

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

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No. XXIV.—DESCRIPTIONS OF NEW GENERA AND SPECIES OF CRABS FROM THE WEST COAST OF NORTH AMERICA AND THE SANDWICH ISLANDS.

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Of the new forms described in the following pages, the Sandwich Island region is represented by seven species; of the west American forms all but two are found in southern California or Lower California, including the Gulf coast. In all six genera and forty-six species are described, of which four genera and forty species were collected by the U. S. Fish Commission steamer *Albatross*; of these forty species, seven had been previously collected by other parties, but had not been described. In the Proceedings of the Museum for 1891, 1892, and 1893 have been described seven new species of *Panopeus*, *Periceridae* and *Maiidae* from recent *Albatross* dredgings, making a total of forty-seven new species of brachyuran crustaceans collected by that vessel between July 1, 1888, and December 31, 1891. From this calculation are omitted the results of the cruise to the Galapagos Islands in the spring of 1891.

Family INACHIDÆ.

Subfamily LEPTOPODIINÆ.

Genus **ERICERUS**.

Carapace much elevated at the cardiac region. Rostrum long and simple. Postocular spine present. Abdomen of male six-segmented, the penultimate and terminal segments coalesced. On the sternum, in front of the abdomen, there are two spines pointing downward and forward, and situated on either side of the median line. The flagellum and a portion of the basal joint of the antenna are visible at the sides of the rostrum. Merus of the external maxillipeds with the inner

angle strongly produced, acute. Chelipeds much stouter than the ambulatory legs; merus trigonal, curved; hand broad and inflated; fingers no longer than the palm, arched. The ambulatory legs diminish rapidly in length from the first to the fourth; they are slender and subcylindrical; dactyli short and curved.

This genus is intermediate between *Metoporphaphis* and *Podochela*; it differs from the former in the relative length of the ambulatory legs and their dactyls, in the absence of the long spine from the meral joints, and in the broader hands and arched dactyls of the chelipeds; from the latter in the more elevated carapace and longer rostrum.

*Ericerus latimanus*

Surface of carapace and legs pubescent. On the gastric region there are two small tubercles on the median line, the anterior the smaller; the cardiac region is armed with a prominent, blunt, well-rounded tubercle; there is a tubercle on the first abdominal segment; on the margin of the carapace there is a minute spine in front of the chelipeds, another on the hepatic region, behind which there is a third on the pterygostomian region. The rostrum is about as long as the post-frontal portion of the carapace; it is triangulate, acuminate, slightly curved upward, hollowed underneath for its proximal half, flattened above between the orbits. Orbital arch thickened. Basal antennal joint with a blunt tooth at the antero-external angle. Chelipeds spinulose on the inner margin, granulate beneath; merus with the outer margin irregularly tuberculate, and a spine on the upper surface at the distal end; carpus one-spined above; fingers dentate within, gaping except at the tips. Ambulatory legs hairy, especially on the penultimate joints; dactyls slightly curved, spinulose beneath.

Length of carapace, including rostrum 26, width 12 millimeters.

Collected by the U. S. Fish Commission steamer *Albatross* in the Gulf of California, at Concepcion Bay, Lower California, March 19, 1889 (17325); and off Adair Bay, Mexico, lat. 31° 21' N., long. 113° 49' W., 11 fathoms, sand, broken shells, gravel, temperature 67°, station 3024, 1889 (17324).

*Podochela tenuipes*.

Branchial regions flattened, hepatic moderately prominent, the gastric region rounded; cardiac prominence small, tuberculate. Rostrum thick, triangulate, acute. There is a small postocular spine or tubercle. The pterygostomian ridge is moderately developed. The abdomen of the male is composed of six segments, the last two normal segments coalesced; first two segments visible from above; first segment long; second very wide; from it the abdomen tapers rapidly to the last segment, which is long and rounded at the extremity. The abdomen of the female is pubescent, and fits over the thin erect lamiform expansion of the sternum. Basal antennal joint with a blunt longitudinal ridge on the posterior two-thirds of its length, which is a little nearer

the thin inner edge than the thickened outer margin and is divided from them by deep grooves. Merus joint of outer maxillipeds strongly produced on the inner side, deeply cut at the antero internal angle. In adult males the chelipeds are moderately robust, pubescent; merus trihedral, curved, outer margin spiny; the carpus has a superior, posterior spine; palm inflated, fingers shorter than the palm, gaping. In females and young the chelipeds are slender, the hands semicylindrical. Ambulatory legs long and slender, especially the first two pairs; with long hairs, those on the upper surface curled; dactyli falciform, toothed, in the first pair about one-third the length, in the remaining pairs about one-half the length, of the penultimate joints; these joints have no thumb processes, but in the last two pairs are slightly thickened in the distal half.

Length of male 14, width 9 millimeters. Length of female 14, width 10 millimeters.

Southern California; W. H. Dall (17505).

Lower California; U. S. Fish Commission steamer *Albatross*, 1889:

Station.	Lat. N.			Long. W.			Fathoms.	Bottom.	Temperature.	Cat. No.
	°	'	"	°	'	"				
2999	24	54	30	110	39	00	39	crs. S.	63.6	17326
3001	24	55	15	110	39	00	33	fine. gy. S. brk. Sh.	64.5	17329
3039	24	27	00	111	59	00	47	fine. yl. S.	68.5	17327
3042	24	38	00	112	05	30	17	fine. gy. S.	65.0	17328

#### *Podochela (Coryrhynchus) mexicana.*

On the median line of the gastric region there are two tubercles, the posterior the longer. Cardiac and hepatic protuberances laminate, prominent. Rostrum hood-shaped, thin, ridged above, obtuse. Ridges of basal antennal joint thin, sinuous, subparallel, continued to the anterior extremity and expanded in a lobe near the posterior end. Pterygostomial ridge well developed. Chelipeds (of male) slender; palm little inflated; fingers meeting along inner edges. Ambulatory legs of moderate length; penult joints of last two pairs very slightly thickened toward the distal end; legs, except the dactyls, ornamented above with tufts of curled setae; propodal joints with long straight hairs beneath; dactyls short, of last three pairs much curved and spinuliferous. Sternum and basal joints of legs vermiculated.

Length, 10; width, 8 millimeters; length of cheliped, about 12; of first ambulatory leg, about 27; of second ambulatory leg, about 21; of fourth ambulatory leg, about 11.

Off Adair Bay, Mexico, in the Gulf of California, lat. 31° 21' N., long. 113° 49' W., 11 fathoms, sand, broken shells, gravel, temperature 67°, station 3024, U. S. Fish Commission steamer *Albatross*; one male (17330).

This species much resembles *Podochela reisei* of the West Indies, but is at once distinguished by the shorter legs and the prominent margins of the basal antennal joint.

*Podochela (Coryrhynchus) lobifrons.*

Carapace pubescent. Cardiac protuberance prominent, surrounded by a deep sulcus; gastric region slightly swollen; hepatic prominence with a laminate, granulate projection. Postocular lobe large for the genus, thin and rounded. Pterygostomial ridge prominent, its lobe showing from above behind the hepatic lobe. Postocular, hepatic, and subhepatic lobes spinulous. Rostrum broad, thin, not produced beyond the antennular fossae, slightly notched in the middle. The ocular pedicels have a spinule above, and traces of a spinule on the anterior and the posterior portions of the middle. Sternum deeply excavated in a transverse groove between the chelipeds, and in two rounded grooves in advance of the chelipeds. Male abdomen composed of six segments, the first of which is long and bituberculate on the median line. Basal antennal joint exceeding the rostrum, strongly angled, the anterior portion as deep as it is broad, the anterior surface deeply grooved for the insertion of the flagellum, which is half as long as the carapace. Merus joint of the external maxillipeds broad, truncate at the anterior edge, strongly notched at the antero internal angle, the inner margin prominent. Chelipeds stout, one-half again as long as the carapace, pubescent, spinulous; ischium and merus spinulous and spinous below and on the inner surface, the spines on the margins broad, flat, and ornamented with spinules; carpus strongly spinous above; manus broad and swollen, spinous on the margins, spines of the inner margin in groups; fingers widely gaping for one-half their length; a prominent tooth on the dactyl. Ambulatory legs very slender and pubescent, the first pair more than three times the length of the carapace; dactyls of first two pairs about one-third, of last two pairs about one-half the length of the penultimate joints; the dactyli of the last three pairs are falciform.

Length 20.5, width 18 millimeters.

A single male specimen was taken in the trawl by the *Albatross*, off Abreojos Point, Lower California, in lat.  $26^{\circ} 16' 15''$  N., long.  $113^{\circ} 42' 15''$  W., 58 fathoms, gray sand, broken shells, temperature  $56^{\circ}$ , station 3044, 1889 (17331).

## Subfamily INACHINÆ.

Genus **ERILEPTUS**.

Carapace broadly triangular; regions well defined, convex. There is a postorbital and also a supraorbital spine. Rostrum slender and simple. Abdomen and sternum granulate; abdomen six-segmented. Basal antennal joint with a slender spine at the antero-external angle. Merus of external maxillipeds with a prominent obtuse lobe on the inner margin. Chelipeds very long, slender, subcylindrical; fingers short, arched. Ambulatory legs very slender, shorter than the chelipeds; dactyls almost straight.

*Erileptus spinosus.*

Carapace spinous; two spines on the median line, one on the posterior part of the gastric region, and the other on the cardiac region; there is one long spine on the branchial region, with a small one in front of it and two on the margin; a spine on the margin of the hepatic region, and two very small ones arranged transversely on the gastric region; there is a slender spine on the orbital arch. Rostrum slender, spinulous on the margins, about one-half the length of the post-frontal portion of the carapace. Postorbital spine small, at some distance behind the eye. The abdomen bears a spine on the first segment. Chelipeds nearly three times as long as the carapace, granulate; merus one-spined above at the anterior margin; hand slender, slightly flattened vertically, increasing in width toward the distal end; dactyl and pollex arched, gaping for one-half their length. Ambulatory legs decreasing regularly in length from the first to the fourth; fourth pair a little more than one-half the length of the first.

This species in the arrangement of its spines and in the rostrum resembles *Anasimus rostratus*, but the carapace is much broader posteriorly, the legs are different in character, and the postorbital spine is small and remote from the eye, while in *Anasimus* it is distinct and defines the orbit.

Length 10, width 6 millimeters; length of cheliped about 28.

Off San Diego, California, lat  $32^{\circ} 33' 30''$  N., long.  $117^{\circ} 16'$  W., 36 fathoms, gray sand, temperature  $58.2^{\circ}$ , station 2934, U. S. Fish Commission steamer *Albatross*, 1889; two males (17341).

*Anasimus rostratus.*

Carapace with two median spines, one of which is on the posterior part of the gastric region and one on the cardiac region. There are two spines on each branchial region, and almost in line with these, one on each protogastric lobe. Lateral margins spinulous. Surface pubescent. Rostrum slender, spinulous on the margins, curving upwards for its distal half. There is a prominent supraorbital spine. The first article of the female abdomen carries a spine; the second article, one much smaller. Basal antennal joint very long and narrow, terminating in a spine, spinulous on the margins, without a prominent tubercle. Chelipeds very weak in the female; margins of merus spinulous; a slender spine above near the carpus; hand granulous; fingers nearly as long as palm, in contact. Ambulatory legs slender, much shorter than in *fugax*, pubescent, decreasing in length but little from the first to the fourth pair; dactyls spinulous below.

This species is distinguishable from *A. fugax*, A. Milne Edwards, of the Antilles, by the fewer spines on the carapace, by the more slender rostrum, and the shorter ambulatory legs.

Length, 7.5; width, 5 millimeters.

Northwest of Cerros Island, off Lower California, lat.  $28^{\circ} 58' 30''$  N., long.  $118^{\circ} 15' 45''$  W., 58 fathoms, gray sand, broken shells, temperature  $55.8^{\circ}$ , station 2983, U. S. Fish Commission steamer *Albatross*, 1889; two females, one of which is very small (17340).

*Inachoides magdalenensis*.

Carapace pyriform, regions distinct, with scattered tubercles and fine pubescence; gastric region with a transverse, arcuate row of tubercles across the middle, and a few tubercles on the posterior portion; cardiac region with a large elevated tubercle surrounded by smaller ones; branchial regions with many tubercles at the summit and a row near the margin; posterior margin with one tubercle; hepatic region with a spiny tubercle just below the margin. Rostrum of moderate length with anterior half slender. Postorbital spines distinct, acute. Sternum tuberculate and pubescent. Abdomen pubescent; in the male six-segmented, the sixth and seventh segments coalesced, and a spine on the first segment; abdomen of the female covered with large granules and longitudinally carinated. Spine at the outer extremity of the basal antennal joint short, acute. Merus of external maxillipeds strongly notched at the antero internal angle. Chelipeds weak, stouter but much shorter than the ambulatory legs, pubescent; merus spinulose on lower outer margin; hand slightly inflated; fingers about as long as palm, gaping a little at the base in the male, not at all in the female. Ambulatory legs long and slender, regularly decreasing in length, pubescent; dactyls slightly curved.

This species can be distinguished from *I. microrhynchus* (Edwards and Lucas) by the weak chelipeds, from *lavis* Stimpson and *hemphilli* Lockington by the tuberculate carapace. In the description of *brevisrostrum* by Lockington, no tubercles are mentioned, there is a small preorbital spine, and the ambulatory legs are evidently not all longer than the cheliped, as in the species here described.

Length of carapace in male 11, width 8 millimeters.

Lower California; U. S. Fish Commission steamer *Albatross*, 1889:

Station	Lat. N	Long. W.	Fathoms.	Bottom	Temperature.	Cat. No.
		" "				
3039	21 27 00	111 59 00	47	fine. yl. S.	68.5	17337
3041	21 35 30	112 05 00	27	fine. gy. S.	61.5	17338
3042	21 38 00	112 05 30	17	fine. gy. S. . .	65.0	17339

*Cyrtomaia smithi*.

Description of an adult female: Carapace broader than long, granulous, finely pubescent on the anterior portion, very convex, broadly rounded at the branchial regions; cardiac and gastric regions elevated, the latter armed with three spines pointing obliquely forward, the posterior one on the median line and smaller than the other two. There is

a subrectangular space between these spines, which is flattened except for a low median ridge which becomes more prominent as it extends to the rostrum. Anterior portion of the carapace strongly deflexed. Cardiac region divided by a shallow longitudinal groove into two protuberances each terminated by a spine. There is a small spine on the anterior portion of each branchial region; a lateral submarginal row of small irregular spines is continued on the pterygostomial regions; a prominent triangular acute spine defines the outer angle of the orbit; there is another smaller flattened spine on the upper orbital border; and two spinules between, and in a line with, the supraorbital and the larger gastric spine; there is a small spine on the margin of the hepatic region. Rostral spines short, triangular, convex, horizontal, with a wide V-shaped interspace. Eyes large, stalks short, rather stout, with a spinule above at the distal extremity. Abdomen broadly oval with seven segments, granulate, carinate, carina spinuliferous. The sternum is armed with spines on its outer margins, and also around the margin of the abdomen, and on the median line in front of the abdomen. Antennae with basal joint armed with three spines on the outer margin, and one on the anterior portion, the spines pointing downward; second and third joints flattened vertically, short, broad, spinuliferous on lower margins, the third joint reaching but little beyond the rostrum. Antennule lodged in cavities underneath the rostrum, the basal joint with its anterior margin thin and elevated. Exterior maxillipeds with ischium and merus spinous, merus with its antero-external angle produced into a flat, rounded projection, spinous on the margin.

Chelipeds about two and one-third times the length of the carapace, spinous; merus about as long as the propodus, more or less four-sided, the two rows of spines on the lower margins being the strongest; palm widening a little toward the fingers, with about six rows of spines; fingers each with a row of irregular teeth within, not fitting closely together. First ambulatory leg nearly twice as long as the cheliped, armed with slender spines, which are longer in the two rows beneath, and especially so in the last two joints, where the two rows are slightly curved toward each other, the spines directed toward the extremity of the dactyl. Second ambulatory leg two-thirds as long as the first, less heavily armed; dactyl unarmed. Last two pairs shorter, more slender, granulous, unarmed, except for a small spine at the distal extremity of the merus and a few spinules. Ambulatory legs slightly pubescent, except the dactyls, which are thickly hirsute above; dactyls slightly curved. Color of legs in alcohol pinkish, the long spines of a deeper shade.

Immature specimens differ from the above description in having the dorsal spines much longer and more slender, and additional spinules on the branchial region. The only male in the collection is about 12.5 millimeters long; the abdomen has seven segments, the carina is spin-

ous, and also the sternum; the chelipeds are similar in character to those of the females.

The largest specimen has a span of about one and a half feet.

	Millimeters
Length of carapace .....	49
Width of carapace .....	54
Length of cheliped about .....	112
Length of first ambulatory leg about .....	211
Length of second ambulatory leg about .....	152
Length of third ambulatory leg about .....	125
Length of fourth ambulatory leg about .....	120

With specimens from station 3474 there is an ambulatory leg of the first pair which is much larger than that of the largest specimen captured. The length of the last three joints is 153 millimeters, while in the specimen of which dimensions are given above the corresponding joints measure only 120 millimeters.

Off the Sandwich Islands, U. S. Fish Commission steamer *Albatross*, 1891:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
3470	21 08 30	157 49 00	313	wh. S. ....	43.3	17518
3473	21 15 00	157 30 00	313	fine. gy. S. ....	43.9	17519
3474	21 12 00	157 38 30	375	fine. wh. S. ....	.....	17520
3475	21 08 00	157 43 00	354	fine. wh. S. ....	.....	17521
3476	21 09 00	157 53 00	298	fine. wh. S. ....	.....	17522

This species is quite distinct from the equatorial Pacific forms collected by the *Challenger*. *C. murrayi* has more spines on the carapace and a preorbital spine, while *C. submi* has longer gastric spines and no supraorbital spine.

#### *Collodes tenuirostris*.

Carapace slightly pubescent, conspicuously granulate on the branchial regions, with a few granules on the gastric region and several on the intestinal region. There is a slender erect spine on the gastric region, one on the cardiac, and another pointing upward and backward on the first abdominal segment. These spines are slightly thickened at the summit. The posterior half of the rostrum has a rounded outline, the anterior half is a slender process in character like the dorsal spines, granulous toward the extremity. Supraorbital arch granulous, with a tubercle at the summit. In the male abdomen the fourth, fifth, and sixth segments have the lateral outlines separately concave; the sixth and seventh segments are anchylosed. Abdomen and sternum with scattered granules. Basal antennal joint with two small spines at the extremity, one below the other; outer margin spinulous; flagellum long. No interantennular spine. Chelipeds weak, much shorter than

the ambulatory legs, hirsute; the ambulatory legs more strongly so, the long hairs retaining large particles of mud.

Length of carapace, 11.5; width, 8 millimeters.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1889:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
	° ' "	° ' "				
3015	29 19 00	112 50 00	145	br. M . . . . .	54.9	17332
3018	30 16 00	113 05 00	36	gy. S. brk. Sh .	63.3	17333

Very much like *granosus* Stimpson, but at once distinguished by the rostral spine.

With the two males from station 3018, there is a small, immature female, in an imperfect state, which also belongs to the genus *Collodes*; the basal antennal joint is one-spined, and the dorsal surface is devoid of long spines; otherwise it resembles *tenuirostris*.

#### Euprognatha bifida.

Entire surface granulate. Carapace subtriangular, flattened behind, conspicuously granulate, regions well defined. There is a spine on the gastric, the cardiac, and each branchial region; a minute spine on the first abdominal segment, and two above the posterior margin; three tubercles in a transverse row on the anterior part of the gastric region. Lateral margins spinulose. Rostrum bifid, the interantennular spine being absent. Supraorbital and postorbital spines distinct. Spine of basal antennal joint thin and deep, advanced as far as the rostrum. Abdomen of male abruptly narrowed at about the middle; of female with a central carina and densely set with large, flattened granules. Chelipeds of male moderate, hand inflated, fingers gaping; of female very weak, hand slender, fingers longer than in male. Dactyli of ambulatory legs long, in first pair about half the length of the penult joints and about the same length as the antepenult.

Length, 9; width, 7 millimeters.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1889:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
	° ' "	° ' "				
2998	24 51 00	110 39 00	40	S. brk. Sh . . . . .	64.	17334
3001	24 55 15	110 39 00	33	fine.gy.S.brk.Sh.	64.5	17335
3014	28 28 00	112 01 30	29	gy. S. . . . .	62.9	17336

#### Subfamily ACANTHONYCHINÆ.

##### *Sphenocarcinus agassizi*.

Carapace tuberculate with an interrupted ridge along the median line; on the gastric region there are three flattened tubercles, the median one most prominent, in advance of the others and tipped ante-

riorly with a short spine; cardiac and branchial regions with irregular, lobate tubercles arranged transversely, the cardiac tubercles in advance of the branchial. Lateral margin, with three prominent, obtuse, flattened lobes, the first on the hepatic region; the first and second with their margins more or less right-angled; the third long and prominent. Rostrum entire for more than one-fourth its length; horns sub-cylindrical, contiguous to near their extremities. There is a small but distinct preorbital lobe. The merus of the cheliped has three small spines on the upper surface, one at the distal end, two near the proximal end; otherwise the legs are unarmed. The palm widens a little towards the fingers, which are gaping at base. Surface pubescent.

Length of carapace, including rostrum, 35 millimeters; width, 23 millimeters.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1889:

Station.	Lat. N.	Lon. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
3011	28 07 00	111 39 45	71	fine gy. S. brk. Sh.	57.9	17342
3019	30 28 00	113 06 30	14	bk. S. brk. Sh. ....	66	17343

#### *Pugettia dalli*.

Adult males: Carapace subtriangular, with a tubercle on the intestinal region, one large on the cardiac region, and two arranged transversely on the gastric region; each of these tubercles is surmounted by a tuft of setae. There are indications of two tubercles on the median line of the gastric region. Branchial regions without areolations. There is an upturned spine on the postero-lateral margin. On the hepatic region there is a slender transverse spine, curved slightly forward. The postocular tooth is thin, obtuse, its upper surface flattened in a smooth oval plate inclined downward from the horizontal at an angle of about 45 degrees. Rostral horns more slender than in *richii*, widely divergent. Preorbital spine acuminate. Rostrum and lateral margin of the branchial region hairy. Chelipeds strong; merus trihedral, with a prominent thin and irregular carina on the upper and inner margins; carpus strongly carinate above and on the inner margin, the outer and inner surface irregularly ridged; hand large, compressed, thin, especially toward the margins; palm nearly as broad as long; fingers gaping, a tooth near the base of the dactyl, and one on the pollex near the extremity of the gape. Ambulatory legs much more slender than in specimens of *richii* of equal size; first pair about as long as, or longer than, the chelipeds; three succeeding pairs short, decreasing regularly in length.

Females: These differ from the adult males not only in the broader and more rounded carapace, but in the areolations. There are three distinct areolations covering the branchial region; the gastric region

is much more swollen than in the male; the chelipeds are weaker, the hands narrow, the fingers in contact for nearly their whole length.

Young males: These resemble the females in the areolations of the branchial regions and in the chelipeds.

Dimensions of a male in millimeters: Entire length of carapace, 11; width, without spines, 6.5; length of cheliped, about 13; width of hand, 3.3.

RECORD OF SPECIMENS EXAMINED.

Southern California; W. H. Dall (17506).

San Diego; C. R. Orcutt (17371); 10 fathoms, H. Hemphill (4283).

Catalina Island, dredged January, 1863; J. G. Cooper (17372).

Lat. 34° N., long. 119° 29' 30" W., 30 fathoms, pebbles, station 2945, U. S. Fish Commission steamer *Albatross*, 1889 (17628).

This species is much smaller than *richii*, which is found in the same localities, and it is at once distinguished from the latter by the hepatic region; in *richii* it is dilated in two flattened horizontal spines, while in *dalli* it is furnished with one slender spine and a flattened obtuse oval tooth not horizontal.

Subfamily NEORHYNCHINÆ.

*Neorhynchus mexicanus*.

Carapace broadly triangular, convex; regions well marked; surface granulate and tuberculate, the tubercles becoming spinous on the lateral margins and on the summit of the branchial regions. On the median line there is a spiny tubercle on the posterior part of the gastric region, a stout spine on the cardiac and on the intestinal region. There is also a shorter spine on the first abdominal segment pointing upward and backward. Rostrum triangular, apex mucronate. Postorbital spines longer than the eyes, the tips pointing forward. Male abdomen with first segment long, one-spined; second, short; third, wide; next three segments gradually tapering; seventh, subtriangular, anchylosed with the sixth. Sternum conspicuously granulate, deeply grooved between the segments. Female abdomen with large flattened granules, five-segmented, the first segment with a spine; the second, third, and fourth, short; the fifth, suborbicular, convex. Basal antennal joint with its outer margin prolonged in a slender spine, slightly incurved, not quite so much advanced as the rostrum. Ischium of external maxillipeds, with the longitudinal groove deep; merus not so deeply cordate as in *depressus*. Chelipeds of male short, rather stout, granulate; merus spinulous on lower margins; hand broad, inflated, with a tubercle on the outer surface near the carpus; fingers nearly as long as the palmi, gaping at the base. Chelipeds of female more slender than in the male, margins of hand parallel, fingers slightly gaping. Ambulatory legs long, slender, cylindrical, granulate under the lens, slightly pubescent, gradually diminishing in size from the first to the fourth; dactyls with acute horny tips.

The median spines present in adult males become tuberculate in females and smaller specimens, and the gastric tubercle is often absent. Length of carapace  $11\frac{1}{2}$ ; width 12 millimeters.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1889:

Station.	Lat. N.		Long. W.		Fathoms.	Bottom.	Temperature.	Cat. No.
	°	'	°	'				
3013	28	23	111	58	14	gy. S. brk. Sh. ....	65	17345
3014	28	28	112	04	29	gy. S. ....	62.9	17346
3020	30	37	113	07	7	gy. S. bk. Sp. ....		17347
3022	30	48	113	47	11	gy. S. bk. Sp. ....	62.1	17348
3029	31	33	114	20	10 $\frac{1}{2}$	br. gy. S. brk. Sh. ....		17349
3030	31	07	111	29	20	M. ....	61	17350
3034	31	06	114	28	33	br. M. ....	63.8	17351
3033	30	50	114	29	18	gy. M. ....	63.5	17352
3037	27	45	110	45	20	gy. M. ....	65.2	17353

### Family PARTHENOPIDÆ.

#### Subfamily PARTHENOPINÆ.

#### *Lambrus* (*Parthenolambrus*) *exilipes*.

Carapace about one-third broader than long; narrow at the hepatic regions, spreading at the branchial regions; a cavity near the margin between the branchial and the small hepatic region; a large cavity between the branchial and the cardiac and gastric regions. Median tubercles four, one large on the posterior portion of the gastric region, one small on the genital, one large on the cardiac, and one small on the intestinal. There is a prominent tubercle at the summit of the branchial region, also a few low tubercles on the branchial region and on the gastric ridges leading to the rostrum. Antero-lateral margin convex, about eight-toothed; teeth denticulate, becoming smaller anteriorly, the row continued on the subhepatic region; tooth at the lateral angle the largest. Postero-lateral margin concave, arched upward, with five small teeth and a large upturned spine at the summit of the arch. Posterior margin slightly convex, tuberculate. The supraorbital arch bears a prominent tubercle. Rostrum channeled, subtriangulate, deflexed at an angle of about 45°. Male abdomen with seven segments. Sternum, abdomen, and merus of external maxillipeds tuberculate. Chelipeds long, irregularly dentate on the margins, teeth denticulate, a stout tooth on the lower side of the first joint; faces of merus with tubercles arranged more or less longitudinally; hand with a distinct ridge on the lower face, outer face somewhat tuberculous, inner face smooth; dactyl dentate on the outside near the base; both fingers dentate on prehensile edges, white at tips, in the right cheliped gaping at base, in the left in contact. Ambulatory legs very short, narrow, flattened; meral, carpal, and propodal joints with a denticulate crest above; meral joints with a narrow, longitudinal groove below, edges of groove denticulate; last two joints densely hairy underneath. Surface pubescent.

Length 10, width 13, length of cheliped about 25 millimeters.

Off San Domingo Point, Lower California, lat.  $26^{\circ} 07' N.$ , long.  $113^{\circ} 32' W.$ , 74 fathoms, fine, gray sand, temperature  $55^{\circ}$ , station 3043, U. S. Fish Commission steamer *Albatross*, 1889; one male (17365).

*Mesorhœa gilli.*

Carapace much broader than long. Surface minutely pubescent. Elevations of cardiac, gastric, and branchial regions angular, each prolonged in a three-sided spine, that on the branchial region situated on the postero-lateral margin. The angles or ridges are more or less crenulate or tuberculate. The two gastric ridges gradually diverge from the spine and are continued nearly to the front. The cardiac spine is longer than the others, compressed laterally so that its anterior face is narrower than its lateral faces. The branchial ridge is curved, subparallel to the antero-lateral margin and has a tubercle in the center larger than the others. In front of the branchial ridge are a few scattered tubercles; and there are one or two tubercles on the hepatic region. Behind the branchial ridge the surface is concave with the exception of the median spines. Rostrum very short, pubescent. Antero-lateral margin convex, distinctly crenulate; postero-lateral and posterior margins entire, thin, with faint impressed lines indicating the normal crenulation. Postero-lateral margin concave, about twice as long as the posterior margin, which is slightly convex in the middle, terminating in a triangular flattened spine at either angle. Ridge between the subhepatic and afferent channels minutely crenulate, pubescent, continued on the subbranchial region with several bead like tubercles. Suborbital tooth strongly ridged. Male abdomen with first segment very short; second, widest with a transverse denticulate crest, having a larger denticle at the extremities and in the middle; third, fourth, and fifth segments ankylosed; sixth, wider than long; seventh, very short, triangular. Abdomen and sternum smooth. Female abdomen with seven segments; first segment in large specimen almost concealed under the carapace; second, with transverse denticulate crest; third, with a similar faint crest not continued to the margins. Basal antennal joint with a long trigonal spine below. Ischium of external maxillipeds punctate, outer margin pubescent, inner margin crenulate; merus with surface uneven, pubescent, anterior margin concave; a groove runs diagonally forward and outward across the surface; there are two tubercles on the outer side of this groove, one of which is at the antero-exterior angle; the inner angle is strongly produced and bears a granulate ridge. Chelipeds long and strong; merus trigonal, with margins irregularly dentate or crenulate; carpus more or less four-sided, margins finely denticulate or crenulate, a ridge running across the lower surface; hand long, trigonal, pubescent, upper surface slightly twisted, about ten teeth on the inner margin and thirteen smaller teeth on the outer margin, lower margin ten-toothed; dactyl at right angles to the upper sur-

face of the palm with a large, white, bead-like tubercle on the outside at the base. Ambulatory legs compressed; third, fourth, and fifth joints crested on the margins.

Dimensions of largest specimen, a female: Length, 15.5; width, 21; length of cheliped, about 33 millimeters.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1888 and 1889:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
2822	24 16 00	110 22 00	21	gy. S. brk. Sh	65.2	17367
3011	28 07 00	111 39 45	71	fine. gy. S. brk. Sh	57.9	17368
3011	28 28 00	112 04 30	29	gy. S.	62.9	17369
3031	31 06 45	114 28 15	33	M.	63.8	17370
3037	27 45 00	110 45 00	20	gn. M.	65.2	17376

This species is apparently very much like *scarpinosa*, but differs from Stimpson's description in the larger cardiac spine, the curving branchial ridge, the distinct crenulation of the antero-lateral border, and in the long chelipeds.

#### Family CANCRIDÆ.

##### *Lophozozymus (Lophoxanthus) frontalis.*

Carapace with the regions well marked and crossed by faint granulated rugæ; somewhat hairy; slightly convex transversely, the lateral teeth somewhat upturned; more convex longitudinally. Frontal and antero-lateral margins granulate. Front more produced than in the other species of this genus, lobes sinuous, more advanced in the middle than at the obtuse outer angles; median notch deep, but closed. Upper orbital margin with two fissures, the intervening tooth more prominent than the adjacent inner portion of the orbit; external orbital angle a small tooth, widely separated from the antero-lateral teeth by a slightly sinuous margin. Antero-lateral teeth three, thick, triangular, acute. Inferior orbital border with a wide external fissure and two prominent teeth, the inner more slender and produced. Subhepatic and subbranchial regions granulate. Abdomen of male with second segment longer and narrower than the first, and narrower at its distal than at its proximal end, exposing a very small portion of the sternum; third segment touching the coxæ of the fifth pair of legs; penultimate broader than long; terminal segment rounded, almost semicircular. Chelipeds very stout; merus short, trigonous, with a row of bead-like tubercles on the upper margin; carpus large, rugose, a short, stout spine at the inner angle and a tubercle at the proximal end; hands with a broad, prominent lobe on the inner side of the proximal upper margin, the lobe turned inward; the pollex is curved downward, the dactyl arched; both are irregularly dentate within and gape somewhat

for their entire length, the tips hooked. The fingers are brown and mottled, the color extending far back on the palm, both inside and out. Ambulatory legs flattened, crested, hairy; propodal joints broad, about as long as the dactyls.

Small specimens have the carapace and upper portion of the hands rougher and the carpus very deeply crooked.

One specimen in the *Albatross* collection, without label, is associated with *Xanthodes taylori* and *Pachygrapsus crassipes*. A series of specimens loaned by the Peabody Museum of Yale University are from San Diego, California.

*Cycloxanthus californiensis*.

Carapace slightly convex, flattened behind, punctate and anteriorly rugose, wider than in *vittatus*; regions separated by shallow grooves and subdivided as in *vittatus*, but less distinctly. Antero-lateral teeth nine, besides the postorbital; the first depressed, lobate, the last two small, the last one being absent in small specimens; margin thick, teeth short, subacute. Front produced, more advanced in the middle than at the orbits, with a deep, closed median fissure; lobes each with a shallow sulcus, in some specimens almost straight. Abdomen broader than in *vittatus*, the second and penultimate joints noticeably shorter. Chelipeds with carpus and upper part of hand rugose; carpus with two blunt teeth at the inner angle; hands rather long, with upper and lower margins subparallel; fingers irregularly toothed, not gaping, grooved, light brown with white tips. Ambulatory legs hirsute on margins.

Length 24.5, width 37 millimeters.

RECORD OF SPECIMENS EXAMINED. -

Catalina Harbor, California; beach (17509); 30 to 40 fathoms, sandy mud (17508); W. H. Dall.

San Diego, California; J. G. Cooper (17536); C. R. Orcutt (17499); H. Hemphill (17531).

Guadalupe Island, Lower California; U. S. Fish Commission steamer *Albatross*, 1889 (17395).

This species is much like *vittatus*, but differs from it in the shorter, blunter antero-lateral teeth, in the absence of hair on the margins, in the narrower hands, as well as in the characters mentioned above.

Lockington has described a species, *Xantho novem-dentatus*, from San Diego and Lower California (Proc. Cal. Acad. Sci., pp. 32 and 99, 1876), which he later (in annotations) decides to be identical with Stimpson's *vittatus*. Lockington says that the Lower California specimens are narrower than those from San Diego. He probably had two species, but there is nothing in his description to indicate that his type is identical with the species described above, excepting the broad carapace and the locality.

*Xanthodes minutus.*

Carapace transverse, convex anteriorly. Antero-lateral margin with three teeth, besides the orbital angle; posterior tooth minute. Carapace minutely granulate; regions well marked; the sinuses between the antero-lateral teeth are continued on the carapace; there is a tubercle near the first and the second tooth. Front very broad, deflexed; the two lobes convex, with very thin margins. The grooves leading backward from the median and lateral notches of the front are deep. Orbits with two closed fissures above. The basal antennal joint just reaches the front. Chelipeds almost equal, granulate; carpus with outer surface covered with about seven nodules, unequal in size and shape; hands with longitudinal grooves; fingers acute, dentate, brown, white at tips. Ambulatory legs punctate, striped with light color; dactyls light, hairy; remaining joints sparingly hirsute.

Length 3, width 4.2 millimeters.

Color in alcohol, dark purplish.

Off the Sandwich Islands, lat.  $21^{\circ} 14' 51''$  N., long.  $157^{\circ} 43' 30''$  W., 14 fathoms, sand, coral, station 3169, U. S. Fish Commission steamer *Albatross*, 1891; one male (17517).

The broad front and the nodulous carpi in connection with the relatively smooth carapace sufficiently distinguish this species.

*Micropanope polita.*

Carapace transverse, convex longitudinally, smooth and punctate posteriorly, rough granulate anteriorly, the granules\*most prominent on the hepatic regions. Front broad, median notch narrow, lobes nearly straight, thin, denticulate. Areolations distinct. Antero-lateral teeth five (with the orbital angle); a concave sinus between the first and second; last tooth similar in character to the others, but smaller. Inferior regions of the carapace and surface of maxillipeds granulate. Sternum and abdomen smooth and punctate. Abdomen of male with five segments, the first and second broad, the second narrowest at its distal end. Basal antennal joint reaching the front. Anterior margin of merus of outer maxillipeds sinuous. Large cheliped, with merus finely granulate, dentate on the upper margin; carpus with spiny granules arranged in indistinct transverse ridges, an acute spine inside; hand granulate above and near the carpus, smooth and punctate elsewhere; palm broad, convex on lower margin; fingers brown, with lighter tips. The small cheliped differs in its much narrower, more granulate hand, with almost straight lower margin. Ambulatory legs slender, punctate, spinulose above, last three joints hairy.

Length of carapace 6.2, width 9.8 millimeters.

Off Magdalena Bay, Lower California, lat.  $24^{\circ} 58' 15''$  N., long.  $115^{\circ} 53'$  W., 36 fathoms, coralline, temperature 64.3, station 2989, U. S. Fish Commission steamer *Albatross*, 1889 (17397).

*Menippe convexa.*

Carapace more convex than in the American species of the genus; smooth to the eye, obscurely granulate under the lens; regions not defined, except the anterior portion of the mesogastric region and the epigastric lobes. Front with median lobes small, separated by a shallow sulcus, the margin sloping obliquely from each lobe to the inconspicuous lobe at the inner orbital angle. Antero-lateral margin marked with a sharp ridge. Postorbital angle not produced, separated by a shallow sulcus from the first tooth, which is the shortest; a slight emargination separates the first and second teeth; the third is most prominent; the fourth and last has a sharp ridge which extends back on the carapace. There are no tubercles on the inferior surface of the carapace. Chelipeds as in the genus; with depressed granules and punctures, most evident on the hands; hands not very deep, without striae on the inner surface.

Length, 15.5; width, 21 millimeters.

Honolulu; one female (13908).

This species in its convexity approaches the East Indian *M. lequillouii* A. Milne Edwards, but differs in the character of the front and lateral margins.

*Pilodius flavus.*

Entire upper surface covered with long, soft, orange bristles. Carapace transversely oval; areolations distinct; five antero-lateral spines composed of single, sharp, distinct spines (the first two the smallest), with a few accessory spinules at their bases, the largest of which is behind the third spine. Carapace with spinules or granules near the antero-lateral margins, which are with difficulty distinguished under the covering of setae. Front with a wide median emargination, separating broad arcuate lobes; lateral lobes small, less advanced; margin denticulate. Chelipeds spinous; merus with inner margin spinous, the spines longer near the carpus; carpus covered with spines, inner angle produced, two-spined; hand spinous on the outer and upper surface, the spines becoming tubercles toward the lower margin, almost naked within, smooth and shining; fingers meeting only at the tips, spoon-shaped, toothed on prehensile edges; dactyls spinulous above. Ambulatory legs spinulous above on third, fourth, and fifth joints; long-hairy.

Length, 6; width, 9 millimeters.

Color of carapace and chelipeds in alcohol, light yellow; ambulatory legs and bristles, orange; fingers, horn color, lighter toward tips.

Off the Sandwich islands, lat.  $21^{\circ} 14' 51''$  N., long.  $157^{\circ} 43' 39''$  W., 14 fathoms, sand, coral, station 3469, U. S. Fish Commission steamer *Albatross*, 1891; one immature female (17317).

*Pilumnus gonзалensis*.

Carapace much broader than long, strongly deflexed in front, flattened behind, covered with a short, dense, tough pubescence, each hair being regularly tapering, acuminate, not curved. When the hairs are removed the outlines of the mesogastric region are distinct; there are three or four spinules near the antero-lateral margin; otherwise the surface is smooth. Front spinulose and hairy on the margin, with a broad U-shaped sinus; the lateral lobes scarcely distinct from the median, but less advanced. Orbital margin armed with small spines. Antero-lateral margin evenly rounded, four-spined, the spine next the orbit being double, the two parts equally large; second spine also double, its anterior half the larger; all the antero-lateral spines have one or more accessory spinules. Subhepatic and subbranchial regions granulous. Ridge on the endostome distinct. Lower surface of the crab with a shorter pubescence than the upper. Chelipeds very unequal, outer surface pubescent and rough with short spines which are arranged in irregular lines on the hands. Toward the fingers and lower edge the large hand is naked, but punctate and finely granulous. Fingers short, stout, and dentate on the prehensile edges; dactyls tuberculous above near the base. Ambulatory legs rather broad, hairy, the carpal joints longitudinally grooved on the outside.

Color in alcohol: The carapace when the hairs are removed is red, mottled with pale yellowish. The hairs are yellow; the spines and fingers are brown. In addition to the hairs the carapace and chelipeds of many specimens are covered with minute algae.

Dimensions: Length 13, width 18 millimeters.

San Luis Gonzales Bay, March 27, 1889, U. S. Fish Commission steamer *Albatross*; eight males and thirteen females, four of which bear eggs (17415).

This species can be distinguished from the other described west American forms by the following characters: *P. depressus* Stimpson has the carapace flattened; *P. stimpsonii* Miers=*marginatus* Stimpson (name preoccupied by Stimpson himself for an Oriental species) has a tuberculate carapace, and a prominent antero-lateral margin; *P. xantusii* Stimpson is a narrow species; *P. spino hirsutus* (Lockington) has the front long-spined; in *P. limosus* Smith the carapace is covered with tubercles.

## Family PORTUNIDÆ.

*Neptunus (Hellenus) iridescens*.

This is the western representative of *spinicarpus* (Stimpson). It differs from that species in its more prominent ridges, in the obtuse frontal teeth, of which the median are narrower and more produced than the lateral; the eight small antero-lateral teeth are less sharp and their posterior margins more convex; the inner suborbital lobe is obtuse,

There are no adult specimens in the collection. The largest specimen is a female measuring 15 millimeters long, 35 wide including spines, and 22 wide between the bases of the spines. The long carpal spine reaches nearly to the base of the spine on the manus, and is no longer in the young males. The granulated ridge on the posterior portion of the gastric region is triangulate instead of  $\perp$ -shaped, as in *spinicarpus*. There are four spines on the inner margin of the merus of the chelipeds. The postero-lateral angles are strongly upturned. The surface is iridescent.

Gulf of California and west coast of Lower California, U. S. Fish Commission steamer *Albatross*, 1889:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
	° ' "	° ' "			°	
3011	28 07 00	111 39 45	71	fne. gy. S. brk. Sh.	57.9	17444
3017	29 54 30	113 01 00	58	gn. M. ....	61.8	17445
3033	30 50 45	114 29 45	18	gy. M. ....	63.5	17446
3039	24 27 00	111 59 00	47	fne. yl. S. ....	68.5	17447

### Family OCYPODIDÆ.

#### Subfamily CARCINOPLACINÆ.

##### Genus **CEDIPLAX**.\*

Carapace very convex longitudinally, much resembling *Panopeus* in general appearance. Antero-lateral margin, with four teeth besides the postorbital. Eystalks stout, orbits large, external hiatus broad. Antennæ and maxillipeds much as in *Panopeus*. Hands elongate; ambulatory legs flattened.

This genus belongs to that section of the Carcinoplacinae in which the post-abdomen of the male does not cover the sternum between the fifth pair of legs. Although the classification in this subfamily is based largely on the arrangement of the segments of the abdomen in the male, it is true that there is a correspondence in the sexes in the width of the basal segments of the abdomen as compared with the width of the adjacent sternal segments. Therefore, although the species at hand is represented by females only, I feel justified in referring them to that group characterized by having only the anterior portion of the last segment of the sternum exposed. There are four described genera in this group: *Euryplax* Stimpson has the antennæ excluded from the orbit by the enlargement of the suborbital lobe; *Eueratopsis* Smith has very heavy chelipeds; in *Glyptoplax* Smith the merus joint of the exterior maxillipeds is triangulate, the hands are large and the front nearly horizontal. In *Panoplax* Stimpson there are but three distinct

\* Οἰδίω, to become swollen; πλαξ, anything flat and broad; carapace. In analogy with Οἰδίπους (οἰδίω+πούς), the swollen-footed.

antero-lateral teeth, the carapace is depressed, and the orbits small, with a slight outer hiatus.

In *Ediplax* the first segment of the abdomen is very wide and reaches the coxae of the fifth pair of legs; the second segment is much narrower, exposing a large portion of the last sternal segment; the third abdominal segment is wider than the second, but not so wide as the first, nor does it reach the coxae.

#### *Ediplax granulatus*

Carapace transverse, broadest at the last antero-lateral teeth; depressions between the regions shallow, excepting the hepatic and the branchio-gastric sutures; surface granulate; granules largest on the hepatic region, and almost entirely wanting near the posterior margin. Antero-lateral and postero-lateral borders about equal in length; antero-lateral teeth four, besides the postorbital, the third the largest; teeth granulate; sinus between the postorbital and the first tooth, and the space below the sinus denticulate. Front deltaxed; median notch broad; lobes slightly sinuous. Orbit with two fissures above; inner tooth of inferior border prominent. Chelipeds not very unequal, roughened with spiny granules, arranged more or less in lines; merus short, trigonal, with a stout spine on its upper margin near the distal end; carpus rounded above with a large spine at its inner angle, and a smaller one at the base of the larger; dactyls granulate above for half their length; fingers toothed within, in the larger hand gaping, and with a large tooth at the base of the dactyl. Ambulatory legs hairy; merus joints spinulose on upper margin.

Length, 32.5; width, 16 millimeters.

Gulf of California, lat.  $31^{\circ} 06' 45''$  N., long.  $114^{\circ} 28' 15''$  W., 33 fathoms, brown mud, temperature  $63.8^{\circ}$ , station 3031, U. S. Fish Commission steamer *Albatross*, 1889; two females, one immature (17165).

#### *Speocarcinus grandimanus*.

Carapace very convex longitudinally, almost straight transversely, deeply and irregularly punctate, obscurely granulate near the margins. The mesogastric region is distinctly outlined; a deep sulcus separates the hepatic and branchial regions from the gastric and cardiac regions; between the hepatic and branchial regions there is a deep, smooth pit. Front two-lobed, with a narrow median groove from which a sulcus extends backward to the mesogastric region; lobes with almost straight margins, sloping forward and outward from the middle. Frontal, orbital and antero-lateral margins granulate. Orbit with two fissures above, the outermost broad and open. Antero-lateral margin arcuate; teeth four, not prominent, separated by very narrow sinuses; outer margins of the first three teeth rounded, the first (the orbital tooth) the longest, the others decreasing successively in length; last tooth small, acute, directed outward. Postero-lateral margins nearly straight

and parallel. Suborbital border with an outer hiatus and a broad, rounded inner lobe. First segment of the male abdomen very short and wide; second, longer and much narrower; third, as wide as the first at its proximal end; from this point to the distal end of the penultimate segment the margin of the abdomen is markedly concave; the three divisions of the coalesced segment faintly indicated; terminal segment rounded, about as long as broad; abdominal appendages long, slender, and curved. Merus of external maxillipeds produced at the antero-lateral angle in an acute angle. Chelipeds slightly unequal; merus obscurely granulate, margins tuberculate, a small spine near the distal end of the upper margin; carpus granulate with a spiniform tooth at the inner angle; hand granulate, with longitudinal rows of tubercles on the palm and on the margins; fingers broad, not gaping, deflexed, coarsely toothed within. Ambulatory legs smooth, shining, sparingly punctate; dactyls margined with hair; remaining joints sparsely hairy. The margins of the carapace and the upper margin of the hand are sparsely hairy, while the inferior portions of the carapace, the upper margin of the merus, the inner margin of the carpus, and the abdomen of the female, are thickly fringed with hair.

Length, 17; width, 21 millimeters.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1889:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
	° ' "	° ' "				
3031	31 06 45	114 28 15	33	bn. M. ...	63.8	17460
3035	30 21 00	114 25 15	30	y. M. ...	62	17461

This species can at once be distinguished from *carolinensis* by the less prominent antero-lateral teeth, by the shape of the front, and by the granules of the hand.

#### *Carcinoplax dentatus.*

Carapace broader than long, very convex longitudinally, less so transversely, regions slightly marked; surface microscopically granulate and pubescent. An indistinct arcuate ridge extends transversely across the gastric region and joins two others running longitudinally across the branchial regions; from these ridges the carapace slopes downward to the frontal and lateral margins. Front about one-third the width of the carapace, nearly straight, thick, two-edged, and deeply grooved, with a faint median notch. Supra-orbital border denticulate, with two fissures, the outer one broad. Antero-lateral teeth three, broad, separated by wide sinuses, margins denticulate; first tooth at the orbital angle, with nearly straight sides; second with outer margin convex, inner concave; third tooth similar to the second, but narrower. Postero-lateral margins nearly straight. Male abdomen with seven segments, not entirely covering the sternum at its base; first joint no wider than the second, neither reaching the coxæ; third joint very wide, touch-

ing the coxae of the fifth pair of legs; from the third segment to the extremity the abdomen is almost triangular, the sides very little concave; terminal segment longer than broad, obtuse; appendages widely separated at base, terminating in long slender filaments crossing each other near the tips. Maxillipeds widely gaping; meral joint with anterior margin concave, inner margin convex, palpus articulating at the antero interior angle. Chelipeds equal, granulate; merus with a tooth above, one-third the distance from the distal end, and one near the distal extremity of the lower outer margin. Carpus short and broad, a sharp curved spine on the inner side near the proximal end; outer surface of carpus and manus covered with long hair; hands compressed, spinulose on the lower margin, smooth inside, except for a line of spinules running from the lower margin near the pollex diagonally backward; upper margin with a small spine at the anterior extremity; fingers bent downward, irregularly toothed within, not gaping, curving toward each other at the tips. Ambulatory legs long and slender, clothed with downy hairs, which are longest on the last three joints; third pair longest.

Length, 14; width, exclusive of teeth, 16.3 millimeters.

\*Gulf of California; U. S. Fish Commission steamer *Albatross*, 1889:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
	° ' "	° ' "				
3016	29 40 00	112 57 00	76	gn. M. ....	59.0	17462
3017	29 54 30	113 01 00	58	gn. M. ....	61.8	17463
3035	30 21 00	114 25 15	30	gy. M. ....	62.0	17461

The chelipeds of this species in shape and hairiness are very like those of *C. vestitus* (de Haan), but that species is broader and has much smaller antero-lateral teeth, as well as other striking differences.

#### Subfamily OCYPODINÆ.

##### *Gelasimus gracilis*.

This species is the west coast representative of *pugnax* Smith, but is distinguished by the more convex carapace, much wider posteriorly, the more transverse anterior margin, making the carapace more rectangular. The front is narrower and consequently the supraorbital border is longer than in *pugnax*. The male abdomen is much narrower than in *pugnax*, and the second segment much shorter. The ischium of the outer maxillipeds is very broad and convex. The large cheliped of the male has the joints relatively longer and more slender than in *pugnax*; the merus is crossed by transverse tuberculate rings, and the inner margin is tuberculate or denticulate; the carpus also has the inner margin tuberculate, the outer surface roughened with flattened tubercles arranged more or less in striae, and the inner surface crossed diagonally by tubercles; the palm is narrow near its articulation with the carpus and is very finely tuberculate or granulate, the granules be-

coming so small on the lower half as to be scarcely perceptible to the naked eye; on the inner surface of the palm an oblique tuberculate ridge extends from the lower margin to the depression into which the carpus fits, and joins another tuberculate ridge running to the upper margin; the space between this ridge and the dactyl is not tuberculate as in *pugnax*, but smooth and shining, except for the two lines of tubercles near the base of the dactyl; the fingers are longer and more slender than in *pugnax*, the pollex with a large tubercle near its middle and the dactyl irregularly tuberculate with a large tubercle not far from the base. The meral joints of the ambulatory legs are longer and more slender than in *pugnax*.

Length, 10; width, 15 millimeters.

RECORD OF SPECIMENS EXAMINED.

San Diego, California; H. Hemphill, 1872 (17501).

Todos Santos Bay, Lower California; H. Hemphill (17576).

La Paz, Lower California; L. Belding (1622).

San Luis Gonzales Bay, Lower California; U. S. Fish Commission steamer *Albatross*, March 27, 1889 (17158).

This species might perhaps be referred to Lockington's *crenulatus*, except that he describes the outer surface of carpus and manus as smooth.

*Gelasimus latimanus*.

This species is represented by a single male specimen, found among a large lot of *Gelasimus gracilis* from La Paz, Lower California, L. Belding (17500). It differs from all described species except *gibbosus*, in having the abdomen five-segmented; and from *gibbosus* in the entirely different character of the hand and fingers which are short and broad. The carapace in general appearance resembles that of *gracilis* except that it is broader and much more convex; it is smooth to the eye; front and orbits similar to those of *gracilis*; eyes shorter and stouter. First segment of abdomen very short; second equaling the first in length; fourth, fifth, and sixth anchylosed. Maxillipeds very convex. Larger cheliped short; merus and carpus with outer surface rugose, and inner margin denticulate; propodus shorter than the width of the carapace; palm broad, outer surface closely set with distinct granules, which become tuberculate near the upper margin; inner surface with the lower proximal portion granulate, the distal portion smooth, the two parts not separated by a sharp ridge; parallel to the base of the dactyl there are two lines of tubercles, the posterior line continuous with the granules on the edge of the pollex. Fingers granulate, much shorter than the palm, broad, little gaping; the pollex rounding upward, the dactyl slightly arched and overreaching the pollex but little. Smaller cheliped with palm broad and fingers widely gaping, but not so much so as in *gibbosus*. Ambulatory legs with a few long hairs, especially on the last three joints.

Length, 6.3; width, 10; length of cheliped about 18 millimeters.

This may be identical with a short-fingered specimen from the west coast of Lower California, which Lockington doubtfully refers to *steno-dactylus*.

*Gelasimus coloradensis*.

Carapace very convex, regions protuberant, smooth; there is a longitudinal groove crossing the branchial region, and this groove opposite the posterior margin of the gastric region widens into a deep pit from which fine irregular grooves radiate; cervical suture deep, with a pit near the frontal margin. Front broad. Posterior or upper edge of the superior orbital border curving forward and outward, with smooth margin; anterior or lower edge denticulate, curving rapidly downward near the base of the ocular peduncle, then gradually rounding upward to join the posterior margin at a little distance from the antero-lateral angle of the carapace, which is acute and points forward. The lateral border is marked by a sharply upturned and finely denticulate margin which slopes inward anteriorly, so that the carapace is much narrower at the antero-lateral angles than posterior to them; and the posterior portion of the lateral margin is strongly incurved and terminates opposite the cardiac region. The inferior orbital border is marked by about twenty-four distinct tubercles. The eye-stalks are slender and do not nearly fill the orbit. The jugal region is covered with depressed tubercles. Male abdomen broad, second segment much shorter than the first, sixth segment wider than the fifth; appendages slender. Ischium of outer maxillipeds wide and smooth; merus short. The left cheliped (the larger in the one specimen at hand) is very long; merus as long as the carapace, rugose, inner margin finely tuberculate; carpus also rugose, inner margin tuberculate, the tubercles coarser towards the proximal end; inner surface with a tuberculate ridge; palm with the upper portion turned abruptly inward almost at a right angle but without a sharp ridge; the upper surface is depressed and obscurely tuberculate, the tubercles becoming large and coarse near the union with the outer surface, which is crowded with granules which are smaller toward the tuberculate lower edge; there is a deep depression between the palm and pollex; the inner surface of the palm has a row of coarse tubercles extending from the lower margin obliquely upward and joining at right angles the row extending to the upper surface. The row of denticles or tubercles on the inner margin of the pollex is continued parallel to the base of the dactyl, and between this row and the dactyl there is an additional row; the irregular depression anterior to the oblique row is smooth and shining to the naked eye, but with the lens fine scattered granules may be seen near the gape of the fingers and continued on the pollex; pollex nearly twice as long as palm, almost straight, finely denticulate on the outer and inner margins of the prehensile edge, with a row of irregular tubercles between; distinctly two-toothed at the upturned extremity; dactyl overreaching

the pollex by about one-sixth of its length, slender, similarly armed within except that the irregular tubercles are prominent nearer the palm. Smaller cheliped with fingers much longer than palm. Ambulatory legs with meral joints wide, transversely striated, and hirsute near the base; remaining joints smooth; dactyls very slender. There are a few scattered hairs on the lower surface of the carapace, and a fringe of hairs on the inferior margin; the abdomen and sternum are also margined with very short hairs; otherwise the crab is smooth.

Length, 12.5; width, 20; length of large cheliped about 57 millimeters.

Horseshoe Bend, Colorado River, Lower California, U. S. Fish Commission steamer *Albatross*; one male (17459).

### Family GRAPSIDÆ.

#### Subfamily GRAPSINÆ.

##### *Pachygrapsus longipes.*

One small specimen of a female with eggs is closely related to *P. plicatus* (Milne Edwards), but differs in the smoothness of the carapace. The anterior portion of the carapace and the margins are faintly plicated transversely, but without stiff hairs. The frontal lobes are well marked and the margin of the front is slightly convex. There is no tooth behind the postorbital. The chelipeds are covered with granules, arranged in irregular reticulations; there are several spines at the distal extremity of the merus and one sharp spine on the inner side of the carpus; a sharp longitudinal crest extends from the tip of the pollex back on the palm; the tips of the fingers are outlined with thick, bristly hair. The ambulatory legs have the meral joints transversely plicated, denticulate and hairy on the upper margin, lower margin with one or two spines near the distal end; remaining joints furnished with a few hairs, very slender; propodal joints much longer than in *plicatus* or *minutus*. Color in alcohol, green, mottled; legs striped with dark.

Length, 6.5; width, 8 millimeters.

Honolulu, U. S. Fish Commission steamer *Albatross*, 1891 (17320).

##### *Brachynotus (Heterograpsus) jouyi.*

Carapace much broader than long, nearly as wide at the orbital angles as at the last antero-lateral teeth; slightly convex in both directions; punctate, pubescent, and roughened with minute, spiny granules anteriorly and on the lateral margins. Front not advanced, deflexed, seen from above almost straight; seen from in front the margin has two small median lobes separated by a slight sinus, the remainder of the edge wavy. The superior orbital border slopes outward and backward to the base of the orbital tooth. Lateral teeth three, including the postorbital, prominent, acute, the first two similar, separated by a deep sinus, the third smaller, separated from the second by a shallower,

wider sinus. Terminal segment of the male abdomen much longer than wide, oblong. Chelipeds in male unequal; merus and carpus with fine granulated rugae; palm broad, much inflated, finely granulate, not carinate, with a patch of hair on the inside extending from the carpus up on the pollex and in width occupying the central half of the palm; fingers very slightly gaping. Chelipeds in female very small; hands with a carina on the upper margin, and another on the outside near the lower margin. Ambulatory legs hairy, especially the fourth and fifth joints, rather slender; dactyls very slender.

Guaymas, Mexico; P. L. Jony, February 29, 1891 (17496). "Gulf side, under stones, scarce."

### Family PINNOTHERIDÆ.

#### Subfamily PINNOTHERINÆ.

##### *Pinnixa occidentalis.*

Carapace transverse, thick, hairy on the sides, surface uneven; on the cardiac region there is an acute, transverse crest, not interrupted in the middle as in *P. cylindrica* and *P. chatopterana*, but becoming lower and curving backward toward the center; regions well defined by pubescent sulci. Front narrow, median groove deep. A sharp ridge runs from the orbit diagonally outward and backward, crossing the hepatic region, and forms the antero-lateral margin of the carapace. Abdomen of male narrowing a little at the first suture, and gradually tapering from the second suture to the terminal segment, which is more than one half as long as broad, and rounded. The female abdomen is very broad, the terminal segment much broader than in *chatopterana* or *cylindrica*. The second joint of the palpus of the external maxillipeds is somewhat oblong, tapering toward the distal end; terminal joint subspatulate, overreaching the preceding. Chelipeds stout, setose; merus thick, trigonal; palm broad, flat, shining on the outside; pollex short, bent downward, prehensile edge with a stout tooth in the middle and a small one near the tip; dactyl much curved, with sometimes a minute tooth in the middle. First pair of ambulatory legs shorter than the chelipeds, weak; second pair longer and stronger than the first; third pair very long and strong, especially the meral joint; fourth pair intermediate in length between the first and second; dactyli as long as the propodi. Ambulatory legs setose.

In the females the cardiac ridge is much less prominent than in the males, the fingers are less gaping or not at all gaping, the dactylic tooth is larger, and the teeth of the pollex are merged into one low denticulate prominence.

Length of largest male, 9.5; width, 19.5; length of third ambulatory leg, 27 millimeters; length of largest female, 10.5; width, 20.5; length of third ambulatory leg, about 24.

RECORD OF SPECIMENS EXAMINED.

From Hinliuk Harbor, Unalaska, to Gray's Harbor, Washington; U. S. Fish Commission steamer *Albatross*, 1888-1890:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
	° ' "	° ' "				
2862	50 49 00	127 36 30	238	gy. S. P. ....	44.7	17470
2868	47 52 00	124 41 00	31	gy. S. ....	46.9	17471
2869	47 38 00	124 39 00	32	bk. S. ....	48.4	17472
2870	46 34 00	124 32 00	58	ky. ....	46.5	17473
3216	51 29 30	163 37 00	61	bk. S. M. ....		17474
3311	53 59 36	166 29 43	85	gn. M. ....	41.0	17475
3313	54 01 51	166 27 38	68	fine bk. S. ....	42.7	17476
3333	53 53 35	166 30 15	19	gn. M. ....	43.9	17477

Alaska, W. H. Dall:

Locality.	Fathoms.	Bottom.	Cat. No.
Port Levashell .....	20-30	M. Sh. ....	17513
Port Levashell .....	70-80	M. S. ....	17514
Chajafka Cove, Kadiak .....	12-14	M. S. ....	17512
Port Etches .....	12-18		17511
Sitka Harbor.....	15	Gr. M. ....	17510

San Diego, California; H. Hemphill, one male, dried (17501).

*Pinnixa californiensis*.

The genus *Pinnixa* is represented on the coast of California by another species much resembling the one described above, but sufficiently distinct. The carapace is shorter, the cardiac ridge straighter throughout its length, the antero-lateral ridge straighter and less arched, and the carapace descends more abruptly at the sides. The front, orbits, and maxillipeds do not differ from those of *occidentalis*. The abdomen of the male has the margins of the second segment parallel, while in *occidentalis* the segment is wider at the distal than at the proximal end. In male specimens the pollex is shorter than in *occidentalis*, and consequently the dactyl is more nearly parallel with the end of the palm. The chelipeds in the female and the ambulatory legs in both sexes resemble those of *occidentalis*.

Length of ♂ 6, width 13; length of third ambulatory leg about 17.5 millimeters.

Monterey Bay and off Point Ano Nuevo, California, U. S. Fish Commission steamer *Albatross*, 1890:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
	° ' "	° ' "				
3133	36 47 50	121 49 00	37	br. M. ....	52.3	17478
3148	37 08 00	122 28 10	47	br. M. ....	51.3	17479

Genus **CRYPTOPHRYS**.

Carapace no broader than long, hard. Front produced; orbits lodged in the sides of the front and very slightly visible from above. External maxillipeds not large enough to completely close the buccal cavity; ischium rudimentary; menis long and curved; palpus two-jointed. Male abdomen with the second, third, and fourth articles coalesced. Chelipeds in male with palms broad, inflated. Ambulatory legs, with third, fourth, and fifth joints broad.

**Cryptophris concharum**.

Male: Carapace subpentagonal, slightly longer than broad, smooth, rigid, a faint sulcus visible behind the gastric region. Anterior and antero-lateral margins defined by a ridge of coarse setae, which are thickest and longest at the antero-lateral angles. Orbits circular, completely filled by the stout peduncles; antennulae large, transverse. Abdomen broadest near the proximal end of the second segment; first segment short; coalesced segment with the first two of its component articles convex on the margin and separated by a faint line, and the last article slightly concave on the margin; third and fourth segments broader than long; terminal segment subrectangular. External maxillipeds having the menis curved on the outer margin, the distal portion almost transverse in position; the palpus articulated at its antero-external angle, two-jointed; terminal joint four-sided, much broader at the extremity. Chelipeds stout, margined with a row of coarse setae, as are also the remaining legs; on the palm the upper row of setae is on the inner surface just below the margin. First three pairs of ambulatory legs subequal, the second the longest; the fourth pair the shortest, overreaching the carpal joint of the preceding pair; dactyli about as long as the propodi, terminating in slender, curved hooks.

Length, 4.7; width, 4.2 millimeters.

False Bay, San Diego County, California; H. C. Orcutt, June 4, 1882; from mantle of *Mya arenaria* Linne, two males, one of which is very minute (17498).

Puget Sound, in *Cardita borealis* Conrad; two males, dried (17502).

In the alcoholic specimens the sixth and seventh abdominal segments are partially coalesced.

Genus **SCLEROPLAX**.

Carapace transverse, hard. External maxillipeds with ischium rudimentary; menis longer than broad, oblique, not curved, winged on the margins; palpus three-jointed. Ambulatory legs similar in character, slender, the third pair the longest, but slightly exceeding the others.

*Scleroplax granulatus.*

Carapace subpentagonal, hard, granulate anteriorly and near the margins, punctate elsewhere; a granulated ridge defines the lateral margin. Front narrow, produced, slightly convex as seen from above. Orbits nearly circular, eye-stalks very short and thick; antennules almost transverse. Merus of maxillipeds granulate, with a longitudinal, wing-like expansion on the inner margin, and another on the outer margin, which becomes narrower at the proximal end. Palpus triarticulate, large, the penult joint longer than the merus, the ultimate joint articulated near the proximal end of the inner margin of the penultimate and about equal in width to the adjacent portion of the penultimate; both joints are long, with a longitudinal median depression, and a fringe of very long hair bordering the extremities, the last joint slightly overreaching the other. Abdomen of female very smooth and shining, fringed with hair, not reaching beyond the sternum. Chelipeds in the female granulate, weak, shorter than the ambulatory legs; hands broad, somewhat compressed; dactyls strongly curved. Ambulatory legs slender, granulate, the third pair longest, the second longer than the first, the first pair weakest; the joints narrow, flattened; the dactyls are very slender, almost straight, and equal in length the propodal joints.

Length, 6; width, 8 millimeters.

Ensenada, Lower California, C. R. Orcutt; three females (17497). In the same vial is a fragment of a male, apparently the same species, in which the abdomen is narrow, tapering very gradually to the broad, terminal segment; third, fourth, and fifth segments partially anchylosed.

## Subfamily ASTHENOGNATHINÆ.

Family Asthenognathidae Stimpson, Proc. Acad. Nat. Sci. Phila., x, p. 107, 1858.

Resembling Pinnotherine, but the ischium of the external maxillipeds is longer and more distinctly developed. The last pair of ambulatory legs is not rudimentary or abortive. In this family are included the genus *Asthenognathus* and the following

## Genus OPISTHOPUS.

Carapace usually firm and unyielding; smooth, subquadrilateral, regions not defined; lateral margins regularly arcuated. Epistome very short. Abdomen seven jointed, in the male not covering the sternum between the coxæ of the last ambulatory legs. Eye-peduncles short. Antennæ small, situated at the inner orbital hiatus; basal joint small. Antennule obliquely plicated. External maxillipeds with the ischium well developed, the merus broad, the palpus three-jointed, the ultimate joint articulated on the inner side of the penultimate. Chelipeds moderate; ambulatory legs subequal in length, joints flattened.

*Opisthopus transversus.*

Carapace transverse, convex, thin, but not soft and yielding as in *Pinnotheres*, angles rounded. Front deflexed, almost straight when seen from above, with a slight median sulcus. Abdomen of male narrow at base, decreasing regularly in width to the seventh joint, which is subquadrilateral; abdomen of female very wide and long, almost covering the maxillipeds. Antennule well developed, lodged in deep, diagonal fossa. Exterior maxillipeds with the ischium strong, broad; the merus as broad as long, with the antero-external angle broadly rounded; the palpus large; the ultimate joint narrow, inversely spatulate, overreaching the penultimate joint. Chelipeds rather stout; merus broad, triangular; palm a little longer than the fingers, thick, slightly compressed, margins rounded, lower margin convex. Ambulatory legs similar in character; joints rather broad, except the dactyls, which are curved and small, a little more than half the length of the propodal joints; second pair of legs the longest, fourth pair the shortest, reaching midway of the propodal joint of the preceding pair.

Monterey, California; Dr. J. A. Cantfield (3446); two males and two females, the females much larger than the males.

Point Loma, California; U. S. Fish Commission steamer *Albatross*, January 28, 1889; one female with eggs (17481).

Width of female, Monterey, 18; length, 11 millimeters. Width of female, Point Loma, 13; length, 11 millimeters; width of male, 9.8; length, 8.5 millimeters.

The front, appendages, anterior margin of the sternum, and the abdomen of the female, are fringed with hair. One female with eggs, from Monterey, is entirely covered with a short, dense sponge growth. The smallest male was found in the folds of *Lucapina crenulata* Sowerby.

## Family CALAPPIDÆ.

## Subfamily CALAPPINÆ.

*Musia hawaiiensis.*

Carapace transverse, very convex in both directions, granulate, the granules becoming smaller on the tubercles, which are arranged in five more or less longitudinal rows, one of which is in the median line; lateral margins granulate, the antero-lateral also crenulate; lateral spine very short; carapace widest not at the base of the lateral spine, but in advance of that point; at each extremity of the posterior margin there is a flattened obtuse tooth; and midway between a faint projection or convexity of the margin. Frontal margin little produced, triangular, with three small teeth, the median more produced and depressed than the others. Orbits with a closed fissure above, and a deep rounded hiatus beneath; inner subocular lobe triangular; eyes oval, large, short-

stalked, filling the orbits. Subhepatic regions deeply channeled. Abdomen in male with five segments, the second with a thin, prominent trilobed crest, lobes minutely crenulate. Antennae long; antennules oblique. Maxillipeds as in the genus. Chelipeds granulate, very unequal; large cheliped with three spines on the anterior portion of the merus, the inner very small, the outer the largest and of moderate length; hand not very deep, nine-toothed above; an irregular crest near the lower margin bears a sharp spine near the merus; small cheliped with merus one-spined; hand with about eleven small irregular teeth above; both hands have the lower margin spinuliferous. Ambulatory legs with granulated lines on the upper surface of the carpal joints.

The alcoholic specimen has tinges of red on the carapace and chelipeds and an elongated patch of red on the inner surface of the hand near the dactyl.

Length, in median line, 29; width, without spines, 36; length of lateral spine, measured on its posterior margin, 4 millimeters.

Off the Sandwich Islands, lat.  $21^{\circ} 12' N.$ , long.  $157^{\circ} 49' W.$ , 295 fathoms, fine white sand, station 3472, U. S. Fish Commission steamer *Albatross*, 1891; one male (17515).

This species is nearly related to *M. curtispina* Miers, but differs in the shorter lateral spines and the character of the hands; in *M. hawaiiensis* the hand is less deep, the crest more continuous and prominent, the sinuses of the upper margin narrower. The inner subocular lobe is regularly triangular and does not exceed the basal antennal joint, instead of being rounded, with a produced acuminate tip as in *curtispina*. The almost entire obsolescence of the median lobe of the posterior margin also distinguishes this species from *curtispina* and connects it with *armata* de Haan.

#### *Platymera californiensis.*

This species is closely allied to *P. gaudichaudii* from the coast of Chile. It agrees with Milne Edwards's brief description of that species,\* but differs in many respects from the figure in d'Orbigny's Atlas.†

The antero-lateral teeth are smaller and are distinctly separated by broad, shallow sinuses. The tuberculous ridge on the palm is nearer the lower crest; the second and third teeth of the upper margin, counting from the carpus, are larger and stronger than in *gaudichaudii*. The ambulatory legs are narrower; this is especially noticeable in the fourth and fifth joints; the fifth joint of the first three pairs is not so distinctly granulate as in the figure. The external maxillipeds are granulate, especially the ischium, which has also strong irregular teeth on its inner margins. The raised portions of the carapace have a number of de-

\* Hist. Nat. Crust., II, p. 108, 1837.

† Milne Edwards and Lucas, d'Orbigny's Voy. l'Amér. Mérid., atlas, Crustacés, pl. XIII, fig. 1, 1843.

pressed tubercles not mentioned in Edwards's description, but perhaps indicated in the figure by the red spots. There are three on the median line. In the young these tubercles are more prominent and the lateral and meral spines are proportionally much longer than in adults.

Milne Edwards says of *gaudichaudii* that the second ambulatory leg is longer than the first. In this series of specimens the two legs are very nearly equal in length, sometimes the first being a little longer and sometimes the second; this difference may occur on opposite sides of the same individual. The variation is due to the fact that, although the meral joint is always longer in the second pair, the carpal and terminal joints are always longer in the first pair; the propodal joints are more nearly equal, but when there is a difference, it is always longer in the first leg.

The characters above mentioned, which are constant in the hundred specimens examined, taken in connection with the great difference in habitat, are, I think, sufficient basis for the formation of a species.

Length of carapace, 64; width to base of spine, 95; length of spine, 14 millimeters.

Collected by the *Albatross* at the following stations off the coast of California:

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
2918	32 22 30	119 03 30	67	fine gy. S	52.4	16031
2921	32 27 00	119 14 15	145	fine gy. S	51.5	16035
2922	32 27 15	119 05 15	47	fine gy. S	57.1	16036
2953	33 47 00	119 58 15	83	gy. S, bk. Sh	.....	16037
2956	33 57 30	120 18 30	52	fine gy. S, R	53.1	16775
2969	34 20 10	119 37 45	26	gy. S, P, S, M	58.0	17167
2970	34 20 20	119 37 30	29	fine gy. S, M	59.1	16038
2978	33 59 15	119 22 15	16	gy. S, S	56.5	16039
3100	37 13 20	122 41 00	29	cs. S	50.4	15609
3103	37 38 00	123 02 30	67	fine dk. S	57.9	15607
3106	37 21 00	122 51 00	77	fine gy. S	.....	15605
3113	37 06 10	122 37 30	70	fine gy. S, S	48.8	15606
3115	37 05 00	122 24 00	43	fine bk. S	.....	15604
3129	36 39 40	122 01 00	204	S, M	43.7	15608
3116	36 53 30	122 12 00	62	gn. M, R	49.5	15613
3117	37 00 00	122 20 00	56	br. M	49.2	15611
3148	37 08 00	122 28 10	47	br. M	51.3	15614
3204	36 54 15	122 20 15	292	bk. S	44.1	15612
3207	37 00 30	122 35 30	108	fine gy. S	45.8	15603

One-half of the specimens collected are young. Station 3207 yielded the greatest number.

### Family LEUCOSIIDÆ.

#### Subfamily LILINÆ.

##### *Ebalia americana*.

Carapace longer than broad, suborbicular, convex; a distinct groove separates the cardiac, branchial, and intestinal regions; entire surface granular, the small granules crowded together, the large ones prominent, numerous, spiny; intestinal region oblique, very much rounded,

with a median tubercle pointing backward; on the posterior margin are two triangular obtuse, lamiform spines, the space between concave; on the posterior part of the branchial region, just above the margin, there is a stout, somewhat flattened, recurved spine. Frontal region without large granules; there is a cluster of granules at the summit of the hepatic region. Rostrum upturned, truncate. Male abdomen with third, fourth, and fifth segments coalesced, last segment long, triangular; female abdomen with fourth, fifth, and sixth segments coalesced, oval; abdomen and sternum in both sexes granulate. Orbits almost circular, with two fissures above and one below, besides the inner hiatus which is nearly filled by the obliquely-placed basal antennal joint. Antennular fossae oblique. Ischium of external maxillipeds with a longitudinal row of large granules; exognath with large scattered granules, wide at the base, outer margin nearly straight, extremity rounded. There is a tubercle on the subhepatic region. Chelipeds in male about two and a half, in female about one and a half times the length of the carapace; merus subcylindrical with spiny granules; carpus and hand with flattened granules; hand compressed, fingers about two thirds the length of the palm, not gaping, with granulate ridges, inner edges finely toothed and hairy. Ambulatory legs slender, granulate; meral joints cylindrical, of fourth pair with a row of spiny granules below; last three joints flattened; dactyls hairy.

Length, without posterior spines, 12.5; width, 11; length of cheliped, about 30 millimeters.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1888-'89:

Station.	Lat. N.			Long. W.			Fathoms.	Bottom.	Temperature.	Cat. No.
	°	'	"	°	'	"				
2822	24	16	00	110	22	00	21	gy. S. brk. Sh	.....	17386
2823	24	18	00	110	22	00	26½	brk. Sh	.....	17627
3011	28	07	00	111	39	45	71	fine gy. S. brk. Sh	.....	17387
3014	28	28	00	112	04	30	29	gy. S	.....	17388
3037	27	45	00	110	45	00	20	gn. M	.....	17389

#### *Myra townsendi*.

Carapace oval-orbicular, granulate, the granules not close together, and on the gastric region few and indistinct; margin slightly concave behind the hepatic region; upper posterior spine at a right angle with the other two, longest; all three spines recurved; pterygostomian regions produced in a stout spine; frontal notch widely but distinctly V-shaped. Male abdomen with the third to the sixth segments ankylosed; first three segments granulate, remainder smooth; sternum granulate. In young males the abdomen is granulate for almost its entire length. Female abdomen with the fourth to the sixth segments ankylosed and oval; the first three segments and the margins of the ankylosed segment granulate. Anterior margin of buccal cavity with

a slight emargination. Antennular fossae oval, slightly oblique. Merus of chelipeds not so long as the width of the carapace, subcylindrical, stouter through its proximal half, granulate, the granules growing smaller and less distinct near the carpus, which is minutely granulate, as are also the hand and dactyl; hand compressed, tapering a little toward the fingers, which are about the length of the palm, slender, bent downward, the outer margin of the pollex concave. Ambulatory legs with the merus joints cylindrical, fourth joint subcylindrical, fifth flattened, not dilated, cristate above; dactyls styliform, pubescent on the margins.

This species is very close to *Persephona*.

Length, without posterior spine, 32; width, 28; length of cheliped about 64 millimeters.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1889;

Station.	Lat. N.	Long. W.	Fathoms.	Bottom	Temperature.	Cat. No.
3017	29 51 30	113 01 00	58	gn. M.	61.8	17381
3044	30 36 30	114 27 45	24	gy. M.	61.5	17382
3035	30 21 00	114 25 15	30	gy. M.	62	17383
3037	27 15 00	110 45 00	20	gn. M.	65.2	17384

#### *Myra subovata*.

Carapace ovate-orbicular, longer than broad, granulate on margins and intestinal region with raised granules; remainder of surface smooth with scattered granules depressed in pits; lateral margin distinct; posterior median spine not sufficiently raised above the other two to form a right angle with them; spines triangular, recurved, median longest; posterior margin between the spines with large conspicuous granules; hepatic regions slightly swollen; pterygostomian regions unarmed. Male abdomen with the third to the sixth, and female abdomen with the fourth to the sixth, segments coalesced. Anterior margin of buccal cavity with a small U shaped notch. Orbits slightly oblique. Outer margin of exognath of maxillipeds areolate. Chelipeds slender, less than twice the length of the carapace, granulate, the granules largest on the proximal half of the merus, which is thicker than the distal half; merus subcylindrical; hand slightly compressed; fingers as long or longer than the palm, finely and sharply dentate within. Ambulatory legs slender throughout.

Dimensions of female: length, without spine, 22.7; width, 20; length of cheliped, about 40 millimeters.

Gulf of California; lat. 28° 28' N., long. 112° 01' 30" W., 29 fathoms, gray sand, temperature 62.9°, station 3014; U. S. Fish Commission steamer *Albatross*, 1889 (17385).

*Randallia distincta.*

Carapace slightly longer than broad, orbicular, convex; sulci defining the regions distinct; antero-lateral margin behind the hepatic region slightly indented; entire surface granulate, the granules varying in size, larger posteriorly, somewhat clustered on the margins; three granulated tubercles on the margin of the anterior portion of the branchial region; one on the posterior portion; posterior marginal teeth stout, triangular; on the intestinal region there is a short recurved spine; hepatic region without a tubercle; pterygostomian region with a faint tubercle. Abdomen of immature female with fourth, fifth, and sixth segments coalesced, the sections distinct, however, as in the young of *ornata*. Rostrum two lobed, the lobes high and ridged above; median groove deeper than in *ornata*. Orbit with two fissures above, with an intervening lobe, one fissure below, and an inner hiatus. Basal antennular joint forming an operculum which partly closes the fossa; basal antennal joint larger than the following joints, but not reaching the front. The anterior margin of the buccal cavity does not form the lower wall of the orbit. The maxillipeds do not cover the whole of the buccal cavity as in *ornata* and *granulata*, but leave an oval opening at the extremity of the exognath; endognath longitudinally ridged; ischium longer than the merus, with smooth inner margin; merus obliquely truncated at distal extremity, almost triangular; exognath nearly straight on the outer margin, extremity rounded, not reaching the end of the endognath. Chelipeds in the female nearly twice as long as the carapace, slender, granulate; merus cylindrical with granules spiny; hands narrow, slightly compressed, margins subparallel; fingers ridged, inner margins uneven, no gape. Ambulatory legs slender, granulate; dactyls hairy.

Length, 20.5; width, 20; length of cheliped, about 40 millimeters.

Off the Sandwich Islands, lat. 21° 12' N., long. 157° 49' W., 295 fathoms, fine white sand, station 3472; U. S. Fish Commission steamer *Albatross*, 1891; one immature female (17516).

*Nursia tuberculata.*

Carapace with posterior two-thirds very convex, densely set with circular tubercles, many of which are large, the space between them filled with smaller tubercles or granules of the same character; a median ridge extends backward from the frontal region to the cardiac region; intestinal region with a convex posterior projection somewhat bilobed. Antero-lateral margin with a slight convexity at the hepatic region, a broad lobe posterior to it followed by a denticle at the lateral angle. Postero-lateral margin tuberculate and slightly convex for its anterior half, concave for its posterior half, the intervening angle marked by a denticle. There is also a subhepatic denticle. Front truncate with a narrow median notch. Male abdomen broad, with the third to the fifth segments coalesced; penultimate segment with a

short appressed spine at its proximal end pointing backward. Inferior regions tuberculate, the tubercles of the abdomen and sternum much depressed. Chelipeds short, stout, tuberculate; merus cylindrical; carpus and manus with a thin superior crest; fingers almost as long as the palm, strongly deflexed, tuberculate at base, with fine teeth on the prehensile edges, fitting closely together; dactyl with a slight crest. Ambulatory legs tuberculate, except the dactyls, and hairy; dactyls long, slender and curved.

Length of carapace, 11.8; greatest width, 12.5 millimeters.

Gulf of California; lat. 29° 30' N., long. 112° 40' W., 45 fathoms; Lieut. Commander H. E. Nichols, U. S. Navy, 1880-1882; one male, dried (17503).

### Family DORIPPIDÆ.

#### *Ethusa lata*.

Carapace about as broad as long, covered with a velvety pubescence, interspersed with longer, curled hairs; a fringe of long hair borders the frontal margin and the outer orbital tooth; the cervical and cardio-branchial sutures are well marked; depression between the cardiac and gastric regions very deep but short. Front four toothed, the median teeth more widely and deeply separated from each other than from the lateral. External orbital tooth large, triangular, not quite so much advanced as the front. Eye-stalks stout. Epistome very narrow. Bases of antennules moderately developed. Male abdomen five jointed. Chelipeds in male very unequal, minutely pubescent; merus subtriangular; carpus in larger cheliped suborbicular, produced internally in a rounded lobe; hand large, very broad, much inflated; fingers short and broad, irregularly denticulate on prehensile edges. Carpus of small cheliped in males and of both chelipeds in females, more elongate; hands small and narrow; fingers as long as the palm. Second and third pairs of legs very long, microscopically pubescent, dactyli much longer than the penultimate joints; fourth and fifth pairs densely pubescent and hairy, dactyli very short.

Length of male, 11; width, 11.5; length of second pair of ambulatory legs, about 34; of third pair, about 14.5 millimeters. Length of female, 11.8; width, 12; length of male, 7.2; width, 7.

In the smallest specimen, in which the length of the carapace is greater than the width, the median frontal lobes are more produced than the lateral, while the opposite is the case in larger specimens.

Gulf of California; U. S. Fish Commission steamer *Albatross*, 1889;

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
3013	28 23 45	111 58 00	14	gy. S. brk. Sb.	65.0	17482
3031	31 06 45	111 28 15	33	bn. M.	63.8	17483

*Cymopolia fragilis.*

Carapace very broad, ornamented with tubercles as follows: two large and broad on the frontal region; two small and broad directly behind these; four arranged almost transversely across the gastric region and separated by the mesogastric region, on which there are three in a triangle, and behind these two granules; across the cardiac region there is a prominent transverse ridge of four large tubercles, which is continued on the branchial region by an arcuate line of four smaller ones; between the penultimate tubercle of this row and the antero-lateral margin there are two small tubercles; there is a tubercle near the inner angle of the branchial region, and sometimes another exterior to it; also a depressed tubercle behind the orbit; there are two granules on the posterior portion of the cardiac region; the posterior margin is bordered by granules. The space between the tubercles is covered with short scattered setae. Front four-toothed, the median lobes produced and near together, the lateral small. Supraorbital margin with two teeth. Antero-lateral teeth five, including the postorbital, the last two approximating. The inferior orbital border has two wide cuts; the inner lobe is itself two-lobed, with the outer lobe the larger. Sternum and abdomen finely pubescent; a ridge runs on the fifth sternal segment from the second abdominal segment to the coxae of the fourth pair of legs; terminal segment of abdomen three-lobed. Chelipeds weak in both sexes, pubescent; carpus and manus obscurely tuberculate. Second and third pairs of ambulatory legs much exceeding the others, the second the longer, more than twice as long as the width of the carapace; meral joints of second and third pairs long, flattened below, with two dentate ridges above, the margins also dentate; carpal joints with smooth ridges; propodal joints with long hairs fringing the margins, the hairs lying flat upon the joints; dactyls with hairs upon the upper margin. First ambulatory leg a little longer than the width of the carapace, slender, obscurely ridged; fourth ambulatory leg very weak, about as long as the carapace.

Length, 8.5; width, 12.2; length of first ambulatory leg, about 13; of second, 25.5; of fourth, 8 millimeters.

Off Lower California; U. S. Fish Commission steamer *Albatross*, 1889;

Station.	Lat. N.	Long. W.	Fathoms.	Bottom.	Temperature.	Cat. No.
2983	28 58 30	118 15 45	58	gy. S. brk. Sh. . .	55.8	17485
3011	28 07 09	111 39 45	71	inc. gy. S. brk. Sh.	57.9	17486

*Cymopolia zonata.*

Carapace much narrower than in the preceding species, pubescent; protuberances arranged as in *fragilis*, but consisting not of single tubercles, but of clusters of many small tubercles or granules. Front four-

lobed, the median lobes rounded and inconspicuous, and separated by shallow notches from the broad lateral lobes. The upper margin of the orbit bears two triangular teeth; the outer angle is sharp and much produced. In addition there are two acute antero-lateral teeth projecting little beyond the marginal line, the outer edge of the teeth nearly straight. The posterior margin of the specimen is mutilated, but there can be discerned near the margin a transverse line of seven thin elongated tubercles; the margin itself is very minutely granulate, and between it and the tubercles the surface is granulate. The lower orbital border has two fissures and the inner lobe is two-lobed at the summit. Basal antennal joint little advanced. Sternum and abdomen finely pubescent; a transverse ridge on the fifth sternal segment; abdomen of male more tapering than in *fragilis*; margin of penultimate segment with an obtuse angle; terminal segment longer than broad, rounded, reaching the inner margin of the ischium of the maxillipeds. Chelipeds (the right one only is preserved) weak, tuberculate, pubescent; carpus armed with many irregular sharp-edged tubercles; hand broader than in *fragilis*, tubercles arranged longitudinally, the two rows on the upper surface the largest. Ambulatory legs of moderate length; first three pairs with a prominent tooth at the upper distal end of the meral joint; second and third pairs with a tooth near the upper distal end of the carpal joint; the meral ridges are formed by spiny tubercles; the carpal ridges are thin, prominent, and finely denticulate.

The specimen in alcohol is dark colored and mottled, and the legs have broad, transverse bands of dark and light.

Length, 9; width, 10.5; length of first ambulatory leg, about 11; of second, 18; of fourth, about 7.5 millimeters.

Gulf of California, lat. 24° 51' N., long. 110° 39' W., 40 fathoms, sand, broken shells, temperature 61°, station 2998; U. S. Fish Commission steamer *Albatross*, 1889; one male (17481).