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Section  
Marine Invertebrates

Crustacea

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SCIENTIFIC RESULTS OF THE EXPEDITION TO THE GULF OF CALIFORNIA  
IN CHARGE OF C. H. TOWNSEND, BY THE U. S. FISHERIES STEAM-  
SHIP 'ALBATROSS,' IN 1911. COMMANDER G. H. BURRAGE, U. S. N.,  
COMMANDING

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XIII

*The Brachyuran Crabs Collected by the U. S. Fisheries  
Steamer 'Albatross' in 1911, Chiefly on the  
West Coast of Mexico*

BY MARY J. RATHBUN

BULLETIN

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INVERTEBRATE  
ZOOLOGY  
Crustacea

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**BULLETIN, NOVITATES, AND MEMOIRS**

OF

**The American Museum of Natural History**

**FRANK E. LUTZ, Editor**

The following are the more recent papers on **HERPETOLOGY AND ICHTHYOLOGY**. Orders should be addressed, Library, The American Museum of Natural History, 77th St. and Central Park West, New York City.

**HERPETOLOGY**

- Notes on the Herpetology of Santo Domingo. By Karl Patterson Schmidt, 1921, Bulletin, XLIV, Art. 2, pp. 7-20, 12 text figures. 15c.
- The Herpetology of Navassa Island. By Karl Patterson Schmidt, 1921, Bulletin, XLIV, Art. 18, pp. 555-559, Pls. xxv, xxvi, 5 text figures. 20c.
- The Bony Structure and Phyletic Relations of *Sphaerodactylus* and Allied Lacertilian Genera, with the Description of a New Genus. By G. K. Noble, 1921, Novitates, No. 4, pp. 1-16, 8 text figures. 20c.
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- New Species of North American Lizards of the Genera *Holbrookia* and *Uta*. By Karl Patterson Schmidt, 1921, Novitates, No. 22, pp. 1-6. 10c.
- Five New Species of Salientia from South America. By G. K. Noble, 1921, Novitates, No. 29, pp. 1-7, 6 text figures. 10c.
- The Phylogeny of the Salientia, Part I. By G. K. Noble, 1922, Bulletin, XLVI, Art. 1, pp. 1-87, Pls. 1-xxiii. \$1.00
- The Amphibians and Reptiles of Lower California and the Neighboring Islands. By Karl Patterson Schmidt, 1922, Bulletin, XLVI, Art. 11, pp. 607-707, Pls. XLVII-LVII, 13 text figures. \$1.50
- A Review of the North American Genus of Lizards *Holbrookia*. By Karl Patterson Schmidt, 1922, Bulletin, XLVI, Art. 12, pp. 709-725, LVIII-LX, 5 text figures. 35c.
- Six New Batrachians from the Dominican Republic. By G. K. Noble, 1923, Novitates, No. 61, pp. 1-6. 10c.
- Four New Lizards from Beata Island, Dominican Republic. By G. K. Noble, 1923, Novitates, No. 64, pp. 1-5. 10c.
- The Generic and Genetic Relations of *Pseudacris*, the Swamp Tree Frogs. By G. K. Noble, 1923, Novitates, No. 70, pp. 1-6, 4 text figures. 10c.
- Contributions to the Herpetology of the Belgian Congo Based on the Collection of the American Museum Congo Expedition, 1909-1915. Part II.—Snakes. By Karl Patterson Schmidt, 1923, Bulletin, XLIX, Art. 1, pp. 1-146, Pls. 1-xxxii, 19 maps and 15 text figures. \$2.50

**ICHTHYOLOGY**

- A Bibliography of Fishes, Vol. II, 1917. Authors' Titles L-Z, pp. 1-702. By Bashford Dean, Edited by Charles Eastman. \$5.50
- Fresh-water Fishes of the Congo Basin Obtained by the American Museum Congo Expedition, 1909-1915. By John Treadwell Nichols and Lu dlow Griscom. With Field Notes by the Collectors, Herbert Lang

**Article XX.**—THE BRACHYURAN CRABS COLLECTED BY  
THE U. S. FISHERIES STEAMER 'ALBATROSS' IN 1911,  
CHIEFLY ON THE WEST COAST OF MEXICO<sup>1</sup>

BY MARY J. RATHBUN

PLATES XXVI TO XXXVI

The number of species in this list is 56, which by no means represents the existing fauna of the region. There are, however, a number of new and rare species which add value to the collection. A new species of *Sesarma* has already been described from Magdalena Bay, and the males of two unknown species of *Pinnotheres* are described below; these may later on be linked up with the females of the species, which are perhaps already described. The differences in shape and general appearance between males and females of this genus are usually too great for one to identify both sexes of a species unless they are found associated. A series of *Pilumnus* from Lower California enables the author to establish the presence of two closely allied species with continuous ranges which overlap at Magdalena Bay. The ranges of various species are extended, including those of *Lophopanopeus heathii*, *Panopeus bradleyi* and *Collodes tumidus*. Also noteworthy is the presence in the collection of a well-developed specimen of *Pliosoma parvifrons*, a species of rare occurrence.

A considerable collection of young stages, chiefly crab megalopa, was obtained. It is impossible to identify all of them with certainty, as our knowledge of the development of these creatures is still very limited. It has been thought best to publish drawings of the different forms, that future students who contrive to raise the young from the eggs may be able to classify them. The drawings of larvæ were made by Dr. Charles J. Fish, of the Bureau of Fisheries, who is making an intensive study of the plankton of the Woods Hole region. He has suggested the generic position of several of the Lower Californian larvæ which are akin to others on the Atlantic side.

**DROMIIDÆ**

***Dromidia larraburei* Rathbun**

*Dromidia larraburei* (by error) RATHBUN, 1910, Proc. U. S. Nat. Mus., XXXVIII, October 20, p. 553, Pl. XLVIII, fig. 4.

<sup>1</sup>Scientific Results of the Expedition to the Gulf of California in charge of Dr. C. H. Townsend, by the U. S. Fisheries Steamship 'Albatross' in 1911; Commander G. H. Burrage, U. S. N., commanding. XIII. Published by permission of the U. S. Commissioner of Fisheries.

*Dromidia sequeipes* WEYMOUTH, 1910, Leland Stanford Jr. Univ. Publ., Univ. Ser., No. 4, November 12, p. 15, Pl. 1, figs. 1-2.

*Dromidia larraburei* SCHMIDT, 1921, Univ. Calif. Publ. Zool., XXIII, p. 183, Pl. XXXIII, fig. 1.

Magdalena Bay: Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35' 20" N., long. 111° 59' 35" W.; 13.5 fathoms; S. brk. Sh.; March 21; station D5678; 2 small ♀; one "had a large compound ascidian on its back."

Without locality label; 1 ♀, soft-shell.

See also list of larvae.

#### **Hypoconcha digueti** Bouvier

1898, Bull. Mus. Hist. Nat., Paris, IV, pp. 374 and 376.

San Estaban Island; 1 ♂ without chelipeds. Length of carapace 10.2 mm., width 10.6 mm.

The type female came from La Paz Bay.

#### **CALAPPIDÆ**

##### **Cycloes bairdii** Stimpson

*Cyclois bairdii* STIMPSON, 1860, Ann. Lyc. Nat. Hist. N. Y., VII, p. 237 [109].

Cape San Lucas; March 23; 2 ♂ 1 ♀.

#### **PORTUNIDÆ**

##### **Portunus (Portunus) xantusii** (Stimpson)

*Achelous xantusii* STIMPSON, 1860, Ann. Lyc. Nat. Hist. N. Y., VII, p. 222 [94].

Point San Bartholome; 2 juv. Also with boat dredge; March 13; 3 ♂ 5 ♀.

Santa Maria Bay; boat dredge; March 18; 100 juv.

Magdalena Bay: Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35' 20" N., long. 111° 59' 35" W.; 13.5 fathoms; S. brk. Sh.; March 21; station D5678; 1 ♂ 1 ♀.

Cape San Lucas; March 23; 6 ♂ 8 ♀ (2 ovigerous).

Pichilingue Bay: By electric light; March 27; 6 ♂ 1 ♀ 16 juv. April 18; 6 ♂ 1 ovigerous ♀. By electric light; 1 juv.

San Josef Island; March 31; 1 ♂ 1 ♀.

Agua Verde Bay; April 1; 1 juv.

Without locality label; 59 juv.

##### **Arenæus mexicanus** (Gerstæcker)

*Euctenota mexicana* GERSTÆCKER, 1856, Arch. f. Naturg., XXII, pt. 1, p. 131, Pl. v, figs. 3 and 4.

Ballenas Bay; March 16; 1 ♂ 1 ♀.



**Callinectes arcuatus** Ordway

1863, Boston Journ. Nat. Hist., VII, p. 578.

San Jose del Cabo; March 26; 2 ♂ 2 ♀ (1 immature, 1 soft-shell).

**Callinectes bellicosus** (Stimpson)

*Lupa bellicosa* STIMPSON, 1859, Ann. Lyc. Nat. Hist. N. Y., VII, p. 57 [11].

Point San Bartholome: With boat dredge; March 13; 3 ♂ 2 ♀.  
March 14; 1 ♂. In seine; 4 juv.

Abreojos Point; March 16; 2 ♀.

Ballenas Bay; March 16; 2 ♂ juv., 1 ♀ juv.

S. end of Magdalena Bay; March 20; 10 ♂ 2 ♀.

Pichilique Bay: By electric light; March 27; 6 juv. March 29;  
1 ♂ juv.

Agua Verde Bay; April 2; 2 immature ♀.

Mulge, at mouth of river; in 100-foot seine; April 4; 1 ♂.

Ricason Island, Concepcion Bay; April 7; 8 ♂ 2 ♀.

**Cronius ruber** (Lamarck)

*Portunus ruber* LAMARCK, 1818, 'Hist. Nat. Anim. sans Vert.,' V, p. 260.

*Amphitrite edwardsii* LOCKINGTON, 1877, Proc. Calif. Acad. Sci., VII, 1876, p. 43 [3].

Point San Bartholome; in seine; March 14; 2 ♂ 2 ♀.

**ATELECYCLIDÆ****Pliosoma parvifrons** Stimpson

Plate XXVI

1860, Ann. Lyc. Nat. Hist. N. Y., VII, p. 228 [100], Pl. III, fig. 6.

Cape San Lucas; March 23; 1 ♂. Carapace 20 mm. long, 18.8 mm. wide.

The specimen is larger than those collected by Xantus and is better developed. The spines are reduced in size, the gastric, hepatic and two inner branchial prominences being scarcely more than tubercles. The first ambulatory leg is nearly twice as long as the carapace; the cheliped is stronger than the legs and one and two-thirds times as long as the carapace; surface finely granulate except on distal half of fingers; merus subcylindrical, carpus subspherical; propodus a little compressed, increasing in width gradually and regularly almost to the fingers where the lower margin bows outward, giving the fixed finger a sinuous edge and making a considerable gape between the proximal halves of the fingers, into which a very low, broad tooth projects from the dactylus; meeting edges crenulate.

**CANCRIDÆ****Cancer jordani** Rathbun

1900, Amer. Nat., XXXIV, p. 133.

Middle of east side of Cerros Island; March 12; 1 ♀.

**Cancer amphicetus** Rathbun

1898, Proc. U. S. Nat. Mus., XXI, p. 582.

Middle of east side of Cerros Island; March 12; 1 juv.

Santa Maria Bay; with boat dredge; March 18; 2 juv.

**XANTHIDÆ****Leptodius occidentalis** (Stimpson)*Chlorodius occidentalis* STIMPSON, 1871, Ann. Lye. Nat. Hist. N. Y., X, p. 108.

Pichilique Bay; March 27; 5 ♂ 3 ♀.

Agua Verde Bay; April 1; 3 ♂.

**Xanthodius hebes** Stimpson

1860, Ann. Lye. Nat. Hist. N. Y., VII, p. 208 [80].

Pichilique Bay; March 27 and 29; 16 ♂ 17 ♀.

Agua Verde Bay; April 1; 2 ♂ 8 ♀ (1 ovigerous).

San Francisquito Bay; April 9; 1 ♀.

**Cycloxanthops novemdentatus** (Lockington)*Xanthodes? novem-dentatus* LOCKINGTON, 1877, Proc. California Acad. Sci., VII, 1876, p. 32.

Point San Bartholome; in seine; 1 ♀.

**Glyptoxanthus labyrinthicus** (Stimpson)*Actæa labyrinthica* STIMPSON, 1860, Ann. Lye. Nat. Hist. N. Y., VII, p. 204.

San Francisquito Bay; beach; April 9; 1 ♂.

**Panopeus bradleyi** Smith

1869, Proc. Boston Soc. Nat. Hist., XII, p. 281.

Santa Maria Bay; with boat dredge; March 18; 1 ♀.

Head of Concepcion Bay; April 6; 1 ♂.

**Eurypanopeus planissimus** (Stimpson)*Xantho planissima* STIMPSON, 1860, Ann. Lye. Nat. Hist. N. Y., VII, p. 205.

Agua Verde Bay; April 1; 1 ♂.

San Francisquito Bay; beach; April 9; 4 ♂.

***Micropanope nitida* Rathbun**

1898, Proc. U. S. Nat. Mus., XXI, p. 587, Pl. XLII, fig. 9.

Agua Verde Bay; April 1; 1 ♂ 3 ♀.

Locality not given; 23 ♂ 16 ♀ 1 juv.

***Lophopanopeus heathii* Rathbun**

1900, Amer. Nat., XXXIV, p. 137.

Middle of east side of Cerros Island; March 12; 1 ♂ and carapace.

***Pilumnus spinohirsutus* (Lockington)**

Plate XXVII

*Acanthus spino-hirsutus* LOCKINGTON, 1877, Proc. California Acad. Sci., VII, 1876 pp. 33 and 102.

*Pilumnus spino-hirsutus* STREETS AND KINGSLEY, 1877, Bull. Essex Inst., IX, p. 107.

*Pilumnus spinohirsutus* RATHBUN, 1904, 'Harriman Alaska Exped.,' X, p. 185 (part), not Pl. VII, fig. 2; 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 585 (part).

Point Abrecojos; March 6; 1 ♂.

Magdalena Bay: Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35' 20'' N., long. 111° 59' 35'' W.; 13.5 fathoms; S. brk. Sh.; March 21; station D5678; 1 ♂ 1 ♀ 2 juv.

Occurs in southern California and on the west coast of Lower California as far south as Magdalena Bay.

From Magdalena Bay southward as far as Manzanillo, including the Gulf of California, *P. spinohirsutus* is replaced by a form which I formerly regarded as a variation, but a considerable series of both sorts from many localities shows consistent differences.

Lockington's types are not extant. His description would apply to either species, according to the reader's interpretation of this sentence: ". . . four larger spines on antero-lateral margin of carapax, besides those on upper margin of orbit." Did he include the spine at the outer angle of the orbit with the antero-lateral spines or with the upper orbital spines? We can judge only by the locality of his specimens, San Diego, which is included in the range of the northern species, and from which the National Museum possesses two specimens belonging to that species. In it, there are four antero-lateral spines beside the outer orbital spine; the latter therefore was classed by Lockington with "those on upper margin of orbit."

The species have much in common. In both, the dorsal surface of carapace and appendages is covered with long hairs, except the hinder part of the carapace, while the carapace and ambulatory legs have a short

coat of pubescence. The carapace is very convex antero-posteriorly, slightly convex from side to side. The antero-lateral margins are armed with long spines, the orbit and the front with shorter spines. Chelipeds spinous above and also on the outer surface of the palms except on the lower portion of the larger palm. On the legs, the upper surface of the carpus-propodus and the distal extremity of the merus are spined.

The differences are as follows:

<i>P. spinohirsutus</i>	<i>P. townsendi</i>
Antero-lateral spines 5; the first or orbital spine is a little shorter than the others and the space between first and second is less than the other spaces, the bases of those spines often contiguous, so that they appear like one deeply bifid spine.	Antero-lateral spines 4, equally separated.
No subhepatic spine, although there may be some small spinules.	A slender, well-marked, subhepatic spine, below the interval between first and second lateral spines.
Frontal spines short.	Frontal spines longer.
In male usually half of outer surface of larger hand is smooth and naked, the smooth area separated obliquely from the rough area by a line running from the lower proximal corner to the distal end opposite the middle of base of dactylus. In female the smooth space is similar to, but smaller than, that of the male.	In both sexes less than half of outer surface of larger hand is smooth. A continuous line of short, conical spines runs lengthwise in line with the base of cutting edge of propodal finger.
Carapace wider, width (exclusive of spines) more than $1\frac{1}{3}$ times length.	Carapace narrower, width (exclusive of spines) $1\frac{1}{3}$ , or less than $1\frac{1}{3}$ , times length.

*P. spinohirsutus* runs larger than the next species, measuring 23.4 mm. (Cat. No. 32964, U. S. N. M.) in total length of carapace as contrasted with 14.2 in *townsendi* (type).

*P. spinohirsutus* shows a tendency to produce a posterior branch on the third lateral spines.

### ***Pilumnus townsendi*,<sup>1</sup> new species**

Plate XXVIII

*Pilumnus spinohirsutus* RATHBUN, not Lockington, 1904, 'Harriman Alaska Exped.,' X, p. 185 (part), Pl. VII, fig. 2; 1910, Proc. U. S. Nat. Mus., XXXVIII, p. 585 (part).

<sup>1</sup>For Dr. Charles H. Townsend, in charge of the 1911 expedition.

TYPE-LOCALITY.—Off Adair Bay, Gulf of California, Mexico; 17 fathoms; station 3026, 'Albatross'; 2 females (1 is holotype).

TYPE.—Cat. No. 17413, U. S. N. M.

MEASUREMENTS.—Female holotype, length of carapace on median line 13.8, length including spines 14.2, width excluding spines 18.3, including spines 21.4 mm.

SPECIMENS COLLECTED BY THE 1911 EXPEDITION.—

Magdalena Bay: Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35' 20" N., long. 111° 59' 35" W.; 13.5 fathoms; S. brk. Sh.; March 21; station D5678; 1 ♂ 1 ♀.

Head of Concepcion Bay; April 6; 1 ♂ 3 juv.

A lot containing 1 ♀, 3 juv., is labeled "Station 5695," obviously incorrect, as the depth at that station is 534 fathoms.

RANGE.—Magdalena Bay to Manzanillo, via Gulf of California, to a depth of 22 fathoms.

For description of this species and its relations, see under *Pilumnus spinohirsutus*, above.

#### ***Pilumnus gonzalensis* Rathbun**

1893, Proc. U. S. Nat. Mus., XVI, p. 240.

San Francisquito Bay; April 9; 2 ♀.

#### ***Eurytium affine* (Streets and Kingsley)**

*Panopeus affinis* STREETS AND KINGSLEY, 1877, Bull. Essex. Inst., IX, p. 106.

Pichilique Bay; March 27; 3 ♂ 1 ♀.

#### ***Eriphia squamata* Stimpson**

1859, Ann. Lyc. Nat. Hist. N. Y., VII, p. 56 [10].

Agua Verde Bay; April 1; 1 ♂ 1 ♀.

Pichilique Bay; March 27; 5 ♂ 8 ♀ (3 ovigerous).

Mazatlan; 1 propodus of right cheliped.

#### **PINNOTHERIDÆ**

#### ***Pinnotheres jamesi*,<sup>1</sup> new species**

Plate XXIX, Text Figures 1 and 2

TYPE-LOCALITY.—Pichilique Bay, Lower California; by electric light; 1 male.

TYPE.—Cat. No. 57005, U. S. N. M.

MEASUREMENTS.—Length of carapace of type male 3.7 mm., width the same.

DIAGNOSIS OF MALE.—Carapace hard, nearly circular, bordered with hair around lateral angles. Last leg very much smaller than the others. Male abdomen extremely long and narrow.

DESCRIPTION OF MALE.—Carapace subcircular, inclining toward the hexagonal, broadest at the middle of its length; evenly convex in all directions; surface smooth and shining except for a narrow border of pubescence, 1.4 mm. long, embracing the

<sup>1</sup>For Mr. Arthur Curtiss James, a patron of the expedition.

widest part of the carapace. Posterior margin 2.3 mm. long, slightly curved; posterolateral margin thickened over the last pair of legs. Front 1.2 mm. wide, nearly truncate, extremities curved; middle part bent under and ending in a point.

Chelipeds shorter than first leg and very little stouter. Margins of chelipeds and legs hairy. Palm increasing in width distally; fingers with a small tooth near base of inner edges, tips curved toward each other. The legs are similar in form, their relative lengths represented by 2.3.1.4, the second longest, fourth very much shorter than the others, its merus not reaching the middle of the merus of the third leg; in all, the margins of the merus are subparallel, the upper margin of the propodus is slightly arched, the dactylus is strongly curved, gradually tapering, but with a very slender tip; the carpus-propodus of the second and third legs has a fringe of long hairs on the posterior surface which proceed from near the upper margin.

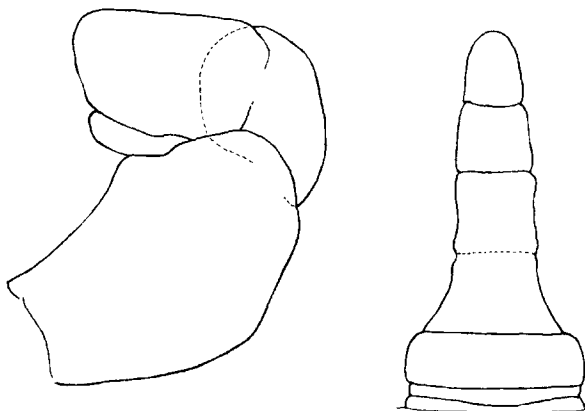


Fig. 1. *Pinnotheres jamesi*, left outer maxilliped of ♂ holotype, × 77.5.

Fig. 2. *Pinnotheres jamesi*, abdomen of ♂ holotype, × 18.

The abdomen is very narrow and long, reaching to the buccal cavity; the first two segments are linear, the third occupies little more than half the width of the sternum, its ends rounded; fourth and fifth segments fused, the line of union partially visible; the fourth tapers a little, the fifth is nearly square; the sixth is a little shorter than the fifth and narrows slightly to the seventh, which is suboblong with rounded tip.

This species belongs to the same group as *P. concharum*<sup>1</sup>; it differs from male *concharum* in its rounder carapace with pubescence along the lateral angles instead of around the anterior half of the carapace, in the broader front, the more convex posterior margin, the shorter and broader legs, especially noticeable in the propodus, the longer and differently shaped abdomen. The outer maxilliped is akin to that of *P. reticulatus*,<sup>2</sup> from the Gulf of California, which is known only from the female and has no other obvious relation to *P. jamesi*.

<sup>1</sup>Rathbun, 1918, Bull. U. S. Nat. Mus., No. 97, p. 86, Pl. xx, figs. 3-6, text-fig. 42.

<sup>2</sup>*Op. cit.*, p. 93, Pl. XXI, figs. 1 and 2.

***Pinnotheres pichilinquai*, new species**

Plate XXX; Text Figures 3 to 5

TYPE-LOCALITY.—Pichilinqu Bay, Lower California; by electric light; March 27; 4 males.

TYPE.—Cat. No. 57004, U. S. N. M.

MEASUREMENTS.—Length of carapace of type male 4.4 mm., width 4.3 mm.

DIAGNOSIS OF MALE.—Pubescent. Carapace deeply sculptured. Chelipeds very heavy. Legs subequal.

DESCRIPTION OF MALE.—Carapace subhexagonal, the postero-lateral regions deeply hollowed, the posterior ambulatory leg fitting into the hollow; surface covered with a dense soft pubescence which forms a smooth, as opposed to a ragged, surface, but does not conceal the inequalities of the shell. Cardiac region surrounded by a deep groove except posteriorly; branchial and gastric regions grooved in such a

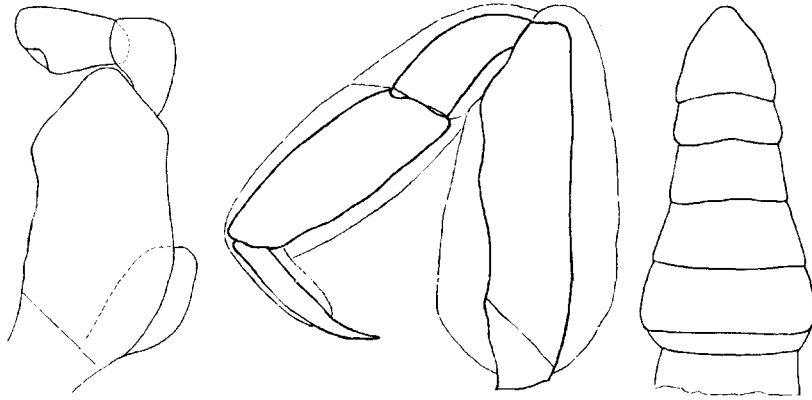


Fig. 3. *Pinnotheres pichilinquai*, left outer maxilliped of ♂ paratype,  $\times 33\frac{1}{8}$ .

Fig. 4. *Pinnotheres pichilinquai*, right first ambulatory leg of ♂ paratype,  $\times 27$ . The outer line marks the extent of the fringe of hair.

Fig. 5. *Pinnotheres pichilinquai*, abdomen of ♂ paratype,  $\times 27$ .

way as to form a regular pattern; hepatic region depressed. Front viewed from above, advanced, broadly subtriangular, edge arcuate; viewed from before, the front is deflexed and pointed. Orbits round, eyestalks stout, corneae smaller but of good size and black. Antennules when folded bulging; antennae as long as one-half width of front.

Chelipeds pubescent like the carapace and with a dense short fringe on the inner border; they are stout; carpus somewhat nodose, chela thick and high; palm with upper surface concave, outer surface with two longitudinal grooves; lower margin of propodus convex from one end to the other; fingers heavy, meeting when closed, tips slender and crossing; a small tooth near base of each finger.

Ambulatory legs similar, diminishing slightly from first to fourth pair; carpus-propodus broader than merus, and having a fringe of long hairs attached on the posterior surface just below the upper margin, the hairs lying against the surface; dactyli slender, long, curved.



COLOR.—The preserved specimens show a great deal of dark color on the carapace; in the type-specimen the front is light with a narrow, dark, median line, the extreme rear is light, the remainder is dark shading to nearly black; chelipeds and legs mostly light.

This is the Pacific counterpart of *P. shoemakeri*<sup>1</sup> which inhabits the Gulf of Mexico and the West Indies. The Atlantic species has a longer carapace with smaller arcoles and wider furrows; the fingers are narrower and the legs much slenderer.

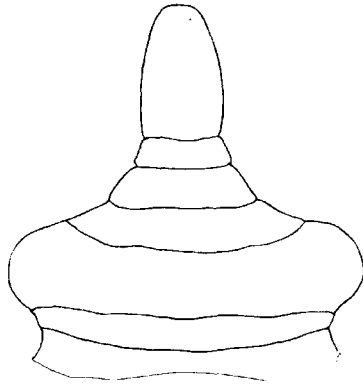


Fig. 6. *Parapinnixa nitida*, Pichilique Bay, abdomen of ♂, × 27.

***Parapinnixa nitida* (Lockington)**

Text Figure 6

*Pinnixa* (?) *nitida* LOCKINGTON, 1877, Proc. California Acad. Sci., VII, 1876, p. 155 [11], part (type-locality, Angeles Bay).

*Parapinnixa nitida* RATHBUN, 1918, Bull. U. S. Nat. Mus., No. 96, p. 107, text-fig. 58, and synonymy.

Pichilique Bay; by electric light; 1 ♂.

Carapace 2.6 mm. long, 5.6 mm. wide. The male is similar in shape to the female which is known to us only through Holmes's figure, the type specimen itself being no longer extant. Just behind the front there is a transverse furrow which laterally curves forward until it meets the upper margin of the orbit. The carpus and propodus, taken together, are more nearly of a size in the first three ambulatory legs than is represented in Holmes's figure where the second and third legs were narrowed by perspective.

<sup>1</sup>Rathbun, 1918, Bull. U. S. Nat. Mus., No. 97, p. 95, Pl. xxxii, figs. 1-4, text-fig. 48.

**Dissodactylus nitidus** Smith

1870, Trans. Connecticut Acad. Arts and Sci., II, p. 173.

Santa Maria Bay; from boat dredge; March 18; 6 ♂ 2 ♀.

**GRAPSIDÆ****Grapsus grapsus** (Linnæus)

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

South end of Cerros Island; March 10; 1 ♂.

Santa Maria Bay; March 18; 2 ♂.

San Estaban Island; April 13; 1 ♂.

Label illegible; 1 ♂.

**Geograpsus lividus** (Milne Edwards)

*Grapsus lividus* MILNE EDWARDS, 1837, 'Hist. Nat. Crust.,' II, 1837, p. 85.

Pichilique Bay; March 27; 2 ♀ (1 ovigerous).

**Pachygrapsus crassipes** Randall

1840, Journ. Acad. Nat. Sci. Philadelphia, VIII, 1839, p. 127.

Guadalupe Island; March 2; 1 ♂ 1 ♀.

E. San Benito Island; March 9; 1 ♂ 2 ♀ (1 ovigerous).

W. San Benito Island; March 9; 4 ♂ 2 ♀.

S. end of Cerros Island; March 10; 6 ♂ 8 ♀.

Santa Maria Bay; March 15; 1 ♂.

Point Abreojos; March 16; 1 ♂ 3 ♀ (1 soft-shell).

Margarita Island; March 19; 3 ♀.

Tiburón Island; April 12; 1 ♀.

**Pachygrapsus transversus** (Gibbes)

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

Pichilique Bay; March 27; 1 ovigerous ♀.

Agua Verde Bay; April 1; 2 ♂ 1 ovigerous ♀.

**Goetice americanus**, new species<sup>1</sup>

Plate XXXI; Text Figure 7

*Hemigrapsus oregonensis* RATHBUN, Bull. U. S. Nat. Mus., No. 97, p. 270 (part).

TYPE-LOCALITY.—San Luis Gonzales Bay, Lower California (gulf side), Mexico; March 27, 1889; 'Albatross'; 70 males; 41 females (27 ovigerous). One male is holotype. A set of paratypes has been placed in the American Museum.

TYPE.—Cat. No. 17452, U. S. N. M.

<sup>1</sup>Not represented in the 1911 collection. Published here by permission of the Smithsonian Institution.

MEASUREMENTS.—Male holotype, length of carapace 14, greatest width 15.8, width between outer orbital angles 14.4 mm.

DESCRIPTION.—Dorsal aspect very much as in *Hemigrapsus oregonensis*. In specimens of equal carapace length, the width is a little less, both at the widest part and at the orbital angles, than it is in *oregonensis*, the posterior of the lateral teeth is smaller, the granulated ridge setting off the steep postero-lateral region is fainter, the blunt ridge just above and parallel to the margin of the front is more extensive, punctate and smoother than in *oregonensis*.

The most noticeable difference in the species is in the outer maxillipeds; the ischium is distinctly smaller than the merus and diminishes in width from the distal to the proximal end, its distal margin is concave forward except for a smooth arcuate lobe at the inner end which is strongly produced forward and partially overlaps the merus; merus elongate; palpus strongly developed, reaching, when it is folded in place, quite to the ischium.



Fig. 7. *Goctice americanus*, left outer maxilliped of ♂ paratype (Cat. No. 17452, U. S. N. M.),  $\times 8$ .

The chelipeds in the well-developed male are very heavy and equal; palms high height greater than length measured from articulation with carpus to sinus between fingers; anterior margin of palm very oblique; tip of immovable finger curved upward, wider than tip of dactylus; dactylus slender, a large lobe near its base, the distal half of which has a crenulated edge, continued also along the edge of the dactyl as far as the tip; a large brush of coarse hair occupies the greater part of the inner surface of the palm.

Ambulatory legs of moderate size and bordered with long, soft hair.

Abdomen of male narrow, the sides converging little from the third to the middle of the sixth segment.

VARIATION.—There is considerable variation in individuals from the same locality. Large specimens have not always as well developed chelipeds as smaller specimens. The two chelipeds may be unlike, one with a tooth on the dactyl, the other without a tooth, and with meeting fingers, similar to those of females and young. Most of the specimens of the type lot including all the females are devoid of hair on the legs; in a lot from Guaymas, there is a greater proportion of hairy individuals, including some females.

RANGE.—From San Bartolome Bay, on the west coast of Lower California to the Gulf of California where it has been found at Guaymas, Puerto Refugio on Angel Island, and at San Luis Gonzales Bay. It was not taken by the 1911 expedition of the 'Albatross.'

*Hemigrapsus oregonensis*, with which this species was formerly confounded, does not occur in Mexico farther south than Todos Santos Bay on the west coast of Lower California just below the United States line (not Todos Santos near the tip of the peninsula).

The genus *Goetice*,<sup>1</sup> distinguished by the form of the outer maxillipeds, has not before been noted in America. Its type species, *G. depressus* (de Haan),<sup>2</sup> is a common shore crab in Japan; it differs from the American species in its carapace narrowed behind instead of squarish and the articulation of merus and ischium of endognath of outer maxillipeds more oblique. Male abdomen and chelipeds similar, except that the inner surface of the palm is bare in *depressus*.

### ***Sesarma (holometopus) magdalenense* Rathbun**

Plate XXXII

1918, Bull. U. S. Nat. Mus., No. 97, p. 305, Pl. LXXXVI.

TYPE-LOCALITY.—Mangrove Island, Magdalena Bay, Lower California; March 20, 1911; 'Albatross'; 8 ♂ 8 ♀ (1 ♂ is type).

TYPE.—Cat. No. 45793, U. S. N. M.

MEASUREMENTS.—Type male, length of carapace 11.6 mm., width between the outer angles of the orbits 14.2 mm., width at postero-lateral angles 13.1 mm.

Carapace distinctly broader than long, broadest at the outer angles of the orbit, diminishing posteriorly, a very shallow sinus in the lateral margins behind the antero-lateral angles. Surface for the most part smooth and shining, depressions moderately deep; pits of two sorts, a few large scattered ones visible to the naked eye, and numerous small ones, which become crowded on the anterior branchial region. On the anterior and antero-lateral regions, there are a few scale-like granules. Antero-lateral angle a well-marked tooth.

Front about three-fifths as wide as carapace, surface nearly vertical, with the lower edge advanced; front widening below, lower margin arcuate, outer corners rounded; surface uneven, wrinkled and unevenly granulate with fine, depressed granules; superior frontal lobes nearly smooth and feebly separated, the middle pair the wider.

Chelipeds of male massive; merus and carpus covered on the outer surface with short granulated rugæ; chelæ high, swollen; immovable finger short, high, horizontal; dactylus strongly arched. Palm with lower margin very arcuate, its upper surface with several longitudinal, broken lines of fine granules, its outer surface, as well as the upper surface of the proximal half of the dactylus, covered with fine scabrous granules; fingers punctate, gaping; basal half of prehensile edge of the

<sup>1</sup>Gistel, 'Natur. Thierreichs,' 1848, p. x.

<sup>2</sup>*Grapsus (Platymotus) depressus* de Haan, 'Fauna Japon., Crust.,' 1835, p. 63, Pl. VIII, fig. 2, Pl. D (mouth-parts, *Platymotus*).

dactylus cut out in a deep sinus, into which projects a crenulated tooth of the immovable finger; both fingers irregularly dentate.

The chelipeds of the female have both fingers horizontal and longer than the immovable finger of the male; they do not gape, and the teeth fit rather closely together. In the young male the chelæ are intermediate in form between those of the adult male and of the female, and the gape is lacking.

Ambulatory legs with merus-joints rather short, (in the fourth pair  $2\frac{1}{4}$  times as wide as long), widening distally, and crossed by fine short rugæ; dactyli slender, longer than their respective propodi measured on the outer or anterior margin.

Abdomen of male broadly triangular; terminal segment as broad as long. Appendages of first segment rather slender, tips oblique.

COLOR.—Specimens preserved in alcohol have a greenish-blue carapace mottled with purple; upper, proximal half of chelæ reddish-brown; upper surface of legs covered with a pattern of fine dots of dark purple on a light ground.

This species is unlike other American *Sesarmæ* in its faintly marked frontal lobes, which give it much the appearance of a *Metasesarma*, e.g., *M. rousseauxi* Milne Edwards<sup>1</sup> and *M. aubryi* (A. Milne Edwards).<sup>2</sup> In *Sesarma magdalenense*, however, the inner orbital lobe, although large, does not meet the angle of the front and exclude the antenna from the orbit.

#### GEARCINIDÆ

##### *Cardisoma crassum* Smith

1870, Trans. Connecticut Acad. Arts and Sci., II, p. 144, Pl. v.

Agua Verde Bay; 1 ♀.

#### OCYPODIDÆ

##### *Ocypode occidentalis* Stimpson

1860, Ann. Lye. Nat. Hist. N. Y., VII, p. 229.

Cape St. Lucas; March 23; 3 ♂.

Carmen Island: with 175-foot seine; April 3; 3 ♂ 3 ♀. April 7; 2 ♂.

##### *Uca crenulata* (Lockington)

*Gelasimus crenulatus* LOCKINGTON, 1877, Proc. California Acad. Sci., VII, 1876, p. 149.

Mangrove Island, Magdalena Bay; March 20, 1911; 4 ♂.

Agua Verde Bay; April 2; 1 ♂.

Head of Concepcion Bay; April 6; 13 ♂.

<sup>1</sup>1853, Ann. Sci. Nat., Zoöl., (3) XX, p. 188 [154].

<sup>2</sup>*Sesarma (Holometopus) aubryi* A. Milne Edwards, 1869, Nouv. Arch. Mus. Hist. Nat. Paris, V, p. 29.

**PARTHENOPIDÆ****Heterocrypta macrobrachia** Stimpson

1871, Ann. Lyc. Nat. Hist. N. Y., X, p. 103.

Magdalena Bay: Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35' 20" N., long. 111° 59' 35" W.; 13.5 fathoms; S. brk. Sh.; March 21; station D5678; 1 juv.

**MAJIDÆ** (= Inachidæ)**Stenorynchus debilis** (Smith)

*Leptopodia debilis* SMITH, 1871, Rept. Peabody Acad. Sci., 1869, p. 87.

Without locality label; 1 ovigerous ♀.

**Podochela hemphillii** (Lockington)

*Microrhynchus hemphillii* LOCKINGTON, 1877, Proc. California Acad. Sci., VII, 1876, p. 30 [3].

San Estaban Island; April 14; 1 ♂.

"Station D5679"; 1 ♂. As the depth at this station is 325 fathoms, the label is probably erroneous.

**Eucinetops panamensis** Rathbun

1923, Proc. Biol. Soc. Washington, XXXVI, p. 73.

San Francisquito Bay; beach; April 9; 1 ♂, soft-shell.

**Euprognatha bifida** Rathbun

1893, Proc. U. S. Nat. Mus., XVI, p. 231.

Middle of east side of Cerros Island; March 12; 3 ♂ 2 ♀.

**Collodes granosus** Stimpson

1860, Ann. Lyc. Nat. Hist. N. Y., VII, p. 194 [66], Pl. II, fig. 4.

Cape San Lucas; March 23; 1 ovigerous ♀.

**Collodes tumidus** Rathbun

1898, Proc. U. S. Nat. Mus., XXI, p. 569, Pl. XLI, fig. 1.

Middle of east side of Cerros Island; March 12; 1 ♀ juv.

**Inachoides tuberculatus** (Lockington)

*Inachus tuberculatus* LOCKINGTON, 1877, Proc. California Acad. Sci., VII, p. 30.

Santa Maria Bay; with boat dredge; March 18; 1 ♂ 4 ♀.

Without locality label; 3 ♂ 3 ♀.

***Epialtus sulcirostris* Stimpson**

1860, Ann. Lyc. Nat. Hist. N. Y., VII, p. 198 [70].

Santa Maria Bay; with boat dredge; March 18; 1 ♂.

***Epialtus nuttallii* (Randall)**

*Libinia nuttallii* RANDALL, 1840, Journ. Acad. Nat. Sci. Philadelphia, VIII, 1839, Pl. III.

W. San Benito Island; March 9; 1 ♀ juv.

***Loxorhynchus grandis* Stimpson**

1857, Proc. Boston Soc. Nat. Hist., VI, p. 85.

Point San Bartholome; 1 ♀. This is farther south than the species has hitherto been recorded.

***Chorilia longipes* Dana**

1851, Amer. Journ. Sci., (2) XI, p. 269.

W. of Point Buchon, California: Pine Mountain, N. 42° E.; lat. 35° 18' 30" N., long. 121° 28' W.; 440 fathoms; temp. 39.9° F.; April 27; station D5696; 1 ♂ 1 ♀.

W. of San Nicolas Island, California: lat. 33° 13' 30" N., long. 120° 04' 30" W.; 451 fathoms; April 26; station D5693; 4 ♂ 3 ♀.

***Chionoecetes tanneri* Rathbun**

1893, Proc. U. S. Nat. Mus., XVI, p. 76, Pl. iv, figs. 1-4.

Taken at the following localities off the California coast:

Off Carmelo Bay: lat. 36° 30' N., long. 122° W.; 659 fathoms; gn. M.; temp. 37.9° F.; April 27; station D5699; 7 ♂ 9 ♀.

Off Point Sur: Point Sur, N. 6° W.; Juniperro Mountain, N. 47° E.; lat. 35° 50' N., long. 121° 49' 30" W.; 475 fathoms; temp. 39.9° F.; April 27; station D5698; 8 juv.

W. of Piedras Blanca: Silver Peak, N. 40° E.; Pine Mountain, N. 75° E.; lat. 35° 35' N., long. 121° 39.8' W.; 485 fathoms; gn. M. bk. S.; temp. 39.8° F.; April 27; station D5697; 14 juv.

W. of Point Buchon: Pine Mountain, N. 42° E.; lat. 35° 18' 30" N., long. 121° 28' W.; 440 fathoms; temp. 39.9° F.; April 27; station D5696; 2 large ovigerous ♀, 2 ♂, 3 ♀ immature, and 16 juv.

N. W. of San Nicolas Island: lat. 33° 33' N., long. 120° 17' 30" W.; 534 fathoms; gn. S. Glob.; temp. 38.9° F.; April 26; station D5695; 1 large ♂, 4 juv.

N. W. of San Nicolas Island: lat. 33° 24' 36" N., long. 120° 12' 30" W.; 640 fathoms; gn. M.; April 26; station D5694; 1 immature ♀, 1 juv.



The specimens are of various sizes and have very slender spines on the margins and also in the two dorsal branchial lines, one transverse, the other oblique. The slender meropodites of the legs are very narrow, not at all dilated, although tapering gradually to the distal end and are bristling with sharp spines especially on both margins.

Length of largest specimen (male) on median line 124.4 mm., width between lower branchial margins (finely spined) 135 mm.

**Libinia setosa** Lockington

1877, Proc. California Acad. Sci., VII, 1876, p. 68 [6].

Santa Maria Bay; with boat dredge; March 18; 1 ♂ 2 ♀ 13 juv. Without locality label; 4 juv.

**Thoe sulcata** Stimpson

1860, Ann. Lyc. Nat. Hist. N. Y., VII, p. 177.

San Francisquito Bay; beach; April 9; 1 ♂.

**Pitho picteti** (Saussure)

*Othonia picteti* SAUSSURE, 1853, Rev. et Mag. de Zool., (2) V, p. 357, Pl. XIII, fig. 2.

Without locality label; 1 ♂.

**Mithrax sinensis** Rathbun

1892, Proc. U. S. Nat. Mus., XV, p. 266, Pl. XXXVIII, fig. 2.

San Estaban Island; 1 ♂.

**Stenocionops triangulata** (Rathbun)

*Pericera triangulata* RATHBUN, 1892, Proc. U. S. Nat. Mus., XV, p. 246, Pl. XXXII, fig. 1.

Magdalena Bay: Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35' 20'' N., long. 111° 59' 35'' W.; 13.5 fathoms; S. brk. Sh.; March 21; station D5678; 1 ♀ juv.

**Microphrys triangulatus** (Lockington)

*Mithraculus triangulatus* LOCKINGTON, 1877, Proc. California Acad. Sci., VII, 1876, p. 73 [11].

San Josef Island; March 31; 1 ♂.

Agua Verde Bay; April 2; 1 ♂.

Without locality label; 1 ♂.

**Microphrys branchialis** Rathbun

1898, Proc. U. S. Nat. Mus., XXI, p. 577, Pl. XLII, fig. 5.

Magdalena Bay: Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35' 20'' N., long. 111° 59' 35'' W.; 13.5

fathoms; S. brk. Sh.; March 21; station D5678; 1 immature ♂, the chelipeds slightly developed, scarcely larger than the first ambulatory leg.

#### LIST OF LARVAL FORMS

##### *Dromidia larraburei*

Cape San Lucas, ship's anchorage, taken by electric light; one megalops, 5 mm. long. (See Pl. XXXIII, fig. 4.)

Point San Bartholome; one megalops, lacking chelipeds.

Middle of east side of Cerros Island, March 12, one female, early postlarval stage.

As *D. larraburei* is the only dromiid in the region, the identification of the above is reasonably certain.

Carmen Island, southeast side, taken by electric light; one megalops, 2.9 mm. long. (See Pl. XXXIII, fig. 3.) This and the following forms are placed under *Dromidia* on account of the great development of the coxa of the hind legs.

Cape San Lucas; 5 megalopa, 3 mm. long. (See Pl. XXXIII, figs. 1 and 2.)

##### *Callinectes*

Cape San Lucas; 50+ megalopa, 5 mm. long. (See Pl. XXXVI, fig. 3.)

Cape San Lucas; 50+ megalopa, of two sizes. Seem to be the same as the figured lot.

Carmen Island, southeast side, taken by electric light; 50+ megalopa. Perhaps same as the two preceding lots.

San Francisquito Bay, taken by electric light; about 10 megalopa, with legs broken off. Perhaps belong here.

There are three species of *Callinectes* in the region; *arcuatus*, *toxotes* and *bellicosus*. The first two were described from Cape San Lucas; *bellicosus* is as near the Cape as La Paz on the one side and Magdalena Bay on the other. According to Dr. Fish, the megalopa figured is almost identical with that of *Callinectes sapidus* of the Atlantic coast.

##### Portunidae, genus unknown, perhaps *Callinectes*

Cape San Lucas; 3 megalopa, 6.6 mm. long. (See Pl. XXXVI, fig. 4.)

##### *Pliosoma* (?), or *Libinia* (?)

Carmen Island, southeast side; one megalops, 2.2 mm. long. (See Pl. XXXVI, fig. 2.) Dr. Fish says that this closely resembles an Atlantic species of *Libinia*.

##### *Pachygrapsus crassipes* (?)

Cape San Lucas; one megalops.

Guadalupe Island, taken by electric light, March 3; 25+ megalopa, 6 mm. long. (See Pl. XXXIV, figs. 1 and 2.) The large size indicates a large species of Grapsoid.

##### *Sesarma (Holometopus) magdalenense*

Carmen Island, southeast side, taken by electric light; one megalops.

Cape San Lucas; 3 megalopa, 5.5 mm. long. (See Pl. XXXIV, figs. 3-5.)

Cape San Lucas, ship's anchorage, taken by electric light; 5 megalopa.

The larvæ show (Pl. XXXIV, fig. 5) the humped movable finger peculiar to *S. magdalenense* (Pl. XXXII).

Grapsoid. A pair of pigment spots on each abdominal somite.

Point San Bartholome; one megalops.

Benito Island; 6 megalopa, 5 mm. long. (See Pl. XXXV, figs. 4-6.)

Grapsoid, different from the preceding. Body thick, color reddish in alcohol, speckled.

Cape San Lucas; 20 megalopa, 2.3 mm. long. (See Pl. XXXV, figs. 1-3.)

*Libinia setosa*

Cape San Lucas; 4 megalopa, 3.15 mm. long. (See Pl. XXXVI, fig. 1.) Dr.

Fish says that this is very similar to an Atlantic species of *Libinia*, the rostrum of which is more pointed. The only *Libinia* known from Cape San Lucas is *L. setosa*. Another Mexican form, *L. mexicana*, has been taken only at the extreme head of the Gulf of California.

PLATE XXVI

*Pliosoma parvifrons*

- Fig. 1. Cape San Lucas, ♂, carapace 20 mm. long, dorsal view.  
Fig. 2. Same specimen, ventral view.

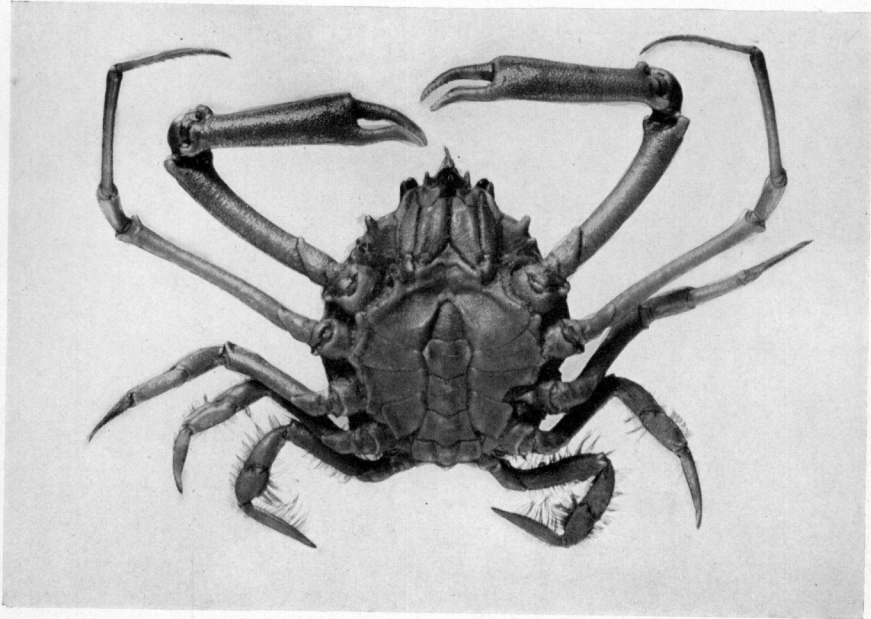
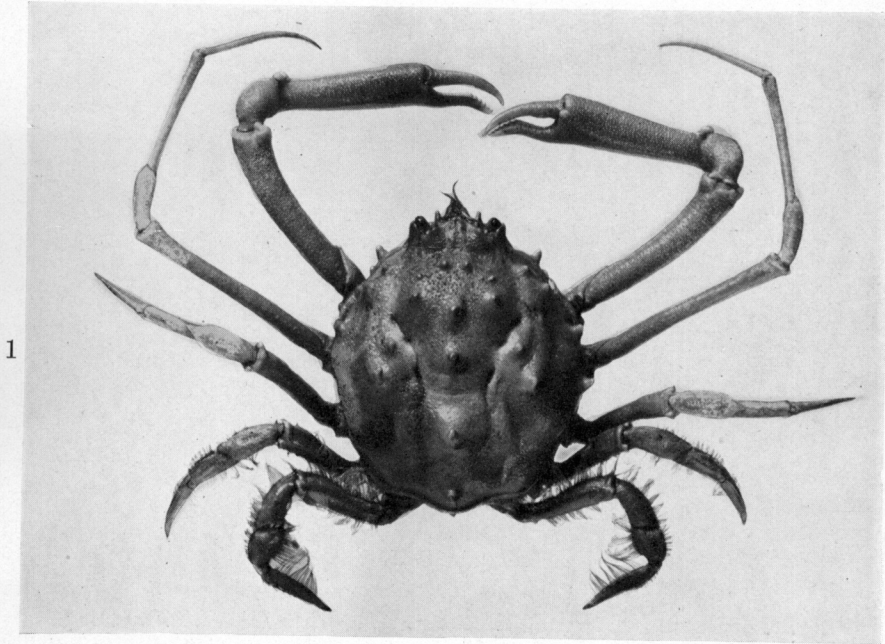


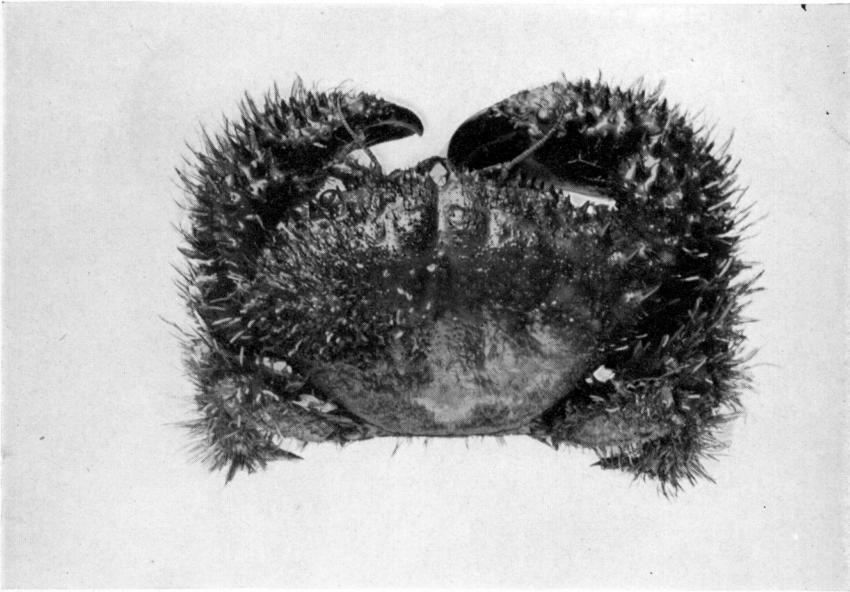
PLATE XXVII

*Pilumnus spinobirsutus*

Fig. 1. Female (Cat. No. 54763, U. S. N. M.), carapace 17.2 mm. long, dorsal view.

Fig. 2. Same specimen, ventral view.

1



2

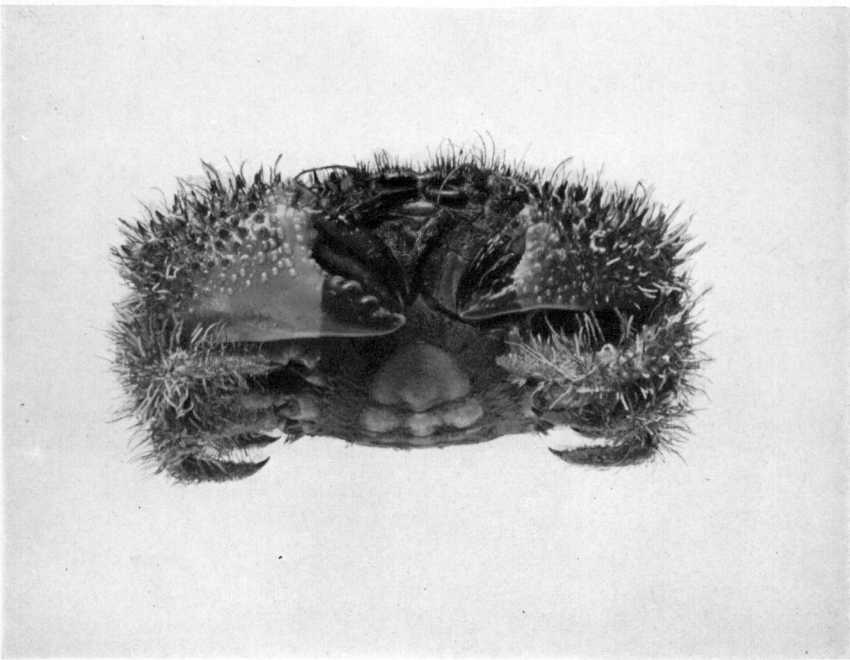




PLATE XXVIII

*Pilumnus townsendi*

Fig. 1. Female holotype, carapace 13.8 mm. long, dorsal view. The second lateral tooth counting from the orbit is below the margin of the carapace.

Fig. 2. Same specimen, ventral view.