two spines at extremity. Caudal laminae exceeding telson, inner lamina narrower than outer.

Dimensions of female: Length, 20.3 mm.; length of carapace and rostrum, 7.5 mm.; length of rostrum, 2.4 mm.

Type locality, Playa de Ponce, 14 specimens (Cat. No. 23787).

The short antennular peduncles and antennal scale easily distinguish this species from all others.

Named for Dr. H. F. Moore, naturalist of the *Albatross*, who accompanied the *Fish Hawk* on its cruise to Porto Rico.

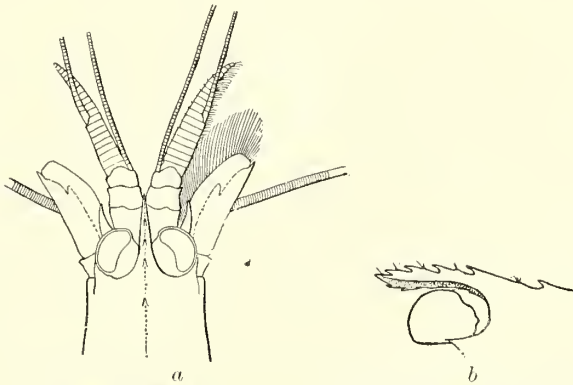


FIG. 23.—*Hippolysmata moorei*. (a) Anterior portion, dorsal view,  $\times 5$ .  
 (b) Rostrum, side view,  $\times 10.66$ .

**Hippolysmata intermedia** Kingsley.

*Hippolysmata intermedia* Kingsley, Proc. Ac. Nat. Sci. Phila., xxx, 1878, 90, (2); Bull. Essex. Inst., xiv, 128, pl. 1, f. 4 1882.

Carapace carinated for its anterior two-thirds. Crest horizontal, armed with six teeth, two or three on carapace, the remainder on rostrum; posterior dorsal tooth at middle of carapace. Rostrum sharp-pointed, with two inferior teeth and reaching end of penult segment of antennular peduncle. A strong antennal and a small pterygostomial spine. Antennulæ with stout flagellum longer than carapace, fringed with long hair, and bearing the outer slender flagellum at twentieth segment in large specimens. Antennal scale longer and more slender than in *H. moorei*. Peduncle just reaching penult segment of antennular peduncle; flagellum 1.5 times length of body. Outer maxillipeds exceeding antennal scale by half the length of terminal joint. Carpus and propodus of first pair of feet subequal; palm narrower than in *H. moorei*; fingers one-third the length of palm. Second pair of feet more slender than in *H. moorei*; carpus with about thirty articles. Telson similar to that of *H. moorei*.

Dimensions of female with eggs: Length, 20.5 mm.; length of carapace and rostrum, 8 mm.; length of rostrum, 3 mm.

Porto Rico: Mayaguez Harbor; off Vieques, 12½ fathoms, station 6095; Ensenada Honda, Culebra. No Name Key, Fla., banks, low tide (H. Hemphill, coll.); Key West (H. Hemphill, coll.); Tortugas (Kingsley); St. Thomas (Nobili); Pim Bay, Fayal, Azores (Lewis Dexter, coll.).

**Genus THOR** Kingsley.

*Thor* Kingsley, Proc. Acad. Nat. Sci. Phila., xxx, 1878, 94 (6).

Carapace with antennal spine; rostrum short, toothed above; antennulæ biflagellate, outer branch very stout. Mandibles without palpi, bifurcate, apical process narrow; proximal process stout with one acute and one obtuse tooth and a pubescence of minute curved hooks. External maxillipeds pediform, exopodite present. Feet of first pair short, stout; of second elongate, slender; carpus five-annulate. Telson elongate, triangular.

**Thor floridanus** Kingsley.

*Thor floridanus* Kingsley, Proc. Acad. Nat. Sci. Phila., xxx, 1878, 95 (7); Proc. Acad. Nat. Sci. Phila., xxxi, 1879, 421, pl. xiv, f. 6, 1880.

Carapace with a small antennal spine. Rostrum shorter than eyes, four to five toothed above, the first tooth over orbits, the distal tooth so near the end as to make it appear bifid; unarmed below. Antennulæ with basal joint large, basal spine long, acute, reaching half the length of third joint; second and third joints very short, the second with a slender, acute spine on outside, the third with a thin, flat, blunt projection on upper side; inner flagellum slender, slightly longer than peduncle; outer about as long as peduncle, stout, ciliated on apex and inner margin. Antennæ with a spine on basal joint; antennal scale reaching as far or nearly as far as outer branch of antennular flagellum, its inner margin slightly concave; flagellum three-fourths as long as body. External maxillipeds slender, reaching tip of antennal scale, penult joint the shortest, antepenult three and last joint four times as long as penult, the last joint terminating with slender spines. First pair of feet with meral and carpal joints subequal, the latter with minute spinules on inner margin; hands subcylindrical, the dactyli occupying two-fifths their length. Meral joint of second pair of feet as long as first three carpal joints; first carpal joint the longest, second joint next in size, fifth next; third and fourth subequal, together equal to first. Hand as long as fourth and fifth articulations of carpus, the fingers being two-fifths of its length. Dactyli and propodi of remaining feet spinulose beneath. Telson with apex truncate, spined.

Length of adult female, 10.5 mm.; length of carapace, 3.2 mm.

Porto Rico: Mayaguez on coral reef; Puerto Real; Playa de Ponce Reef; off St. Thomas, 20 to 23 fathoms, station 6079; Ensenada Honda, Culebra.

Key West (type locality); Harbor Key and Sarasota Bay, Fla. (Kingsley).

Specimens in National Museum from Anclote Sponge Station, Tarpon Springs, Fla. (Evermann); Punta Rassa, 1 fathom (H. Hemphill); Marco, 1 to 3 fathoms, among sponges (H. Hemphill); No Name Key, among algae, low tide (H. Hemphill); Key West (*Albatross*), among algae below low tide (H. Hemphill); Key West Harbor (E. Palmer); Dry Tortugas (E. Palmer), Gulf of Mexico, 25 fathoms, station 2370 (*Albatross*); off Cape Catoche, Yucatan, 24 fathoms, station 2365 (*Albatross*); St. Thomas (*Albatross*).

## Family PANDALIDÆ Kingsley, 1878 (Pandalinæ); Bate, 1888.

Rostrum long and slender, armed with teeth or spines. Eyes well developed. Mandibles with a two or three-jointed palp. First pair of trunk-legs not chelate, second pair chelate, carpus subdivided. Pleopods biramous; tail-fan well developed and strong.

*Key to the Porto Rican genera of the family Pandalidæ.*

- A. Rostrum not articulated with frontal margin of carapace ..... *Pandalus*  
 A'. Rostrum articulated with frontal margin of carapace ..... *Pantomus*

## Genus PANDALUS Leach.

*Pandalus* Leach, Edinburgh Encyc., vii, 432, 1814.

Anterior portion of carapace carinated. First pair of antennæ usually not longer than carapace; spine on the outer margin of their basal joint obtusely pointed. Outer maxillipeds and first pair of legs slender.

*Pandalus longicauda*, sp. nov.

Rostrum twice as long as carapace, nearly horizontal. At the posterior sixth of carapace, a small, blunt median spine; in front of this arises the median crest which is unarmed posteriorly, anteriorly with about forty small, fixed spines, of which two or three are on the carapace, the remainder on the rostrum. Spines larger posteriorly than anteriorly.

Lower edge of rostrum armed with about thirty spines, a little finer and more appressed than the superior spines. A perfect ocellus or secondary eye is situated on the posterior surface of the ophthalmopod. Antennular flagellum as long as the carapace and rostrum, in this respect resembling the genus *Pandalopsis* Bate. Stylocerite oval, subacute. Antennal scale as long as carapace. Outer maxillipeds a little longer than antennal scale. Propodal and terminal segments subequal. The propodus of the first pair of feet reaches the end of antennal scale. Carpus and dactylus subequal; propodus 1.5 times as long as carpus. The feet of second pair are subequal and reach the end of antennal scale. Carpus 1.5 times as long as merus and about twenty-jointed; proximally the divisions are very faint; distal segment about 3 times the next one, which is subequal to each of the four succeeding. Palm a little wider and about as long as adjacent carpal segment; fingers of the same length. The carpus of fifth pair of feet overreaches antennal scale; propodus 1.5 times as long as carpus; the dactylus very short, less than one-tenth the propodus. Sixth abdominal segment much compressed and 3 times the length of fifth; it has a median groove with a carina on each side. Seventh segment dorsally grooved; of its three pairs of dorsal aculei, the anterior pair is about at the middle of length of segment.



FIG. 24.—*Pandalus longicauda*, rostrum,  $\times 4$ .

Male: Length, about 44 mm.; length of carapace and rostrum, 18.5 mm.; length of rostrum 12.5 mm.; length of flagellum of antennula, 20 mm.; length of sixth abdominal segment, 6.8 mm.

This species may readily be distinguished by the spine on the posterior part of the carapace. In the fixed rostral teeth and long first antennæ it resembles *Plesionika* Bate; in the ocellus it resembles *Nothocaris*, while the stylocerite is that of *Pandalus*.

Mayaguez Harbor, 220 to 225 fathoms, station 6070, 2 specimens.

The Porto Rican examples being in poor condition, I have taken as types two examples collected by the *Albatross* in the Gulf of Mexico, lat. 28° 42' 30" N., long. 85° 29' W., 88 fathoms, station 2403 (U. S. Nat. Mus. No. 23568).

## PANTOMUS A. Milne Edwards.

*Pantomus* A. Milne Edwards, Recueil de Figures de Crustacés nouveaux ou peu connus, pl. 26, 1883.

Near *Pandalus*, but with the rostrum articulated with frontal margin of carapace. According to Bate,<sup>1</sup> the rostrum "seems to have the power of movement to a slight extent in any direction at the will of the animal; this modification can be due only to one purpose, that of receiving the shock of an approaching enemy directly on its point rather than obliquely."

<sup>1</sup>Challenger Rept., xxiv, p. viii, 1888.



**Pantomus parvulus** A. Milne Edwards.

*Pantomus parvulus* A. Milne Edwards, Recueil de Figures de Crustacés nouveaux ou peu connus, pl. 26, 1883.

Rostrum longer than carapace, terminal half ascending. Anterior half of carapace carinated and armed with three spines, the two posterior being nearer together and movable, the anterior situated at articulation of rostrum; three spines on basal half of rostrum, increasing in size from the posterior to anterior. Lower margin armed with numerous slender overlapping spines. Tip bifid. Antennal scale reaching two-thirds the length of rostrum. Outer maxillipeds and first pair of thoracic feet reaching end of antennal scale. One foot of second pair longer than first pair, carpus with fifteen to seventeen articles; the other foot of second pair shorter than first pair, carpus with ten to twelve articles. Third, fourth, and fifth pairs subequal, exceeding the second pair. Third abdominal segment carinated in its posterior half; sixth segment elongate, 2.5 times as long as fifth.

Length of ovigerous female, station 2403, about 30 mm.

Mayaguez Harbor, 75 to 76 fathoms, station 6063, 1 specimen; Mayaguez Harbor, 97 to 120 fathoms, station 6067, 1 specimen.

Distribution: Northern part of Yucatan Bank, latitude 23° 13' N., longitude 89° 16' W., 84 fathoms, station 36, *Blake* (type locality); off Frederickstadt, Santa Cruz, 248 fathoms, station 134, *Blake* (Faxon); Gulf of Mexico, off Cape San Blas, Fla., 88 fathoms, station 2403 (*Albatross*); off Cape Lookout, N. C., 124 fathoms, station 2602 (*Albatross*).

## Family ATYIDÆ Kingsley, 1878.

Carapace dorsally smooth; scale of second antennæ short. Mandibles with a molar process and cutting edge, but no palp. Third maxillipeds four-jointed and pediform. First and second trunk-legs chelate with spoon-shaped fingers; carpus of second pair not subdivided. Telson flattened, truncate.

*Key to the Porto Rican genera of the family Atyidæ.*

- A. Pereiopoda with exopodites. Carpal joints of first two pairs not distally excavated ..... *Xiphocaris*  
 A'. Pereiopoda without exopodites. Carpal joints of first two pairs distally excavated.  
 B. Both fingers of each hand subequal in size; no palma developed..... *Atya*  
 B'. Movable fingers shorter than the immovable part of the hand, the latter distinctly divided into a palmar portion and an immovable finger ..... *Ortmannia*

## Genus XIPHOCARIS von Martens.

*Xiphocaris* von Martens, Arch. f. Naturg., xxxviii, pt. 1, 139, 1872; Ortmann, Proc. Acad. Nat. Sci. Phila. 1894, 400.

Rostrum slender, compressed, dentate, usually long. All the pereiopoda slender and with exopodites; carpal joints of first two pairs without a distal excavation, articulating in a normal way with the proximal end of the propodus. Abdomen with sixth segment elongate; telson slender, truncate at tip.

**Xiphocaris elongata** (Guérin).

*Hippolyte elongata* Guérin, in La Sagra's Hist. Cuba, vol. VII, p. xx; vol. VIII, pl. II, f. 16, 1857.

*Xiphocaris elongata* von Martens, Arch. f. Naturg., xxxviii, pt. 1, 140, 1872; Ortmann, Proc. Acad. Nat. Sci. Phila. 1894, 400, and synonymy.

In typical specimens the rostrum is from 1 to 1.66 times as long as the remainder of the carapace, its carina prolonged only a little way on carapace; horizontal for its basal fifth, then inclined upward at an angle of about 30 degrees; upper margin armed in its basal, horizontal portion with ten to fifteen crowded spines, remainder entire; lower margin armed with numerous spines beginning near anterior end of superior row and extending to the extremity, which is obliquely truncate and armed with a few spines. Carapace behind anterior fifth smooth and rounded. An outer orbital tooth present. Second segment of peduncle of the inner antennæ 1.5 times as long as the third. Upper and outer flagellum as long as rostrum, its basal half thickened; inner and lower flagellum slender, longer than carapace and rostrum. Flagellum of outer antenna as long as body; scale reaching to middle of rostrum, its sides parallel, extremity rounded, prolonged a considerable distance beyond outer spine. First pair of feet reaching to end of first antennular segment; second pair more slender and reaching to

or beyond the end of antennular peduncle. Third, fourth, and fifth pairs diminishing very slightly in the order named, the third pair being a little longer or shorter than second. Sixth abdominal segment nearly twice as long as fifth.

Length, 57 mm.; length of carapace and rostrum, 24 mm.; length of rostrum, 14.2 mm.

Varieties occur with much shorter rostrum, having the appearance of typical specimens from which a portion of the rostrum has been broken off. In the Porto Rican specimens from El Yunque the rostrum extends to the end of the first antennular segment or to the middle of second segment. This form is equivalent to *Xiphocaris brevirostris* Pocock. In the individuals from Rio Grande de Arecibo the rostrum extends to the end of the second antennular segment or to the middle of the third. This form is *Xiphocaris gladiator* Pocock. The specimens from the other localities are typical. It may be noted also that while the different forms are represented by specimens of equal length, the *brevirostris* form is thicker than the *gladiator* or than the typical *elongata*.

Porto Rican localities: Rio Caguítas, Caguas, 75+ specimens; Rio Grande, near mouth of Rio Caguítas, 5 specimens; Rio Bayamon, 15 specimens; Rio Grande de Arecibo, at the falls (A. B. Baker, coll.), 2 specimens (rostrum of the form of *Xiphocaris gladiator* Pocock); El Yunque, 31 specimens; Rio Arecibo (Gundlach).

Known only from the fresh waters of the Antilles: Cuba (Guérin, von Martens); Haiti (Saussure); Santo Domingo (Sharp); Dominica (Pocock); Port Castries, St. Lucia, in small brook (*Albatross*).

#### ATYA Leach.

*Atys* Leach, Trans. Linn. Soc. London, XI, 345, 1815. (Preoccupied.)

*Atya* Leach, Zool. Misc., III, 29, 1817.

*Atyoida* Randall, Jour. Acad. Nat. Sci. Phila., VIII, 140, 1839; A. Milne Edwards, Ann. Soc. Entom. France (4), IV, 151, 1864.

Rostrum short, flat, and broad at the base, horizontal or depressed. Pereiopoda without exopodites; first two pairs short, with carpal joints distally deeply excavate, infero-distal angle articulating with outer margin of propodus; propodus and dactylus subequal in size and fringed with long hair; no distinct palm; third pair of feet large and long; third and fourth pairs diminishing successively in size. Abdomen with sixth segment not elongate; telson broad, rounded at the end.

#### *Atya scabra* Leach.

*Atys scaber* Leach, Trans. Linn. Soc. London, XI, 345, 1815.

*Atya scabra* Leach, Zool. Misc., III, p. 29, pl. 131, 1817; Ortmann, Proc. Acad. Nat. Sci. Phila. 1894, 409, and synonymy.

Rostrum reaching nearly or quite to end of first antennular segment and with a median and a lateral carina; either triangular or with lateral carina terminating in a tooth above eye. Carapace deeply punctate; anterior margin with an external orbital and a branchiostegal tooth or spine. First and second pairs of feet subequal, terminal hairs reaching to or beyond antennal scale. Third, fourth, and fifth pairs of feet covered with short spines. In typical specimens the third pair of feet are very heavy, the merus being much swollen between middle and distal end; carpus and propodus subequal in length; dactylus very short. Fourth and fifth pairs much shorter and more slender, subequal in thickness.

This species is extremely variable in the form of the rostrum and more noticeably in the shape of the last three pairs of thoracic feet, which may all be slender and nearly equal in length; and their spines very feeble and appressed. These differences are independent of sex or size, and probably represent different stages in the growth of the individual.

Length of Porto Rican specimen, a male with feet of third pair stout, 66 mm.; length of carapace and rostrum, 26.8 mm.; of rostrum, 4 mm. Length of male specimen with feet of third pair slender, 80.5 mm.; length of carapace and rostrum, 29 mm.; of rostrum, 6.5 mm.

Porto Rican localities: San Juan market; Mayaguez, fresh water; Falls of Rio Grande de Aibonito; Falls of Rio Grande de Arecibo (A. B. Baker, coll.); El Yunque; a tributary of the River Añasco, and San Juan market (Gundlach).

Common to the fresh waters of Mexico, Nicaragua, Costa Rica, West Indies, West Africa and adjacent islands; Orinoco; Venezuela (Lyon and Robinson coll.).

Common name, *Guábara* (Gundlach).

Genus *ORTMANNIA*, nom. nov.<sup>1</sup>

*Atyoida* Ortmann, Proc. Acad. Nat. Sci. Phila. 1894, 406. (Not *Atyoida* Randall.)

Differs from *Atya* chiefly in the character of the chela of the first and second pairs of legs; the dactylus is inserted on the upper margin of the propodus and is shorter than the latter, forming a chela consisting of a palmar portion and two fingers, as is usual in the Decapoda.

*Ortmannia potimirim* (F. Müller).

*Atyoida potimirim* F. Müller, Kosmos, ix, 117, figs. 1-20, 1881; Arch. Mus. Nac. Rio de Janeiro, viii, 155, pls. ix and x, 1892. Ortmann, Proc. Acad. Nat. Sci. Phila. 1894, 407; Rev. Mus. Paulista, ii, 183, pl. i, figs. 1-3, 1897.

Rostrum shorter than antennular peduncle, narrow, acute, having a superior unarmed median carina, and two or three teeth below. Carapace smooth; anterior margin furnished with suborbital spine; also a branchiostegal spine in the female, none in male. Feet all slender, those of the second pair reaching the end of the antennular peduncle. Carpus of second pair nearly as long as its propodus and much longer than carpus of first pair. Meral joints of third, fourth, and fifth pairs armed with a few spines below; the propodi and dactyli have many smaller and more slender spines.

Length, from 15 mm. in the male to 25 mm. in the female, according to Müller.

Vieques Island in small stream (Dr. L. Stejneger, coll.); 1 male.

Hitherto known only from Brazil, where it has been taken in the Itajahy River and at São Sebastião in the sea.

Family PONTONIDÆ Kingsley, 1878 (*Pontoniæ*); Bate, 1888.

Body often depressed; rostrum often short, compressed or depressed with or without dentations. Outer flagellum of first antenna consisting of a thick hairy part, bearing a thin hairless part, the latter usually arising from the former at a short distance from the free end, and thus giving it a bifid appearance. Mandible deeply cleft into two divisions and without a palp; endopodite of the second maxilliped not biramous; third maxilliped pediform, but usually with some of the joints broadened. All the legs without exopodites or mastigobranchs; first two pairs of legs chelate, first pair slender; second pair larger than first, not foliaceous. Mode of life often semiparasitic. (Borradaile.)

*Key to the Porto Rican genera of the family Pontoniidæ.*

- A. Dactyli of last three pairs of legs slender, nearly straight, without basal protuberance.....*Periclimenes*  
 A'. Dactyli of last three pairs of legs short, curved, with a basal protuberance.  
 B. Antennal scale long.....*Coralliocaris*  
 B'. Antennal scale short.....*Pontonia*

<sup>1</sup>The National Museum has lately received from Mr. H. W. Henshaw, Hilo, Hawaii, two species of river shrimp belonging to the family *Atyidæ*. One is a true *Atya*, the other belongs to the genus *Atyoida* as defined by Ortmann (Proc. Acad. Nat. Sci. Phila. 1894, 406). Either corresponds to Randall's brief description of *Atyoida bisulcata*. Randall, however (Jour. Acad. Nat. Sci. Phila., viii, 1839, 140), says that *Atyoida* is essentially similar to the genus *Atya*, "excepting the third pair of feet"; this would seem to imply that the first two pairs of feet are similar to those of *Atya*, which is not the case in *Atyoida* as defined by Ortmann.

Through the courtesy of Mr. Witmer Stone, of the Academy of Sciences of Philadelphia, I have been able to examine a dried fragment (all that remains) of Randall's type of *Atyoida bisulcata*. It comprises a carapace and a foot of both the first and second pairs. These are without doubt feet of typical *Atya*, and the species is seemingly identical with one of those received from Mr. Henshaw; it is that figured by Dana and by Bate. The genus *Atyoida* Randall is therefore a synonym of *Atya* Leach. In *Atya* (to quote Dr. Ortmann) the "dactylus [of the chela] articulates with the propodus on the posterior end of the latter, both joints being exactly alike and forming a hand of a very peculiar shape among the Decapoda, the palmar portion being wholly reduced, and the hand consisting only of two fingers about alike in size and connected with each other at the posterior ends."

In the genus *Atyoida* Ortmann (non Randall) for which I propose the name *Ortmannia*, "the hands are formed like those of *Caridina*, the dactylus is inserted on the upper margin of the propodus, being shorter than the latter and forming a chela, as usual in the Decapoda, consisting of a palmar portion and two fingers." The type is *Ortmannia henshawi* nom. nov. (= *Atyoida bisulcata* Ortmann, 1894, not Randall = *Atya bisulcata* Sharp, 1893, in part, Cat. No. 162), from Kaiwiki, Hilo, Hawaii, 1,800 feet altitude, 3 miles from the sea, H. W. Henshaw, collector (U. S. Nat. Mus., Cat. No. 24825).



Genus **PERICLIMENES** Costa.

*Periclimenes* Costa, Ann. Ac. degl. Aspir. Nat. Nap., II, 1844; Faun. Reg. Nap., II, 1, 1846 (*teste* Borradaile); Borradaile, Ann. Mag. Nat. Hist. (7), II, 380, 1898, and synonymy.

Rostrum long, compressed, usually dentate, in side view diminishing gradually to a sharp point at free end, not bent downward; thicker flagellum of first antenna long or moderate, bifid; scale of second antenna long, usually narrow; second maxilliped with penultimate joint as broad as—usually broader than—the last joint, which it bears terminally; third maxilliped narrow, the last two joints together may be longer or shorter than the preceding joint; dactyls of last three pairs of legs slender, nearly straight, without basal protuberance. (Borradaile.)

**Periclimenes americanus** (Kingsley).

*Anchistia americana* Kingsley, Proc. Acad. Nat. Sci. Phila., xxx, 1878, 96 (8); Bull. Essex Inst., XIV, 109, pl. II, f. 10, 1882. *Periclimenes americanus* Borradaile, Ann. Mag. Nat. Hist. (7), II, 383, 1898.

Rostrum reaching nearly to end of antennal scale, upper margin straight, directed slightly upwards, seven to nine-toothed; two teeth on carapace proper; posterior one at anterior two-fifths of carapace, and farther from second than the remainder are from each other; two to three teeth on lower margin. Hepatic and antennal spines present. Basal joint of antennule very broad, and as long as next two joints together, and with an antero-lateral spine; the thick upper and outer flagellum bifid for one-fourth its length; lower flagellum as long as peduncle. Basal joint of antennæ with an outer distal spine; peduncle not reaching end of first antennular segment; scale slightly overreaching antennular peduncle; distal spine longish; flagellum as long as body. Last two joints of outer maxilliped together are longer than preceding joint.

First pair of feet very slender, elongate, end of carpus reaching tip of antennal scale; merus and carpus subequal in length; propodus two-thirds the carpus; fingers shorter than palm. Second pair of feet very elongate, as long as or longer than body; merus a little longer than carpus, which is more than half as long as palm and is distally enlarged.

Palm cylindrical, slightly compressed; fingers about two-fifths as long as palm, slightly deflexed, armed with a few small teeth, when closed leaving hiatus. Third, fourth, and fifth pairs of feet long and slender, the fifth pair reaching end of rostrum.

Dimensions of Culebran specimen: Length, 14.7 mm.; length of carapace and rostrum, 5.3 mm.; length of second foot, 15 mm.

This species was found at the following Porto Rican localities: Mayaguez; Mayaguez Harbor; off Puerto Real, 8½ fathoms, station 6074; Ponce, on coral reef; off Humaçao, 9½ fathoms, station 6099; off Vieques, 6 to 15 fathoms, stations 6085, 6091, 6096; Ensenada Honda, Culebra; off St. Thomas, 20 to 23 fathoms, station 6079.

Also occurs at Key West (type locality); Florida (H. Hemphill, coll.), at Orange Bluff, Clearwater Harbor, 1 to 2 fathoms; Sarasota Bay, Punta Rassa, 1 fathom; Marco, 1 to 3 fathoms, and Key West, Gulf of Mexico, 26 and 33½ fathoms, stations 2406 (*Albatross*) and 5072 (*Grampus*); off Cape Catoche, Yucatan, 24 fathoms, station 2365 (*Albatross*); Old Providence (*Albatross*); Port Antonio, Jamaica (J. E. Duerden, coll.); St. Thomas, W. I. (*Albatross*); Bermudas.

Genus **PONTONIA** Latreille.

*Pontonia* Latreille, Cuvier's Règne Animal, 2d ed., v, 96, 1829.

Body depressed; rostrum short, depressed, bent downward, not dentate, with or without a keel below at the free end; both flagella of first antenna short, the thicker of the two bifid; scale of the second antenna of moderate length, broad; flagellum of same not short; second maxilliped with penultimate joint broader than the last joint and bearing it terminally; third maxilliped with last two joints narrow, together shorter than the preceding joint, which is broad; dactyls of the last three legs straight or little curved, without basal protuberance; one of the second pair of legs with very large chela.

*Pontonia grayi*, sp. nov.

Rostrum reaching middle of the penult segment of the antennular peduncle. Antennal spine slender, sharp, inclined upward. Antennal scale reaching the end of the antennular peduncle. Large cheliped of second pair with small cup-shaped carpus; palm compressed, dilated, nearly twice as long as broad; dactylus a little longer than the width of the palm, narrow, cylindrical, with a large tooth at the basal third fitting between two large teeth on the pollex, which is broad and flat. Dactyls of last three legs slightly curved and with a subterminal as well as a terminal spine.

Length of female with ova, 20.5 mm.; length of carapace, 8.8 mm.

Nine specimens were taken between San Antonio Bridge and San Geronimo, San Juan, Porto Rico, by Mr. G. M. Gray (types, Cat. No. 23789); a very small specimen without claws, and of seemingly the same species, was dredged by the *Fish Hawk* off Vieques Island, in 16 fathoms, station 6092.

This species is in general appearance remarkably like *P. domestica* Gibbes, which has, however, the dactyli of the last three pairs of feet strongly curved and with a strong basal protuberance, a character which throws it into the genus *Conchodytes*, according to Borradaile. *Pontonia mexicana* Guérin is represented with a much shorter and less slender rostrum and smaller antennal scale. It also attains a larger size (length, 35 mm.).

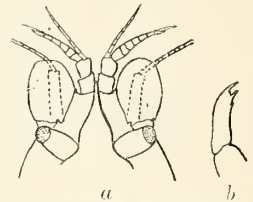


FIG. 25.—*Pontonia grayi*. (a) Female, anterior portion,  $\times$  5.33. (b) Dactylus of one of last three pairs of legs, much enlarged.

Genus *CORALLIOCARIS* Stimpson.

*Ædipus* Dana. Crust. U. S. Expl. Exped., I, 572, 1852. (Preoccupied.)

*Coralliocaris* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 38 (107), 1860.

Rostrum long or moderate, with or without dentations, usually somewhat depressed, shallow, at most only slightly bent downward, flagella of first antenna of moderate length, thicker of the two bifid; scale of second antenna long, broad; flagellum of same not short; second maxilliped with last joint as broad as or broader than penultimate joint, which bears it terminally; third maxilliped with antepenultimate joint moderately broad, last two joints of about the same breadth as, and together as long as or longer than, the antepenultimate; chelæ of second pair large; dactyls of last three legs short, strong, curved, with a large basal protuberance on under side. (Borradaile.)

*Coralliocaris atlantica*, sp. nov.

Rostrum in a line with the dorsal surface of the carapace, serrated above, with four teeth, all in front of orbital sinus; below unarmed; extremity acuminate; reaching middle of penult segment of antennular peduncles. Eyes subspherical, not reaching penult segment of antennular peduncle; cornea of lesser diameter than stalk and situated on its antero-external surface. Antennular peduncles extending beyond the eyes to a distance equaling length of eye-stalks; flagella fringed with setæ. Carpus and propodus of first pair of feet subequal and a little shorter than merus; palm and fingers subequal; carpus increasing in width distally; fingers setose; chelæ broadest in middle, tapering toward carpus and toward finger tips. Palm of right cheliped of second pair about twice as long as broad; upper margin straight; lower margin slightly inclining toward upper distally; fingers about half as long as palm; pollex triangular, broad at base, slender at tip; dactylus narrow and curved; carpus cup-shaped, less than half as long as palm. Left cheliped of second pair missing. In the last three pairs of feet the propodus is half again as long as carpus and has a few spinules on its lower side near extremity. Dactylus very short and stout, with a moderate protuberance on lower side.

Length, 5.5 mm.

Type locality, off St. Thomas, 20 to 23 fathoms, station 6079, 2 specimens (Cat. No. 23788).

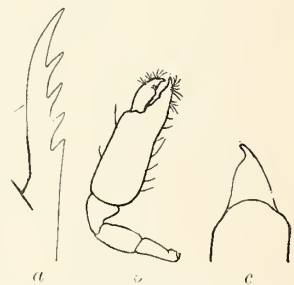


FIG. 26.—*Coralliocaris atlantica*. (a) Rostrum, much enlarged. (b) Right cheliped of second pair,  $\times$  10. (c) Dactylus of one of last three pairs of legs, much enlarged.

## Family PALÆMONIDÆ Leach, 1819.

Carapace dorsally rounded and laterally compressed; rostrum long, laterally compressed and generally armed with teeth. Eyes well developed and pyriform. First antennæ with basal joint dorsally hollowed, with a strong spine on outer side, and frequently one of the flagella branched; second pair with a long and narrow foliaceous scale, its rigid outer margin ending in a small tooth. The mandibles have molar tubercle and cutting edge, and either have or have not a palp. Third maxillipeds pediform. First two pairs of trunk-legs chelate, the chelæ of the second pair generally larger than those of first; carpus not subdivided.

*Key to the Porto Rican genera of the family Palæmonidae.*

- A. Carapace with hepatic spine.  
 B. Mandibles with a palp. Body stout. Eyes short and thick ..... *Bithynis*  
 B'. Mandibles without a palp. Body and eyes elongate ..... *Urocaris*  
 A'. Carapace without hepatic spine. Mandibles with a palp ..... *Palæmon*

## Genus BITHYNIS Philippi.

*Bithynis* Philippi, Arch. f. Naturg., XXVI, 1, p. 161, 1860.

*Palæmon* Stimpson, Proc. Acad. Nat. Sci. Phila., XI, 41 (110), 1860.

Carapace with a single lateral spine on front margin, and behind it a second spine, on hepatic region. Rostrum dentated. Inner antennæ with three flagella. Mandibles with a three-jointed palp. First pair of feet slender, second pair much longer and thicker. Species usually fluviatile, often attaining a large size and with second pair of legs greatly developed.

*Key to the Porto Rican species of the genus Bithynis.*

- A. Large chelipeds with palm cylindrical or nearly so.  
 B. Chelipeds rough.  
 C. Fingers of large chelipeds covered with a thick felt-like coating of stout setæ ..... *acanthurus*  
 C'. Fingers naked ..... *jamaicensis*  
 B'. Chelipeds smooth ..... *savignyi*  
 A'. Large chelipeds with palm swollen and compressed, wider than the carpus ..... *olfersii*

*Bithynis jamaicensis* (Herbst).

*Cancer (Astacus) jamaicensis* Herbst, Natur. Krabben u. Krebse, II, 57, pl. xxvii, f. 2, 1792.

*Palæmon jamaicensis* Milne Edwards, Hist. Nat. Crust., II, 398, 1837.

*Bithynis jamaicensis* Pocock, Ann. Mag. Nat. Hist. (6), III, 10, 1889.

Rostrum about as long as peduncles of inner antennæ; teeth, 11 to 14 above and 3 to 5 below; upper margin strongly arcuate above eyes. Chelipeds of second pair equal—rough in young individuals, but provided with strong spines in the old ones. Carpus considerably shorter than merus, thickened in distal portion. Palm subcylindrical, slightly compressed in old specimens, but not much thicker than contiguous extremity of carpus; more than three times as long as wide. Fingers about as long as palm. Telson rounded at end, on either side two short movable spines.

Length of body of Porto Rican specimen, 21.5 cm.; length of second cheliped, 24.5 cm.

Fresh waters of the Pacific slope, from Lower California to Ecuador; and of the Atlantic slope, from Texas to Rio de Janeiro, including the West Indies. Porto Rican localities: Caguas, Rio Grande; San Juan market; San Sebastian (A. B. Baker, coll.); Arroyo.

*Bithynis acanthurus* (Wiegmann).

*Palæmon acanthurus* Wiegmann, Arch. f. Nat., II, pt. 1, p. 150, 1836.

*Palæmon forceps* Milne Edwards, Hist. Nat. Crust., II, 397, 1837.

*Palæmon macrobrachion* Herklots, Addit. Faun. Afr. Occ., p. 15, 1851.

*Palæmon africanus* Kingsley, Bull. Essex Inst., XIV, p. 107, 1882.

*Bithynis acanthurus* Rathbun, Proc. U. S. Nat. Mus., XXII, No. 1199, p. 315, 1900.

Rostrum a little variable, rectilinear or slightly curved upward, as long as or longer than antennal scales and longer than stalk of inner antennæ; it has 8 to 12 teeth above and 4 to 7 below. Second pair of feet almost cylindrical, equally developed, spiny in the old and rough in the young; carpus considerably longer than merus; palm cylindrical; fingers shorter or just as long as palm, in the old like felt; spines strong, arranged in longitudinal series. Telson short-pointed, inner of side teeth overreaching extremity.



Length of body, 102 mm.; length of large cheliped, 116.5 mm.

Known from Rio Grande, Texas; Antilles; Escondido River, Nicaragua; Sabanilla, United States of Colombia (*Albatross*); Brazil, as far south as Rio Grande do Sul; Panama; Ecuador; West Africa. Porto Rican localities: Rio Bayamon; San Juan market; Rio Bayamon, above Palo Seco; Aguadilla; Mayaguez, in fresh water; Po. ce; Isabel II Vieques Island; Fajardo; Rio Arecibo (Gundlach).

Common name, *Noca* (Gundlach).

***Bithynis olfersii* (Wiegmann).**

*Palaemon olfersii* Wiegmann, Arch. f. Natur., II, pt. 1, 150, 1836; Ortmann, Zool. Jahrb., Syst., v, 733, pl. XLVII, f. 8, 1891.

*Palaemon spinimanus* Milne Edwards, Hist. Nat. Crust., II, 399, 1837.

*Palaemon spinimanus* von Martens, Arch. f. Natur., XXXV, pt. 1, 26, pl. II, f. 3, 1869.

*Palaemon faustinus* Saussure, Mém. Soc. Phys. Hist. Nat. Genève, XIV, 469 (53), pl. IV, f. 30, 1858; Ortmann, Zool. Jahrb., Syst., v, 734, 1891; Rev. Mus. Paulista, II, 213, 1897.

*Palaemon olfersi* Ortmann, Rev. Mus. Paulista, II, 212, pl. 1, figs. 10 and 11, 1897.

Rostrum as long as or a little shorter than the stalk of inner antennæ, shorter than antennal scale, arched above; 13 to 14 teeth above, 3 to 5 below. Chelipeds of second pair very unequal. Carpus longer or shorter than merus; carpus and merus distally swollen. Palm strongly compressed, oval or oblong-oval, broader than carpus and longer than broad. Fingers widely gaping when flexed; movable finger curved. Chelipeds armed with spines, which are stronger and slightly curved on the side of flexion of segments. Inner, outer, and lower surfaces of palm covered with felt and with long hair. Telson pointed, inner of side spines longer than the point. In the National Museum are all gradations between the two forms hitherto known as *olfersii* and *faustinus*. In specimens from Costa Rica, the chelipeds are very broad, palm a very little longer than broad, carpus much swollen and as long as width of palm, merus much swollen at middle and 1.5 times as long as carpus. This is the most extreme form of *olfersii*. Specimens from La Paz have the cheliped similar to that figured by Ortmann (Rev. Mus. Paulista, II, pl. 1, f. 10)—the palm nearly twice as long as broad, the carpus about two-thirds as long as the palm and subequal to the merus. A specimen from Jamaica represents the most slender form of the *faustinus* variety. The palm is 2.5 times as long as broad, the carpus a little longer than palm and 1.33 times as long as merus. Porto Rican specimens from Rio Caguitas resemble strongly Saussure's figure of *faustinus*. The rostrum, however, does not quite reach the extremity of the antennal peduncle. The following shows the dimensions of a number of specimens:

| Locality.                       | Sex.    | Length of body. | Length of propodus of larger cheliped. | Length of palm of larger cheliped (outer margin). | Width of palm (without spines). | Length of carpus. | Width of carpus. | Length of merus. | Width of merus. |
|---------------------------------|---------|-----------------|--|---|---------------------------------|-------------------|------------------|------------------|-----------------|
|                                 |         | mm.             | mm.                                    | mm.   | mm.                             | mm.               | mm.              | mm.              | mm.             |
| Costa Rica .....                | Male .. | 51              | 25                                     | 11.2  | 9                               | 9                 | 5.7              | 12.5             | 6               |
| La Paz .....                    | do ..   | 45              | 22.5                                   | 13.3  | 7.2                             | 9.5               | 4.3              | 9.7              | 4               |
| Cape St. Lucas .....            | do ..   | 49.3            | 19                                     | 9.6   | 5.2                             | 8.9               | 4.2              | 9                | 3.6             |
| Guadeloupe .....                | do ..   | 88.5            | 44.5                                   | 24.3  | 13.5                            | 20                | 8.6              | 22.3             | 9               |
| Porto Rico (Rio Caguitas) ..... | do ..   | 71              | 44.2                                   | 25  | 12                              | 22.6              | 8                | 18.2             | 8               |
| Jamaica .....                   | do ..   | 71.5            | 43                                     | 22  | 8.7                             | 22                | 6.2              | 17               | 5.8             |

Porto Rico; Rio Caguitas, Caguas; Rio Grande, near mouth of Rio Caguitas; Rio Bayamon; Mayaguez, fresh water; Arroyo; Fajardo; in the rivers about Bayamon (Gundlach).

Also at Jamaica (*Albatross*); Haiti (Saussure, Ortmann); Cuba (von Martens, Gibbs); Santo Domingo (W. M. Gabb, coll.); Dominica (Pocock); Tobago (F. A. Ober, coll.); Port Castries, St. Lucia, in small brook (*Albatross*); Guadeloupe (Mus. L. Guesde); Vera Cruz, Mexico (Ortmann); Escondido River, Nicaragua, 50 miles from Bluefields (C. W. Richmond, coll.); La Guaira, Venezuela (Lieut. Wirt Robinson, U. S. A., coll.); Rio de Janeiro (von Martens); near Rio de Janeiro (Ortmann); La Paz; Cape St. Lucas; Costa Rica; West Africa.

Common name, *Noca* (Gundlach).

***Bithynis savignyi* (Bate).**

*Brachycarpus savignyi* Bate, Challenger Rept., Zool., XXIV, 795, pl. CXXIX, f. 4, 1888.

Rostrum horizontal, reaching end of antennal scale; armed with 7 teeth above (3 of which are on carapace) and 3 below. Feet of second pair subequal, almost cylindrical, smooth, fingers hairy;

carpus less than half the length of merus, distally thickened; palm subcylindrical, slightly compressed, not much thicker than carpus; fingers more than half the length of palm. Dactyli of last three pairs of feet biunguiculate. Telson short, pointed, on either side with two movable spines, of which the inner overreaches the middle point. Length, 44 mm.; length of second cheliped, 41 mm.

A marine species, taken at Ponce; Light-House Reef, Arroyo; Ensenada Honda, Culebra.

Bermudas, shallow water (Bate); Nassau (Rankin); off Habana, Cuba, 78 fathoms, station 2169 (*Albatross*); between Jamaica and Haiti, 23 fathoms, station 2138 (*Albatross*); Curaçao (*Albatross*).

#### Genus PALÆMON Fabricius.

*Palæmon* Fabricius, Suppl. Entom. Syst., 378, 1798.

*Leander* Desmarest, Ann. Soc. Entom. France (2), VII, 87, 1849; Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 40 (109), 1860.

Much like *Bithynis*, but carapace armed with an antennal and a branchiostegal spine; no hepatic spine. Legs of second pair not so greatly developed as in *Bithynis*. Species for the most part marine and of small size.

#### Key to the Porto Rican species of the genus *Palæmon*.

- A. Rostrum with 8 or 9 teeth on upper margin, 3 or 4 on lower margin. Antennal scale very broad, its spine not reaching end of blade ..... *affinis*  
 A'. Rostrum with 11 to 13 teeth on upper margin, 5 to 7 on lower margin. Antennal scale very narrow, its spine overreaching blade ..... *paulensis*

#### *Palæmon affinis* Milne Edwards.

*Palæmon affinis* Milne Edwards, Hist. Nat. Crust., II, 391, 1837.

*Palæmon affinis* Dana, Crust. U. S. Expl. Exped., I, 584, 1852; pl. XXXVIII, f. 5, 1855. Bate, *Challenger* Rept. Zool., XXIV, 782, pl. CXXVIII, f. 5, 1888.

Dorsal crest beginning at middle of carapace, either horizontal or slightly depressed at middle of rostrum and ascending toward extremity, reaching to or beyond end of antennal scale; armed with 8 or 9 teeth, 2 or 3 of which are on the carapace; the last tooth usually near tip of rostrum and separated by a considerable distance from penultimate tooth; lower margin of rostrum with 3 or 4 teeth. Adult Porto Rican specimens are smaller than those from New Zealand before me, and have 8 to 10 segments of upper flagellum of antennula united and 12 to 16 free; whereas the New Zealand specimens have 12 to 14 united and 20 to 25 free. Carapace of second pair of feet reaching to or beyond the tip of the rostrum; slightly longer than the palm. Palm 1.5 times as long as the fingers, not swollen, a little wider than distal end of carpus.

Length of ovigerous female from Fajardo, Porto Rico, 35.5 mm.; length of carapace and rostrum, 16.1 mm.; length of rostrum, 8.5 mm.

Porto Rico; Puerto Real; Boqueron Bay; Arroyo; Hucares; Fajardo.

New Zealand (Milne Edwards, Dana, U. S. Nat. Mus.); Port Jackson, Australia (Bate); Bermudas (Heilprin, Ortmann).

The rostrum of the New Zealand specimens in the National Museum is almost horizontal, but in Porto Rican specimens it resembles Bate's figure of an adult female of approximate size. Specimens of *Palæmon squilla* from Jersey in the National Museum have the palm twice as long as the fingers.

#### *Palæmon paulensis* (Ortmann).

*Leander paulensis* Ortmann, Revista Mus. Paulista, II, 192, pl. I, f. 14, 1897.

Dorsal crest beginning just in front of middle of carapace, armed with 11 to 13 teeth, the first 2 or 3 of which are on the carapace itself; rostrum ascending for its distal two-thirds; lower margin with 5 to 7 teeth; as long as or a little longer than antennal scales. The antennular peduncle reaches a little more than half the length of antennal scale. The outer flagellum has in the type specimens 8 segments united and 12 free; in specimens in hand 5 to 7 segments are united and 15 to 17 free. Antennal scale very narrow, its inner margin very oblique; antero-external spine extending beyond blade. Middle of palm of second pair of feet opposite tip of rostrum. Carpus, palm, and fingers subequal in length; the carpus may be a little longer than the palm. The carpus increases in size distally; the palm is subcylindrical, slightly compressed and swollen, wider than carpus.

Length of ovigerous female from Marco, Fla., 28.5 mm.

Specimens which I refer to this species are from Marco and Punta Rassa, Fla. Some of them had been recorded by Kingsley as *Palæmonetes carolinus*. They differ from Ortmann's description and figure in having the posterior two of the dorsal teeth more separated than the others.

One specimen only was taken in Porto Rico, at Mayaguez, with the boat dredge; it agrees in all respects with the Floridian specimens, except that the rostrum is only two-thirds as long, having the appearance of abnormality.

Type locality, Brazil, between the continent and the island of San Sebastian, State of San Paulo.

The Floridian and Porto Rican form may prove to be distinct from the Brazilian, but a comparison of specimens is necessary to determine this point.

#### Genus *UROCARIS* Stimpson.

*Urocaris* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 39 (108), 1860.

Body slender, compressed; abdomen long, sixth segment especially elongate. Rostrum above cristate, dentate; below straight, toothless except near tip. Hepatic spine present. Eye-stalks long. Antennule similar to those of *Bithynis*. Mandibles not palpigerous. External maxillipeds and feet agreeing with those of *Bithynis*.

#### *Urocaris longicaudata* Stimpson.

*Urocaris longicaudata* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 39 (108), 1860.

Rostrum short, not reaching end of penult segment of antennular peduncle; superior crest strongly dilated above eyes, arcuate, seven to eight-toothed; lower margin with a tooth near tip. A long rounded extra-orbital tooth. Antennal scale longer than antennular peduncle. First pair of feet slender, reaching to tip of spine on antennal scale; carpus and propodus equal. Second pair a little stouter, middle of carpus reaching tip of antennal scale; carpus, palm, and fingers subequal. Last three pairs of feet very slender; dactyli biunguiculate. Abdomen four or five times as long as carapace, third segment strongly swollen, sixth segment slender, as long as carapace.

Length, 21 mm.; length of carapace and rostrum, 5.6 mm.; of rostrum, 2.5 mm.

Mayaguez, 1 specimen; off Culebra, 14 $\frac{3}{4}$  fathoms, station 6086, 1 specimen.

Carolina (Stimpson); Beaufort, N. C. (Kingsley); Marco Pass and Charlotte Harbor, Fla. (Kingsley); Andros Bank, Bahamas (F. Stearns, coll.); Punta Rassa, Fla., 1 fathom (H. Hemphill, coll.); Sarasota Bay, Fla., one-half fathom (H. Hemphill, coll.); Marco, Fla., one-third fathom, among sponges (H. Hemphill, coll.); Marco (*Grampus*); Gulf of Mexico, 30 fathoms, station 2405 (*Albatross*); Jamaica (*Albatross*); off Cape Catoche, Yucatan, 24 fathoms, station 2365 (*Albatross*); off Jacumã, Parahyba, Brazil, 15 feet (Branner-Agassiz Exped., 1899).

#### Family GNATHOPHYLLIDÆ Kingsley, (Gnathophyllinæ) 1879; Ortmann, 1890.

Rostrum short, compressed, toothed. Mandibles without a cutting edge and without palp. Third segment of outer maxilliped strikingly broad; both the following segments are small. First two pairs of feet chelate, the first pair feeble, the second strong. Contains only one genus:

#### Genus *GNATHOPHYLLUM* Latreille.

*Gnathophyllum* Latreille, Nouv. Dict. Hist. Nat., 2d ed., xxx, 72, 1819 (*Gnatophyllum*); Cuvier's Règne Anim., 2d ed., IV, 96, 1829.

*Drimo* Risso, Hist. Nat. Eur. Mérid., v, 70, 1829.

#### *Gnathophyllum americanum* Guérin.

*Gnathophyllum americanum* Guérin, in La Sagra's Hist. Cuba, VII, p. xx, 1857; atlas, VIII, pl. II, f. 14.

*Gnathophyllum fasciolatum* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 28 (97), 1860; Haswell, Cat. Austral. Crust., 181, 1882.

*Gnathophyllum zebra* Richters, Meeresfauna Mauritius u. d. Seychellen, 161, pl. XVII, figs. 18-20 and 22, 1880.

? *Gnathophyllum pallidum* Ortmann, Zool. Jahrb., Syst., v, 537, 1890.

Body thick. Carapace obtusely carinate dorsally, carina obsolete posteriorly, and anteriorly continuous with rostrum. Rostrum not reaching apex of antepenultimate segment of antennular peduncles, obliquely truncate above, a little concave, and five to six-toothed, the extremity acute, the lateral carina situated near inferior margin, which has a very small tooth near tip. Eyes rather large, having a prominent, conical, obtuse protuberance, pigmented with black, arising from upper part of cornea. Caudal segment armed with two marginal spines toward extremity and two long spines at extremity. Body marked with ten to sixteen linear transverse bands of color; legs with a band of



same color on ischial, meral, and propodal joints. Specimens which have been long in alcohol show no stripes.

Length, about 11 mm.

Boqueron Bay; Playa de Ponce; Arroyo. Port Jackson, Australia (Stimpson); Port Stephens, Australia (Haswell); Fouquets, Mauritius (Richters); Tahiti (Ortmann); Cuba (Guérin); St. Thomas, West Indies (*Albatross*); Gulf of Mexico, 26 to 27 fathoms, stations 2372, 2374 (*Albatross*); Bermudas (G. B. Goode, coll.).

#### Family PASIPHÆIDÆ Kingsley, 1878.

Rostrum small or obsolete; mandibular palp two or one-jointed or wanting. Trunk-legs with exopods. Third, fourth, and fifth pairs inferior in size to the two pairs of chelipeds, the fourth being generally smallest of all.

#### LEPTOCHELA Stimpson, 1860.

*Leptochela* Stimpson, Proc. Acad. Nat. Sci. Phila., XII, 42 (11), 1860.

Carapace partially cristate; lateral walls and margin destitute of spines. First pair of antennæ biflagellate. Mandibles with a short one-jointed palp. Second maxillipeds not pediform, the last joint armed with long spines or hairs. First and second pairs of feet compressed, chelate, slender, with long parallel digits. Three posterior pairs short. Pleon with the fifth segment more or less abruptly curved. Telson long, narrow, and tapering.

#### Key to the Porto Rican species of the genus *Leptochela*.

A. Orbits entire. Carina of fifth abdominal segment dentate .....*carinata*  
A'. Orbits serrate or spinulous. Carina of fifth abdominal segment entire.....*serratorbita*

#### *Leptochela carinata* Ortmann.

*Leptochela carinata* Ortmann, Dec. u. Schiz. Plankton Exped., 41, pl. IV, f. 1, 1893.

Anterior portion of carapace with a median crest extending to point of rostrum; in females this crest extends the length of the carapace, and there is also a sharp lateral crest, slightly curved, but subparallel to median, and not far from it, and reaching from orbit nearly to posterior margin. In the males the median carina is on anterior half only, and there is only a faint indication of the lateral carina. Rostrum shorter than eye-stalks, deflexed. Orbits entire. Antennular peduncles reaching to middle of antennal scale. Fingers of first and second pair of feet about as long as or a little longer than palm; palm 1.5 times as long as carpus. Fourth abdominal segment carinated in its posterior half; fifth segment carinated throughout its length, the carina cut into four triangular teeth; sixth segment with a median spine or tubercle at its anterior extremity. Telson with an anterior submedian pair of spinules and three lateral marginal pairs, equidistant, the first pair opposite the submedian pair, the second pair at middle of margin, and third pair at extremity.

Length of egg-bearing female, west Florida, 28 mm.; length of carapace and rostrum, 7.8 mm.

Off Vieques, 6 to 14 fathoms, stations 6084, 6085, 6096, 3 specimens; off Culebra, 15 fathoms, station 6093, 1 specimen. Off mouth of Tocantins, Brazil, depth 50 to 100 meters (type locality); Rum Cay, Bahamas (*Albatross*); Gulf of Mexico, 19 fathoms, station 5084 (schooner *Granopus*).

#### *Leptochela serratorbita* Bate.

*Leptochela serratorbita* Bate, Challenger Rept., Zool., XXIV, 859, pl. CXXXIX, f. 1, 1888.

Abdomen more than 2.75 times as long as the carapace. Anterior half of the carapace carinated; rostrum almost horizontal, as long as or longer than the eye-stalks, orbits finely serrated or spinulous, antennal scale shorter than in *carinata*, the antennular peduncle reaching beyond middle of scale. Fingers of both first and second pairs of feet a little longer than palm, which is only a trifle longer than carpus. Fourth and fifth segments of abdomen carinated, entire; sixth segment with an anterior median tubercle, and a posterior spine either side of middle. Telson with an anterior submedian pair of spines and three lateral marginal pairs, of which the anterior pair is at the anterior fourth, the second pair at the middle, the third pair near posterior extremity.

Length of female, Key West, 18 mm.; length of carapace and rostrum, 4.7 mm.

Off Vieques, 15 fathoms, station 6091, 1 specimen; off Culebra, 15 fathoms, station 6093, 4 specimens. St. Thomas, W. I., shallow water (type locality); St. Thomas (*Albatross*); Key West, taken at surface by electric light (*Albatross*).