

A CONTRIBUTION TO A KNOWLEDGE OF THE FRESH-  
WATER CRABS OF AMERICA.—THE PSEUDOTHELPHU-  
SINÆ.

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INTRODUCTION.

The critical study of the Pseudothelphusinae has led to somewhat different conclusions as to their classification and distribution from those published by Dr. Ortmann in his recent revision of the Potamonida,<sup>1</sup> of which the Pseudothelphusinae form a subfamily. The U. S. National Museum contains the largest collection of Pseudothelphusinae in any museum. Of the 52 species now included in the subfamily, 35 are in the national collection, and are represented by 230 specimens. The material contained in several other large museums has also been examined by the writer, including type specimens of all species excepting *Epilobocera cubensis* Stimpson, *Pseudothelphusa denticulata* (Milne-Edwards), *P. aequatorialis* (Ortmann), *P. henrici* Nobili, and *Rathbunia festæ* Nobili.

The comparison of this large amount of material seems to justify the division of the subfamily into four genera: *Pseudothelphusa*, *Potamocarcinus*, *Epilobocera*, and *Rathbunia*; and the evidence goes to show that the species inhabit comparatively restricted areas. The first part of this paper is devoted to a description of the subfamily, genera, and new species, with analytical keys; the second part deals with the distribution of genera and species, comprising all that is known at present regarding the range of these interesting forms. It should not be inferred that the results here published are in any degree complete. The need is felt of larger series of specimens to determine the extent of variation in each species due to age and environment; therefore, in determining specimens the writer has refrained from undue multiplication of species, and it is possible that some differences which have been attributed to age or locality may later, with more individuals for comparison, prove to be specific.

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<sup>1</sup> Zool. Jahrb., Syst., 1897, X, pp. 296-329.

## DESCRIPTION OF THE SUBFAMILY.

## PSEUDOTHELPHUSINÆ Ortmann.

*Bosciacca* MILNE-EDWARDS, Ann. Sci. Nat., 1853, 3rd ser., Zool., XX, p. 207 [173], (family).

*Bosciada* SMITH, Trans. Conn. Acad. Sci., 1870, II, p. 146 (family).

*Pseudothelphusida* RATHBUN, Proc. U. S. Nat. Mus., 1893, XVI, p. 649 (family).

*Pseudotelphusina* ORTMANN, Zool. Jahrb., Syst., 1893, VII, p. 487.

*Potamocarcinina* ORTMANN, Zool. Jahrb., Syst., 1897, X, p. 315.

The Pseudothelphusinae are those Potamonidae in which the merus of the endognath is broader than long, and the exognath is short, overreaching the ischium of the endognath but little, if at all.

They may be further defined as follows: The outer margin of the merus of the endognath is either arcuate from the articulation of the ischium to the insertion of the carpus or forms an antero-exterior angle with the anterior margin; posterior margin usually as wide as the anterior margin of the ischium. The form of the merus is either subquadrangular or subtriangular; the carpus is inserted at the anterior inner notch. Ischium without a longitudinal furrow. Exognath considerably shorter than the endognath, never reaching more than half the length of the merus, and often considerably reduced. The palatal ridges reach quite to the anterior margin of the buccal cavity and form two lateral well-marked channels.

Carapace transversely oval; side margins toothed or tuberculate, either distinctly or indistinctly. Epigastric lobes and cervical sutures present. Median furrow usually present. Front inclined, generally bilobed, either straight or slightly arched and with or without a superior margin. An inner suborbital lobe, distinct from the orbital margin, is always present, and is either separated from the front by the width of the flagellum, or, when united with the front, permits the passage of the flagellum behind it into the orbit.

## THE GENERA OF THE PSEUDOTHELPHUSINÆ.

## ANALYTICAL KEY TO THE GENERA OF THE PSEUDOTHELPHUSINÆ.

- A. Posterior margin of merus of endognath equaling the anterior margin of the ischium, against which it is applied.
- B. Exognath exceeding in length the ischium of the endognath; offerent branchial channel with a tooth or spine projecting from the upper side near the anterior end.....*Epilobocera*
- B'. Exognath not equaling in length the ischium of the endognath; offerent branchial channel without tooth or spine.
- C. Superior margin of front projecting over the surface of the front, which is strongly retreating and not visible in a dorsal view; antero-lateral teeth large and spiniform.....*Potamocarcinus*
- C'. Superior margin less advanced than inferior margin, or about equally advanced with it; antero-lateral teeth small, often tuberculi-form.....*Pseudothelphusa*
- A'. Posterior margin of merus of endognath one-half the width of the anterior margin of the ischium, and articulated with the outer half of the latter.....*Rathbunia*

## PSEUDOTHELPHUSA Saussure.

- Potamia* LATREILLE, Cours d'Entomologie, 1831, p. 338, name preoccupied. Type, *Thelphusa dentata* Latreille.—DE HAAN, Fauna Japon., 1833, p. 23.—DANA, Amer. Jour. Sci., 1851, 2d ser., XII, p. 131; Crust. U. S. Expl. Exped., 1852, I, p. 293.—SAUSSURE, Mém. Soc. Phys. Hist. Nat. Genève, 1858, XIV, p. 435 [19].
- Boscia* MILNE-EDWARDS, Hist. Nat. Crust., 1837, II, p. 14, name preoccupied. Type, *Thelphusa dentata* Latreille.—MILNE-EDWARDS, Ann. Sci. Nat., 3d ser., Zool., 1853, XX, p. 207 [173].—A. MILNE-EDWARDS, Ann. Soc. Entom. France, 1866, 4th ser., VI, p. 203.
- Pseudothelphusa* SAUSSURE, Rev. et Mag. Zool., 1857, 2d ser., IX, p. 305. Type, *P. americana* Saussure.—SMITH, Trans. Conn. Acad. Sci., 1870, II, p. 146.—RATHBUN, Proc. U. S. Nat. Mus., 1893, XVI, p. 649.
- Hypolobocera* ORTMANN, Zool. Jahrb., Syst., 1897, X, pp. 298, 323. Type, *Potamia chilensis* Milne-Edwards and Lucas.
- Potamocarcinus* ORTMANN, Zool. Jahrb., Syst., 1897, X, pp. 298, 315 (part); not *Potamocarcinus* Milne-Edwards.

The genus *Hypolobocera* Ortmann, type and only species, *Potamia chilensis* Milne-Edwards and Lucas, founded on the union of the inner suborbital lobe with a projection of the front and the consequent exclusion of the antenna from the orbit, is open to the objection that the distance between the front and the orbital angle is too variable in the members of a single genus or of a single species in this subfamily to be considered of any importance. In the type specimen of *P. chilensis* in Philadelphia there is a want of symmetry in the antennæ. On both sides the front is united with the orbital lobe. On the left side the second of the fixed joints of the antenna is long, and the third joint is attached to the ventral surface of the second, and is very short; it is followed by a fourth, also very short; the flagellum is absent. On the right side the second joint is shorter than on the left, the following joints are absent, but it is evident that the third joint was never attached as on the left side. In the type<sup>1</sup> figured by Milne-Edwards and Lucas, which is in the Paris museum, a similar though less striking asymmetry exists. On the left the front touches the inner orbital lobe only by a part of its width, the point of contact forming a sort of bridge, for the third article of the antenna appears at the inner angle of the orbital cavity, followed by the fourth, bearing a short flagellum of three articles. On the right side the line of contact of the front and the orbital lobe is much wider; only the first two articles of the antenna are present; the second article is much larger than on the opposite side. In *P. bouvieri*, a closely allied species, similar variations occur, but in all cases the antenna enters the orbit. The antennæ enter the orbits also in every other species of the Pseudothelphusinae. It is reasonable to infer that the disposition of the single antenna for which the genus *Hypolobocera* was created is abnormal.

<sup>1</sup>The antennal region of this specimen has been carefully examined by Professor Bouvier at my request.

## ANALYTICAL KEY TO THE SPECIES OF PSEUDOTHELPHUSA.

- A. Front without a superior margin or marginal line.
- B. Outer margin of merus of maxilliped straight or concave, forming an angle with anterior margin.
- C. Spinules of dactyli of ambulatory legs small and numerous, 15 or more in a row ..... *macropa*
- C'. Spinules larger and few, about 5 or 6 in a row.
- D. Cervical sutures arching toward each other. Ambulatory legs very slender ..... *ecuadorensis*
- D'. Cervical sutures sinuous. Ambulatory legs of moderate width.
- E. Merus of maxilliped very wide, width  $1\frac{1}{2}$  times the length ..... *plana*
- E'. Merus of maxilliped very little wider than long ..... *indigiana*
- B'. Outer margin of merus of maxillipeds convex and gradually curving into the anterior margin.
- C. Ambulatory legs very slender.
- D. Lower margin of propodus of the larger cheliped of the female most convex or protuberant at the middle of the palm. Width of carapace less than  $1\frac{1}{4}$  times its length ..... *exilipes*
- D'. Lower margin of propodus of the larger cheliped of the female most convex or protuberant below the articulation of the dactylus. Width of carapace more than  $1\frac{1}{4}$  times its length ..... *gracilipes*
- C'. Ambulatory legs not slender.
- D. Lower margin of front faintly rimmed ..... *jouyi*
- D'. Lower margin of front strongly rimmed.
- E. Lower margin of front sinuous or trilobed, in a front view .... *agrestis*
- E'. Lower margin of front convex.
- F. Lateral teeth of carapace obliterated. Inner lobe of abdominal appendage of first segment in male falcate, distant from the appendage ..... *terrestris*.
- F'. Lateral teeth of carapace present, though indistinct. Inner lobe of abdominal appendage not falcate, appressed  
*americana-dugesii*
- A'. Front with a superior margin or marginal line.
- B. Superior margin of front not keeled.
- C. Superior margin smooth.
- D. Ambulatory legs elongate, the propodi at least twice as long as wide.
- E. Sixth segment of abdomen of male half as long as its proximal width.  
*aqualoralis*
- E'. Sixth segment of abdomen of male less than half as long as proximal width.
- F. Lower margin of larger propodus convex; lower margin of pollex straight ..... *verticalis*
- F'. Lower margin of larger propodus sinuous.
- G. Front low, its width about 12 times its height ..... *belliana*
- G'. Front higher, its width about 9 times its height ..... *montana*
- D'. Ambulatory legs not elongate, the propodi less than twice as long as wide.
- E. Manus with a tubercle at base of fingers ..... *tumimanus*
- E'. Manus without a tubercle at base of fingers ..... *tristani*
- C'. Superior margin of front tuberculate.
- D. Merus of maxilliped narrow, the outer oblique margin making an angle with the anterior margin.
- E. Cervical suture curved ..... *chilensis*
- E'. Cervical suture straight.
- F. Ambulatory legs slender. No outer orbital notch ..... *nobilii*

- F'. Ambulatory legs of moderate width. A well-marked outer orbital notch.....*bourieri*
- D'. Merus of maxilliped with outer margin convex, forming a single curve to the insertion of the palpus.
- E. Exognath reduced to a stump.
- F. Superior frontal margin unilobate. Median suture absent or faintly indicated.
- G. Cervical sutures straight. Carapace finely granulate.....*denticulata*
- G'. Cervical sutures curved, arching toward each other. Carapace coarsely granulate.....*agassizii*
- F'. Superior frontal margin bilobate. A median suture present...*fossor*
- E'. Exognath not reduced to a stump.
- F. Inferior margin of front convex.
- G. Cervical suture markedly sinuous.....*dilatata*
- G'. Cervical suture nearly straight.....*sulcifrons*
- F'. Inferior margin of front not convex, but sinuous or straight.
- G. Ambulatory legs slender. Carapace smooth to the naked eye.  
*bisuturalis*
- G'. Ambulatory legs not slender. Carapace granulate to the naked eye.....*caulusi*
- B'. Superior margin of front keeled.
- C. A tubercle on outer surface of manus at base of fingers.
- D. Merus of maxilliped narrow, outer margin very oblique. Dactylus of larger cheliped wide throughout its length....*conradi*
- D'. Merus of maxilliped broad, the external and antero-external margin very arcuate.
- E. Exognath reduced to a stump.....*garmani*
- E'. Exognath not reduced to a stump.
- F. Orbit more than twice the depth of the eye.....*magna*
- F'. Orbit less than twice the depth of the eye.....*tuberculata*
- C'. No tubercle on outer surface of manus at base of fingers.
- D. Exognath reduced to a stump, less than one-third the length of the ischium of the endognath.
- E. Cervical suture straight.....*dentata*
- E'. Cervical suture arching forward in anterior half.....*affinis*
- D'. Exognath at least one-third the length of the ischium of the endognath.
- E. Maxillipeds much wider than the buccal cavity, nearly covering the jugal area.....*maxillipes*
- E'. Maxillipeds only a little wider than the buccal cavity.
- F. Carapace very convex longitudinally.
- G. Lateral margins of fourth to sixth segments of abdomen of male not arcuate. Exognath reaching distal third of ischium.  
*convexa*
- G'. Lateral margins of fourth to sixth segments of abdomen of male arcuate. Exognath not reaching distal third of ischium.  
*reflexifrons*
- F'. Carapace flattened or slightly convex longitudinally.
- G. Cervical suture straight or nearly so. Lateral margin armed with rather large (for the genus) separated teeth...*richmondi*
- G'. Cervical suture curved.
- H. Carapace very wide, more than  $1\frac{1}{2}$  times as wide as long.  
*colombiana*
- H'. Carapace narrower, less than  $1\frac{1}{2}$  times as wide as long.
- J. Carapace finely granulate.
- K. A small species, less than 30 mm. wide. Lower margin of front tuberculate.....*pittieri*

- K'. A large species, more than 70 mm. wide. Lower margin of front not tuberculate ..... *henrici*
- J'. Carapace coarsely granulate.
- K. Merus of maxilliped narrow, subtriangular, outer margin straight or nearly so ..... *peruviana*
- K'. Merus of maxilliped broader, subquadrilateral, outer margin arcuate to the distal extremity.
- L. Sixth and seventh segments of abdomen of male of equal length; appendages of first segment with extremity very large and vertically compressed ..... *bocourti*
- L'. Sixth segment longer than seventh; appendages of the *jouyi* group ..... *lamellifrons*

## RELATION OF SPECIES OF PSEUDOTHELPHUSA TO ONE ANOTHER.

The genus *Pseudothelphusa* now contains 42 species, 17 of which are here described for the first time. A key to a genus in which the variations are so slight as in *Pseudothelphusa* is necessarily imperfect. The character of the front offers the most satisfactory basis for a primary division. Even here there are species of doubtful position. For example, *P. verticalis* forms a link between section A, front without a superior margin, and A', front with a superior margin, as, although its front is vertical, the superior margin is not sharply outlined. Under the species with smooth superior margin, *P. tumimanus* shows a transition to species with keeled fronts, as its superior margin is very well marked, approaching a keel. The forms intermediate between section A, front without a superior marginal line, and section A', B, C', superior margin tuberculate, are *P. ecuadorensis* and *P. nobilii*. The former has the surface of the front coarsely granulate, but without a distinct marginal line; the latter has a distinct line, feebly granulate. Under the group with superior margin tuberculate, we have *P. fossor* and *P. xantusi* inclining toward species with keeled fronts.

It is a notable fact that the merus of the maxillipeds of southern species differs from that of northern species. In the former the merus has a subtriangular shape, its outer margin concave or straight or rarely slightly convex and forming an angle with the anterior margin. In the latter the merus is subquadrate, and its outer margin is convex and curves gradually into the anterior margin. The first form of the merus is found in *macropa*, *plana*, *ecuadorensis*, *liudigiana*, *chilensis*, *bouvieri*, *nobilii*, *conradi*, *henrici*, and *peruviana*, all South American species inhabiting Colombia, Ecuador, Peru, and Bolivia. The second form of merus is found in all North American and West Indian species and in the South American species *garmani*, *fossor*, and *denticulata*, which inhabit the northern border of South America (Venezuela and Guiana). Two of this group, *richmondi* and *xantusi*, extend as far south as Colombia. *P. colombiana* has the merus intermediate between northern and southern forms; its range extends northward to Mexico. The meri of *P. reflexifrons* (Upper Amazon) and *P. agassizii* (Para) are also intermediate. That of *aquatorialis* is unknown to me.

It is impossible to correlate this difference in the maxillipeds with

any other character. With regard to the general appearance of the carapace, *reflexifrons*, *agassizii*, and *convexa* are the most convex; *peruviana*, *garmani*, *lamellifrons*, and *bocourti* are most flattened and are coarsely granulate. In the remainder of the species the carapace is moderately convex, often flattened in the middle and posterior portions and gradually deflexed near the anterior and lateral margins. In the following species the exognath is reduced to a short stump: *affinis*, *agassizii*, *bouvieri*, *chilensis*, *conradi*, *dentata*, *denticulata*, *fossor*, *garmani*, and *nobilii*. The following have a tubercle on the outside of the manus at the base of the fingers: *conradi*, *garmani*, *magna*, *tuberculata*, *tumimanus*.

In no two species are the abdominal appendages of the first segment in the male exactly alike, but some species have similar appendages. The different forms may thus be briefly described and the species grouped accordingly:

1. Extremity broad, with at least one tooth or lobe on each side: *americana*, *belliana*, *dilatata*, *jouyi*, *lamellifrons*, *pittieri*, *sulcifrons*, *terrestris*.

2. Two lobes on outer side, vertically compressed, inner extremity curving outwardly over these lobes: *colombiana*, *convexa*, *montana*, *tristani*, *tumimanus*, *xantusi*.

3. One outer lobe, extremity curving outwardly over it: *ecuadorensis*.

4. Compressed laterally; above at extremity a large subquadrate lobe which is toothed or spinous: *bocourti*, *maxillipes*.

5. Extremity thick, slightly compressed laterally, with outward-pointing teeth: *magna*, *richmondi*.

6. Compressed laterally; extremity subtriangular: *agrestis*, *denticulata*, *fossor*, *garmani*.

7. Upper lamina produced at extremity in a slender prominence, curving over broad, lower lamina: *dentata*, *reflexifrons*.

8. Outer margin with a long narrow lobe; terminus truncate, with a short tooth at outer and inner angles: *aquatorialis*, *bouvieri*, *conradi*, *lindigiana*.

9. Complex; terminal lamina oval, transverse; subterminal lamina oval, longitudinal: *verticalis*.

10. Narrow; extremity small; on outer side, a dentate backward-pointing lobe: *tuberculata*.

11. A deep rounded sinus on outer side near the extremity: *macropa*, *peruviana*.

12. Terminal half much narrower than the basal half; extremity with a transverse rim of backward-pointing spines: *bisuturalis*.

13. Appendages not known to me: *affinis*, *agassizii*, *chilensis*, *exilipes*, *gracilipes*, *henrici*, *nobilii*, *plana*.<sup>1</sup>

<sup>1</sup>The specimen of *nobilii* in the U. S. National Museum is a female; the type male of *chilensis* in the Paris Museum is dried and so preserved that the removal of the abdomen is not practicable; of the remaining species, only females have been collected.

In addition to the characters given above, one should look for specific differences also in the form of the orbits, size of the eyes, direction and depth of the dorsal sutures, character of the lateral indentations, form of the abdomen of the male, and of the chela and ambulatory legs.

The new species here made are based not on one character but on several.

DESCRIPTIONS OF NEW SPECIES OF PSEUDOTHELPHUSA.

PSEUDOTHELPHUSA EXILIPES, new species.

*Front without superior margin; width of carapace less than 13 times its length; outer margin of merus of maxilliped convex; ambulatory legs slender.*

Carapace covered with punctae visible to the naked eye and fine reticulating furrows seen only with the lens; granulate near anterolateral margins. Cervical suture very broad in its inner half, narrowing outwardly, its posterior margin curved, anterior straight. Epigastric lobes narrow, separated by a well-marked groove.



FIG. 1.—PSEUDOTHELPHUSA EXILIPES, FEMALE. a. MAXILLIPED, X 24. b. FRONT, NATURAL SIZE. c. LARGER CHELA, NATURAL SIZE.

Front (fig. 1, b) without a defined upper margin; the outline of the upper portion in a dorsal view is nearly straight; lower border marginate, sinuous, slightly visible in a dorsal view, median and lateral lobes about equally deflexed. The inner half of the orbits is longer than the outer half; the superior margin seen from above slopes outward and forward. Lateral margin finely denticulate, and with a hepatic tooth. Exognath

reaching about three-fourths the length of the ischium of the endognath (fig. 1, a).

Chelipeds very unequal in the female, covered with scaly granules; palm of larger cheliped with very convex margins; fingers slender, gaping, armed with irregular teeth (fig. 1, c); in the smaller cheliped the margins of the palm are slightly convex and the fingers do not gape. The ambulatory legs are very narrow; meri about  $3\frac{1}{2}$  times as long as wide; the propodi have straight margins, except in the last pair, where they are slightly convex.

*Dimensions.*—Female: Length, 14.4 mm.; width, 24.2 mm.

*Type.*—No. 19488, U.S.N.M.; one mature female; El Coronel, Costa Rica, 700 meters altitude; P. Brolley and E. Fernandez, collectors.

*Additional specimens.*—Two females, about the size of the type, are in the British Museum, associated with *P. tumimanus*, but without label of locality.

PSEUDOTHELPHUSA AGRESTIS, new species.

*Front without superior margin; lower margin sinuous, rimmed; outer margin of merus of maxilliped convex; exognath reaching about one-half the length of the ischium.*

Carapace smooth, punctae visible to the naked eye. Cervical suture deep, concave forward for the most part, outwardly straight, not continued to the margin. Median suture deep; epigastric lobes well



marked. Lateral denticles very slightly indicated. Front very low; upper boundary blunt, smooth, slightly arched forward in a dorsal view and downward in a front view; lower margin strongly rimmed, sinuous or trilobed (fig. 2, *f*). The appendages of the first segment of the abdomen of the male are laterally compressed (fig. 2, *d, e*). The chelipeds are very unequal, and the large cheliped differs from those of allied species in having the fingers widely gaping and armed with a few long teeth (fig. 2, *a*). Ambulatory legs narrow, but not markedly slender, as in *gracilipes* and *exilipes*.

*Dimensions*.—Male: Length, 15.9 mm.; width, 26.5 mm.; exorbital width, 8.1 mm.

*Types*.—One male (No. 19487, U.S.N.M.), one female (Costa Rica Mus.); La Flor, a farm near Torito, Costa Rica, 900 to 1,000 meters high; E. Fernandez, collector.

*Additional locality*.—El Coronel, 700 meters; P. Biolley and E. Fernandez, one male (Costa Rica Mus.).

**PSEUDOTHELPHUSA BELLIANA,**  
new species.

*Front low; superior margin smooth, not keeled; lower margin of larger propodus not sinuous; sixth segment of abdomen of male less than half as long as its proximal width; ambulatory legs elongate, the propodi at least twice as long as wide.*

Carapace punctate, granulate near the front and antero-lateral margins.

Lateral and posterior portions covered with short, coarse, black hairs. Cervical suture rather wide, more so inwardly than outwardly, ending a little way from the margin, slightly curved or concave forward. Median suture well-marked, widening toward its posterior end. Scerations of lateral margin small and irregular. Hepatic and cervical teeth very faintly marked, sometimes not evident. Front (fig. 3, *a*) narrow; superior margin deflexed, smooth, save for the general granulation of the surface, very faintly bilobed by the median sinus, the margin as a whole somewhat arcuate as seen from above; seen from in front it slopes downward and inward; lower margin subparallel to the upper and tuberculate; intervening space concave and smooth. Orbits a little wider than half the front; viewed from above, a great part of the margin is nearly transverse; in a front view, the outer half is longer than the inner. Sixth and seventh segments of the male abdomen of equal length (fig. 3, *c*). Appendages (fig. 4, *b, e*), similar to those of *joyi*. Exognath about two-thirds length of ischium; the latter widening rapidly distally to near the extremity, where it narrows again; merus rather broad and very arcuate on the outer side (fig. 4, *a*).



FIG. 2.—PSEUDOTHELPHUSA AGRISTIS, MALE. *a*. LARGER CHELA, NATURAL SIZE. *b*. MAXILLIPED, X 2½. *c*. ABDOMEN, NATURAL SIZE. *d*. LEFT ABDOMINAL APPENDAGE, INNER VIEW, X 5½. *e*. THE SAME, LOWER VIEW, X 5½. *f*. FRONT, NATURAL SIZE.

Chelipeds very unequal in both sexes, but much more so in the male. Lower margin of palm of larger cheliped very convex; pollex stout; both fingers granulate and armed with broad, low teeth. Ambulatory legs slender; meri not much compressed, slightly dilated at the middle; propodi narrow and much shorter than the slender dactyli.



FIG. 3.—PSEUDOTHELPHUSA BELLIANA, MALE, NATURAL SIZE. *a.* FRONT. *b.* LARGER CHELA. *c.* ABDOMEN.

*Dimensions.*—Male: Length, 15.8 mm.; width, 25.3 mm.; superior width of front, 7.5 mm.; inferior width of front, 6.6 mm.; depth of front, 0.8 m. Female: Length, 19 mm.; width, 33.5 mm.; superior width of front, 9 mm.; inferior width of front, 8 mm.; depth of front, 1 m. Female: Length, 17.8 mm.; width, 30 mm.

*Types.*—No 771, Brit. Mus.; No. 20038, U.S.N.M., one male and one female. Xautipa, State of Guerrero, Mexico, not far from Chilpancingo; H. H. Smith, collector.

Named for Prof. F. Jeffrey Bell, of the British Museum, through whose courtesy the writer has described the species.

#### PSEUDOTHELPHUSA MONTANA, new species.

*Allied to P. belliana, but front higher and less advanced, orbits more oval, cervical suture more transverse, merus of maxillipeds longer (fig. 6, a); abdominal appendages of the tristani group (fig. 6, b, c).*



FIG. 5.—PSEUDOTHELPHUSA MONTANA, MALE, NATURAL SIZE. *a.* FRONT. *b.* LARGER CHELA. *c.* ABDOMEN.

Punctae numerous and visible to the naked eye. Cervical suture arching backward and very deep. Median suture also deep; epigastric lobes well marked. Antero lateral denticles small and blunt; a hepatic tooth is present, about one-third the distance from the orbit to the cervical suture. Front (fig. 5, *a*) vertical; upper margin smooth and blunt, divided into two slightly convex lobes in a dorsal view, and strongly arched downward in a front view, terminating above the base of the eye-stalks; lower margin sinuous, slightly projecting; front deepest at the outer extremities. Orbits oblong in a front view, upper and lower margins subparallel.

Chelipeds unequal in both sexes; palms with convex margins, scaly granulate, as are also the fingers. Fingers reddish-brown, with teeth alternately large and small (fig. 5, *b*), fitting closely together. Meri of ambulatory legs narrow, but slightly dilated in the middle.

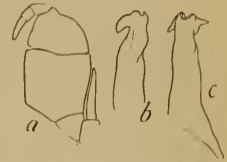


FIG. 4.—PSEUDOTHELPHUSA BELLIANA, MALE. *a.* MAXILLIPED, X 1½. *b.* LEFT ABDOMINAL APPENDAGE, INNER VIEW, X 3½. *c.* SAME, LOWER VIEW, X 3½.

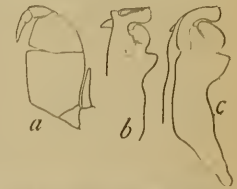


FIG. 6.—PSEUDOTHELPHUSA MONTANA, MALE. *a.* MAXILLIPED, X 1½. *b.* LEFT ABDOMINAL APPENDAGE, INNER VIEW, X 3½. *c.* SAME, LOWER VIEW, X 3½.

*Dimensions*.—Male: Length, 16 mm.; width, 27.5 mm.; exorbital width, 17.5 mm. Female: Length, 18.7 mm.; width, 33.5 mm.; exorbital width, 20 mm.

*Types*.—No. 19486, U.S.N.M.; two males and two females; Costa Rica: La Palma, 1,500 meters, under trunks of trees; J. Fid Tristan, February, 1896.

PSEUDOTHELPHUSA TUMIMANUS, new species.

*Superior margin of front smooth, not keeled; ambulatory legs wide; manus with a tubercle at base of fingers.*

Allied to *P. tristani*, but a much larger species. Carapace smooth, densely punctate. Cervical suture wide and nearly transverse in its inner half, then narrowing and curving abruptly forward, becoming obsolete near the margin of the carapace. Median furrow deep, crossing the upper frontal margin. Epigastric lobes marked by deep grooves. Lateral margin of carapace obscurely denticulate; in the largest specimen without additional teeth; in the three smaller specimens one or two teeth are faintly indicated. Front (fig. 7, *a*) with a marginate rim on its lower and lateral borders; lower border sinuous; front deepest near the middle. Orbits similar in shape to those of *tristani*, but wider; eyes much smaller than the orbits. Appendages of first abdominal segment of the male (fig. 7, *e, f*) resembling those of *montana*, but the subterminal lobe on the outer side is less thickened, and the posterior lobe less angular, than in that species. The maxillipeds (fig. 7, *c*) differ slightly from those of *tristani*; the meri are broader; their inner edges, instead of being marginate and subparallel, as in that species, are flat, and divergent anteriorly; the outer margins are more oblique than in *tristani*.

The chelipeds of the male are heavy and unequal. The teeth on the anterior or inner margin of the merus are very large and blunt, increasing in size distally. Propodus similar in shape to that of *tristani*, but inferior margin more convex, the greatest width of the segment being near the digital end of the palm. Fingers thick, slightly gaping, surface mottled with flattened black granules, scarcely perceptible to the touch; teeth black. There is a large round smooth wart or protuberance on the manus between the digits and in line with the teeth of their cutting edges (fig. 7, *b*).

*Dimensions*.—Male: Length, 42.2 mm.; width, 70.2 mm.; width of front (lower margin), 18 mm.; greatest depth of front, 3 mm.

*Distribution*.—This is a Costa Rican species taken in considerable numbers at Cachi, Reventazón River, 1,300 meters, by Mr. J. Fid Tris-

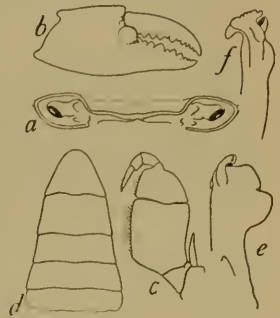


FIG. 7.—PSEUDOTHELPHUSA TUMIMANUS, MALE. *a*. FRONT X  $\frac{3}{8}$ . *b*. LARGER CHELA, X  $\frac{1}{2}$ . *c*. MAXILLIPED, X  $\frac{3}{8}$ . *d*. ABDOMEN, X  $\frac{3}{8}$ . *e*. LEFT ABDOMINAL APPENDAGE, LOWER VIEW, X  $1\frac{1}{2}$ . *f*. THE SAME, INNER VIEW, X  $1\frac{1}{2}$ .

tan; at La Palma, 1,500 meters, February, 1896, also by Mr. Tristan; and at Pacaca, Rodeo, 785 meters. A series of this species is in the British Museum, without indication of locality.

*Type*.—No. 19484, U.S.N.M.; one male; Cachi.

*Habits*.—Mr. J. Fid Tristan, of the National Museum of Costa Rica, writes thus concerning this species:

In La Palma, for instance, I found some in a small pond, near a house, in which the crabs have stationed themselves to feed on the refuse of meals, etc., that are from time to time thrown in. I saw that they showed preference for the cooked maize, and as soon as a morsel is thrown in the water to them they start from their hiding places to secure it, and then return to devour it at home. They also eat soap, which act surprises me, because of the caustic nature of the article.

#### PSEUDOTHELPHUSA NOBILII, new species.

*Pseudothelphusa gracilipes* NOBILI, Boll. Mus. Zool. Torino, 1897, XII, No. 275, p. [4]. Not *Boscia gracilipes* A. MILNE-EDWARDS, Ann. Soc. Entom. France, 1866, 4th ser., VI, p. 204.

*Superior margin of front tuberculate, not keeled; cervical suture straight; merus of maxilliped narrow, outer margin oblique; ambulatory legs slender.*

Differs from *gracilipes* in its narrower carapace; straight cervical suture directed more longitudinally than in *gracilipes*; bilobed superior frontal margin; in the sinuous lower margin of the propodus of the chelipeds, the propodus being widest at the middle of the palm (fig. 8, *b*), and not at the articulation with the dactylus, as in *gracilipes*; in the shorter ambulatory legs; in the reduction of the exognath to a short stump (fig. 8, *c*), while in *gracilipes* it extends three-fourths the length of the ischium.



FIG. 8.—PSEUDOTHELPHUSA NOBILII, FEMALE. *a*. FRONT, NATURAL SIZE. *b*. LARGER CHELA, NATURAL SIZE. *c*. MAXILLIPED, X 2½.

*Dimensions*.—Female: Length, 16.5 mm.; width, 28.5 mm.; exorbital width, 15.5 mm.

*Type*.—No. 20041, U.S.N.M.; one female. Guayaquiza, Ecuador; Dr. Enrico Festa.

*Additional localities (after Nobili)*.—Ecuador: Valle del Rio Santiago; San José de Cuchipamba; Valle del Rio Zamora.

This species was sent to the U. S. National Museum by the Museum of Turin, through Mr. Joseph Nobili, who expressed doubts as to the correctness of its identification and has permitted me to include it among the new species here made known.

#### PSEUDOTHELPHUSA BOUVIERI, new species.

*Superior margin of front tuberculate, not keeled; cervical suture straight; merus of maxillipeds narrow, outer margin oblique; ambulatory legs not slender.*

Very near *P. chilensis*; differs as follows: Carapace wider than in *chilensis*. Cervical suture straight instead of curved. Front propor-

tionally narrower. Orbits shorter and wider in *bouvieri*, and longer in their outer than their inner half (fig. 9, *a*); in *chilensis* they are of equal length in their outer and inner half. The maxillipeds are similar to those of *chilensis*, except that the merus is wider; its anterior width is about equal to its length measured from the antero-external angle (fig. 9, *b*), while in *chilensis* its anterior width is much less than its length.

*Dimensions*.—Male: Length, 31.5 mm.; width, 52.3 mm.; exorbital width, 26.5 mm.

*Types*.—Paris Museum, one male and one female; No. 20056, U.S.N.M., one male. Santa Fé de Bogota, United States of Colombia; M. Lindig.

The specific name is in honor of Prof. E. L. Bouvier, through whose liberality the U. S. National Museum has made many valuable additions to its collection of fresh-water crabs.



FIG. 9.—PSEUDOTHELPHUSA BOUVIERI, FEMALE, NATURAL SIZE. *a*. FRONT. *b*. MAXILLIPED.

#### PSEUDOTHELPHUSA AGASSIZII, new species.

*Superior margin of front tuberculate, not keeled, unilobate; surface coarsely granulate; cervical sutures convex to each other; merus of maxillipeds with outer margin convex; exognath reduced to a stump.*

Allied to *P. reflexifrons* and *P. denticulata*. Carapace convex, narrower than in *reflexifrons* or *denticulata*, very coarsely granulate, especially toward the lateral margins. Cervical suture slightly arched forward. The faintest trace of a median groove; branchio-cardiac lines deep. Lateral margin with about 22 distinct tuberculiform teeth; exorbital tooth larger than any other. Superior frontal margin not bilobed, truncate, rounding upward at the extremities; edge tuberculate, not projecting. Inferior border sinuous, margined, somewhat four-lobed (fig. 10, *a*); corners rounding; sides oblique; surface of front inclined downward and backward. Superior margin of orbit slightly sinuous, sloping backward a little, except toward the outer angle. Orbit large, wider than one-half the width of the front; eyes large, not quite filling orbit. Median tooth of epistome very long, produced downward and forward. Maxillipeds much as in *reflexifrons*, the merus having a thickened and strongly beveled outer margin (fig. 10, *b*). Abdomen of female narrow, apparently mature.

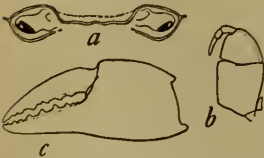


FIG. 10.—PSEUDOTHELPHUSA AGASSIZII, FEMALE, NATURAL SIZE. *a*. FRONT. *b*. MAXILLIPED. *c*. LARGER CHELA.

Chelipeds very unequal, rather stout; surface covered with rough, scaly granules. Lower margin of merus bordered by rather large tubercles or blunt spines; upper surface very rough. Carpal spine sharp. Palm (fig. 10, *c*) stout, both margins convex; fingers not gaping, and with broad triangular teeth. Ambulatory legs rough with spiniform

granules; meri broad, with very convex upper margins; dactyli very long, considerably exceeding the propodal joints.

*Dimensions*.—Female: Length, 24.5 mm.; width, 35.6 mm.; exorbital width, 23.5 mm.; width of front above, 10.5 mm.; depth of front, 1 m.

*Type*.—No. 4915, Mus. Comp. Zool.; one female. Para, Brazil; Agassiz and Bourget, Thayer expedition.

**PSEUDOTHELPHUSA FOSSOR**, new species.

*Boscia dentata* GERSTAECKER, Arch. f. Naturg., 1856, XXII, Pt. 1, p. 145. Not *Boscia dentata* Milne-Edwards.

*Superior margin of front tuberculate, not keeled, bilobate; surface finely granulate; cervical suture straight; merus of maxillipeds with outer margin convex; exognath reduced to a stump.*

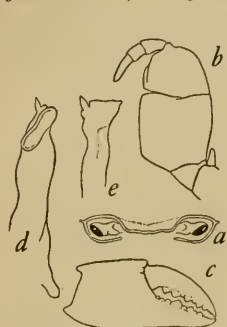


FIG. 11.—PSEUDOTHELPHUSA FOSSOR. a. FRONT, NATURAL SIZE. b. MAXILLIPED, X 2. c. LARGER CHELA, FEMALE, NATURAL SIZE. d. LEFT ABDOMINAL APPENDAGE, MALE, LOWER VIEW, X 5. e. THE SAME; INNER VIEW, X 5.

Carapace about three-fifths as long as wide, convex in both directions, smooth to the eye, finely punctate, faintly granulate along the frontal and lateral margins. Cervical suture very shallow, straight, scarcely distinguishable near the margin of the carapace. There is a shallow depression behind the outer end of the cervical suture. Median suture sufficiently marked; epigastric lobes narrow, distinct. Lateral margins denticulate; a shallow tooth is present at one-third the distance from the orbit to the cervical suture. The frontal region in advance of the epigastric lobes is deflexed. The front itself is perpendicular, about one-fourth the width of the carapace, shallow, deepest near the outer ends (fig. 11, a); lower border marginate, sinuous; upper border tuberculate, straight when viewed from above, inclining slightly toward the middle

when viewed from in front. The orbits belong to the group having a more or less quadrate outline; upper margin nearly transverse, lower margin running downward and outward from the inner angle. The eyes are rather large. The maxillipeds (fig. 11, b) have the outer margin of the merus and ischium of the endognath regularly convex, the ischium having its greatest width at some distance back of the distal end. The merus is not much wider than long. The exognath is much reduced, not reaching more than one-third the length of the margin of the ischium.

Chelipeds very unequal, covered with scabrous granules. Carpal tooth acute. Palm (fig. 11, c) with convex margins; fingers wide, meeting along their cutting edges, tips crossing, teeth white. Ambulatory legs with meral joints dilated in the middle; otherwise long and narrow. Dactyli long and slender, armed with very slender spines.

*Dimensions*.—Female: Length, 17.6 mm.; width, 28.7 mm.; width of front on lower margin, 6.5 mm; greatest depth of front, 1 m.

*Type*.—One female. No. 18818, U. S. N. M. Near La Guayra, Venezuela; Lieut. Wirt Robinson, United States Navy, June 23, 1895.

*Additional specimens*.—Caracas; Gollmer (No. 375, Berlin Mus., one male; Nos. 378, 384, 385, three females). Venezuela; E. Simon (Paris Mus., one male and four females). 'Antilles' (Kiel Mus., three males).

Of the habitat of this species, Lieut. Robinson says:

About three-fourths of a mile to the eastward of La Guayra a bed of a stream enters the sea. Ascending the valley, or rather canyon, down which this bed runs, there is on the right hand side an acequia, or aqueduct, cut out in the face of the steep hills. This taps the stream a mile above and takes all of its water leaving the bed from this point dry. About three-fourths of a mile back from the sea the canyon grows deeper and narrower and is filled with large buttressed trees. The little acequia winds among these in a semigloom. All along under the roots of these trees and under loose stones to the right and left, these little whitish crabs have burrows and sit at the entrance of them, gliding back under shelter as one passes near.

**PSEUDOTHELPHUSA DILATATA, new species.**

*Superior margin of front tuberculate, not keeled; lower margin convex; cervical suture sinuous; merus of maxilliped with outer margin convex; exognath about half length of ischium.*

Closely allied to *P. xantusi*. Carapace of similar proportions, with large punctæ, but devoid of the granulation so conspicuous on the frontal and lateral regions of *P. xantusi*. Cervical suture sinuous and deep, very broad in its inner half.

Branchial region very convex anteriorly, as in *P. xantusi*. Median furrow continued to the lower margin of the front. Front narrower than in *xantusi*; lower margin arcuate, most depressed in its central portion (fig. 12, a); in *xantusi* this margin for its entire length is in almost the same horizontal plane; upper margin also arcuate; front slightly deeper toward the outside. Orbits differing from those of *xantusi*; in the latter the upper and lower margins are regularly arcuate; in *dilatata* the orbits are subquadrilateral, the side margin of the front forms somewhat of an angle with the upper margin which is nearly straight for a ways; the lower margin beginning at the inner end slopes outward and downward. Maxillipeds similar to those of *xantusi* (fig. 12, b). The abdominal appendages of the male are akin to those of *jouyi* and *americana*; the outer laminate branch near the extremity is wider distally than proximally; more spreading than in *jouyi* and is 3-toothed; the inner projection is a broad, rounded lobe with a small tooth above its base (fig. 12, e, f). The chelipeds are very unequal in both sexes, but more so in the male. The palm in the larger cheliped widens considerably toward the fingers and is very thick and heavy, its lower margin con-

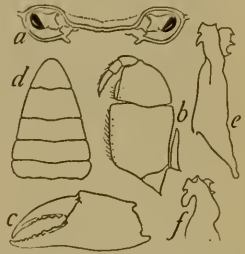


FIG. 12.—PSEUDOTHELPHUSA DILATATA, MALE. a. FRONT, X  $\frac{3}{8}$ . b. MAXILLIPED, X  $1\frac{1}{2}$ . c. LARGER CHELA, X  $\frac{3}{8}$ . d. ABDOMEN, X  $\frac{3}{8}$ . e. LEFT ABDOMINAL APPENDAGE, LOWER VIEW, X 2. f. THE SAME, INNER VIEW, X 2.

vex, upper nearly straight (fig. 12, c). Lower margin of palms tuberculate. Fingers widely gaping to the tips in the male, very slightly gaping in the female.

*Dimensions*.—Male: Length, 34 mm.; width, 56.2 mm.; width of front, lower margin, 13.8 mm. Female: Length, 37 mm.; width, 61.2 mm.; width of front, lower margin, 14.3 mm.

*Distribution*.—This species was received from the Mexican commission of the World's Columbian Exposition, 1893. The types are from Colima, Mexico; one large male and two large females (No. 18632, U. S. N. M.). There are also one male and three females from Huetamo, State of Michoacan.

PSEUDOTHELPHUSA SULCIFRONS, new species.

*Allied to P. dilatata, but front higher, orbits oval, cervical suture straight and more transverse, merus of maxilliped shorter.*

Carapace wider than in *dilatata*, smooth; cervical suture straighter and more transverse, deep; median suture very deep, continued to the lower margin of the front. Front (fig. 13, a) of about even depth throughout its width; lower margin an even curve, interrupted at the middle; upper margin obscurely tuberculate. Outline of orbit like that of *P. xantusi*. Abdominal appendage of the first segment in the male (fig. 13, e, f) with the outer laminate process well developed, its outer margin irregularly dentate, posterior tooth the largest, denticulate, and separated by a broad sinus from the following teeth. The lobe on the inner side of the appendage is broader and its basal tooth larger than in *P. dilatata*. Palm of cheliped (fig. 13, c) with its lower margin more convex than in *dilatata*; the palm is widest at a little distance from the base of the dactylus, while in *dilatata* the widest part is at the base of the dactylus. The pollex is shorter than in *dilatata*. Surface of fingers and lower surface of palm covered with squamiform granules.

FIG. 13.—PSEUDOTHELPHUSA SULCIFRONS, MALE. a. FRONT, X  $\frac{2}{3}$ . b. MAXILLIPED, X  $1\frac{1}{3}$ . c. LARGER CHELA, X  $\frac{2}{3}$ . d. ABDOMEN, X  $\frac{2}{3}$ . e. LEFT ABDOMINAL APPENDAGE, INNER VIEW, X 3. f. SAME, LOWER VIEW, X 3.

*Dimensions*—Male: Length, 22.8 mm.; width, 39.5 mm.; width of front, lower margin, 9.8 mm.

*Type*.—One specimen only, a male (No. 19482, U. S. N. M.), was collected at Yalalag, Oaxaca, Mexico, July 4, 1894, by E. W. Nelson and E. A. Goldman while making biological explorations for the U. S. Department of Agriculture. It was found in a spring on the mountain side at about 3,500 feet elevation.

PSEUDOTHELPHUSA GARMANI, new species.

*Superior margin of front keeled; carapace depressed, granulate; exognath of maxillipeds reduced to a stump; hand with a tubercle at base of fingers; front low.*



Carapace slightly convex; the gastric region is a little elevated, the branchial less so. The protogastric lobes are prominent and are continued laterally in a faint ridge to a point behind the base of the eye-stalk (fig. 14, *b*). The depressions defining the anterior part of the mesogastric region are distinct. Median furrow very deep. Cervical groove straight, deep, and continued nearly to the lateral margin. Anterior and lateral portions of the carapace covered with coarse scabrous granules. Lateral margins finely dentate, with traces of two larger indentations between the orbit and the cervical suture. Front low (fig. 14, *a*); superior margin convex, bilobed, tuberculate, slightly projecting over the vertical surface, and in a front view slightly concave or depressed in the middle; lower margin prominent, tuberculate, sinuous, partially visible in a dorsal view in small specimens. Orbit nearly filled by the eyes and with tuberculate margins, the superior margin sinuous. The outer margin of the endognath of the maxillipeds is convex (fig. 14, *g*); the ischium is narrower at its distal end than behind that point; the merus is rather short and broad, and has a regularly arcuate antero-lateral margin. The exognath is very short, being reduced to a stump.

The merus of the chelipeds is rugose above, the inner margin is armed with stout teeth graduated in size; the lower and distal margins of the inferior surface are marked by small and regular bead granules. Carpus rugose; inner tooth acute. Larger propodus stout (fig. 14, *f*), upper margin slightly convex; lower margin convex except for a slight sinus beneath the base of the pollex; surface covered with scattered scabrous granules; a large irregular tubercle at the base of the union of the fingers. Fingers broad, deeply punctate, punctæ in longitudinal rows; prehensile edges in contact or nearly so, and furnished with broad teeth. The smaller propodus differs in having the margins subparallel, and in having less heavy teeth on the fingers. Merus joints of ambulatory legs flattened, with upper margins convex and sharply denticulate. Superior margin of carpal and both margins of propodal joints spinulose. These joints in the last pair are rather broad. The dactyli are slender.

*Dimensions.*—Type, female: Length, 17.1 mm.; width, 26.8 mm.; exorbital width, 17.1 mm.; width of front below, 7 mm.; above, 8 mm.; depth, 0.7 m. Female, Antilles: Length, 38 mm.; width, 63 mm.; exorbital width, 35 mm.; width of front below, 15.8 mm.; above, 17.7 mm.;

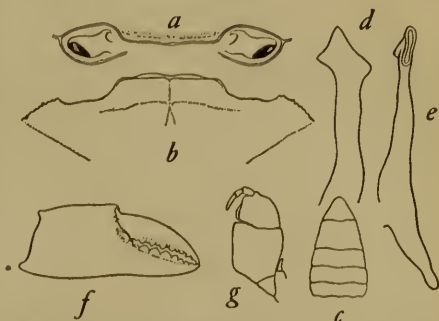


FIG. 14.—*PSEUDOTHELPHUSA GARMANI*. *a*. FRONT, X 1 $\frac{1}{2}$ . *b*. ANTERIOR OUTLINE, X 1 $\frac{1}{2}$ . *c*. ABDOMEN, MALE, NATURAL SIZE. *d*. LEFT ABDOMINAL APPENDAGE, MALE, INNER VIEW, X 10. *e*. THE SAME, LOWER VIEW, X 10. *f*. LARGER CHELA, FEMALE, X 1 $\frac{1}{2}$ . *g*. MAXILLIPED, X 1 $\frac{1}{2}$ .

depth, 2.2 mm. Male, Caracas: Length, 22.7 mm.; width, 35.2 mm. Female, Caracas: Length, 49 mm.; width, 78 mm.

*Type*.—No. 5101, Mus. Comp. Zool.; one immature female. Trinidad; S. Garman, April 6, 1879.

*Additional localities*.—Venezuela: Near Caracas (Copenhagen Mus.; one small male, one small female, one young). Caracas; Gollmer (Nos. 1387, 1388, 2122, Berlin Mus.; one male and three females). A large female labeled "Antilles, Dr. Claudius, 1853," is in the museum at Kiel.

This crab is very closely related to *P. dentata* of the Windward Islands and *P. fossor* also of Venezuela. It is easily distinguished from either by its lower, wider front, from *dentata* by the tubercle on the manus and the wider merus of the endognath, and from *fossor* by its rougher, flatter carapace and projecting frontal margin.

#### PSEUDOTHELPHUSA AFFINIS, new species.

*Potamocarcinus dentatus* ORTMANN, Zool. Jahrb., Syst., 1897, X, p. 318 (part).  
Not *Pseudothelphusa dentata* (Latreille).

*Allied to P. dentata; carapace wider; front wider and lower; cervical sutures convex to each other in their anterior half.*

This species differs from *P. dentata* as follows: The carapace is wider; the cervical suture, although nearly straight, is slightly convex forward in its anterior half; median suture and epigastric lobes very faintly indicated. Lateral margins, although distinctly denticulate, are not broken by an epibranchial or other large tooth. Front wider and much less high than in *P. dentata*, the height between the tubercles being about one-twelfth the greatest width of the front, measured inside the tubercles of the lateral margin. The lower margin of the palm is very convex, the width of the palm being nearly equal to the superior length.

*Dimensions*.—Female: Length, 22.4 mm.; width, 38.8 mm.; superior width of front, 10.7 mm.; entire height of front, 1.3 mm.; superior length of palm, 13.5 mm.; width of same, 12.5 mm.; length of dactylus, 16.5 mm.

*Type*.—No. 128, Mus. Phila. Acad. Nat. Sci.; one female, dried. Cuba; Guérin; Dr. T. B. Wilson collection.

#### PSEUDOTHELPHUSA MAXILLIPES, new species.

*Superior margin of front keeled; maxillipeds unusually wide; exognath about three-fourths the length of the ischium of the endognath.*

Carapace of medium width, obscurely granulate on the frontal and lateral regions, finely punctate. Cervical suture shallow, nearly straight. Lateral margin denticulate, interrupted by a small tooth at the cervical suture. Front (fig. 15, *a*) of slight depth and vertically concave; lower edge strongly marginate, more depressed in the center than outwardly; the two halves slightly sinuous; upper margin tuberculate, the lobes nearly straight and transverse in a dorsal view and

inclined downward toward each other in a front view. Margins of orbits similar to those of *dilatata*, in that the upper and lower margins are nearly straight and parallel; just below the outer sinus, however, the margin is produced in a shallow obtuse tooth in addition to the regular crenulation of the margin. The last two segments of the abdomen of the male (fig. 15, *d*) are rather long, and their margins partly concave. The appendages of the first segment (fig. 15, *e, f*) are more like those of *richmondi* than any other species; distally they are much compressed in a vertical direction, and on the upper margin have three teeth, the anterior of which is on the inner side of the appendage, the two posterior on the outer side; the posterior of these teeth is large, acute, directed upward and backward; on the outer surface near the extremity there is a small slender spine directed outward. The outer maxillipeds (fig. 15, *b*) are wider than in any other described species; the ischium of the endognath much wider at its distal than its proximal end; outer margin of the merus with a very convex arch.

Chelipeds very unequal. The larger propodus (fig. 15, *c*) is very deep; upper margin slightly convex, lower margin convex, forming a single curve to the end of the pollex; fingers slightly gaping; teeth very irregular; the largest tooth occurs at about the middle of the pollex in both chelipeds; in the greater one, this tooth is strongly developed and outwardly protuberant, an effect probably due to injury. The upper margin of the smaller hand is slightly convex; lower margin convex proximally, concave distally. The inner surface of the hands and fingers shows numerous scabrous tubercles or granules, especially on the margins; these are present, though much less distinct, on the outer surface.

*Dimensions*.—Male: Length, 37.5 mm.; width, 59 mm.; width of front on lower margin, 14.2 mm.; depth of front, 1.7 mm.

*Type*.—No. 19481, U.S.N.M.; one male. Tuxtla, Vera Cruz, Mexico, 1,000 feet elevation; E. W. Nelson and E. A. Goldman, May 16, 1894, Biological Survey, U. S. Department of Agriculture.

#### PSEUDOTHELPHUSA CONVEXA, new species.

*Superior margin of front keeled; carapace very convex longitudinally; lateral outline of fourth to sixth segments of abdomen of male not arcuate (fig. 16, d); appendages of the first segment similar to those of P. tristani; exognath reaching distal third of ischium of endognath.*

This species resembles *P. reflexifrons* and *P. agassizii* in being very convex antero-posteriorly. Carapace smooth, except along the postero-

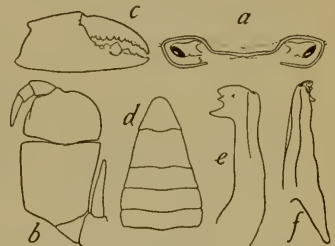


FIG. 15.—PSEUDOTHELPHUSA MAXILLIPES, MALE. *a*. FRONT, X  $\frac{2}{3}$ . *b*. MAXILLIPED, X  $1\frac{1}{2}$ . *c*. LARGER CHELA, X  $\frac{1}{2}$ . *d*. ABDOMEN, X  $\frac{2}{3}$ . *e*. RIGHT ABDOMINAL APPENDAGE, OUTER VIEW, X  $1\frac{2}{3}$ . *f*. LEFT ABDOMINAL APPENDAGE, LOWER VIEW, X  $1\frac{2}{3}$ .

lateral margins. The cervical suture is sinuous, wider, and deflected slightly backward in its inner half, becoming obsolete near the margin, and ending in a transverse depression. Lateral margin for the most part sharply and irregularly denticulate, the denticles becoming smaller and more obtuse anteriorly, where there is a shallow tooth between the orbital angle and the cervical suture. Median sulcus well marked, cutting the superior frontal margin. Epigastric lobes faintly indicated. Front (fig. 16, *a*) shallow, concave in a vertical direction; lower border conspicuously marginate, sinuous, the front being deepest near the middle; upper margin depressed, projecting forward in a tuberculate crest, which is divided into two slightly convex lobes. The orbits are of the same order as in *dilatata*, the lower margin sloping downward from the inner angle. The male abdominal appendages of the first

segment (fig. 16, *e, f*) are of the same class as those of *P. tristani* and *P. tumimanus*; of the two lobes on the outer margin, the anterior is much more thickened and deflexed than in those species; as in *tristani*, the posterior lobe is reduced and subquadrate instead of triangular and acute. The merus of the maxillipeds (fig. 16, *b*) is narrower than in *tristani*, its greatest length exceeding its anterior width. The exognath extends to the distal third of the ischium of the endognath.

The chelipeds are distinguished by the slender, acuminate carpal spine. The propodus (fig. 16, *c*) is slightly convex above and convex below the



FIG. 16.—PSEUDOTHELPHUSA CONVEXA, MALE.  
*a.* FRONT, NATURAL SIZE. *b.* MAXILLIPED, X 2. *c.* LARGER CHELA, NATURAL SIZE.  
*d.* ABDOMEN, NATURAL SIZE. *e.* LEFT ABDOMINAL APPENDAGE, INNER VIEW, X 3.  
*f.* THE SAME, LOWER VIEW, X 3.

palmar portion. The inner and upper surfaces are marked with small tubercles, most abundant near the margins. The fingers do not gape, and are tuberculate on both inner and outer surfaces. The ambulatory legs are rather narrow.

*Dimensions.*—Male: Length, 25 mm.; width, 39.6 mm.; width of front along lower margin, 9.5 mm.; greatest depth of front, 1.2 mm.

*Type.*—No. 19483, U.S.N.M.; one male received from the National Museum of Costa Rica. Palmar, Costa Rica, 20 meters; George K. Cherric.

*Additional locality.*—One male was also received from Mr. H. Pittier, who collected it at Santo Domingo, Gulf of Dulce, Costa Rica, April, 1896.

PSEUDOTHELPHUSA PITTIERI, new species.

*Small species; superior margin of front keeled; carapace finely granulate; abdominal appendages of the jouyi group.*

Carapace flattened, granulate anteriorly and laterally. Cervical

suture strongly curved, concave forward, as in *bocourti*, but more transverse than in that species. Front (see fig. 17, *a*). Orbits (fig. 17, *a*) nearly transverse in a front view, suboval. Abdominal appendages similar to those of *jouyi*, *americana*, *terrestris*, etc. (fig. 17, *d*); extremity with a large, rounded, inner lobe, and a pointed tooth directed forward at the antero-external angle. Fingers of chelipeds slightly gaping (fig. 17, *b*). Meral joints of ambulatory legs dilated in the middle.

*Dimensions*.—Male: Length, 12.3 mm.; width, 19.5 mm. Female: Length, 17 mm.; width, 27.5 mm.

*Habitat*.—Costa Rica: Agua Buena, type locality; Java, one female. The specimens are the gift of Mr. H. Pittier, director of the Physical-Geographical Institute of Costa Rica, for whom the species is named.

*Types*.—No. 21243, U.S.N.M.; two males, two females; Agua Buena.

#### PSEUDOTHELPHUSA PERUVIANA, new species.

*Superior margin of front keeled, carapace coarsely granulate; merus of maxilliped subtriangular; abdominal appendages horizontally compressed.*

A narrow species, with advanced front. Carapace covered with depressed, crowded granules, larger near the margin; puncta inconspicuous. Cervical suture a single curve, concave forward. Antero-lateral teeth well marked, but small. Median suture very deep, cutting the superior frontal margin. This margin is arcuate in a single curve, ending above the base of the eyestalks, tuberculate; in a front view it bends down toward the middle (fig. 18, *a*).

Lower margin projecting beyond the upper, tuberculate, strongly sinuous, three-lobed, the middle lobe reaching farther down than the lateral lobes, which are subtriangular. Side margins of front nearly vertical. Orbits about as wide as one-half the front, rather deep, nearly filled by the eyes. Abdominal appendages twisted, terminal third lamelli-form, compressed horizontally (fig. 18, *e*). Maxilliped (fig. 18, *c*) with exognath short, about one-half length of ischium. The ischium is a little narrower at the distal end than behind that point; merus subtriangular, outer margin very slightly convex. Chelipeds granulate, not very unequal. Merus strongly

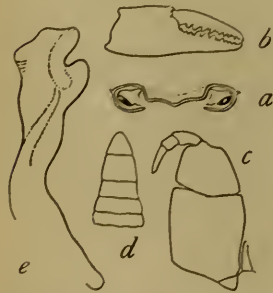


FIG 18.—PSEUDOTHELPHUSA PERUVIANA, MALE. *a*. FRONT, X 1 $\frac{1}{3}$ . *b*. LARGER CHELA, X 1 $\frac{1}{2}$ . *c*. MAXILLIPED, X 2. *d*. ABDOMEN, X 1 $\frac{1}{3}$ . *e*. LEFT ABDOMINAL APPENDAGE, LOWER VIEW, X 4.

toothed on inner margin; feebly tuberculate on lower and distal margins of inner surface. Hands convex above and below. Teeth of fingers subtriangular, as a rule large and small alternating and dove-



FIG. 17.—PSEUDOTHELPHUSA PITTIERI, MALE. *a*. FRONT, X 1 $\frac{1}{3}$ . *b*. LARGER CHELA, X 1 $\frac{1}{2}$ . *c*. MAXILLIPED, X 2. *d*. LEFT ABDOMINAL APPENDAGE, LOWER VIEW, X 3.

tailing into each other so that the fingers do not gape (fig. 18, *b*). Ambulatory legs not very long; meri flat, widening slightly toward the middle; carpi rather wide; propodi short and broad; dactyli about as long as posterior margin of propodi.

*Dimensions*.—Male: Length, 23.5 mm.; width, 34.3 mm.; width of front above, 10.7 mm.; below, 9.8 mm.; greatest depth, about 1.6 mm.

*Types*.—No. 74-53, Brit. Mus.; two males; Moyombamba, Peru; Purdi Higgins.

POTAMOCARCINUS Milne-Edwards.

*Potamocarcinus* MILNE-EDWARDS, Ann. Sci. Nat., 3d ser., Zool., 1853, XX, p. 208 [174]; Arch. Mus. Hist. Nat. Paris, 1851, VII, p. 174. Type, *P. armatus* Milne-Edwards.—RATHBUN, Proc. U. S. Nat. Mus., 1893, XVI, p. 655.—ORTMANN, Zool. Jahrb., Syst., 1897, X, pp. 298, 315 (part).

*Kingsleya* ORTMANN, Zool. Jahrb., Syst., 1897, X, pp. 298, 324. Type, *Potamia latifrons* Randall.

I have set apart under the name *Potamocarcinus* those species which have the superior frontal margin overhanging the front, which is rapidly retreating; the orbits very deep, the margins above and below making deep, semicircular incisions in the carapace, and having below two angular sinuses, and the antero-lateral teeth large and spiniform.

To this genus I refer *P. armatus* Milne-Edwards (type species), *P. nicaraguensis* Rathbun, and *P. latifrons* (Randall)=*Potamia schomburgkii* White, 1847,<sup>1</sup> nomen nudum (type examined).<sup>2</sup>

I have not adopted the genus *Kingsleya* Ortmann for the following reasons: The genus is established on two characters, namely, the union of the inner orbital angle with the front, and the reduction of the exognath of the third maxilliped. An examination of the species of *Pseudothelphusa* having a very short exognath (p. 513) will convince one that this is but a specific character. As to the union of the front and the orbital angle, this character is open to the objection stated under *Hypolobocera* (p. 509). Even in the type specimen of *Potamia latifrons* Randall (*Kingsleya* Ortmann), the two sides are not symmetrical. On the right side the front unites with the orbital margin, but on the left it does not, there being between them a hiatus in which lies the flagellum. The inner suborbital lobe is present on both sides, but is almost entirely hidden. *Kingsleya* is therefore considered a synonym of *Potamocarcinus*.

ANALYTICAL KEY TO THE SPECIES OF POTAMOCARCINUS.

- A. Exognath reduced to a stump, less than one-third the length of the ischium of the endognath ..... *latifrons*  
 A'. Exognath more than one-third the length of the ischium.  
 B. Carapace more than  $1\frac{1}{2}$  times as wide as long (including spines) ..... *nicaraguensis*  
 B'. Carapace less than  $1\frac{1}{2}$  times as wide as long (including spines).... *armatus*

<sup>1</sup>List Spec. Crust. Coll. Brit. Mus., p. 30.

<sup>2</sup>*Potamocarcinus denticulatus* Stimpson, Proc. Acad. Nat. Sci. Phila., 1861, XIII, p. 373, from the River Atrato, United States of Colombia, is indeterminable from the brief description. The type is not extant, and specimens have not since been collected from the same locality. It is probably a *Pseudothelphusa*, and if so, the name *Ps. denticulata* is preoccupied for another species described by Milne-Edwards.

## EPILOBOCERA Stimpson.

*Epilobocera* STIMPSON, Ann. Lyc. Nat. Hist. N. Y., 1860, VII, p. 234. Type, *E. cubensis* Stimpson.—SMITH, Trans. Conn. Acad. Sci., 1870, II, p. 150.—RATHBUN, Proc. U. S. Nat. Mus., 1893, XVI, p. 657.—ORTMANN, Zool. Jahrb., Syst., 1897, X, pp. 298, 321.

*Opisthocera* SMITH, Trans. Conn. Acad. Sci., 1870, II, p. 148. Type, *O. gilmanii* Smith.

In the genus *Epilobocera* are included those species in which the exognath exceeds the ischium of the endognath, and is sometimes at least provided with a palpus, and in which there is a tooth or spine in the efferent branchial channel. There is also a subcervical suture, bordered on the posterior side by a granulated line. The spines on the dactyli of the ambulatory legs are longer and more slender than in *Pseudothelphusa*, and also more numerous than in any species of that genus except *P. macropa*. The principal character assigned by Stimpson to this genus, the union of the inner suborbital lobe with the front, is not constant. This lobe is usually separated from the front by the width of the flagellum.

I believe that the first description of an *Epilobocera* was made by Herbst under the name *Cancer fluviatilis*.<sup>1</sup> Herbst confused several species in the synonymy, but his figure was borrowed from the manuscript of Plumier's 'Zool. Americ.', and the description is evidently based on the figure and not on the animal itself. No locality is given. Plumier made three voyages to the West Indies and the neighboring continent. Among the islands visited were Guadeloupe, Martinique, and Santo Domingo. The species *Cancer fluviatilis* approaches nearest to *E. cubensis* Stimpson, but its identity can not be determined with certainty. Latreille named it *Thelphusa serrata*.<sup>2</sup>

As above defined, the genus *Epilobocera* contains six species: *E. cubensis* Stimpson (type species), *E. sinuatifrons* (A. Milne-Edwards), *E. armata* Smith, *E. gilmanii* (Smith, as *Opisthocera*), *E. haytensis* Rathbun, and *E. granulata* Rathbun.

Dr. Ortmann<sup>3</sup> rejects the name *eubensis* for that species because Stimpson in his specific diagnosis, "Superior frontal crest . . . not projecting beyond the inferior one," contradicts his generic diagnosis, "*Potamocarcino carapacem frontemque similis*," and also Professor Smith's statement that "the superior frontal crest projects considerably beyond the inferior." The truth is that different individuals of this species vary in the amount of projection of the front. In large specimens (about 52 by 84 mm.) the superior margin of the front is considerably projecting, while in small specimens (about 20 by 31.3 mm.) the superior margin projects scarcely at all over the surface of the front.

Considering the correspondence in locality, there seems to be little

<sup>1</sup> Natur. Krabben u. Krebse, 1785, I, p. 183, pl. x, p. 61.

<sup>2</sup> Nouv. Dict. Hist. Nat., 1819, XXXIII, p. 504.

<sup>3</sup> Zool. Jahrb., Syst., 1897, X, p. 322.

doubt that Stimpson's species is the same as the *cubensis* of von Martens. One of von Martens's types, a half-grown specimen, I have compared with the specimen of equal size in the museum of the Philadelphia Academy, from Cuba, labeled by Dr. Ortmann *E. gilmanii* (Smith), and find them identical.<sup>1</sup> To *E. cubensis* von Martens, Dr. Ortmann gives the name *E. haytensis* Rathbun, considering them synonymous; but the identity of the species is disproved by the fact that a specimen of true *E. haytensis* Rathbun in the museum of the Philadelphia Academy is labeled "*Potamocarcinus sinuatifrons* (A. Milne-Edwards)."<sup>2</sup> This specimen agrees with the one figured in Proceedings of the U. S. National Museum, 1893.<sup>3</sup> Moreover, it is impossible for species to be synonymous which have maxillipeds so different in shape as those shown in figures 5 and 6 of the plate cited.

The specimens of *E. haytensis* Ortmann,<sup>4</sup> from Guantanamo, Cuba, are *E. armata* Smith. I have compared them directly with one of the types. The locality of the type specimens is unknown, though thought by Professor Smith to be the Bahamas. It is not, however, known that any of the Pseudothelphusinae inhabit the Bahamas. *E. cubensis* is quite convex and evenly so, both in an antero-posterior and a transverse direction. *E. armata* is less convex, the cervical suture deeper, the tubercles of the superior frontal margin are very prominent and form a distinct ridge, well marked in the young male as well as in the adult female, which measures 29.8 by 46.6 mm., with the superior width of the front 13 mm. The outer angle of the orbit has one or two prominent spiniform tubercles, and the teeth of the antero-lateral margin are spiniform. There are, however, tubercles or granules near the lateral margins of the carapace which are wanting in the types, these being much larger specimens than the female in the Philadelphia Academy.

The six species of *Epilobocera* may be divided into two groups, according to the form of the merus of the endognath. In the first group belong those species having the merus very broad and regularly arcuate from the postero-external angle to the insertion of the palpus; the second group includes those species having the merus narrower and subquadrate, the outer margin forming a blunt angle with the distal margin. *E. armata*, *cubensis*, *granulata*, and *gilmanii* belong to the first group. *E. gilmanii* is set apart from the others by its much narrower and more convex carapace, more advanced front, projecting considerably beyond the line of the outer orbital angles and by the smoothness of the front. *E. armata* and *cubensis* are of about equal width, small specimens being narrower proportionally than large ones. The difference between these two species is given in a preceding paragraph. *E. granulata*, founded on young specimens, is much wider than either of its allies, and its frontal crest is strongly marked, as in young *armata*. The inferior margin differs from that of *armata* in being sinuous and in projecting beyond the superior.

<sup>1</sup> See Zool. Jahrb., X, p. 323.

<sup>2</sup> Zool. Jahrb., X, p. 318.

<sup>3</sup> Vol. XVI, pl. LXXVII, figs. 4, 5.

<sup>4</sup> Zool. Jahrb., X, p. 322.



The second group, with quadrate meri, embraces *E. haytensis* and *E. sinuatifrons* (*E. portoricensis*, manuscript, Berlin Mus.). *E. haytensis* is much flatter than any other member of the genus, and is narrower than *sinuatifrons*, with strikingly larger eyes and strongly protruding inferior frontal margin; this margin is not visible in a dorsal view of *sinuatifrons*.

ANALYTICAL KEY TO THE SPECIES OF EPILOBOCERA.

- A. Front without superior crest; exognath considerably overlapping merus of endognath; spine of efferent channel narrow ..... *gilmanii*  
 A'. Front with superior crest; exognath slightly overlapping merus of endognath; tooth of efferent channel short and broad.
- B. Merus of endognath broad, its outer and anterior margin arcuate.  
 C. Width varying from 1.56 times the length in small specimens to 1.64 times the length in large specimens.  
 D. Antero-lateral teeth spiniform ..... *armata*  
 D'. Antero-lateral teeth dentiform ..... *cubensis*  
 C. Wider; width of small specimens 1.7 times length ..... *granulata*
- B'. Merus of endognath narrower, subquadrate, with an antero-external angle.  
 C. Inferior margin of front projecting beyond the superior ..... *haytensis*  
 C'. Inferior margin of front not projecting beyond the superior. . . . . *sinuatifrons*

RATHBUNIA Nobili.

*Rathbunia* NOBILI, Boll. Mus. Zool. Torino, April 16, 1896, XI, No. 238, p. [1]; March 15, 1897, XII, No. 280, p. [2], text figure.

This genus is allied to *Pseudothelphusa*, but differs from it and also from all other members of the subfamily in the form of the outer maxilliped (see text figure cited above), the merus of which is very narrow posteriorly. Its posterior margin is articulated with the outer half of the anterior margin of the ischium.

The genus was founded on a single specimen (female) from Darien, in the museum at Turin, *Rathbunia festa*. It is one of the largest of the Pseudothelphusinae, being equaled only by *Pseudothelphusa magna* and *henrici*, *Potamocarcinus nicaraguensis*, and *Epilobocera sinuatifrons*.

DISTRIBUTION OF THE PSEUDOTHELPHUSINÆ.

The genus *Epilobocera*, with six species, is confined to the West Indian Islands.

The genus *Potamocarcinus*, with three species, is continental, so far as known, ranging from Nicaragua to Guiana.

The genus *Rathbunia*, one species only, inhabits Darien.

The genus *Pseudothelphusa* embraces many more species than any of the above, and ranges throughout the West Indies and on the continent from the States of Jalisco and Guanajuato in Mexico to Peru and Bolivia on the west, and Para, Brazil, on the east. There is no indisputable evidence of its occurrence in Chile. The Potamonidæ are represented in Brazil, Argentina, Paraguay, Uruguay, and Chile by the Trichodactylinae, which, however, are not confined to those countries, but inhabit nearly the whole of South America and extend into Nica-

ragua. The single American *Potamon*, *P. (Geothelphusa) chilensis* (Heller), inhabits Chile.

The evidence goes to show that each species of the Pseudothelphusinae inhabits a limited area, and that closely related species inhabit adjacent areas. The only instances of the same species inhabiting both continent and island are *Ps. garmani*, in Venezuela and Trinidad, and *Ps. americana* and *Ps. terrestris*, both of which are found in Cuba and Central Mexico. Each species of *Epilobocera* is restricted to a single island or to two adjacent islands, as, for example, *E. cubensis* and *E. armata* to Cuba, *E. gilmanii* to the Isle of Pines, *E. haytensis* to Haiti, and *E. sinuatifrons* to Porto Rico and Santa Cruz, which are connected by a ridge at about 900 fathoms depth. The home of *E. granulata* is not known, further than that it is West Indian. The species of *Pseudothelphusa* inhabiting the Greater Antilles do not extend farther east than Santa Cruz, being replaced in the Windward Islands by *P. dentata*.

Of continental species those having the greatest range are *Ps. macropa*, extending from Colombia to Bolivia; *Ps. xantusi*, from Mexico (?) to Venezuela; *Ps. richmondi*, from Nicaragua to the Isthmus; *Ps. colombiana*, from Mexico to Colombia, and *Ps. tuberculata*, from Guatemala to Costa Rica.

Costa Rica has yielded the greatest number of species of any one region. This is due not to the superabundance of species in this State, but to the diligence of collectors, Mr. J. Fid Tristan and his colleagues of the National Museum of Costa Rica, at San José, and Mr. H. Pittier, of the Physical-Geographical Institute of Costa Rica, also at San José.

It is worthy of note that in spite of the researches in Jamaica for many years past, no fluviatile crab of the family Potamonidæ has as yet been recorded from the island.

Following is a list of the species of Pseudothelphusinae, with the localities where each is found; also a list of localities, with the species found in each. Among the localities are given a few of doubtful value, as "Antilles" and "Chile," both of which are left out of consideration in the above remarks.

LIST OF THE SPECIES OF PSEUDOTHELPHUSINÆ, WITH LOCALITIES FOR EACH.

Genus PSEUDOTHELPHUSA Saussure.

*æquatorialis* (Ortmann).

Ecuador (Strasburg Mus.).

*affinis* Rathbun.

Cuba (Mus. Phila. Acad. Nat. Sci.).

*agassizii* Rathbun.

Brazil: Para (Mus. Comp. Zool.).

*agrestis* Rathbun.

Costa Rica: La Flor, Torito, 900-100 meters (U. S. Nat. Mus., Costa Rica Nat. Mus.); El Coronel, 700 meters (Costa Rica Nat. Mus.).

*americana* Saussure (type species of the genus) = *dugesi* Rathbun.

Cuba<sup>1</sup> (Geneva Mus.).

Haiti (type locality).

Mexico:

State of Morelos: Cuernavaca, type locality of *dugesi* (U. S. Nat. Mus., Turin Mus.);

State of Guanajuato: Guanajuato (U. S. Nat. Mus.);

State of Puebla: Chiguahuapan (U. S. Nat. Mus., Paris Mus.);

State of Guerrero: Amula (Brit. Mus., U. S. Nat. Mus.);

State of Oaxaca: Oaxaca (Paris Mus.).

*belliana* Rathbun.

Mexico: State of Guerrero: Xautipa (Brit. Mus., U. S. Nat. Mus.).

*bisuturalis* Rathbun.

Guatemala: Streams of St. Augustine near Atitlan, on Pacific slope (Paris Mus., U. S. Nat. Mus.).

Locality unknown (Brit. Mus.).

*bocourti* (A. Milne-Edwards).

Guatemala: Coban, Vera Paz (Paris Mus.).

*bourieri* Rathbun.

United States of Colombia: Santa Fé de Bogota (Paris Mus., U. S. Nat. Mus.).

*chilensis* (Milne-Edwards and Lucas).

Peru: Lima<sup>2</sup> (Paris Mus., Mus. Phila. Acad. Nat. Sci.).

*colombiana* Rathbun.

United States of Colombia:

River David, Chiriqui, 4,000 feet, type locality (U. S. Nat. Mus.);

Chiriqui (Berlin Mus.).

Mexico, 300 meters (Brit. Mus., U. S. Nat. Mus.).

*conradi* Nobili.

Ecuador:

Gualaquiza (Turin Mus.);

Valley of the Rio Santiago (Turin Mus.);

San José de Cuchipamba (Turin Mus.);

Exact locality not given (U. S. Nat. Mus.).

Peru:

Cuterro (Brit. Mus., U. S. Nat. Mus.);

Tambillo (Brit. Mus.).

*convexa* Rathbun.

Costa Rica:

Palmar, 20 meters, type locality (U. S. Nat. Mus.);

Santo Domingo, Gulf of Dulce (U. S. Nat. Mus.).

*dentata* (Milne-Edwards) = *tenuipes* Pocock.

Guadeloupe (Paris Mus.).

Dominica, type locality of *tenuipes* (Brit. Mus., U. S. Nat. Mus., Mus. Comp. Zool.).

Martinique, type locality (Paris Mus., U. S. Nat. Mus., Mus. Comp. Zool.).

St. Lucia (U. S. Nat. Mus.).

? ? Chile (Brit. Mus.).

*denticulata* (Milne-Edwards).

Guiana:

Surinam (Mus. Comp. Zool.);

Cayenne, type locality (Paris Mus.).

<sup>1</sup>The only specimens of *P. americana* in the museum at Geneva are labeled "Cuba."

<sup>2</sup>The type female from Guérin's collection in the Museum of the Philadelphia Academy of Sciences is marked on the abdomen "rivière de Lima."

*dilatata* Rathbun.

## Mexico:

State of Colima: Colima, type locality (U. S. Nat. Mus.);

State of Michoacan: Huetamo (U. S. Nat. Mus.).

*ecuadorensis* Rathbun.

## Ecuador:

Near Quito, type locality (Paris Mus., U. S. Nat. Mus.);

Tinubaco, north of Quito, 9,000 feet (Brit. Mus.).

*exilipes* Rathbun.

Costa Rica: El Coronel, 700 meters (U. S. Nat. Mus.).

Locality unknown (Brit. Mus., U. S. Nat. Mus.).

*fossor* Rathbun.

## Venezuela:

Near La Guayra, type locality (U. S. Nat. Mus.);

Caracas (Berlin Mus.);

Exact locality not given (Paris Mus.).

"Antilles" (Kiel Mus.).

*garmani* Rathbun.

Trinidad, type locality (Mus. Comp. Zool.).

## Venezuela:

Near Caracas (Copenhagen Mus.);

Caracas (Berlin Mus.).

"Antilles" (Kiel Mus.).

*gracilipes* (A. Milne-Edwards).

Guatemala: Mountains of Haute Vera Paz (Paris Mus.).

*henrici* Nobili.

Ecuador: Valley of Rio Santiago (Turin Mus.).

*jouyi* Rathbun.

## Mexico:

State of Jalisco:

Lake Chapala, 5,000 feet, type locality (U. S. Nat. Mus., Paris Mus.,  
Turin Mus., Mus. Comp. Zool.);

Juanacatlan, Falls of Rio San Juan (U. S. Nat. Mus., Mus. Comp. Zool.);

River of Zapotlanejo, Guadalajara (U. S. Nat. Mus., Paris Mus.).

State of Guanajuato: Near Valle de Santiago (U. S. Nat. Mus.).

*lamellifrons* Rathbun.

## Mexico:

State of Vera Cruz: Cordoba (Brit. Mus., Geneva Mus., U. S. Nat. Mus.);

State of Oaxaca: Santa Domingo (U. S. Nat. Mus.);

Isthmus of Tehuantepec, type locality (U. S. Nat. Mus.).

*lindigiana* Rathbun.United States of Colombia: Santa Fé de Bogota, type locality (Paris Mus.,  
U. S. Nat. Mus.).

Ecuador: Milligalli, 3,000 feet (Brit. Mus., U. S. Nat. Mus.).

*macrota* (A. Milne-Edwards).

Bolivia, type locality (Paris Mus.).

United States of Colombia:

Santa Fé de Bogota (Paris Mus., U. S. Nat. Mus.);

Near Bogota (Mus. Comp. Zool.).

*magna* Rathbun.

## Costa Rica:

Pozo Azul, 800 or 1,000 feet, type locality (U. S. Nat. Mus.);

Rio Maria Aguilar (U. S. Nat. Mus.);

San José, Rio Maria Aguilar (Costa Rica Nat. Mus.);

San José, Rio Torres (Costa Rica Nat. Mus.).

*maxillipes* Rathbun.

Mexico: State of Vera Cruz: Tuxtla, 1,000 feet (U. S. Nat. Mus.).

*montana* Rathbun.

Costa Rica: La Palma, 1,500 meters (U. S. Nat. Mus.).

*nobilii* Rathbun.

Ecuador:

Gualaquiza, type locality (Turin Mus., U. S. Nat. Mus.);

Valle del Rio Santiago (Turin Mus.);

San José de Cuchipamba (Turin Mus.);

Valle del Rio Zamora (Turin Mus.).

*peruviana* Rathbun

Peru: Moyombamba (Brit. Mus.).

*pittieri* Rathbun.

Costa Rica:

Agua Buena, type locality (U. S. Nat. Mus.);

Java (U. S. Nat. Mus.).

*plana* Smith.

Peru: Paiti (Yale Univ Mus.).

*reflexifrons* (Ortmann).

Upper Amazon, type locality (Mus. Phila. Acad. Nat. Sci.).

"Antilles" (Berlin Mus.).

*richmondi* Rathbun.

Nicaragua: Escondido River, 50 miles from Bluefields, type locality (U. S. Nat. Mus.).

Costa Rica: Santa Clara Jiménez, 250 meters (Costa Rica Nat. Mus.).

United States of Colombia:

Darien: Rio Cucunati (*teste* Nobili, Turin Mus.);

Isthmus of Panama: San Pablo (Mus. Comp. Zool.).

*sulcifrons* Rathbun.

Mexico: State of Oaxaca: Yalalag, 3,500 feet (U. S. Nat. Mus.).

*terrestris* Rathbun.

Cuba (Mus. Phila. Acad. Nat. Sci.).

Mexico:

State of Jalisco:

Atamajac, 3 miles west of Guadalajara, type locality (U. S. Nat. Mus.);

Barranca Ibarra, near Guadalajara, 3,700 feet (U. S. Nat. Mus., Paris Mus., Turin Mus., Mus. Comp. Zool.);

Etzatlan (U. S. Nat. Mus.).

Tepic Territory:

San Diego (U. S. Nat. Mus.);

Pedro Pablo (U. S. Nat. Mus.).

Exact locality not given (Berlin Mus.).

*tristani* Rathbun.

Costa Rica:

North of San José (Costa Rica Nat. Mus.);

La Mina, Rio Torres, 1,130 meters, type locality (U. S. Nat. Mus.);

Pacaca, Rodeo (U. S. Nat. Mus.);

Exact locality not given (Brit. Mus.).

*tuberculata* Rathbun.

Guatemala:

Streams of St. Augustine, near Atitlan, on Pacific slope, type locality (Paris Mus., U. S. Nat. Mus.);

Coban, 5,000 feet (Brit. Mus.).

Costa Rica: Boruca (U. S. Nat. Mus.).

*tumimanus* Rathbun.

## Costa Rica:

Cachi, Reventazón River, 1,300 meters, type locality (U. S. Nat. Mus.);

La Palma, 1,500 meters (U. S. Nat. Mus.);

Pacaca, Rodeo, 785 meters (U. S. Nat. Mus.);

Locality unknown (Brit. Mus., U. S. Nat. Mus.).

*verticalis* Rathbun.

Mexico: State of Oaxaca: Tehuantepec (U. S. Nat. Mus.).

*xantusi* Rathbun.

? Mexico, type locality (U. S. Nat. Mus.).

Costa Rica: Borueca (U. S. Nat. Mus.).

United States of Colombia: Darien (*teste* Nobili, Turin Mus.).Venezuela: La Guayra, Rio de Macuto (*teste* Nobili, Turin Mus.).

## Genus POTAMOCARCINUS Milne-Edwards.

*armatus* Milne-Edwards, type species.

Locality unknown (Paris Mus.).

*latifrons* (Randall)=*schomburgkii* (White).

## Guiana:

British Guiana, type locality of *schomburgkii* (Brit. Mus.);

Cayenne (Paris Mus.);

? Surinam, type locality (Mus. Phila. Acad. Nat. Sci.).

*nicaraguensis* Rathbun.

## Nicaragua:

Lake Nicaragua (U. S. Nat. Mus.);

Near Greytown, type locality (U. S. Nat. Mus., Paris Mus., Mus. Comp. Zool.);

Rio San Juan (Copenhagen Mus.).

## Costa Rica:

Rio Frio (U. S. Nat. Mus.).

## Genus EPILOBOCERA Stimpson.

*armata* Smith.

Cuba: Guantanamo (Mus. Phila. Acad. Nat. Sci.).

? Cuba, type locality (Boston Soc. Nat. Hist.).

*cubensis* Stimpson.

## Cuba:

Santiago (type not extant);

Guantanamo: Yateras River (Berlin Mus., U. S. Nat. Mus.);

Exact locality not given (Paris Mus., Mus. Phila. Acad. Nat. Sci.).

*gilmanii* (Smith).

Cuba: Isle of Pines, type locality (Boston Soc. Nat. Hist.).

*granulata* Rathbun.

West Indies (U. S. Nat. Mus.).

*haytensis* Rathbun.

## Haiti:

Jeremie (Mus. Comp. Zool.);

Exact locality not given (type, U. S. Nat. Mus.).

San Domingo (U. S. Nat. Mus.).

*sinuatifrons* (A. Milne-Edwards)=*portoricensis* (manuscript, Berlin Mus.).

Porto Rico (Berlin Mus., U. S. Nat. Mus.).

Santa Cruz (Copenhagen Mus.).

Locality unknown (type, Paris Mus.).

## Genus RATHBUNIA Nobili.

*festæ* Nobili.

United States of Colombia: Darien: Laguna della Pita (Turin Mus.).

## LIST OF LOCALITIES, WITH SPECIES FOUND IN EACH.

## West Indies:

Cuba: *Pseudothelphusa affinis, americana, terrestris, Epilobocera cubensis, armata?*Isle of Pines: *E. gilmanii*.Haiti: *Ps. americana, E. haytensis, sinuatifrons*.Porto Rico: *E. sinuatifrons*.Santa Cruz: *E. sinuatifrons*.Guadeloupe: *Ps. dentata*.Dominica: *Ps. dentata*.Martinique: *Ps. dentata*.St. Lucia: *Ps. dentata*.Trinidad: *Ps. garmani*."Antilles:" *Ps. reflexifrons, fossor*.Locality not given: *E. granulata*.

## Mexico:

Tepic Territory: *Ps. terrestris*.State of Jalisco: *Ps. jouyi, terrestris*.State of Guanajuato: *Ps. americana, jouyi*.State of Colima: *Ps. dilatata*.State of Michoacan: *Ps. dilatata*.State of Vera Cruz: *Ps. lamellifrons, maxillipes*.State of Puebla: *Ps. americana*.State of Morelos: *Ps. americana*.State of Guerrero: *Ps. americana, belliana*.State of Oaxaca: *Ps. americana, lamellifrons, sulcifrons, verticalis*.Locality not given: *Ps. colombiana, xantusi*.Guatemala: *Ps. bisuturalis, boconrti, gracilipes, tuberculata*.Nicaragua: *Ps. richmondi, Potamocarcinus nicaraguensis*.Costa Rica: *Ps. agrestis, convexa, exilipes, magna, montana, pittieri, richmondi, tristani, tuberculata, tumimanus, xantusi, Pot. nicaraguensis*.United States of Colombia: *Ps. bouvieri, colombiana, lindigiana, macropa, richmondi, xantusi, Rathbunia festæ*.Venezuela: *Ps. fossor, garmani, xantusi*.Guiana: *Ps. denticulata, Pot. latifrons*.Brazil: *Ps. agassizii*.Ecuador: *Ps. aequatorialis, conradi, ecuadorensis, henrici, lindigiana, nobilii*.Upper Amazon: *Ps. reflexifrons*.Peru: *Ps. chilensis, conradi, peruviana, plana*.Bolivia: *Ps. macropa*.? Chile: *Ps. dentata*.