Description.—Carapace suboval; anterior two-thirds crossed by granulated rugae; a well-marked straight transverse ridge runs across the branchial region in line with posterior border of gastric region and just behind the transverse ridge which runs inward from tip of last lateral tooth. Lobule 1 L small, a dimple at its middle, 3 L and 4 L marked by an obtuse-angled line of granules; 2 M divided only half way longitudinally. Front nearly transverse, composed of two lobes separated by a V-shaped notch, each lobe very slightly concave and more advanced at inner than at outer angle. Of the five antero-lateral teeth (which include orbital angle), the second, third and fourth are broad, shallow and obtuse-angled, second and third blunt, fourth subacute, fifth narrow, acute, pointing directly outward. Lower margin of orbit unusually prominent, especially the inner tooth.

Outer surface of wrist and upper half of exposed surface of palm coarsely granulate, and rough with irregular depressions and ridges. The black of the immovable fingers is continued back on the palm; tips of all fingers spooned. Legs fringed with hair.

Color.—Sage greenish in general, mottled with some lighter traces of pea green (Schmitt).

Measurements.—Male holotype, length of carapace 12.6, width 20, fronto-orbital width 21, front 5.6 mm.

Range.—Panama to Ecuador.

Material examined.—Panama; S. E. Meek and S. F. Hildebrand, Smithsonian Biological Survey of the Panama Canal Zone: Taboga Island, Bay of Panama; May 11–15, 1911; 2 males (1 is holotype) (43658), 1 male (Field Mus.), 1 female (44198). Balboa, Canal Zone; February 7, 1912; 1 female (59306).

Panama; 1924; E. Deichmann: Pacific shore; low tide, rocks; May–July; 1 male (60750). Entrance of canal, Pacific side; July; 1 male (60749).

Salinas, Ecuador; September 12–14, 1926; W. L. Schmitt; 17 males, 3 females (60897, 60898).

LEPTODIUS PARVULUS (Fabricius), new combination

Plate 141, Figures 1–3

Cancer parvulus FABRICIUS, Ent. Sys. Auct. et emend., vol. 2, 1793, p. 451 (type-locality, in Americae meridionalis Insulis; type probably in Kiel Mus.).

Chlorodius americanus SAUSSURE, Mém. Soc. Phys. Hist. Nat. Genève, vol. 14, 1858, p. 430, pl. 1, fig. 5 (type-locality, Haiti; type in Geneva Mus.).

Chlorodius floridanus STIMPSON (not Gibbes), Amer. Journ. Sci., ser. 2, vol. 27, 1859, p. 446.

Xanthodius americanus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 209 [81].

Leptodius americanus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 269.

Xanthodius parvulus RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 15.

Diagnosis.—Antero-lateral margin dentate. One faint longitudinal ridge at middle of outer surface of hand. Color of immovable finger extending on palm.

Description.—Carapace suboval, a little wider at the fourth than at the fifth lateral tooth; deeply areolated, the areoles rough with large, irregular punctae; protogastric region (2 M) divided longitudinally for half its length, outer lobule wider than inner, which is confluent with the epigastric lobe (1 M); 1 L, 3 L, 4 L well developed. Frontal margin transversely canaliculate, the lower submedian lobules more advanced than the upper; median notch shallow, each lobe oblique and concave. Outer orbital tooth low, inconspicuous, remaining lateral teeth broad, shallow, with subacute tips, the posterior tooth directed outward or a little backward.

Wrist and upper half of hand finely granulate, furrowed and dimpled; two blunt longitudinal carinae on upper surface of hand and a faint raised line of granules through the middle. Fingers rather slender, tips narrow in profile, a large tooth on each immovable finger just proximal to middle of prehensile edge, dark color curving backward onto palm. Legs scantily hairy, the hair confined to dactylus, upper margin of merus and lower margin of propodus.

Color.—Brick red or yellowish, fingers black bordered with white (Saussure).

Measurements.—Male (24383), length of carapace 15, width 24.5, fronto-orbital width 11.4, front 6 mm.

Range.—Bermudas (Verrill); Bahamas and Florida Reefs to Fernando Noronha, Brazil (Pocock).

Material examined.—Abaco, Bahamas; *Albatross;* 1 male, 1 female (17771).

Key West, Florida; Henry Hemphill; 1 male, 2 females (17803).

Mid-section of Bush Key reef, Florida; August 1, 1924; W. L. Schmitt; 1 male (59442).

Montego Bay, Jamaica; P. W. Jarvis; specimens in Jarvis collection; "numerous."

Haiti; 1 male type (Geneva Mus.).

St. Domingo; specimen in Copenhagen Mus.

Ponce, Porto Rico; January 31, 1899; *Fish Hawk;* 1 male, 1 female (24383).

Barbados; May 8, 1890; W. H. Brown, U. S. Eclipse Expedition to Africa; 1 male (14886).

Barbados; 1918; Barbados-Antigua Expedition, State University of Iowa; 1 male (S.U.I.). Pelican Island; shallow; 2 males (58050). In tide pool, May 11, 1 young male, 1 female (S.U.I.).

Barbados; rock pool at Bathsheba; February 22, 1924; Gerrit S. Miller; 1 ovigerous female (62522).

Curaçao; February 10–18, 1884; *Albatross;* 5 males, 2 females (17812).

Great Bay, Wacao, Curaçao; ½ fathom; among algae; October 3, 1905; J. Boeke; 1 male (Leiden Mus.).

Caracas Bay, Curaçao; under stones near shore; May 3, 1920; C. J. van der Horst; 1 female (Amsterdam Mus.).

Locality not given; 1 small specimen about 9.6 mm. wide, labeled "*Cancer parvulus*," perhaps type (Kiel Mus.).

Locality not given; 1 specimen labeled "*Alphaeus parvulus*" (Copenhagen Mus.).

LEPTODIUS AGASSIZII A. Milne Edwards

Plate 141, Figures 4 and 5

Leptodius agassizii A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 270, pl. 49, fig. 3 (type-locality, Florida Reefs, 12 to 18 fathoms; type in Mus. Comp. Zoöl.).

Xantho species, SMITH, Rept. Commr. Fish and Fisheries, 1885 (1886), p. 630 [26].

Leptodius agassizi A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 313, pl. 2, fig. 8; pl. 5, fig. 2.

Diagnosis.—Antero-lateral teeth thick, subconical or pyramidal, acute. Carapace rough with granules. Dorsal surface of chelipeds covered with granulate tubercles. Color of fingers not continued on palm.

Description.—Lobulation of anterior two-thirds of carapace well marked and ornamented with bead granules arranged either in short transverse lines or in clusters; posterior third, behind line of gastro-cardiac suture, finely granulate. Front little advanced, bimarginate; upper margin of lobes nearly straight, oblique; lower margin with a V-shaped median cut, lobes concave, the small submedian lobules more advanced than those at outer angles. Margin of front and orbits granulate. Outer angle of orbit inconspicuous; next two lateral teeth, E and N broad, E very shallow, T and S thick with acute tips turned forward; all the teeth are bordered and surmounted by granules; teeth E, N, T, and S have a flattened anterior surface; the upper margin of this surface in E is continued to the outer angle of the orbit while the lower margin, or subhepatic tubercle, is part of a broken line leading to the buccal angle. This arrangement provides a link with the genus *Medaeus*.

Chelipeds very unequal. Inner angle of wrist bidentate; upper-outer surface very rough, the granules arranged mostly on very unequal tubercles. Similar ornamentation on the palm, continued part way down the outer and inner surfaces especially toward the proximal end; a deep superior longitudinal groove. Fingers with punctate impressed lines; color of immovable finger ending obliquely but otherwise not continued on palm. Ambulatory legs sharply granulate above and hairy.

Measurements.—Male (18008), total length of carapace 11.8; width of same 19.2, fronto-orbital width 10.5, front 4.6 mm. Ovigerous female (53750), total length of carapace 19.6, width of same 31, fronto-orbital width 15.7, front 8.4 mm.

Range.—From Cape Hatteras, North Carolina, to Pensacola, Florida; 6¾ to 45 fathoms.

Material examined.—See table, page 309.

LEPTODIUS TRIDENTATUS Lenz

Plate 143, Figures 1–4

Leptodius tridentatus LENZ, Zool. Jahrb., 1902, Suppl. 5, p. 761, pl. 23, figs. 7 and 7*a* (type-locality, Juan Fernandez; type in Lubeck Mus.).

Leptodius spinoso-granulatus LENZ, Zool. Jahrb., 1902, Suppl. 5, p. 762, pl. 23, figs. 8 and 8*a* (type-locality, Juan Fernandez; type in Lubeck Mus.).

Diagnosis.—Three lateral teeth of fair size, the last two ending in a movable spine. Carapace not lobulated. Legs spinulous.

Description.—Surface of anterior half of carapace finely granulate, with some transverse and oblique lines of granules; one row immediately behind the frontal lobes. Front notched at middle, lobes concave, forming four rounded tubercles, one at either end of each lobe, the margin between feebly granulate. Outer angle of orbit not dentiform. Antero-lateral region granulate; first marginal tooth very small, acute, distant from the orbit and from the second tooth. Second, third, and fourth teeth strongly curved, the third the largest, third and fourth tipped with a small articulating spine. Postero-lateral margin nearly straight.

Chelipeds: Merus feebly granulate, a row of denticles above; carpus tuberculate varying to simply rugose and with a large and a small tooth on inner margin. Hand rough above and on upper half of outer face with tubercles and rugae, varying to rugae only, when it has an eroded appearance. Dark color of immovable finger ending in a straight line running obliquely back from the interdigital sinus to the lower margin. Legs sparsely hairy, spinulous on upper border.

Color.—Variable. Of the specimens collected December 8, Doctor Schmitt says: Largest one (about 13 mm. wide) burnt umber, with mummy brown fingers and more or less brick red hands; a smaller one is more of a seal brown, hands a sort of dark maroon purple, fingers decidedly hazel; legs of both bister. One 8 mm. wide has a seal brown nearly black carapace and hands about the same color above but flushed in front with dark prune purple a splotch especially on right hand near fingers; fingers bay; legs bister, cross-banded darker and lighter. Smallest specimen, 4 mm. wide, pepper and salt color, blackish and bistrish white contrasting. One 5.7 mm. wide is much like the preceding but the carapace is more nearly all one color.

Measurements.—Type-specimen, length of carapace 14, width 22 mm. (Lenz). Male (45971), length 7.4, width 11.3 mm.

Range.—Chile: From Arica to Puerto Corral; Juan Fernandez Islands.

Material examined.—

Arica; C. E. Porter; 3 males, 3 females, 4 young (45971).

Material examined of Leptodius agassizii

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
North Carolina:	° ′ ″	° ′ ″			° C.						
Off Cape Hatteras	35 21 00	75 21 30	16	gy. S. brk. Sh.		Oct. 19, 1884	2280	*Albatross*	6♂ 17♀ (3 ovig.) 28 y.	37858	
									3♂ 3♀ 4y	8851	
Fishing grounds off Beaufort.	34 22 00	76 57 00	12.5	Co		Sept. 7, 1913	7958	*Fish Hawk*	1♂ 2♀	51081	
Florida:											
Gulf Stream off Cape Florida.	2⅛ m. SSE. of Fowey Rocks Light.		45	rky	21.1	Mar. 25, 1903	7511	do	1 ovig. ♀	53750	
					° F.						
Off Sand Key	Sand Key W., 8½ miles		31		74.5	Dec. 18, 1912	7787	do	1♂	61376	
Tortugas	About 7 m. S. of No. 2 buoy.		18	crs. S		July 22, 1924	44	W. L. Schmitt	1♀	60886	Gift of Carnegie Institution.
Do	About 8 m. S. of No. 2 buoy (sponge haul).		25	picked from coral rock.		June 11, 1925	217	do	4♂ 1♀	60885	Do.
Do	About 11 m. S. of No. 2 buoy.		37	shy. S. Sponges.		June 10, 1925	207	do	3♀	60884	Do.
					° C.						
Off Cape Romano	25 50 15	82 41 45	21	sdy	20	Apr. 2, 1901	7124	*Fish Hawk*	1 y	25611	
Highland section	27 55 30	83 11 30	13	Co. R	15.2	Jan. 28, 1902	7253	do	1 y. ♀	60744	
					° F.						
Off Cedar Keys	Cedar Keys Light, N. ¾ E., 21¾ m.		5.75	Co	63.45	Jan. 11, 1913	7807	do	1♀	60745	
					° C.						
Pepperfish Key section	29 18 00	83 37 00	8	rky	18	Nov. 21, 1901	7161	do	2♂ 3♀ (1 ovig.) 2 y.	53749	
Do	29 21 00	83 32 00	6.75	rky	16.7	do	7160	do	2♂	53748	
Deadmans Bay section	29 39 00	83 53 10	7.5	S. Co	21.5	Nov. 7, 1901	7152	do	1 immature ♀	60747	
Do	29 43 40	83 49 45	5.25	Co	20.5	do	7151	do	1♀	60746	
Do	29 35 20	83 56 00	9.5	S. Co	23	do	7153	do	1 ovig. ♀	53747	
					° F.						
Off Carrabelle	Carrabelle Light, N. by W., 14⅔ miles.		10		60.2	Jan. 16, 1913	7810	do	1♀	60887	
South of Apalachicola	Between 29 11 30 and 29 18 15	Between 85 29 00 and 85 32 00	25–27			Feb. 7, 1885	Between 2369 and 2374	*Albatross*	1 y. ♀	19722	
Snapper banks off Pensacola.			13⅓					Benjamin Harrison	4♂ 2♀	18008	

Puerto Corral; February, 1903; C. E. Porter; 1 male, returned to sender.

Juan Fernandez Islands; 1926; W. L. Schmitt: Along boulder covered beach to left of "factory"; December 8; 4 males, 2 females, 1 young (60752). Cumberland Bay; December 11; 1 young (60751). Dredged in Carbajal Bay; 15 to 20 fathoms; December 15; 1 young female (60753); color brownish. From tufts of seaweed in mouth of *Plagusia* collected on weed-covered rocks along shore; December 22; 1 male, 1 female (60754).

LEPTODIUS COOKSONI Miers

Plate 142

Leptodius cooksoni MIERS, Proc. Zool. Soc. London, 1877, p. 73, pl. 12, figs. 1–1*d* (type-locality, Charles Island; type in British Museum).

Leptodius lobatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 271, pl. 49, figs. 4–4*b* (type-locality, Chile; type in Paris Mus.).

Xanthodius lobatus RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 589; vol. 38, 1910, p. 582.

Diagnosis.—Antero-lateral margins lobed. Wrist and hand deeply dimpled; hand longitudinally ridged outside and above, especially on upper inner margin. Color of immovable fingers not extending on palm.

Description.—Carapace everywhere punctulate, punctulations more crowded on anterior part; areolets and intervening fissures well defined. Frontal margin sinuous, median lobes distinctly more advanced than lateral. Antero-lateral margins thick and rounded, tooth at external orbital angle obsolete, the next three projections are rounded lobes, the last lobe small with a short tip pointing a little forward and upward. Posterior to the last lobe are two or three short transverse lines; 1 L is merged with its marginal lobe, 3 L and 4 L are separated from their marginal lobes by a shallow furrow, 3 L is posteriorly united with 2 L; 1 M is fused with 2 M, the latter longitudinally divided for two-thirds its length, outer lobule wider than inner.

Chelipeds strong, granulate; exposed surface of wrist and hand with numerous raised reticulating lines and also longitudinal granulated lines on outer surface and a pronounced ridge on upper inner margin of hand; a blunt tooth at inner angle of wrist. Legs short, smooth, almost without hairs, except on the dactyli and lower edge of propodi.

Color.—Deep reddish brown with yellow spots, more numerous toward posterior part of carapace (A. Milne Edwards).

Measurements.—Male (22008), length of carapace 15.6, width of same 25, fronto-orbital width 11.2, front 6.5 mm.

Range.—Clarion Island, Mexico; Galapagos Islands; Chile (A. Milne Edwards).

Material examined.—Socorro Island, Mexico; Hanna and Jordan, California Acad. Sci.; 2 males, returned; 1 female (62701).

Clarion Island, Mexico: A. W. Anthony; 5 males, 4 females (20698). Shore; Hanna and Jordan, California Acad. Sci.; 1 male, returned; 1 male (62702).

Galapagos Islands; Dr. W. H. Jones, U. S. Navy; 1 male, 2 females (17288).

Eden Island, off Indefatigable Island, Galapagos Islands; rock pools; April 6, 1923; Williams Galapagos Expedition; 1 male (57746), received from New York Zoological Society.

Galapagos Islands; 1888; *Albatross:* Charles Island; April 8; 4 males (22008). Duncan Island; April 13; 5 males, 7 females (22009).

Genus XANTHODIUS Stimpson

Xanthodius STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 52 [6]; type, *X. sternberghii* Stimpson.

Carapace broadly suboval; antero-lateral marginal rim continued behind widest part of carapace; postero-lateral margin up to this rim shorter than chord of antero-lateral margin. Antero-lateral margin lobate or dentate. Fronto-orbital distance between a third and a half of extreme width of carapace. Orbits subcircular. Otherwise as in *Leptodius*.

Both sides of the American continent; islands of the Pacific.

KEY TO THE AMERICAN SPECIES OF THE GENUS XANTHODIUS

A[1]. Antero-lateral margins cut into four lobes or lobiform teeth exclusive of the orbital angle.
- B[1]. Antero-lateral margin thin. Edge of front visible in dorsal view. **sternberghii**, p. 311.
- B[2]. Antero-lateral margin thick. Edge of front invisible in dorsal view. **hebes**, p. 313.

A[2]. Antero-lateral margins cut into nine or more narrow teeth.
- B[1]. Carapace not deeply subdivided into numerous lobules bordered with hair. Median notch of front small and shallow. Wrist and hand rugose and dimpled above ..... **denticulatus**, p. 314.
- B[2]. Carapace deeply subdivided into numerous lobules bordered with hair anteriorly. Median notch of front deep. Wrist and hand covered above with large tubercles ..... **stimpsoni**, p. 315.

ANALOGOUS SPECIES OF XANTHODIUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
denticulatus	*stimpsoni*

XANTHODIUS STERNBERGHII Stimpson

Plate 144; Plate 145, Figure 2

Xanthodius sternberghii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 52 [6] (type-locality, Panama; type not extant).—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, pl. 45, figs. 4–4*b*, 4*c* (?).[37]

Leptodius sternberghii A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 272; not *Actaeodes mexicanus* Lockington.[38]

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[37] The abdomen figured is more like that of *X. hebes*.

[38] The measurements given by Lockington indicate a narrower species than *sternberghii*.

Diagnosis.—Carapace about one and three-fourths times as wide as long; antero-lateral margin thin. Edge of front visible in dorsal view.

Description.—Carapace depressed, distinctly though not prominently areolated; surface punctate and rugulose or as if eroded anteriorly. 2 M divided for half its length, the furrow continued forward toward the fronto-orbital notch; 2 L and 3 L posteriorly confluent. Antero-lateral margin somewhat acute, four-parted, teeth or lobes little prominent, only the last two showing a blunt point; margin at anterior tooth blunt and rugulose. Front a little projecting, sinuous, slightly emarginate at middle, a short furrow leading back from the notch; lateral lobes of front deflected and bent inward. Orbits small, rounded.

Chelipeds not very stout; upper portions of wrist and hand rugulose; fingers rather narrow, a spoon-shaped cavity at their tips; dark color of immovable finger of major cheliped prolonged a little on palm. Ambulatory legs scantily hairy on lower margin; dactyli tomentose. Abdomen of male very narrow from the middle of the fourth segment.

Color.—Dark reddish, fingers black (Stimpson).

Measurements.—Male (48802), length of carapace 19.4, width 34.2, fronto-orbital width 13, front 7.8 mm.

Range.—Cape St. Lucas (A. Milne Edwards); Panama to Peru.

Material examined.—Cape St. Lucas, Mexico; 1 young, 5.4 mm. wide (17541); identification probably correct.

Panama; Doctor LeConte and A. Agassiz; 5 males, 5 females (3 ovigerous) (415, M.C.Z.); identified by Stimpson.

Panama, Panama; tide pools; March 21, 1912; Smithsonian Biological Survey; 1 male (59334).

Panama, Panama; James Zetek: December 12, 1913; 1 male (48802). December, 1914; 1 male (48804).

Balboa, Canal Zone; February 7, 1912; Smithsonian Biological Survey; 1 male (Field Mus.).

Taboga Island, Bay of Panama: June, 1914; James Zetek; 4 males, 2 females (48788), 5 males, 2 females (48796). May, 1927; Melbourne Ward; 1 male, 1 female; returned.

Taboguilla Island, Bay of Panama; between tide marks; October 31, 1899; *Albatross;* 3 males, 5 females (33282), 2 males, 2 females (M.C.Z.).

Perico Island, Bay of Panama; October 26, 1904; *Albatross;* 1 male (33265).

Panama, Panama; low tide, rocks; May–July, 1924; E. Deichmann; 3 males, 1 female (60832).

Salinas, Ecuador; September 12–14, 1926; W. L. Schmitt; 1 female (60968).

Paita, Peru; 1873; Dr. W. H. Jones, U. S. Navy; 1 male, 1 female (2381, M.C.Z.).

XANTHODIUS HEBES Stimpson

Plate 147

Xanthodius hebes STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 208 [80] (type-locality, Cape St. Lucas; cotypes in M.C.Z.).

Acteodes mexicanus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 42 [2] (type-locality, Mazatlan; type not extant).

Actoeodes mexicanus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 103 [9].

Leptodius hebes A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 273.

Diagnosis.—Carapace about one and a half times as wide as long; antero-lateral margin thick. Edge of front invisible in dorsal view.

Description.—Carapace narrower than in *sternberghii*, moderately areolated; surface conspicuously punctate. Antero-lateral margin thick, obtusely rounded, obscurely quadrilobate, the last lobe having a short subacute point. Front deflexed, edge not visible in dorsal view, lobes oblique, deeply sinuous, median notch shallow, a short furrow leading back from it. Outer angle of orbit not raised. Suborbital and subhepatic region deeply punctate or finely vermiculate. Chelipeds rather short and stout, rugulose above and externally. Abdomen of male wider than in *sternberghii*.

Color.—Ranges from dark reddish brown, sometimes tinged with green, to almost white, and in some cases even the fingers are whitish (Lockington).

Measurements.—Male (50485), length of carapace 18.6, width of same 31, fronto-orbital width 12.3, front 7.5 mm.

Range.—West coast of Mexico from Magdalena Bay on the ocean side, and Mulege Bay on the gulf side of Lower California southward to Maria Madre Island.

Material examined.—Mexico: Magdalena Bay: 1917; C. R. Orcutt; 4 males, 3 females (50634). Shore; Hanna and Jordan, California Acad. Sci.; 1 male, 1 female returned; 1 male, 1 female (62711).

Cape St. Lucas; J. Xantus; 5 males, 5 females (1 ovigerous), cotypes (1252, M.C.Z.).

La Paz; May 2, 1921; L. S. Rubio; 1 male (Amer. Mus.).

Pichilinque Bay; March 27, 1911; *Albatross;* 8 males, 8 females (50485).

Espiritu Santo, Balandra Bay, near Point Diablo; L. Belding; 1 male (6377).

Agua Verde Bay; April 1, 1911; *Albatross;* 1 male, 4 females (1 ovigerous) (50486).

Maria Madre Island; March–May, 1927; from Secretaria de Agricultura y Fomento, through A. L. Herrera; 1 young male (60831).

Maria Magdalena Island; shore; Hanna and Jordan, California Acad. Sci.; 1 male (62712); 1 female, returned.

XANTHODIUS DENTICULATUS (White), new combination

Plate 145, Figure 1; Plate 146

Xantho denticulatus WHITE, List Crust. Brit. Mus., 1847, p. 17 (*nomen nudum*); Ann. Mag. Nat. Hist., ser. 2, vol. 2, 1848, p. 285 (type-locality, West Indies; type in Brit. Mus.).—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 252, pl. 45, figs. 2–2*b*.

Xantho humilis DESBONNE, in Desbonne and Schramm, Crust. Guadeloupe, 1867, p. 27 (type-locality, Guadeloupe; type not located).

Cycloxanthops denticulatus RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 14.

Diagnosis.—Nine lateral teeth behind orbital tooth. Carapace not very deeply lobulated anteriorly. Median notch of front small and shallow. Wrist and hand rugose and dimpled above.

Description.—Carapace suboval, multidentate, antero-lateral margin continued well behind widest part of carapace, postero-lateral margins shorter than in typical members of the subgenus *Leptodius*. Surface deeply sculptured, punctate, and in frontal and antero-lateral portions pitted. 1 L narrow, 2 L, 3 L, and 4 L subconical, low. The transverse ridge across branchial region is in line with anterior end of last lateral tooth. 1 M and 2 M fused; 2 M longitudinally divided for not more than half its length. Frontal lobes oblique, median notch minute, outer teeth tuberculiform; a groove behind and parallel to margin. The three outer orbital teeth well marked, obtuse. Antero-lateral margin armed with nine, sometimes ten, small blunt, outward pointing teeth separated by U-shaped sinuses; margin considerably behind outer orbital tooth and directed toward outer angle of buccal cavity.

Upper surface of wrist and hand rugose and eroded; two teeth, one above the other, at inner angle of wrist. Fingers tapering to slender tips, not spooned; immovable fingers bent down except toward the extremity. Lower side of carapace hairy, also upper margins of merus of cheliped and legs; last two articles of ambulatories sparingly fringed below with long hair.

Color.—Grey with red spots, fingers black (Desbonne). Some shade of red, purplish red or salmon; usually reddish salmon or pink; on front part of carapace there is often a red spot. Under surfaces whitish, some pale brown spots on abdomen. Chelae pinkish brown, tips dark brown or nearly black.

Measurements.—Male (22014), length of carapace 19.5, width of same 32.3, fronto-orbital width 12, front 6.8 mm.

Range.—Bermudas; Bahamas and Florida Keys to Abrolhos Islands, Brazil.

Material examined.—Bermudas: Dr. F. V. Hamlin; 1 male (17806), received from Wesleyan College. W. N. Rankin; 1 male (25823). Hungry Bay; F. G. Gosling; 3 males (25442).

Abaco, Bahamas; *Albatross;* 2 males, 1 female (17770).

Off Biscayne Key, Florida; 16–34 feet; May 29, 1912; Paul Bartsch; 1 young (53768).

Key West, Florida; Henry Hemphill; 1 male, 1 female (17769).

Tortugas, Florida; 1924; W. L. Schmitt: East side Loggerhead Key; from rocks below lighthouse pier; August 24; 1 male (59469). South end of Bird Key reef; August 13; 1 male (59468).

Jacks Bay, Jamaica; February 15, 1928; C. R. Orcutt; 1 male (62558).

Montego Bay, Jamaica; coral reef; 1910; C. B. Wilson; 1 male (43050).

Kingston Harbor, Jamaica; P. W. Jarvis; specimens in Jarvis collection.

Porto Rico; 1899; *Fish Hawk:* Fajardo; February 17; 1 male (24281). Hucares; February 13; 1 male, 1 female (24304).

Caballo Blanco Reef, Vieques Island; February 7, 1899; *Fish Hawk;* 1 female (24305).

St. Thomas; January 17–24, 1884; *Albatross;* 1 female (18513).

Pillars of Hercules, Antigua; 1918; Barbados-Antigua Expedition, State Universiy of Iowa; 1 young male (S.U.I.).

Barbados; 1918; Barbados-Antigua Expedition, State University of Iowa: Pelican Island; tide pool; 1 male (S.U.I.). Bathsheba; 1 young (57994).

Colon, Panama; coral reef; May 2, 1911; Meek and Hildebrand, Smithsonian Biological Survey; 1 female (43999).

Caracas Bay, Curaçao; under stones near shore; May 3, 1920; C. J. van der Horst; 1 male, 1 female (Amsterdam Mus.), 1 female (56874).

Trinidad; February, 1878; Crosby; 1 male (57013), received from Boston Society of Natural History.

Brazil; 1899; A. W. Greeley, Branner-Agassiz Expedition: Boa Viagem, Pernambuco, stone reef; July 6; 1 female (25718). Maceio, Alagoas, coral reef; July 22–26 and August 3; 10 males, 5 females (25719).

Abrolhos Islands, Brazil; December 27, 1887; *Albatross;* 1 male (22014).

XANTHODIUS STIMPSONI (A. Milne Edwards), new combination

Plate 143, Figures 5–7

Xantho denticulata STIMPSON ("nov. sp." not *X. denticulatus* White), Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 207 [79] (type-locality, Cape St. Lucas; cotypes, 1257, M.C.Z.).

Xantho multidentatus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 99 [5]; *nomen nudum* (type-locality, Mazatlan; type not extant).

Xantho stimpsoni A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 252, pl. 46, fig. 2–2*b* (type-locality, Cape St. Lucas; type in Paris Mus.).

Cycloxanthops (?) *stimpsoni* RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 583.

Diagnosis.—Nine lateral teeth behind orbital tooth. Carapace very deeply lobulated anteriorly, lobules bordered with hair on front edge. Median notch of front deep. Wrist and hand covered above with large tubercles.

Description.—Very strongly lobulated in front, each lobule bordered anteriorly by some very short hairs. Antero-lateral border cut into nine slightly irregular teeth, the first one separated from the orbital angle by a furrow. The two median lobes of the front terminate in a straight border and are separated on the median line by a wider and deeper notch than in *denticulatus;* inner orbital angle dentiform. Basal antennal article short, barely reaching the subfrontal prolongation. Wrist and palm covered above with large rugose tubercles; one or two irregular granulate crests on outer face of palm. Fingers strongly channeled.

Color.—Ecru drab, movable finger drab, chela and fixed finger like carapace only lighter; first, second, and third legs except dactyls olive and just a fleck of olive on each side of dactyls (Schmitt).

Measurements.—Male, length of carapace 7.8 mm. (0.31 inch), width 11.2 mm. (0.44 inch) (Stimpson).

Range.—From Mexico (mouth of Gulf of California) to Ecuador.

Recorded localities.—Cape St. Lucas, Lower California (Stimpson and A. Milne Edwards); Mazatlan, Sinaloa, Mexico (Lockington); Baia di Sant' Elena, Ecuador (Nobili).

Material examined.—MEXICO.—Cape St. Lucas; J. Xantus; 3 males, cotypes (1257, M.C.Z.). Santa Isabel Island, Tepic Territory; on rocks; Secretaria de Agricultura y Fomento; 1 male (61031).

PANAMA.—Taboga Island, Bay of Panama; under stones at low tide; May, 1927; Melbourne Ward; 1 male, 1 female; returned.

ECUADOR.—1926; W. L. Schmitt: South side Point Santa Elena; September 17; 3 males, 1 female, 2 young (60834, 60970). Salinas; September 12–14; 3 males, 1 female, 3 young (60833, 60835, 60969, 60971).

Genus LOPHOXANTHUS A. Milne Edwards

Lophoxanthus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 256; type, *L. lamellipes* (Stimpson).—Rathbun, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 272.

Carapace flat, suboctagonal, slightly areolated; antero-lateral teeth N, T and S subequal, D and E obsolete. Front narrow, deflexed, thickened. Orbits small, subcircular, one fissure above. Chelipeds massive; carpus broader than long; manus and digits very high; lower margin of propodus nearly straight. Ambulatory legs broad, cristate. Male abdominal segments 3–5 partially fused.

Contains only one species.

LOPHOXANTHUS LAMELLIPES (Stimpson)

Plate 148, Figures 3 and 4

Xantho lamellipes STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 205 [77] (type-locality, Cape St. Lucas; type in M.C.Z.).
Lophoxanthus lamellipes A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 256, pl. 46, figs. 3, 3*a*.

Diagnosis.—Carapace flat, octagonal. Chelipeds massive; carpus broader than long; fingers high, not gaping. Legs broad, laminiform.

Description.—Carapace smooth, somewhat octagonal; antero-lateral margin having a strong angle or shoulder on the hepatic region just before the indistinct cervical suture. Carapace very broad at this shoulder; between it and the orbit the margin is thick, obtuse, perfectly straight and smooth. Behind the shoulder-tooth and almost in the same longitudinal line there are two other small teeth, rather sharp and crested. Front deflexed, surface reticulated, edge bilobed, each lobe formed of a submedian lobe and an outer tooth. Sub-hepatic regions reticulated, that is, covered with minute cavities, the parietes of which form a fine network. Ischium of outer maxillipeds with a deep longitudinal furrow not far from middle; merus with two irregular depressions. Chelipeds angular, with reticulated surface especially on merus and carpus; upper side of carpus somewhat dilated, with a strong outer, inner, and posterior tooth or angle; manus thick, higher than its superior length. Fingers high, not gaping, marked with longitudinal rows of punctae, tip of immovable finger curved upward; prehensile teeth shallow, tooth at middle of propodal finger most prominent. Ambulatory legs much compressed, almost laminiform, with sharp, smooth lamelliform crests above, that on the carpus of the first two legs distinctly bilobed; the carpus and propodus of these legs have also a longitudinal crest on the side, the spaces between crests forming deep cavities. Sternum, abdomen and inner side of legs pubescent. (After Stimpson.)

Color.—Slate-colored, with the antero-lateral margins and chelipeds reddish-white.

Measurements.—Male (50968), length of carapace 8.4, width of same 13, fronto-orbital width 6.5, width of front 4 mm.

Range.—West coast of Mexico to Ecuador.

Material examined.—Cape St. Lucas, Lower California, Mexico; John Xantus; 1 male, 1 female, cotypes (1254, M.C.Z.).

La Paz, Lower California, Mexico; L. Belding; 1 male (17287), 1 ovigerous female (17534).

Clarion Island, Mexico; shore; Hanna and Jordan, California Acad. Sci.; 1 young; returned.

Panama; received June 10, 1862; C. F. Davis; 1 ovigerous female (2342, M.C.Z.).

Naos Island, Panama Bay; E. M. Keyser; 1 male (50968).

Taboga Island, Panama Bay; under stones at low tide; May, 1927; Melbourne Ward; 1 female; returned.

Porto Bello, Panama (Atlantic side); living on large holothurian; 1912; August Busck; 2 ovigerous females (50967).

Salinas, Ecuador; September 13, 1926; W. L. Schmitt; 1 young (60757).

Genus METOPOCARCINUS Stimpson

Metopocarcinus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 216 [88]; type, *M. truncatus* Stimpson.

FIGURE 48.—METOPOCARCINUS TRUNCATUS, MALE, CAPE SAN LUCAS, CARAPACE 0.18 INCH WIDE, DORSAL VIEW. AFTER STIMPSON

Carapace bare, suborbicular or subhexagonal, anteriorly truncate; regions faintly indicated; antero-lateral margins almost entire, shorter than postero-lateral, somewhat cristate, crest posteriorly curved inward as in *Pilumnoides*. Front large, very wide, prominent, margin straight, subentire. Orbit completely filled by the large eye. Antenna occupying the inner hiatus of the orbit, basal article not reaching front. Feet of medium size. Third, fourth and fifth segments of male abdomen fused (Stimpson).

Known only from a single species.

METOPOCARCINUS TRUNCATUS Stimpson

Plate 148, Figures 1 and 2

Metopocarcinus truncatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 216 [88], pl. 3, fig. 4 (type-locality, Cape St. Lucas; type not extant).

Diagnosis.—Carapace narrow, hexagonal-orbicular, nearly smooth. Front prominent, truncate. Lateral teeth obscure.

Description.—Carapace somewhat convex, naked, nearly even, finely granulate, granules rather sparse but symmetrically arranged especially on the raised portions. Antero-lateral margin obscurely dentate, five teeth or divisions are evident: A small pointed tooth at orbital angle, followed by two shallow lobes, the third longer than the second; the fourth division is a tooth at the widest part of the carapace; behind it an obscure tooth whence the marginal crest curves inward. Front double-edged, the edges granulate, lower margin not visible from above and separated by a sulcus from the upper; the latter is straight, transverse, a feeble nick at its middle. Orbit with two closed fissures above, and a shallow lobe at the middle of the lower margin; inner angle sharp. Eyes large, filling orbits. Basal article of antenna narrow, reaching just as far forward as the inner sub-orbital tooth; next article reaching the prolongation of the front. Merus of outer maxillipeds narrower than ischium, distal margin oblique, outer angle arcuate, distal inner margin slightly notched. Chelipeds and legs naked, unarmed; chelipeds sparingly finely granulate; carpus uneven, a short tooth at inner angle; palms inflated; fingers gradually tapering, acuminate; major dactylus with a large,

backward pointing tooth at base of prehensile edge. Legs dark colored in alcohol except the dactyli and distal ends of the propodi; dactyli pubescent, and with long, slender unguicles. Abdomen of immature female suboblong, sixth segment widening distally.

Color.—Pale orange; postero-lateral surfaces above bases of legs black; fingers and dactyli of legs dark colored. (Stimpson.)

Measurements.—Male holotype, length and breadth of carapace 4.6 mm. (0.18 inch) (Stimpson). Immature female (62629), length of carapace 3.5, width of same 4, fronto-orbital width 2.9, width of frontal margin 1.4 mm.

Range.—Cape St. Lucas, Lower California, Mexico. Valparaiso, Chile.

Material examined.—Valparaiso, Chile; Jan. 7, 1927; W. L. Schmitt; 1 female, immature (62629).

Genus LOPHOPANOPEUS Rathbun

Lophopanopeus RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 272; type, *L. bellus* (Stimpson).

Carapace hexagonal, moderately convex, areolate. Of the five lateral teeth, N, T and S are subequal, prominent; E present but reduced and coalesced with D to a greater or less extent. Front narrow, lobes sinuous. Orbits transverse. Carpus of cheliped longer than wide; lower margin of propodus concave distally. Legs more or less cristate, especially as to the carpus. Third, fourth and fifth segments of male abdomen coalesced.

Bahamas and Florida to West Indies; west coast of North America; Japan to Australia; West Africa.

KEY TO THE AMERICAN SPECIES OF THE GENUS LOPHOPANOPEUS

A¹. Upper margin of merus of ambulatory legs not spinulous.
- B¹. Carpus of cheliped smooth or nearly so (uneven in young *bellus*).
  - C¹. Color of immovable finger running far back on hand--**frontalis**, p. 323.
  - C². Color of immovable finger not running back on hand.
    - D¹. Carapace rough about the antero-lateral and frontal regions. Hand with a very slight lobe above at posterior end; lobe often absent----------**bellus**, p. 320.
    - D². Carapace smooth except on outer half of hepatic region. Hand with prominent lobe above----------**heathii**, p. 322.
- B². Carpus of cheliped very rough.
  - C¹. Carpus of ambulatory legs strongly bilobed.
    - D¹. Carpus of cheliped covered with reticulating ridges inclosing pits of irregular shape----------**leucomanus**, p. 324.
    - D². Carpus of cheliped covered with tubercles.
      - E¹. Carpus of legs with two thick naked tubercles on upper margin; propodus of last one, two or three legs with a lobe----------**diegensis**, p. 327.
      - E². Carpus of legs with two compressed tubercles on upper margin; propodus of last three legs with a lobe on upper margin----------**bellus**, var., p. 321.
  - C². Carpus of ambulatory legs slightly bilobed-------**lockingtoni**, p. 325.

A². Upper margin of merus of ambulatory legs spinulous.
  B¹. Surface of chelipeds spinulous ..... **distinctus**, p. 331.
  B². Surface of chelipeds not spinulous but smooth or nearly so.
    C¹. Coalesced (first and second) antero-lateral tooth truncate. Color of immovable finger continued on palm. Carpus of legs distinctly bilobed ..... **lobipes**, p. 329.
    C². First and second antero-lateral teeth separated by a shallow sinus. Color of immovable finger not continued on palm. Carpus of legs indistinctly bilobed ..... **maculatus**, p. 330.
Only dactyls of chelipeds known ..... **somaterianus**, p. 332.

LOPHOPANOPEUS BELLUS (Stimpson)

Plates 150 and 151

Xantho bella STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 204 [76], pl. 3, fig. 2 (type-localities, Monterey, Cal. and Fort Townsend, Puget Sound; cotype from Monterey in M.C.Z.).

Xanthodes hemphillii LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 32 [5] (type-locality, Monterey; type examined but not now extant).

Xantho hemphilliana LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 100 [6].

Lophoxanthus bellus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 257 (part), pl. 46, figs. 4–4c.—HOLMES, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 60, pl. 1, fig. 3.

Lophozozymus (*Lophoxanthus*) *bellus* MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 115.

Lophopanopeus bellus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 272; Harriman Alaska Exped., vol. 10, 1904, p. 180.—SCHMITT, Univ. California Publ. Zool., vol. 23, 1921, p. 241, text-fig. 143, pl. 37, fig. 4.

Diagnosis.—Carapace very rough. Frontal lobes slightly oblique. Anterior margin of third lateral tooth in line with truncate margin of second tooth. Lobe on upper surface of palm low or absent.

Description.—Carapace roughened along the antero-lateral margin; this margin leads to the orbit and in its anterior part is more pronounced in the old, thicker and blunter in the young; lower surface of carapace coarsely granulate. Frontal lobes slightly sinuous and oblique, outer tooth faintly indicated. Anterior margin of third antero-lateral tooth (N of Dana) in line with truncate margin of second tooth or that coalesced with outer orbital tooth.

Carpus of chelipeds slightly roughened; transverse subdistal groove deep. Hand smooth, with a thick shallow lobe at proximal end of inner margin of upper surface in the old, lobe not developed in the young. Dark color of fingers not running back on palm. Carpus of all ambulatory legs slightly bilobed on upper margin; propodus with convex upper margin.

Color.—Very variable; some specimens (in Monterey Bay) are almost pure white, while others show various irregular patterns of bluish and dark red or are wholly of the latter color.

"Crimson or beet red; carapax sometimes lighter in color, or yellowish, maculated with deep red. Northern specimens are more sober in coloration than those found in warmer latitudes." (Stimpson.)

Measurements.—Male (14970), length of carapace 23, width of same 34.2, fronto-orbital width 16, width of front 9.2 mm.

Range.—From Prince William Sound, Alaska, to Monterey, California. Lower California (A. Milne Edwards).[39]

Habitat.—Low tide, among rocks.

Variety.—A distinct variety has the carpus of the chelipeds very rough with irregular granulated tubercles, some coalescent; the carpus approaches that of *L. diegensis* in which, however, the tubercles are smoother and more finely granulate. In *bellus* variety, the carpus of the ambulatory legs is bilobed above and the propodus of the last three pairs has a similar, smaller lobe on its dorsal margin; the lobes are compressed and different from the thick, naked lobes on the carpus of *diegensis*. Miss Stevens writes from Friday Harbor of the specimens of this variety submitted that they were dredged in from 18 to 40 fathoms and that a few similar specimens have at times come up in the dredge; that typical *bellus* is more common and occurs under rocks along shore and occasionally is dredged.

Material examined.—

ALASKA.—Prince William Sound; 1899; Harriman Alaska Exped.: Fox Island; T. Kincaid; specimens returned to collector. Virgin Bay; W. R. Coe; 1 female (25851), variety.

Cedar Island, Loring; June 17, 1904; Chamberlin and Aller, Bureau of Fisheries; 1 ovigerous female (53347).

Kasa-an Bay, Prince of Wales Island; Dr. T. H. Streets, U. S. Navy; 1 young female (17285).

1903; exact locality not given; *Albatross;* 1 male, 1 female (31543), variety.

WASHINGTON.—Strait of Juan de Fuca; 1880; D. S. Jordan; 1 male (3066).

Puget Sound: *Albatross;* 1 male (21779). August, 1928; K. L. Hobbs; 1 male, 1 ovigerous female (62523).

Northeast corner Brown Island, Friday Harbor; shore; August, 1926; Belle A. Stevens; 1 male, 2 females (59988).

Off Canoe Island, Friday Harbor; 18–40 fathoms; Belle A. Stevens; 1 male, 1 female, variety; returned to sender.

Admiralty Inlet, vicinity of Port Townsend: Admiralty Head light, N. 38° W., 1.3 miles; 26–15 fathoms; R. Sh.; temperature, 50.8° F.; June 29, 1903; station 4205, *Albatross;* 2 males, 1 ovigerous female (50975), 1 male, 1 female (31542), variety.

Port Orchard; July, 1889; O. B. Johnson; 15 males, 6 females (14970).

Near Tacoma: 1923; J. G. Malone; 1 male (57269).

CALIFORNIA.—Pacific Grove; 1918; Ida S. Oldroyd; 24 males, 18 females (54013).

[39] May represent a different species.

Monterey: Henry Hemphill; 1 male, type of *Xanthodes hemphillii* Lockington; specimen dstroyed in San Francisco fire. H. N. Lowe; 1 male (53340). A. S. Taylor; 1 ovigerous female, cotype (1292, M. C. Z.).

LOPHOPANOPEUS HEATHII Rathbun

Plate 149

Lophopanopeus heathii RATHBUN, Amer. Nat., vol. 34, 1900, p. 137 (type-locality, Monterey Bay; type, Cat. No. 22870, U.S.N.M.); Harriman Alaska Exped., vol. 10, 1904, p. 182, pl. 7, fig. 9.—SCHMITT, Univ. California Publ. Zool., vol. 23, 1921, p. 243, pl. 37, fig. 1.

Lophoxanthus leucomanus HOLMES, Occas. Papers Calif. Acad. Sci., vol. 7, 1900, p. 61 (part).

Diagnosis.—Carapace very convex, nearly smooth. Anterior margin of third lateral tooth almost in line with second tooth. Wrist and hand nearly smooth.

Description.—Carapace more convex antero-posteriorly than in *bellus*, regions less distinctly indicated, dorsal surface smooth except on outer half of hepatic region where it is slightly rough. The line of the antero-lateral margin is continued to the orbit; the suborbital and subhepatic regions are roughly granulated. Margin of frontal lobes very oblique and sinuous; lobule at outer end more pronounced than in *bellus*. The anterior margin of the third lateral tooth is almost in line with the second or coalesced tooth.

Carpus of cheliped smooth or nearly so; no subdistal groove. Hand smooth, with a broad, prominent lobe occupying the proximal half of the upper margin. Immovable fingers bent downward, their tips upward; color not continued on palm. Carpus of ambulatory legs slightly bilobed on upper margin.

Color.—Very variable. A young male had white claws with dark tips, last legs white, other legs and body dark red; a young female had red claws, hind legs white, body darker; another young male was white. (Hilton.)

Measurements.—Male holotype, total length of carapace 16.6, width of same 22.6, fronto-orbital width 11.6, width of front 7.4 mm.

Range.—From Monterey Bay, California, to Magdalena Bay, Lower California.

Material examined.—

CALIFORNIA.—Monterey Bay: Under stones, mean and low tide mark; Harold Heath; 2 males (1 is holotype), 1 female (22870). December 26, 1896; J. O. Snyder; 1 male (19821).

Monterey; specimens returned to California Academy of Sciences.

Pacific Grove: June, 1905; J. E. Benedict; 1 male (50549). 1918; Ida S. Oldroyd; 12 males, 14 females (1 ovigerous) (54014).

Venice, Santa Monica Bay; under aquarium; February, 1911; P. S. Barnhart; Venice Marine Biol. Sta.; 1 male (60558).

San Pedro; shore; 1924; E. P. Chace; 1 young (58763).

Santa Catalina Island: Specimens returned to California Academy of Sciences. Carapace of young specimen (18278).

LOWER CALIFORNIA.—Magdalena Bay; 1917; C. R. Orcutt; 3 females, 1 young (50635).

Affinity.—While the antero-lateral teeth resemble those of L. *bellus*, the smooth surface and the strong tooth on the manus ally it closely to *L. frontalis*.

LOPHOPANOPEUS FRONTALIS (Rathbun)

Plate 152

Lophozozymus (*Lophoxanthus*) *frontalis* RATHBUN, Proc. U. S. Nat. Mus., vol. 16, 1893, p. 236 (type-locality, San Diego Bay; type, Cat. No. 18177, U.S.N.M.).

Lophopanopeus frontalis RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 272; Harriman Alaska Exped., vol. 10, 1904, p. 181, pl. 7, fig. 8.—SCHMITT, Univ. California Publ. Zool., vol. 23, 1921, p. 242, text-fig. 144, pl. 37, fig. 3.

Lophoxanthus frontalis HOLMES, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 64, pl. 1, figs. 5 and 6.

Diagnosis.—Dark color of immovable finger runs well back and up on the palm. Hand smooth, upper lobe large. Front prominent. Anterior margin of third lateral tooth nearly transverse.

Description.—Carapace well areolated, almost smooth. Front prominent, lobes markedly sinuous, middle portion very convex. Third antero-lateral tooth more produced than second or coalesced tooth, its anterior margin nearly transverse.

Carpus of chelipeds smoother than in *L. bellus*. Hand smooth, short and high, increasing rapidly in height to distal end; a large tooth or lobe projects inward on inner side of upper margin and extends half length of upper margin. Fingers unusually long. Carpus of ambulatory legs slightly bilobed on anterior or upper margin; propodus narrower than in *L. bellus*, with convex anterior margin; dactylus slender.

Color.—The dark color of the immovable finger runs backward and upward on the palm.

Measurements.—Male holotype, length of carapace 17.2, width of same 23.7, fronto-orbital width 12.5, width of front 6.7 mm.

Range.—From Santa Monica Bay and Santa Catalina Island to San Diego, California. (Schmitt.)

Material examined.—

CALIFORNIA.—Anaheim Bay; from clusters of mussels on piles at low tide; February, 1918; H. N. Lowe; 1 male (52682).

San Diego Bay; *Albatross;* 1 male holotype (18177).

San Diego: San Diego Soc. Nat. Hist.; 1 male (53359). Edward Palmer; 1 male, 1 female (19823), received from Peabody Mus., Yale Univ.

LOPHOPANOPEUS LEUCOMANUS (Lockington)

Plate 153, Figures 5 and 9; Plate 154, Figure 4

Xanthodes leucomanus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 32 (type-localities, Santa Rosa Island, Monterey and San Diego; types not extant); not *X. leucomanus* Lockington, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 100.

Lophoxanthus bellus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 257 (part).

Lophopanopeus leucomanus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 272; Harriman Alaska Exped., vol. 10, 1904, p. 182.—SCHMITT, Univ. California Publ. Zool., vol. 23, 1921, p. 243, text-fig. 145, pl. 37, fig. 6.

Lophoxanthus leucomanus HOLMES, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 61, pl. 1, fig. 4.

Diagnosis.—Carpus of chelipeds covered with numerous small pits separated by reticulated lines. Carpus of ambulatory legs strongly bilobed. Roughness of hepatic region continuous with that on adjacent teeth.

Description.—Carapace well areolated; anterior half deeply rugose, roughness on hepatic region not divided from that on two adjacent teeth. Margin of frontal lobes strongly oblique except outer tooth. Third antero-lateral tooth more produced than second or coalesced tooth; a definite, finely granulate marginal line connects third tooth with orbit. Subhepatic and suborbital region rough with unequal granulate tubercles, extending as far down as a line connecting third tooth with anterior angle of buccal cavity.

Carpus of chelipeds covered with numerous small irregular pits separated by reticulating lines. Upper portion of hand pitted and reticulated like carpus and with two or more irregular, inward-pointing teeth on upper margin, the proximal the larger. Color of fingers not running back on palm. Carpus of ambulatory legs with a very thin and strongly bilobed crest on the upper margin; propodus wide with a prominent lobe at proximal end.

Color.—The general color of an ovigerous female from Laguna Beach, preserved in formalin, is red, deepest along the front and antero-lateral margins and on the upper half of the chelae.

Measurements.—Male (50209), length 11.1, width 14.6, fronto-orbital width 8.5, width of front 5.2 mm.

Range.—From Monterey (Lockington, Holmes) to San Diego, California.

Material examined.—

CALIFORNIA.—Venice, Santa Monica Bay; *Anton Dohrn;* P. S. Barnhart, Venice Marine Biological Station: Beach on roots of kelp; 1 female, 1 young (50216). Breakwater; October 29, 1913; 2 females (50213, 50290).

Point Vincent, from rocks; February, 1918; H. N. Lowe; 2 males (51121).

San Pedro: H. N. Lowe; 1 male (23053). 1901; T. D. A. Cockerell; 1 male (31513). Portuguese Bend; littoral; June 26, 1914; *Anton Dohrn;* Venice Marine Biological Station; 1 male, 1 ovigerous female (50210). E. P. Chace: December 15, 1918; 2 males (53992). Near foot of breakwater; October 30, 1917; 1 male (53994). Point White; May 18, 1919; 2 ovigerous females (53874, 53875). November, 1924; 1 young (61111).

Southern California; March 13, 1920; Univ. Southern Calif.; 1 male, 1 female (62526).

Seal Beach, south of Long Beach; March 2, 1919; E. P. and E. M. Chace; 1 female, 1 young (53993).

Laguna Beach; W. A. Hilton; 1 ovigerous female (50597), 2 ovigerous females (52753). September 16, 1918; 4 males, 1 young (54031–54035).

Santa Catalina Island: Dredged, January, 1863; J. G. Cooper; 1 male (17533). *Anton Dohrn,* Venice Marine Biological Station: Catalina Harbor; April 1, 1915; 1 male, 1 female (50291). Entrance to Catalina Harbor; December 30, 1912; 2 males, 3 females (50215). Isthmus Harbor; 8 males, 4 females (50208), 1 male (50211), 1 male (50229).

San Clemente Island; H. N. Lowe; 1 male (29960).

La Jolla; 1918; W. L. Schmitt: From kelp holdfast on beach; August 17; 1 young (53974). Tide pools; September 22; 4 males (53975).

San Diego; H. Hemphill; 1 female (17774).

LOPHOPANOPEUS LOCKINGTONI Rathbun

Plate 153, Figures 1, 2 and 8; Plate 154, Figures 1–3

Xanthodes leucomanus Lockington, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 100; not *X. leucomanus* Lockington, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 32.

Lophoxanthus bellus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 257 (part).

Lophoxanthus leucomanus Holmes, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 61 (part).

Lophopanopeus lockingtoni Rathbun, Amer. Nat., vol. 34, 1900, p. 137 (type-locality, San Diego Bay; type, Cat. No. 19973, U.S.N.M.); Harriman Alaska Exped., vol. 10, 1904, p. 183, pl. 7, fig. 7.—Schmitt, Univ. California Publ. Zool., vol. 23, 1921, p. 244, pl. 37, fig. 2.

Diagnosis.—Dark color of immovable finger of male (not female) continued a little way on palm. Carpus of chelipeds rough with a few partially reticulating ridges. Granulated patch on hepatic region separated from granules on adjacent teeth.

Description.—Anterior half of carapace irregularly roughened; an obliquely oval granulated patch on hepatic region is separated from granules on adjacent teeth. Frontal lobes slightly oblique, outer tooth well marked. Third antero-lateral tooth more produced than second tooth; a line of fine granules runs from the third tooth to the

orbit; below, the suborbital and subhepatic regions are coarsely granulate, without a definite line between the third tooth and the buccal angle.

Carpus of chelipeds crossed by a few thickened ridges incompletely reticulating, distal margin having a thick granulated ridge distinctly separated by a deep sulcus from rest of carpus; a large granulated tubercle near articulation with hand. Upper surface of hand with two longitudinal ridges, the outer straight, the inner curved and ending proximally in a lobe or tooth; in the old these ridges tend to disappear but not the lobe; outer surface of hand granulate, the granules forming more or less in longitudinal and transverse lines and becoming fainter below and toward the fingers. Dark color of immovable finger of male runs back a little on palm, ending in an oblique line, and in a right angle above. Carpus of ambulatory legs distinctly but not markedly bilobed on the upper margin; propodus with slightly convex upper margin.

Color.—Shows great variation, some have black fingers with white tips, others have colored fingers, and the general tint of the carapace varies considerably (Lockington).

Measurements.—Male (32976), length of carapace 10.6, width of same 13.9; fronto-orbital width 8.2, width of front 4.5 mm.

Variation.—The reticulating ridges of the carpus (wrist) are sometimes very strong (as in the holotype) and may be broken up into more or less elongated tubercles as in specimens from Long Beach (50548) and Anaheim Slough.

Range.—From San Pedro, California, to Gulf of California, Mexico. To a depth of 4½ fathoms.

Material examined.—

CALIFORNIA.—San Pedro; H. N. Lowe; 2 males (32976).

Long Beach; H. N. Lowe; 1 female (50548).

Anaheim Slough; Lena Higgins; 2 females (1 ovigerous), variety (61536).

Newport Bay; November 27, 1914; *Anton Dohrn*, Venice Marine Biological Station; 1 male, 1 female, soft shell (50241).

San Diego; H. Hemphill; 1 male (22562).

San Diego Bay; *Albatross:* 4½ fathoms; R. brk. Sh.; March 24, 1894; station 3591; 1 female holotype (19973). 4 fathoms; M. Sh.; March 31, 1896; station 3619; 1 young female (55500).

MEXICO.—"La Paz, 3 fathoms, Mulege Bay, Port Escondido, No. 29"; 1 male, 2 females, described by Lockington (p. 100) and lent to the author by S. J. Holmes after the original specimens (types of *leucomanus*) had been lost.

LOPHOPANOPEUS DIEGENSIS Rathbun

Plate 153, Figures 6, 7, and 10

Lophopanopeus diegensis RATHBUN, Amer. Nat., vol. 34, 1900, p. 137 (type-locality, San Diego, 10 fathoms; type, Cat. No. 4281, U.S.N.M.); Harriman Alaska Exped., vol. 10, 1904, p. 184, pl. 9, fig. 3.—SCHMITT, Univ. California Publ. Zool., vol. 23, 1921, p. 245, text-fig. 146, pl. 37, fig. 5.

Diagnosis.—Carpus of ambulatory legs with two large naked tubercles on upper margin. Carpus of chelipeds with numerous, mostly separated tubercles on exposed surface. Second antero-lateral tooth slightly projecting.

Description.—Carapace granulate on frontal and lateral regions, granules arranged partly in lines. Frontal lobes deflexed, edge slightly oblique and sinuous, outer tooth inconspicuous. Second antero-

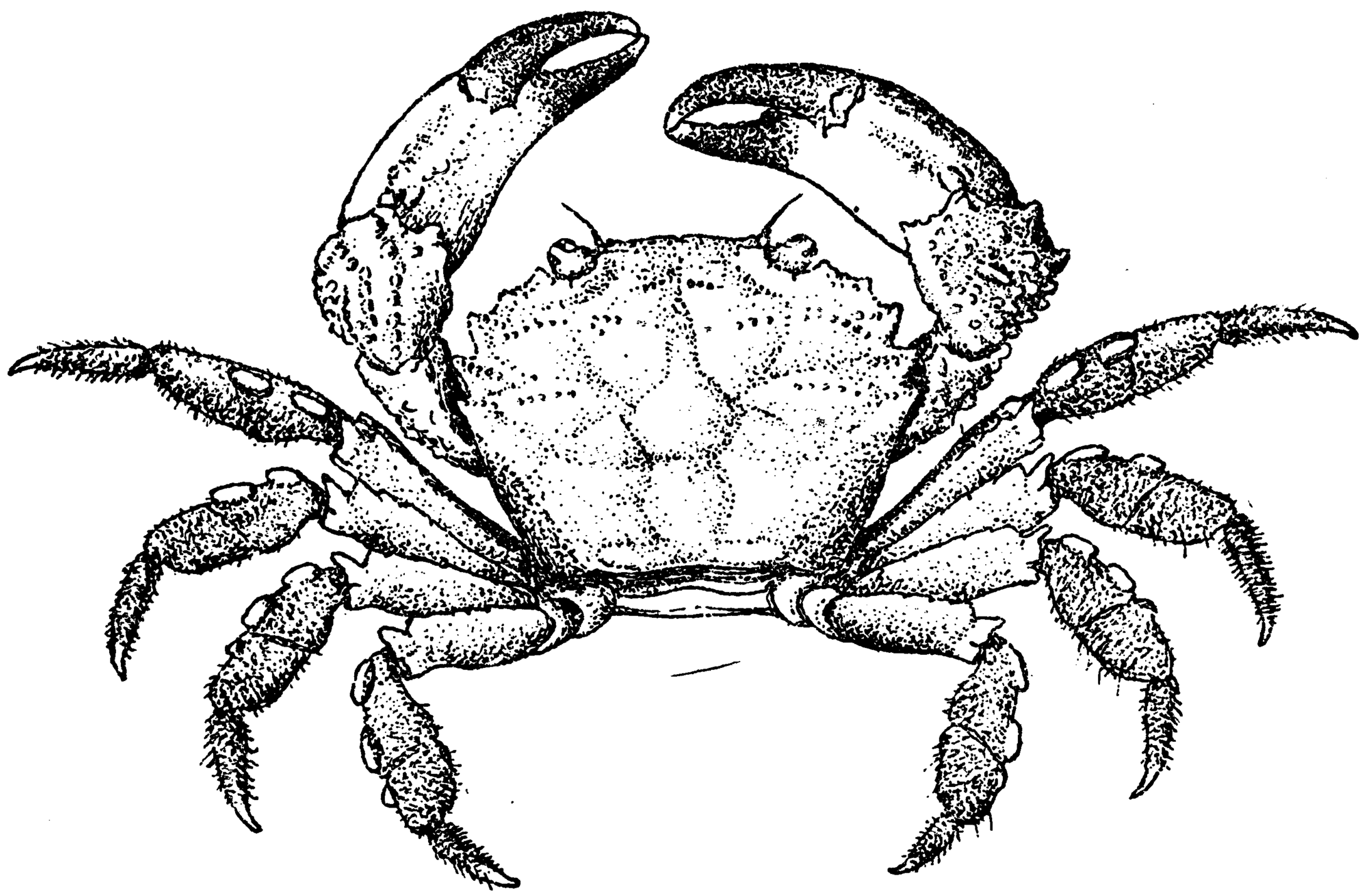

FIGURE 49.—LOPHOPANOPEUS DIEGENSIS, MALE, HOLOTYPE, CARAPACE 11.4 MM. WIDE

lateral tooth small, somewhat dentiform, directed toward orbit; third, fourth, and fifth teeth prominent, carinate and subacute. Suborbital and subhepatic regions granulate.

Carpus of chelipeds with about 35 unequal, finely granulate tubercles, irregularly placed, some of them forming lines. Hand bicarinate above, inner carina with a small prominence at proximal end; a few tubercles on upper part of inner surface; upper and proximal portion of outer surface rough with fine granulated rugae. Dark color of immovable fingers not running back on palm but ending obliquely on minor chela. Carpus of legs with two prominent naked, truncate tubercles on upper margin, by which this species may at once be recognized; propodus of last one to three pairs with a smaller tubercle near proximal end of upper margin.

Color.—Dull brown or blackish, occasionally tinged with red but never conspicuously marked as in *L. heathii* (Weymouth).

Measurements.—Male (50239), length of carapace 13.2, width of same 18.6, fronto-orbital width 9.7, width of front 5.6 mm.

Range.—From Monterey Bay to San Diego, California. To a depth of 46 fathoms.

Material examined.—

CALIFORNIA.—Monterey Bay; Point Pinos Light House, S. 9° E., 4.5 miles; 56–46 fathoms; crs. S. Sh. R.; June 6, 1904; station 4551, *Albatross;* 1 male (50970).

Off Point Conception; lat. 34° 25′ 25″ N.; long. 120° 20′ 00″ W.; 31 fathoms; gy. S. brk. Sh.; January 8, 1889; station 2908, *Albatross;* 1 female (24751).

Monica Bay, off Santa Monica; August 13–14; *Anton Dohrn;* Venice Marine Biological Station; 2 males (50237).

Monica Bay, off Venice; August 13–14; *Anton Dohrn;* 2 males (50233).

Venice breakwater; February 19, 1913; *Anton Dohrn;* 5 males (50239).

South of Venice breakwater; 20 fathoms; September 24, 1924; Univ. Southern California; 1 male (62691).

Three miles SW. by S. of Venice; 22 fathoms; August 2, 1913; *Anton Dohrn;* 1 male (50235).

Point Vincent; from rocks; February, 1918; H. N. Lowe; 1 female (51128).

Off Point Fermin; March 14, 1914; *Anton Dohrn;* 1 female (50236).

San Pedro; H. N. Lowe; 1 male, 1 female (32969).

Near Portuguese Bend, San Pedro; June 23, 1914; *Anton Dohrn;* 1 ovigerous female (50240).

Long Beach; 1925; Univ. Southern California: 16 fathoms; September 26; 1 female; returned. 16 fathoms; October 3; 1 male, 1 female; returned. 28 fathoms; October 17; 1 female (62524). 24 fathoms; October 17; 2 males, 2 females, returned; 1 male, 2 females (62693).

Santa Catalina Island; *Anton Dohrn:* Entrance to Catalina Harbor; December 30, 1912; 1 male, 2 young (50238). Isthmus Harbor; November 27, 1913; 4 males, 2 females (50234).

La Jolla; in kelp holdfast on beach; August 18, 1918; W. L. Schmitt; 1 male (53973).

San Diego; 10 fathoms; H. Hemphill; 1 male, holotype (4281).

Southern California; Univ. Southern California; 5 males, 2 females (1 with Rhizocephalid) (62525).

LOPHOPANOPEUS LOBIPES (A. Milne Edwards)

Plate 155, Figures 3–5

Neopanope lobipes A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 331, pl. 61, fig. 3–3*b* (type-locality, south of Florida, lat. 24° 43′ N., long. 83° 25′ W.; 37 fathoms; type in M.C.Z.); Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14 (locality given as 24° 44′ N., 83° 26′ W.).

Lophopanopeus lobipes RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 272.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 327.

Diagnosis.—Lobes of front oblique. A tooth at middle of upper orbital margin. First two antero-lateral teeth fused. Palms almost entirely smooth to naked eye.

Description.—Regional furrows and areolations well marked; the prominent parts of the lobes are covered with very fine granulation, which is lacking on the cardiac region and the urogastric lobe. Frontal lobes oblique, separated by a small rounded median sinus; a slight lobe at outer angles. Orbits large, having on the upper margin an inner and a median tooth. Outer orbital or first antero-lateral tooth small, coalesced with the second, lobiform tooth, forming a single oblong or truncate tooth. Remaining teeth large, triangular, sharp, margin thick, the third tooth broadest and further from the fourth than the fourth from the fifth.

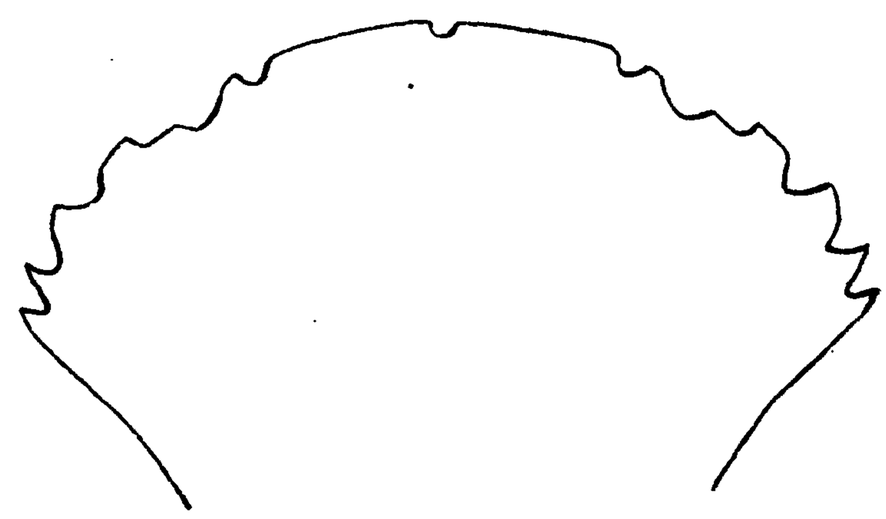

FIGURE 50.—LOPHOPANOPEUS LOBIPES, FEMALE, KEY WEST (MUS. S. U. I.), CARAPACE 5.6 MM. WIDE

Chelipeds very unequal; surface covered with fine crowded pearly granules forming reticulating ridges. Major palm very swollen, rugose above, where it is marked with one or two inconspicuous, longitudinal furrows; outer face almost completely smooth to the naked eye; fingers large and brown, color encroaching but little on the palm, where it ends in an oblique, wavy line. Minor chela slender and feeble; fingers comparatively much longer, its color extending much further back on the palm. Fingers of both chelae meeting when closed. Color of fingers in female less extensive than in male. Merus of ambulatory legs feebly granulate above; carpus laterally compressed, its upper border bilobed except in the last leg where there is a single lobe.

Measurements.—Ovigerous female (S.U.I.), length of carapace 4.3, width 5.6 mm. Male type, length of carapace 4, width 5 mm.

Range.—Bahama Banks; Straits of Florida.

Material examined.—Bahama Banks; May 18, 1893; State University of Iowa Expedition; 1 young (Mus. S.U.I.).

Off Key West; shallow water; station 46; State University of Iowa Expedition; 1 ovigerous female (Mus. S.U.I.).

Northwest of Tortugas; lat. 24° 44′ N., long. 83° 26′ W.; 37 fathoms; April 2, 1877; station 10, U. S. Coast Survey steamer *Blake;* 1 male, type (2911, M.C.Z.).

LOPHOPANOPEUS MACULATUS Rathbun

Lophopanopeus maculatus RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 588, pl. 42, figs. 10 and 11 (type-locality, southern part of Gulf of California, 8 fathoms, station 2824 [*Albatross*]; type, Cat. No. 21585, U.S.N.M.).

Diagnosis.—Wrist slightly rough; legs somewhat cristate, merus spinulous; terminal segment of male abdomen wider than preceding segment.

Description.—Carapace hexagonal, moderately convex, deeply areolated; covered with very fine, depressed, scabrous granules. Front narrow, advanced, thickened, emarginate, with a short closed median fissure; lobes oblique, margin sinuous, granulate, outer angle truncate, obtuse. Lobe between superior notches of orbital margin truncate, not produced. Exorbital tooth small, second lateral tooth well marked though not prominent, rounded; third, fourth, and fifth teeth dentiform, subacute, fifth a little smaller; sinuses separating second, third, fourth, and fifth teeth continued by grooves on carapace. Carapace granulate below; a suborbital tubercle. Inner tooth of inferior orbital margin large, produced, thickened, blunt; outer fissure deep, V-shaped. Proximal angles of third abdominal segment of male acute, overlapping coxae of last pair of legs; penult segment nearly as long as wide, increasing in width distally; last segment wider than preceding, free margin broadly arcuate.

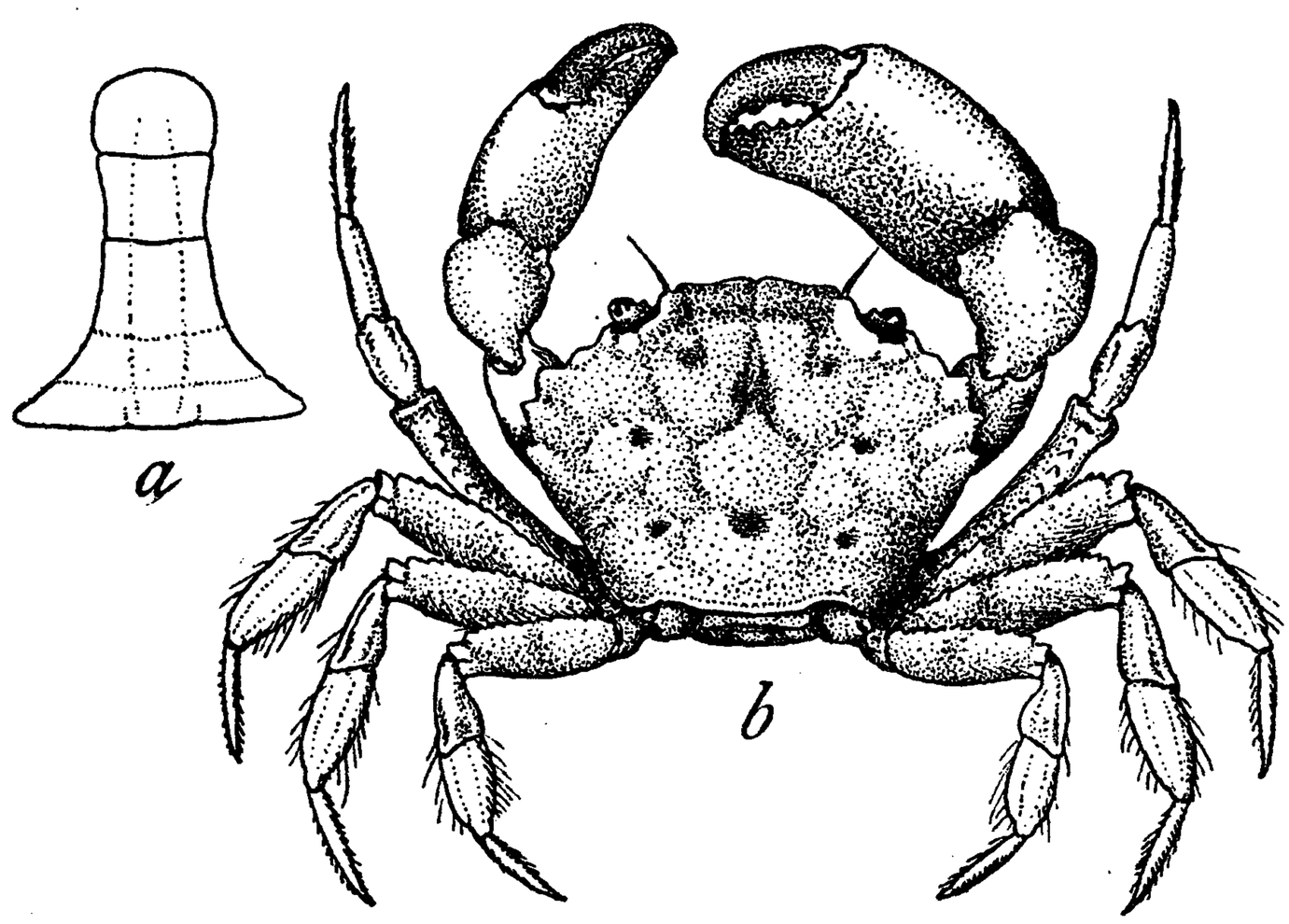

FIGURE 51.—LOPHOPANOPEUS MACULATUS, MALE, HOLOTYPE, CARAPACE 9.9 MM. WIDE. *a.* ABDOMEN. *b.* DORSAL VIEW

Chelipeds not very unequal, heavy. Arm trigonal, as broad as long, superior margin denticulate; wrist slightly rugose, a distal groove and two blunt inner teeth or tubercles, one above the other. Major palm wider than its superior length, upper surface somewhat flattened, lower margin of whole propodus slightly sinuous; covered with large and small punctae and fine granules which become larger and rougher on the broad upper surface. Fingers wide, slightly gaping, and having a few impressed, punctate lines; dactylus arched, a large basal tooth and about seven small teeth; about six large teeth on immovable

finger. Minor cheliped narrower, fingers bent down a little more; prehensile teeth all small. Merus of legs narrow, anterior margins spinulous; carpus-propodus enlarged at middle; carpus subcristate, having a deep groove near anterior margin; propodus with convex margins.

Measurements.—Male holotype, length 7.1 mm., width 9.9 mm.

Range.—Mexico: Magdalena Bay, Lower California; Gulf of California. 7 to 17 fathoms.

Material examined.—Magdalena Bay, west coast of Lower California; lat. 24° 32′ 00″ N., long. 111° 59′ 00″ W.; 12 fathoms; fne. gy. S.; May 2, 1888; *Albatross;* 1 ovigerous female (22006).

Southern part of Gulf of California; *Albatross:* Lat. 24° 11′ 30″ N., long. 109° 55′ 00″ W.; 10 fathoms; Sh.; April 30, 1888; 1 young female (22005). Lat. 24° 22′ 15″ N., long. 110° 19′ 15″ W.; 7 fathoms; brk. Co.; April 30, 1888; 4 males, 1 female (22004). Lat. 24° 22′ 30″ N., long. 110° 19′ 30″ W.; 8 fathoms; brk. Sh.; April 30, 1888; 1 male holotype, 1 female (21585). Lat. 25° 02′ 15″ N., long. 110° 43′ 30″ W.; 17 fathoms; S. Sh.; March 17, 1889; 1 male (22007).

LOPHOPANOPEUS DISTINCTUS Rathbun

Plate 155, Figures 1 and 2

Micropanope sculptipes A. Milne Edwards, Crust. Rég. Mex., 1880, p. 325, pl. 54, fig. 2–2*c;* Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14; not *M. sculptipes* Stimpson.

Lophopanopeus distinctus Rathbun (new name), Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 272.—A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 326.

Diagnosis.—Carapace unusually wide. Chelipeds granulate. Propodus of legs wide, not cristate.

Description.—Carapace broad, regions well marked, lobulate, and granulate on the highest parts, with a tendency to form transverse series; surface sparsely hairy. Front little advanced, deflexed, double-edged, the upper edge more coarsely granulate than the lower or true edge; median notch broad; each lobe with a concave edge and an obtuse angle at either end. Inner angle of orbit a right angle; margin granulate; outer notch of good width, a broad tooth on its inner side. Outer angle of orbit slight, inconspicuous; next antero-lateral tooth broad and low; last three teeth subequal, the last two teeth with pointed tips, which are equally produced laterally in the old, but the last tooth less produced in the young.

Chelipeds subequal, narrow, pubescent and covered with sharp granules; merus spinulous on upper margin; carpus with a stout inner spine, outer surface irregularly furrowed; manus with a longitudinal furrow outside, a little below upper surface, and another, narrower and shallower furrow on the upper surface. Fingers elongate, little or no gape, shallow teeth on prehensile edge. The mov-

able finger has four strong carinae, two outside, one above, one inside; the immovable finger has three carinae. In the small male (20717) the major chela is very little stouter than the minor. The female (11403) lacks the left chela; the dactylus of the right chela is longer than the upper surface of the manus. Legs densely pubescent; merus with a row of spinules above, carpus with two rows.

Measurements.—Female (11403), length of carapace 6.2, width of same 9.5, fronto-orbital width 6, width of front 3.1 mm.

Range.—Gulf of Mexico; Straits of Florida; Barbados (A. Milne Edwards). 26 to 101 fathoms.

Material examined.—Gulf of Mexico; south of St. George Island, Florida; lat. 28° 46′ 00″ N., long. 84° 49′ 00″ W.; 26 fathoms; crs. S. Co.; March 15, 1885; station 2406, *Albatross;* 1 male (20717).

Gulf of Mexico; northwest of Tortugas; lat. 25° 33′ N., long. 84° 21′ W.; 101 fathoms; temperature 61¾° F.; 1877–78; U. S. Coast Survey Steamer *Blake;* 1 male (2772, M.C.Z.).

Straits of Florida; lat. 25° 05′ 00″ N., long. 80° 15′ 00″ W.; 56 fathoms; Co. S.; April 9, 1886; station 2640, *Albatross;* 1 female (11403).

LOPHOPANOPEUS SOMATERIANUS, new species

Plate 153, Figures 3 and 4

Two specimens of a dactylus or movable finger of a cheliped of this genus have been taken from stomachs of *Somateria* at St. George Island, Pribilof Islands, Bering Sea, Alaska, by the United States Biological Survey. One, which may be considered the holotype (Cat. No. 61135, U.S.N.M.), is from *S. spectabilis*, King Eider (B. S. 149820), taken February 4, 1917; the other (Cat. No. 61138) is from *S. v-nigra*, Pacific Eider (B. S. 149824), February 6, 1917. Both are right dactyli, tapering regularly to the tip and smooth except on prehensile edge. The holotype is about 10 mm. long, thick, with an irregular line of six unequal, low, separated tubercles along the outer base of the blunt prehensile edge; a larger tubercle than these but also low is situated near the proximal end of the inner half of the same surface. Three longitudinal lines of punctae on the outer surface and also on the inner surface. The second specimen is about 8 mm. long, resembling the first, except that the tubercles are less worn, more triangular and more projecting, and form with two small intercalated denticles a continuous, subacute edge. Color of both fingers hair brown with whitish tip.

Both ducks are Arctic species. *Somateria spectabilis* is said to winter from the Aleutian Islands to Kadiak Island and from southern Greenland and Gulf of St. Lawrence south to Long Island; *S. v-nigra* winters in Bering Sea about the Aleutian Islands.

Genus PANOPEUS Milne Edwards

MUD CRABS

Panopeus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 403; type, *P. herbstii* Milne Edwards.

Eurypanopeus RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 165 (part; not *Eurypanopeus* A. Milne Edwards 1880).

Eupanopeus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273. Substituted for *Panopeus* which was rendered invalid by *Panopea* Ménard 1807, according to a rule since reversed.

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

Merus of outer maxillipeds transverse, its anterior margin more or less sinuous. Chelipeds unequal in both sexes; the merus has a superior subterminal tooth; the carpus a tooth at inner angle; fingers acute, movable finger of large cheliped with a large basal tooth. Legs rather thick, compressed; horny tip of dactylus of last pair recurved backward (not upward), that is, the tip does not lie in the same plane as the remainder of the limb. Abdomen of male 5-segmented.

From Massachusetts to State of Santa Catharina, Brazil; Bahamas; Bermudas; west coast of Mexico to Chile. West Africa.

KEY TO THE AMERICAN SPECIES OF THE GENUS PANOPEUS

A¹. Five lateral teeth, the first two always distinguishable but generally more or less fused.

B¹. Dark color of immovable finger continued more or less on palm, especially in males.

C¹. Carapace narrow, length to width approximately as 1:1.35 or 1.36.

D¹. Carapace depressed, fourth lateral tooth wider than third, measured from sinus to sinus..... **americanus**, p. 357.

D². Carapace high in middle, fourth lateral tooth narrower than third..... **herbstii forma simpsoni**, p, 337

C². Carapace wider, fourth lateral tooth equal to or narrower than third.
D¹. Edge of front thick, beveled, and with a transverse groove. Third segment of male abodmen with lateral extremities broadly rounded.....**bermudensis**, p. 360.
D². Edge of front if thick not transversely grooved. Third segment of male abdomen with lateral extremities angled.
E¹. Front much produced, narrow, .24 of carapace width. First and second lateral teeth deeply separated; remaining teeth strongly hooked, spiniform.....**chilensis**, p. 346.
E². Front little produced, wider, .28 to .33 of carapace width. First and second lateral teeth not deeply separated; remaining teeth not strongly hooked.
F¹. Sixth segment of male abdomen much broader than long. First and second lateral teeth of carapace very unequal, separated by a shallow sinus. Color of immovable fingers running slightly back on palm. **turgidus**, p. 364.
F². Sixth segment of male abdomen very little broader than long. First and second lateral teeth of carapace separated by a deeper sinus. Color of immovable fingers running well back on palm in male.
G¹. Outer margins of lateral teeth form a regular curve from lateral angle of carapace to orbital angle. **herbstii**, typical, p. 335.
G². Lateral teeth more outstanding, their outer margins not forming a regular curve from lateral angle to orbital angle.
H¹. Teeth shallow, third tooth suboblong. **herbstii forma obesa**, p. 336.
H². Teeth deeper, measured from tip to base, compared to distance between sinuses. **herbstii forma crassa**, p. 336.
B². Dark color of immovable finger not continued on palm.
C¹. Carapace and chelipeds rough and hairy. Outer surface of palm with three longitudinal ridges.....**rugosus**, p. 353.
C². Carapace and chelipeds not noticeably hairy. Outer surface of palm without longitudinal ridges.
D¹. Coalesced (first plus second) lateral tooth narrow, width equal to that of fourth tooth.....**purpureus**, p. 344.
D². Coalesced-tooth broad, width greater than that of fourth tooth.
E¹. Carapace rough with upstanding bead granules. First and second lateral teeth similar, acute and widely separated. **harttii**, p. 355.
E². Granules of carapace depressed.
F¹. Carapace rugose. Third to fifth lateral teeth more prominent and widely separated. **occidentalis forma serrata**, p. 349.
F². Carapace nearly smooth. Third to fifth lateral teeth less prominent and nearer together.
G¹. Third lateral tooth narrower at base than fourth. **convexus**, p. 352.
G². Third lateral tooth wider at base than fourth. **occidentalis**, typical, p. 348.
A². Four lateral teeth, the first two of the normally five teeth completely and indistinguishably fused.....**boekei**, p. 365.

ANALOGOUS SPECIES OF PANOPEUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
herbstii forma crassa.	*purpureus.*
occidentalis.	*convexus.*

PANOPEUS HERBSTII Milne Edwards

Plates 156 and 157

Cancer panope SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1817, p. 58, pl. 4, fig. 3 (part); not *Cancer panope* Herbst, 1801, which is a *Menippe.*

Panopeus herbstii MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 403 (type-locality, North America; type in Paris Mus.).—SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 276.—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 308, pl. 57, figs. 2, 2*a*.—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 358, pl. 19, figs. 1, 2; pl. 23, figs. 10–12.—SUMNER, Bull. Bur. Fisheries, vol. 31, 1911, part 2, 1913, p. 673.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 437, pl. 34, fig. 9.

Panopeus lacustris DESBONNE and SCHRAMM, Crust. Guadeloupe, 1867, p. 68 (type-locality, Guadeloupe; type not extant).

Panopeus herbstii var. *obesus* SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 278 (type-localities, Egmont Key, Florida, and Aspinwall; types in Peabody Mus. Yale Univ.).

Panopeus herbstii granulosus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 309 (type-locality, Bahia, Brazil; type in Paris Mus.).

Panopeus crassus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 313, pl. 57, figs. 1, 1*a* (type-localities, Bahia and Desterro, Brazil; types in Paris Mus.).

Eupanopeus herbstii var. or subspecies, *minax* VERRILL, Trans. Connecticut Acad. Arts and Sci., vol. 13, 1908, p. 348, text-fig. 15, pl. 15, fig. 2 (type-locality, Harrington Sound, Bermuda; type in Yale Mus.).

Panopeus herbstii GUNDLACH and TORRALBAS, An. Acad. Ci. Habana, vol. 36, 1917, p. 370 [24], pl., fig. 16.

Diagnosis.—Front sinuous, slightly four-lobed. Second lateral tooth large, blunt, or arcuate. Wrist without distal groove. Several roundish color spots on upper three-fifths of outer surface of hand. Dark color of propodal finger continued a short distance on palm. Abdomen of male arcuate at tip.

Description of the typical form (Plate 156, figs. 1 and 2).—Carapace about 7/10 as long as wide; regions well marked, convexity variable, surface coarsely granulate. A transverse raised granulate line nearly across the branchial reigon and in line with the last sinus of the antero-lateral border; a similar line runs obliquely backward from the anterior margin of the last tooth; shorter transverse lines, sometimes wavy, are found on anterior half or two-fifths of carapace. First (or outer orbital) tooth of lateral margin triangular, blunt, little prominent; second tooth separated from first by a shallow rounded sinus, and larger and nearly as advanced as first, either blunt-pointed and with arcuate outer margin, or lobiform; third and fourth teeth still larger, prominent, with arcuate outer margins and acute tips, the third directed obliquely inward, the fourth forward or slightly inward; fifth tooth shorter, with acute tip and straight outer margin. In general the outlines of the teeth form a regular curve from

the lateral angle to the orbital angle. Front about two-sevenths the greatest width of carapace; middle portion advanced only a little beyond outer angles.

Chelipeds heavy, granulate; carpus without a groove parallel to distal margin. Dark color of immovable finger continued for a short but variable distance on palm. Third segment of male abdomen reaching coxae of feet of fifth pair; terminal segment broader than long, rounded at end.

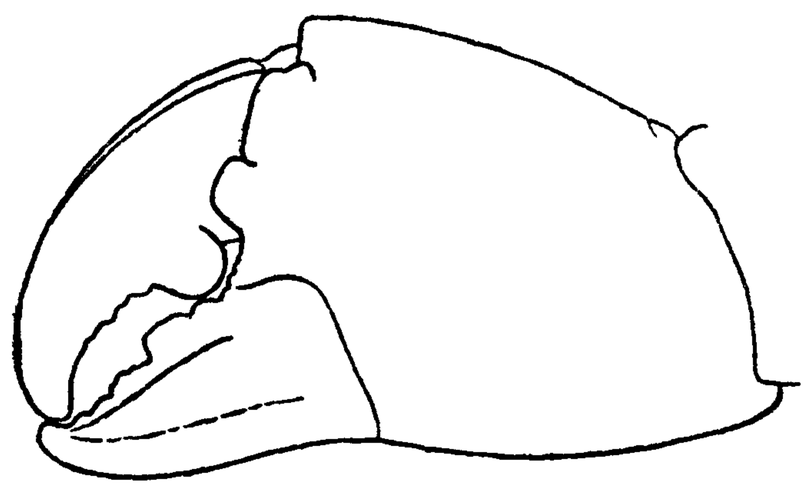

FIGURE 52.—PANOPEUS HERBSTII, MALE, MAJOR CHELA, ENLARGED. AFTER BENEDICT AND RATHBUN

Color.—Dull brown-green, paler below. Chelipeds deeper, sometimes spotted with claret brown. Fingers blackish. A dirty gray or slate color (Hay and Shore).

Variation.—Extremely variable, especially as to convexity, proportionate length and width, acuteness of lateral teeth, depth of sinus between first and second teeth. Apart from typical *herbstii* or *forma typica*, three forms are sufficiently different to be worthy of distinct names and yet not so sharply separated in characters or distribution as to be considered subspecies or varieties.

FORMA OBESA Smith

Plate 156, Figure 3

Carapace very convex antero-posteriorly, usually shorter and broader than in typical *herbstii*. Lateral teeth more outstanding, their outer margins not forming a regular curve from the lateral angle to the orbital angle; the tips of the last two teeth not curved inward; the third to fifth teeth less sharp than in *typica*, the third and fourth blunt in the old, third suboblong. Chelae more elongate than in *typica*.

FORMA CRASSA A. Milne Edwards

Plate 157, Figure 3

Carapace wide, much swollen in the mesobranchial region. Front scarcely retreating in the middle, outer angles prominent. Lateral teeth more outstanding than in either of the two above described forms, second tooth smaller and less lobiform, last three teeth widely separated, acute and with a sharp granulated edge which is continued behind the fifth tooth; third tooth suboblong. Proportions of chelae intermediate between those of *typica* and *obesa*, and ambulatory legs narrower. Verrill's *minax* from Bermuda appears to be the same as *crassa*.

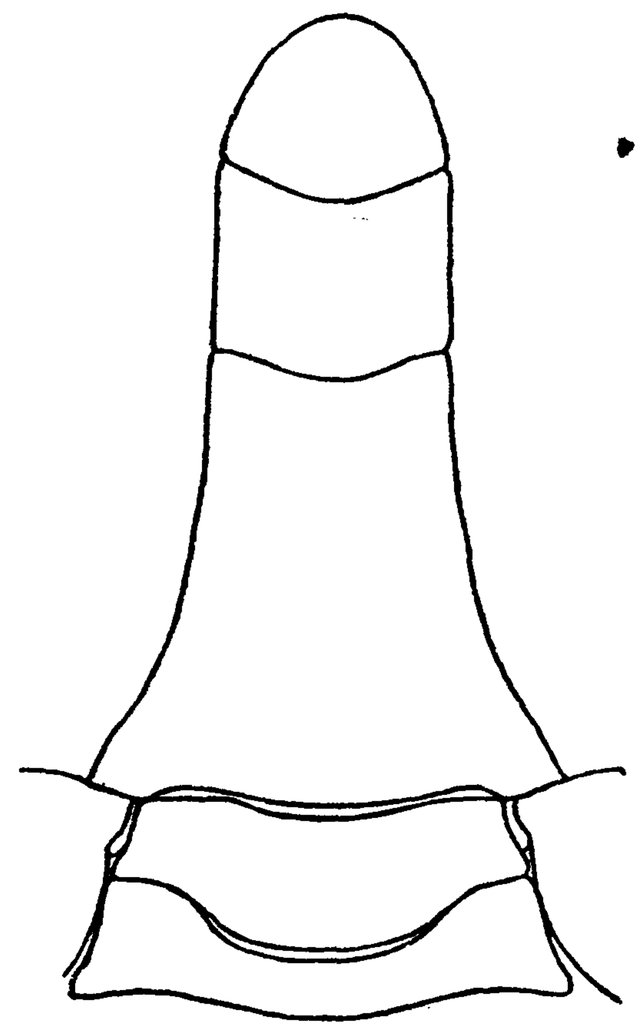

FIGURE 53.—PANOPEUS HERBSTII, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

FORMA SIMPSONI[40] **new**

Plate 157, Figures 1 and 2

Type Locality.—Apalachicola, Fla. Type, female, Cat. No. 56382, U.S.N.M.

Carapace rather narrow, more hexagonal than other forms of the species, due to the advanced front, the second lateral tooth being similar to, and no larger than the first tooth and situated almost entirely behind the level of the first tooth, the chord of the antero-lateral margin short, the last three teeth rather small, pointed, well separated, third pointing forward or in the old obliquely forward and outward, fifth tooth oblique, directed more outward in the old; a carina follows its summit and is continued on the carapace. Surface with many raised granulated lines, and with a scattering of stout vesiculous hairs; these hairs form also a dense covering on the ventral surface of the branchial region, the outer surface of the ischium of the cheliped and outline the segments of sternum and abdomen. Sub-hepatic tubercle flattened, free end directed forward. Chelipeds very unequal in both sexes, the major palm as high as its middle length. Legs of first three pairs narrow and rather long, in the fourth pair the last three articles are short and broad.

The forms here recognized are not always easily separated from one another. Some specimens can not be referred to any one of them but are intermediate. Intermediates may be found also in the same gathering with others representing a true form.[41]

Measurements

Forma	Catalogue No.	Sex	Carapace length	Carapace width	Fronto-orbital width	Front width
typica	4539	♂	31	43. 3	23. 6	12. 1
obesa	15784	♂	36. 1	51. 4	29	15
crassa	15412	♂	38. 8	57	30. 6	16
simpsoni	56382	♀	26	35. 3	22. 1	10. 2

Habitat.—Both *forma typica* and *forma obesa* were found in large numbers on the South Carolina coast by a survey party on the steamer *Fish Hawk* in 1891. *Forma typica* was taken at low tide on bunches of oysters while *forma obesa* was living in burrows in the banks above the water line. The shape of the convex form is attributable to its habitat, the mode of life being calculated to mold the body into a subcylindrical shape and to eliminate sharp points. Joseph D. Mitchell says of *forma simpsoni* on the coast of Texas, "It lives on oyster reefs and does not dig holes but scoops a place under a large

[40] For Charles T. Simpson, of Little River, Fla., who has devoted many years to the development of the flora and fauna of the State.

[41] Specimens of the different forms were sent to M. Gravier, Muséum National d'Histoire Naturelle, Paris, who compared them critically with type specimens of *P. herbstii* and *P. crassus*.

bunch of shells or piles a lot of small shells together over a depression in the mud in which it lives."

Range of the species.—From Boston, Massachusetts, to Florianopolis (or Desterro), Brazil; Bermuda. Occasional or accidental north of New Jersey.

The typical form is more northern than any other. There are specimens in the National Museum from Woods Hole (Massachusetts), Newport (Rhode Island), Chesapeake Bay (Maryland and Virginia), South Carolina and Florida (as far as Cedar Keys); Bermuda (Verrill).

Beaufort (North Carolina) is the most northern occurrence of *forma obesa;* it is known also from South Carolina, Florida Keys, west Florida, Louisiana, Cuba, Jamaica, St. Martin (Dutch West Indies), Curaçao, southern Brazil (from Bay of Rio de Janeiro to Florianopolis); Bermuda.

Forma crassa ranges from western Florida through the West Indies to Trinidad, and by way of Honduras, Panama and Colombia to central Brazil (from Mamanguape to the State of Rio de Janeiro); Bermuda.

Forma simpsoni is the prevailing, though not the exclusive, form in the Gulf of Mexico, as, in west Florida and Texas; it has been taken occasionally in South Carolina, where also various forms intermediate between the *typica* and *simpsoni* occur.

Material examined.—

MASSACHUSETTS.—Boston (M.C.Z.).

Vineyard Sound; 1875; 1 specimen (P.M.Y.U.).

Woods Hole; January 8, 1876; Vinal N. Edwards, U. S. Fish Commission; 1 specimen (40012), *forma typica.*

Buzzards Bay shore of Pasque Island, Elizabeth Islands; 6½–7½ fathoms; Sh. M.; July 12, 1905; station 84, *Phalarope,* Bureau of Fisheries; 1 young (Woods Hole Station).

RHODE ISLAND.—Newport; shore; 1880; U. S. Fish Commission; 2 males, 1 female (4539, 40114), *forma typica;* 2 males, 1 young female (P.M.Y.U.).

Drownville (M.C.Z.).

NEW JERSEY.—Maurice River Cove; November 16, 1928; H. G. Richards; 1 male, *forma typica;* returned to University of Pennsylvania.

MARYLAND.—Magothy Bay; on coon oysters; July 22, 1916; *Fish Hawk;* 2 males, 1 ovigerous female (56266), *forma typica.*

VIRGINIA.—Smith Island; December 24, 1898; William Palmer; 1 female (22328), *forma typica.*

Eastern shore of Chesapeake Bay: 1 female (42811), *forma typica,* from Union College. H. E. Webster; 1 male (56837), almost *typica,* varying toward *simpsoni,* from Boston Society of Natural History.

November 22, 1921; W. D. Schroeder; stations 26 and 27, Bureau of Fisheries; 1 female (57139), *forma typica.*

Chesapeake Bay, ½ mile southeast of Tangier Light; lat. 37° 47′ N.; long. 75° 58′ W.; 12 fathoms; January 18, 1914; station 8018; *Fish Hawk;* 1 male (56386), *forma typica.*

Western shore of Chesapeake Bay, in Northumberland County; December 23, 1914; P. L. Boone; 4 males, 4 females (48850), *forma typica.*

Lynnhaven Bay; July 14, 1916; *Fish Hawk:* 1 male, 1 female (56267), *forma typica.* In small creek at Hoeflicks; 1 female (56268), *forma typica,* overgrown with compound ascidian.

NORTH CAROLINA.—Beaufort; in oyster beds; R. Binford; 1 female (42849), *forma obesa.* Zoea hatched August 12, 1908.

Beaufort Harbor; 1928; Schmitt and Shoemaker: Shackleford Bank, inside; September 12; 1 female (62540), *forma typica.* Gallant Point; mud flats; September 13, 6 males, 3 females (62539), *forma typica;* September 14, 3 males (62538), *forma typica.*

SOUTH CAROLINA.—Winyah Bay; *Fish Hawk:* 1 young female (18623), *forma simpsoni.* Half a mile N. of wharf on South Island; 4 fathoms; hrd. Sh.; temperature 48.5° F.; January 3, 1891; 15+ specimens (15690), between *formae typica* and *simpsoni.* Lat. 33° 49′ 45″ N., long. 78° 04′ 00″ W.; 7 fathoms; hrd.; temperature 80.5° F.; July 12, 1915; station 8275; 3 males, 1 female (51022), *forma simpsoni.* Lat. 33° 13′ 22″ N.; long. 79° 11′ 07″ W.; 5 fathoms; hrd.; temperature 81° F.; July 10, 1915; station 8272; 1 male, soft-shell, 6 females (2 ovigerous), 1 young (56265), between *formae typica* and *simpsoni.*

Oyster Bay; 1890; 1 male, 1 female (15730).

Old Man Creek; December 30, 1890; *Fish Hawk;* 2 young (15741), atypical varying toward *forma simpsoni.*

Bulls Bay; 1891; *Fish Hawk;* 1 male, 2 females, 2 young (15775).

Cooper River; 300 yards above Lighthouse wharf, lower entrance; 5 fathoms; hrd. Co.; temperature 50° F.; January 16, 1891; station 1646, *Fish Hawk;* 1 female y. (59938).

Charleston; 2 females (57011), *forma obesa,* from Boston Society of Natural History.

Colleton River; between tide marks in stone and sand; January 21, 1891; U. S. Fish Commission; 1 female (56379), *forma obesa.*

Morgan River; under bunches of oysters; February 24, 1891; *Fish Hawk;* 8 males, 16 females (15780), *forma typica.*[42]

Myrtle Bush Creek; 1891; *Fish Hawk;* 13 specimens (15772).

Jericho Creek; January 23, 1891; *Fish Hawk;* 25 specimens (15782), *forma typica;* 3 young (26150), atypical varying toward *forma simpsoni.*

[42] Compared by M. Gravier with Milne Edwards's types in Paris Museum.

Cat Island Creek; *Fish Hawk;* 2 females (15779).

West end Port Royal Island; January 27, 1891; *Fish Hawk;* 22 males, 34 females (15768, 15784), *forma obesa.*

Near Port Royal; *Fish Hawk;* 1 female, 4 young (15726), *forma typica.*

Paris Island; January 19, 1891; *Fish Hawk;* 1 young (15742), *forma obesa.*

Mouth of Bull Creek; 1891; *Fish Hawk;* 1 male, 1 female, 1 young (15722).

Calibogue Sound; *Fish Hawk;* 1 female (15737).

FLORIDA.—St. Augustine (P.M.Y.U.).

Mouth of Indian River (P.M.Y.U.).

Near Indian Key; H. Hemphill; 1 male, 3 females (15018, 15423).

Key Vaccas; December, 1883; H. Hemphill; 2 males, 1 female (14071).

Big Pine Key; H. Hemphill; 1 male, 1 female (15014).

Harbor Key; H. E. Webster; 1 male (56838), *forma typica,* received from Boston Society of Natural History.

Key West: 1884; *Albatross;* 9 males, 8 females (7512). 1884; Edward Palmer; 1 male, 1 female (9254), between *formae typica* and *obesa.* H. Hemphill; 2 males, 5 females (9296), varying from *typica* toward *obesa* and *crassa.*

Off North Fort Murtane; July 14, 1924; W. L. Schmitt; 10 males (2 soft shell), 4 females (62541, 62542) between *forma obesa* and *forma typica;* gift of Carnegie Institution.

Boca Grande; April 27, 1915; E. Danglade, *Fish Hawk;* 1 ovigerous female (56360), *forma simpsoni.*

Tortugas: Garden Key; 18 males, 10 females (2077), *forma obesa.* Off coal dock and Bird Key Reef; June 26, 1925; W. L. Schmitt; 4 males, 6 females (3 ovigerous), (59456) nearly typical; received from Carnegie Institution. From stomach of gray snapper, *Neomaenis griseus* (L.); June 21, 1925; W. L. Schmitt; 1 pair of chelipeds (61122), received from Carnegie Institution. Bush Key Reef; July 16, 1926; C. R. Shoemaker; 2 males (59937), var. between typical and *forma crassa.* Mid-section of Bush Key reef; August 1, 1924; W. L. Schmitt; 2 males, 2 females (62544), *forma obesa;* gift of Carnegie Institution.

Marco; H. Hemphill; 6 males, 1 female, 1 young (15017, 15636); 2 males, 1 female (15412) *forma crassa.*

Oyster Bay; H. Hemphill; 2 females (15013), 2 young (15637), *forma simpsoni.* Ferguson's Pass; 1 male (15419), *forma obesa.*

Punta Rassa; February, 1884; H. Hemphill; 18 males, 8 females (6438), 1 young (18261).

Sanibel Island; February 22, 1928; O. C. Van Hyning; 2 females, returned to Florida State Mus.

Sarasota Bay: February, 1884; H. Hemphill; 2 males (6425), 1 female (15421) *forma obesa.* H. E. Webster; 1 male (56839), *forma obesa*, received from Boston Society of Natural History.

Cortez; J. W. Velie; 2 specimens (39122), *forma obesa.*

Palma Sola, mouth of Manatee River; January, 1884; H. Hemphill; 10 males, 18 females (6433), leaning toward *forma simpsoni.*

Egmont Key; cotypes of *forma obesa* (P.M.Y.U.).

Tampa Bay: H. Hemphill; 8 males, 3 females (15407). 1889; *Grampus;* 1 male (15224). Near Piney Point; 2 fathoms; H. Hemphill; 12 males, 4 females (6962).

Goodland Point; H. Hemphill; 11 young (1 abnormal) (6985, 15635), *forma simpsoni.*

Boca Ceiga Bay, inner shore of Pine Key; January, 1884; H. Hemphill; 1 female (6447).

Clearwater; July 14, 1879; S. T. Walker; 2 males, 1 female (3277).

Cedar Keys: H. Hemphill; 10 males, 4 females (6982, 15413, *forma simpsoni;* 15417, *forma typica*). January, 1918; O. C. Van Hyning; 1 male (57846), *forma crassa*, gift of Florida State Museum. From gullet of *Rallus crepitans scotti* female; March 20, 1926; G. S. Miller, jr., and C. R. Aschemeier collectors; 1 young female (60806), *forma crassa.* Flats at low tide; March 27, 1926; Miller and Aschemeier; 1 male (60919), *forma typica.*

St. George Sound; 1860; H. A. Purdie; 1 female (56841), *forma simpsoni*, from Boston Society of Natural History.

Apalachicola; July 16, 1915; E. Danglade, *Fish Hawk;* 6 males, 2 females (56382), *forma simpsoni;* 1 female is type.

Apalachicola Bay, vicinity of New Inlet; in algae on oysters; 1 female (61377), *forma simpsoni.*

Apalachicola; summer, 1928; J. V. and Frank F. Gander; 1 young male (62545), *forma simpsoni.*

Pensacola; 1878; S. Stearns; 1 specimen (3466).

MISSISSIPPI.—Henderson Point; Sept. 2, 1928; Tulane University; 1 female, *forma simpsoni;* returned to sender.

LOUISIANA.—Grand Isle, near New Orleans; G. Kohn; 1 female (2256), *forma obesa.*

TEXAS.—Galveston Bay; November 5–15, 1891; B. W. Evermann, U. S. Fish Commission; 1 male (17101), *forma simpsoni.*

Matagorda Bay: J. D. Mitchell; 3 males, 2 females (20639), *forma simpsoni;* Palacios Reef; December, 1904; T. E. B. Pope, Bureau of Fisheries; 3 females (33029, 33030), *forma simpsoni.*

MEXICO.—Vera Cruz; P. Geddes (Brit. Mus.).

HONDURAS.—Near Belize; W. A. Stanton; 1 female (21376), *forma crassa.*

BAHAMAS.—H. Bryant; 1 male (57008), between *formae obesa* and *crassa*, received from Boston Society of Natural History.

Green Turtle Cay; E. A. Andrews; 1 male (20710), between *formae typica* and *obesa*.

Bahama Banks; 1893; State University of Iowa Expedition; 1 female (Mus. S.U.I.).

CUBA.—1914; Henderson and Bartsch, *Tomas Barrera* Expedition: Ensenada de Cajon, off Cape San Antonio; station 11; May 22; caught by copper sulphating reef; 2 males (48559), *forma obesa*. Punta Colorado; station 10; 2–3 fathoms; Sh. Grs.; 1 male (48553), *forma crassa*. Los Arroyas; station 8; May 20; 2 females (48551), *forma obesa*.

Mariel; under stones between tides; May 10, 1900; William Palmer and J. H. Riley; 15 specimens (2 with Peltogastrid parasite) (23829), *forma obesa*.

Cardenas; 1923; Francisco R. Sosa; 4 males, 1 female (58393), *forma obesa*.

Guantanamo Bay; on beach; Lieut. Commander George E. Brandt, U. S. S. *Borie;* 1 young female (59896), *forma obesa*.

Nueva Gerona, Isle of Pines; Mario Sanchez Roig; 1 male (53343), *forma crassa*.

HAITI.—Jeremie (M.C.Z.).

JAMAICA.—1884; *Albatross;* 2 males, 2 females, 1 young (15654), *forma crassa*.[43] T. H. Morgan; 1 female (59472), *forma crassa*. February 4, 1928; C. R. Orcutt; 1 female ovigerous (61366).

Montego Bay; 1910: Brackish pond near seashore; June 2; C. B. Wilson; 4 males, 2 females (42933), *forma crassa*.

Bogue Islands; on mangrove roots with sponges, ascidians, etc.; June 20; C. B. Wilson; 2 males, 4 females (45931), inclining toward *P. occidentalis*. Salt Pond; June 28; E. A. Andrews; 1 male, 2 females (41750), *forma crassa*.

Kingston Harbor; May–July, 1896; F. S. Conant; 3 young (19591), *forma crassa*, probably.

Jamaica; C. R. Orcutt: 1 male (62543); *forma obesa*. Kingston; 1 young male (62537).

PORTO RICO.—1899; *Fish Hawk:* San Juan; January 12; 1 female (24266). Porto Real; in mangrove swamp; January 27; 1 female (24246). Ponce; reefs; January 30; 1 male, 2 females (24268). Ensenada Honda, Culebra; February 9; 2 young (24329). All are *forma crassa*.

LEEWARD ISLANDS.—St. Martin; 1905; J. Boeke: Philips Bay; April; Dr. Shaw collector; 1 ovigerous female (Leiden Mus.). Simson's Bay, lagoon, inside sponge; September; 1 ovigerous female (42979), *forma obesa*.

Antigua; 1918; Barbados-Antigua Expedition, State University of Iowa: English Harbor; 1 young male (58037), *forma crassa*. Pillars of Hercules; 1 male, thin shell, 2 young (Mus. S.U.I.).

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[43] Compared by M. Gravier with A. Milne Edwards's types in Paris Museum.

BARBADOS.—1918; Barbados-Antigua Expedition, State University of Iowa; 1 male (58036), *forma crassa;* 1 male, 1 female (Mus. S.U.I.).

TRINIDAD.—Shore; January 30–February 2, 1884; *Albatross;* 2 males, 1 female (7640). February, 1878; Crosby collector; 1 male, 1 female (57012), from Boston Society of Natural History. All are *forma crassa.*

DUTCH ISLANDS, OFF VENEZUELA.—1905; J. Boeke; specimens in Leiden and Amsterdam Museums. Bonaire; lagoon, shallow water (½ fathom), in mangroves; 1 young. Curaçao; rifwater, shallow water, mud; September 4; 1 male. Caracas Bay, Curaçao; 3 fathoms; October 21; 1 immature female. Aruba; Paarden Bay; 1 fathom; coral rocks; August 3; 1 young.

Curaçao: February 10–18, 1884; *Albatross;* 9 males, 7 females (7585), between *formae obesa* and *crassa.* Caracas Bay; small pool; April 26, 1920; C. J. van der Horst; 1 young female, soft shell, and 1 male from under a stone (both in Amsterdam Mus.). Spanish Water; 1920; C. J. van der Horst: April 17; 3 young (Amsterdam Mus.). May 7; 1 female (56889), *forma obesa.*

VENEZUELA.—Cumana (M.C.Z.).

COLOMBIA.—Sabanilla; March 16–22, 1884; *Albatross;* 3 males, 4 females (7562), between *formae obesa* and *crassa;* 1 young, very small (15655), probably *forma crassa.*

PANAMA.—Fox Bay, Colon; Meek and Hildebrand, Smithsonian Biological Survey: January 19, 1911; 1 male (44181), *forma crassa.* March 22, 1912; 2 males, 2 females (59319), 1 male, 2 females (Field Mus.).

Toro Point, Canal Zone; April 12, 1911; same collectors; 1 male (44180).

BRAZIL.—Para (M.C.Z.).

Mamanguape stone reef; June 23, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 female (25732) *forma crassa.*

Rio Parahyba do Norte, Cabedello; on mangroves; June 20, 1899; same collector; 4 males, 5 females (25733), *forma crassa.*

Pernambuco stone reef; July 7, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 small female without chelipeds (25734), *forma crassa.*

Plataforma, Bahia; 1876–1877; Richard Rathbun, Hartt Explorations; 1 female (40585), *forma crassa.*

Mapelle, Bahia; same collector; 1 male (40584), *forma crassa.*

Ilhéos, Bahia; 1919; E. Garbe; 1 female; lent by Mus. Paulista (1225, part), *forma obesa.*

Barra de São João, Est. Rio de Janeiro; October, 1912; E. Garbe collector; 1 male (47847), *forma crassa,* received from H. von Ihering.

Paqueta, Bay of Rio de Janeiro; August 19, 1925; W. L. Schmitt; 8 males, 6 females (2 ovigerous) (59457), *forma obesa.* One immature female is atypical, leaning toward *americanus.*

São Francisco, Bay of Rio de Janeiro; sandy beach and adjacent rocks; August 25, 1925; W. L. Schmitt; 1 male, 1 female (59460), *forma obesa.*

Between Canals 4 and 5, Estuario, Santos; September 13, 1925; W. L. Schmitt; 10 males, 4 females (1 ovigerous) (59461), *forma obesa.*

Piassaguera, Santos; June, 1913; H. von Ihering; 1 male (47851), *forma obesa.*

Paranagua; sandy mud flats, under scattered rocks; October 3, 1925; W. L. Schmitt; 8 males (1 soft shell), 2 females (59462), *forma obesa* or near it.

Ilha São Francisco, Santa Catharina; October 28–29, November 1, 1925; W. L. Schmitt; 3 males, 11 females (2 ovigerous) 1 young (59465), *forma obesa.* October 7, 1925; 1 young (59458) *forma obesa.*

Florianopolis; Praia de Fora (rocks); November 5, 1925; W. L. Schmitt; 4 males, 2 females (1 soft shell) (59459), *forma obesa.*

BERMUDA.—1876–1877; G. Brown Goode; 3 specimens (43046), *forma crassa.*

W. N. Rankin; 1 female (25825), *forma obesa.*

PANOPEUS PURPUREUS Lockington

Plate 158, fig. 1; Plate 159

Panopeus purpureus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 101 [7] (type-localities, Magdalena Bay and La Paz; types not extant).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 316, pl. 57, fig. 3.—RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 541.

Diagnosis.—Front broad. Coalesced (first plus second) lateral tooth narrow, width equal to that of fourth tooth. Exorbital notch deep. Color of immovable fingers not covering proximal end. Legs slender. Tip of male abdomen arcuate.

Description.—Carapace very high in the middle, convex in both directions. Lateral boundaries of cardiac and metagastric regions deep, of protogastric and mesogastric regions shallow. Surface densely granulate, with a few raised lines of granules, which are not prominent, namely, one long, transverse, on epibranchial region, one transversely oblique, leading inward from the last lateral tooth, a faint irregular, usually broken, protogastric line and a short epigastric one. Front edge sinuous, a well formed, rounded lobule at outer angle; lobes of middle pair with a slight indentation not far from median line; median notch small, continued by a closed fissure. Inner orbital angle obtuse, margin between superior closed fissures transverse, outer suborbital emargination broad and deep, the lower margin of the orbit being advanced at this point in a small tooth; inner lower tooth bluntly rounded and set off by a V-shaped cut. Antero-lateral margin short, about two-thirds as long as postero-lateral margin; first or orbital tooth an isosceles triangle, tip rectangular; second tooth with a convex outer margin directed forward and

inward, tip similar to first tooth and equally (in the old) or nearly as advanced as the first tooth. The coalesced first and second tooth is uncommonly long and narrow, its width at base is equal to width of fourth tooth, its extremity is narrow with a small emargination. Third tooth short and broad, anterior margin concave or (in the old) slightly sinuous, outer or posterior margin convex, acute, tip pointing slightly inward. Fourth tooth larger than third, anterior margin concave, posterior convex, acute tip pointing directly forward. Fifth tooth of good size, although smaller than third, narrow, conical, directed outward and slightly forward.

Subdistal tooth of merus of chelipeds acute. Distal furrow of carpus faintly indicated. Palms elongate, much higher at distal than proximal end; a few low uneven tubercles on inner side of proximal half of upper surface. Major propodal finger nearly horizontal, minor one deflexed, tips of both upturned, color not quite covering base of finger. Ambulatory legs long and narrow, propodus of last pair only slightly wider than that of fourth pair.

Abdomen of male elongate, sixth segment a little wider than its greatest length, free edge of terminal segment broadly rounded.

Color.—Carapace, dark bluish brown; upper surface of chelipeds lighter violet brown; both carapace and chelipeds spotted with irregular blotches of dark reddish brown. Under surface of chelipeds orange yellow. Fingers light brown, white at tips.

Measurements.—Male (40427), length of carapace 35.6, width of same 51.2, fronto-orbital width 30, width of front 15.7 mm.

Relation.—Nearest to *P. herbstii forma crassa* which, however, has more short transverse markings on the carapace, a wider coalesced lateral tooth, narrower front, less prominent lower orbital margin, and more extensive color on immovable fingers.

Range.—From Mexico (Magdalena Bay and Guaymas) to Peru.

Material examined.—Guaymas, gulf side, Mexico; under stones; scarce; February 27, 1891; P. L. Jouy; 5 males, 2 females, 1 young (16080, 16081).

Gulf of Fonseca, Salvador-Nicaragua; J. A. McNiel; specimens in M.C.Z.

Puntarenas, Pacific-Estero side, Costa Rica; inhabits mangroves; February, 1905; J. F. Tristan; 2 females (32326).

Puntarenas, Costa Rica; January 10, 1927; M. Valerio, 1 male (60836).

Canal Zone, Panama; Meek and Hildebrand, Smithsonian Biological Survey: Corozal; April 20–21, 1911; 1 male (44182), 1 male (Field Mus.). Balboa; tide; February 1, 1912; 1 female (59320).

Mouth of Rio Tumbes (Boca Alamo), Peru; in casting net; January 15, 1908; R. E. Coker; 1 male (40427), received from Peruvian Government.

PANOPEUS CHILENSIS Milne Edwards and Lucas

Plate 158, fig. 3; Plate 160

Panopeus chilensis MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 16; atlas, vol. 9, 1847, pl. 8, fig. 2–2*b* (type-locality, Chile; cotypes in Paris Mus., one cotype in U. S. Nat. Mus., No. 20264, one in Phila. Acad.).

Panopeus validus SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 278 (type-localities, Panama and Acajutla, Salvador; types in Peabody Mus. Y.U.).

?*Panopeus bradleyi* SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 281 (type-locality, Panama; type not located in Peabody Mus. Y.U.).

Eupanopeus chilensis RATHBUN, Bull. Lab. Nat. Hist., State Univ. Iowa, vol. 4, 1898, p. 273.

Eupanopeus bradleyi RATHBUN, Bull. Lab. Nat. Hist., State Univ. Iowa, vol. 4, 1898, p. 273.

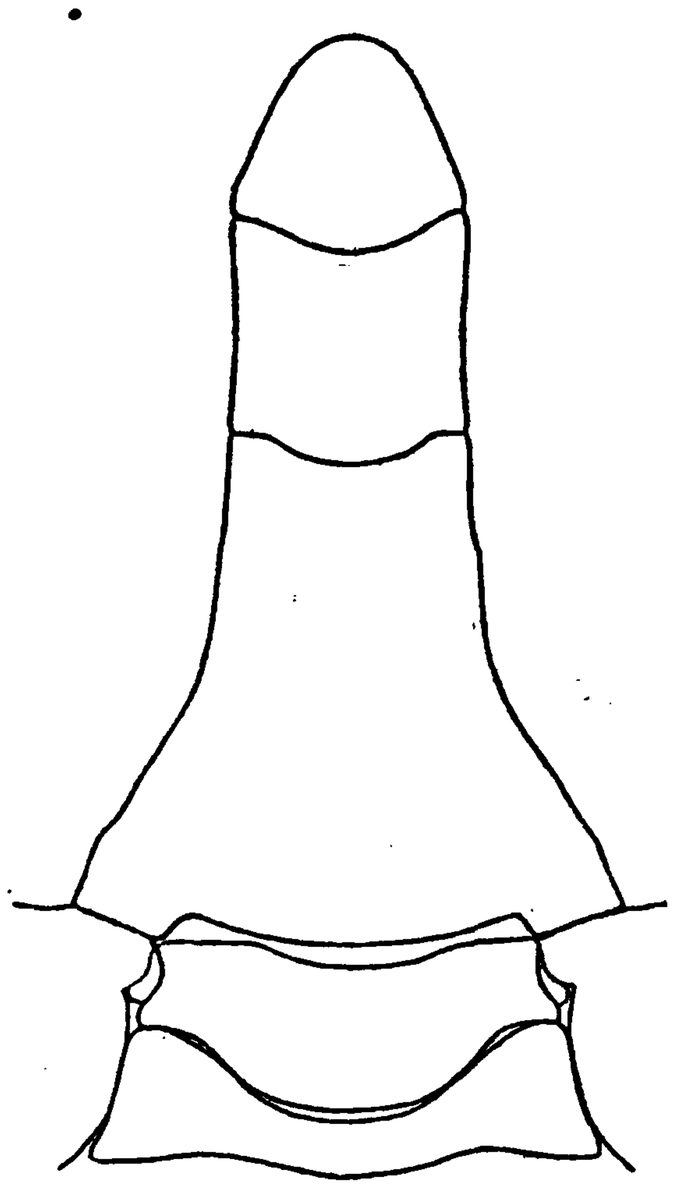

FIGURE 54.—PANOPEUS CHILENSIS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Diagnosis.—Front narrow. Second to fifth lateral teeth large and strongly curved. Middle portion of lower orbital margin a strong tooth. Color of immovable fingers spreading on palm. Abdomen of male constricted between fifth and sixth segments.

Description.—Carapace moderately convex, coarsely granulate. Grooves defining gastric region and anterior cardiac region deep; branchio-hepatic groove shallower. Transverse granulate lines weak; the strongest are the epibranchial, hepatic, and epigastric; the protogastric regions have various short irregular lines. Front narrow, prominent, with a small, very distinct lobule at either end; submedian lobes more advanced, edge forming a single arch with a very slight median emargination which is followed by a deep, almost closed or slightly button-holed fissure. Inner border of orbit strongly elevated, ending in an acute tooth; superior border between fissures short, arched forward; a broad and deep external emargination, below which is a strong tooth which forms a large part of the lower wall of the orbit; its inner slope is long and slightly bilobed; tooth at inner angle more advanced and conical. Subhepatic tubercle large, conical, below anterior part of second lateral tooth. Antero-lateral margin nearly as long as postero-lateral, teeth large (except first), well separated. First (or orbital) tooth small, an equilateral triangle with a blunt point, separated from next tooth by a deep and very broad sinus. Second tooth with a strongly arched outer margin and a concave inner one, tip blunt. Third, fourth, and fifth teeth also strongly curved forward, the inner edges concave; third wider at base than fourth, fifth much narrower and thicker, but still longer and stronger than usual

in the genus; the carapace is distinctly widest between tips of teeth of this last pair.

Chelipeds somewhat shorter than in *P. purpureus;* subdistal tooth on merus short and broad; carpus uneven, covered with reticulating rugae, a distal groove present, inner tooth short, blunt; manus shorter in relation to its height than in *purpureus*, covered on the greater part of its surface inside and out by a reticulating color pattern; upper surface somewhat flattened, grooved only at proximal end. Color of immovable finger running well back on hand in male, especially on lower margin but more restricted in female; the major finger is high at base and has on the prehensile edge a well-developed subbasal tooth which helps to define the sinus into which the large tooth of the dactyl fits. Ambulatory legs rather broad, especially propodus of last leg; dactylus of this leg only a little longer than propodus. The dactyls of the other legs are longer (1½ times) than their respective propodites. The legs besides a short tomentum have a marginal fringe of tubular hairs.

Abdomen of male strongly constricted between fifth and sixth segments; terminal segment with rapidly convergent sides and a rounded tip.

Color.—General color bright bottle green, mixed with yellowish above. Chelipeds bluish green above, bright yellow orange below, fingers brownish. Legs and lower surface of body yellowish white. (Milne Edwards and Lucas.)

Measurements.—Male (13930), length of carapace 34, width of carapace 48.4, fronto-orbital width 24, width of front 11.7 mm.

Relation.—In the shape of the carapace, the narrow front and orbits and the curve of the antero-lateral teeth coinciding with the direction of the margin, this species resembles *P. rugosus*, but the latter is much rougher and hairier, and the hands and fingers deeply grooved.

Range.—From Sinaloa, Mexico, to Chile.

Material examined.—States of Sinaloa and Nayarit, Mexico; 2–12 meters; Secretaria de Agricultura y Fomento; 1 male, 3 females (1 ovigerous) (60233).[44]

Mazatlan, Mexico; September 29, 1922; C. R. Orcutt; 1 ovigerous female (56687).

Maria Madre Island, Mexico; March–May, 1927; from Secretaria de Agricultura y Fomento, through A. L. Herrera; 1 young male, 3 young females (60804).

Carbon Island, Corinto, Nicaragua; J. A. McNiel; specimen in M.C.Z.

Punta Arenas, Pacific coast of Costa Rica; January, 1907; J. F. Tristan; 1 male, 3 females (39086), received from P. Biolley.

[44] "Species most abundant in oyster beds. Females were found with eggs in two different seasons; first from May to July, and for the second time in December and January. I could not observe whether two broods were hatched per annum; or only one, the females laying eggs at different seasons."

Panama: 1 female (19872), received from Ward's Natural Science Establishment. Panama (?); 1 male (13930). Panama City; J. Zetek: December 12, 1913, 1 male (48792); October 5, 1914, 1 male (48783). Shore of Panama; low tide, rocks; May–July, 1924; E. Deichmann, 1 male, 1 female with Rhizocephalid (60803).

Paita, Peru; October 8, 1926; W. L. Schmitt; 1 cheliped (62723).

Oyster beds of Matapalo (near Capon), Peru; January 23, 1908; R. E. Coker; 1 female (40426), received from Peruvian Government.

Chile; d'Orbigny; cotypes (Paris Mus.), 1 male cotype (20264), 1 male cotype, Guérin collection (Phila. Acad.).

PANOPEUS OCCIDENTALIS Saussure

Plate 161

Panopeus occidentalis SAUSSURE, Rev. et Mag. Zool., ser. 2, vol. 9, 1857, p. 502 (type-locality, Guadeloupe; type in Geneva Mus.); Mém. Soc. Phys. Genève, vol. 14, 1858, p. 431 [15], pl. 1, fig. 6.—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 310.—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 360, pl. 20, fig. 3; pl. 23, fig. 14.

Panopeus serratus SAUSSURE, Rev. et Mag. Zool., ser. 2, vol. 9, 1857, p. 502 (type-locality, Guadeloupe; type in Geneva Mus.); Mém. Soc. Phys. Genève, vol. 14, 1858, p. 432 [16], pl. 1, fig. 7.—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 371, pl. 24, figs. 3 and 4.

Eupanopeus occidentalis RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 29.

Eupanopeus serratus VERRILL, Trans. Connecticut Acad. Arts and Sci., vol. 13, 1908, p. 353, text-figs. 14*d* and 18, pl. 16, figs. 1 and 5.

Diagnosis.—Front narrow, advanced. Gastric region convex. Lateral teeth thick and deeply separated. Third tooth broad and blunt, forming almost a right angle at tip. Wrist with distal groove. Dark color of propodal finger not continued on palm. Sixth segment of male abdomen usually narrowed toward proximal end.

Description of the typical form (Plate 161, fig. 2).—Differs from *P. herbstii* as follows: Carapace more convex especially the gastric region. Second tooth of lateral margin usually narrower and separated by a deeper sinus from first tooth; third to fifth teeth thicker, more prominent and more widely separated from each other; third tooth blunt. forming almost a right angle at the tip. Front narrower and more advanced. Carpus of chelipeds with a groove parallel to distal margin. Dark color of thumb not continued on palm. Ambulatory legs a little longer and slenderer. Abdomen of male wider, especially noticeable at penult segment, which is inclined to narrow a little toward proximal end.

Color.—Carapace dull yellow spotted with brown and red; feet nankin yellow, with some brown maculations and speckles on chelipeds and brown or rose streaks on the ambulatories (Desbonne and Schramm). In Brazilian specimens the speckles on the palm form a partially reticulate pattern, the color runs further down the outer

surface than in *herbstii*, and one misses the scattered round dots characteristic of the latter species.

Variation.—There is considerable variation even in the same lot of specimens. The carapace may be almost smooth and shining or have some slight, granulate, transverse lines. The second tooth of the lateral margin may be small, subacute, similar to the first tooth instead of broadly rounded and larger than the first one. The sides of the sixth abdominal segment in the female may be parallel or nearly so instead of converging slightly toward proximal end. In a lot of six from Brazil (Ilha Governador) the carapaces are rather more convex and more oval than usual and two large males of subequal size differ remarkably from each other in their antero-lateral margins; in one all the sinuses are deep and all the teeth subtriangular; in the other the sinuses are shallow, the outer margins of the second, third, and fourth teeth are long and arcuate. Certain assemblages of specimens differ in several respects from the typical form and yet are not so homogeneous as to warrant a specific designation. They may be known as a *forma*

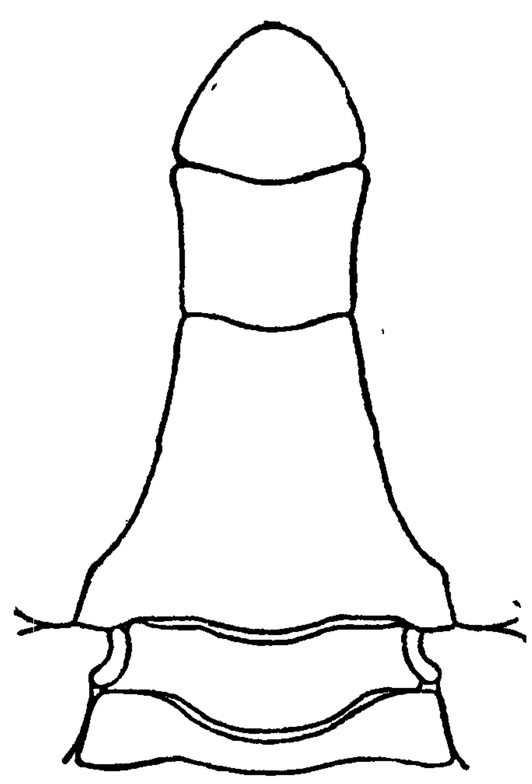

FIGURE 55.—PANOPEUS OCCIDENTALIS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

FORMA SERRATA Saussure

Plate 161, Figures 1 and 3

Differs from true *occidentalis* in the carapace more rugose, the third, fourth and fifth teeth widely separated and more outstanding, the second tooth usually narrow and subtriangular. Carpus of cheliped rugose. Within the form, the abdomen varies in the amount of constriction and the carapace varies in shape, leaning either toward the hexagonal or to the oval.

Measurements.—A smaller species than *P. herbstii.*

Forma	Catalogue No.	Sex	Carapace length	Carapace width	Fronto-orbital width	Front width
typica	59463	♂	22. 6	33	17	9
serrata	15713	♂	19. 1	27. 7	15. 6	8

Range.—From South Carolina, by way of the Gulf of Mexico, to State of Santa Catharina, Brazil. Bermuda.

Material examined.—Unless otherwise indicated, the form of the specimens listed below is typical or near typical.

SOUTH CAROLINA.—Calibogue Sound; *Fish Hawk:* Off south end of May River; 10 fathoms; hrd.; temperature 51° F.; January 16, 1891; station 1651, 1 young female (59491) typical; 6 males, 8 females, 8 young (15713), *forma serrata.* Between stations 1646 and 1651; 1 young female (15737), *forma serrata.*

Material examined of Panopeus occidentalis from Fish Hawk dredgings in Florida

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			° C.						
Hawk Channel	¼ mile SW. by S. of Basin Hill Beacon.		2	S. G	20.5	Feb. 19, 1903	7469	*Fish Hawk*	1♀	59939	*Forma serrata.*
Off Cape Sable	25 06 52	81 22 25	4.25	gy. S. brk. Sh	23	Dec. 18, 1902	7359	do	1♂ 1♀ 1 y	59940	
Do	24 58 05	81 28 30	5	rky	22	Dec. 19, 1902	7373	do	1♂ 1♀	59941	
Do	25 00 55	81 22 15	4	rky	22	do	7372	do	1♂	59942	
Do	25 01 00	81 25 30	4.5	Sp. S. Sh	23	do	7375	do	4♂ 2♀	59943	
Do	25 07 05	81 25 50	4.5	gy. S	23	Dec. 18, 1902	7360	do	24♂ 16♀	59944	
Do	25 07 10	81 29 00	5	rky. Co	23	do	7361	do	4♂ 1♀	59945	
Do	E. end Sawyer Key, S. ¼ W., 2¼ miles.		4.75	rky	22.5	Dec. 22, 1902	7390	do	2♂ 3♀ 1 y	59946	
Off Sarasota Bay	Longboat Inlet, ENE., 4½ miles.			S. brk. Sh		Jan. 5, 1913	7802	do	1♀	60922	Do.

FLORIDA.[45]—Miami; G. M. Gray; 1 male, 1 young female (42128).

Biscayne Bay, near Cape Florida; U. S. Fish Commission; 2 males (31470), *forma serrata.*

Carysfort Reef; 1884; Edward Palmer; 1 male (9297), *forma serrata.*

Indian Key; H. Hemphill; 1 male (15418), *forma serrata.*

Knights Key; January 21, 1903; *Fish Hawk;* 1 male (60808), *forma serrata.*

No Name Key; H. Hemphill; 4 males, 2 females (15015).

Key West; D. S. Jordan; 2 males, 2 females (15424). Along shore among rocks; 1885; H. Hemphill; 6 males, 13 females (14445). 1884; *Albatross;* 1 female (16335).

South Florida: S. Stearns; 1 male (3464).

Tortugas: June 5–8, 1893; Biological Expedition, State University of Iowa; 2 young males (Mus. S.U.I.). Garden Key; on coral rock and piling; December 25, 1912; *Fish Hawk;* 1 male (60921), *forma serrata.* Carnegie Institution; W. L. Schmitt collector: June 6, 1925; Long Key; 1 male, 1 female (59466). June 3, 1925; Rocks about lighthouse pier, west side of Loggerhead Key; 1 male (59464). Fort Jefferson moat; July 16, 1924; 1 female (62548). Fort Jefferson moat; washed from seaweed; July 27, 1924; 1 male (62549), *forma serrata.* West side Bush Key reef, near Long Key; 4 feet; from holes in rocks; July 30; 1 male, 1 female (62547).

[45] See also table on this page.

Florida Keys; May, 1913; J. B. Henderson; 1 male (46041).

Off Cape Sable; lat. 25° 00′ 55″ N.; long. 81° 22′ 15″ W.; 4 fathoms; rky.; temperature 22° C.; December 19, 1902; station 7372, *Fish Hawk;* 1 female (60807).

Marco; 1–3 fathoms; H. Hemphill; 15 males, 19 females, numerous young (15427).

Goodland Point; H. Hemphill; 4 young (15426), *forma serrata.*

Sarasota Bay; Union College collection; 2 young (42812, 42813).

Boca Ceiga Bay, inner shore of Pine Key; January, 1884; H. Hemphill; 4 males, 3 females (15425).

BAHAMAS.—H. Bryant; 1 male (56842), from Boston Society of Natural History. New Providence; 1886; *Albatross;* 1 male (16334).

CUBA.—Guadiana Bay (M.C.Z.).

Cabañas; S. Sh. Grs. M.; June 8–9, 1914; station 16; Henderson and Bartsch, *Tomas Barrera* Expedition; 1 male, 1 female (48567).

Varadero Playa, Bay of Cardenas; under stones near shore; April, 1927; Melbourne Ward; 1 male; returned.

JAMAICA.—1884; *Albatross;* 2 males, 1 female (7678). T. H. Morgan; 1 male (59473).

Bogue Islands, Montego Bay; on mangrove roots with sponges, ascidians, etc.; June 20, 1910; C. B. Wilson; 6 young (2 males, 4 females) (45931).

Coral reef, 8 miles east of Montego Bay; July 20, 1910; C. B. Wilson; 1 female (42934), toward *forma serrata.*

Kingston Harbor: May–July, 1896; F. S. Conant; 1 male, 2 females (19590). May 31, 1927; C. R. Orcutt; 1 cheliped (62546).

DOMINICAN REPUBLIC.—Boca del Infierno, Samana Bay; February, 1928; Gerrit S. Miller, Jr.; 1 male, 3 females (61888), leaning toward *forma serrata.*

PORTO RICO.—1899; *Fish Hawk:* Hucares; February 14; 2 females (1 with *Sacculina*) (24330).

LEEWARD ISLANDS.—St John (Copenhagen Mus.).

St. Croix: Christiansted Lagoon (Copenhagen Mus.).

St. Martin; very shallow water; stony bottom; August, 1905; J. Boeke; 1 ovigerous female (Leiden Mus.).

Guadeloupe: Cotypes (Geneva Mus.). Specimens (Berlin Mus.).

CARIBBEAN SEA.—Old Providence (east of Nicaragua); April 4–9, 1884; *Albatross;* 1 male (9135).

NORTH COAST OF SOUTH AMERICA.—Fox Bay, Colon, Panama; 1912; Meek and Hildebrand, Smithsonian Biological Survey; 3 males, 1 female (Field Mus.); 3 males, 2 females (1 ovigerous) (59324).

Sabanilla, Colombia; March 16–22, 1884; *Albatross,* 3 males (15656).

Curaçao: February 10–18, 1884; *Albatross;* 10 males, 13 females (7588). Schottegat (lagoon): among pieces of coral (*Madrepora*);

April 15, 1905; J. Boeke; 1 male (returned to sender). 1 fathom; among algae; July 9, 1905; J. Boeke; 1 young female (returned to sender). Bay of Caracas; 3 fathoms; October 21, 1905; J. Boeke; 1 male (42951). Spanish Water; April–May, 1920; C. J. van der Horst; 1 male, 1 young (56890), toward *serrata*.

Bonaire; lac (lagoon); shallow water (½ fathom); in mangroves; J. Boeke; 1 male, 1 female (returned to sender).

Trinidad; 1884; *Albatross:* Shore; January 20–February 2; 3 males, 1 female (15657), *forma serrata*. Monos Island; January 30–February 2; 1 young (59492), *forma serrata*.

Cayenne, French Guiana (Brit. Mus.).

BRAZIL.—Rio Parahyba do Norte, Cabedello, on mangroves; 1899; A. W. Greeley, Branner-Agassiz Expedition; 2 males (Stanford Univ.).

Ilha Governador, Bay of Rio de Janeiro; outside mouth of river; under rocks, sponges, and bunches of bryozoa; September 1, 1925; W. L. Schmitt; 3 males, 3 ovigerous females (59463).

State of Santa Catharina; 1919; H. Luederwaldt; 2 immature females (Mus. Paulista), *forma serrata*.

BERMUDAS.—W. N. Rankin collector; 1 male (25824), with abdomen not constricted between fifth and sixth segments.

PANOPEUS CONVEXUS A. Milne Edwards

Plate 158, Figure 2

Panopeus convexus A. Milne Edwards, Crust. Rég. Mex., 1880, p. 316, pl. 58, fig. 5, 5*a* (*Pilumnus convexus* on explanation of plate, by error) (type-locality, Chile; type in Paris Mus.).

Eupanopeus convexus Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.

Diagnosis.—Carapace high in middle, relatively smooth. Front narrow. First lateral sinus shallow, third tooth blunt. A secondary blunt tooth or prominence on carpus below inner tooth.

Description.—Carapace remarkable swollen in both directions, from the center down to the level of the lateral teeth, but more swollen longitudinally. Regions fairly well marked. Surface almost smooth to the naked eye, but fine granules are to be seen with the lens; the only noticeable line of granules is opposite the last lateral sinus where on the epibranchial region a transverse line runs inward and slightly forward. Front narrow, deflexed, most advanced near the middle; outer end not dentiform, bluntly rounded, its anterior margin transverse. First antero-lateral tooth small, blunt; second lobiform; intervening sinus shallow, rounded. Third, fourth, and fifth teeth with arcuate outer margin; third a little narrower at base than fourth, suboblong, with straight anterior margin, tip very blunt; fourth and fifth with concave anterior margins and acute tips; fifth directed obliquely forward.

A large subdistal tooth on merus of cheliped. Tooth on carpus subcylindrical, very blunt; below it a small, somewhat dentiform prominence. Upper surface of manus rounded; color of immovable finger not continued on palm.

Measurements.—Male holotype, length of carapace 24.6, width of same 35.9, fronto-orbital width 19 mm.

Range.—Chile.

Material examined.—Chile; 1 male holotype (Paris Mus.).

Remarks.—Very close to *P. occidentalis*.

PANOPEUS RUGOSUS A. Milne Edwards

Plates 162 and 163

Panopeus rugosus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 314, pl. 57, fig. 4 (type-locality, Bahia; type in Paris Mus.).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus. vol. 14, 1891, p. 383.

Diagnosis.—Coarsely and densely granulate and hairy. Median V of front large. Second lateral tooth much larger than first; last three teeth sharp-pointed. Wrist very rough with irregular tubercles. Palm with a groove above and three longitudinal raised lines on outer surface. Fingers deeply grooved. Propodus and dactylus of legs long and narrow. Sixth abdominal segment in male broader than long.

Description.—Carapace very broad and more distinctly granulated than other species, the anterior and lateral regions being covered with coarse granules plainly visible to the naked eye; their margins are bordered with a band of granules, the ridge on the third, fourth, and fifth lateral teeth is coarsely granulate. An obliquely transverse epibranchial ridge composed of a single line of granules, a similar transverse protogastric ridge, a transverse ridge either side at widest part of mesogastric region and numerous shorter granulate lines, especially on the hepatic, gastric, and frontal regions, whi e on the branchial region where the level portion bends downward toward the lateral margin there is a series of short granulate lines behind one another; in old specimens, 50 or 60 mm. wide, the two hinder of these rows become thick and high, forming elongate tubercles. In the smooth spaces the carapace is punctate. The entire animal is more hairy than other species; the surface is covered with a short pile (easily rubbed off) formed of short vesicular hairs in the punctae with some longer hairs interspersed. Front narrow, divided by a large V instead of the shallow emargination and closed fissure of allied species; each half is bilobed, the lobes subequal, the inner lobe more advanced than the outer. Inner margin of orbit elevated, its tooth prominent; space between superior orbital fissures arcuate; outer tooth small, inconspicuous, its outer margin long and nearly straight. Next or second antero-lateral tooth broad, flat, rounded at tip, outer

margin arcuate. Last three teeth curved, tips usually all sharp pointed; in the largest specimen the third tooth is rectangular, not pointed. A narrow, subconical spine at lower inner angle of orbit, more advanced than upper nner angle but less advanced than front. Adjoining tooth arcuate, more advanced than corresponding lobe above. Outer hiatus V-shaped, of good size. Subhepatic tooth large, elongate, paralleling the antero-lateral border. The outer maxillipeds, as well as the lower surface of carapace and the sternum, are coarsely granulate; the lengthwise groove on the ischium is unusually wide.

Chelipeds densely granulate. The massive merus has a sharp subdistal spine. The carpus is very rough, having beside the granulation, numerous lumps of various shapes scattered over its surface; inner spine sharp, conical, sometimes curved. Chelae in old females (we have at hand no old males) moderately unequal. Palm increasing slightly in height toward the fingers, upper and lower margins a little convex. A gutter runs along the upper surface and is accented by rough granulated tubercles along its edges. Among the closely crowded granules of the outer surface, three raised lines run lengthwise through the middle portion from the proximal toward the distal end. The surface in half grown specimens is especially fuzzy, becoming less so in the old. Fingers very deeply grooved, light brown in preserved specimens, color not continued on palm; prehensile teeth moderate. Ambulatory legs long and narrow, especially the last two articles.

Abdomen smooth or nearly so. In the male the sixth segment is broader than long, sides parallel, terminal segment subtriangular.

Measurements.—Female (17715), total length of carapace 39.3, width of same 57, fronto-orbital width 23.3, width of front 12 mm.

Variation.—In the very young (7–10 mm. wide) from Florida and Cuba which I refer to this species, although with some reserve, the following characters differ from those of the adult: The median sinus of the front is minute, the first two lateral teeth are similar, subequal, small and triangular, the epigastric crests are longer and more prominent, and the whole surface less hairy. The smallest adult (Santa Catharina) is 19 mm. wide.

Range.—From Gulf of Mexico to the State of Santa Catharina, Brazil.

Material examined.—

FLORIDA.—North Key section; December 9, 1901; *Fish Hawk:* Lat. 28° 55′ 30″ N.; long. 83° 02′ 00″ W.; 4 fathoms; rky.; temperature 15.3° C.; station 7208; 1 female (59953). Lat. 28° 52′ 45″ N.; long. 83° 07′ 00″ W.; 5¾ fathoms; rky.; temp. 16° C.; station 7209; 1 male (59954).

Off Charlotte Harbor; lat. 26° 33′ N.; long. 83° 10′ W.; 28 fathoms; sdy.; April 2, 1901; station 7123, *Fish Hawk;* 1 very young female (25612).

Off Cape Sable; 1902; *Fish Hawk:* Lat. 25° 10′ 10″ N. ; long. 81° 28′ 30″ W.; 4.75 fathoms; gy. S. Sh.; temperature 23.5° C.; December 17; station 7354; 3 young (59948). Lat. 25° 09′ 52″ N.; long. 81° 21′ 53″ W.; 3.75 fathoms; gy. S. Sh.; temperature 23.5° C.; December 17; station 7352; 2 immature females (59949). Lat. 25° 09′ 45″ N.; long. 81° 18′ 35″ W.; 3.25 fathoms; rky. Co.; temperature 23.5° C.; December 17; station 7351; 1 male (59950). Lat. 25° 00′ 40″ N.; long. 81° 15′ 37″ W.; 2.5 fathoms; rky.; temperature 22.5° C.; December 19; station 7370; 1 male (59951).

No Name Key; banks, low tide; H. Hemphill; 1 very young male (15664).

Off Northwest Channel; lat. 24° 42′ 30″ N.; long. 81° 55′ 22″ W.; 7.25 fathoms; Co.; temperature 20° C.; February 24, 1902; station 7293, *Fish Hawk;* 5 young (59952).

Tortugas: 1884; Edward Palmer; 1 very young female (15663). Haul No. 206, from boat dredge; June 10, 1925; W. L. Schmitt; propodus of cheliped of 2 specimens (60809).

WEST INDIES.—Cabañas, Cuba; S. Sh. G. M.; June 8–9, 1914; Henderson and Bartsch, *Tomas Barrera* Expedition, station 16; 1 young female (48548).

Jeremie, Haiti; 1 female (18506), received from Museum of Comparative Zoölogy; 4 specimens (M.C.Z.).

Virgin Islands; 1915; C. R. Shoemaker collector; received from Carnegie Institution: From piles; 1 young (59956). Gregerie Bay, St. Thomas; ½ to 2¾ fathoms; Co. R. S. seaweed; July 7; station 7; 1 male, 1 young (59955).

Ensenada Honda, Culebra; February 11, 1899; *Fish Hawk;* 1 young male (24326).

CENTRAL AMERICA.—Patuca, Honduras; July 16, 1891; Harry W. Perry; 1 female (17715). Greytown, Nicaragua; April 8, 1892; Charles W. Richmond; 1 male (17304).

CURAÇAO.—1920; C. J. van der Horst: Spanish water; reef; May 4; 1 young female (56892). Caracas Bay; in coral; May 13; 1 female, 1 young (56891).

BRAZIL.—Cannavieiras, State of Bahia; Thayer Expedition; 1 specimen (M.C.Z.). Iguape, State of São Paulo; 1902; R. Krone; 1 male (Mus. Paulista). State of Santa Catharina; 1919; H. Luederwaldt; 2 females (Mus. Paulista).

PANOPEUS HARTTII Smith

Plate 164, Figures 1, 2, and 5

Panopeus harttii SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 280 (type-locality, Abrolhos Reefs, Brazil; cotype in Museum of Comparative Zoölogy; cotype, Cat. No. 833, P.M.Y.U., not located 1929). Trans. Connecticut Acad. Sci., vol. 2, pp. 5 and 34, 1869, pl. 1, fig. 5.

Eupanopeus harttii RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.

Hexapanopeus hirsutus BOONE, Bull. Bingham Ocean. Coll., vol. 1, art. 2, 1927, p. 27, fig. 7.

Diagnosis.—Carapace deeply areolated, granulation prominent. Front deflexed, hairy; outer lobes well developed. Antero-lateral teeth very thick, sinuses wide. Carpus uncommonly rough, with reticulating ridges.

Description.—Carapace more deeply areolated than in any other species of *Panopeus*; the cervical suture is especially deep and next, the division of the branchial region into anterior, middle and posterior subdivisions and the division of the gastric region into three. Bead granules of different sizes form a pattern on the anterior two-thirds but diminish in size and prominence posteriorly. Front bent down, hairy, edge thin, four-lobed, median notch open, narrow, middle lobes separately arched, outer teeth bluntly dentiform. Inner orbital teeth triangular, directed forward or slightly outward; middle lobe between fissures arched slightly forward. First and second lateral teeth small, tuberculiform, subequal, separated by a triangular sinus; third, fourth and fifth teeth diminishing in the order named, vertically thick, widely separated, tips tuberculiform. Under side of carapace covered with coarse granules, subhepatic tubercle subconical, acute.

Dorsal aspect of chelipeds roughly granulate; carpus rugate, the rugae tending to form a more or less reticulated pattern, distal groove very deep, inner tooth short, stout, blunt; manus with well marked superior furrow, outside which the granules form in short, parallel, vertical rugae on the upper, but not on the true outer surface, this last being smooth to the naked eye, but granulate toward proximal end; fingers long and narrow, normally with a large basal prehensile tooth on the major dactyl, though in two large males it is undeveloped and the palm and fingers resemble in shape those of the minor chela; immovable finger bent down, its color not continued on palm. Legs long and slender. Sixth segment of male abdomen shorter than broad, especially at middle.

Color.—Alcoholic specimens are light olive brown above and on the chelipeds; fingers black, lighter at tips (Smith).

Measurements.—Male type, length of carapace 15, width of same 22.5 mm. (Smith). Male (16259), length of carapace 10.7, width of same 15.7, fronto-orbital width 10.2, width of front 4.4 mm.

Relation.—In shape of carapace, *P. harttii* resembles *P. herbstii forma simpsoni* and *P. occidentalis forma serrata;* it differs from both in a more areolated carapace, which suggests a *Leptodius*, bent down front, more distinct outer lobe of front, narrower fourth and fifth lateral teeth, rougher carpus of cheliped; it differs from *P. herbstii forma simpsoni* in the color of immovable finger not continued on palm, the absence of coarse tubular hairs and groove on the carpus.

Range.—From Florida Keys to State of São Paulo, Brazil.

Material examined.—

FLORIDA.—Cape Florida; Edward Palmer; 2 females (14432).

Indian Key; H. Hemphill; 2 males (15647).

Key West; on rocks, low tide; H. Hemphill; 2 females (14454).

Loggerhead Key, Tortugas, northwest of lighthouse; August 4, 1924; W. L. Schmitt; 1 male (59454).

CUBA.—Isle of Pines; 2 females, types, *Hexapanopeus hirsutus.*

PORTO RICO.—1899; Str. *Fish Hawk*: Boqueron; January 25; 1 male, 1 female, 2 young (24277). Mayaguez; January 20; 3 males, 1 female (24275). Mayaguez Harbor; January 20; 1 male, 5 young (24276).

LESSER ANTILLES.—St. Thomas; 1884; *Albatross*; 2 males, 1 ovigerous female (18263).

Antigua: Pillars of Hercules; 1918; Barbados-Antigua Expedition; 1 female (58035), from State University of Iowa.

Barbados: Pelican Island; shallow water; 1918; Barbados-Antigua Expedition; 1 male (Mus. S.U.I.).

BRAZIL.—Pernambuco; 1876–77; R. Rathbun, Hartt Explorations: 2 males, 4 females (1 ovigerous) (16259, 16260, 59471). Rio Formoso; 1 ovigerous female (16261).

Maceio, Alagoas; on coral reef; 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 male (25737).

Plataforma, Bahia; 1876–77; R. Rathbun, Hartt Explorations; 1 male (16262).

Abrolhos Reefs; 1867; C. F. Hartt; 1 female, cotype (4806, M.C.Z.).

Villa Bella, Ilha São Sebastião, São Paulo: September 20, 1925; W. L. Schmitt; 14 males, 4 females (1 ovigerous), 3 young (59455). October, 1925; H. Luederwaldt; 4 males (1 soft shell) (60918).

PANOPEUS AMERICANUS Saussure

Plate 164, Figures 3, 4, and 6

Panopeus americanus SAUSSURE, Rev. et Mag. Zool., ser. 2, vol. 9, 1857, p. 502 (type-locality, Guadeloupe; type in Geneva Museum); Mém. Soc. Phys. Genève, vol. 14, 1858, p. 432 [16], pt. 1, fig. 8.

Panopeus areolatus BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 361, pl. 21, fig. 3 (type-locality, Sabanilla, Colombia; type, Cat. No. 15646, U.S.N.M.).

Eupanopeus americanus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.

Diagnosis.—Carapace flattish, narrow. Surface covered with short transverse striae. Fourth lateral tooth longer than third, its outer edge longitudinal. Dark color of immovable finger running back on palm.

Description.—Carapace narrower than in most of the other *Panopeus* and squarish, the antero-lateral margin being long and the outer margin of the fourth tooth longitudinal or nearly so. Surface slightly

convex except near the sides where it is flat. The groove outlining the gastric region is the most distinct. Surface crossed by more numerous short, transverse, granulated striae than in other species, although on the posterior middle portion the striae are short and sparse. Median emargination of front shallow, continued backward by a closed fissure; outer tooth well marked, projecting forward but bent obliquely downward and sideways. Inner angle of orbit a little less than a right angle; lobe between fissures truncate. Lateral teeth shallow, little projecting; second tooth larger than first, lobiform and separated from it by a U-shaped sinus; third tooth slightly longer than second, three-fourths to five-sixths as long as fourth tooth and rightangled or nearly so, outer margin slightly arched; fourth tooth slightly pointed, outer margin nearly straight and longitudinal; fifth tooth short, acute, directed outward.

Chelipeds very unequal; the carpus has a very shallow distal groove and a short inner tooth; manus high in both chelae, finely rugose in upper part. Major dactyl strongly arched, a large tooth at base. Fingers of minor chela slender. Color of both immovable fingers running back on palm. Abdomen of male constricted between fifth and sixth segments, terminal segment subtriangular.

Color.—Yellowish or reddish (Saussure). In freshly preserved specimens from Brazil the upper surface of the chelipeds is purplish, the color thinning out below on the palm in a reticulated pattern; farther down on the outer surface are a number of small spots or dabs of irregular shape, not round as in *P. herbstii.*

Measurements.—Male (59447), length of carapace 24.2, width of same 32.7, fronto-orbital width 18.5, width of front 9 mm.

Range.—West Florida; Bahamas; West Indies to Florianopolis, Brazil.

Material examined.—

FLORIDA.—Sarasota Bay, Union College collection; 1 young male (42814).

Key West, off North Fort Murtane; July 14, 1924; W. L. Schmitt; 1 male (60915); gift of Carnegie Institution.

BAHAMAS.—New Providence; 1886; *Albatross;* 1 male (16340).

CUBA.—Cabañas; 2–12 fathoms; S. Sh. Grs. to M.; June 8–9, 1914; Henderson and Bartsch, *Tomas Barrera* Expedition, station 16; 1 male (48545), 1 young female (48544).

Mariel; 1900; William Palmer and J. H. Riley: Under stones, between tides; May 10; 6 specimens (23828). June 10; 1 female (23827).

Cardenas; 1923; Dr. Francisco R. Sosa; 2 males (58392).

JAMAICA.—March 1–11, 1884; *Albatross;* 11 males, 4 females (7783). T. H. Morgan; 2 males, 1 female (17215). Kingston Harbor; May–July, 1896; F. S. Conant; 1 male (19593). Kingston; C. R. Orcutt; 1 young male (62536).

DOMINICAN REPUBLIC.—Samana; February 22, 1928; Gerrit S. Miller, jr., 10 males; 1 female, 3 young (61889).

PORTO RICO.—Arroyo; February 4, 1899; *Fish Hawk;* 1 male (24320).

ST. THOMAS.—1915; C. R. Shoemaker: Shore of harbor near town; July 10; 8 males (1 soft shell), 8 females (3 ovigerous) (59935). Lagoon; July 9; 1 male, 1 female (59936).

GUADELOUPE.—Cotypes (Geneva Mus.). 1 male cotype (20676), from Museum of Natural History, Geneva.

TRINIDAD.—1884; *Albatross*; 1 male (59470).

COLOMBIA.—Sabanilla; March 16–22, 1884; *Albatross*; 1 male, 1 female (15646), types of *P. areolatus*.

BRAZIL.—Hartt Explorations; 3 males, 2 females (31499), received from Museu Nacional, Rio de Janeiro.

Rio Parahyba do Norte; on mangroves; June 21, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 female (25735).

Bahia; 1876–77; R. Rathbun, Hartt Explorations: Plataforma; 3 males (16257). Bom Fim; 1 male, 1 young (16258).

Bay of Rio de Janeiro: Dredged, shallow water; 1876–77; R. Rathbun, Hartt Explorations; 1 ovigerous female (59493). 1925; W. L. Schmitt: 8 males (59452). Paqueta; station 1; August 19; 39 males, 67 females (46 ovigerous) (59447). River on Ilha Governador; August 27; 3 males, 2 females (59453). Ilha Governador, outside mouth of river; under rocks, sponges and bunches of bryozoans; station 12; September 1; 14 males, 20 females (3 ovigerous) (59446). São Francisco; sandy beach and adjacent rock; station 5; August 25; 1 male, 1 female (59449).

Across the bay from Rio de Janeiro; C. Moreira; 1 male (31500), received from Museo Nacional, Rio de Janeiro.

Ilha São Sebastião, São Paulo: 1896; Bisego collector; 2 males (47864), received from H. von Ihering. 1898; H. Luederwaldt; 3 males (47869), received from H. von Ihering. Villa Bella; station 16; September 29, 1925; W. L. Schmitt; 14 males, 14 females (4 ovigerous) (59444).

Paranagua; sandy mud flats, under scattered rocks; station 24; October 3, 1925; W. L. Schmitt; 15 males, 9 females (6 ovigerous) (59445).

State of Santa Catharina: 1919; H. Luederwaldt; 9 males, 7 females (Mus. Paulista). Ilha São Francisco; 1925; W. L. Schmitt: Along flat in front of sea wall by Mercado; October 5; 1 male (59450). Station 27; October 7; 6 males, 1 female (59451). Stations 45–48; October 28–30 and November 1; 28 males, 30 females (17 ovigerous) (59448). Florianopolis; Praia de Fora (rocks); station 49; November 5; 14 males, 9 females (4 ovigerous) (59443).

PANOPEUS BERMUDENSIS Benedict and Rathbun

Plate 165

Panopeus herbstii var. *serratus* MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 129; Bermuda.

Panopeus wurdemannii BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 372, pl. 24, figs. 6 and 7 (type-locality, Marco, Florida; type, Cat. No. 15667, U.S.N.M.); not *P. wurdemannii* Gibbes.

Panopeus bermudensis BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 376, pl. 20, fig. 2; pl. 24, figs. 14 and 15 (type-locality, Bermudas; type, Cat. No. 42804, U.S.N.M.).

Eupanopeus bermudensis RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.

Eupanopeus bermudensis var. *sculptus* VERRILL, Trans. Conn. Acad. Arts & Sci., vol. 13, 1908, p. 357 (type-locality, Bermuda; type not located).

Diagnosis.—Size small. Prominent raised lines of granules on dorsum. Edge of front thick, grooved. Lateral teeth prominent, third and fourth curved forward. Color of immovable finger continued a little way on palm. Lateral extremities of third abdominal segment of male rounded.

Description.—A small species. Carapace distinctly areolated, the regions separately convex and ornamented with raised lines of granules. The principal ones are: A transversely oblique hepatic ridge which forms with a transverse protogastric ridge a regular though broken arch across the carapace; a second protogastric ridge behind the first, and subparallel to it, but the hinder one is slightly oblique, so that they are farther apart at outer than inner end; a short epigastric ridge; either side of metagastric region at its greatest width a ridge almost transverse but slanting a little backward from median line; a little in advance of this, a transverse epibranchial ridge; a short mesobranchial ridge, and a similar metabranchial ridge in front of the end of the posterior margin of the carapace. Front with a median V sinus, each lobes inuous and forming a rectangular outer corner; edge thick, oblique and guttered. Inner margin of orbit high; superior sinuses V-shaped, enclosing a lobe; outer emargination deep, inner angle a conical, acute tooth. First lateral tooth (the orbital) small, rectangular; second larger, lobiform; next three teeth projecting prominently outward, tips curved forward, well separated, third and fourth with arcuate outer, and slightly concave anterior margin, the third the larger; fifth narrow, directed nearly outward; fourth and fifth prominently ridged.

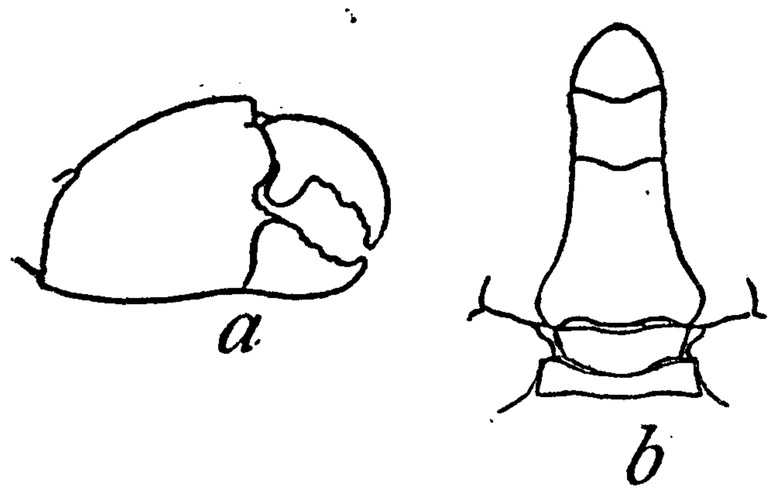

FIGURE 56.—PANOPEUS BERMUDENSIS, MALE, ENLARGED. *a*. MAJOR CHELA. *b*. ABDOMEN. AFTER BENEDICT AND RATHBUN.

Chelipeds of male very unequal; carpus rugose or tuberculate with a deep distal groove; manus gently rugose above, with a shallow groove along the margin; in small specimens the roughness or granu-

lation may cover the outer surface; major palm as high as its superior length; minor palm half as high as major; fingers light colored or brown, the color of immovable finger continued a little on palm. A large tooth at base of major dactyl; immovable finger horizontal. Immovable finger of minor dactyl deflexed, both fingers slender.

Third segment of male abdomen narrow, its lateral extremities rounded, not angled. Abdomen constricted between fifth and sixth segments, the sixth broader than long; terminal segment subtriangular, tip rounded.

Color.—Fore part of carapace a sort of cinnamon rufous with a few darker bay markings, hinder part shading into ecru drab; legs a raw umber; chelae much lighter, more a pearl gray; fingers with a fawn spot at base, tips white, under parts more or less porcelain white (Schmitt).

Measurements.—Male type, length of carapace 10.3, width of same 14.4, fronto-orbital width 9.3, width of front 4.6 mm. American specimens run smaller; a male from Brazil (59482) measures length of carapace 6.9, width of same 9.6, fronto-orbital width 6.5, width of front 3.2 mm.

Variation.—The carapace in young and middle-sized specimens and females is rather oval in shape, but in old males is more hexagonal as the front becomes more produced and the dorsum somewhat more depressed; on the whole, approaching a *Hexapanopeus* form. As a rule American specimens have shallower lateral sinuses than the Bermuda types. We have too few specimens from Bermuda to determine how constant that character is for the locality.

Range.—From west coast of Florida and Bahamas to State of Santa Catharina, Brazil. Bermuda. West coast of America from Mexico to Peru.

Material examined.—

FLORIDA.—Goodland Point; H. Hemphill; 18 specimens (15665).

Tampa Bay; 6¼–6½ fathoms; stations 7109, 7121, *Fish Hawk;* 2 young (59841).

Sarasota Bay; Union College Collection; 18 specimens (42810, 59488, 59489, 59490). February, 1884; H. Hemphill; 1 ovigerous female (15666).

Charlotte Harbor; Union College Collection; 2 specimens (42809, 59840).

Marco; H. Hemphill; 20+specimens (15636, 15667).

Garden Key, Tortugas; 1 male (3217).

BAHAMAS.—Nassau; December 25, 1898; *Fish Hawk*; 1 male (24328).

CUBA.—1914; Henderson and Bartsch, *Tomas Barrera* Expedition: Ensenada de Santa Rosa, Station 7, May 19, 1 male (48546); Los Arroyas, station 8, May 20, 1 ovigerous female (48547).

JAMAICA.—*Albatross;* 9 specimens (19786). T. H. Morgan; 1 male (17216). P. W. Jarvis; 1 female (22289). Bogue Islands, Montego Bay; 1910, C. B. Wilson: June 15, 2 males (42940); June 20, on mangrove roots with sponges, ascidians, etc., 2 males, 2 females (42941); July 10, from sponge on mangrove roots, 2 females (1 ovigerous) (42939). July 6, 1910; E. A. Andrews; 1 male (43056). Kingston Harbor; 1893; R. P. Bigelow; 7 specimens (19785).

PORTO RICO.—1899; *Fish Hawk:* 1 female (24327). Mayaguez; January 20; 3 males, 4 females (24321). Boqueron; January 25; 1 male (24322). Boqueron Bay; January 27; 4 males, 4 females (1 ovigerous) (24323). Guanica Bay; January 29; 1 young (24324), identification probably correct; Arroyo, on lighthouse reef; February 3; 1 male, 1 female (24325).

ST. THOMAS (Virgin Islands).—1884; *Albatross;* 11 specimens (19788).

1915; C. R. Shoemaker; gift of Carnegie Institution: Gregerie Bay; ½–2¾ fathoms; Co. R. S. seaweed; July 7; station 7; 2 males, 1 ovigerous female (6800). St. Thomas harbor; from bottom of a small boat; July 10; 3 males, 3 females (2 ovigerous) (60799). Virgin Islands; from piles; 1 male, 1 female (60801).

TRINIDAD.—Monos Island, January 30–February 2, 1884; *Albatross;* 1 young (19789).

OLD PROVIDENCE, CARIBBEAN SEA.—*Albatross;* 1 young (19790), identification probably correct.

COLOMBIA.—Sabanilla; March 16–22, 1884; *Albatross;* 2 females (19787).

GUIANA.—Clevia, Surinam; water side; R. C. Gonggryp; 1 female, returned to sender.

BRAZIL.—Bom Fim, Bahia; 1876–1877; R. Rathbun, Hartt Explorations; 2 females (16265).

Bay of Rio de Janeiro: Paqueta; 3–4 fathoms; 1876–1877; R. Rathbun, Hartt Explorations; 1 male (16266). Across from Rio; from sponges; C. Moreira; 4 males, 6 females (31501), from Museo Nacional Rio de Janeiro.

Bay of Rio de Janeiro; 1925; W. L. Schmitt: 1 male, 2 females (59476). River on Ilha Governador; August 27; 52 specimens (59480). Ilha Governador, outside mouth of river; under rocks, sponges and bunches of bryozoans; September 1; 100 specimens (59479). Paqueta; August 29; 1 male (59483). Conto de Rio, Nictheroy; tide pool, on sides and in water; August 22; 4 males, 1 female (59477).

Villa Bella, Ilha de São Sebastião, State of São Paulo; 1925: Weeds from rock in front of hotel; September 24; W. L. Schmitt; 2 males, 2 young (61121). September 19; W. L. Schmitt; 1 female (61145). September 21; W. L. Schmitt; 3 young (59485). October; H.

Luederwaldt collector; 7 females (4 ovigerous) (59487). H. Luederwaldt collector; 1 ovigerous female (59486).

Between Canals 4 and 5, Estuario, Santos; September 13, 1925; W. L. Schmitt; 1 ovigerous female (59478).

Paranagua; October 3, 1925; W. L. Schmitt; 1 male (59484).

Ilha São Francisco, Sta. Catharina; 1925; W. L. Schmitt: October 7; 1 male (59481). October 28 and 29, November 1; 19 males, 14 females (11 ovigerous), 1 young (59482).

BERMUDA.—1876–1877; G. Brown Goode; 15 specimens including holotype (42804). H. M. S. *Challenger;* 1 female (Brit. Mus.), *serratus* of Miers.

WEST COAST OF MEXICO.—Magdalena Bay, Lower California; C. R. Orcutt; 1 male (54735).

Cape St. Lucas, Lower California; John Xantus; a specimen, not now extant, was described by Stimpson in manuscript only, and is referred here.

Teacapán, Sinaloa; oyster beds; Secretaria de Agricultura y Fomento; 1 male (60228).

Nayarit; 1922; C. R. Orcutt; 1 male (57059).

Santa Isabel Island, Tepic Territory; among corals; Secretaria de Agricultura y Fomento; 1 male, soft shell (60232).

COSTA RICA.—Punta Arenas; 1907; P. Biolley collector; received from J. Fid. Tristan: January; 1 male (60879). February; 1 male (60878).

PANAMA.—Chame Point; February 13, 1912; Meek and Hildebrand; 1 male, 1 female (59318).

Balboa, Canal Zone; from dry dock; December 1, 1923; James Zetek; 1 young female (58059).

Panama; 1924; E. Deichmann: Pacific shore; low tide, rocks; May–July; 1 male (60796). Taboga Island; on coral; June; 1 male (60797).

ECUADOR.—South side Pt. Santa Elena; September 17, 1926; W. L. Schmitt; 1 male, 1 young (60798).

Salinas; W. L. Schmitt; 1928: September 12–14; 5 males, 2 females, 9 young (60793). September 13; 2 males (60917).

PERU.—Paita; 1926; W. L. Schmitt: October 6; 1 male, 1 female (60794). October 7; 2 ovigerous females, 2 young (60795). October 8; 10 males, 12 females (4 ovigerous) (60916). From rock pools; October 13; 21 males, 11 females (8 ovigerous) (60792).

Oyster beds of Matapalo (near Capon); January 23, 1908; R. E. Coker; 1 male (40419), 2 females, from masses of sponge (40420); received from Peruvian Government.

PANOPEUS TURGIDUS, new species

Plate 166

Type-locality.—Chandeleur Islands, Louisiana; L. R. Cary collector; male holotype, Cat. No. 33106, U.S.N.M.

Diagnosis.—Carapace suboval. Front thick, not grooved. Protogastric striae oblique. Male abdomen broad, third segment drawn to a point at each side, sixth segment much broader than long.

Description.—Carapace suboval, swollen in the middle, subdivisions of gastric region almost obliterated; surface little roughened with the exception of the granulate lateral and anterior regions and a few raised granulate lines as follows: One epibranchial, nearly transverse and slightly in advance of a transverse metagastric line which is interrupted in the middle; a pair of protogastric lines on each side, parallel and distinctly oblique, inclined backward and outward; a fainter hepatic line, either sinuous or broken. Epigastric lobes swollen. Front little advanced, edge thick but not guttered, very slightly convex, median emargination minute, not continued by a closed fissure, outer ends not forming teeth or lobes. Anterior margin of preorbital lobe transverse. Supra-orbital emarginations faint, followed by closed fissures, of which the inner is much longer than the outer, edge between them slightly arched. Suborbital emargination of good size, followed by a transverse margin and a short, broad, blunt, inner tooth; subhepatic tubercle low and obsolescent. First antero-lateral (or orbital) tooth small, separated by a shallow sinus from the low, broad, second tooth. Three remaining teeth acutely pointed, third and fourth with convex outer margins curving forward, last tooth short-triangular.

Chelipeds very unequal (the minor one may be subnormal), very rough in their dorsal aspect. Merus with a prominent, sharp, subdistal tooth. Carpus with reticulated granulation, a deep distal groove and a sharp inner tooth. Hands suboblong, with a superior groove. Fingers of major chela, as well as of minor, long and narrow, their teeth reduced in size. Color of immovable finger continued a little on palm and limited by a line extending from the basal end of the prehensile edge obliquely downward to lower margin.

Third segment of male abdomen tapering to a point at either end, sixth segment much broader than long.

Female.—A female from Vera Cruz is larger but its characters are less pronounced than in the male, the lines on the carapace less prominent, the color of the immovable fingers not extended to the palm.

Measurements.—Male holotype, length of carapace 14, width of same 19.3, fronto-orbital width 11.6, width of front 6.4 mm. Female, Vera Cruz, length of carapace 17.3, width of same 24.4 mm.

Relation.—Small specimens might be confused with *P. bermudensis* but differ in the characters given in the diagnosis above. The chelae approach those of *P. rugosus* but are less rough and hairy.

Range.—Gulf of Mexico: Alabama, Louisiana, and Vera Cruz.

Material examined.—

ALABAMA.—Bayou la Batre; in stomach of *Clangula clangula americana;* January 5, 1916; W. L. Bryant, U. S. Biological Survey; 1 right major chela, 7 mm. long (135077 A, Biol. Surv. collection).

LOUISIANA.—Chandeleur Islands; L. R. Cary; 1 male holotype (33106).

MEXICO.—Vera Cruz; Dr. T. B. Wilson; 1 female (2526, Phila. Acad.); labeled "*Panopeus mexicanus* Guérin," a manuscript name.

PANOPEUS BOEKEI Rathbun

Plate 167

Panopeus boekei RATHBUN, Proc. Biol. Soc. Washington, vol. 28, 1915, p. 118 (type-locality, Tumble-Down-Dick Bay, St. Eustatius; type in Leiden Mus.); in Boeke, Rapport Visscherij Kolonie Curaçao, pt. 2, 1920, p. 336 [20], text-figs. 4 and 5; Bijdragen tot de Dierkunde, Amsterdam, vol. 23, 1924, p. 15.

Diagnosis.—Four strong lateral teeth, the first two of typical *Panopeus* being indistinguishably united. Front strongly deflexed. Subhepatic tubercle undeveloped. Color of immovable finger not continued on hand. Dactyli of legs very slender.

Description.—Carapace deeply areolated in anterior two-thirds, areoles crossed by finely granulated rugae of which the principal are transverse and simple on the epibranchial, protogastric, and epigastric regions; the hepatic elevation is formed by several oblique rugae, and forms a continuous arch with the protogastric ridge; surface covered with scattered hairs of uneven length. Carapace convex in a longitudinal as well as in a transverse direction, save for the four antero-lateral teeth which are thickened and upturned; teeth well separated; first tooth short and broad, outer margin convex or a little angled; this tooth corresponds to the usual coalesced (first plus second) tooth in *Panopeus;* three remaining teeth equally prominent and more so than the first; second tooth as wide at base or nearly as wide as the first, posterior margin convex, anterior straight or slightly concave, tip blunt; third tooth similar in shape, but longer, narrower and thicker; fourth tooth narrow, triangular, anterior margin nearly transverse, tip acute, situated at widest part of carapace. Front bent obliquely down from a transverse granulate line fringed with long hair; edge of front divided by a V-shaped emargination into two well rounded lobes, with a small independent lobule at outer end. Pre-orbital angle prominent, blunt, a broad, nearly transverse, slightly convex lobe between the two V fissures of the upper margin; a larger V fissure below the outer angle; lower margin gradually advancing up to base of inner tooth which is low and blunt.

Major cheliped much more massive than minor. Merus short and high, with an outer groove subparallel to distal margin, and behind it a compressed tooth on upper margin. Carpus finely rugose, a distal furrow and a stubby, blunt inner tooth. Manus granulate, granules reticulating, coarser toward upper surface where there is a a shallow groove. Fingers with rows of punctae, two grooves both outside and inside of immovable finger, and a groove near upper edge of outer surface of dactylus; prehensile edges irregularly toothed, one of the larger teeth at base of dactyl of larger chela; fingers of this chela gaping moderately; major immovable finger slightly deflexed, minor one considerably so; fingers light brown, color not extended on palm. Ambulatory legs hairy, slender and rather long, especially the dactyls.

Third segment of male abdomen rather narrow, about as wide as first segment and not drawn laterally to a point; sixth segment about twice as wide as long, widening distally, sides sinuous, mostly concave; seventh segment broadly triangular.

Measurements.—Male type, length of carapace 8.6, width of same 13, fronto-orbital width 9.4, width of front 4.4 mm.

Range.—Lesser Antilles; Caribbean Sea.

Material examined.—Gregerie Bay, St. Thomas, Virgin Islands; ½–2¾ fathoms; Co. R. S. seaweed; July 7, 1915; station 7, C. R. Shoemaker; 1 male (60802), gift of Carnegie Institution.

St. Eustatius, Lesser Antilles: Tumble-Down-Dick Bay; 15 fathoms; stony; September 17, 1905; J. Boeke; 1 male, holotype, 1 female (Leiden Mus.).

Bonaire, off coast of Venezuela; lagoon; ½ fathom; in mangroves; August 1905; J. Boeke; 1 male (46005).

Curaçao, off coast of Venezuela: 1905; J. Boeke: Schottegat, in lagoon, 1 fathom, among algae; July 9, 1 male (46006), 1 male returned to sender; Rifwater, in lagoon, 1 fathom, July 26, 1 male (returned to sender). 1920; C. J. van der Horst: Spanish Port, April 10, 1 female (Amsterdam Mus.); Caracas Bay, May 1, 1 female (56888); April 26, 3 males (Amsterdam Mus.); in sand, May 13, 1 male (56887.)

Old Providence island, Colombia (east of Nicaragua; April 4–9, 1884; *Albatross*; 3 males (45965).

Genus NEOPANOPE A. Milne Edwards

Neopanope A. Milne Edwards, Crust. Rég. Mex., 1880, p. 329; type, *N. packardii* (Kingsley) = *N. pourtalesii* A. Milne Edwards.—Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.

Carapace subhexagonal, rather narrow, high in middle, sloping down in all directions. Regions delimited, almost smooth. Of the five antero-lateral teeth the first and second are very closely fused, separated only by a shallow sinus; second tooth arcuate or lobiform. Front advanced, arcuate. Chelipeds very unequal at least in male,

fingers acute. Abdomen of male constricted between fifth and sixth segments; terminal segment broader than long, subtriangular. Otherwise as in *Panopeus*.

From Provincetown, Massachusetts, to Texas; Bahamas; Cuba.

KEY TO THE SPECIES OF THE GENUS NEOPANOPE

A[1]. Dactylus of major chela without a large basal tooth.
  B[1]. Fingers white or light horn-color. Antero-lateral teeth sharp and much produced ..... *texana texana*, p. 367.
  B[2]. Fingers black or dark-colored in males. Antero-lateral teeth blunter and less produced ..... *texana sayi*, p. 369.
A[2]. Dactylus of major chela with a large basal tooth ..... *packardii*, p. 380.

NEOPANOPE TEXANA TEXANA (Stimpson)

Plate 168, Figures 1 and 2

Panopeus texanus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1858 (1859), p. 55 [9] (type-locality, St. Joseph's Island, Texas; type not extant).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 363, pl. 22, fig. 5; pl. 23, fig. 9.

Neopanope texanus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.

Neopanope texana RATHBUN, Amer. Nat., vol. 34, 1900, p. 138.

Diagnosis.—Dactylus of larger hand without a large basal tooth. Fingers white or light horn color. Color of immovable finger continued a short distance on palm. Tips of last three antero-lateral teeth sharp.

Description.—Carapace very convex in both directions, high in middle, widest at posterior tooth, minutely pubescent, especially in female. Regions defined, gastric subregions faintly indicated. Front slightly produced and rounded, a small median notch. First tooth of lateral margin small, triangular, coalesced with the low, arcuate second tooth from which it is separated by a shallow sinus; next two teeth sharp, tips pointing forward, the fourth tooth ascending; last tooth short and sharp, tip directed outward or slightly forward, and upward. On the fourth and fifth teeth a short oblique ridge extends from the tip inward. Chelipeds smooth, glabrous, very unequal and dissimilar. Carpus with a subdistal groove. Fingers white or light horn color in male, the movable finger usually darker than the immovable; fingers darker in female than in male. Color of immovable fingers continued a little on palm, terminating in a very distinct line, which begins at base of finger in gape and curves backward to lower margin. No large tooth or tubercle at base of dactyl or on anterior outer margin of palm. Legs long and slender.

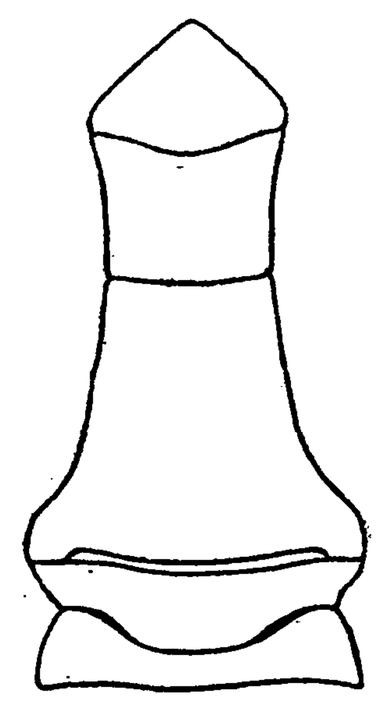

FIGURE 57.—NEOPANOPE TEXANA, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Measurements.—Male (15383), length of carapace 20.7, width of same 27, fronto-orbital width 16.5, width of front 8.8 mm.

Age variation.—In specimens 14 mm. across the back and smaller, the wrist is much rougher than in the full grown, and has a distal groove and a sharper, inner spine; there is a longitudinal groove on the upper surface of the palm; in those below 5 mm. in width there is no evidence of a sinus between the first and second lateral teeth.

Range.—From Mosquito Lagoon, Florida, southward by way of Florida Keys and the Gulf coast to Texas.

Material examined.—

FLORIDA.—Mosquito Lagoon; December 1, 1908; J. A. Pine and B. A. Bean, Yacht *Orian*; 1 female (39192).

Titusville, Indian River; January 14, 1896; U. S. Fish Comm.; 3 males, 2 females (20255); variety half way between typical *texana* and *texana sayi.*

Cocoa, Indian River; January 17, 1896; U. S. Fish Comm.; 3 males (20256); varying toward *texana sayi.*

East Peninsula opposite Micco; O. Bangs; 3 males, 2 females (18741).

Indian River Inlet; January 23, 1896; U. S. Fish Comm.; 1 male, 1 female (20257); variety near *texana sayi.*

Mouth of Indian River; specimens in P.M.Y.U.

Off Cape Sable; lat. 25° 06′ 30″ N.; long. 81° 12′ 25″ W.; 11.5 feet; rocky; temperature 22° C.; December 18, 1902; station 7356, *Fish Hawk;* 1 male (60787).

Boca Grande; April 27, 1915; *Fish Hawk* (E. Danglade); 1 male (56344).

Marco; H. Hemphill; 1 female (15384).

Punta Rassa; 1 fathom; February, 1884; H. Hemphill; 2 males, 1 female (6653).

Near Punta Rassa; low tide, in grass; H. Hemphill; 10 males, 10 females, 18 young (14082).

Sanibel Island; February 20 and 22, 1928; O. C. Van Hyning; 3 males, 1 female (returned to Florida State Mus.).

Charlotte Harbor; low tide, in grass; H. Hemphill; 9 males, 14 females (14089).

Off Charlotte Harbor; 27.5 fathoms; April, 1901; station 7122, *Fish Hawk;* 1 male, 1 female (25618).

Sarasota Bay: 1884; H. Hemphill; low tide to 2 fathoms; 6 males, 5 females, 10 young (6975). February; 7 males, 12 females (6426).

Palma Sola, mouth of Manatee River; H. Hemphill; 4 males, 2 females (15383).

Egmont Key; specimens in P.M.Y.U.

Tampa Bay: In seine; March 17, 1885; *Albatross;* 1 male, 3 females (15385), 2 males (55546); 6.5 fathoms; M.; temperature 20.5° C.; March 29, 1901; *Fish Hawk;* 1 male (25617).

Goodland Point; H. Hemphill; 3 females (1 young) (15631).

Boca Ceiga Bay, inner shore of Pine Key; January, 1884; H. Hemphill; 10 males, 20 females (15382), 1 young (21397).

Orange Bluff, Clearwater Harbor; 1–2 fathoms; May, 1884; H. Hemphill; 2 males, 1 female (6968).

Cedar Keys: December, 1883; H. Hemphill; low tide, in grass; 4 young (6421), 47 males, 59 females, 20 young (6415). February, 1887; Lieut. J. F. Moser, U. S. Navy, U. S. Coast Survey Str. *Bache;* 1 female (15386). Flats at low tide; March 27, 1926; Miller and Aschemeier; 2 males, 1 ovigerous female (60914).

Pepperfish Key section; lat. 29° 32′ 10″ N.; long. 83° 29′ 50″ W.; 3 fathoms; sdy.; temperature, 21.8° C.; November 5, 1901; station 7144, *Fish Hawk;* 1 young (59932).

Deadman's Bay section; lat. 29° 37′ 00″ N.; long. 83° 35′ 15″ W.; 3½ fathoms; S. G.; temperature 15° C.; December 6, 1901; station 7206, *Fish Hawk;* 1 young (59934).

Deadman's Bay section; lat. 29° 48′ 05″ N.; long. 83° 46′ 40″ W.; 4 fathoms; Co.; temperature 19.5° C.; November 7, 1901; station 7150, *Fish Hawk;* 1 female (59933).

Apalachicola; January, 1915; *Fish Hawk* (E. Danglade); 1 female (56343).

Pensacola; in seine; February 9, 1885; *Albatross;* 1 male (23282); claws lost before last moult.

LOUISIANA.—Chandeleur Islands; L. R. Cary; 7 females (33105, 33107, 33109).

TEXAS.—Texas; specimens in M.C.Z.

Shamrock Point, Corpus Christi; November 27–30, 1891; B. W. Evermann, U. S. Fish Comm.; 1 male (17102).

NEOPANOPE TEXANA SAYI (Smith)

Plate 168, Figures 3 and 4

Cancer panope Say, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1817, p. 58 (part; not pl. 4, fig. 3); not *Cancer panope* Herbst, 1801, which is a *Menippe*.

Panopeus sayi Smith, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 284 (type-localities, New Haven, Conn., and Eastham, Cape Cod, Mass.; cotypes in B.S.N.H. and P.M.Y.U.).—Benedict and Rathbun, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 363, pl. 22, fig. 4, pl. 23, figs. 7 and 8.

Neopanope texanus sayi Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.

Neopanope texana sayi Rathbun, Amer. Nat., vol. 34, 1900, p. 138.—Sumner, Bull. Bur. Fisheries, vol. 31, 1911, pt. 2, 1913, p. 673, chart 118.

Diagnosis.—Dactylus of larger hand without large basal tooth. Fingers of male black or dark colored. Color of immovable finger continued extensively on palm. Tips of last three antero-lateral teeth acute angled but not sharp.

Description.—Compared to typical *texana*, the antero-lateral teeth are less sharp and less projecting; margin of front more depressed.

Color of fingers in male darker, and running back from immovable finger on outside and inside of palm to a variable extent, but on the lower margin at least half way along the propodus; in the females the color is lighter than in males and is often restricted much as in typical *texana*, reaching no further than middle of smaller propodus and falling far short of middle of larger propodus. Ambulatory legs much shorter. Abdomen of male narrower at terminal segment; sixth segment more elongate compared to its width.

Color.—Dark blue or brown speckles on a background varying from light bluish to yellowish. On the carapace the speckles are sometimes densely arranged; sometimes loosely in some parts and densely in others, forming a regular bisymmetrical pattern. Speckles larger and tending to form a more reticulated pattern on the claws, of which only the upper half is speckled. Fingers black or dark brown or gray, at the tips shading through horn color to white.

Measurements.—Male (18770), length of carapace 20, width of same 27.2 mm.

Habitat.—Common in muddy places but dredged on all sorts of bottoms.

Range.—Malpeque, Prince Edward Island, Canada. Geddes Point, Northumberland Strait, New Brunswick. From Provincetown, Massachusetts to eastern Florida. Shore to 43 fathoms. From Massachusetts to South Carolina inclusive, this form is easily distinguishable from typical *texana* of the Florida Keys and Gulf coast. On the east coast of Florida the types are confused. See under *Neopanope texana texana*, "*Material examined.*"

FIGURE 58.—NEOPANOPE TEXANA SAYI, MALE CHELA, ENLARGED. AFTER BENEDICT AND RATHBUN

Notes on intermediates between texana *and* sayi.—Specimens from Mosquito Lagoon and East Peninsula resemble *t. sayi* except that fourth and fifth lateral teeth are more projecting and more acute, leaning toward typical *texana*. A small male and female from Indian River Inlet are nearest *t. sayi* as to lateral teeth, color of fingers and form of abdomen, but the ambulatory legs are those of typical *texana*. In specimens from Titusville the legs are long and the third to fifth lateral teeth laterally prominent as in *texana*, but the teeth are blunt as in *sayi;* the males have black fingers with the color continued on palm as in *sayi*. Three males from Cocoa are nearer *texana* than the above; third lateral tooth acute but less sharp than in *texana;* fingers light but color extending on palm to some extent, as in *sayi;* abdomen nearest *texana*. A male from Shackleford Bank has the teeth of carapace and color of fingers as in *texana*, but the shape of front and extension of finger color on palm as in *sayi*.

Material examined.—See table, pages 371 to 379.

Material examined of Neopanope texana sayi [1]

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			° F.						
New Brunswick: Geddes Point (near Buctouche).			Low tide.	Under stones		Sept. 1, 1926		F. Johansen	1♂	61619	
Massachusetts:											
Provincetown						Sept. 28, 1879		U. S. Fish Commission.	1 y	3005	Off dyke.
Do						Sept. 29, 1879		do	5♂ 2♀	3827	Do.
Wellfleet			(2)			1879		H. E. Webster	1♀	3001	In tubes of *Amphitrite ornata*.
Off Chatham	Chatham Lights, WNW., 16 miles.		43	S. G	49	Aug. 30, 1881	981	*Fish Hawk*	1♀ ovig	36581	
Nantucket Sound	Bishop and Clerks Lightship, E. by S. ¼ S.; Collins Beacon, N. by W. ¾ W.; Hyannis Light, NE. ¼ N.		4.5	S. Sh	69.5	Sept. 5, 1887	1245	do	5 y	12688	
Off East Chop, Marthas Vineyard.			10–11.5			Aug. 11, 1887	1205–1208	do	1 y	16336	
Woods Hole								U. S. Fish Commission.	25♂ 18♀	3214	
Do								do	1♂ 1♀	40776	
Do			(2)					do	1♂ and exuvia	18771	Molt Aug. 27.
Do						July —, 1875		do	5 y	40786	
Do						Sept. 20, 1881		do	7♂ 3♀	40780	
U. S. Fisheries wharf, Woods Hole.						July 5, 1905		J. A. Cushman	4 y	32464	
Do			On piles.			July 27, 1905		M. J. and S. H. Rathbun.	1♂ several y	32446	
Vicinity of Woods Hole.						1905		M. J. Rathbun	50+	32444	
Woods Hole						1911		Bureau of Fisheries.	12	43184	
North of Penzance Point.			4–4.75	fne. S. St		July 29, 1905	124	*Phalarope*	1♂	32467	
Woods Hole Passage			4–4.75	S. St		July 27, 1905	121	do	2♂	32466	
Ram Island						Sept. —, 1875		U. S. Fish Commission.	2♂	36895	
Vineyard Sound								do	50♂ 25♀ 19 y	8487	
Do						1875		do	2♂	18770	
Do						1875		do	2 claws	34066	

[1] See also under Sumner, Bull. Bur. Fisheries, vol. 31, 1911, pt. 2, 1913, pp. 673 and 674.

[2] Low water.

Material examined of Neopanope texana sayi—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Massachusetts—Contd.	° ′ ″	° ′ ″			° F.						
Vineyard Sound			6–13	hrd. Sh. G	69–70	Aug. 31, 1875	710–715	*Bluelight*	2♂ 3♀	40777	
Do						1875		U. S. Fish Commission.	19	40116	
Do			9–14		64–67	July 20, 1881	932–934	*Fish Hawk*	6♂ 6♀	39958	
Do	Nobska Point Light, WSW. ¼ W., 1⅝ miles.		6	S. G	71.5	Aug. 18, 1882	1099	do	1♂	5764	
Do			(2)			1883		U. S. Fish Commission.	2♂	6518	Molt Aug. 1.
Do			(2)			1883		do	2♂	6508	Molt Aug. 22
Do						1883		do	2♂	6503	Molt Aug. 20.
Do						1911		Bureau of Fisheries.	1	43185	
East of Uncatena Island.			7–5	S. Sh		July 27, 1905	118	*Phalarope*	7	32465	
Northwest Gutter, Naushon.						July 5, 1905		M. J. Rathbun	6♂ 1♀	32445	
Off Falmouth						1884		*Fish Hawk*	2♂	13843	
Do			3–5			1884		U. S. Fish Commission.	1 y	34166	
Do						1883		do	1♂	40778	
Buzzards Bay	Near Hog Island Harbor.		3.25–5			Aug. 5, 1905	134–137	*Phalarope*	7+	32469	
Do	Nyes Neck, NE. ¾ E., 2¾ miles.		8	bk. M	68	Aug. 26, 1881	961	*Fish Hawk*	2♀	15661	
Do	Nyes Neck, E. by S., ¼ mile.		7	S	68	do	955	do	10♂ 6♀	4576	
Cataumet						July 22, ——		U. S. Fish Commission.	2♂	40787	
Do						do		do	3♂ 1♀	40779	
Buzzards Bay	S. of Wild Harbor and Cataumet Harbor.		3–6.5			Aug. 7, 1905	138, 141, 142	*Phalarope*	10+	32470	
Do	East shore		4.5–5	S. G		Aug. 5, 1905	132	do	13	32468	
Mattapoisett Harbor						Nov., 1882		Willard Nye, jr	7♀	5782	
Rhode Island:											
Sakonnet River	McCurrys Point, N. ¼ E., 1¼ miles.		3.5	sft. M. brk. Sh.	71	Aug. 27, 1880	835	*Fish Hawk*	1♂ 2♀ 7 y 1♂ 1♀	40773 41029	
Newport			Shore.			1880		U. S. Fish Commission.	1♀	34021	
Do			Shore.			July 31, 1880		do	2♀ with zoeae.	34022	
Do			Shore.			1880		do	2♂ 1♀	40113	

Do			Wharf.			Aug. 20, 1880		do	15♂ 13♀	40117
Off Newport						1880		do	3 y	36316
Narragansett Bay	North end Dutch Island, S., ½ mile.		10.5	S. M. Sh	69	Aug. 6, 1880	774	*Fish Hawk*	1♂ 1♀ ovig	56388
									1 y	34004
Do	North end Dutch Island, S., 1 mile.		12	G. S. M	68	do	775	do	2♂ 2♀ ovig	36748
									5 y	40800
Do	Off Fort Dumpling		26–27.5	S. Sh. G	58.5	Aug. 7, 1880	777, 778	do	1♀ ovig	40784
Do	Poplar Point Lights, W. by N., 2¼ miles.		4.5	M	68	Aug. 16, 1880	801	do	1♂	40774
Do	Off south end Hope Island.		5–5.5	M. brk. Sh	70	Aug. 23, 1880	820, 821	do	1♂ 3 y	40775
Do	South end Hope Island, NE., ⅛ mile.		4.5	M. brk. Sh	70	do	822	do	2 y	34019
Connecticut:										
Long Island Sound	Old Tower, N. ⅜ E., 4¾ miles; SW. Ledge Light, N. ¼ W., 4 miles.		9	sft	69.5	Sept. 16, 1892	1695	do	1	26178
Mouth of New Haven Harbor, oyster beds of H. C. Rowe.						May 28, 1880		R. Rathbun	2♂ 1♀	4162
									1 y	56370
Long Island Sound	Stratford Point Light, WSW., 2½ miles; Middle Ground Light, SW. by S. ½ S., 7 miles.		6.6	sft	64	Oct. 13, 1890	1626	*Fish Hawk*	2 y	15749
Do	Stratford Point Light, SW. by W. ½ W., 3 miles; Middle Ground Light, SW. by S. ¾ S., 7¾ miles.		5.8	hrd	62	do	1625	do	3 y	15748
Do	Stratford Point Light, SW. ¾ W., ⅞ mile; Middle Ground Light, S. by W. ½ W., 6¼ miles.		4	sft	63.5	Oct. 8, 1890	1597	do	2♂	15676
Do	Bridgeport Light NW. by N. ¼ N., 5 miles; Stratford Point Light, N. by E. ¼ E., 3⅝ miles; Middle Ground Light, S. ¼ E., 2 miles.		8.5	hrd	67.5	Oct. 1, 1890	1579	do	1♂	56350

[2] Low water.

Material examined of Neopanope texana sayi—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Connecticut—Continued.	° ′ ″	° ″			° F.						
Long Island Sound	Bridgeport Light, NW. ¼ N., 4 miles; Penfield Reef Light, W. by N. ¾ N., 4⅝ miles; Middle Ground Light, S. by E., 2¾ miles.		6.5	hrd	68	Sept. 26, 1890	1572	*Fish Hawk*	2♂ 1♀	15747	
Do	Bridgeport Light, N. ¼ W., 2½ miles; Penfield Reef Light, W. ¾ N., 2½ miles; Stratford Point Light, NE. by E. ¾ E., 3¾ miles.		6	sft	70	Sept. 19, 1890	1537	do	1♀	15746	
Do	Bridgeport Light, N. ¾ E., 2⅝ miles; Penfield Reef Light, W. by N. ½ N., 2 miles; Stratford Point Light, NE. by E. ¾ E., 4¼ miles.		7	sft. M	70	Sept. 18, 1890	1528	do	1♂	15764	
Do	Bridgeport Light, N. ¾ E., 2 miles; Penfield Reef Light, W., 2 miles; Stratford Point Light, E. by N. ½ N., 4 miles.		6	sft. M	70	do	1527	do	1♂ 6♀	15763	
New York (Long Island):											
Gardiners Bay						1874		U. S. Fish Commission.	1 y	36263	
Peconic Bay						Aug. 14, 1874		do	1♀	40785	
The Gut, Cold Spring						July 23, 1898		Biological Laboratory, Cold Spring.	25+	21659	
Great South Bay						1898		T. H. Bean	1♂	56371	
New Jersey:											
Cape May						Aug. 6, 1928		Horace G. Richards.	1 y	(3)	Alive, on concrete boat.
Maurice River Cove						Nov. 16, 1928		do	3♂ 3♀	(3)	

Maryland (Chesapeake Bay):											
Off Back River Light								*Grampus*	1 y	56362	
Magothy Bay						July 22, 1916		*Fish Hawk*	1♂	56347	
Virginia						1876		Union College collection.	15+	42808	
Eastern shore								do	20+	42803	
Do								H. E. Webster	5♀	56835	From Boston Soc. Nat. Hist.
Chincoteague						July —, 1913		Henderson and Bartsch.	9♂ 3♀	46287	
Mouth of Kings Creek near Cape Charles City.			(4)			Mar. 22, 1894		*Fish Hawk*	1♀	31487	
From Crisfield, Md., to Cape Charles.						Nov. 22, 1921	26, 27	W. C. Schroeder	3♂ 2♀	57144	Beam trawl.
Chesapeake Bay	37 54 03	76 06 20	4½ miles E. by N. ¼ N. from Smith Point Light.	6.75	fne. gy. S	64	Oct. 24, 1915	8347	*Fish Hawk*	1 y 1♂ 1♀ 29 y 2 y	58328 56327 56328
Do	37 53 00	76 05 30	4½ miles E. ¼ S. of Smith Point Lighthouse.	6	sft. fne. gy. S	48.5	Dec. 5, 1915	8383	do	2♂ 8♀ 153 y 7♂ 1♀ 20 y	56331 56332
Do	37 51 38	76 09 44	Smith Point Light, NW. by N., Buoy NNW.	24	hrd. fne. S. M.	48	Apr. 23, 1916	8512	do	3 y	56340
				Meters		°*C.*					
			Smith Point Light 270°, Great Wicomico Light 236°.	12.81		11	Mar. 31, 1921	8975	do	1♀ 1 y	58339
Do			Smith Point Light, W. ¾ N., Tangier Island Light SE. ⅜ S.	10		24.4	July 7, 1920	8816	do	1♀ ovig	55722
				Fathoms		°*F.*					
Do	37 41 12	76 00 40	Tangier Island Light, NNE., San Marcos wreck, NW. ¼ W.	9	hrd. gn. Marl, S.	66.5	Oct. 23, 1915	8344	do	7♂ 7♀ 3 y	56326
Do	37 39 18	76 02 12	4¼ miles SSE. from San Marcos wreck.	9	sft. gn. bl. M	50.2	Dec. 4, 1115	8379	do	1♂ 1 y	56330
Do	37 38 50	76 05 20	7¾ miles E. by N. ½ N. of Windmill Point Lighthouse.	7	hrd. gn. Marl, S.	65.3	Oct. 23, 1915	8343	do	6♂ 4♀ 17 y	56325
Do	37 34 00	75 59 07	Can Buoy No. 1, SE. ½ E., 1 mile.	4.25	hrd. Sh., marine growth.	51.5	Apr. 23, 1916	8508	do	1♂ 4♂ 4♀ 14 y	58330 56339

[3] Returned.

[4] On sand bar.

Material examined of Neopanope texana sayi—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			° F.						
Virginia—Continued. Chesapeake Bay	37 33 07	76 02 34	10.25	sft. bk. M., marine growth.	77.3	July 27, 1916	8606	*Fish Hawk*	1♀	56342	
Do	37 22 12	76 10 25	9.5	sft. gn. M. S.	66	Oct. 22, 1915	8341	do	2♂ 6♀ 1♂	56323 56324	
Do	37 17 12	76 14 12	4.25	hrd. fne. gy. S.	48.5	Dec. 4, 1915	8374	do	1 y	56329	
			Meters		°C.						
Do	Buoy C 9, NW. by N. ¼ N., New Point Comfort Light, NW. ¾ W., York Spit Light, S. by W. ½ W.		10.07	gy. M. S.	4.8	Jan. 23, 1921	8936	do	1 y	58337	
Do	New Point Comfort Light 296°, York Spit Light 8°.		8		11.1	Apr. 2, 1921	8982	do	1 y	58340	
			Fathoms		°F.						
Do	37 16 50	76 14 27	5.5	hrd. fne. S., marine growth.	50.3	Apr. 22, 1916	8506	do	3 y 1♀ 1 y	58329 56338	
Do	37 15 58	76 10 54	6	do	49.8	do	8505	do	2♂ 2♀ 2 y	56337	
			Meters		°C.						
Do	York Spit 252°, Old Plantation Light 308°.		42.5	bk. M.	11.5	Apr. 2, 1921	8985	do	2 y	58341	
Do	York River; wooden buoy No. 8.					July 5, 1883		Commander R. D. Evans, U. S. N.	1♂	13847	

Do	37 15 54 | 76 07 42 Plantation Light, SE. by E., Buoy No. 10, E. by N. 5/8 N., Buoy No. 15, S. by E. 1/8 E.	7	sft. fne. gy. S. M.	49.4	Apr. 22, 1916	8504	*Fish Hawk*	1♀ 1 y	56336
		Meters		°*C.*					
Do	Plantation Light, SE. by E., Buoy No. 10, E. by N. 5/8 N., Buoy No. 15, S. by E. 1/8 E.	12.81	gy. M. S	5	Jan. 23, 1921	8934	do	1♂	58336
		Fathoms		°*F.*					
Do	37 15 21 | 76 04 40 Plantation Light, SE. 3/8 S., Buoy No. 10, N. 1/4 E., Cherrystone Light, E. 3/8 N.	25	hrd. brk. Sh	51.6	Apr. 22, 1916	8503	do	2♂ 2♀	56335
		Meters		°*C.*					
Do	Plantation Light, SE. 3/8 S., Buoy No. 10, N. 1/4 E., Cherrystone Light, E. by N.	45.75		21.9	July 8, 1920	8826	do	1♂	55731
Do	Plantation Light, SE. 3/8 S., Buoy No. 10, N. 1/4 E., Cherrystone Light, E. by N.	45.75	gy. S. Sh	4.9	Jan. 23, 1921	8933	do	1 y	58335
		Fathoms		°*F.*					
Do	37 12 00 | 76 10 05 Back River Light, NW., Thimble Light, W., buoy, SSW. 1/4 W.	4	fne. gy. S	68	Oct. 22, 1915	8336	do	23♂ 27♀ (1 ovig.).	56321
Do	37 06 35 | 76 07 30 3/4 mile W. by S. 1/2 S. of 35-foot Channel Lightship.	8.25	gy. M. fne. gy. S.	68	do	8337	do	2♂ 1♀	56322
Do	37 04 42 | 76 09 18 3 miles SW. of 35-foot Channel Lightship.	5.5–6.5	hrd. S		Jan. 16, 1914	8009	do	3♂ 3♀	56320
Do	37 00 35 | 76 15 15 8 miles WSW. of Thimble Shoal.	15	sft. bk. M. Seaweed.	41.5	Jan. 16, 1916	8403	do	1♀	56333
		Meters		°*C.*					
Do	Bell Buoy No. 1, E. 3/8 S., 3 1/2 miles, Buoy No. 10C, N. by E. 1/4 E., off Sandy Point.	14.64		4.2	Jan. 23, 1921	8938	do	1 y	58338
Do	Bell Buoy No. 1, SE. 1/2 E., 1 mile, Buoy No. 10C, NW. by W. 1/8 W., off Sandy Point.	7.77		24.8	July 8, 1920	8821	do	21♂ 11♀ (4 ovig.).	55732

Material examined of Neopanope texana sayi—Continued

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Virginia—Continued.	° ′ ″	° ′ ″			°C.						
Chesapeake Bay	Bell Buoy No. 1, E. ⅜ S., 3½ miles, Buoy No. 10C, N. by E. ¼ E., off Sandy Point.		14.64		22.5	July 8, 1920	8820	*Fish Hawk*	1♀	55724	
Do	37 00 33	76 15 25	15.25	hrd	47.8	Apr. 21, 1916	8497	do	5♂ 2♀	56334	
	Thimble Light, ENE. ¾ E., Bell Buoy No. 15, SE. ⅛ E.										
			Meters		°C.						
Do	Thimble Light, ENE. ¾ E., Bell Buoy No. 15, SE. ⅛ E.		28.08	M. S. C. Sh	10.1	Dec. 4, 1920	8898	do	1♂ y	58332	
Do	Thimble Light, ENE. ¾ E., Bell Buoy No. 15, SE. ⅛ E.		27.91	bl. M	4.4	Jan. 22, 1921	8929	do	2♂ 2♀	58334	
			Fathoms		°F.						
Do	36 57 02	76 00 26	12	hrd	69.8	July 25, 1916	8595	do	4♂ 6♀ (3 ovig.).	56341	
	Cape Henry Light, S. ⅝ W., Lightship, N. ⅜ E., Can Buoy C1, W ¼ S.										
			Meters		°C.						
Do	Lightship, S. ⅜ E., Cape Henry Light, S. ¼ W., Whistling Buoy, SW. by W. ¼ W.		16.1	gy. S. bl. M	11	Dec. 4, 1920	8901	do	1 y	58333	
Do	Cape Henry Light, SW. by S. ¾ S., Lightship, N. ¾ W.		22.87	S. M	19.7	Oct. 21, 1920	8896	do	1 y	58331	
Do						Jan. 3, 1894	5	do	1 y	56349	
Do						do	18	do	1 y	56351	
			Fathoms								
Do	Lower Bay		3.75					U. S. Fish Commission.	1♂	58327	
Do	Mouth of Bay					May 10, 1888		*Grampus*	1♂ y	59851	
Do	Hampton Roads		12			Apr. 8, 1887	2737	*Albatross*	3♂ 2♀ 3 y	12453	
									3 y	15632	
North Carolina:											
Off Cape Hatteras	35 21 00	75 21 30	16	gy. S. brk. Sh.		Oct. 19, 1884	2280	do	1 y	56363	
Bogue Sound, off Beaufort.						July —, 1912		*Fish Hawk* (W. P. Hay).	1 y	51389	

Off Morehead City						July 18, 1912		do	6	51011	
Off Harker's Island, near Beaufort.								do	2	51091	
Pivers Island						Jan. 31, 1927		J. S. Gutsell	1 y ♀	62204	
Do				From *Pinna* beds.		Sept. 14, 1928		Schmitt and Shoemaker.	1♂	62535	
Shackleford Bank, inside.				Washed from seaweed.		Sept. 12, 1928		do	3♂ 6♀ (3 ovig.) 5 y.	62534	
Do				do		do		do	1♂ 15 y	62568	Between *texana* and *t. sayi*.
Do						do		do	3♂ 1♀ 2 y	62533	
Gallant Point, Beaufort Harbor.				Mud flats		Sept. 13, 1928		do	3♂ 1♀	62532	
Do				Tide flats, oyster reef.		do		do	1♂ 1♀	62531	
South Carolina:											
Winyah Bay						Dec. —, 1890		*Fish Hawk*	1 y	15689	
Clambank Creek						Dec. 30, 1890		do	1♂ 1♀	15703	From oysters.
Bulls Bay Lighted Beacon.						Mar. 23, 1891		do	1♀	15777	Among oyster shells.
					°*F.*						
Cooper River	Half a mile above mouth, 300 miles from marsh, south side.		2.6	sft	51	Jan. 16, 1891	1645	do	10+	15720	
Do	300 yards above Lighthouse wharf, lower entrance.		5	hrd	50	do	1646	do	5 y	26365	
Mouth of Bull Creek	Near Cooper River							do	1♂ y	56345	
Do						Jan. 15, 1891		do	25+	17521	
Bull Creek								do	3♂ 1♀	15734	
Charleston Harbor			7.8	stky	58	Mar. 13, 1891	1659	do	1♂ 1♀	15767	
Do						May 14, 1891	2	do	1♂	15778	
Do						1891		do	1♂	31475	
Klawah River						Mar. 8, 1891	4	do	2♂ 2♀ 1 y	56346	
Coosaw River						Feb. 28, 1891		do	1♂ 1♀	15771	
Myrtle Bush Creek						Feb. 7, 1891		do	6	15769	
Jericho Creek						Jan. 23, 1891		do	2 y 1 y 1♀ y	15783 26175 56348	
Port Royal, naval station.			(5)			Feb. 12, 1891		do	1♂	31474	
Near Port Royal						1891		do	2♂ 1♀	15729	
West end Skull Creek								do	13	15738	Mostly small.
Skull Creek						1891		do	3	26174	
May River	One mile inside of					Jan. 27, 1891		do	2 27	26176 15731	Small.
Calibogue Sound	Southern beacon abeam.		7	sft	50	Jan. 16, 1891	1649	do	1♂ 1♀ 2 y	56319	
Do	Off south end May River.		10	hrd	51	do	1651	do	1♀ 2 y 40+ 20+ y	31473 15712 15716	

[5] Piles of wharf.

NEOPANOPE PACKARDII (Kingsley)

Plate 168, Figures 5 and 6

Panopeus packardii KINGSLEY, Proc. Boston Soc. Nat. Hist., vol. 20, 1879, p. 152 (type-locality, Key West, Florida; type in M. C. Z.).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 365, pl. 22, fig. 1; pl. 23, fig. 6.

Neopanope pourtalesii A. MILNE EDWARDS, Crust. Rég. Méx., 1880, p. 330, pl. 61, figs. 2–2*e* (type-localities, Woman Key and Florida Strait (lat. 24° 44′ N., long. 83° 26′ W.), 37 fathoms; cotypes in M. C. Z. and Paris Mus.).

Neopanope packardii RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; Amer. Nat., vol. 34, 1900, p. 138.

Neopanope pourtalesi A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 329, pl. 5, fig. 6.

Diagnosis.—Dactylus of larger hand with a large basal tooth. Last three antero-lateral teeth spiniform, widely separated; tip of fifth tooth at right angles to tip of third.

Description.—Carapace high in middle whence it slopes down rather rapidly in all directions excepting at the mesobranchial region which is high and bears an obscure transverse ridge leading to the ridge on the posterior tooth of the lateral margin. Front prominent in middle, median emargination minute, lobes slightly sinuous. Antero-lateral teeth sharp pointed, very divergent; interspaces, save the first, broadly open. Third and fifth (reckoning five teeth on a side) pointing at right angles to each other, the fourth in an intermediate direction.

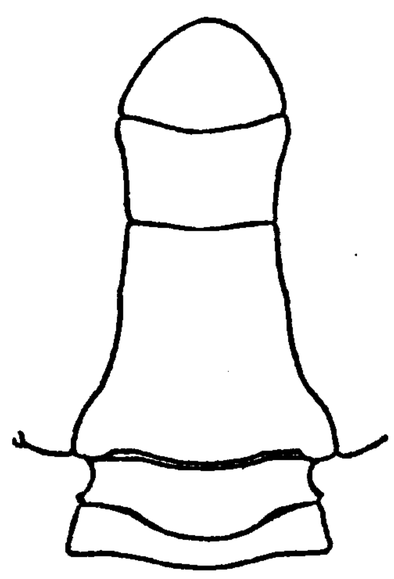

FIGURE 59.—NEOPANOPE PACKARDII, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Fingers black varying to light brown, tips white, color continued on palm along lower margin; dactylus of major cheliped with a large tooth at base of prehensile edge. Tooth of wrist sharp, spiniform. Chelipeds more nearly equal in female than in male.

Measurements.—Male (13042), length of carapace 13.4, width of same 19 mm.

Range.—Southern and western Florida; Bahamas; Cuba.

Material examined.—

FLORIDA.[46]—Miami; G. M. Gray; 1 male (42139), 1 female (42147).

Bonefish Banks SW. end of Biscayne Bay; November 26, 1906; Pine and Bean; 1 male (33145).

Cards Sound: 1889; *Grampus;* 3 males, 2 females (15225). 1.5 miles N. of Pumpkin Key; 10 feet; barry; temperature 24° C.; March 10, 1903; station 7493, *Fish Hawk;* 1 immature female (60786).

Key Largo; 1 fathom; GIS.; H. Hemphill; 1 female (15392).

Lower Metacumbe Key; December 4, 1906; Pine, Vandegrift and Bean, Yacht *Orian*; 1 ovigerous female (33143).

[46] See also table on page 382.

No Name Key; low tide and below; amid grass and algae; H. Hemphill; 24 males, 29 females (13546).

Summerland Keys; December 6, 1906; B. A. Bean; 1 male (33148).

Key West: A. S. Packard, Jr.; 1 male, type (4800, M.C.Z.). H. E. Webster; 1 male, 1 female (56833), received from Boston Society of Natural History. D. S. Jordan; 5 males, 1 female (15390). H. Hemphill; 6 males, 2 females (15395). C. N. E. Eliot; 1 young female (22991). April 15–27, 1884; *Albatross;* 4 males, 6 females (18519).

Woman Key; William Stimpson; 1 specimen, cotype of *N. pourtalesii* (2985, M.C.Z.).

Harbor Key; H. E. Webster; 2 males (56834), received from Boston Society of Natural History.

Florida Bay; Union College collection; 1 specimen (42799).

Off Cape Romano; lat. 25° 50′ 15″ N.; long. 82° 41′ 45″ W.; 21 fathoms; sdy.; temp. 20° C.; April 2, 1901; station 7124, *Fish Hawk;* 1 male (25615).

Marco; H. Hemphill; 3 young (15633), 1 young (15634).

Punta Rassa; H. Hemphill; 15 males, 10 females (15394).

Charlotte Harbor: Low tide, amid grass; Henry Hemphill; 1 male (15393). Mar., 1887; W. H. Dall; 1 female (15389).

Off Charlotte Harbor; 1901; *Fish Hawk*: Lat. 26° 33′ N.; long. 83° 10′ W.; 28 fathoms; sdy.; temperature 66° F.; April 2; station 7123; 1 male (25613). Lat. 26° 35′ N.; long. 83° 11′ W.; 27.5 fathoms; sdy.; temperature 66° F.; April 2; station 7122; 2 males (25614).

Sarasota Bay; February, 1884; H. Hemphill; 15 males, 14 females (6430).

Boca Ceiga Bay, inner shore of Pine Key; January, 1884; H. Hemphill; 25 males, 19 females, 4 young (15396).

Orange Bluff, Clearwater Harbor; 1 and 2 fathoms; H. Hemphill; 2 males (15391).

Off NW. end St. Martin's Reef, Florida Banks, near lat. 28° 50′ N.; long. 83° W.; 1887; Lieut. J. F. Moser, U. S. N., U. S. Coast Survey Str. *Bache;* 3 males, 4 females (13042).

Cedar Keys: December, 1883; H. Hemphill; 36 males, 13 females, 19 young (15397). February 1887; Lieut. J. F. Moser, U. S. N., U. S. C. S. Str. *Bache;* 1 male (59916).

Sea Horse Key; beach, low water; sft. M. Grs.; March 21, 1887; Lieut. J. F. Moser, U. S. Navy, U. S. Coast Survey Str. *Bache*; 1 male (13051). Flats at low tide; March 27, 1926; Miller and Aschemeier; 4 males, 1 ovigerous female (60913).

West coast of Florida: F. W. Crosby; 1 male (56832), received from Boston Society of Natural History. 1891; Henderson and Simpson; 9 specimens (16339).

Material examined of Neopanope packardii from Fish Hawk dredgings in Florida

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.
	Latitude N.	Longitude W.								
	° ′ ″	° ′ ″	*Feet*		°*C.*					
Biscayne Bay	4 miles ENE of Turkey Point.		8.5	hrd. S	25	Mar. 6, 1903	7476	*Fish Hawk*	1♀ ovig. 1 y	59917
Do	3.5 miles SW. by W. ½ W. of Soldier Key.		10.5	barry	23.5	Mar. 7, 1903	7482	do	2♂ 1♀	59918
Cards Sound	1.5 miles SW. ½ W. of Pumpkin Key.		11.5	sft. S. G	24	Mar. 10, 1903	7492	do	4♂ 1♀	59919
Do	1.5 miles N. of Pumpkin Key.		10	barry	24	do	7493	do	3♂ 3♀ (1 ovig.)	59920
North of Knights Key Channel	3.5 miles E. by N. of East Bahia Honda Key.		10	rky	20	Jan. 22, 1903	7411	do	1♂ 1♀	59921
Do	3 miles NE. by N. of East Bahia Honda Key.		11	rky	20	do	7412	do	1♂ 1 y	59922
Do	4.75 miles NNE. of West Bahia Honda Key.		11.5	S. G. barry	20	do	7413	do	1 ♂	59923
Do	6 miles NNE. ½ E. of East Bahia Honda Key.		11	barry	20.5	do	7414	do	2♂ 2♀ 1 y	59924
			Fathoms							
Pigeon Key Lake	Nearly 1 mile NNE. ½ E. of Money Key.		9	S. G	17.5	Jan. 7, 1903	7402	do	1 ♀ 2 y	59925
Off Key West, inside the reef	Key West Light to E. Channel Bar Buoy 71° 53′ to Beacon A 74° 46′.		5.25	Co. S. G	20	Feb. 13, 1902	7278	do	1 ♀	59926
Florida Bay and vicinity						Jan. 29, 1903	7432–7442	do	6♂ 1♀ 1 y	59927
Off Cape Sable	25 09 52	81 21 53	3.75	gy. S. Sh	23.5	Dec. 17, 1902	7352	do	1 y	59928
			Feet							
Do	WSW. ½ W. from signal, 7.25 miles.		11	gy. S. G	22	Dec. 19, 1902	7368	do	1♂	59929
			Fathoms							
Do	E. end Sawyer Key, S. ¼ W., 2.25 miles.		4.75	rky	22.5	Dec. 22, 1902	7390	do	1♂	59930
Tampa Bay			6.5	M	20.5	Mar. 29, 1901	7109	do	1♀	25616
Pepperfish Key section	29 32 10	83 29 50	3	sdy	21.8	Nov. 5, 1901	7144	do	1♂	59931

BAHAMAS.—Bahamas; from living sponges; 1888; Frederick Stearns: 5 specimens (42801). West side Andros Island; 10 specimens (42802). Andros Banks; 2 specimens (42800).

Off Governor's Harbor, Eleuthera Island; 5 fathoms, in oyster dredge; July 7, 1903; B. A. Bean; 3 males, 2 females (31056), received from Geographic Society of Baltimore.

CUBA.—Esperanza; shallow water; May 11, 1924; Henderson and Bartsch, *Tomas Barrera* Exped.; 1 male (48519).

Genus HEXAPANOPEUS Rathbun

Hexapanopeus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; type, *H. angustifrons* (Benedict and Rathbun); Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 30.

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

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

From southern Massachusetts to Uruguay; west coast of Mexico.

KEY TO THE SPECIES OF THE GENUS HEXAPANOPEUS [47]

A¹. Fingers either black or horn color.
  B¹. Fifth lateral tooth well developed.
    C¹. Color of immovale finger continued slightly backward on palm, ending in an oblique line.
      D¹. Margin of front with a small tooth or lobule at outer ends.
        E¹. Carpus of cheliped not covered with tubercles although it may be lumpy.
          F¹. Tips of lateral teeth not tuberculiform. Supraorbital lobe wide, more than half as wide as the distance to tip of inner orbital tooth.....**angustifrons**, p. 384.
          F². Tips of lateral teeth tuberculiform. Supra-orbital lobe narrow, less than half as wide as the distance to tip of inner orbital tooth.....**orcutti**, p. 397.

[47] *H. hirsutus* Boone, Bull. Bingham Ocean. Coll., vol. 1, art. 2, 1927, p. 27, fig. 7, Isle of Pines, is *Panopeus harttii;* figure unrecognizable.

E². Carpus of cheliped covered with tubercles, about 15 in number. Fingers deeply grooved.....**paulensis**, p. 395.

D². Margin of front without a small tooth at outer ends. Carapace deeply furrowed. Supra-orbital tooth defined by open fissures.....**sinaloensis**, p. 398.

C². Color of immovable finger continued well backward and also upward on palm. Edge of front thick, beveled.....**schmitti**, p. 393.

B². Fifth lateral tooth almost obsolete.....**caribbaeus**, p. 399.

A². Fingers white or nearly so.

B¹. Fingers not deeply grooved. Short granulated ridges on carapace.

C¹. Carpus and manus granulate, without tubercles...**hemphillii**, p. 400.

C². Carpus and upper surface of manus covered with tubercles. **nicaraguensis**, p. 395.

B². Fingers deeply grooved. First two lateral teeth similar to, but smaller than, remaining teeth.....**quinquedentatus**, p. 402.

ANALOGOUS SPECIES OF HEXAPANOPEUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
schmitti	*sinaloensis*
paulensis	*nicaraguensis*

HEXAPANOPEUS ANGUSTIFRONS (Benedict and Rathbun)

Plate 169, Figures 1 and 2

Panopeus angustifrons BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 373, pl. 22, fig. 3; pl. 24, fig. 18 (type-locality, Long Island Sound, 6–7 fathoms; type, Cat. No. 15669, U.S.N.M.).

Hexapanopeus angustifrons RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.—SUMNER, Bull. Bur. Fisheries, vol. 31, 1911, part 2, 1913, p. 674.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 436, pl. 34, fig. 7.

Diagnosis.—Anterior margin of third lateral tooth transverse. Hepatic tubercle obsolete. Deep groove on carpus. Color of immovable finger not extended on palm. Outer ends of third abdominal segment of male rounded.

Description.—Carapace convex, lateral teeth ascending; areolations fairly well marked; front narrow, much produced, four-lobed, lateral lobes small, their outer margin oblique; median notch V-shaped, continued in a narrow or closed fissure; margin between the two supra-orbital fissures produced, arcuate; antero-lateral edge thin, shorter than postero-lateral; sinus of coalesced tooth shallower in adult than in young; orbital angle acute, next tooth arcuate or lobiform; third and fourth teeth short and broad, anterior edge of third tooth nearly at right angles to median line, posterior edge much longer than anterior and directed obliquely backward and outward from tip; fourth tooth with posterior margin a little longer than anterior and subparallel to median line; fifth tooth shorter and sharper. Inner

lower angle of orbit conical, produced much beyond upper angle; outer hiatus deep, closed at bottom, wide spreading at opening. No subhepatic tubercle.

One and sometimes two small teeth on upper margin of arm; carpal groove deep, tooth at inner angle subcylindrical, stout, obtuse, a shallow lobe below it; major palm smooth, deep, swollen, fingers widely gaping, a cylindrical tooth near the base of the strongly arched dactyl; fingers hooked at tips; the color of immovable finger ends in the old, in an oblique line not extending further on palm; in smaller specimens the color line is vertical and does not quite reach base of finger. Legs slender; dactyls long and hairy.

Third, fourth, and fifth segments of male abdomen partially anchylosed; third segment not as wide as first, its outer ends rounded; terminal segment rounded at tip.

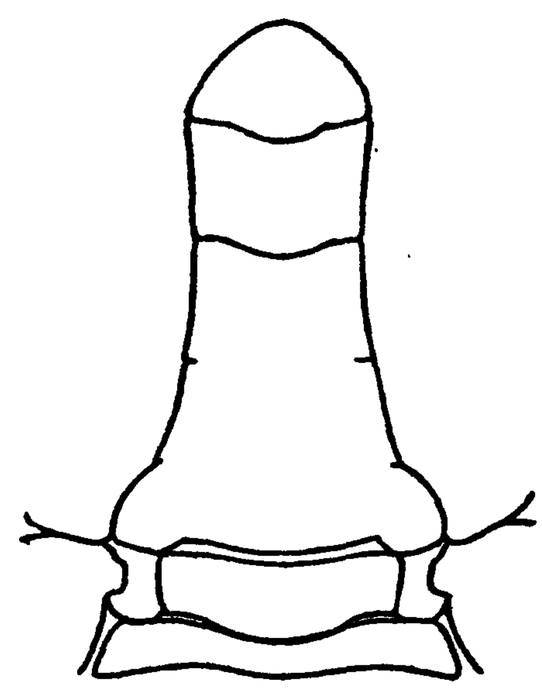

FIGURE 60.—HEXAPANOPEUS ANGUSTIFRONS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Color.—Variable, sometimes a uniform brownish yellow or even light buff, but usually a dark reddish brown or dark gray, the females usually darker than the males and often more or less spotted. In both sexes the fingers are black or dark brown at the base, lighter at the tips. (Hay and Shore.)

Measurements.—Male holotype, length of carapace 17.8, width of same 26.5, fronto-orbital width 13, width of front 7.2 mm. Most of the specimens from Chesapeake Bay and from South Carolina southward are small.

Variation.—A single male (21236) from Jamaica is atypical. It has the not uncommon abnormality of two minor chelipeds instead of a major and a minor; but these are not only similar in form but of nearly equal size and are much longer and stronger than its small carapace (11.6 mm. wide) would normally carry, the merus projecting well beyond the carapace. In addition, the sinus of the coalesced lateral tooth of the carapace is deeper and wider than usual and the ambulatory legs are very narrow, the merus of the last pair being 4.6 by 1.1 mm.; the size of the corresponding member of a male of 13.5 mm. carapace-width (15643) is 4.5 by 1.4 mm.

Range.—From Massachusetts (Vineyard Sound) to Gulf of Mexico (Louisiana), Bahamas and Jamaica.

Material examined.—See table, pages 386 to 392.

Material examined of Hexapanopeus angustifrons

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Massachusetts:	° ′ ″	° ′ ″			°F.						
Off East Chop, Martha's Vineyard.			10 -11.5	S. Sh. G	72	Aug. 11, 1887	1205–1208	*Fish Hawk*	7♂ 7♀	12686	
Vineyard Sound								U. S. Fish Commission.	2♂ 1♀	15639	
Vicinity of Woods Hole.						1905		M. J. Rathbun	1♂ 1♀	32472	
Buzzards Bay	Nye's Neck, NE. ¾ E. 2¾ miles.		8	bk. M	68	Aug. 26, 1881	961	*Fish Hawk*	1♂	15638	
Do	Scraggy Neck and Wings Neck Light.		3.5 - 4.75	S. Sh. fne. G		Aug. 9, 1905	144,145,147	*Phalarope*	3♂	32471	
Nantucket Sound	Bishop and Clerks Lightship, E. by S. ¼ S.; Collins Beacon, N. by W. ¾ W; Hyannis Light, NE. ¼ N.		4.5	S. Sh	69.5	Sept. 5, 1887	1245	*Fish Hawk*	1♂	16337	
Rhode Island:											
Sakonnet River	McCurrys Point, N. ¼ E., 1¼ miles.		3.5	sft. M. brk. Sh.	71	Aug. 27, 1880	835	do	2♂ 5♂ 8♀	36745 40789	1 female is host of an Entoniscid and has a deformed abdomen.
Narragansett Bay	Halfway Rock, NNE. ½ E., 2⅜ miles.		12.5	M	67	Sept. 17, 1880	882	do	1♂	5769	
Connecticut:											
Long Island Sound	Branford Beacon, N. by W. ⅝ W., 1¼ miles.		10	sft	70	Sept. 21, 1892	1733	do	1♀	26148	
Do	Off New Haven and Branford.		3.83- 8.83	M. S		July 28, 1890	1504–1511	do	1♂	17165	
Do	Stratford Point Lighthouse, W. ⅞ S., 2⅜ miles.		7	sft	64	Oct. 13, 1890	1627	do	2♂ 3♀	15711	
Do	Stratford Point Lighthouse, NE. by N., 3½ miles.		8	sft	68.5	Sept. 25, 1890	1562	do	1♂ 5♀	15673	
Do	Bridgeport Light, N. ¾ W., 2 miles.		5.16	sft	70	Sept. 19, 1890	1536	do	1♂ 2♀	15756	
Do	Off Bridgeport		4.5 - 4.66		71	Sept. 17, 1890	1523, 1524	do	1♂	15754	

Do	Bridgeport Light, N. by E. ¾ E., 3¼ miles; Penfield Reef Light, NW., 1⅝ miles.	9	sft	65	Oct. 11, 1890	1622	do	1♂	15759	
Do	Penfield Reef Light, NW. by W. ¼ W., 2¼ miles.	8.5	sft	70	Sept. 18, 1890	1529	do	2♂ 2♀	15710	
Do	Penfield Reef Light, W. by N., 2½ miles.	6.33	sft	70	Sept. 19, 1890	1537	do	1♀	17166	
Do	Penfield Reef Light, W. by N. ¼ N., 3 miles.	7	sft	70.5	do	1546	do	3♀	17164	
Do	Penfield Reef Light, W. by N. ¼ W., 3½ miles.	6	sft	70	do	1547	do	1♀	17163	
Do	Off Penfield Reef Light.	6 - 7	sft		do	1546–1547	do	2♂ 7♀ 2 y	15669	1 male is holotype.
Do	Middle Ground Lighthouse, S. ⅛ E., 2½ miles.	7	hrd	67	Oct. 1, 1890	1580	do	3♂ 5♀ 2 y	15677	
Do	Middle Ground Lighthouse, S. by E., 2¾ miles.	6.66	hrd	68	Sept. 26, 1890	1572	do	2♂ 3♀	15757	
Do	Off Norwalk				1890		do	3♂ 4♀	15768	
New York	The Gut, Long Island.				July 23, 1898		Biological Laboratory, Cold Spring Harbor.	6	21660	
Maryland:										
Chesapeake Bay	38 47 30 | 76 25 06 Bloody Point Light, NNE. ¾ E.; N. end Poplar Island, SE. by E. ¾ E.	20	sft. bk. M		Apr. 25, 1916	8528	*Fish Hawk*	1 y ♀	56292	
Do	38 33 24 | 76 26 06 ¾ mile W. of Bell Buoy No. 18 A.	13	sft. gn. Marl	65.7	Oct. 26, 1915	8355	do	1♂	56306	
Do	38 20 24 | 76 18 14 Barren Island Buoy No. 16 D, NE. by N., about 200 yards.	26	sft. bk. M., marine growth.	45	Apr. 25, 1916	8523	do	2♂ 1♀	56318	
Do	38 14 42 | 76 15 36 Hooper Island Light, NE.; Buoy N. ½ E.	26	sft. bk. M	46	do	8522	do	1♂ 1 y ♀	56291	
Do	38 07 12 | 76 13 30 3⅛ miles E. by S. of Point No Point Lighthouse.	21	hrd.; seaweed, brk. Sh.	52.2	Dec. 6, 1915	8388	do	2♂ 1 y ♀	56309	

Material examined of Hexapanopeus angustifrons—Continued

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Virginia:	° ′ ″	° ′ ″			°F.						
Chincoteague						July —, 1913		Henderson and Bartsch.	1♂	46288	
Eastern shore of Virginia.									1♂ 1♀	42797	From Union College. No large tooth at base of dactyl of major cheliped.
Chesapeake Bay	37 54 03	76 06 20	6.75	fne. gy. S	64	Oct. 24, 1915	8347	*Fish Hawk*	4♂ 2♀ 14 y 3♂ 3♀ 1 y	56304 56305 58356	
	4½ miles E. by N. ¼ N. of Smith Point Light.										
Do	37 53 00	76 05 30	6	sft. fne. gy. S	48.5	Dec. 5, 1915	8383	do	6♂ 4♀ 2♂	56289 56288	From red sponge.
	4½ miles E. ¼ S. of Smith Point Light.										
Do	37 51 38	76 09 44	24	hrd. fne. gy. S. M.	48	Apr. 23, 1916	8512	do	1 y ♀	56317	
	Smith Point Light, NW. by N.; Buoy NNW.										
Do	37 48 50	75 58 05	11	sft. fne. gy. S. gy. marl.		Oct. 23, 1915	8345	do	1 y ♂ 1 y ♀	56303	
	Tangier Island Sound, 200 yards E. of Spar Buoy No. 1A.										
Do	37 41 12	76 00 40	9	hrd. gn. marl, S.	66.5	do	8344	do	7♂ 5♀ 1 y	56302	
	Tangier Island Light, NNE.; San Marcus wreck, NW. ¼ W.										
Do	37 39 18	76 02 12	9	sft. gn. bu. M.	50.2	Dec. 4, 1915	8379	do	2 y ♂	56307	
	4¼ miles SSE. of San Marcus wreck.										
Do	37 38 50	76 05 20	7	hrd. gn. marl, S.	65.3	Oct. 23, 1915	8343	do	1♂	56301	
	7¾ miles E. by N. ½ N. of Windmill Point Lighthouse.										
Do	37 35 48	76 10 24	23	hrd. thin layer bk. M.	48	Apr. 23, 1916	8511	do	1 y ♂	56316	
	Windmill Point Light, W. ½ N.; Bell Buoy, SW. by W. ½ W.										
Do	37 34 00	75 59 07	4.25	hrd. Sh. marine growth.	51.5	do	8508	do	1♀	56315	
	Can Buoy No. 1, SE. ½ E., 1 mile.										

Do	37 33 19 | 75 58 21 500 yards NW. by W. ½ W. from Can Buoy No. 1.	3	hrd	79	July 27, 1916	8607	do	1 ovig. ♀	60876	
Do	Plantation Light, SE. ⅜ S.; Buoy No. 10, N. ¼ E.; Cherrystone Light, E. by N.	*Meters* 45.75		°*C.* 21.9	July 8, 1920	8826	do	1♀	55727	
Do	37 23 24 | 76 05 08 Wolf Trap Light, W. ½ N.; Plantation Light, S. ¼ E.	*Fathoms* 13	hrd. Sh. marine growth.	°*F.* 50.2	Apr. 22, 1916	8507	do	1♂	56314	
Do	Cherrystone Light, S. ⅞ E.; New Point Light, SW. by W., ⅞ W.; Wolf Trap Light, W. ½ N.	*Meters* 23.79	bu. M	*C.* 24.8	July 8, 1920	8822	do	1♂ 1 cheliped	55725 55723	
Do	37 22 12 | 76 10 25 1¼ miles SSE. of Wolf Trap Light.	*Fathoms* 9.5	sft. gn. M. S	°*F.* 66	Oct. 22, 1915	8341	do	3♂ 1♀ 1 y 1♂ 1♀	56296 56293	
Do	37 16 50 | 76 14 27 Buoy C 9, NW. by N. ¼ N.; New Point Comfort Light, NW. ¾ W.; York Spit Light, SW. ½ W.	5.5	hrd. fne. S. M. marine growth.	50.3	Apr. 22, 1916	8506	do	2 y 2♀ 1 y	58357 56313	
Do	37 15 58 | 76 10 54 New Point Comfort Light, NW. by W. ⅜ W.; York Spit Lighthouse, SW. ½ W.; Buoy No. C 7, W.	6	hrd. fne. S. M. marine growth.	49.8	do	8505	do	1 y ♂	56312	
Do	37 15 21 | 76 04 40 Plantation Light, SE. ⅜ S.; Buoy No. 10, N. ¼ E.; Cherrystone Light, E. ⅜ N.	25	hrd. brk. Sh	51.6	do	8503	do	9♂ 11♀	56290	
Do	Thimble Light, E NE. ¾ E.; Bell Buoy No. 15, SE. ⅛ E.	*Meters* 28.08	M. S. Co. Sh	°*C.* 10.1	Dec. 4, 1920	8898	do	3 y	58358	
Do	Thimble Light, E NE. ¾ E.; Bell Buoy No. 15, SE. ⅛ E.	27.91	bu. M	4.4	Jan. 22, 1921	8929	do	1♂ 1♀	58359	
Do	37 12 00 | 76 10 05 Back River Light, NW.; Thimble Light W.; Buoy, SSW. ¼ W.	*Fathoms* 4	fne. gy. S	°*F.* 68	Oct. 22, 1915	8336	do	2♂ 1♀	56299	Female is soft shell.

Material examined of Hexapanopeus angustifrons—Continued

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Virginia—Continued.	° ′ ″	° ′ ″			°F.						
Chesapeake Bay	Off Back River Light							*Grampus*	1♀	56361	
Do	37 06 35	76 07 30	8.25	gy. M. fne. gy. S.	68	Oct. 22, 1915	8337	*Fish Hawk*	1♀	56300	
	¾ mile W. by S. of 35-foot channel Lightship.										
Do	37 05 55	76 10 00	25	sft. gy. bu. M.	50.9	Dec. 5, 1915	8381	do	1♀	56294	
	1¼ miles SSE. of Smith Point Lighthouse.										
Do	37 03 18	75 58 12	7.5	sft. fne. S. brk. Sh.	48.9	Dec. 3, 1915	8371	do	2♂ 1♀	56286	
	3/10 mile W. by S. ¾ S. of No. 4 Buoy, Nautilus Shoal.										
Do	37 00 40	76 14 55	16	sft. gn. bk. M.	50	Dec. 2, 1915	8366	do	1♂ 2♀	56287	
	½ mile W. by S. of Thimble Shoal Lighthouse.										
Do	37 00 35	76 15 15	15	sft. bk. M. seaweed.	41.5	Jan. 16, 1916	8403	do	1♂	56285	
	8 miles WSW. of Thimble Shoal Light.										
Do	37 00 33	76 15 25	15.25	hrd	47.8	Apr. 21, 1916	8497	do	2♂ 2♀	56310	
	Thimble Light, ENE. ¾ E.; Bell Buoy No. 15, SE. ⅛ E.										
Do	56 58 38	76 07 14	5.25	hrd. brk. Sh.	46.2	do	8498	do	1♂	56311	
	Buoy No 4, N. by W. ⅜ W.; Buoy No. 5, W. by N.										
			Meters		°C.						
Do	Cape Charles Light, NE.; Buoy No. 4, E. ⅛ S.; Lightship, SW. by S. ¾ S.		18.3		18.2	July 9, 1920	8827	do	1 ovig. ♀	55726	
			Fathoms		°F.						
Do	36 57 02	76 00 26	12	hrd	69.8	June 25, 1916	8595	do	1♀	56295	
	Cape Henry Light, S. ⅝ W.; Lightship N. ⅜ E.; Can Buoy C 1 W. ¼ S.										

			Meters		°*C.*						
Do	Cape Henry Light, SW. by S. ¾ S.; Lightship, N. ¾ W.		23.79		24.2	July 9, 1920	8829	do	1♀	55728	
Do	Lower Chesapeake Bay.					Jan. —, 1921		do	1♂ 1♀	58355	
			Fathoms								
Do	Hampton Roads		12			Apr. 8, 1887	2737	*Albatross*	1♀	12457	
Do	Mouth of Bay					May 10, 1888		*Grampus*	2 y	31478	
North Carolina:											
Off Cape Hatteras	35 21 00	75 21 30	16	gy. S. brk. Sh.		Oct. 19, 1884	2280	*Albatross*	1 y	60877	
Off Harker's Island, near Beaufort.						July 24, 1913		*Fish Hawk* (W. P. Hay).	1♂ 4 ovig. ♀	51089	
South Carolina:					°*F.*						
Winyah Bay	33 49 45	78 04 00	7	hrd	80.5	July 12, 1915	8275	*Fish Hawk*	1♂	51061	
Cooper River	300 yards above Lighthouse wharf, lower entrance.		5	hrd. Co	50	Jan. 16, 1891	1646	do	25 7 y	15724 26366	Small.
Do	½ mile above mouth of Cooper River, 300 yards from marsh, south side.		2.6	sft	51	do	1645	do	10	15719	Do.
Charleston Harbor			7.8	stky	58	Mar. 13, 1891	1659	do	1♂	15766	
Near Port Royal						1891		do	1♂ 1♀	15728	
May River	1 mile inside of river					do		do	6	15732	
Skull Creek	West end of creek					do		do	4	15739	
Calibogue Sound	Southern Beacon abeam.		7	sft	50	Jan. 16, 1891	1649	do	3 y 1 y	15740 56297	
Do						1891		do	3♂ 1♀	15736	
Florida:					°*C.*						
Off Northwest Channel.	24 44 50	81 53 38	10	hrd. S	19.5	Feb. 24, 1902	7289	do	1♀	59914	
Off Cape Romano	25 50 15	82 41 45	21	sdy	20	Apr. 2, 1901	7124	do	1♂	25621	
Marco								H. Hemphill	5♂ 5♀ 10 y	15642	
Punta Rassa								do	6♂ 7♀ 8 y	15643	Do.
Charlotte Harbor						Mar. —, 1887		W. H. Dall	2♀	15644	
					°*F.*						
Off Charlotte Harbor.	26 33 00	83 10 00	28	sdy	66	Apr. 2, 1901	7123	*Fish Hawk*	2♀	25620	
Do	26 35 00	83 11 00	27.5	sdy	66	do	7122	do	2♀ ovig	25619	Atypical: Carapace and chelipeds rough, lateral teeth prominent.
Sarasota Bay			1-2			Feb. —, 1884		H. Hemphill	1♂	15645	
Do									1♂	42796	From Union College.
Do									1♀	42795	From Union College. Rough variety, densely granulate.

Material examined of Hexapanopeus angustifrons—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued.	° ′ ″	° ′ ″			°C.						
Tampa Bay			6.25–6.5	M	20.5–21.6	Mar. 29, 1901 Apr. 1, 1901	7109, 7121	*Fish Hawk*	1♂ 3♀ 2 y	25622	
Goodland Point								H. Hemphill	3♂ 1♀	18260	
Pensacola						July —, 1893		J. E. Benedict	25 y	18259	
West Florida						1891		Henderson and Simpson.	10	16338	
					°F.						
Louisiana: Mouth of Mississippi River.	S. Pass Light, N. by E.; SW. Light, NE.		76	sft. M	71	June 24, 1913	7909	*Fish Hawk*	1♀	56298	In mud bag.
Bahamas: Andros Islands.	Banks, west side of islands.					1888		F. Stearns	1♀	59509	In live sponges.
Jamaica:											
Montego Bay	Off Montego Bay Point					June 28, 1910		E. A. Andrews	1♂	42944	
Do	Off Bathing Beach					Aug. 5, 1910		do	2♂	42945	
Do	do					July 19, 1910		do	1♀	42943	Dredged.
Port Antonio								J. E. Duerden	1♂	21236	Atypical. From Institute of Jamaica.

HEXAPANOPEUS SCHMITTI,[48] **new species**

Plate 169, Figures 3–5

Type-locality.—Bay of Rio de Janeiro, Brazil; 1925; W. L. Schmitt collector; male holotype (Cat. No. 59831, U.S.N.M.).

Diagnosis.—Front edge thick, beveled. Anterior margin of third lateral tooth directed outward and slightly forward. A raised bunch of granules on subhepatic region. Color of immovable finger extended backward and upward on palm. Outer ends of third abdominal segment of male rounded; terminal segment an acute, equilateral triangle.

Description.—A small species, representing *H. angustifrons* in the Southern Hemisphere. Carapace convex, with an ascending antero-lateral rim, as in *angustifrons*, but less hexagonal, the front being less advanced and the antero-lateral margin more arcuate. Mesogastric region narrower and more regularly tapering. Protogastric regions covered with numerous irregular and unequal rugae, oblique or transverse in direction. On the other areas, the principal single lines of granules are, one transverse and interrupted at middle, on widest part of metagastric region, and one oblique and directed outward and slightly backward on the epibranchial region. An oblique hepatic elevation bears several striae. Front narrow, edge sinuous, median notch minute, outer angles a little more pronounced than in *angustifrons;* edge thick, obliquely beveled and with a shallow furrow. Supra-orbital notches small, but V-shaped, intervening lobe short, ascending. Sinus between coalesced teeth deepish and rather large in relation to the teeth; remaining sinuses deeper than in *angustifrons*. Third tooth rectangular at tip, anterior margin oblique; fourth tooth triangular, its posterior margin nearly straight, not convex, and directed backward and inward; last tooth pointing outward. Outer suborbital notch V-shaped, adjacent margin slightly concave and less advanced than in *angustifrons*, not separated by an emargination from the inner tooth, which is longer than in the related species. A broad, low, subhepatic tubercle.

Subdistal tooth of merus of cheliped lower and transverse groove deeper than in *angustifrons*. Groove of carpus also deep and continued backward at the outer end in a right angle; inner tooth shorter and broader at base than in *angustifrons*. Minor palm shorter than in full grown *angustifrons;* propodal finger of both chelae more deflexed than in that species. Legs similar to those of the northern species.

In comparison with *angustifrons* the third segment of male abdomen is narrower and its ends more rounded, sixth segment longer, terminal segment longer and more acutely pointed, forming almost an equilateral triangle.

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[48] For Dr. W. L. Schmitt who, as a fellow under the Walter Rathbone Bacon fund of the Smithsonian Institution, has made extensive collections of crustaceans in South America.

Color.—Carapace of freshly preserved specimens olive gray sometimes finely speckled on posterior half. Dorsal half of chelipeds covered with reddish speckles more or less confluent; a larger red spot at articulations. Legs with duller speckles like carapace. The dark color of immovable finger may extend in male along half, or even more than half, of entire lower margin of propodus.

Measurements.—Male holotype, length of carapace 9.4, width of same 12.8, fronto-orbital width 7.8, width of front 4.2 mm.

Remarks.—Small specimens are easily mistaken for *Panopeus bermudensis* on account of the similarity of the granulate lines on the carapace, but they can be identified by the character of the lateral teeth, the thick front, the texture of the palms, and the extension of the color of the finger in the male.

Range.—Brazil; Uruguay.

Material examined.—

BRAZIL.—Maceio, Alagôas; coral reef; August 3, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 female (25736); formerly recorded as *bermudensis*.

Bom Fim, Bahia; 1876–77; R. Rathbun, Hartt Explorations; 1 male (21398); chelipeds not regenerated.

Bay of Rio de Janeiro: 1876–77; R. Rathbun, Hartt Explorations: Dredged, shallow water, 1 male, 3 females (1 ovigerous) (19792); Rio de Janeiro, dredged, 1 female (19791). 1925; W. L. Schmitt: 7 males, 5 females (1 ovigerous) (59831), 1 male is holotype; Pedra de Itapuca, Nictheroy, August 24, 1 ovigerous female (59832); Paqueta, August 19, 4 males, 1 female, 2 young (59833); River in Ilha Governador, August 27, 1 male, 1 female (59847). January, 1922; Carlos Moreira; Copacabana; in *Sargassum*, carried to shore by waves; 19 males, 21 females (8 ovigerous) (59834); received through W. L. Schmitt.

Villa Bella, Ilha São Sebastião, São Paulo; 1925; from W. L. Schmitt: September 28, 4 males, 1 ovigerous female (59835); H. Luederwaldt collector: August, 5 males, 1 ovigerous female, 1 young (59836); October, 14 males, 9 females (3 ovigerous) (59837).

São Francisco, Santa Catharina; along flat in front of sea wall by Mercado; October 5, 1925; W. L. Schmitt; 1 male, 1 female (59838).

URUGUAY.—Cape Polonia; December 6, 1922; H. M. Smith; 1 male (56719).

Punta del Este; under rocks in seaweed mostly in water; November 15, 1925; W. L. Schmitt; 1 male, much worn (59839).

Puerto La Paloma, Rocha: February, 1925; 1 male; lent by Buenos Aires Mus. (15175). March, 1925; *Atair;* 1 male; lent by Buenos Aires Mus. (15412, part).

HEXAPANOPEUS PAULENSIS, new species

Plate 170, Figures 5 and 6

Type-locality.—Santos, São Paulo, Brazil; received from Museu Paulista; male holotype (Cat. No. 61136, U.S.N.M.).

Diagnosis.—Carapace with short transverse lines of single granules. Wrists tuberculate. Fingers deeply grooved, the color of the immovable finger continued moderately back on palm. Sixth abdominal segment of male abdomen broader than long.

Description.—About 12 transverse granulated lines on gastric, cardiac and branchial regions; epigastric and frontal lobes prominent. Edge of front thin, arcuate, with a small median V-notch and a small slightly projecting lobule at outer end. Supra-orbital border arcuate between the two emarginations. Outer tooth small, next or second tooth of antero-lateral margin larger, broad and shallow, with arcuate outer margin; third tooth with nearly straight margin directed inward and forward; fourth and fifth teeth acute and prominent; there may be a small denticle in the first, second, or third sinus. Inner suborbital tooth large, further advanced than the supra-orbital angle but less than the outer angle of the front. On the subhepatic region a raised line of granules.

The chelipeds are distinguished from others of the genus by the roughness of wrist and upper part of palm. The wrist has about 15 tubercles irregular in size and distribution; besides the customary tooth at the inner angle, there is below it a very small but plainly marked tooth or denticle; distal groove deep. Manus with a superior groove, also one on the outer surface just below the upper edge; the two ridges thus formed each have 4 or 5 low ill-defined tubercles. Fingers deeply grooved, tips light, remainder horn color, the color of the immovable finger continued a little on the palm and ending in an oblique line. Of the abdominal segments of the male the last two are broader than long, the terminal segment subtriangular, its proximal margin arching toward the sixth segment.

Measurements.—Male, holotype, length of carapace 7, width of same 9.6, fronto-orbital width 5.6, width of front 2.9 mm.

Range.—State of São Paulo, Brazil.

Material examined.—

Villa Bella, Ilha São Sebastião, São Paulo; September 19, 1925; W. L. Schmitt; 1 male, 2 ovigerous females (61137).

Santos, São Paulo; 3 males, 2 females (61136) from Museu Paulista; 3 males, 3 females (Mus. Paulista, 1011).

HEXAPANOPEUS NICARAGUENSIS Rathbun, new combination

Lophopanopeus nicaraguensis RATHBUN, Proc. Biol. Soc. Washington, vol. 17, 1904, p. 162 (type-locality, Realejo, west coast of Nicaragua; type in Copenhagen Mus.).

Diagnosis.—Five well marked, triangular, antero-lateral teeth. Transverse granulated lines on carapace. Upper surface of wrist and palm tuberculate.

Description.—Regions of carapace plainly marked, finely granulate, crossed by transverse lines of coarser granules—on front and epigastric lobes, two on each protogastric region, one at widest part of mesogastric region, one hepatic, two on anterior part of branchial region, while on posterior part of same region there is a nearly longitudinal row of very short granulated rugae which extend to posterior margin; the last of these is the strongest. Front narrow, little more than one-fourth width of carapace; margin thick, granulate, bilobed, median notch V-shaped, lobes most advanced near the notch, outer angles distinct, blunt teeth. Margin of orbit granulate, outline convex between the two superior fissures; outer sinus a large V, inner lower

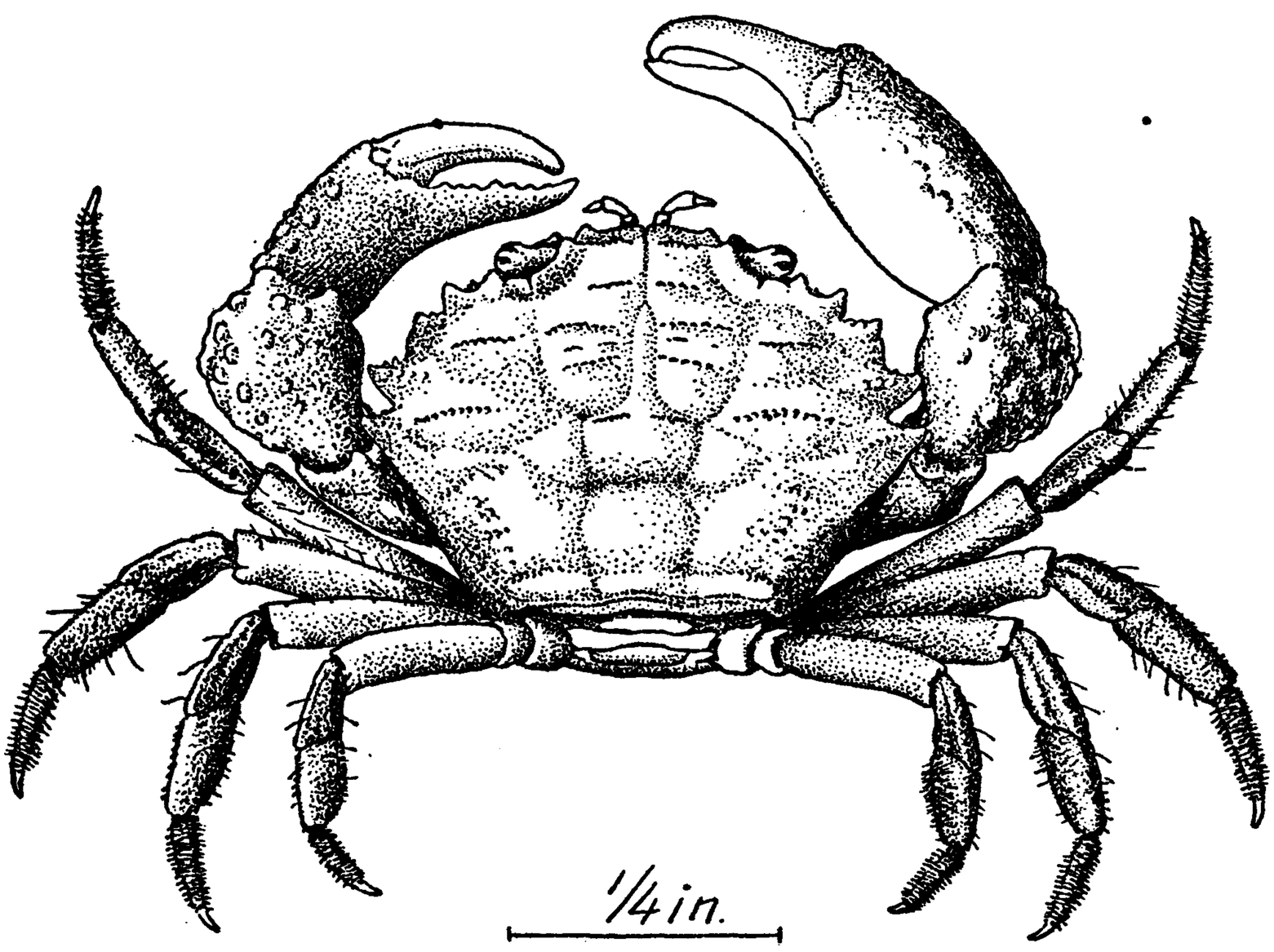

FIGURE 61.—HEXAPANOPEUS NICARAGUENSIS, MALE, HOLOTYPE (COPENHAGEN MUS.), CARAPACE 13 MM. WIDE, DORSAL VIEW

angle prominent, triangular, intervening outline convex. Antero-lateral teeth five (orbital included), increasing rapidly in size from first to fourth, fifth nearly as large as fourth, thick, upturned, margins denticulate. From the second a granulate bilobed crest extends along subhepatic region to antero-lateral angle of buccal cavity. The fourth and fifth teeth have a superior crest prolonged on to the carapace.

Chelipeds very unequal, granulate, granules coarser on elevations and margins. Merus as high as long, a strong subterminal tooth above, behind it a denticle. Carpus covered outside with granulated tubercles, anterior and outer margins thickened; inner tooth small. The fine granules of the palm form transverse reticulating lines; upper and posterior end rough with granulated tubercles which form two rows above and have a tendency to form longitudinal lines on

outer surface. Fingers of large claw gaping, dactylus with a large basal tooth, thumb a little deflexed, that of smaller claw more strongly so. Fingers almost white in alcohol, color line oblique but not extended noticeably on palm. Upper margins of ambulatory legs granulate, carpal crests unevenly so; last two articles densely hairy.

First segment of male abdomen with a transverse granulated crest; penult segment much broader than long, and broader at anterior than posterior margin; terminal segment broadly subtriangular.

Measurements.—Male holotype, length of carapace 8.7, width of same 13, width of front 3.5 mm.

Range.—West coast of Nicaragua.

Material examined.—Known only from the type-specimen from Realejo; Oersted collector; one male (Copenhagen Mus.).

HEXAPANOPEUS ORCUTTI, new species

Plate 170, Figures 3 and 4

Type-locality.—Near Modesto, Sinaloa, Mexico; September 29, 1922; 1 male holotype (Cat. No. 56688, U.S.N.M.).

Diagnosis.—Lateral teeth with tuberculiform tips. Carpal furrow turning backward at a right angle. Major manus with a furrow on upper part of outer surface. Color of immovable finger prolonged obliquely backward from interdigital sinus.

Description.—Striae of dorsal surface ill defined, regional furrows shallow. Margin of front slightly arched, as far as the well marked outer teeth; median emargination minute. Upper orbital border between fissures lobiform. Antero-lateral teeth similar, triangular, shallow, and with thick tuberculiform tips; first tooth equilaterally triangular and so deeply and widely separated from the second that they do not appear coalesced; third tooth with a short anterior margin directed a little forward and the posterior margin directed well outward and backward; fourth tooth widest, its anterior margin running slightly back to the tip, posterior margin longer, a little convex and directed backward and inward to the small and narrow fifth tooth, which points obliquely forward.

Carpus of cheliped very lumpy, its distal furrow continued backward at the outer end in a right angle. Upper part of major manus compressed so that a longitudinal furrow is formed on the outer surface. Color of both propodal fingers continued moderately on palm, the terminal line beginning in the sinus at base of finger and continued obliquely down and back in a sinuous line. The major dactyl lacks a large basal tooth; this may be an accidental rather than a specific character.

Sixth segment of male abdomen broader than long, sides mostly parallel but curve inward a little at distal end. Terminal segment very short and rounded at tip.

Measurements.—Male holotype, length of carapace 4.9, width 6.6, fronto-orbital width 4.5, width of front 2.6 mm.

Range.—West coast of Mexico. Known only from the type specimen.

HEXAPANOPEUS SINALOENSIS, new species

Plate 170, Figures 1 and 2

Type-locality.—Teacapán, Sinaloa, Mexico; on oyster beds especially among bunches of Hydrozoa; Secretaria de Agricultura y Fomento; 1 male holotype (Cat. No. 60229, U.S.N.M.).

Diagnosis.—Carapace deeply furrowed. Front arcuate, without tooth at outer ends. Supra-orbital lobe set off on either side by an open fissure. Second antero-lateral tooth much larger than first; third wider than fourth.

Description.—Regions and subregions of the dorsal surface of the carapace marked off by deep furrows; transverse granulated lines inconspicuous. Front thin, not crossed by the median epigastric groove; edge arcuate, scarcely interrupted by the minute notch at the middle, and without a tooth at the outer ends. Inner supra-orbital tooth large, outer edge longitudinal, inner oblique; space between fissures broad, transverse, fissures open, terminating in a V-notch; inner suborbital tooth low, reaching only as far as the line of the base of the supra-orbital tooth. Outer tooth small, only a third as wide as the second tooth of lateral margin and separated from it by a narrow sinus; second tooth shallow, inner margin nearly transverse, outer margin sinuous, directed backward and outward; third tooth broadest, a lobule on its inner margin, outer margin nearly longitudinal; fourth tooth narrow-triangular, a minute lobule at base of inner margin, outer margin oblique and slightly convex; fifth tooth very small but well formed, directed obliquely forward.

The chelipeds, which are detached and very unequal, are rough, the carpus lumpy toward the distal end, the manus very rough above and with a deep superior furrow. Both chelipeds have the fingers strongly deflexed and the dactyl without a large basal tooth. They have the appearance of minor chelipeds and may not both belong to the type-specimen. The color of the fixed finger runs back a little on the palm in a horizontal line, then turns obliquely downward, forming a line parallel to the proximal margin of the palm.

Abdomen (male) rather narrow, the third segment not reaching the coxae of the last pair of legs; sixth segment broader than long, its sides sinuous; terminal segment slightly broader than long, subtriangular.

Measurements.—Male holotype, length of carapace 6.2, width 8.5, fronto-orbital width 5.7, width of front 3.2 mm.

Range.—West coast of Mexico. Known only from the type specimen.

HEXAPANOPEUS CARIBBAEUS (Stimpson)

Plate 171, Figures 3–5

Micropanope caribbaea STIMPSON, Ann. Lyc. Nat. Hist. N. Y., vol. 10, 1871, p. 108 (type-locality, St. Thomas; type not extant).
Eurypanopeus caribbaeus RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 20.
Hexapanopeus caribbaeus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; Bull. U. S. Fish Comm. for 1900, vol. 20, part 2, 1901, p. 31.

Diagnosis.—Fifth lateral tooth minute. A supra-orbital lobe present, advanced to level of outer orbital tooth. Dark color of fingers running backward and upward on palm. No large tooth at base of major dactyl.

Description.—Carapace moderately convex, pubescent. Transverse ridges with longer hairs, as follows: Two subparallel, on protogastric region; one epibranchial, strong, in line with last lateral tooth; slightly further back, one metagastric, interrupted at middle; one cardiac, with a shorter median break; one short, above base of last leg. An oblique and more feeble granulate hepatic ridge paralleling the lateral margin; this ridge is lacking in small specimens. Front very narrow, produced, edge thin, lateral margins oblique, a median V, lobes oblique, or in the young transverse or nearly so. Antennal flagellum as long as front is broad. Inner supra-orbital border elevated, emarginations V-shaped, intervening space lobate or obtusangled, as advanced as the small triangular, outer tooth. Exorbital notch V-shaped, lower margin advanced, becoming gradually more so up to the broad inner tooth, which is less produced than the corresponding tooth above. Second antero-lateral tooth small, similar to first and separated from it by a shallow sinus; their combined width equal to that of third tooth, which has a transverse or in the old strongly concave, anterior, and an arcuate posterior margin, tip acute. Fourth tooth spiniform, a little narrower at base than third, and much more outstanding, directed obliquely forward, anterior margin concave, posterior straight or nearly so. Fifth tooth minute, separated from fourth by a closed fissure and appearing much like a section from the posterior slope of the fourth.

Chelipeds very unequal; carpus with a number of small tubercules, arranged roughly in three rows, and at the inner angle a small slender tooth. Palm very finely granulate but smooth to the naked eye; two parallel ridges above and a smooth interspace. Fingers dark with light tips, the dark of the propodal finger prolonged in the male well back and up on the palm, in the female and young a short way back. Major fingers stout, not gaping, minor fingers slenderer and longer; major dactylus without large basal tooth; major fixed finger nearly horizontal, minor deflexed. Ambulatory legs very slender, merus not inflated.

Male abdomen: Third segment narrow, ends rounded; remaining segments relatively broad, a slight constriction between fifth and sixth, sixth and seventh much broader than long; seventh subtriangular, with blunt tip.

Measurements.—Male (24278), length of carapace 8, width 11.5, fronto-orbital width 7.5, width of front 3.7 mm.

Range.—West Indies; coast of South America from Colombia to State of Santa Catharina, Brazil.

Material examined.—

WEST INDIES.—Jamaica: P. W. Jarvis; 4 males (19356, 19402). Montego Bay; from sponges and algae in brackish pond; July 2, 1910; C. B. Wilson; 1 female (42938). Bogue Islands; 1910; C. B. Wilson: On mangrove roots with sponges, ascidians, etc., June 20, 12 males, 6 females (42937); from sponge on mangrove roots, July 10, 1 male (42936). Kingston Harbor: 1893, R. P. Bigelow, 1 male (19795); P. W. Jarvis, 2 males, 1 female (19359).

Porto Rico; 1899; *Fish Hawk:* 1 male (24279). Boqueron Bay; January 27; 1 male, 1 female (24280). Hucares; February 14; 1 male (24278).

St. Thomas; 1884; *Albatross;* 1 male (19414).

SOUTH AMERICAN COAST.—Colombia: Sabanilla; March 16–22, 1884; *Albatross;* 2 ovigerous females, 1 young (19416).

Curaçao; Caracas Bay; 1920; C. J. van der Horst: Under stones near shore; May 3; 1 female (Amsterdam Mus.). In coral; April 28; 1 young (56883).

Trinidad; January 30–February 2, 1884; *Albatross:* 12 specimens (19794). Monos Island; 3 females (2 ovigerous, 1 of which is only 4.5 mm. wide) (19415).

Brazil: Bay of Rio de Janeiro, across from the city; from sponges; C. Moreira; 2 males (31502) from Museu Nacional, Rio de Janeiro. River on Ilha Governador, Bay of Rio de Janeiro; August 27, 1925; W. L. Schmitt; 1 male (59829). State of Santa Catharina; 1919; H. Luederwaldt; 2 males, lent by Museu Paulista.

HEXAPANOPEUS HEMPHILLII (Benedict and Rathbun)

Plate 171, Figures 1, 2, and 6

Panopeus hemphillii BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 374, pl. 24, figs. 12 and 13 (type-locality, Indian Key, Florida; holotype, Cat. No. 15649, U.S.N.M.).

Hexapanopeus hemphillii RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; Bull. U. S. Fish Comm. for 1900, vol. 20, part 2, 1901, p. 31.

Diagnosis.—Third lateral tooth broader at base than the other teeth. Carapace widest at fourth tooth. Fifth tooth well developed. Fingers not deeply grooved; color white, not extended on palm.

Description.—Carapace well areolated, mesogastric region constricted behind the point where it narrows to the tip. Transverse granulated ridges on epigastric, protogastric, hepatic, and epibranchial regions; except in the last-mentioned, the ridges are two or more granules in width, and in the protogastric and hepatic ridges are very irregular and wider at outer than inner end. Anterior and lateral margins granulate; third, fourth, and fifth teeth surmounted by a line of granules, that on fourth and fifth teeth widening inwardly in a bunch of granules. Front with a row of granules paralleling the margin; a narrow median V; edge of either half oblique and sinuous, forming a low outer lobule strongly rounded off. Inner upper tooth of orbit acutangled; superior fissures V-shaped, intermediate space short; outer emargination a broad V from which the lower margin of the orbit is transverse up to the conical inner tooth. Outer tooth of orbit small, obtusangled, separated by a shallow rounded, or sometimes slightly pointed sinus from the next or second antero-lateral tooth; this is larger than the first, larger in full-sized than in small specimens, and sometimes rounded or lobiform as in the type-lot, or subtriangular as in smaller specimens. Last three teeth unequal and dissimilar; third widest, suboblong, anterior margin straight, oblique; posterior margin rounded or a little angled. Fourth tooth prominent laterally (carapace widest here), not much more than half as wide at base as third, anterior margin concave and obliquely transverse, posterior margin convex; fifth tooth triangular, directed outward.

Chelipeds very unequal in male. Upper margin of merus rough with granules, two or three denticles preceding the subdistal tooth or tubercle. Carpus rough with granulated ridges and tubercles, the distal furrow widens at outer end, and a broad, nearly smooth, depression runs along the inner border from the tooth to articulation with manus. The latter is rough above and inside with fine granulate reticulations, superior groove well marked; on the outer surface the granules become very fine below or disappear. Fingers not gaping, white, color not extended on palm. Fingers of major chela very short and broad, propodal finger horizontal; fingers of minor chela long, narrow, deflexed, grooves deeper than in major chela.

Fifth segment of male abdomen narrowing distally, sides sinuous. Sixth segment broader than long, narrowing slightly toward fifth segment. Terminal segment an equilateral triangle, or in the full grown, more elongate; tip subacute.

Measurements.—Male holotype, length of carapace 6.9, width of same 9.8, fronto-orbital width 6.3, width of front 3.4 mm.

Range.—Western and southern Florida; West Indies.

Material examined.—

FLORIDA.—Sarasota Bay; 1 male (42807); from Union College.

Tortugas: 1884; Edward Palmer; 2 ovigerous females (15653). East side Loggerhead Key; from two buckets of turtle grass, roots, etc.; June 17, 1925; W. L. Schmitt; 1 male (59830). Fort Jefferson from beach at pier; July 25, 1926; C. R. Shoemaker, station 6; 1 ovigerous female (60880); gift of Carnegie Institution.

Key West: 1884; *Albatross;* 3 males, 5 females (18262). H. Hemphill; 50 specimens (15652). February 3, 1901; B. A. Bean and W. H. King; 1 male, 1 female (24843). Key West Harbor; Edward Palmer; 8 specimens (15651).

Off Key West; inside the reef; Key West Light to East Channel Bar Buoy, 71° 53′, to Beacon A, 74° 46′; 5¼ fathoms; Co. S. G.; temperature 20° C.; February 13, 1902; station 7278, *Fish Hawk;* 3 young (59911).

No Name Key; H. Hemphill; 13 specimens (15650).

3¾ miles NW. ½ N. of E. end of Grassy Key; 8 feet; rky.; temperature 24° C.; January 28, 1903; station 7431, *Fish Hawk;* 1 male (59912).

Duck Key N., 1.25 miles; 2¾ fathoms; Co. S. grass; temperature 69.5° F.; December 20, 1912; station 7790, haul 2, *Fish Hawk;* 1 male, 1 female with Bopyrid parasite, 1 young (60881).

4¼ miles W. by N. of Elbow Reef Beacon, Hawk Channel; 2¾ fathoms; barry, S.; temperature 20.5° C.; February 19, 1903; station 7467, *Fish Hawk;* 1 ovigerous female, 1 young (59913).

Indian Key; H. Hemphill; 1 male holotype, 1 female (15649).

Key Largo; among corallines, low tide; H. Hemphill; 1 female (15648).

WEST INDIES.—Cuba; on reef flat between Cayo Hutia and Little Cayo, northeast of Light; May 12, 1914; Henderson and Bartsch, *Tomas Barrera* Expedition; 1 male (48515).

Porto Rico; 1899; *Fish Hawk:* 2 females (24259). Mayaguez Harbor; January 20; 1 male (24260). Porto Real; January 27; 1 male (24261).

St. Thomas; January 17–24, 1884; *Albatross;* 2 females (1 ovigerous) (18518).

HEXAPANOPEUS QUINQUEDENTATUS Rathbun

Hexapanopeus quinquedentatus RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 31, text-fig. 6 (type-locality, Mayaguez, Porto Rico; type Cat. No. 23769, U.S.N.M.).

Diagnosis.—Lateral teeth prominent, thick; sinus deep between first and second. Outer tooth of front obsolete. Fingers white, deeply grooved.

Description.—Carapace deeply areolated, regions separately convex, granulate; granules coarser on elevations, noticeably in a transverse line on epibranchial, mesobranchial, metabranchial, hepatic, epigastric, metagastric (line interrupted at middle), protogastric

(two, one behind the other), and on the midribs of the lateral teeth. Edge of front thin, with a median V; lobes slightly oblique, nearly straight, outer angles deflexed and but very little, almost imperceptibly, advanced; side margins oblique, outer corners rounded. Upper orbital margin between fissures wide, slightly arched. Five well-marked lateral teeth, sinus deep between first and second; the first four teeth increase successively in size; second tooth with convex outer margin and blunt tip; third, fourth, and fifth most prominent, thick, subacute; fifth directed outward.

Chelipeds not very heavy nor very unequal, coarsely and closely granulate; merus margined above, ending in a minute subdistal point. Carpus uneven with a few tubercles and a very wide and deep distal groove. Manus deeply grooved along upper surface; a broader shallower groove on upper part of outer surface. Fingers deeply grooved, intervening ridges partly granulate; tips acute, fingers not gaping; color white, apparently not continued on palm. Legs granulate along anterior margin.

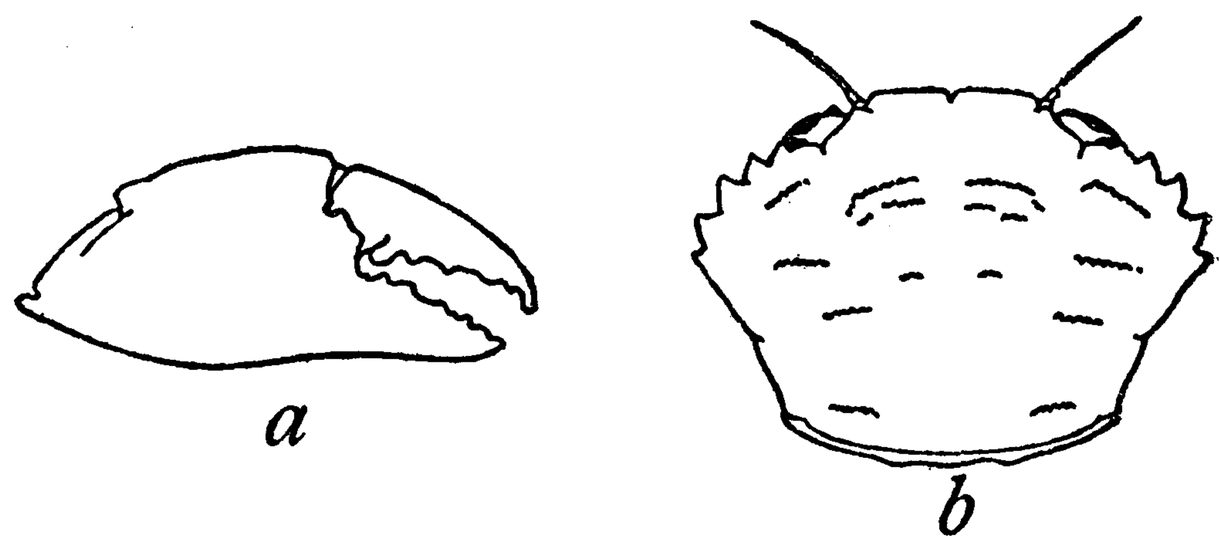

FIGURE 62.—HEXAPANOPEUS QUINQUEDENTATUS. *a*. MALE, RIGHT CHELA, × 10. *b*. FEMALE, CARAPACE, × 4

Measurements.—Female holotype, length of carapace 5.5, width of same 7.4, fronto-orbital width 5, width of front 2.4 mm.

Range.—Porto Rico.

Material examined.—Porto Rico; 1899; *Fish Hawk:*

Mayaguez; January 19; 1 female, holotype (23769); chelae equal and both of the minor sort without basal tooth on the dactyl.

Mayaguez Harbor; customhouse, E. by S. ¼ S., 2¼ miles; 12 fathoms; stky. M.; January 19; station 6060; 1 ovigerous female (24245).

Off Porto Real; Punta Guaniquilla, S. ¼ E., 2 miles; 8.5 fathoms; Co. S.; January 25; station 6074; 1 immature female (24244).

Off Boca Prieta; Punta Guaniquilla, S. SE., 3¼ miles; 8.5 fathoms; Co. S.; January 25; station 6075; 1 immature female (24243).

Relation.—*H. quinquedentatus* resembles *sinaloensis* in the deep sinus between the first and second lateral teeth, but is a much rougher species with more outstanding third, fourth, and fifth teeth and straighter, more transverse front.

Genus EURYPANOPEUS A. Milne Edwards

Eurypanopeus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 318; type, *E. crenatus* (Milne Edwards and Lucas).

Carapace rather broad, length about two-thirds width, oval, depressed or convex, regions not strongly marked or areolated, often

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

From Massachusetts Bay to State of Santa Catharina, Brazil; Bahamas; Bermudas; west coast of Mexico to Chile.

KEY TO THE SPECIES OF THE GENUS EURYPANOPEUS

A¹. Carapace distinctly convex, especially in the antero-posterior direction.
- B¹. Fingers of minor cheliped spooned. Chelipeds very unequal.
  - C¹. Minor manus two-thirds as high as major. Transverse lines on dorsum not strikingly prominent ---------- **depressus**, p. 410.
  - C². Minor manus half as high as major. A few very prominent raised granulated lines on dorsum ---------- **dissimilis**, p. 411.
- B². Fingers of both chelipeds with acute tips, not spooned.
  - C¹. Dark color of immovable finger continued on palm.
    - D¹. Front double-edged, upper edge with a line of granules.
      - E¹. Hepatic region faintly indicated and not crossed by oblique granulated lines ---------- **transversus**, p. 407.
      - E². Hepatic region deeply indicated and crossed by oblique granulated lines ---------- **abbreviatus ater**, p. 407.
    - D². Front not double-edged. Hepatic region deeply delimited ----- **ovatus**, p. 409.
  - C². Dark color of immovable finger not continued on palm.
    - D¹. Carapace moderately convex, well areolated; three lateral sinuses of good size ---------- **abbreviatus**, p. 404.
    - D². Carapace very convex, regions faintly marked; lateral sinuses slight. ---------- **crenatus**, p. 418.

A². Carapace flat, especially toward the sides.
- B¹. Carpus of cheliped smooth (without grooves). Anterior and antero-lateral regions rough with granules and granulated rugae -- **planus**, p. 420.
- B². Carpus of cheliped with two grooves at right angles to each other. Anterior and antero-lateral regions nearly smooth, finely granulate -------- **planissimus**, p. 421.

ANALOGOUS SPECIES OF EURYPANOPEUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
abbreviatus	*ovatus*

EURYPANOPEUS ABBREVIATUS (Stimpson)

Plate 172, Figures 1 and 2

Xantho parvulus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 395, Antilles and Brazil (not *Cancer parvulus* J. C. Fabricius, 1793).

Panopeus abbreviatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 211 (type-locality, Barbados; type in M. C. Z.).

Panopeus politus SMITH, Trans. Connecticut Acad. Sci., vol. 2, 1869, pp. 3 and 34, pl. 1, fig. 4 (type-locality, Abrolhos Reefs, Brazil; type in P. M. Y. U.).

Eurypanopeus parvulus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 322, pl. 59, figs. 5–5*d*.

Eurypanopeus abbreviatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 320, pl. 59, figs. 3, 3*a*.—RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 19; Bull. U. S. Fish Comm. for 1900, vol. 20, part 2, 1901, p. 30.

Panopeus parvulus BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 369, pl. 21, fig. 1; pl. 23, figs. 2 and 3.

Diagnosis.—Antero-lateral margin cut into shallow lobes. Carpus of cheliped with a broad low blunt tooth at inner angle. Color of immovable finger not prolonged on palm. Fingers of minor chela acute.

Description.—Carapace naked above, broad, moderately convex in two directions, granulate and uneven on the front and along the antero-lateral border, smooth and polished on median regions and posteriorly. Regions slightly but distinctly indicated. Several well marked rugae among the granules: One on the raised epigastric lobes; one, straight or broken, on hepatic region, subparallel to antero-lateral margin; one or two on anterior part of protogastric region; one epibranchial. Front strongly deflexed, edge somewhat beveled from above and four-lobed; median lobes prominent, oblique, separated by an acute V-notch, lateral lobes project as small narrow teeth. Upper margin of orbit with two slight notches followed by deeply impressed closed fissures, intervening margin a little convex. Suborbital notch broad and shallow, adjacent margin sloping somewhat backward to base of the stout inner tooth. On the subhepatic region a low, granulated swelling below the interval between first two lateral teeth. Antero-lateral margin thin, divided by small notches into four lobes, the first of which is composed of the inconspicuous angle of the orbit coalesced by a slightly concave line with the low, rounded lobule or normal second tooth; third tooth (second lobe) truncate, oblique, with either end an obtuse angle; fourth tooth with outer margin longitudinal or nearly so, anterior angle a right angle and slightly carinate; fifth tooth subtriangular, directed straight outward.

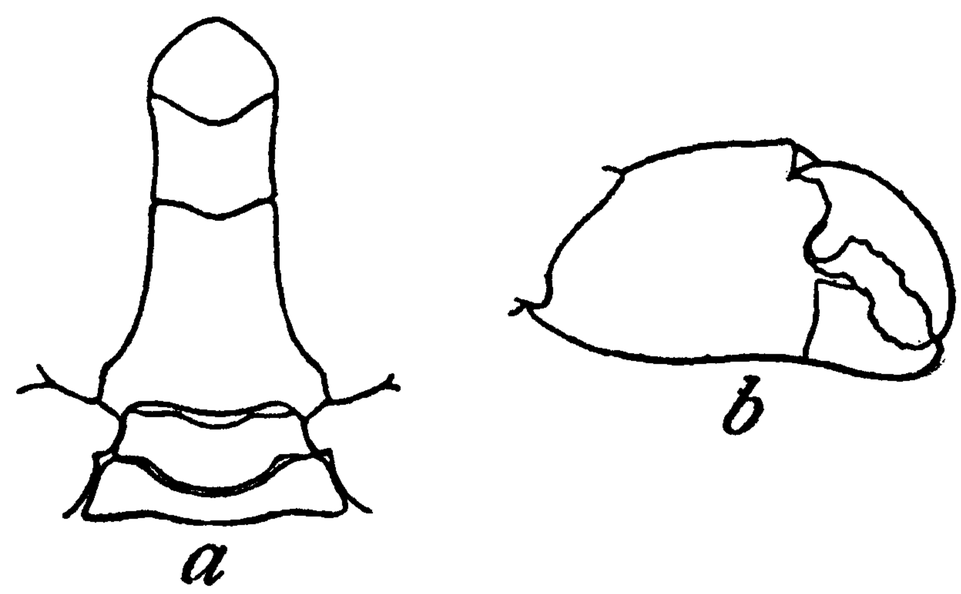

FIGURE 63.—EURYPANOPEUS ABBREVIATUS, MALE, ENLARGED. *a*. ABDOMEN. *b*. MAJOR CHELA. AFTER BENEDICT AND RATHBUN

Chelipeds of male very unequal. Inner angle of carpus marked by a low blunt lobe. Major palm stout and high. Fingers slender, pointed, widely gaping in the major chela, fitting closely in the minor chela, tips crossing in both; a very large tooth at base of larger dactyl, base of immovable finger rectangular, then rapidly diminishing;

fingers of smaller chela more deflexed. Dark color restricted, just, or not quite, covering base of immovable fingers. In female, major cheliped not much heavier than minor, gape of fingers narrow.

Abdomen of male with sixth segment broader than long, side margins a little sinuous; terminal segment triangular with angles blunt.

Color.—Yellowish or brownish; chelipeds and front margin of carapace roseate; fingers black with paler tips (Stimpson). Light brown above, tinged with bluish purple on anterior part of carapace and upper side of chelipeds (Smith). A number of large dark spots on upper half of chelipeds in Brazilian specimens.

Measurements.—Male (59845), length of carapace 14.1, width of same 22, fronto-orbital width 11, width of front 6 mm.

Range.—From Bahamas and Florida Keys to State of Santa Catharina, Brazil.

Material examined.—

Florida: Key West; 1885; H. Hemphill; 1 male, 1 female (15787). Dr. H. Allen; specimens in P. M. Y. U.

Bahamas: Abaco; 1886; *Albatross;* 2 males, 1 female (16333). Andros Islands; under rocks at Smith's; May 5, 1912; Paul Bartsch; 1 female (45726).

Jamaica: Montego Bay and Port Henderson; specimens returned to sender. Kingston Harbor; May–July, 1896; F. S. Conant; 1 male (19592).

Haiti: Santo Domingo; 1878; W. M. Gabb; 5 males, 2 females (3202).

Porto Rico; 1899; *Fish Hawk:* Ponce; January 31; 1 female (24331). Arroyo; February 4; 1 male, 1 female (24332). Hucares; February 13 and 14; 5 males (24334), 1 female (24335). Ensenada Honda, Culebra; February 9 and 10; 2 males, 1 female, 1 young (24333).

St. Thomas harbor; shore near town; July 10, 1915; C. R. Shoemaker; 1 male (59902).

St. Croix; specimens in Copenhagen Mus.

Antigua: Pillars of Hercules; 1918; Barbados-Antigua Expedition, State University of Iowa; 1 male, 1 young (Mus. S. U. I.), 1 female (58001).

Barbados: Theodore N. Gill; 1 male cotype (M. C. Z.). Rock pool at Bathsheba; February 22, 1924; Gerrit S. Miller; 3 males, 4 females, 1 young (62516).

Colombia: Sabanilla; March 16–22, 1884; *Albatross;* 6 males, 15 females (15788).

Curaçao: Caracas Bay; under stones near shore; May 3, 1920; C. J. van der Horst; 1 ovigerous female (56877), 2 females (1 ovigerous) (Amsterdam Mus.).

Venezuela: Puerto Cabello; specimens in Berlin Mus.

Trinidad: February, 1878; Crosby collector; 3 males (56815), received from Boston Society of Natural History. 1884; *Albatross;* 9 males, 5 females (15658).

Brazil: 1899, A. W. Greeley, Branner-Agassiz Expedition: Mamanguape stone reef, Parahyba, June 22 and 23, 5 males, 7 females (25738); Rio Goyanna stone reef, Pernambuco, June 18, 2 males (25739); Boa Viagem stone reef, Pernambuco, July 6, 1 male, 1 female (25740); Maceio coral reef, Alagoas, 3 males, 1 female (Stanford Univ.). Bahia, 1876–1877, R. Rathbun, Hartt Explorations, 1 specimen (16264). 1925, W. L. Schmitt: Ilha Governador, Bay of Rio de Janeiro, outside mouth of river, under rocks, sponges and bunches of bryozoa, September 1, 1 female (59842); Paqueta, Bay of Rio de Janeiro, August 19, 1 ovigerous female (59843); Villa Bella, Ilha São Sebastião, São Paulo, September 20 and 21, 28 males, 18 females (5 ovigerous), 1 young (59844); same locality, October, H. Luederwaldt collector, 4 males, 4 females (1 ovigerous) (59846); São Francisco, Santa Catharina, October 28–30, November 1, 5 males, 7 females (3 ovigerous) (59845).

EURYPANOPEUS ABBREVIATUS ATER, new subspecies

Plate 172, Figures 3 and 4

Type-locality.—Vera Cruz, Mexico; 1925; C. R. Orcutt; 1 male (Cat. No. 59994, U.S.N.M.).

Diagnosis.—Distinguished from the typical form (1) by the dark color of the immovable finger of both chelae continued on the palm backward to a point a little beyond the middle of the lower margin of the propodus (measured from tip of finger) and upward more than half its greatest height; and (2) by the numerous and well separated red dots on the outer surface of the palm.

Measurements.—Male holotype, length of carapace 13.3, width of same 19.8, fronto-orbital width 9.6, width of front 5.4 mm.

EURYPANOPEUS TRANSVERSUS (Stimpson)

Plate 172, Figures 5–7

Panopeus transversus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 210 [82] (type-locality, Panama; type not extant).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 367, pl. 22, fig. 2; pl. 24, fig. 9.

Eurypanopeus transversus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 319, pl. 59, fig. 1-1*f*.

Diagnosis.—Front double-edged, upper edge marked with a line of granules. Hepatic region faintly indicated. Lateral margin cut into shallow lobes. Color of propodal fingers continued on palm.

Description.—Carapace moderately convex, the front bent noticeably downward; sparingly short-pubescent, anteriorly finely granulate and rugose, regions indicated; mesogastric region narrow, very slightly constricted at middle, acuminate, a median groove leading from it to

edge of front. This edge is divided into two sinuous granulate lobes, the outer angle of which forms a distinct but inconspicuous lobule; the front appears thick because it has a row of single granules a little above and behind the true edge. Supraorbital notches minute and not far apart. Outer orbital angle obtuse forming a low tooth scarcely distinguishable from the truncate second tooth of the lateral margin, which has a long, straight or slightly convex margin. Succeeding notches short and narrow, more or less V-shaped, the V often ending in a short linear fissure. Third and fourth teeth truncate, slightly convex, the third a trifle shorter than or sometimes subequal to, the fourth. Suborbital emargination of good size, lower margin of orbit a little convex or nearly straight, separated by a shallow V from the broad, low, triangular, inner tooth. Subhepatic tubercle as a rule very little developed.

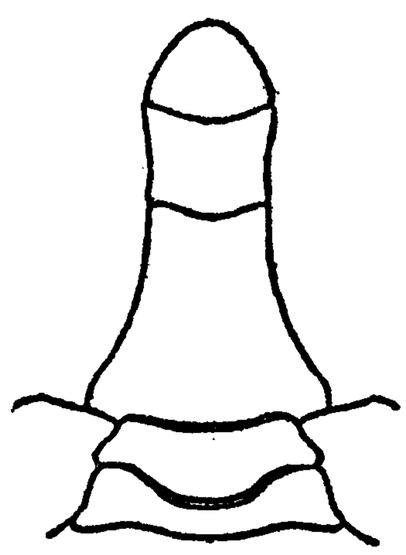

FIGURE 64.—EURYPANOPEUS TRANSVERSUS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Chelipeds minutely granulate; no subdistal tooth on merus; surface of carpus covered with fine granulate rugae irregularly transverse, inner angle a very short blunt tooth. Palms crossed by transverse rugae emphasized by intermediate rows of punctae larger than the granules. A strong tooth at base of major dactyl, which forms a narrow gape with its opposing finger. Both propodal fingers are nearly horizontal, their color runs back a little on the palm, less in female than in male.

Abdomen of male with third segment very little wider than second, somewhat rounded or a little angled at outer ends; sixth segment broader than long, terminal segment subtriangular, the tip broadly arcuate.

Measurements.—Male (16214), length of carapace 11.4, width of same 17, fronto-orbital width 10, width of front 5.5 mm.

Variations.—Stimpson says of this species, "Surface not uneven near the antero-lateral teeth." Of the specimens before me this is true of some but others have a deep groove leading inward from the last two lateral notches. There is variability also in size of lateral notches, in development of subhepatic tubercle, even on different sides of one individual; and in prominence of granules on manus.

In two specimens the major chela is underdeveloped, as not infrequently happens in Panopeids; in male No. 16214, which corresponds most nearly to Stimpson's description, the major chela retains its characteristic shape but is somewhat lower, and the basal tooth of the dactylus is much reduced; in female No. 40425 not only is the major chela considerably reduced but it has the shape of a minor chela including the form and ornamentation of the fingers.

Range.—West coast of Mexico (A. Milne Edwards); Salvador to Peru.

Material examined.—

SALVADOR.—Acajutla; F. H. Bradley; specimens in P. M. Y. U.; 1 male (16214), from Peabody Museum, Yale University.

Gulf of Fonseca; J. A. McNiel; 1 female (4801, M. C. Z.).

NICARAGUA.—Corinto; 1 female (4802, M. C. Z.).

COSTA RICA.—Puntarenas: January 1907; J. Fid. Tristan; 1 male, 1 female (39104). 1907; P. Biolley; 1 male, 1 female (50497). Pacific or Estero side; February 1905; J. Fid. Tristan; 4 males, 4 females (1 ovigerous) (32282); "inhabit mangroves." August 8, 1927; M. Valerio; 1 male, 1 ovigerous female (61144). Salinas, at sea level; July 17, 1928; M. Valerio; 1 male, 1 ovigerous female (62519).

PANAMA.—Doctor LeConte; 4 specimens (424, M. C. Z.), labeled by Stimpson. C. F. Davis; 1 male (2238, M. C. Z.). Reefs; Melbourne Ward; 1 male, returned. Panama, Pacific side; 1924; E. Deichmann: Low tide, rocks; May-July; 1 male (60738). June; 2 males, 2 ovigerous females (60737).

PERU.—Paita; 1873; Doctor W. H. Jones, U. S. N., 1 male (2239, M. C. Z.). Las Vacas, near Capon; on beach; January 23, 1908; R. E. Coker; 1 female (40425), 1 female returned to Peruvian Government. Chincha Islands; R. C. Murphy; 1 male returned to Brooklyn Museum.

EURYPANOPEUS OVATUS (Benedict and Rathbun), new combination

Plate 173, Figures 5 and 6; Plate 174, Figure 4.

Panopeus ovatus BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 368, pl. 24, fig. 8 (type-locality, Concepcion Bay, Gulf of California; type, Cat. No. 15786, U.S.N.M.).

Diagnosis.—Front not double-edged. Hepatic region deeply delimited. Anterior and antero-lateral regions coarsely granulate and rugose. Lateral margin cut into shallow lobes. Color of propodal fingers continued on palm.

Description.—Close to *E. transversus.* Carapace flatter, anterior and antero-lateral regions coarsely granulate and rugose, gastric region narrower, surface more uneven, hepatic region more distinctly outlined, median groove and groove leading back from antennal notch deep. A groove extends inward from each of the three lateral notches, the intermediate of these, that is, the one between third and fourth teeth, longer than the other two. The front is not bimarginate; although bent down and appearing thick, it lacks the regular line of granules above which distinguishes *transversus.* A subhepatic tubercle present. In the chelipeds, the outer surface of the manus is punctate and nearly smooth, but the upper surface is finely wrinkled. In old well developed males the major manus is twice as high as the minor.

In abdomen of male, the terminal segment is shorter and more arcuate than in *transversus.*

Measurements.—Male (16078), length of carapace 13.4, width of same 20.4, fronto-orbital width 11, width of front 6 mm.

Habitat.—"On beach at low water under stones. In order to avoid capture when disturbed they splash around and attempt to bury themselves in the sand before the water clears." (Jouy.)

Range.—West coast of Mexico, in Gulf of California.

Material examined.—

Guaymas, inner harbor; February 23, 1891; P. L. Jouy; 6 males, 5 females (16078).

Concepcion Bay, Lower California; March 19, 1889; *Albatross;* 5 males, 3 females (15786).

EURYPANOPEUS DEPRESSUS (Smith)

Plate 173, Figures 3 and 4

Panopeus depressus SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 283 (type-localities, New Haven, Connecticut, and Egmont Key, Florida; types in Peabody Museum, Yale University); Rept. U. S. Commr. of Fish and Fisheries, pt. 1, for 1871–72 (1873), p. 547 [253], pl. 1, fig. 3.—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 366, pl. 20, fig. 5; pl. 23, figs. 4 and 5.

Eurypanopeus depressus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 320, pl. 59, fig. 2.

Diagnosis.—Antero-lateral margin deeply cut, forming three (third to fifth) sharp teeth. Carpus of cheliped with a conical spine-tipped tooth at inner angle. Color of immovable finger prolonged on palm. Fingers of minor chela spooned.

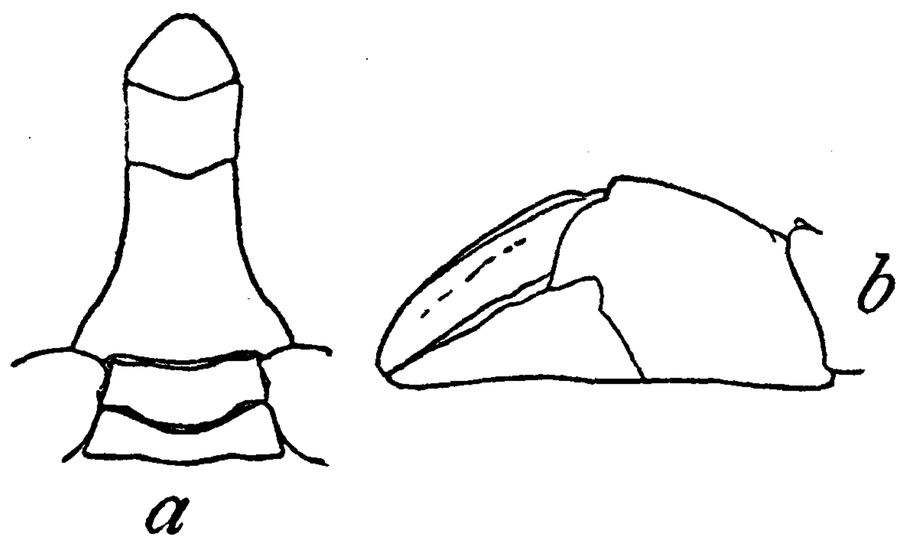

FIGURE 65.—EURYPANOPEUS DEPRESSUS, MALE, ENLARGED. *a.* ABDOMEN. *b.* MINOR CHELA. AFTER BENEDICT AND RATHBUN

Description.—Carapace gently convex, roughened with very fine granules and innumerable short, unequal, transverse lines of coarser granules; hepatic and posterior cardiac grooves shallow, otherwise the regions are plainly marked; mesogastric region narrowing gradually forward until near the tip where it suddenly contracts to a deeply impressed line; epigastric lobes low; surface short pubescent. Front slightly arcuate, with a minute median nick, not followed by a closed fissure. Inner border of orbit broad and high, ending in a blunt, acute angle; upper border with two small V-shaped nicks prolonged in a closed fissure, the inner one twice as long as the other; outer angle of orbit small, triangular; beneath it a large V emargination from which the border extends in a concave line to the broad, triangular tooth at the lower inner angle. Second tooth of lateral margin of carapace broad, lobiform, united with the first tooth by a shallow concavity; remaining teeth acute, more or less spiniform, curved, so that the outer line follows the general contour of the body; third tooth points obliquely inward, fourth forward, fifth obliquely outward and forward.

Chelipeds very unequal and dissimilar. The acute, granulate upper margin of the merus ends distally at the transverse groove with a small slender spinule. Inner tooth of carpus tipped with a similar spinule. Height of palm as great as superior length. Major chela heavy, propodal finger nearly horizontal, both fingers stout, gaping, an enlarged tooth at base of dactyl. In the minor chela, the fingers are almost as bulky as the palm, distal half spooned and fitting close together, proximal half finely denticulate and with a small gape. Ambulatory legs with a ragged hairiness.

Third segment of male abdomen pointed at ends, sixth segment narrowing a little toward the fifth, terminal segment triangular with end rounded.

Color.—Dark olive brown; fingers black or dark brown, the color of the propodal finger prolonged well back and up on the palm.

Measurements.—Male (18739), length of carapace 15.7, width of same 22.8, fronto-orbital width 14, width of front 7.3 mm. Male type, length of carapace 18.6, width 26.8 mm. (Smith.)

Habitat.—On muddy and stony shores, oyster beds, wharves and submerged timber, and in eel-grass; sometimes in brackish water.

Range.—From Massachusetts Bay to Florida (east and west coasts), to Texas; St. Martin, West Indies; Bermuda.

Material examined.—See table, pages 412 to 416.

EURYPANOPEUS DISSIMILIS (Benedict and Rathbun)

Plate 173, Figures 1 and 2

Panopeus dissimilis BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 366, pl. 20, fig. 4, pl. 23, fig. 1 (type-locality, Trinidad; type, Cat. No. 15640, U.S.N.M.).

Eurypanopeus dissimilis RATHBUN, Ann. Inst. Jamiaca, vol. 1, 1897, p. 19.

Diagnosis.—Lateral teeth prominent, well separated. Minor cheliped strikingly small and rough, its fingers spooned. Color of immovable fingers not spreading upward on palm. Third abdominal segment of male not fused with fourth.

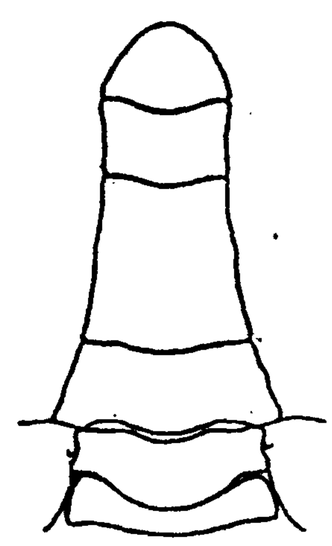

FIGURE 66.—EURYPANOPEUS DISSIMILIS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Description.—Resembling *E. depressus;* antero-lateral notches larger (both deeper and wider), second to fifth teeth, inclusive, more prominent, second tooth more dentiform, its outer margin nearly longitudinal, third, fourth, and fifth teeth strongly hooked. Regional grooves deeper than in *depressus*. Surface less rugose, lacking a background of fine granulation. Two transverse granulate lines on each protogastric region, diverging outwardly; one metagastric line, narrowly interrupted at middle, forming a curve with a short broken line on epibranchial region; further forward a long epibranchial line which ends just in front of inner end of ridge leading

Material examined of Eurypanopeus depressus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
New England:	° ′ ″	° ′ ″			° F.						
Vineyard Sound, Massachusetts.						1875		U. S. Fish Commission	9	P.M.Y.U	
Do						1882		do	2♂ 1♀	14799	
Woods Hole, Massachusetts.						1886		do	6	11727	At Woods Hole Station.
New Bedford, Massachusetts.								R. E. C. Stearns	1♀	58746	In *Modiolus modiolus* (L.).
Do						Sept 24, 1882		Willard Nye, jr	10	P.M.Y.U	
Sakonnet River, Rhode Island.	Black Point, W. ¼ N., ½ mile.		5		71	Aug. 27, 1880	836	*Fish Hawk*	Several	do	
Newport, Rhode Island.			Shore.					U. S. Fish Commission.	20	19025	
Fishers Island Sound, Connecticut.			10-12			1874		do	5	P.M.Y.U	
New Jersey: Maurice River Cove, Delaware Bay.			Dredged.			Nov. 16, 1928		H. G. Richards	1♂ 1♀	Univ. Penna.	
Maryland:											
Magothy Bay, Chesapeake Bay.						July 22, 1916		*Fish Hawk*	9♂ 8♀ (4 ovig.) 1♂ 5♀ (1 ovig.)	56271 56272	On wild oysters.
Creek halfway between Plum Point and Chesapeake Beach, Chesapeake Bay.						May 30, 1912		Palmer and Ward.	6♂ 3♀ 15 y	56367	
Chesapeake Beach.						Aug. 6, 1927		W. L. Schmitt	2♂ 2♀ ovig	60732	
Plum Point, Chesapeake Bay.						Aug. 15, 1912, to Aug. 24, 1912.		William Palmer	2♂	56385	Around piles.
Do						Aug.; 1913		do	1♀	46104	
Do						July 14, 1914		C. R. Shoemaker	1♀	56378	

Chesapeake Bay	38 20 24 | 76 18 14 Barren Island Buoy No. 16D, NE. by N., about 200 yards.	26	sft. bk. M., marine growth.	45	Apr. 25, 1916	8523	*Fish Hawk*	1 y	56284	
	38 06 06 | 76 17 20 Point No Point Light, N. ⅜ E.; Holland Island Bar Light, E. by S. ⅝ S.	6.5	sft	79	July 28, 1916	8614	do	2♀	58367	
Brick House Bar, Chesapeake Bay.					Sept. 10, 1928		R. V. Truitt	1♂ 2♀ ovig	61828	
Smith's Creek, Potomac River.					July 10, 1883		Commander R. D. Evans, U. S. Navy.	14♂ 15♀	13845	On wooden buoy.
Cedar Point, Potomac River.					July 29, 1916		*Fish Hawk*	2♂ 2♀	56273	In washings from oysters. One male has an encrusting bryozoan.
Herring Creek, St. Marys County.					June 14, 1926		James E. Benedict, jr.	1♂	59848	
Do					Sept. 11, 1926		do	1♂	60280	
Tangier Sound, Chesapeake Bay					1897		U. S. Fish Commission.	1♂ 2 y	20123	
Virginia:										
Eastern shore							H. E. Webster	5♂	56817	From Boston Society of Natural History.
Fishermans Island.	Motor-boat landing				July 21, 1916		*Fish Hawk*	1♂	56357	Washed from dead oysters.
Chesapeake Bay	From Crisfield, Md., to Cape Charles Va.				Nov. 22, 1921	26–27	W. C. Schroeder, Bureau of Fisheries.	7♂ 10♀ 6 y	57140	Beam trawl.
Do	S. point Tangier Island, N NW., 1 mile.	9.5–20	br. M. Sh	42	Mar. 2, 1882	1064	*Fish Hawk*	5♂ 4♀	13793	
Do	37 53 00 | 76 05 30 4.5 miles E. ¼ S. of Smiths Point Lighthouse.	6	sft. fne. gy. S	48.5	Dec. 5, 1915	8383	do	5♂ 2♀ 70 y 8♀ 5♂ 32 y	56275 56276	On red sponge.
Do	37 54 03 | 76 06 20 4.5 miles E. by N. ¼ N. of Smiths Point Lighthouse.	6.75	fne. gy. S	64	Oct. 24, 1915	8347	do	3♂ 2♀ 7 y	56274	
Do	Smiths Point Lighthouse W. ½ N.; Great Wicomico Light, SW. by W. ½ W.	7	sft. bk. M	47.8	Apr. 23, 1916	8513	do	4♀ (3 ovig.)	56281	
Do	Northumberland County.				Dec. 23, 1914		P. L. Boone	25♂ 22♀ 4 y	48849	

Material examined of Eurypanopeus depressus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Virginia—Contd.	° ′ ″	° ′ ″			° F.						
Piankatank River	Iron buoy No. 1					July 6, 1883		Commander R. D. Evans, U. S. Navy.	2♂	13848	
Mouth of Indian Creek.	On iron buoy					do		do	9♂ 16♀	13929	Left side abnormal, first three teeth completely fused, edge undivided.
									1♀	15402	
York River	Wooden buoy No. 8							do	2♀	15403	
North Carolina:											
Shackleford jetty, Beaufort.						July 22, 1912		W. P. Hay, *Fish Hawk.*	8	51099	
Shackleford Bank, inside.				Washed from seaweed.		Sept. 12, 1928		Schmitt and Shoemaker.	1♂ 1♀	62517	
South Carolina:											
Winyah Bay						Dec., 1890		*Fish Hawk*	1♂ 1 y	15688	
Do								do	1	15683	Above brackish water.
Do	Half mile N. of wharf on South Island.		4	hrd. Sh	48.5	Jan. 3, 1891	1639	do	5	15692	
Do	About half a mile N. of wharf.		4.5–5	Sh	47–49.5	Jan. 3, 1891	1641, 1642	do	1♂ 3♀ 25 y	56282	
									3	15697	
Jones Creek, near inlet.						Dec. 31, 1890		do	1♂	15685	
Clambank Creek, upper mouth.						Dec. 30, 1890		do	2♀	15702	On oysters.
Bulls Bay Lighted Beacon						Mar. 23, 1891		do	1♂ 3 y	15776	
Charleston Harbor.						Mar. 11, 1880		Col. M. McDonald.	1♂	4065	
Morgan River						Feb. 24, 1891		*Fish Hawk*	2♂	15781	
Do				M		do		do	2	26149	On coon oysters.
Jericho Creek						Jan. 23, 1891		do	1♂	15785	
Near Port Royal								do	3♂ 1♀	15727	
Georgia: Near mouth of Savannah River.								J. S. Raymond	1♀	59910	From wood bored by *Teredo.*

Florida:											
East peninsula opposite Micco.								O. Bangs	400	18739	
Cocoanut Grove, edge of bay.			Shallow.			Nov. —, 1913		James Silver, U.S. Biological Survey.	12♂ 4♀ (2 ovig.).	58427	
Cape Florida						1884		Edward Palmer	1♂ 3♀	13899	
Oyster Bay						May —, 1884		H. Hemphill	11♂ 19♀ 17 y	6990	
Punta Rassa						Feb. —, 1884		do	18♂ 6♀ 11 y	6665	
Sanibel Island						Feb. 21, 1928 Feb. 22, 1928		O. C. Van Hyning.	5♂ 2♀ ovig	Fla. State Mus.	
Palma Sola, mouth of Manatee River.								H. Hemphill	46♂ 26♀ 13 y	15401	Mostly small.
Tampa Bay, near Piney Point.								do	15♂ 3♀	15399	
Goodland Point								do	3♂	15398	
Cedar Keys								do	2 y	6466	
Apalachicola; St. Georges Sound.						Jan. —, 1915		E. Danglade, Bureau of Fisheries.	1♂ 1♀	56358	
Apalachicola Bay, vicinity of New Inlet.				In algae on oysters.		1915		do	2♀	61375	
Apalachicola						Summer, 1928.		J. V. and Frank F. Gander.	2♀	62518	
St. Georges Sound						Jan. 16, 1915		*Fish Hawk*	1♂ 1♀	56283	
Pensacola						July —, 1893		J. E. Benedict	1♂ 1♀	18258	
Alabama: Mobile Bay						1894		U. S. Fish Commission.	4	19354	
Mississippi: Henderson Point.						Sept. 2, 1928		Tulane University.	1♂ 2♀ (1 ovig.)	Returned to sender.	
Louisiana:											
Oyster Bay, St. Bernard Parish.						Feb. 3, 1898		*Fish Hawk*	1♂	59903	On oyster bed.
Bay NW. of Shell Island.						Feb. 7, 1898		do	1♂	59904	From oysters.
S. of Crooked Island Bay, Bodreau, St Bernard Parish.						Feb. 10, 1898		do	1 y	59905	On oyster bed.
Dutchmans Gap, St. Bernard Parish.						Feb. 16, 1898		do	1♂	59906	On oysters.
Near Mussel Bayou, St Bernard Parish.						do		do	1♀	31469	
Near Half Moon Island.						Feb. 21, 1898		do	1♀	59907	Do.
Around Half Moon Island.						Feb. 23, 1898		do	1 y	59908	Do.

Material examined of Eurypanopeus depressus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Louisiana—Contd.	° ′ ″	° ′ ″			° F.						
Mussel Bayou						Feb. 23, 1898		*Fish Hawk*	3♀	59909	On old stump. Var. with major fingers spooned.
Texas:											
Galveston Bay						Nov. 5, 1891, to Nov. 15, 1891.		B.W.Evermann, U.S.Fish Commission.	3♂ 2♀	17103	
Matagorda Bay								J. D. Mitchell	20	20638	
Do	Reef off Point at flag station.	Dresings				Mar. 20, 1905		T. E. B. Pope, Bureau of Fisheries.	2♀	33033	
Oyster Reef, Lavaca Bay.								J. D. Mitchell	10	19628	
Dutch West Indies: St. Martin, Leeward Islands.	Simsons Bay lagoon		Shallow.			Sept. 7, 1905		J. Boeke	1♂ 1♀ ovig	42960	Despite their remoteness these specimens are undoubted *depressus*.
Bermuda						1903			1♂	56816	From Boston Society of Natural History.

from fifth lateral tooth; a broken mesobranchial line on the same level with anterior cardiac border; just behind this border, a short transverse cardiac line on either side; in front of base of last leg a short granulate ridge. Outer end of front not advanced, neither lobiform nor dentiform. Supraorbital and suborbital notches larger than in *depressus;* inner inferior tooth lower, acute.

Chelipeds more unequal than in *depressus*, the minor palm only half as high as the major, while in *depressus* it is two-thirds as high as the major. Palms coarsely granulate, the minor much more so than the major, and with two or three longitudinal lines at middle of outer surface; upper surface of both palms more deeply guttered than in *depressus*. Color of propodal finger continued on palm but not spreading upward. Fingers of minor chela together smaller than the palm, their distal half spooned, extremities narrower than in *depressus*, ridges rough with granulation.

Third segment of male abdomen not fused with the fourth, its lateral extremities less pointed than in *depressus;* sixth segment shorter and broader than in that species.

Measurements.—Of smaller size than *depressus*. Male paratype (15640), length of carapace 9.6, width of same 14.3, fronto-orbital width 9.5, width of front 4.6 mm.

Variation.—Occasionally a major cheliped is reduced so that the manus is only half again as high as in the minor cheliped, but in such cases the chela partakes of the character of the minor one in shape and roughness and the spooning of the fingers.

Range.—From the Gulf of Mexico (west coast of Florida) to Santa Catharina, Brazil.

Material examined.—

FLORIDA.—Off Charlotte Harbor; lat. 26° 35′ N.; long. 83° 11′ W.; temperature 66° F.; April 2, 1901; station 7122; *Fish Hawk;* 2 males (25623).

CUBA.—Manimani River, Bahia Honda, Pinar del Rio; 1924; Mario Sanchez Roig; 1 female (58666). Mariel, Pinar del Rio; May 10, 1900; William Palmer and J. H. Riley; 1 male (23830).

JAMAICA.—Montego Bay and Port Henderson; P. W. Jarvis; "numerous"; specimens returned to sender. Kingston Harbor: 1893, R. P. Bigelow, 25 specimens (17971); May–July, 1896, F. S. Conant, 2 young (19595).

NICARAGUA.—Salt water lagoon near Greytown; in crevices in logs; Charles W. Richmond; 2 males, 2 females (18011).

TRINIDAD.—January 30–February 2, 1884; *Albatross;* 13 males (including holotype), 18 females, 17 young (15640). Mono Island; *Albatross;* 2 males, 7 females, 6 young (18522).

BRAZIL.—Vigia, Grão Para; 1870; Derby and Powers, Hartt Explorations; specimens in P. M. Y. U. São Francisco, Santa Catharina; November 1, 1925; W. L. Schmitt; 1 female (61107).

EURYPANOPEUS CRENATUS (Milne Edwards and Lucas)

Plate 174, Figures 1–3

? *Xantho crenatus* MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 396 (type-locality, Peru; type in Paris Mus.).

Panopeus crenatus MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, Crust., 1844, p. 16; atlas, vol. 9, 1847, pl. 8, fig. 1 (type-locality, environs de Callao (Chili); type in Paris Mus.).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 377, pl. 21, fig. 4; pl. 24, fig. 17.

Eurypanopeus crenatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 318, figs. 4–4*b*.

Eurypanopeus peruvianus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 318, pl. 60, figs. 3–3*b* (type-locality, Peru; type in Paris Mus.).

Diagnosis.—Carapace very convex, smooth, no rugose lines. Urogastric region of good length throughout. Front prominent. Lateral margin cut into shallow lobes. Fingers not gaping; dark color scarcely continued on palm.

Description.—Carapace very convex, especially antero-posteriorly. Surface nearly smooth, punctate, microscopically very closely granulate; no rugosities. Regions indicated by shallow sutures; a large pit between hepatic and branchial regions; urogastric region longer than usual, about half as long as wide; a small triangular area delimited at inner angle of branchial region. Front advanced, upper surface concave, edge thick, slightly convex to the shallow outer lobules, which are rounded off and not at all prominent; median notch minute ending in a short closed fissure. Supra-orbital notches slight; exorbital notch large; from the latter the suborbital margin is transverse to the broad arcuate tooth at inner angle. First antero-lateral (orbital) tooth very small, united with the broad second tooth or lobe, forming a sinuous margin. Remaining lateral sinuses narrow, shallow; third and fourth teeth subequal, truncate, the long margin slightly convex; anterior margin longer and more outstanding in fourth than in third tooth; a short carina running from apex of fourth tooth; fifth tooth short, triangular, obtuse, its carina extended on the carapace further than in fourth tooth.

Inequality of chelipeds not great. Subdistal tooth of merus rectangular, tip tuberculiform. Carpal groove shallow, inner tooth broadly pyramidal. Lower margin of propodus slightly sinuous, finger nearly horizontal, its color scarcely extending on palm, only so far as is limited by an oblique line from the prehensile edge to lower margin. Fingers not gaping. Basal tooth of major dactyl broader than long.

In abdomen of male the third segment is nearly as wide as first and rounded at ends; sixth broader than long and converging a little toward fifth; last segment short, subtriangular, tip rounded.

Color.—Carapace above deep rose and yellowish white. Chelipeds deep rose above, whitish yellow below, fingers light brown. Legs slightly tinged with rose above, yellowish white below; dactyls a light ashen gray. (Milne Edwards and Lucas.)

Male (60731) almost seal brown, fingers burnt umber fading out to whitish tips, chelae more hazel. Female (60731) more bay color on carapace, single chela tawny, fingers a bit lighter, tips still lighter. In male and female the part of the abdomen visible from above has a row of white spots down the median line, the first one on the hind edge of the carapace, abdomen mottled whitish bistre. (Schmitt.)

Comparison with E. transversus.—Carapace less oval, more hexagonal, and devoid of the fine transverse rugae present on the anterior half in *transversus*. Front more advanced beyond inner orbital angles, submedian lobes straight instead of convex, outer lobe narrower. Outer orbital angle small, pointed, and distinguishable from the second antero-lateral lobe, not completely fused with it. Transverse ridge on fifth lateral tooth high. Postero-lateral margins a little more concave. In the full grown male the fingers of the major cheliped gape very little, less than in *transversus*, and are more elongate, the dactylus less arched and the propodal finger more deflexed.

Measurements.—Ovigerous female (16213), length of carapace 15, width of same 22, fronto-orbital width 11, width of front 6 mm. Male (2245, M. C. Z.), length of carapace 24.3, width of same 35.6, fronto-orbital width 15.8 mm., width of front 9.3 mm.

Range.[49]—Puna, Ecuador (Cano), to Magellan Strait.

Material examined.—

PERU.—2 males, 1 female (Paris Mus.), labeled "*peruvianus*," probably cotypes. Callao; F. H. Bradley; 1 male, 2 females (1 ovigerous) (16213), from P. M. Y. U. Callao; 1 male, 2 females (4803, M. C. Z.). Callao; specimen in Brit. Mus. "Chili"; 1 male (Paris Mus.), probably type of *Panopeus crenatus*. Off San Lorenzo Island, Callao Bay; dredged; November 7, 1926; W. L. Schmitt; 1 male, 1 female, both small (60731); also 2 young, representing a postlarval stage (62715); identification probably correct. Paracas Bay; *Hassler* Exped.; 3 males, 4 females (2245, M. C. Z.).

CHILE.—Valparaiso; J. D. Dana, U. S. Expl. Exped.; 1 male, 1 female (1924, M. C. Z.). 1872; *Hassler* Exped.: Caldera, May 16, 5 males, 3 females (2 ovigerous) (2246, M. C. Z.); Talcahuano, Apr., 4 males, 6 females, 2 young (2244, M. C. Z.): Juan Fernandez Ids., May 1, 1 male (2247, M. C. Z.); Port Gallant, Magellan Strait, Mar., 1 male (2313, M. C. Z.).

[49] The locality, Esquimalt Harbour, B. C., assigned to this species by Spence Bate is erroneous (Lord's A Naturalist in Vancouver Island and British Columbia, vol. 2, 1866, p. 270).

EURYPANOPEUS PLANUS (Smith)

Plate 175, Figures 3–5

Panopeus planus SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 283 (type-locality, Bay of Panama; cotypes in P. M. Y. U.).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 369, pl. 24, figs. 10 and 11.

Eurypanopeus planus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 321, pl. 59, fig. 4–4c.

Diagnosis.—Carapace depressed, rugose. Lateral teeth truncate (save the last), well separated. Front prominent. Chelipeds heavy, carpus nearly smooth, fingers gaping, color of immovable finger continued on palm.

Description.—Carapace slightly convex in an antero-posterior direction, in general depressed; anterior and antero-lateral portion roughly granulate and rugose; posterior and middle portion nearly smooth, punctate; gastric and hepatic regions well delimited. Front produced, a narrow median V cut, lobes deeply sinuous forming a pronounced outer lobule. Two closed supraorbital fissures deeply impressed; outer sinus broad and shallow. Lateral emarginations V-shaped, continued by a groove on carapace. Coalesced tooth (first and second) also third and fourth subtruncate; orbital angle a little more than a right angle; other angles obtuse, rounded; fifth tooth triangular, tip blunt.

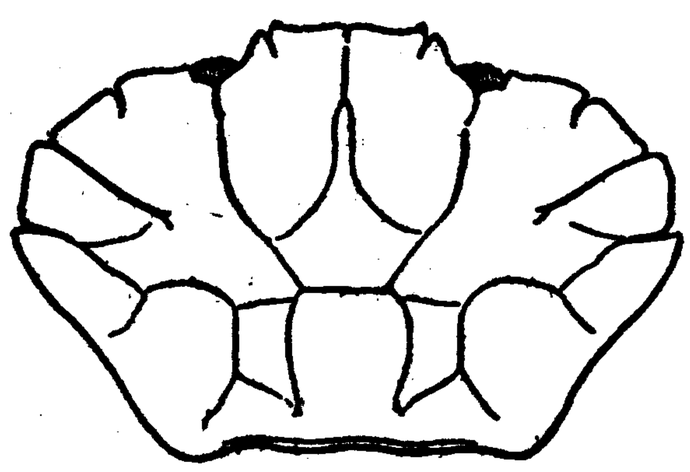

FIGURE 67.—EURYPANOPEUS PLANUS, BAY OF PANAMA, CARAPACE, ENLARGED. AFTER BENEDICT AND RATHBUN

Chelipeds heavy; carpus lacking groove, or with a faint one, inner tooth slightly marked, scarcely dentiform; palms higher than superior length in the full grown; lower margin of manus convex, upper margin also convex, but highest at base of dactylus; propodal finger high at base, lower margin sinuous, tip curved upward, color continued well back on palm; dactylus slender, arched, a large backward-pointing basal tooth in major chela.

Color.—Ranges from indigo blue and slate, really more slate color, to sepia and seal brown; all are variously mottled with lighter speckles of pearl blu · or olive buff as crabs are bluish or brownish. In blue backed crabs the lower half of outer face of chela is purplish or between a hyacinth blue and royal purple tinge; in brown or drab crabs this part of the chela is porcelain white with a china-blue tinge. A small specimen, 10.3 mm. wide, is mottled porcelain white, ochraceous and mummy brown, legs speckled with wood brown; major hand porcelain white, fingers black or clove brown except extreme tips; minor hand black or clove brown speckled giving it a grayish color, speckles most numerous toward upper margin. (Schmitt.)

Measurements.—Male (44188), length of carapace 17.3, width of same 27.3, fronto-orbital width 12.8, width of front 7.1 mm.

Range.—Gulf of California, Mexico, to Ecuador.

Material examined.—San Carlos Bay, Sonora, Mexico; March 9, 1921; Fred Baker; 1 male (Cal. Acad. Sci.).

Bay of Panama; F. H. Bradley; cotypes in Peabody Museum; 1 male, 1 female, cotypes, Cat. No. 16215, U. S. N. M.

Panama; 1924; E. Deichmann: Panama Harbor; low tide, lava; May 30; 1 male (60734). Pacific shore of Panama; low tide, rocks; May–July; 2 males (60735).

Taboga Island, Bay of Panama; May 11–15, 1911; Meek and Hildebrand, Smithsonian Biological Survey; 1 male, 1 female (Cat. No. 44188, U. S. N. M.); 1 female (Field Mus.).

South side Point Santa Elena, Ecuador; September 17, 1926; W. L. Schmitt; 1 female, 1 young (60736).

Salinas, Ecuador; under rocks; September 12–15, 1926; W. L. Schmitt; 60 males, 74 females (33 ovigerous) (60873–60875, 60920).

EURYPANOPEUS PLANISSIMUS (Stimpson)

Plate 175, Figures 1, 2, and 6

Xantho planissima STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 205 [77] (type-locality, Cape St. Lucas; cotypes in M. C. Z.).

Panopeus planissimus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 108.—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 370, pl. 21, text-fig. 5, pl. 24, figs. 1 and 2.

Eurypanopeus planissimus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 322.

Diagnosis.—Carapace flat, nearly smooth. Chelipeds heavy; carpus with two grooves at right angles; color of immovable finger squared off at proximal end where it encroaches on palm.

Description.—Carapace perfectly flat above, posterior two-thirds smooth, anterior third finely granulate, slightly rugose. Regions moderately well defined but not themselves areolated excepting the gastric in its anterior part. Front arcuate up to the small distinct outer lobules, median notch small; edge thick. Outer orbital tooth small, triangular, separated by a shallow sinus from the second lateral tooth; remaining emarginations V-shaped; third tooth obtusely angled, fourth and fifth subacute. Subhepatic tubercle large, sublaminar.

Chelipeds massive; carpus with a tuberculiform inner tooth and a groove subparallel to the distal margin; the groove widens outwardly; on its proximal margin near the inner end there are two tubercles separated from each other by a short groove at right angles with the first. Manus high, height exceeding length of upper margin, surface punctate and finely granulate; a row of dimples on outer surface below upper edge. Immovable finger broad at base where there are two large prehensile teeth in a line parallel with lower margin; color continued backward in a rectangular patch on palm where it ends in a vertical line and is not continued upward to the

interdigital sinus. On major dactyl a strong basal tooth and a large tooth at distal third, projecting into the gape. Fingers hooked at tips, not gaping in minor chela.

Color.—Very dark bluish gray, marbled posteriorly; fingers black with light tips. (Stimpson).

Measurements.—Male (50966), length of carapace 8.4, width of same 13.4, fronto-orbital with 7.8, width of front 4 mm.

Range.—West coast of Mexico.

Material examined.—

WEST COAST OF GULF OF CALIFORNIA.—Agua Verde Bay; April 1, 1911; *Albatross;* 1 male (50966).

San Francisquito Bay; beach; April 9, 1911; *Albatross;* 4 males (Amer. Mus.).

La Paz: L. Belding; 2 males, 2 females (4629). La Paz Harbor; March 12, 1889; *Albatross;* 1 female (16025).

Cape San Lucas; John Xantus; 2 males, 4 females (1 ovigerous), cotypes (1253, M. C. Z.).

BELOW GULF OF CALIFORNIA.—Maria Madre Island; March-May, 1927; from Secretaria de Agricultura y Fomento, through A. L. Herrera; 1 ovigerous female (60733).

Genus EURYTIUM Stimpson

Eurytium STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 56 [10]; type, *E. limosum* (Say).

Carapace very broad, convex, regions slightly marked, without transverse raised lines. Antero-lateral borders regularly arcuate, shorter than postero-lateral, cut into five shallow teeth, the second tooth rounded and intimately fused with first. Fronto-orbital border half or a little more than half the width of carapace. Front from a fourth to almost a third the width of carapace. Front deflexed, two rounded lobes separated by a V-shaped notch. Superior margin of orbit with two short and inconspicuous fissures; lower margin with a deep rounded sinus outside, and two unequal lobes. Basal antennal segment broad and in contact with front; the flagellum stands in the orbital hiatus. The ridge on the endostome which defines the efferent branchial channel is well marked, and continues to margin of epistome. Chelipeds massive and rounded, unequal in both sexes. Abdomen in male with third to fifth segments fused.

Related to *Panopeus* and its allies, but distinguished by its oval and almost smooth carapace, without ridges, and by its strong palatal ridge.

Along the Atlantic coast of America from New York to the State of São Paulo, Brazil; on the Pacific coast from Mexico to Peru. Bermudas.

KEY TO THE SPECIES OF THE GENUS EURYTIUM

A[1]. Carapace very convex.
  B[1]. Carapace widest behind tips of teeth of last pair-----**limosum**, p. 423.
  B[2]. Carapace widest at tips of teeth of last pair----------**tristani**, p. 425.
A[2]. Carapace nearly flat. Carapace widest at tips of teeth of last pair ----------**affine**, p. 425.

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
limosum	*tristani*

EURYTIUM LIMOSUM (Say)

Plate 176, Figures 1 and 2

Cancer limosa SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1818, p. 446 (type-locality, "Inhabits shores of the northern states;" type not extant).
Panopeus limosus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 404.
Eurytium limosum STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 56 [10].—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 332, pl. 60, fig. 2, 2*a*.

Diagnosis.—Carapace very convex, widest behind tips of teeth of last pair. Frontal lobes undivided. Sinus between coalesced teeth shallow.

Description.—Carapace very convex in an antero-posterior direction; surface smooth to eye, but under the lens densely granulate, the granules coarser near frontal and antero-lateral margins; two feeble epigastric lobes; mesogastric and cardiac regions outlined. Front one-fourth the width of carapace. Antero-lateral margin about two-thirds the length of postero-lateral, bordered by a raised line of granules; first tooth small, triangular; second lobiform, separated from first by a shallow sinus; third obtuse, fourth subacute, both with arcuate outer margin; fifth more prominent, acute, pointing forward.

Granulation of chelipeds fine and reticulate; upper margin of merus coarsely tuberculate, a strong subdistal tooth; no groove on carpus, a narrow inner spine; fingers pointed, deflexed, a large basal tooth on major dactyl; color of immovable fingers stopping short of palm.

Color.—Carapace a brilliant purplish blue; wrist and hand bluish; fingers white except proximal upper half of movable finger pink; lower portion of chelipeds and also carpal tooth orange-yellow.

Measurements.—Male (44184), length of carapace 26.6, width of same 42.8, fronto-orbital width 21.5, width of front 10 mm.

Habitat.—In muddy or marshy banks, a little below high-tide mark, in burrows partially filled with water.

Range.—New York (De Kay) to State of São Paulo, Brazil; Bahamas; Bermudas.

Material examined.—

NEW JERSEY.—Thomas Say collector; 2 males (Phila. Acad.). The larger one is 45 mm. wide, while Say's measured type was 33.8 mm. wide.

SOUTH CAROLINA.—West end of Port Royal Island; January 27, 1891; *Fish Hawk;* 25 specimens (16028).

BAHAMAS.—Watling Island; 1886; *Albatross;* 1 male (16332).

FLORIDA.—Key West: High tide among stones or burrowing in sand; 1885; H. Hemphill; 1 male, 2 females (13824). 1885; *Albatross;* 1 male (9899).

Tortugas: Greater heads up Reef; in stomach of gray snapper, *Neomaenis griseus* (Linnaeus); June 13, 1925; W. L. Schmitt; 1 cheliped (61108), received from Carnegie Institution.

Sarasota Bay; Union College collection ; 5 specimens (42793).

LOUISIANA.—Grand Isle; July 7, 1928; E. H. Behre; 1 female (63040).

CUBA.—Los Arroyas; May 20, 1914; Henderson and Bartsch, *Tomas Barrera* Exped.; 1 male (48552).

Cardenas; 1923; Francisco R. Sosa; 1 male, 1 female (58389).

Bay at Matanzas; under stones between tides; April, 1927; Melbourne Ward; 1 male; returned.

JAMAICA.—Montego Bay; P. W. Jarvis; 1 male, 1 female (19067).

Kingston Harbor; May to July, 1896; F. S. Conant; 1 young female (19594).

PORTO RICO.—Ensenada Honda, Culebra; February 9, 1899; *Fish Hawk;* 1 male, 1 female (24336).

BRITISH HONDURAS.—Belize; H. J. Huwe, S. J.; 1 male (50951).

PANAMA.—Toro Point, Canal Zone; January 24, 1912; Meek and Hildebrand, Smithsonian Biological Survey; 1 young female (59301).

Colon; on coral reef; May 2, 1911; Meek and Hildebrand; 1 male (44184).

CURAÇAO.—February 10–18, 1884; *Albatross;* 2 males, 1 female (7579).

BRAZIL.—Maranhão; Lieut. F. E. Sawyer, U. S. Navy; 1 male (16276).

Plataforma, Bahia; 1876–1877; R. Rathbun, Hartt Explorations; 1 male, 1 female (16263).

Ilhéos, Bahia; 1919; E. Garbe; 1 female; lent by Mus. Paulista (1225, part).

Bay of Rio de Janeiro; 1925; W. L. Schmitt: Paqueta; station 1; August 19; 1 male (59882). River on Ilha Governador; August 27· 1 female (59881).

Santos: Piassaguera; November, 1913; H. Luederwaldt; 2 males (47838). Between Canals 4 and 5, Estuario; September 13, 1925; W. L. Schmitt; 5 males, 6 females (59880).

EURYTIUM TRISTANI Rathbun

Plate 176, Figure 3; Plate 177, Figure 3

Eurytium tristani RATHBUN, Proc. Biol. Soc. Washington, vol. 19, 1906, p. 100 (type-locality, Boca del Jesús Maria, Costa Rica; type, Cat. No. 32366, U. S. N. M.): Proc. U. S. Nat. Mus., vol. 38, 1910, p. 543, pl. 47, fig. 1.

Diagnosis.—Carapace very convex, widest at tips of teeth of last pair. Frontal lobes each with a slightly marked truncate outer lobule. Sinus between coalesced teeth pronounced.

Description.—Carapace widest between tips of lateral teeth of last pair; slightly convex from side to side, strongly convex from front to back, but less so than in *E. limosum*. Cardiac region and gastric region and its subdivisions well delimited. Surface finely granulate. Front one-fourth or, in the old, less than one-fourth as wide as carapace, bilobed, each lobe convex except for a slightly marked transverse outer tooth. Two distinct notches in upper border of orbit. Lateral teeth more prominent, less shallow than in *E. limosum;* first tooth blunt, partly fused with the second tooth, which is lobiform, nearly as advanced as the first and usually larger; anterior margin of fourth and fifth teeth concave; posterior margin of third, fourth and fifth teeth convex; that of fifth tooth sloping backward and inward. Lower teeth of orbit strongly projecting, the outer one a rounded lobe.

Chelipeds and legs as in *E. limosum*.

Color.—Upper surface of chelipeds violet, of movable finger red.

Measurements.—Holotype male, length of carapace 18, width of same 28.2, fronto-orbital width 15.5, width of front 7 mm. Male (40418), length of carapace 34, width of same 51.6.

Habitat.—All the specimens [in Costa Rica] were found in rotten mangroves, hidden in fine mud. (Tristan.)

Range.—From Costa Rica to Peru.

Material examined.—

COSTA RICA.—Punta Arenas; February, 1907; P. Biolley collector; 1 female (39093), from J. Fid. Tristan.

Boca del Jesús Maria; P. Biolley and J. Fid. Tristan collectors: 1 male, holotype (32366), from J. Fid. Tristan. January, 1906; 1 male (32492), from Costa Rica National Museum.

PANAMA.—Canal Zone; 1911; Smithsonian Biological Survey: Corozal; April 20–21; 1 male (Field Mus.). Balboa; tide water; May 5; 1 male (44183).

PERU.—Salto (near Capon); January 31; R. E. Coker; 1 male (40418), received from Peruvian Government; 1 female (Peru Govt.).

EURYTIUM AFFINE (Streets and Kingsley)

Plate 177, Figures 1 and 2

Panopeus transversus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 102; not *P. transversus* Stimpson, 1860 (San Bartolomé, Magdalena and Santa Maria Bays, and La Paz, all in Lower California).

Panopeus affinis STREETS and KINGSLEY, Bull. Essex Inst., vol. 9, 1877, p. 106 (type-locality not designated, but is one of Lockington's localities).

Eurytium affine A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 334, pl. 60, fig. 1–1c.

Diagnosis.—Carapace slightly convex, widest at tips of teeth of last pair. Frontal lobes each with a slightly marked truncate outer lobule. Sinus between coalesced teeth very shallow.

Description.—Carapace slightly convex, granulate along front and antero-lateral margins, especially on hepatic regions. Front with lobes subtruncate, outer angles forming an obscure truncate lobule. Lateral teeth shallow; outer angle of orbit subacute, separated from next lateral tooth by a scarcely perceptible sinus, third tooth oblong, truncate, fourth tooth broadly triangular, fifth most prominent laterally, acute. Teeth of lower margin of orbit narrow, subequal, triangular, the inner one most advanced. A large tooth at base of dactyl of larger chela. Legs sparsely long-hairy.

Measurements.—Male (50484), length of carapace 14.7, width of same 22, fronto-orbital width 12.6, width of front 6.4 mm.

Range.—Mexico: West coast of Lower California and Gulf of California. Ecuador (?).

Material examined.—Magdalena Bay; C. R. Orcutt: September, 1913; 1 ovigerous female (54465). 1917; 1 male, 1 female (50638).

Turtle Bay; August 1, 1896; A. W. Anthony; 12 males, 2 females (19516).

Pichilinque Bay; *Albatross:* April 29, 1888; 1 male, 1 female (22013). 3 males, 1 female (50484).

Puerto Refugio, Angel Island; March 29, 1889; *Albatross;* 1 male (16026).

San Luis Gonzales Bay; March 27, 1889; *Albatross;* 3 males, 1 female (16027).

Guaymas, gulf side; under stones, scarce; February 27, 1891; P. L. Jouy; 3 males, 1 female (16079).

Genus MICROPANOPE Stimpson

Micropanope STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 139; type, *M. sculptipes* Stimpson.

Carapace of moderate width, slightly convex, regions usually lightly indicated, commonly granulous or spinulous toward frontal and antero-lateral borders. Antero-lateral borders arcuate, shorter than postero-lateral, armed usually with five teeth or spines, of which the last is much reduced and the second also reduced or altogether wanting. Postero-lateral borders moderately converging. Fronto-orbital width great, usually three-fourths or more than three-fourths width of carapace and front more than one-third width of carapace. Front bilobed, outer angle rectangular, blunt, and situated below and in advance of upper inner angle of orbit. Upper orbital margin with

two small open notches and an intermediate lobe; inferior margin with a large outer notch; inner tooth prominent. Inner orbital hiatus wide; basal article of antennae not reaching, or barely reaching, prolongation from front. Endostome usually marked by a slight ridge on either side which does not extend to the anterior margin. Chelipeds unequal in both sexes, and usually roughened by sharp granules or spinules. Fingers pointed. Legs slender, usually spinulous above. Abdomen of male with third to fifth segments fused.

Small species, ranging from Cape Hatteras, North Carolina, to Cape Frio, Brazil; Bermudas; from Santa Monica, California, to the Galapagos Islands; Hawaiian Islands. To a depth of 250 fathoms.

KEY TO THE AMERICAN SPECIES OF THE GENUS MICROPANOPE

A[1]. Last lateral tooth of carapace obsolescent.
- B[1]. General appearance of carapace smooth.
  - C[1]. Color of immovable finger continued on palm. Wrists rough **areolata**, p. 450.
  - C[2]. Color of immovable finger not continued on palm. Wrists nearly smooth ..... **nitida**, p. 448.
- B[2]. Carapace uneven or rough or both.
  - C[1]. Carapace deeply areolated all over. Legs unarmed. Chelae high and heavy, *Glyptoplax*-like ..... **pusilla**, p. 431.
  - C[2]. Carapace areolated and rough anteriorly. Legs spinulous.
    - D[1]. Second lateral tooth small but distinct. Anterior carapace and wrists finely granulate ..... **lobifrons**, p. 429.
    - D[2]. Second lateral tooth fused with the first and scarcely distinguishable. Anterior carapace and wrists deeply eroded. **sculptipes**, p. 428.

A[2]. Last lateral tooth of carapace small but easily discernible.
- B[1]. Color of immovable finger continued on palm.
  - C[1]. Submedian lobes of front triangular, prominent. Chelae heavy. Palms with a blunt crest above ..... **cristimanus**, p. 454.
  - C[2]. Frontal lobes straight ..... **latimanus**, p. 433.
- B[2]. Color of immovable finger not continued on palm.
  - C[1]. Palms mostly smooth.
    - D[1]. Lateral projections dentiform.
      - E[1]. No tooth at outer angles of front. Cardiac region granulate. Chelae similar[50] ..... **lata**, p. 441.
      - E[2]. A small tooth at outer angles of front. Cardiac region smooth. Chelae dissimilar ..... **polita**, p. 440.
    - D[2]. Lateral projections spiniform ..... **spinipes**, p. 443.
  - C[2]. Palms entirely or mostly rough.
    - D[1]. Granulation of carapace mostly in lines. Chelipeds coarsely granulate.
      - E[1]. No notches in upper margin of orbit. Palms without longitudinal grooves ..... **granulimanus**, p. 439.
      - E[2]. Two notches in upper margin of orbit. Palms with three longitudinal grooves on upper-outer surface.
        - F[1]. Granulation of carapace fine, squamose; transverse lines slightly marked ..... **xantusii**, p. 438.

[50] As this species was founded on a single specimen, the similarity in chelae may be abnormal.

F². Granulation of carapace coarse, pearl-like; transverse lines strong.....**xantusii taboguillensis**, p. 439.

D². Granulation of carapace not in lines to any great extent.

E¹. Second lateral tooth absent, or fused with the first or orbital tooth. Palms rough with large bead granules. **nuttingi**, p. 450.

E². Second lateral tooth or spine present.

F¹. Lateral projections spinous.

G¹. Outer surface of major palm rough all over. Chelipeds and legs long-haired..**urinator**, p. 451.

G². Outer surface of major palm partly rough. Chelipeds and legs inconspicuously hairy. **barbadensis**, p. 446.

F². Lateral projections dentiform.

G¹. Frontal lobes arcuate. Granulation of carapace and chelipeds rough, not beadlike. **xanthiformis**, p. 442.

G². Frontal lobes truncate. The entire carapace, chelipeds and legs covered with bead granules. **truncatifrons**, p. 433.

ANALOGOUS SPECIES OF MICROPANOPE ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
granulimanus	*polita*
truncatifrons	*xantusii*
xanthiformis	*lata*

MICROPANOPE SCULPTIPES Stimpson

Plate 178, Figures 1–3

Micropanope sculptipes STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p.140 (type-localities, at seven hauls in the Florida Keys, 15–68 fathoms; types not extant).

Micropanope pugilator A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 326, pl. 54, fig. 1–1*e* (type-locality, northwest of Tortugas, lat. 25° 33′ N., long. 84° 21′ W., 101 fathoms; type in M. C. Z.); Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14, (not station 132 which is *M. lobifrons*).—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 326.

Diagnosis.—Chelipeds and anterior half of carapace rough. Margins of legs spinulous. Second lateral tooth almost indistinguishable. A subhepatic tubercle present. A thin laminate crest above dactyls of chelipeds.

Description.—Carapace naked, distinctly areolated; anterior and antero-lateral areolets somewhat roughened in front with small, sharp, tooth-like tubercles which are partly disposed in lines. Antero-lateral teeth sharp and denticulate, the posterior one nearly obsolete, the first and second almost entirely fused, the second represented by a denticle. Frontal lobes abruptly deflexed, little projecting, but with a convex outline; margin thin, minutely crenulate and defined by a slight furrow following it above. A small tubercle on the subhepatic region beneath the second antero-lateral tooth.

Chelipeds granulate above carpus with the granules arranged more or less in raised reticulating rugae, and with a sharp tooth and denticulate margin within; hand with a double denticulate crest above and with the minute granules of the outer surface showing a tendency to arrangement in rows; these granules become obsolete on the distal lower half of the major chela; upper part of inner surface granulate; fingers grooved, more deeply so in the minor chela; a thin superior crest on the dactyls. Ambulatory legs armed with minute spines above, which form two rows on the carpus. Merus of hind leg when appressed, reaching to the fifth or posterior tooth of the lateral margin of the carapace.

Measurements.—Male (20719), length of carapace 4.2, width 6, fronto-orbital width 4.6, width of front 2.4 mm.

Range.—From South Carolina to the Gulf coast of Florida; 15 to 101 fathoms. St. Croix, Grenada and Barbados, 69 to 170 fathoms (A. Milne Edwards).

Material examined.—See table, page 430.

MICROPANOPE LOBIFRONS A. Milne Edwards

Plate 178, Figures 4–6

Micropanope lobifrons A. Milne Edwards, Crust. Rég. Mex., 1880, p. 327, pl. 53, fig. 3 and 3*a* (type-locality, off Montserrat, 88 fathoms; type in Paris Mus.); Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14 (Grenada, 170 fathoms; Barbados, 94 fathoms).—Rathbun, Bull. U. S. Fish Comm. for 1900, vol. 20, part 2, 1901, p. 32.—A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 325, pl. 5, figs. 3 and 4.

Diagnosis.—Carapace and chelipeds partly rough. Five lateral teeth, two small, two large, one very small. A transverse ridge behind front. No subhepatic tubercle.

Description.—Carapace in large part smooth; fine granulation on gastric, hepatic, and epibranchial lobes. Regions fairly well indicated. Lobes of front arcuate, most produced at the inner two-fifths; a transverse granulated ridge marks the upper border. Five anterolateral teeth; the orbital tooth little produced; second tooth equally small, obtuse; third and fourth subequal, sharp-pointed; fifth minute. Subhepatic tubercle obsolete or obsolescent.

Chelipeds covered with small, pointed granules; those of carpus not forming reticulating rugae. Two inner carpal spines, one below the other. Upper surface of palm bicristate; in the major chela the granules of the outer surface become smaller distally and disappear. Fingers deeply grooved. Minor palm elongate. Legs spinulous on margins; hind pair when appressed, reaching fourth tooth of lateral margin of carapace.

Terminal half of male abdomen narrow.

Material examined of Micropanope sculptipes

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			°F.						
South Carolina	32 55 00	77 54 00	79	crs. S. bk. Sp.	59.1	Jan. 5, 1885	2311	*Albatross*	1♂	19797	Compared with type-specimen of *M. pugilator*.
Florida:											
Northwest of Tortugas	25 33 00	84 21 00	101		61.75	1878	45	U. S. C. S. Str. *Blake*	1♂ 1♀	2785, M. C. Z.	Types of *M. pugilator*.
Tortugas						July 22, 1924	44	W. L. Schmitt	1y	60775	Gift of Carnegie Institution.
Tortugas	Due S. of buoy E. side channel.		35–37	crs. S		June 10, 1925	206	*Dohrn;* W. L. Schmitt	1♀	60778	
Do	do		37	shelly S		do	207	do	1♂	60776	
Do	S. of red buoy No. 2		25			June 11, 1925	217	do	2♂	60777	
West of Tortugas	24 43 00	83 25 00	37			1877–78	11	*Blake*	1♂	3048, M. C. Z.	
South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co		Mar. 15, 1885	2406	*Albatross*	1♀	20719	
Southwest of Cape San Blas	29 11 30	85 29 00	26	S. G. brk. Sh.		Feb. 7, 1885	2374	do	1♀ ovig.	19798	
West Florida								*Bache;* W. Stimpson	1♂ 2♀	2982, M. C. Z.	

Measurements.—Male (58014), length of carapace 4.4, width of same 6.3, fronto-orbital width 4.7, width of front 2.6 mm. Width of ovigerous female, Barbados, 61 mm. (Bouvier).

Range.—Florida; West Indies; Panama. 20–170 fathoms.

Material examined.—See table, page 432.

MICROPANOPE PUSILLA A. Milne Edwards

Plate 179, Figures 7 and 8

Micropanope pusilla A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 327, pl. 54, figs. 4–4*b* (type-locality, near the west coast of Florida, 17 fathoms; type in M. C. Z.); Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14 (Florida Strait, 36 fathoms).

Glyptoplax pusilla RATHBUN, Journ. Inst. Jamaica, vol. 2, 1899, p. 628; Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2, 1901, p. 33.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 328.

Diagnosis.—Chelipeds and carapace nearly smooth to naked eye. Legs unarmed. Four lateral teeth distinguishable. No subhepatic tubercle.

Description.—Carapace narrow, covered on the prominent parts with numerous fine, regular granulations. Lobules indicated by deeper furrows, and lobules of branchial and cardiac regions more apparent, than in *sculptipes*. Behind the outer angle of the orbit there are two triangular and slightly projecting teeth and a small tubercle which replaces the last tooth; the second normal tooth is merged with the first. Front wide, appearing almost straight as seen from above but really bent down, in the old almost vertically, the two lobes deep toward the median sinus but becoming shallow toward the orbits; surface of front more coarsely granulate than rest of carapace.

Chelipeds finely granulate; carpus uneven, distal furrow deep; chelae unlike, not very unequal; both palms high, upper surface broad, its outer border slight, inner border cristate, but not lobate, at proximal end. Fingers meeting, tips crossing, those of major chela irregularly dentate throughout, dactyl with large basal tooth; fingers of minor chela longer and narrower, more deflexed, very finely denticulate especially the dactylus, which is of rather even width down to its middle, whence it diminishes to the tip. A finely granulate ridge just above lower margin of each propodal finger is continued a ways on palm; a similar ridge on upper margin of dactyls. Fingers usually light brown in alcohol, sometimes nearly white. Ambulatory legs slender and smooth.

Abdomen of male short and wide; third segment at its base covering the sternum; sixth segment nearly twice as wide as long, seventh segment equally short, margin broadly arcuate.

Measurements.—Male (19802), length of carapace 4.2, width of same 5.6, fronto-orbital width 4.4, width of front 2.4 mm.

Material examined of Micropanope lobifrons

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			° C.						
Florida: South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co		Mar. 15, 1885	2406	*Albatross*	1 y	60906	
Tortugas	S. of SW. channel buoy					Aug. 16, 1924	7	*Dohrn*; W. L. Schmitt.	1 y	62565	Gift of Carnegie Institution.
			Feet								
Gulf Stream off Cape Florida.	2⅛ miles SSE. of Fowey Rocks Light.		45	rky	21.1	Mar. 25, 1903	7511	*Fish Hawk*	1 y	60905	
Cuba: Off Havana						1893		Biol. Exped. State Univ. Iowa.	1 ♀	Mus. S.U.I.	
			Fathoms								
Virgin Islands: Off St. Thomas.	Sail Rock, W. by N. ½ N., 6 miles.		20-23	Co	25.8	Feb. 6, 1899	6079	*Fish Hawk*	1 ♂	24350	
					° F.						
Santa Cruz			115	R. brk. Sh	65	1878-79	132	*Blake*	1 ♂	2685, M.C.Z.	
Barbados	SW. of Pelican Island, 1 mile.		38	fne. Co. fragments.		May 13, 1918	1	Barbados-Antigua Exped. State Univ. Iowa.	2 ♂ 2 ♀	58025 Mus. S.U.I.	
	Half mile W. of station 17.		40	crs. S		May 18, 1918	18	do	1 ♀	do	
	WNW. of Lazaretto; NNW. of Pelican Island.		33	rky		May 27, 1918	51	do	9 ♀ (1 ovig.)	do	3 with Rhizocephalid parasites.
	Cable Station, E. by S.; Lazaretto, ESE. ½ S.		35-60	mostly rky		June 3, 1918	75	do	1 ♂	do	
	Cable Station, SE. by E.; Paynes Bay Church, NE., off shore ¾ mile.		35-75	alternate S. and R.		do	78	do	1 ♀	do	With small Rhizocephalid.
	W. by N. of Telegraph Station, little more than a half mile off.		30-65	R. S		June 5, 1918	79	do	3 ♀	58014	2 with a Rhizocephalid larger than the abdomen.
Grenada			170	fne. gy. Oz	53.5	1878-79	247	*Blake*	1 ♂	2650	
Panama: Near Colon (Aspinwall).	9 32 00	79 54 30	34	brk. Sh		Apr. 2, 1884	2146	*Albatross*	1 ♀	7778	

Range.—From Alabama in the Gulf of Mexico to St. Thomas, Virgin Islands.

Material examined.—See table, pages 434–435

MICROPANOPE LATIMANUS Stimpson

Micropanope latimana STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 107 [17] (type-locality, Cape St. Lucas; type not extant).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 329.[51]

Xanthodes latimanus LOCKINGTON, Proc. Calif. Acad. Sci., vol. 7, 1876 (1877), p. 31 [4] (type-locality, San Diego; type not extant).

Xantho latimanus LOCKINGTON, Proc. Calif. Acad. Sci., vol. 7, 1876 (1877), p. 101 [7].

? *Xanthodes* ? *angustus* LOCKINGTON, Proc. Calif. Acad. Sci., vol. 7, 1876 (1877), p. 100 [6] (type-localities, Magdalena Bay, L. Cal.; Mulege Bay, Port Escondido and San Jose Island, Gulf of Cal.; types not extant).

Diagnosis.—Margin of frontal lobes straight. Palms broader than long. Black of propodal finger continued one-third the way along palm.

Description (after Stimpson).—Carapace moderately convex, naked, smooth and polished, except toward the anterior and antero-lateral margins, where it is somewhat granulated. Front rather broad and little projecting, lobes with straight margins. Subhepatic region minutely granulated. Chelipeds large and angular; palms broader than long, smooth and polished, strongly protuberant at the postero-inferior angle; fingers nearly as long as palm, deflexed and black, the black of the propodal finger extending on the palm for one-third its length. Chelae unequal, the fingers of the smaller one longer and more deflexed than those of the greater one, which gives the hand a more angular form and a deeply concave inferior outline. Ambulatory feet slender, smooth and sparsely hairy.

Measurements.—Male type, length of carapace 7.1 mm. (0.28 inch), width of same 9.7 mm. (0.38 inch).

Range.—San Diego, California, to Cape St. Lucas, Lower California, Mexico.

MICROPANOPE TRUNCATIFRONS Rathbun

Plate 178, Figures 7 and 8

Micropanope truncatifrons RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 274, pl. 4, fig. 2 (type-locality, off Havana, 194 fathoms, station 2326, *Albatross;* type, Cat. No. 9497, U.S.N.M.).

Diagnosis.—Carapace and chelipeds coarsely granulate. Frontal lobes truncate, transverse. Five lateral teeth. No subhepatic tubercle. Legs slender.

Description.—Carapace moderately convex, antero-lateral teeth horizontal. Surface granulate, granules large and conspicuous anteriorly, diminishing toward posterior margin. Regions well defined;

[51] A. Milne Edwards suggests the possibility of this species being equivalent to *Glyptoplax pugnax* Smith.

Material examined of Micropanope pusilla

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			° C.						
Alabama:											
South of Mobile Bay	29 24 30	88 01 00	35	yl. S. bk. Sp.		Mar. 4, 1885	2388	*Albatross*	1♀ ovig	19804	
Do	29 27 30	87 48 30	30	crs. S. bk. Sp. Sh.		do	2390	do	1♂ 1♀	19805	
Florida:											
Southwest of Cape San Blas.	29 18 15	85 32 00	25	crs. gy. S. brk. Sh.		Feb. 7, 1885	2370	do	1♀	19799	
Do	29 15 30	85 29 30	27	G		do	2372	do	4♂	19800	
Do	29 14 00	85 29 15	25	Co		do	2373	do	1♂	19801	
Do	29 11 30	85 29 00	26	S. G. brk. Sh.		do	2374	do	1♂	19802	Compared with type.
Do			25–27			do	2369–2374	do	4♂ 4♀ (1 ovig.) 15 y.	19803	
South of Cape St. George.	28 45 00	85 02 00	30	gy. S. brk. Co.		Mar. 15, 1885	2405	do	1♀	19806	
South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co		do	2406	do	1♂ 4♀ (3 ovig., 1 soft shell.)	19807	
South of Dog Island	28 47 30	84 37 00	24	Co. brk. Sh		do	2407	do	1♀	19808	
Oyster Bay								H. Hemphill	1♂	19809	
West coast of Florida.			17					W. Stimpson	2♂ 1♀	2984, M. C. Z.	Cotypes.
White Shoals, Tortugas.						July 19, 1924	21	W. L. Schmitt	1♂	60770	Gift of Carnegie Institution.
Do						do	25	do	1 ovig. ♀	60771	Do.
Do						do	26	do	1♀ shedding	62567	Do.
Do						do	28	do	1♂ 1 ovig. ♀	60773	Do.
Do						July 20, 1924	35, 36	do	1♂ 1 ovig. ♀	61120	Do.
Tortugas	4–5 miles S. of Channel buoy.		40			July 22, 1924	38	do	1♂	61116	Do.
Do	S. of SW. Channel buoy.					Aug. 16, 1924	7	do	1♂ 3♀	62566	Do.
Do	6 miles S. of No. 2 buoy.		18	crs. S		July 22, 1924	44	do	1♀ [1] 1♂ 1♀	61118 60772	Do.
Do	Due S. of buoy E. side of channel.		35–37			June 10, 1925	206	*Dohrn;* W. L. Schmitt.	2♂ 3♀ (1 ovig.)	60769	Do.
Do	13 miles S. of No. 2 buoy.		87–45	Rough		do	210	do	1♂	60909	Do.
Do	7 miles S. of red buoy No. 2.		20			June 11, 1925	216	do	1♂ 3♀ [2]	61119	Do.
Do	S. of red buoy No. 2		25			do	217	do	1♂ 1 y	60774	Do.

Gulf of Mexico, off Northwest Channel, Key West.	24 40 45	81 53 40	6	hrd. S	19	Feb. 24, 1902	7287	*Fish Hawk*	1♂	61117	
Cuba:											
Between Cape San Antonio and Cape Cajon.				Pure sand to weedy.		May 24, 1914	12	*Tomas Barrera;* Henderson and Bartsch.	1♂	49171	
Bahia Honda						June 7, 1914		do	1♀	49172	
Jamaica: Port Antonio								J. E. Duerden			Specimens in Institute of Jamaica.
Porto Rico:											
Mayaguez Harbor	Custom House, NE. ¾ E., 4½ miles.		4–6	Co	° *F.* 68	Jan. 20, 1899	6065	*Fish Hawk*	1♂ 1♀	24337	
Off Humacao	Hucares, NW. ¾ W., 2¼ miles.		9.5	Co	° *C.* 26	Feb. 14, 1899	6099	do	5♂	24346	
Do	Humacao, N. ½ W., 3 miles.		12.5	Co	26.4	do	6098	do	1♂ 1♀	24345	
Vieques Island:											
Off Vieques	Port Mula Lighthouse, SSW. ⅜ W., 5¾ miles.		14	Co. S	25.6	Feb. 8, 1899	6085	do	1♀	24339	
Do	Culebrita Light House, NE. x N., 10 miles.		15	Co	26	Feb. 10, 1899	6091	do	1♂	24341	
Do	Culebrita Light House, NE. ⅜ E., 7¼ miles.		16	Co	25.2	do	6092	do	1♂ 1♀	24342	
Do	Port Mula Light House, E. ½ N., 11¼ miles.		6	Co	27.3	Feb. 14, 1899	6096	do	2♂ 2♀	24344	
Culebra Island:											
Off Culebra	Port Mula Light House, SW. ½ S., 8½ miles.		14.75	Co. S	25.5	Feb. 8, 1899	6086	do	5♀	24340	
Do	Culebrita, NE., 5¼ miles.		15	Co	25.2	Feb. 10, 1899	6093	do	1♀	24343	
St. Thomas, Virgin Islands.	Sail Rock, NW. ½ W., 4 miles.		20	Co	25	Feb. 6, 1899	6080	do	2♂ 1♀	24338	Female with Rhizocephalid parasite.

[1] 1 female with parasite in right branchial cavity.

[2] 1 female with Rhizocephalid.

interregional furrows smooth. On each epigastric region a short oblique ridge, a longer ridge on the hepatic region, a transversely arcuate elevation on epibranchial region. Outer orbital tooth very small, well separated from second lateral tooth which is small and tuberculiform; third to fifth teeth dentiform, third directed forward, fourth and fifth outward, fifth smaller than the two preceding; margin of teeth denticulate. Front truncate; lobes slightly sinuous, margin thin, finely crenulate; a transverse row of coarse granules behind and above margin giving the front the appearance of having a double edge. Orbital margin granulate; two superior fissures little marked, terminating in small emarginations; lower margin with two subequal teeth and a broad outer V-shaped fissure. Lower surface of carapace granulate.

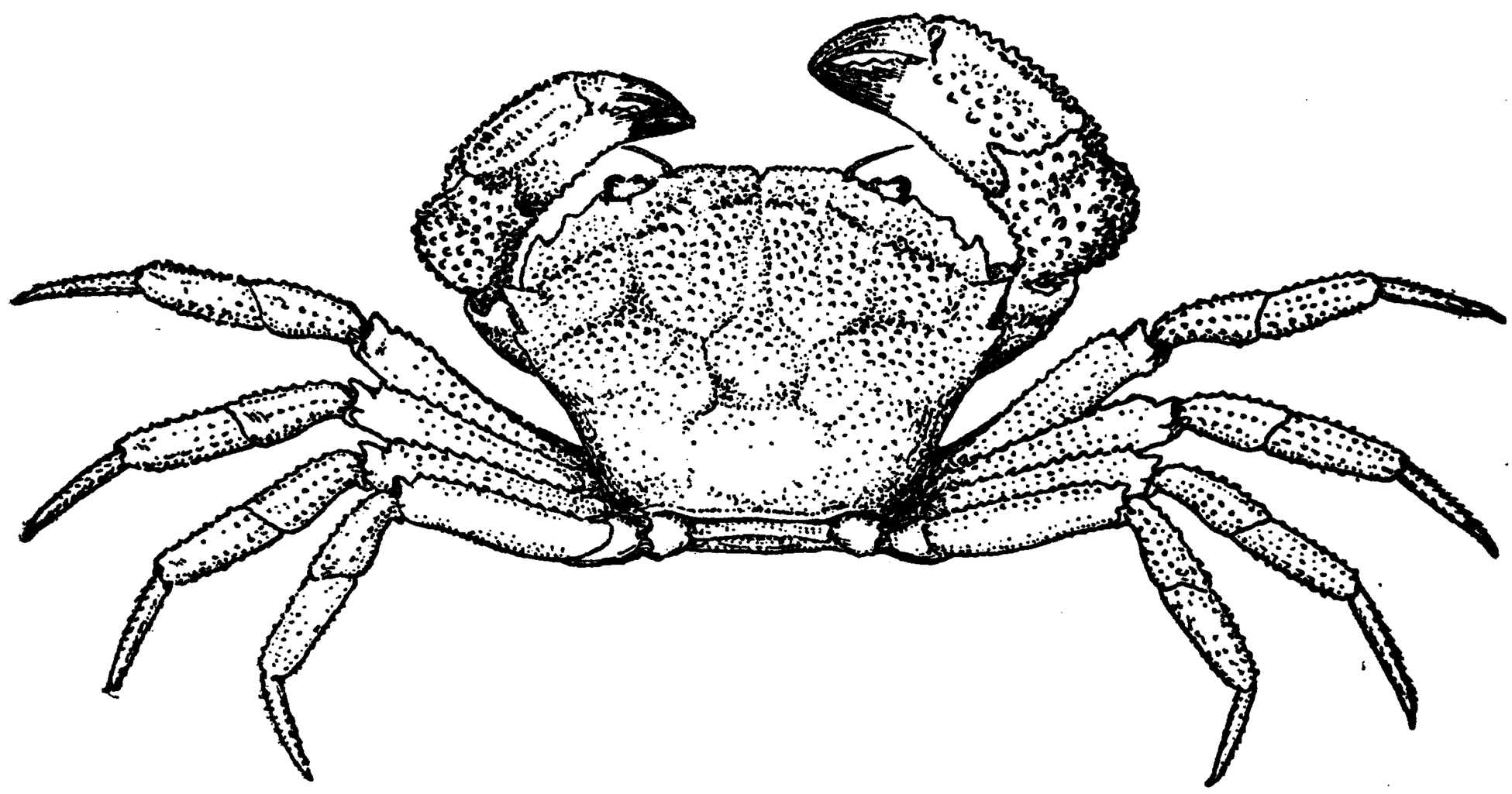

FIGURE 68.—MICROPANOPE TRUNCATIFRONS, FEMALE, HOLOTYPE, DORSAL VIEW, × 3.2

Chelipeds unequal in female, coarsely granulate. Arm short and broad, triangulàte, armed with rather sharp granules, larger on margins. Granules of wrist in irregular masses and ridges; two inner spines, the infero-posterior the smaller. Hand with superior groove and double crest; outer granules diminish in size below, inner granules very large near upper margin, diminishing toward lower and distal margins. Fingers brown, deeply grooved, finely granulate, not gaping when closed; dactylus of larger hand with large basal tooth. Legs very slender, granulate; merus armed with small spines above, carpus and propodus with spinules.

Measurements.—Female holotype, length of carapace 7, width of same 10.4, fronto-orbital width 6.5, width of front 3.5 mm.

Range.—Off Havana and Yucatan; 130 to 194 fathoms.

Material examined.—See table, p. 437.

Material examined of Micropanope truncatifrons

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Cuba:	° ′ ″	° ′ ″			°F.						
Off Havana	23 11 45	82 18 54	194	br. Co	62	Jan. 17, 1885	2326	*Albatross*	1♀	9497	Holotype.
Do	23 10 40	82 20 15	182	Co		Jan. 20, 1885	2349	do	1♂ y	9530	
Mexico: Off Arrowsmith Bank, Yucatan	20 59 30	86 23 45	130	Co		Jan. 22, 1885	2354	do	1♀	20718	

Material examined of Micropanope polita

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Mexico:	° ′ ″	° ′ ″			°F.						
Off Magdalena Bay, Lower California.	24 58 15	115 53 00	36	Coralline	64.3	Mar. 2, 1889	2989	*Albatross*	2♂ 3♀ 2 y 1♂	17397 4252, M.C.Z.	Cotypes.
Off Cape St. Lucas, Lower California.	22 52 00	109 55 00	31	rky	74.1	May 1, 1888	2829	do	7♂ 9♀	19972	
Panama: Near Cocos Island	5 32 45	86 54 30	66	rky	58.4	Feb. 28, 1891	3368	do	1♂	20606	Cotype of *Panopeus tanneri.*
Galapagos Islands:	*Lat. S.*										
East of Indefatigable Island	0 57 00	89 38 00	53	P. Co. Sh	60	Mar. 28, 1891	3405	do	5♂ (2 y.)	4485, M.C.Z.	Cotypes of *Panopeus tanneri.*
Off Hood Island	1 21 30	89 39 45	20	Co. S	20	Apr. 7, 1888	2812	do	1♀	21995	

MICROPANOPE XANTUSII (Stimpson), new combination

Plate 179, Figures 1–4.

Xanthodes xantusii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 105 [15] (type-locality, Cape St. Lucas; type not extant).

Pilumnus beebei BOONE, Zoologica, vol. 8, 1927, p. 219, text-fig. 80 (type-locality, off Hood Island, Galapagos, station 54; cotypes in Mus. New York Zool. Soc.).

Diagnosis.—Granulation of carapace mostly in lines. Frontal lobes oblique. Five lateral teeth. Chelipeds coarsely granulate. Three grooves on outer-upper surface of palm.

Description.—Carapace smooth on its middle and posterior portions but in front areolated and roughened with somewhat squamiform granules and slight transverse crenulated ridges. Antero-lateral margin armed with four teeth not including the angle of the orbit between which and the next tooth there is a nearly straight, granulate interspace. Front little projecting, bordered by a thin lamella; median emargination a large V; outline of lobes concave, forming a lobule on either side, the outer one smaller than the inner; margin finely crenulate, an irregular line of fine granules close to the edge, and further back a transverse line of coarse granules. Orbital fissures little marked, ending in small emarginations separated by a slightly convex edge; outer incision broad, V-shaped, followed by a large tooth similar to that at the inner angle. Subhepatic region irregularly granulate, with one granule or cluster more prominent. Basal article of antennae short, scarcely reaching front.

Wrist and hand strongly granulate, with large and small granules, on the whole outer surface. Carpus with a deep sulcus near and parallel to the outer-distal margin; a rectangular inner angle and a stout spinule below it. Hand with three longitudinal sulci, one on the upper, and two on the outer surface. Smaller cheliped sparsely short-setose. Legs setose and roughened above with stout spinules on the merus and minute spinules and granules on the succeeding articles.

Measurements.—Male type, length of carapace 6.35 mm. (.25 inch), width of same 8.9 mm. (0.35 inch). Male, length of carapace 6.6 mm., width of same 9, fronto-orbital width 5.4, width of front 2.8 mm.

Range.—Cape St. Lucas, Lower California, to Maria Madre Island, Mexico; Galapagos Islands.

Material examined.—Maria Madre Island, Mexico: March–May, 1927; Secretaria de Agricultura y Fomento, through A. L. Herrera; 1 male (60785). E. part of bay; 5–8 meters; May 17, 1925; F. Contreras; 3 females (62704), 1 male, 4 females (1 ovigerous), returned to California Acad. Sci.

Clarion Island, Mexico; Hanna and Jordan; 1 female; returned to California Acad. Sci.

Off Hood Island, Galapagos Islands, 15 feet, William Beebe by diving at station 54, *Arcturus;* 3 males, 1 female, cotypes (Mus. New York Zool. Soc.).

MICROPANOPE XANTUSII TABOGUILLENSIS Rathbun

Plate 179, Figures 5 and 6

Micropanope taboguillensis RATHBUN, Mem. Mus. Comp. Zoöl., vol. 35, 1907, p. 69, pl. 1, fig. 8; pl. 7, figs. 3, 3*a* (type-locality, Taboguilla Island, Panama; type, Cat. No. 32859, U.S.N.M.).

Diagnosis.—Differs from typical *xantusii* in the granules of carapace and chelipeds which are pearl-like rather than squamiform, and larger and fewer in each row, making a rougher and more ornate surface. Interspace behind outer orbital tooth less well defined.

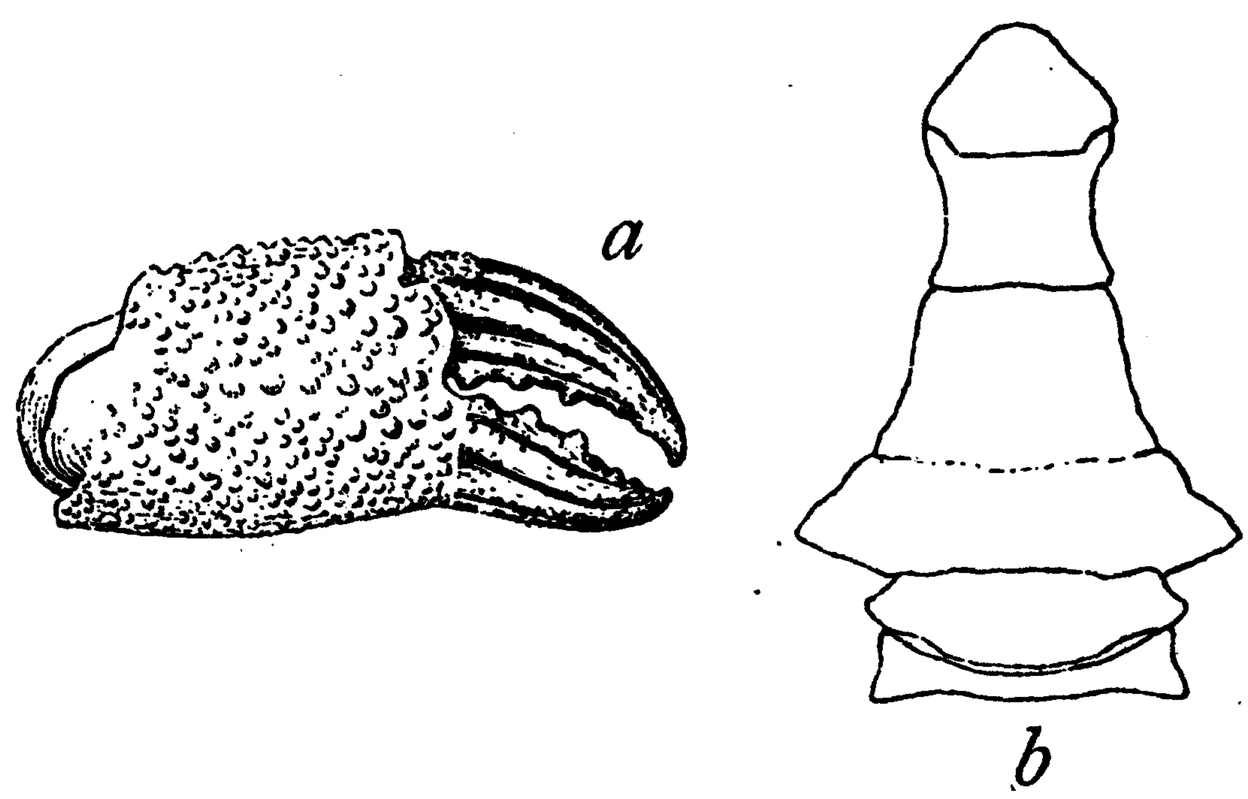

FIGURE 69.—MICROPANOPE XANTUSII TABOGUILLENSIS, MALE, HOLOTYPE, CARAPACE 10 MM. WIDE. *a.* CHELA. *b.* ABDOMEN

Measurements.—Male holotype, length of carapace 7, width of same 10, fronto-orbital width 5.7, width of front 3 mm.

Material examined.—Taboguilla Island, Panama, one fathom, low tide, from coral, October 31, 1904, *Albatross;* 1 male, holotype of *M. taboguillensis* (32859). A smaller male, paratype (M.C.Z.) was taken between tide marks, October 31, 1899, by the *Albatross.*

MICROPANOPE GRANULIMANUS (Stimpson), new combination

Plate 180, Figures 1 and 2

Pilumnus granulimanus STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 143 (type-locality, Cruz del Padre, Cuba; type not extant).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 294.

Xanthias granulimanus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 271.

Diagnosis.—Chelipeds densely granulate. No notches in upper margin of orbit. Basal article of antennae not reaching front.

Description.—Carapace rather short and broad, naked, areolated and granulated in front, smooth posteriorly; granules having a tendency to form lines. Antero-lateral margin minutely denticulate and armed, exclusive of the orbital angle, with four small, acute triangular teeth, the two end ones a little smaller than the two intermediates. At the penult tooth a short granulate ridge, arched obliquely forward, extends inward on the surface of the carapace. Subhepatic region