

**Article XI.—A COLLECTION OF BRACHYURAN CRUSTACEA  
FROM THE BAY OF PANAMA AND THE FRESH WATERS  
OF THE CANAL ZONE**

BY LEE BOONE<sup>1</sup>

The collection of Crustacea herein reported upon was obtained by Dr. Willard G. Van Name, during a trip to the Isthmus of Panama and Pearl Islands in the spring of 1926. This collection is deposited in The American Museum of Natural History. The specimens are to be credited in part also to the work of other members of the party which included Mrs. Samuel D. Sturgis, Mr. and Mrs. Sherman B. Haight, and Mrs. Sydney E. Brewster.

Several hundred specimens were obtained, including both sexes of a number of rare species. Among these were two of the exceedingly rare *Pitho quinquedentata* (Bell), hitherto known only from two males in the Paris and London museums, and an unusually fine specimen of the rare periscope-eyed crab, *Euphylax dovii* Stimpson, which was collected at Pearl Islands.

New records, extending the southern range of the large fresh-water crab, *Pseudothelphusa richmondi* Rathbun, in which the young are born adult crabs, omitting the seven or eight larval moults, were obtained by Dr. Van Name. Little is known of this curious life-history restricted to the Potamonidæ, and the presence of a large species representative of this family, at Barro Colorado, affords an excellent opportunity for its study. It is not improbable that such research will show this unique development to be correlated with the fact that the streams in which the crab makes its home frequently dry up in the dry season.

The splendid series of *Leptodius cooksoni* Miers, obtained from Panama and the Pearl Islands, establishes the first record of this rare form from the mainland, it having hitherto been known only from the Galápagos Islands and Cocos Island. The type of this species is in the British Museum, and the only other records of it are those obtained by the 'Arcturus' Expedition.

*Eurypanopeus planus* S. I. Smith, another very rare species known from three or four specimens in the Peabody Museum, was found to be quite common in the Pearl Islands and at Panama.

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The largest single series so far recorded of the large and rare *Ozius*, *O. verreauxii*, was also obtained by Dr. Van Name at Tabogilla Island.

Both species of the west coast ghost crab, *O. gaudichaudii* and *O. occidentalis*, were obtained. Why these two closely related species, living under the same environmental conditions, have developed such strikingly different types of eyes, is another unsolved problem for the consideration of field workers. Is *O. gaudichaudii* more diurnal in its habits and *O. occidentalis*, like its eastern analogue, *O. arenarius* Bosc, more nocturnal? Are the eyes of either species luminous at night? Does *O. gaudichaudii* have a better field of vision, as might be supposed from the shape of its eye, and correspondingly attain a greater speed in the pursuit of its prey? The ability of these crabs to live on land, in subterranean burrows, and in the sea, gives them a unique place among Decapoda. Their marvelous anatomic adaptations, to enable them to so live, present another unsolved problem for future students.

The beaded-purse crab, *Leucosilia jurinei* Saussure, is represented in the present collection by an unusually fine specimen taken at Saboga Island, Pearl Islands; the only other records of it known are the type in the Geneva Museum, taken at Mazatlan, Mexico, and a specimen in the United States National Museum obtained by Dr. Robert E. Coker at Matapalo, Peru.

Photographs of five species, *Leptodius cooksoni* Miers, *Ozius agassizii* M. Edwards and Lucas, *Eriphia squamata* Stimpson, *Grapsus grapsus* Linnæus, *Pachygrapsus transversus* Gibbes, were loaned by Dr. William Beebe, Director, Tropical Research Station, New York Zoölogical Society, and were made by his assistants, Mr. John Tee Van and Mr. Floyd Crosby.

Photographs of the other species were made by Mr. Hugh Rice of the photographic laboratory of The American Museum of Natural History, under the direction of Dr. W. G. Van Name.

**BRACHYURA****MAJIDÆ****Majinæ****PITHO** Bell***Pitho quinquedentata* Bell**

## Figure 1

*Pitho quinquedentata* BELL, 1835 (1836), Proc. Zool. Soc. London, III, p. 172; RATHBUN, 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 573.

*Othonia quinque-dentata* BELL, 1836, Trans. Zool. Soc. London, II, p. 57, Pl. XII, fig. 2.

*Othonia mirabilis* GERSTAEKER, 1836, Arch. f. Naturg., XXII, part 1, p. 113 (part).

*Othonia quinquedentata* A. MILNE EDWARDS, 1875, 'Crust. Rég. Mex.,' p. 118, Pl. XXIV, figs. 3-3c.

?*Othonia aculeata* CANO, 1889, Boll. Soc. Nat. Napoli, (1) III, p. 181, Pl. VII, fig. 6.

*Pitho quinquedentata* RATHBUN, 1925, Bull. 129, U. S. Nat. Mus., p. 361, Pl. CCL, figs. 1-4; BOONE, 1927, Zoologica, N. Y. Zool. Soc., VIII, No. 4, p. 151, Fig. 46.

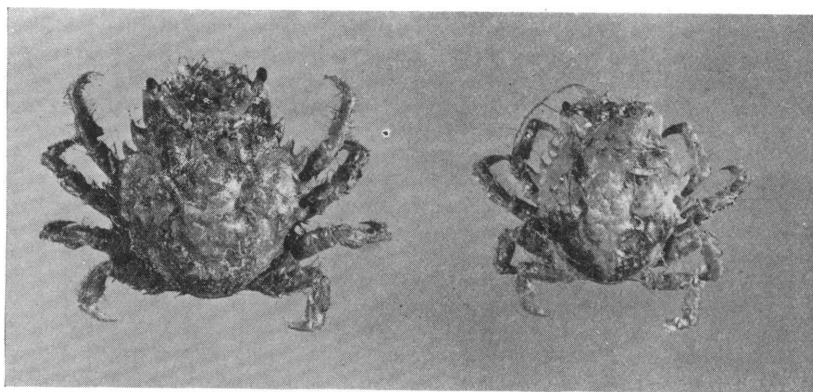


Fig. 1. *Pitho quinquedentata* Bell; a, female and b, male (smaller specimen),  $\times 2$ .

**DIAGNOSTIC CHARACTERS.**—Small, mottled green; legs alternately banded with green and cream. Carapace shield-shaped, with five anterolateral teeth, the second and third of which are united at the base, the fifth is the smallest of the series but is not rudimentary. First movable antennal segment is narrow proximally, widening distally, its maximum width being about equal to its maximum length; the outer distal lobe being the larger.

**RANGE.**—Galápagos Islands (type-locality); Panama Bay, Pearl Islands. Shallow water.

**MATERIAL EXAMINED.**—One male and one female from Saboga Island Harbor, Pearl Islands, on sandy beach with scattered rocks at extreme low tide, by Mrs. S. D. Sturgis.

This appears to be the only pair of this rare species in an American museum; there is one young male from Panama and another from the Galápagos in the Paris Museum.

### PORTUNIDÆ

#### Podophthalminæ

#### EUPHYLAX Stimpson

#### *Euphylax dovii*<sup>1</sup> Stimpson

Figure 2

*Euphylax dovii* STIMPSON, 1860, Ann. Lyc. Nat. Hist., N. Y., VII, p. 225; A. MILNE EDWARDS, 1881, 'Miss. Sci. au Mexique,' V, p. 204, Pl. XXXVIII, figs. 2a-c.; RATHBUN, 1910, Proc. U. S. N. M., XXXVIII, p. 578.

DIAGNOSTIC CHARACTERS.—There are but two species so far described in this genus. Both are confined to the west American coast from the Gulf of Lower California to west Mexico and Central America. *E. dovii*, the genotype, is readily distinguished in life by its magnificent amethystine and coral-red coloration. *E. robustus*<sup>2</sup> is said to have the carapace green, the legs green, tinted with yellow and yellowish red. *E. dovii* has five teeth, counting the orbital tooth, on the anterolateral margin; of these, all are mere denticles except the orbital tooth; *E. robustus* has four anterolateral teeth, of which only the second is reduced, the first (orbital), third, and fourth are long, strong, triangulate teeth.

The chelipeds of *dovii* are much more slender than those of *robustus*; the spines on the anterolateral margin of the merus of *dovii* are much feebler than those of *robustus*.

MATERIAL EXAMINED.—One large male found under stones, Pacheca Island, Pearl Islands, Bay of Panama, March 9, 1926, at flood tide, taken by Mrs. Sherman P. Haight.

### Portuninæ

#### CALLINECTES Stimpson

#### *Callinectes arcuatus* Ordway

Figure 3

*Callinectes arcuatus* ORDWAY, 1863, Boston, Journ. Nat. Hist., VII, p. 578; A. MILNE EDWARDS, 1879, 'Crust. Rég. Mex.,' p. 228 (variety of *Callinectes diacanthus*); RATHBUN, 1895, Proc. U. S. Nat. Mus., XVIII, p. 362; 1910, idem, XXXVIII, p. 537, Pl. LVI.

*Callinectes pleuriticus* ORDWAY, 1863, Boston Journ. Nat. Hist., VII, p. 578; A. MILNE EDWARDS, 1879, 'Crust. Rég. Mex.,' p. 228 (variety of *Callinectes diacanthus*).

*Callinectes dubia* KINGSLEY, 1879, Proc. Boston Soc. Nat. Hist., XX, p. 156.

*Callinectes* species SMITH, 1871, Third Ann. Rept. Peabody Acad. Sci., p. 91.

DIAGNOSTIC CHARACTERS.—In life this species is readily distinguished from *bellicosus* by the much lighter green coloration and by the gayly colored chelipeds in the male. The carapace of *arcuatus* is also more granular. *C. arcuatus* has four stout triangulate

<sup>1</sup>This species was named in honor of Captain Dow, who collected it and many other new and rare west coast species for Professor Stimpson. It is also known as the "periscope crab."

<sup>2</sup>*Euphylax robustus* A. Milne Edwards, 1874, 'Les fondes de la Mer,' II, p. 249; 1881, Miss. Sci. au Mexique et dans l'Amérique Centrale, V, p. 205, Pl. xxxvii.





Fig. 2. *Euphylax dowii* Stimpson, reduced about one-half.

blunt teeth in the frontal region, the inner pair about one-third the size of the outer. The anterolateral margin is very arcuate with nine large, well-separated teeth, the anterior ones subacute, those posterior becoming sharper; the ninth or lateral tooth is also sharp, from two and one-half to three times as long as the preceding one. The male appendages are curved at the tips and reach or nearly reach the last segment of the abdomen.

RANGE.—Lower California, including the Gulf of California, southward to Peru.

MATERIAL EXAMINED.—Four males, Patillo Point, Panama, March 28, 1926, low water. One male, taken between Patillo Point and Old Panama, March 29, 1926, on ebb-tide. Two males, one photographed, Patillo Point, on sandy beach with scattered rocks and stones.

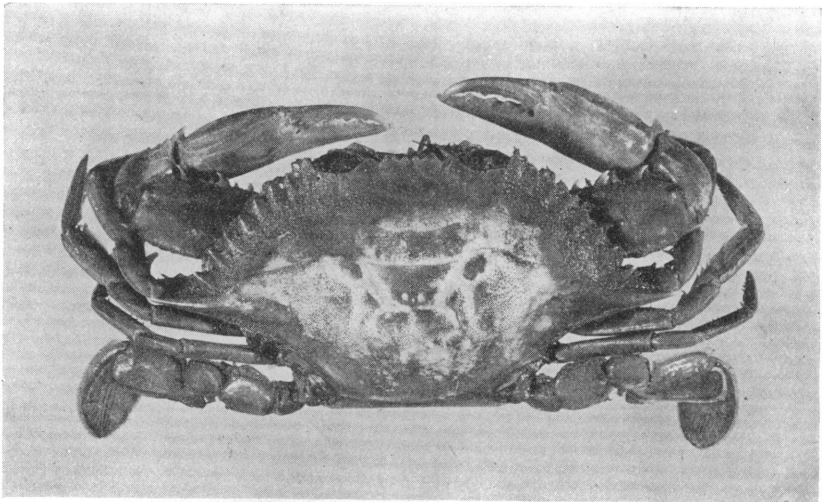


Fig. 3. *Callinectes arcuatus* Ordway, natural size.

### POTAMONIDÆ

#### *Pseudothelphusinae*

#### *PSEUDOTHELPHUSA* de Saussure

#### *Pseudothelphusa richmondi* Rathbun

Figure 4 and 4a

*Pseudothelphusa richmondi* RATHBUN, 1893, Proc. U. S. Nat. Mus., XVI, p. 654, Pl. LXXV, figs. 6–10; 1898, idem, XXI, p. 511; 1905, Nouv. Arch. Mus. Hist. Nat., Paris, (4) VI, p. 242.

DIAGNOSTIC CHARACTERS.—Color chocolate-brown; a *Pseudothelphusa* with the anterolateral edges more dentate or serrate than are most of its tropical American kin; the superior frontal margin is practically straight from above, but actually curving down medially, and with the outer extremities uniting with the orbital margin; the inferior frontal margin is sinuous, its lobes being visible from above. The frontal

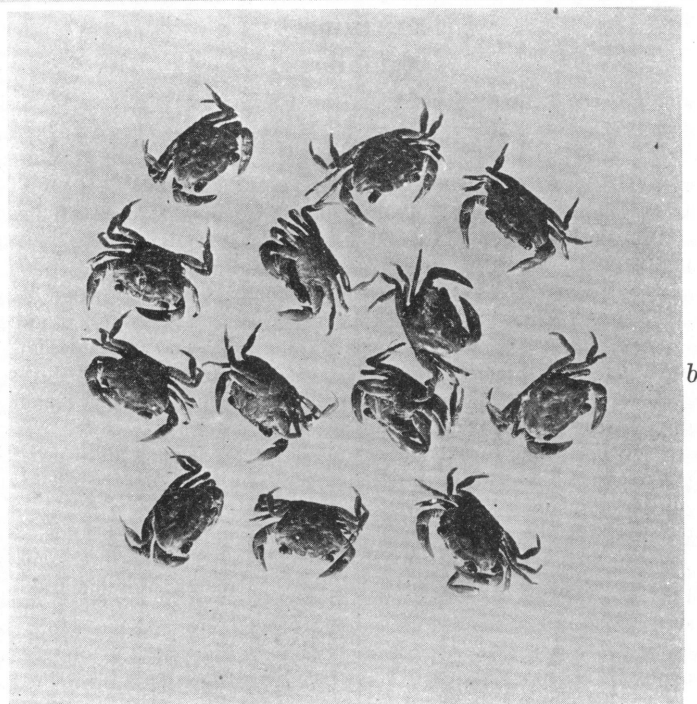
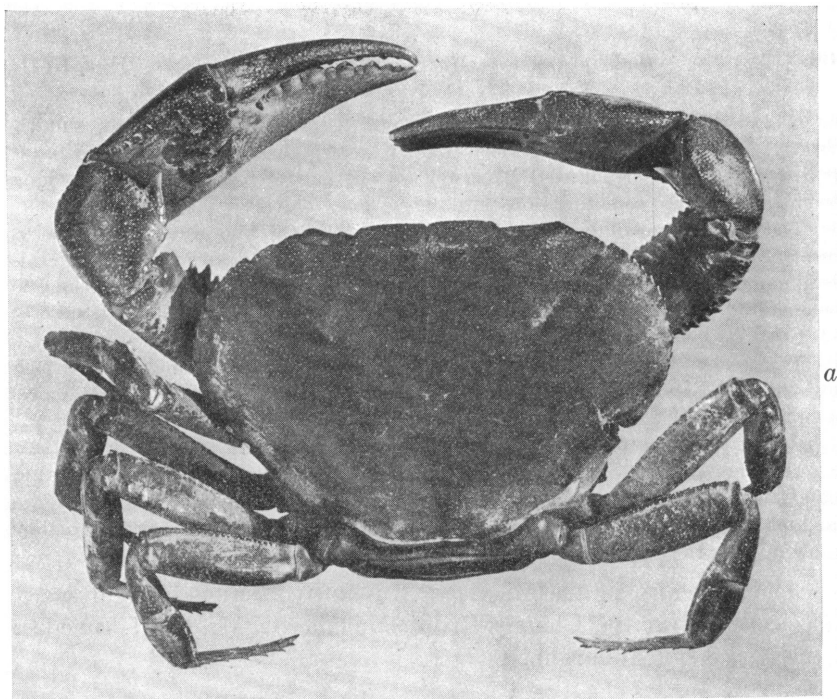


Fig. 4. *Pseudothelphusa richmondi* Rathbun; a, adult slightly reduced; b, young,  $\times 3$ .

and orbital margins are crenulate. The orbital fissure is shallow, broad, and U-shaped. The cervical suture is deep, relatively straight. There are three faint, depressed tubercles arranged transversely on the gastric region. In very young specimens these are sometimes obsolete.

The external maxillipeds are slightly wider than the buccal cavity, the merus scarcely three-fourths as long as the subquadrate ischium, and with the outer lateral-distal margin convex, the inner distal angle truncate; the exognath  $\frac{1}{16}$  to  $\frac{1}{8}$  as long as the ischium.

COLOR.—Chocolate-brown or mud-color.

TYPE.—Dr. Rathbun's type was taken on dry land near a small creek which flows into the Escondido River, fifty miles from Bluefields, Nicaragua, by Dr. C. W. Richmond, October 30, 1892, and is deposited in the U. S. National Museum.

RANGE.—Nicaragua, Costa Rica, Colombia, Panama, Canal Zone.

MATERIAL EXAMINED.—One large female (photographed) from Barro Colorado Island, April 7, 1926, F. M. Gaige, collector; another large female, April 5, and two small males, one young female, from the above locality, under stones in bed of dry brook crossing the Shannon Trail, April 6, 1926.

There are also in the American Museum collections several specimens collected in the Chagres River, Panama, by Mr. C. M. Breder, of the New York Aquarium.

## XANTHIDÆ

### Xanthinæ

#### LEPTODIUS A. Milne Edwards

#### *Leptodius cooksoni* Miers

#### Figure 5

*Leptodius cooksoni* MIERS, 1877, Proc. Zool. Soc. London, p. 73, Pl. XII, figs. 1-1d; RATHBUN, 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 582; BOONE, 1927, Zoologica, N. Y. Zool. Soc., VIII, No. 4, pp. 188-191, Fig. 65.

DIAGNOSTIC CHARACTERS.—Carapace finely punctate, anterior region distinctly areolated. Frontal margin bifid; anterolateral margins obtuse and rounded, the postorbital tooth and the first marginal tooth are obscure, coalesced; the second, third, and fourth teeth are raised lobes.

TYPE.—Miers founded this species on an adult male and a smaller female specimen taken at Charles Island.

RANGE.—Hitherto known only from the Galápagos Islands and Cocos Island. Dr. Van Name's series of specimens from Panama establish the first record of this rare species from the mainland.

MATERIAL EXAMINED.—One female, Pacheca Island, Pearl Islands, Bay of Panama, under stones on rocky and gravelly beach, March 8, 1926. Twelve males and nine females, north shore of Tabogilla Island, Bay of Panama, March 4 and 5, 1926.

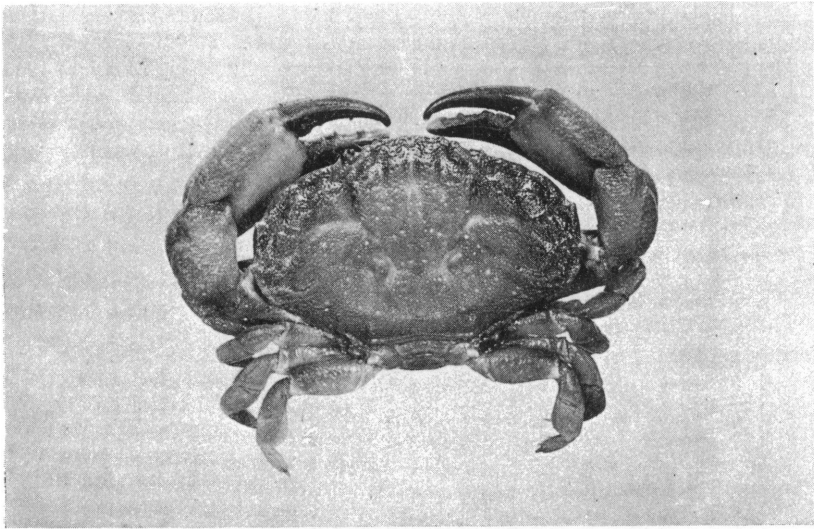


Fig. 5. *Leptodius cooksoni* Miers, natural size. (Photograph, N. Y. Zool. Soc.).

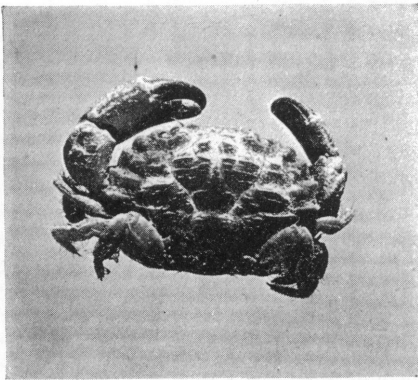


Fig. 6. *Xanthodius occidentalis* Stimpson, natural size.

### **XANTHODIUS** Stimpson, 1859

#### ***Xanthodius occidentalis* Stimpson**

##### Figure 6

*Chlorodius occidentalis* STIMPSON, 1871, Ann. Lyc. Nat. Hist. N. Y., X, p. 108.

*Leptodius occidentalis* A. MILNE EDWARDS, 1880, 'Crust. Rég. Mex.', p. 269; RATHBUN, 1899, Proc. U. S. Nat. Mus., XXI, p. 589.

*Xanthodius occidentalis* RATHBUN, 1923, Bull. American Mus. Nat. Hist., LXVIII, p. 622; BOONE, 1927, Zoologica, N. Y. Zool. Soc., VIII, No. 4, p. 195, Figs. 67A and B.

DIAGNOSTIC CHARACTERS.—Lateral margin quadridentate (in addition to postorbital tooth); anterior two-thirds of carapace deeply areolated and lobulated.

TYPE.—Professor Stimpson's type material was "found at Panama by Alexander Agassiz, Esq., and at Manzanillo, Mexico, by Mr. John Xantus."

RANGE.—Manzanillo, Mexico; Aqua Verde Bay and Pichilique Bay, Lower California; Panama and the Galápagos Islands.

MATERIAL EXAMINED.—One male, one female, Patillo Point, Panama, on sandy beach with scattered rocks and stones, March 26, 1926; one male, north shore

Tabogilla Island, Bay of Panama, March 4 and 5, 1926; six females, one small, three medium size, ovigerous, and two medium size, not ovigerous, Pacheca Island, Pearl Islands, Bay of Panama, under stones on rocky and gravelly beach, March 8, 1926; one female, ovigerous, large (one inch wide), one male, Pacheca Island, Pearl Islands, Bay of Panama, March 9, 1926; one small female, not one-half inch wide, heavily egg laden, Saboga Island (Harbor) Pearl Islands, sandy beach at extreme low tide, March 13, 1926.

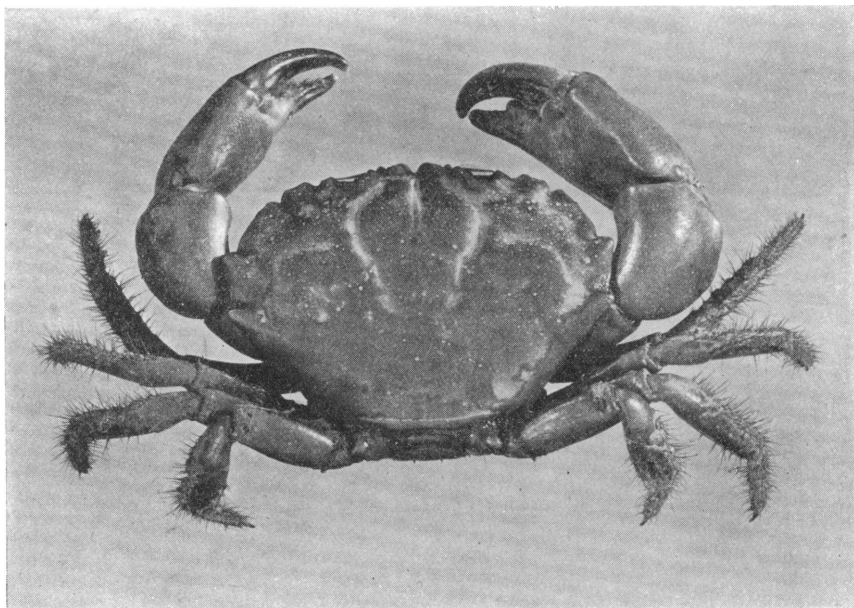


Fig. 7. *Eurypanopeus purpureus* Lockington.

### **Panopeinae**

#### **EURYPANOPEUS** A. Milne Edwards

#### **Eurypanopeus purpureus** Lockington

#### Figure 7

*Panopeus purpureus* LOCKINGTON, 1876, Proc. Calif. Acad. Sci., VII, p. 101; STREET AND KINGSLEY, 1877, Bull. Essex Inst., IX, p. 105; J. S. KINGSLEY, 1879, Proc. Boston Soc. Nat. Hist., XX, p. 152; A. MILNE EDWARDS, 1880, 'Miss. Sci. au Mexique,' part 5, I, p. 316, Pl. LVII, fig. 3; BENEDICT AND RATHBUN, 1891, Proc. U. S. Nat. Mus., XIV, p. 382; RATHBUN, 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 541, Pl. XLI, fig. 2.

DIAGNOSTIC CHARACTERS.—Coloration variable, usually dark purplish-brown, upper surface of chelipeds lighter violaceous-brown, both body and claws splashed irregularly with red-brown; under surface of chelæ orange, fingers light brown with

white tips. This is the west coast analog of the West Indian *E. herbstii*. *E. purpureus* has the carapace convex, granulose, the anterior region with coarse transverse granulous rugæ, the frontal margin nearly straight, weakly lobed. The first tooth with a shallow sinus, the remaining lateral teeth broad, not hooked, separating sinus moderate; much as in *herbstii*. Chelipeds unequal, carpus with distinct groove and sharp tooth at the inner angle; propodus stout, with a double crest on the upper surface.

RANGE.—Lower California to Panama.

MATERIAL EXAMINED.—Three females and one male, from Patillo Point, Panama, sandy beach with scattered rocks and stones, March 28, 1926; one male, taken between Patillo Point and Old Panama, March 9, 1926, on ebb-tide.

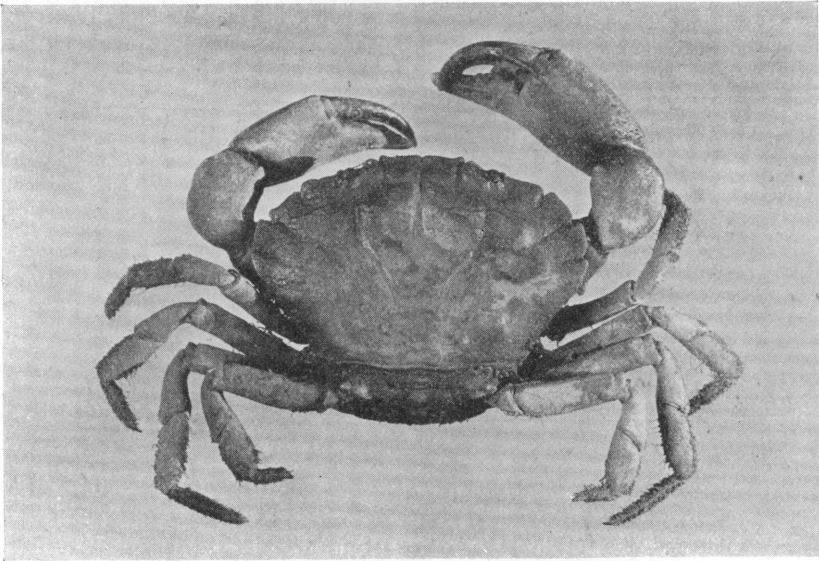


Fig. 8. *Eurypanopeus planus* Smith.

***Eurypanopeus planus* S. I. Smith**

Figure 8

*Panopeus planus* S. I. SMITH, 1869, Proc. Boston Soc. Nat. Hist., XII, p. 283; LOCKINGTON, 1876, Proc. Calif. Acad. Nat. Sci., VII, p. 102; BENEDICT AND RATHBUN, 1891, Proc. U. S. Nat. Mus., XIV, p. 369, Pl. xxiv, figs. 10 and 11.

*Eurypanopeus planus* A. MILNE EDWARDS, 1880, 'Miss. Sci. au Mexique,' part 5, I, p. 321, Pl. LIX fig. 4.

DIAGNOSTIC CHARACTERS.—Carapace very little convex longitudinally, quite flattish transversely. Regions well defined. Frontal margin wide, the external lobes produced, prominent, median lobes separated by a V-shaped notch, from which a deep groove runs back onto the mesogastric region. The cervical groove is also deep and runs back from behind the orbit, circumscribing the mesogastric region. The groove between the second and third teeth, and also that between the third and



fourth teeth, runs inward. There are transverse lines or rugæ thrown up on the anterior region of the carapace. The first or coalesced tooth is very wide, with nearly straight margin; second and third teeth subequal, each three-fourths as long as first tooth and with similar margin; last tooth subacute with its anterior margin very short, its posterior one continuous with the margin of carapace. Chelipeds unequal in male, nearly smooth, fingers hooked near tips.

**MATERIAL EXAMINED.**—Twenty specimens from the Bay of Panama; two specimens, Pacheca Island, Pearl Islands, Bay of Panama, under stones on rocky and gravelly beach, low tide, March 8, 1926; seven specimens from the same locality, taken on flood-tide, March 9; eight specimens taken on sandy beach with scattered rocks and stones, low tide, Patillo Point, Panama, March 26, 1926; one specimen taken on ebb-tide on beach between Patillo Point and Old Panama, March 29, 1926; six specimens found under stones on beach, flood tide, north shore of Tabogilla Island, Bay of Panama, March 4 and 5, 1926.

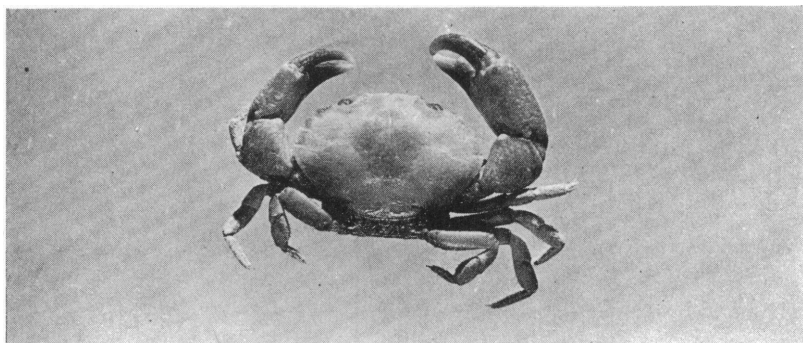


Fig. 9. *Eurypanopeus transversus* (Stimpson).

### ***Eurypanopeus transversus* (Stimpson)**

#### Figure 9

*Panopeus transversus* STIMPSON, 1860, Ann. Lyc. Nat. Hist., N. Y., VII, p. 210; S. I. SMITH, 1869, Proc. Boston Soc. Nat. Hist., XII, p. 282; 1869, Trans. Conn. Acad. Arts and Sci., II, p. 4; 1870, Ann. Rep. Peabody Acad. Sci., III, p. 87; BENEDICT AND RATHBUN, 1891, Proc. U. S. Nat. Mus., XIV, p. 367, Pl. xxii, fig. 2, Pl. xxiv, fig. 9; RATHBUN, 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 543, Fig. 2.

*Eurypanopeus transversus* A. MILNE EDWARDS, 1880, 'Miss. Sci. au Mexique,' part 5, I, p. 319, Pl. LXIX, fig. 1.

**DIAGNOSTIC CHARACTERS.**—Color, dark brown, fingers black with white tips. Carapace broad, moderately convex, upper surface transversely rugulose anteriorly, remainder smooth, regions poorly defined. Front wide, not projecting, margin undulating, two-lobed. Anterolateral margin cut into four slightly separated teeth of which the first is widest, the second next, the third slightly less than the second, while the fourth is smallest and is slightly angulated. Chelipeds unequal, rugulose above. Third abdominal segment in contact with the coxæ of the fifth pair of legs.



TYPE.—Prof. Stimpson's type was taken at Panama by the Rev. J. Rowell and was deposited in the museum of the Smithsonian Institution.

RANGE.—West coast to Central America to Peru.

MATERIAL EXAMINED.—Six males from between Patillo Point and Old Panama.

### Oziinæ

**Ozius** H. Milne Edwards, 1834

**Ozius verreauxii** (de Saussure)

Velvet-fingered Crab

Figure 10

*Ozius verreauxii* H. DE SAUSSURE, 1853, Rev. Mag. Zool., (2) V, p. 358, Pl. XII, fig. 1; 1860, Ann. Lyc. Nat. Hist., N. Y., No. 2, p. 83; A. MILNE EDWARDS, 1880, 'Crust. Rég. Mex.,' p. 277, Pl. LV, fig. 4; FAXON, 1895, Mem. Mus. Comp. Zoöl., XVIII, p. 21; RATHBUN, 1899, Proc. U. S. Nat. Mus., XXI, p. 583; 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 587; 1924, Zoologica, N. Y. Zoöl. Soc., V, No. 14, p. 158; BOONE, 1927, Zoologica, N. Y. Zoöl. Soc., VIII, No. 4, p. 223, Fig. 82.

*Xantho grandimanus* LOCKINGTON, 1876, Proc. Calif. Acad. Sci., September.

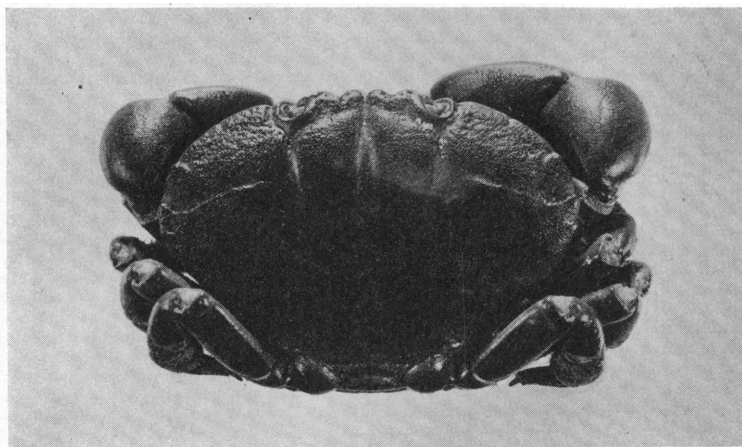


Fig. 10. *Ozius verreauxii* (de Saussure), reduced one-half natural size.

DIAGNOSTIC CHARACTERS.—Anterolateral angles decidedly produced, and broken into three distinct teeth.

TYPE.—H. de Saussure's type material on which this species was founded was secured at Mazatlan, Mexico, as long ago as 1853, and is deposited in the Geneva Museum.

RANGE.—Cape St. Lucas, and La Paz, Lower California; Mazatlan, Mexico; Cocos Island; Galápagos Islands and southward to the coast of Ecuador.

MATERIAL EXAMINED.—Two large males, one male, one female, of medium size, also one small male, from Tabogilla Island, under stones on beach, March 4, 1926.

This genus contains four American species, three of which are from tropical America, Pacific shores, and one, *reticulatus*, is known from the Caribbean. So far as known, *verreauxii* is much the largest of the four species, frequently attaining a body width of six or more inches. In color it is slate-gray with bandings of coral at the meral and carpal joints of the ambulatories. Fingers of chelipeds, blackish brown. The carapace has the anterolateral angles decidedly produced, carpal,

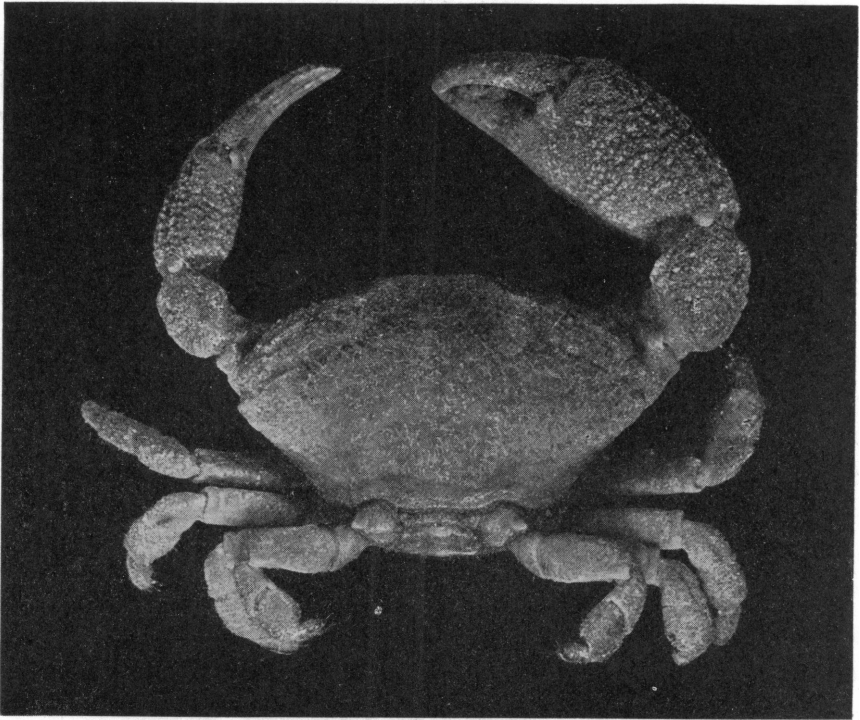


Fig. 11. *Ozius agassizii* A. Milne Edwards, natural size. (Photograph, N. Y. Zool. Soc.)

propodal and dactyl joints of ambulatories covered with silky, velvety brown setæ, and broken into three distinct teeth, of which the posterior one is very prominent; anterolateral angle decidedly produced. There is a deep sulcus running back from the median notch and bifurcating on the gastric region. Chelipeds unequal; larger one very massive in male.

**Ozius agassizii** A. Milne Edwards  
Long-clawed Pebble Crab

Figure 11

*Ozius agassizii* A. MILNE EDWARDS, 1880, 'Crust. Rég. Mex.,' p. 279, Pl. LV, fig. 1; RATHBUN, 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 586; BOONE, 1927, Zoologica, N. Y. Zool. Soc., VIII, No. 4, p. 225, Fig. 83.

DIAGNOSTIC CHARACTERS.—Color. rich red-brown. Carapace seldom more than three inches wide, flat, rugose, with coarse rounded granulations between which are small pits; anterolateral margin oval; branchial region much produced with three small marginal dental prominences. A prominent transverse line extends from the anterolateral angle into the gastric region. Chelipeds extremely unequal, granular. Ambulatories stout; dactyls covered with brown felt.

The third west American species *O. perlatus* Stimpson, also occurs at Panama, but was not taken by Dr. Van Name. (See Boone, *op. cit.*, p. 229, Fig. 84.) It is the same color, and approximately the same size as *O. agassizii*, but *perlatus* has the carapace more broadly rounded anteriorly, devoid of dentition, the upper surface flat, and finely corrugated, much less rough than *agassizii*. The chelipeds are moderately unequal. *O. perlatus* is the west coast analog of the West Indian species *O. reticulatus* Desbonne and Schramm. (Full analysis and figure given in my 'Crustacea of Port au Prince Bay, Haiti,' Zoologica, X, No. 2, 1929.)

TYPE.—This is one of the many species that owes its discovery to Alexander Agassiz, who secured the type at Panama. It is deposited in the Museum of Comparative Zoölogy at Cambridge, Massachusetts.

RANGE.—*Ozius agassizii* is found from the Gulf of Panama (type-locality) to Ecuador and also in the Galápagos Islands and at Cocos Island.

MATERIAL EXAMINED.—One small male, Bay of Panama.

**Eriphinae**

**ERIPHIA** Latreille

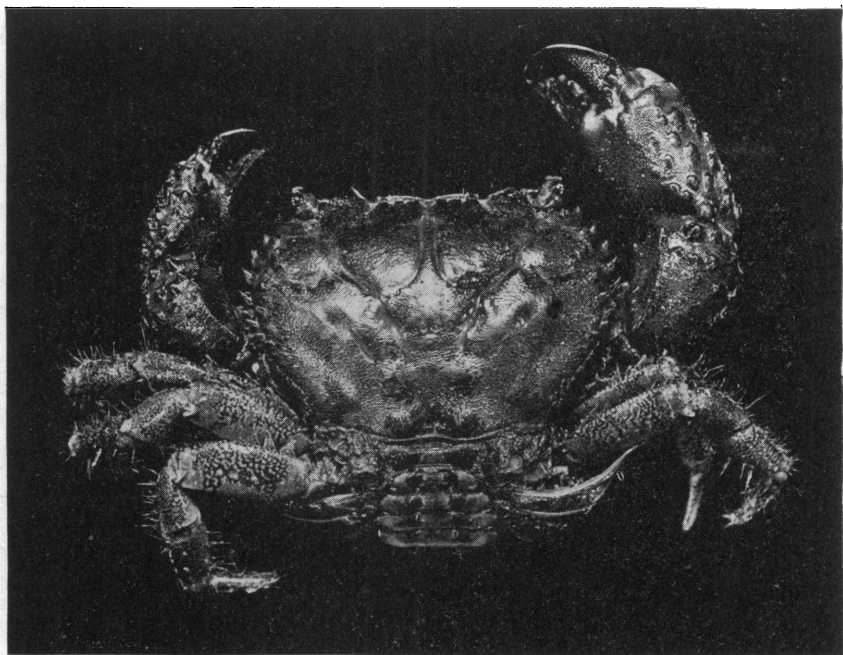
**Eriphia squamata** Stimpson

Figure 12a and b

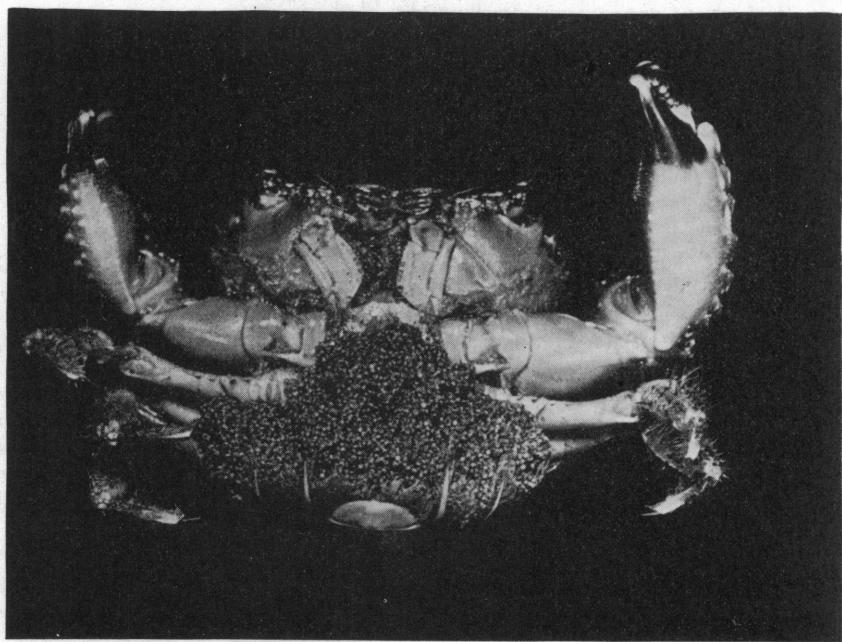
*Eriphia squamata* STIMPSON, 1859, Ann. Lyc. Nat. Hist., N. Y., VII, p. 56; S. I. SMITH, 1869, Rept. Peabody Acad. Sci., p. 90; A. MILNE EDWARDS, 1880, 'Crust. Rég. Mex.,' p. 339, Pl. LVI, fig. 3; RATHBUN, 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 544, Pl. XLI, fig. 1; BOONE, 1927, Zoologica, N. Y. Zool. Soc., VIII, No. 4, p. 231, Figs. 85A and B.

DIAGNOSTIC CHARACTERS.—There are two closely related species of *Eriphia* known from tropical west America: *E. squamata* and *E. granulosa*. *E. squamata* has the carapace ornamented anteriorly with coarse, squamous, scale-like tubercles which in some places simulate rugæ; each tubercle is ringed basally with setæ. The chelipeds are conspicuously unequal with the scale-like tubercles of the wrist and hand squamous and each tubercle ringed anteriorly with setæ.

*E. granulosa*, which, as I have stated elsewhere, may prove to be only a subspecies of *squamata*, has granulations covering the entire gastric region, the hepatic region, the anterior portions of the branchial region, and these granulations are also evident, in a reduced form, on the back. The chelipeds of *granulosa* are very similar to those of *squamata*.



a



b

Fig. 12. *Eriphia squamata* Stimpson; a, dorsal view; b, ventral view, natural size. (Photograph, N. Y. Zool. Soc.).

COLOR.—Purplish red shading into magenta.

TYPE.—Professor Stimpson's type came from Cape St. Lucas, Lower California, and was deposited in the "Museum of the Smithsonian Institution."

RANGE.—This species has been recorded from Cape St. Lucas, Lower California; the west coast of Mexico; Panama; Nicaragua; Peru; and Chile.

MATERIAL EXAMINED.—One very large female, three smaller females, three, small males, and one large male taken at Patillo Point, Panama, on sandy beach with scattered rocks and stones, at low tide, March 28, 1926. One male from Pedro Gonzales Island, Pearl Islands, tide-pool, March 4, 1926. One large male, two medium-sized males, and one medium-sized female from the north shore of Tabogilla Island, Bay of Panama, March 4 and 5, 1926, under stones on the sandy and pebbly beach when tide was about one-half flood. One small female, less than an inch wide, heavily egg-laden, from the Bay of Panama.

### GRAPSIDÆ

#### GRAPSUS Lamarck

#### *Grapsus grapsus* (Linnæus)

Figure 13

*Cancer grapsus* LINNÆUS, 1758. 'Syst. Nat.,' 10th Ed., I, p. 630.

*Grapsus grapsus* BOONE, 1927, *Zoologica*, N. Y. Zool. Soc., VIII, No. 5, p. 244, Fig. 90 (complete synonymy and description).

DIAGNOSTIC CHARACTERS.—Dwells along rocky shore-lines, in or near the spray. Carapace vivid scarlet, discoidal, front vertical, depth in median line slightly greater than half its length. Chelæ moderate; carpal spine ovate-acuminate; fingers spoon-shaped.

RANGE.—"Sally Lightfoot" is a well-known inhabitant of the tropical and sub-tropical shores of America from Miami, Florida, southward through the West Indies and Bermudas to Pernambuco, Brazil, on the east coast, and on the west coast from San Benito Island, Lower California, southward, including the Galápagos Islands, down to Chile; it is also known from the tropical eastern Atlantic, including the Azores and the west coast of Africa.

MATERIAL EXAMINED.—One very large male, taken at Saboga Island, Pearl Islands, Bay of Panama, on the rocks, March 12, 1926. One large female, Panama, April 7, 1926. Two young females, still in the maculated juvenile coloring, Tabogilla Island, Bay of Panama, under stones on the beach, at low tide.

#### PACHYGRAPSUS Randall, 1840

#### *Pachygrapsus transversus* Gibbes

#### The Striated *Pachygrapsus*

Figure 14

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

*Goniograpsus innotatus* DANA, 1851 (1852), *Proc. Acad. Nat. Sci. Phila.*, V, p. 249; 1852, 'U. S. Explor. Exped.,' XIII, *Crust.* part 1, p. 345; 1855, *atlas*, Pl. xxi, fig. 9a-e.



Fig. 13. *Grapsus pragensis* (Linnaeus), reduced one-third. (Photograph, N. Y. Zool. Soc.).

*Pachygrapsus transversus* GIBBES, 1850, *op. cit.*, p. 182; RATHBUN, 1918, Bull. 97, U. S. Nat. Mus., p. 244, Pl. xli, figs. 2, 3; BOONE, 1927, Zoologica, New York Zool. Soc., VIII, No. 4, p. 254, Fig. 92 (full description and synonymy).

DIAGNOSTIC CHARACTERS.—Small species. Interorbital border more than half as wide as carapace, sinuous; lateral margins decidedly convergent; one acute lateral tooth behind the postorbital tooth. Merus of last ambulatory leg dentate on posterior distal margin.

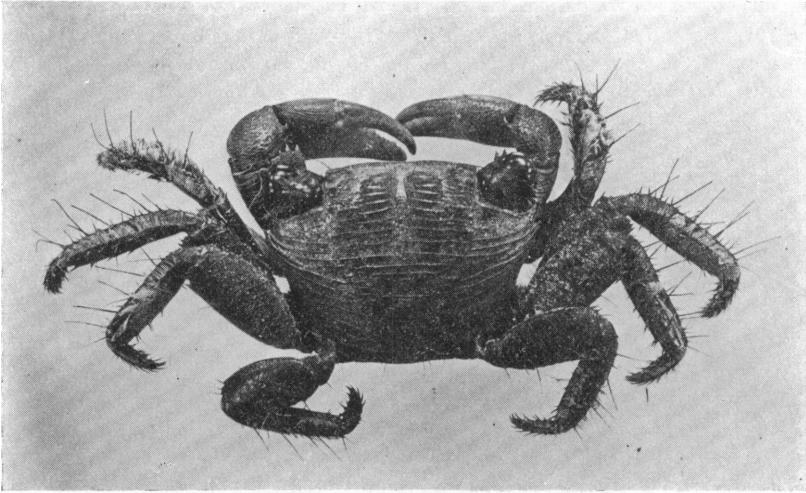


Fig. 14. *Pachygrapsus transversus* (Gibbes),  $\times 2$ . (Photograph, N. Y. Zool. Soc.).

TYPE.—Gibbes' type, which is no longer extant, came from Key West, Florida. However, the types of many of the synonyms of this species are preserved, that of Dana's *Gonigrapsus innonatus* being deposited in the United States National Museum; of Milne Edwards' *Leptograpsus rugulosus*, in the Paris Museum; de Saussure's *Metapograpsus dubius* and *Metapograpsus miniatus* are in the Geneva Museum; Heller's *Grapsus declivifrons* and *Pachygrapsus intermedius* are deposited in the Vienna Museum; and cotypes of Stimpson's *Pachygrapsus socius* are in the Museum of Comparative Zoology, Cambridge, Massachusetts.

RANGE.—This little species has a rather cosmopolitan distribution in the warm seas, having been recorded from Charleston, South Carolina, southward along the Florida coasts, the Gulf of Mexico, the Bahamas, Cuba, Jamaica, Porto Rico, St. Thomas, Bermuda, Trinidad, Curaçao, Brazil, and down as far as Uruguay on the east American coasts. On the Pacific American coasts it is known from the Gulf of Lower California, Mexico, Costa Rica, Panama, the Galápagos Islands, Cocos Island, and down to Metapalo, Peru.

It is also recorded from the west African coasts. Likewise, it is rather abundant in the oriental region.

MATERIAL EXAMINED.—Six males and one female from between Patillo Point and Old Panama, March 29, 1926, ebb-tide.

**OCYPODIDÆ****Ocypodinae****OCYPODE** Fabricius, 1798**Ocypode gaudichaudii** Milne Edwards and Lucas

## Figure 15

*Ocypode gaudichaudii* MILNE EDWARDS AND LUCAS, 1843, d'Orbigny's 'Voy. dans l'Amér. Merid.,' VI, Crust., p. 26; 1847, IX, atlas, Pl. xvii, figs. 4-4b; RATHBUN, 1917, Bull. 97, U. S. Nat. Mus., p. 373, Pl. cxxix, fig. 1, Pl. cxxx, fig. 1; 1924, Zoologica, N. Y. Zoöl. Soc., V, No. 14, p. 155, Pl. vii, figs. 1-3; BOONE, 1927 Zoologica, N. Y. Zoöl. Soc., VIII, No. 4, p. 267.

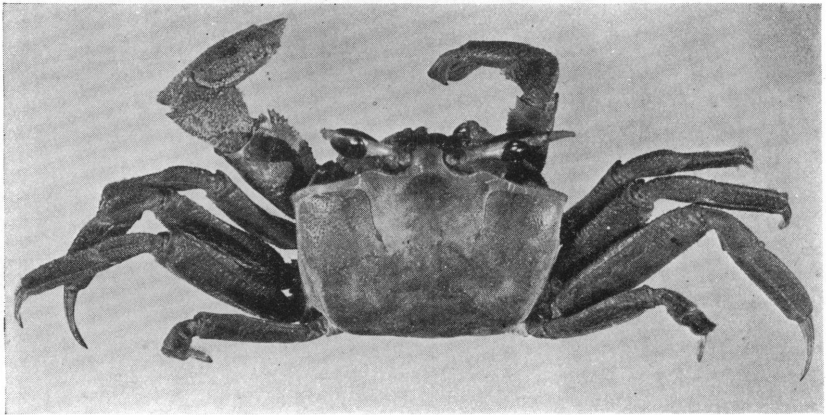


Fig. 15. *Ocypode gaudichaudii* Milne Edwards and Lucas, natural size. (Photograph, N. Y. Zoöl. Soc.).

**DIAGNOSTIC CHARACTERS.**—Fingers truncated. Eyestalks produced to a point beyond the eyes.

**TYPE.**—The type material of this species came from Chile and is deposited in the Paris Museum.

**RANGE.**—This species is known from San Pablo, California, southward, including the Galápagos Islands, to Valparaiso, Chile. Cano has recorded it from Honolulu.

**MATERIAL EXAMINED.**—Two males and one female, at Patillo Point, Panama, taken on sandy beach with several areas of rock and some scattered stones, March 29, 1926, at low tide. Mangroves back of the beach at one place. One male and one female from the above locality, March 26, 1926, ebb-tide.

**Ocypode occidentalis** Stimpson

## Figure 16

*Ocypode occidentalis* STIMPSON, 1860, Ann. Lyc. Nat. Hist., N. Y., VII, p. 229; RATHBUN, 1925, Bull. 129, U. S. Nat. Mus., p. 372, Pl. cxxix, figs. 2, and 3.

**DIAGNOSTIC CHARACTERS.**—This "ghost crab" is readily distinguished from the



other west coast member of the genus by the fact that its eyes are rounded, devoid of the long stylet present in *O. gaudichaudii*. *O. occidentalis* also has the fingers of the claw pointed. This species is the Pacific analogue of the east coast *Ocypode albicans*, Bosc, but has its carapace constantly wider in proportion to its length.

COLOR.—Back gray reticulated finely with white; front of large chelæ tinged with lemon.

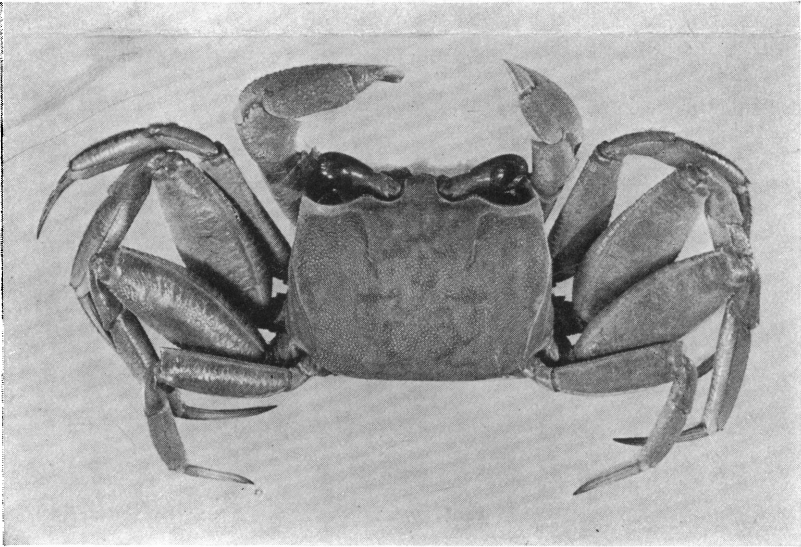


Fig. 16. *Ocypode occidentalis* Stimpson, natural size.

RANGE.—Lower California to Peru.

MATERIAL EXAMINED.—One large female, photographed, Patillo Point; two very young specimens, Pearl Islands, Panama; three very young specimens, Pedro Gonzales Island, Pearl Islands, March 9, 1926, on sandy beach.

### ***Uca mordax* (S. I. Smith)**

Figure 17*a*, *b*, and *c*

*Gelasimus mordax* SMITH, 1870, Trans. Conn. Acad. Arts and Sci., II, p. 135, Pl. II, fig. 3, Pl. IV, figs. 4 and 4*a*.

*Uca mordax* RATHBUN, 1917, Bull. 97, U. S. N. M., p. 391, Pl. CXXXIV, figs. 3-4 (and synonymy).

DIAGNOSTIC CHARACTERS.—Box-like carapace, widest behind the anterolateral angles; length, one-third of maximum width; very convex from front to back; frontal region wide, shallow; eyebrow obliquely inclined. Depression of urogastric region H-formed, deep, another deep arc-like depression along the anterolateral margin behind the orbit. Male cheliped huge, fingers a trifle rough, longer than hand, with white hand.

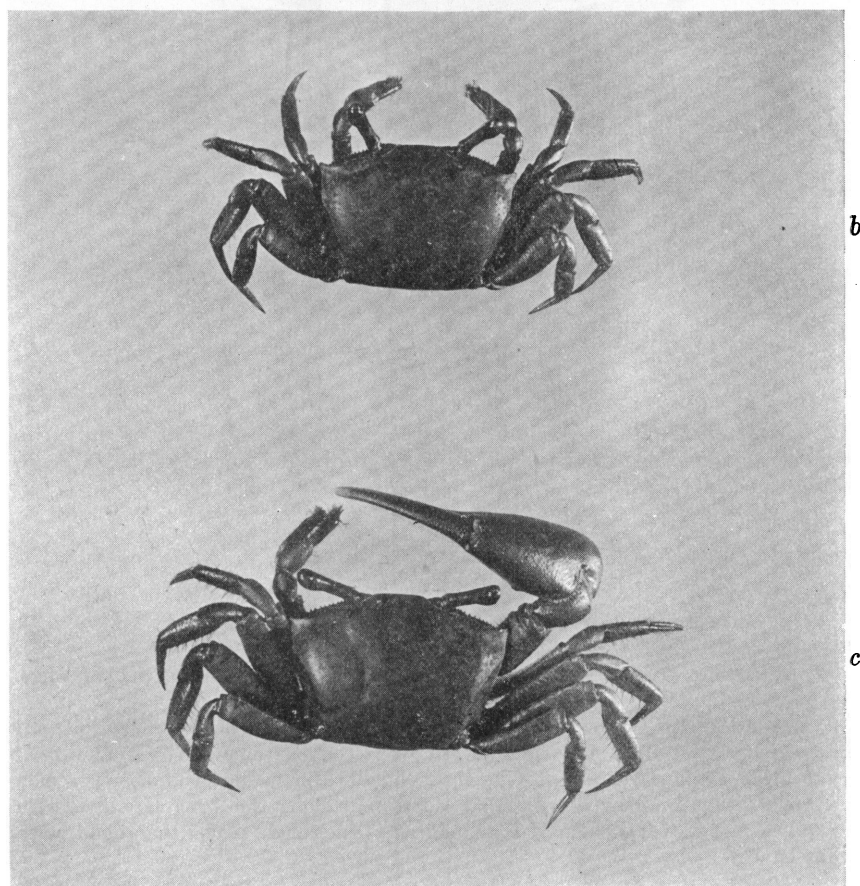
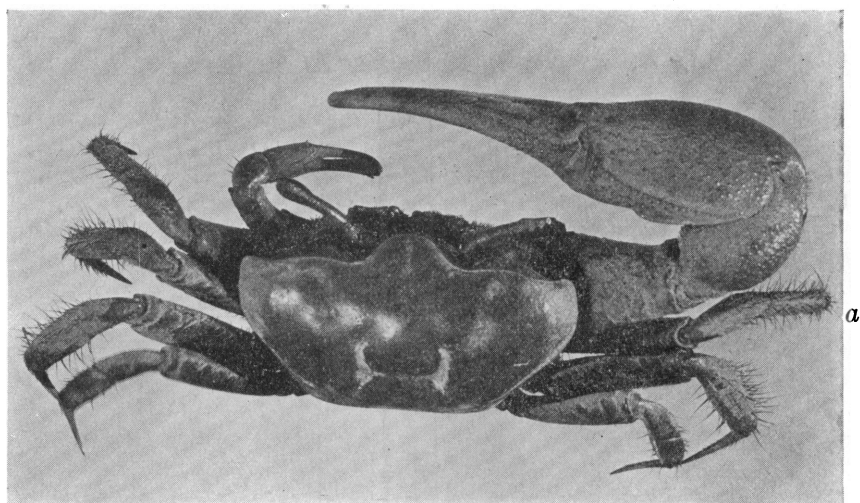


Fig. 17. (*Uca mordax* S. I. Smith); a, large male; b, young female; c, young male.

TYPE.—From the canals at Para; deposited in the Harvard Museum.

RANGE.—From Miami, Florida, southward to Rio de Janeiro, Brazil, on the east coast, and from Lower California to Panama.

► MATERIAL EXAMINED.—One male (large), Tabogilla Island, Bay of Panama, under stones on beach; six females, one male (small).

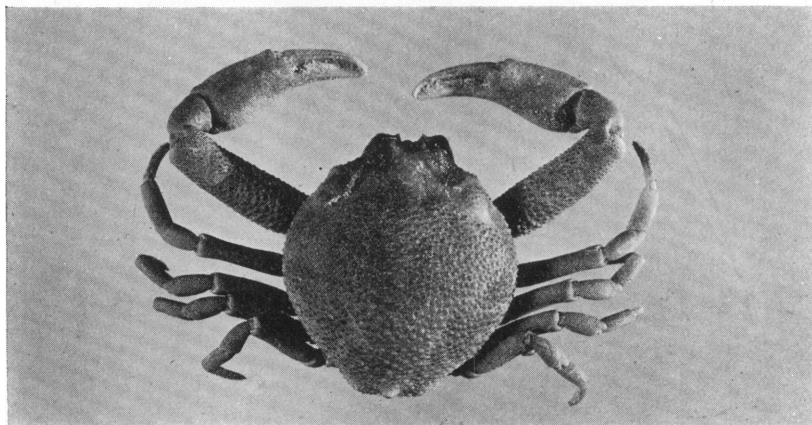


Fig. 18. *Leucosilia jurinei* de Saussure, natural size.

#### LEUCOSIIDÆ

##### Leucosilinae

#### LEUCOSILIA Bell, 1855

##### *Leucosilia jurinei* de Saussure

#### Figure 18

*Leucosilia jurinei* DE SAUSSURE, 1853, Rev. et Mag. de Zool., No. 8, p. 12, Pl. 1b, fig. 4; BELL, 1855, Trans. Linn. Soc. London, XXI, p. 294, Pl. xxxii, fig. 1; RATHBUN, 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 594; BOONE, 1927, Zoologica, N. Y. Zool. Soc., VIII, No. 4, p. 283, Fig. 100.

DIAGNOSTIC CHARACTERS.—Body globular in both sexes, very convex, sides rounded, surface covered with pearly granulations, except on the frontal part and hepatic regions; there is a small elevation on each hepatic lobe; a single small tubercle is present on the posterior part of the carapace in the median line. Chelipeds equal, male ones longer than female; slender, cylindrical; fingers curved, tapering; merus and propodus very granulose.

TYPE.—Taken at Mazatlan, Mexico, deposited in the Geneva Museum.

RANGE.—Mazatlan, Mexico, to Peru and Galápagos Islands.

MATERIAL EXAMINED.—One male, photographed, taken at Saboga Island Harbor, Pearl Islands, extreme low tide on sandy beach, March 13, 1926.

This is a very fine example of an exceedingly rare species.

