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SOME NEW SPECIES OF BRACHYURAN CRABS FROM MEXICO AND THE CENTRAL AND SOUTH AMERICAN MAINLAND

(PLATES 11-26)

by

JOHN S. GARTH

RESEARCH ASSOCIATE
ALLAN HANCOCK FOUNDATION
THE UNIVERSITY OF SOUTHERN CALIFORNIA

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INTRODUCTORY REMARKS

The present paper resumes the study of the Brachyura collected by the Allan Hancock Expeditions on the Pacific Coast mainland of Mexico, Central America, and South America, from the point reached by Dr. Mary J. Rathbun, whose preliminary descriptions of six new species of oxystomatous crabs from this area appeared in the Proceedings of the Biological Society of Washington, vol. 46, p. 183 (1933), and vol. 48, pp. 1-3 (1935), and whose report on the Oxystomata of the Allan Hancock Expeditions prior to 1935 was incorporated in Bulletin 166 of the U. S. National Museum (1937).

One of the descriptions appearing in the following pages was taken from the unpublished manuscript "A Report of the Brachyura collected on the Hancock Pacific Expedition of 1933 at Stations other than those of the Galapagos Islands," submitted by Mr. Fred C. Ziesenhenne to The University of Southern California in partial fulfillment of the degree Master of Science and is attributed to his authorship. Another is the work of Mr. Steve A. Glassell, who was first to call attention to the dissimilarity between the *Daldorfia* species herein described and *Thyrolambrus erosus* Rathbun.

The accompanying illustrations are from the pen of Mr. Anker Petersen, staff artist of the Allan Hancock Foundation, with the exception of figures 4 and 6 of plate 15, drawn by Miss Jane Roller under the direction of Dr. Waldo L. Schmitt. Color notes were taken from living specimens and are expressed according to Ridgway, "Color Standards and Color Nomenclature" (1912).

Once again the writer acknowledges his indebtedness to Dr. Waldo L. Schmitt for assistance in the field and in the laboratories of the U. S. National Museum, and for the loan of comparative material used in these studies. He is also under obligation to Dr. William Beebe for permission to examine the holotype of *Chasmocarcinus ferrugineus* and

to Mr. Steve A. Glassell for constant advice during the preparation of the manuscript. Last, but not least, he wishes to express grateful appreciation to Captain Allan Hancock for the privilege of traveling eight times to tropical Pacific waters aboard *Velero III.*

OXYSTOMATA

LEUCOSIIDAE

Genus **RANDALLIA** Stimpson

Randallia angelica, new species

Plate 11, Figs. 1, 2

Type: Female, holotype, Cat. No. 361, Allan Hancock Foundation, The University of Southern California, and male, allotype, from north of Angel de la Guardia Island, Gulf of California, Mexico, 40-70 fathoms; March 5, 1936; eight males and eight females, paratypes, same locality and date; collected by Allan Hancock Expedition of 1936 at Velero Station 546-36.

Measurements: Female holotype: length of carapace 18.7 mm., width 16.4 mm., length of cheliped 24.2 mm., of chela 12.5 mm., of dactyl 7.2 mm. Male allotype: length of carapace 18.0 mm., width 15.2 mm.

Diagnosis: Carapace smooth and bare both dorsally and ventrally; of the cheliped only the merus is conspicuously granulate. Front produced; frontal teeth well separated. Ischium of third maxilliped nongranulate at base. Lower margin of merus of last ambulatory leg without granules.

Description: Carapace longer than wide, devoid of pearly granules except on median carina, smooth and bare except under high magnification, when it is seen to be paved with fine, flat granulation. Front produced, its sides forming a distinct, though obtuse, angle with the hepatic margin. Frontal teeth considerably advanced over the exorbital and separated from one another by a positive indentation. Hepatic and pterygostomian regions tumid, tuberculate, posthepatic sulcus barely indicated. Three anterolateral granules, evenly spaced. Five posterior tubercles located as follows: two sharp tubercles on posterior margin, a row of three above it, of which two are postbranchial, the third intestinal. Basal antennular articles all but closing antennular fossae. Outer maxillipeds with a longitudinal row of granules down the middle of the

merus which fades out toward the base of the ischium. Anterior extension of septum of branchial channel trilobate.

Merus of cheliped with conspicuous pearly granules. Carpus and manus smooth and bare to the naked eye, microscopically granulate. Male cheliped one and one-half times the length of carapace. Chelipeds subequal in both sexes.

Sternum and abdomen of female smooth and polished, of male microscopically flat granulate.

Ambulatory legs smooth and bare. Lower margin of merus of fourth walking leg entire.

Color in alcohol: This beautiful crab has the same irregular splotching of dark red-orange on cream buff that characterizes *R. ornata* (Randall) (1839).

Color in life: Ground color of carapace olive buff almost covered anteriorly with dots of chrome yellow. Large, regular designs vinaceous russet, smaller patches paler and more orange. Posterior spines white. Cheliped yellow to pale buff, merus covered with carrot red, carpus and manus with a coarse netting of the same color. Merus of ambulatory legs pale yellowish white at base blending into intense scarlet on distal portion. Remaining segments yellowish white; dactyl yellow tipped. (Petersen)

Distribution: The 30 specimens collected at 5 stations of *Velero III* in the Gulf of California in 1936 and 1937 range from Angel de la Guardia Island to Willard's Point, and it is presumed that the species ranges northward to the mouth of the Colorado River.

Remarks: The effectiveness of the thermal barrier to the distribution of species is perhaps not better illustrated than in the case of this crab, which is the Gulf counterpart of the well-known *R. ornata* of the open Pacific. Essentially a cold-water species, *R. ornata* is not known to occur south of Magdalena Bay, while *R. angelica* was not encountered by Allan Hancock Expeditions south of Puerto Refugio, Angel de la Guardia Island, where 13° C. surface temperatures were recorded. Apparently the species do not communicate around Cape San Lucas, where the surface temperature was found to be 20° C. Unfortunately, relative temperatures at depths at which specimens were dredged were not taken.

The points which separate *R. angelica* from *R. ornata* are as follows: (In these comparisons a specimen of *ornata* of like size and sex with the holotype of *angelica* was used.)

(1) The pearly granules covering carapace, chelipeds, sternum, and abdomen in *ornata* and conspicuous to the naked eye are wanting in *angelica* except on the merus of the cheliped.

(2) The angle which the more advanced front makes with the hepatic margin in *angelica* is more pronounced than in *ornata,* the frontal teeth are more prominent, and the intervening sulcus is deeper.

(3) The granules on the external maxilliped tend to disappear toward the base of the ischium in *angelica,* although persisting in *ornata.*

(4) The lower margin of the merus of the fourth walking leg, denticulate in *ornata,* is smooth and bare in *angelica.*

The species is named for one of the two island guardians of the Gulf's solitude, the Island of the Guardian Angel (Angel de la Guardia) and the Island of the Holy Spirit (Espiritu Santo).

CALAPPIDAE

Genus **OSACHILA** Stimpson

Osachila sona, new species

Plate 12, Figs. 1-4

Type: Female, holotype, Cat. No. 387, Allan Hancock Foundation, The University of Southern California, and male, allotype, from Bahia Honda, Panama, 30-50 fathoms; March 1, 1938; four young specimens, paratypes, sex undetermined, same locality and date; collected by Allan Hancock Expedition of 1938 at Velero Station 863-38. Two males and one young female, paratypes, from outside Medidor Island, Bahia Honda, Panama, 30-35 fathoms; March 28, 1939; collected by Allan Hancock Expedition of 1939 at Velero Station 948-39.

Measurements: Female holotype: length of carapace 20.0 mm., width 25.5 mm., width of front 6.0 mm., length of chela 9.5 mm., of dactyl 6.0 mm. Male allotype: length of carapace 14.0 mm., width 17.3 mm.

Diagnosis: Branchial elevations rounded, extensive, inside of each a small, triangular elevation. Front little advanced, lobes broad. Posterior portion of carapace and ambulatory legs roughly granular. Sternum and abdomen with raised, berried tubercles. Dactyls with paired laminae.

Description: Carapace strongly areolate and almost completely coarse granulate, except the spaces between the elevations of the anterior portion, which are bare and microscopically punctate. Branchial elevations extensive, rounded, and tumescent, inside of each a small, triangular areole separated by a deep and naked furrow. Anterolateral margin with sharp denticles grouped in threes, the center of each projecting slightly beyond the others. Posterolateral margins indented in a succession of four steps. Front little advanced, lobes broadened, separated by a shallow depression which communicates with the gastric region posteriorly. Other important areoles located as follows: epigastric, gastric, postbranchial, cardiac, and lateral to the cardiac region. Posterior portion of carapace most conspicuously and irregularly granulate, the granules extending into the depressed areas between the areoles and interspersed with short yellow hairs.

Subhepatic region, external maxilliped, sternum, and abdomen densely granulate. External maxilliped with granules arranged in rows parallel to the long axis of the body, a conspicuous row of punctae separating the two median rows on both ischium and merus.

Abdomen and sternum of both sexes with numerous raised, berried tubercles separated by deeply eroded pits. Terminal segment of female abdomen triangular, sides almost straight.

Tubercles of carpus and manus of cheliped arranged more or less in rows, those of the superior crests sharpened. Granules extending to tips of dactyls. The left cheliped is wanting in the type specimen.

Ambulatory legs with laminate edges denticulate, their superior surfaces paved with rows of granules extending even on the dactyls, the tips of which are amber. Dactyls with paired inferior laminae.

Color in life: Carapace cadmium orange with numerous light blotches of madder brown scattered over entire surface. A large patch of madder brown in median groove on gastric area. Eye pale greenish black. Chelae as carapace on outer side, white on inner side. Granules on movable finger madder brown fading gradually toward tip, which is almost white. Fixed finger with a few light touches of cadmium yellow. Ambulatory legs pale cadmium yellow, granules pale madder brown, many of them white. (Petersen)

Color in alcohol: The holotype, in spirit nine months at this writing, still shows spots of deep magenta in the depressions surrounding the gastric and epigastric regions.

Remarks: This species, closely allied to *O. galapagensis* Rathbun

(1935), differs consistently from the types of the latter (U.S.N.M. No. 69215), in the following features:

(1) The front is less produced, the lobes wider. [An analogous relationship exists between the smooth-carapace species, *O. lata* Faxon (1893) and *O. levis* Rathbun (1898).]

(2) The conspicuous branchial elevation is more extensive and appears rounded, instead of angled, when viewed from off center.

(3) Just inside the branchial elevation there is a small, sharp, triangular prominence cut off by a deep, naked sulcus which occupies an area that in *galapagensis* is depressed.

(4) Two small, sharp areoles, one just anterior to the lateral angle, the other just posterior, are distinctly separate in *sona,* while joined by a ridge in *galapagensis.*

(5) The tubercles of the abdomen and granules of the maxilliped are so produced as to all but obscure the rugosities; in *galapagensis* the prominences are reduced to mere ridges outlining the conspicuous indentations. (See pl. 12, figs. 2, 3, and 6.)

(6) The upper surfaces of the ambulatory legs are heavily granulate, instead of smooth and bare. (See pl. 12, figs. 4 and 5.)

The name *sona,* chosen for its euphony, happens also to be the name of the principal town of the district of Veraguas, situated some miles to the interior of Bahia Honda and referred to by the native population with a strong accent on the final syllable, *"soná."*

BRACHYGNATHA

MAJIDAE

Genus **PODOCHELA** Stimpson

Podochela ziesenhennei, new species

Plate 13, Figs. 1-6

Type: Male, holotype, Cat. No. 78780, U.S. National Museum, from Tenacatita Bay, Jalisco, Mexico, 4-10 fathoms; March 18, 1933; female, allotype, same locality, shore; March 18, 1933; collected by Allan Hancock Expedition of 1933 at Velero stations 122-33 and 121-33, respectively.

Measurements: Male holotype: length of carapace 11.0 mm., width 7.8 mm., length of cheliped 13.0 mm., of chela 5.4 mm., of dactyl 2.4 mm., of first ambulatory leg 26.0 mm. Female allotype: length 12.9 mm., width 9.0 mm., length of cheliped 12.2 mm., of first ambulatory leg 21.8 mm.

Diagnosis: Densely pubescent, posterior portion of carapace flat, margins little projecting laterally. Rostrum thick, bluntly triangular. Basal antennal article relatively wide. Hand of male broad as long, fingers short. First ambulatory leg twice the length of carapace, propodus of leg four sickle shaped.

Description: Body and appendages covered with a dense, wooly pile to which foreign matter adheres readily. Carapace narrowly triangular, little or no flare at base of ambulatory legs. Branchial and intestinal regions depressed, giving the posterior portion of the carapace a flat contour broken only by the dome-shaped cardiac prominence. Rostrum thick, bluntly triangular, length and breadth subequal, sides deflexed, two double rows of short, curved setae. Orbits circular, not appreciably thickened, unarmed; a minute postorbital granule. Eyestalks broad at base, constricted at base of cornea, which is acuminate medially rather than anteriorly. Neck broad, tumid, and of some length. Hepatic regions projecting but little beyond lateral contour, which makes an almost straight line from cervical suture to postlateral angles. Gastric region high, broad, anteriorly extending on to cervical region, laterally confluent with hepatic regions, posteriorly flattened, surmounted by four groups of curved setae arranged in a rectangle but with no median tubercle. Cardiac elevation small, like gastric nontuberculate, surrounded by depressions which set it off from the branchial and intestinal areas. Branchial regions low, traversed by a longitudinal row of curved setae, sides not produced laterally to cover the insertions of the ambulatory legs.

Antennules folding longitudinally into fossae incompletely divided by the median septum. Antennae visible at sides of rostrum; basal article broader than usual in the genus, traversed by a median ridge more prominent on posterior portion, internal edge slightly laminate; flagellum short, second free segment overreaching rostrum by half its length. External maxilliped with merus longer than broad, sides diverging anteriorly, neither angle appreciably produced, internal margin spinulous. (See pl. 13, fig. 4.) Two low hairy ridges on sternum opposite coxae of chelipeds in place of usual tubercles.

Cheliped of male one and one-sixth times as long as carapace. Merus half as broad as long, ischium half as long as merus, both joints with an inferior hairy border. Carpus without spines but with an inner setose margin. Manus tumid, short and high, superior length and height subequal, outer surface convex, pilose, margins setaceous, inner surface smooth, flattened. Fingers short, hairy, denticulate, meeting with a gape in the proximal two thirds in which one tooth of the dactyl is conspicuous. (See pl. 13, fig. 3.)

Ambulatory legs relatively short and stout as compared to other Pacific species of the genus. First leg twice as long as carapace, dactyl one third as long as propodus. Second, third, and fourth legs decreasing in order. Dactyli of all legs, including first, falcate, inner margins denticulate. Propodus of leg four stout, as strongly curved as the dactylus, and with a basal tuft of hair suggesting a thumb process, against which the dactyl folds. (See pl. 13, fig. 5.)

Cheliped of female slightly less than length of carapace, hand more slender than in the male, fingers longer, almost meeting when closed. First ambulatory leg one and two-thirds times length of carapace.

Distribution: The eight specimens in Allan Hancock Foundation collections range from Tenacatita Bay, Jalisco, Mexico, to Salango Island, Ecuador, from shore to eight fathoms.

Remarks: This species was at first thought to be *Podochela angulata* Finnegan (1931) by Mr. Ziesenhenne, who determined the mainland collections of 1933. Later topotypical material from Gorgona Island, Colombia, reveals the following differences:

(1) The gastric and cardiac regions, while elevate, are not tuberculate.
(2) The sides of the carapace are not laterally expanded.
(3) The female chelae, while slender, are not filiform.
(4) The merus of the outer maxilliped is longer than broad, instead of broader than long.
(5) The propodus of the fourth walking leg is thicker and more strongly curved.

I take pleasure in naming this distinctive species for Mr. Fred C. Ziesenhenne, companion on six Allan Hancock Expeditions, whose diligence in the collecting of marine invertebrates has resulted in the discovery of more than one species of brachyuran new to science.

Genus NOTOLOPAS Stimpson

Notolopas mexicanus, new species

Plate 14, Figs. 1-4

Type: Male, holotype; to be deposited in the U.S. National Museum, from south and west of White Friars, Guerrero, Mexico, 25 fathoms, rock with gorgonids; March 2, 1934; collected by Allan Hancock Expedition of 1934 at Velero Station 264-34.

Measurements: Male holotype: length of carapace 7.5 mm., width 5.2 mm., length of cheliped 11.1 mm., of chela 4.2 mm.

Diagnosis: Merus of outer maxilliped subtriangular. Rostrum short. Second antennal segment papillate. No posterior carina. Cardiac region high, dome shaped.

Description: Carapace subpyriform, convex, and posteriorly rounded. Regions elevate, separated by deep, naked sulci and surmounted by regularly arranged tracts of curved setae. Rostrum short, horns divergent and papillate, each bearing two rows of curved setae, tips incurving. Supraocular spine slender and curving forward; postocular cup broad, exteriorly flattened; a minute tooth between pre- and postocular projections. Four equidistant setose tubercles on carapace, one gastric, two branchial, and one intestinal; cardiac area dome shaped, well separated from branchial swellings. Hairs of carapace restricted anteriorly to well-defined tracts of which the two epigastric are most isolated; posteriorly and laterally the growth of hairs is more diffuse. Intestinal area projecting slightly below the general level of the posterior border; no lamellate posterior carina indicated.

Antennules folding almost longitudinally. Basal antennal article wide, concave, edge thin, a blunt spine at anteroexternal angle, a shallow lobe near base, and a tubercle opposite green-gland opening; first movable segment slender, spinulous, reaching nearly to tip of rostrum and visible in dorsal view; flagellum overreaching rostrum by twice its length. Merus of third maxilliped produced at both internal and external distal angles until almost triangular; ischium with internal margin spinulous. Two compressed lobes on pterygostomian ridge. A pair of deep sternal indentations opposite coxae of chelipeds.

Chelipeds of male stouter than legs, merus and propodus of approximately equal length. Merus with four evenly spaced tubercles along inferior margin, of which the proximal is largest. Manus moderately compressed, fingers gaping slightly at base, regularly toothed, tips crossing.

Ambulatory legs diminishing regularly in length, cylindrical, pubescent; dactyli almost as long as propodi, tips curved.

Sternal trough extending past tip of abdomen, which incompletely fills it.

Remarks: The proposed new species is the Pacific analogue of the Atlantic *N. brasiliensis* Miers (1886). Since *N. lamellatus* Stimpson (1871) occurs on both sides of the continent, careful comparison was necessary to ascertain that *N. brasiliensis* does not likewise. Examination of the types of *Hyastenus caribbaeus* Rathbun (1893) (syn. *N. brasiliensis* Miers) Rathbun (1925) shows the following differences:

1. *N. brasiliensis* possesses a long rostrum. This is undoubtedly an age character and might be shown by more mature specimens of the new species.
2. The hepatic region is not tumid on *H. caribbaeus,* although Miers' figure of the type of *N. brasiliensis* shows a tumid region as in the new species.
3. The basal antennal article is thick and bears a prominent lobe on the outer margin. In the new species the edge is thin with but the shallowest of lobes indicated. (See pl. 14, fig. 3.)
4. The merus of the outer maxilliped, squarish in *brasiliensis,* is in *mexicanus* almost triangular. (See pl. 14, fig. 4.)
5. The cardiac region is slightly less protuberant in *brasiliensis.*

In addition to the above, the spongy papillae of the rostrum and second antennal segment appear to be unique in the genus. They may disappear with age.

It should be borne in mind, in connection with the above, that the material available for comparison consisted of the unique holotype of *N. mexicanus,* a young specimen, and the mature types of *H. caribbaeus.* Such great disparity exists between the young and old of this genus, as shown by a long series of *N. lamellatus* in the Hancock collections, that one unfamiliar with the genus might easily mistake the juveniles for a different species, or even refer them to another genus.

The one character constant in individuals of any age should be the shape of the maxilliped. In the case in question, the dissimilarity to *brasiliensis* is sufficient, in the opinion of the writer, to establish the new species on this point alone.

Genus **MITHRAX** Latreille

Subgenus MITHRAX

Mithrax (Mithrax) clarionensis, new species

Plate 15, Figs. 1-3

Type: Female, holotype, Cat. No. 78777, U.S. National Museum, from Sulphur Bay, Clarion Island, Mexico, 57 fathoms; January 5, 1934; collected at Velero Station 137-34. Female, paratype, Cat. No. 341, Allan Hancock Foundation, The University of Southern California, from the same locality, 15 fathoms; June 11, 1934; collected at Velero Station 305-34 by the Allan Hancock Expedition of summer 1934. Five males and five females (three ovigerous), paratypes, same locality, 28-43 fathoms; March 16, 1939; collected by Allan Hancock Expedition of 1939 at Velero Station 917-39.

Measurements: Female holotype: length 12.9 mm., width between fourth lateral spines 12.5 mm., greatest width 12.9 mm., length of cheliped 17.0 mm., of chela 8.0 mm. Largest male paratype: length 10.4 mm., width 10.2 mm.

Diagnosis: Width and length of carapace equal. Three spines on basal antennal article, middle spine curving inward. Three denticles on supraorbital margin between pre- and postorbital teeth. Areoles of carapace finely tuberculate. Anterolateral prominences sharply compound tuberculate. Base of hand paved with rounded granules.

Description: Carapace ovoid, relatively broad, width as great as length, areolate, the areoles abundantly studded with small, sharp tubercles and finer granules; furrows separating gastric and cardiac from branchial regions smooth and deep. Frontal lobes short, quadridenticulate, and separated by a U-shaped sinus of equal width and depth. Orbits with three denticles of approximately equal size between the more prominent preorbital and postorbital teeth. Anterolateral margins quadrilobate, the first or hepatic lobe tridentate and pinched off from the rest of the carapace by deep furrows; the second broader, also compound, but confluent with the anterior branchial region basally; the third and fourth single spines surmounted by spinules, between which a subbranchial spine of equal size is clearly visible.

Basal antennal article with two prominent external teeth and a denticle at the base of the first free article; all three visible in dorsal view; middle tooth curving inward at tip. Two prominent inferior orbital teeth, their tips making a broad, concave arc with the two

outer antennal spines. Pterygostomian ridge tuberculate; one suborbital and two subhepatic spines and a paving of subbranchial spinules. Antennules folding almost longitudinally, fossae large, incompletely divided. Merus of third maxilliped deeply notched for insertion of palpus, outer external angle produced and scalloped; inner border of ischium spinulous and hairy.

Cheliped of female with merus and carpus tuberculate and spinulous, merus with an upper row of three or four, an outer row of six, and an inner row of two or three tubercles. Manus with a cluster of half a dozen rounded granules at basal end of superior surface and two or three at base of outer surface; hand otherwise smooth and bare. Fingers of female weak and toothless, meeting with a slight gape.

Ambulatory legs with a double row of spinules above; carpus grooved; propodus cylindrical; dactylus with finely denticulate inner margin, tip yellow, horny, incurving.

Color in life: Frontal, gastric, and branchial regions deep hellebore red; cardiac and intestinal regions deep olive buff. A small spot of deep olive buff at base of outer orbital tooth and a large spot at base of first marginal tooth. Chelae deep olive buff; merus with two broad, irregular bands of hellebore red; carpus hellebore red; hands with lighter bands of red and a band at base of fingers; distal half of fingers orange yellow. Ambulatory legs banded as chela. (Petersen)

Remarks: Because of its isolated position nearly 500 miles from the mainland coast, Clarion Island, outpost of the Revilla Gigedo group, has developed a unique fauna. A number of morphological characters separate the proposed new species from *M. sinensis* Rathbun (1892) of the Gulf of California, as shown by comparison with a long series of the latter taken by Allan Hancock Expeditions, one of which was compared by the writer with the type (U.S.N.M. 16065).

(1) The carapace, while but slightly broader than that of *sinensis,* is decidedly wider at the base, the posterolateral margin being more nearly transverse.

(2) The paving of the carapace is composed of much finer tubercles and granules, there being approximately twice as many raised prominences on any area examined. (See comparative gastric regions, pl. 15, figs. 1 and 5.)

(3) There is a fully developed third orbital spine, as against two mentioned in the description of *sinensis* and the merest sug-

gestion of a third, found by Dr. Waldo L. Schmitt and shown by a figure of the type. (See pl. 15, figs. 3 and 6.)

(4) The middle of the three basal antennal spines is attenuated and incurving instead of short and blunt. (See pl. 15, figs. 2 and 4.)

(5) Both the infraorbital spines are as prominent as the outer antennal. In *sinensis* one or both are reduced. (See pl. 15, figs. 2 and 4.)

(6) The female chela is paved proximally with rounded granules instead of being entirely smooth and bare.

Genus **MACROCOELOMA** Miers

Macrocoeloma maccullochae, new species

Plate 16, Figs. 1-4

Type: Male, holotype, Cat. No. 372, Allan Hancock Foundation, The University of Southern California, from Isabel Island, Mexico, 10-18 fathoms; April 2, 1937; collected by Allan Hancock Expedition of 1937 at Velero Station 747-37. Two males, two females, and one young, paratypes, same locality, 10-15 fathoms; March 8, 1938; collected by Allan Hancock Expedition of 1938 at Velero Station 870-38.

Measurements: Male holotype: length of carapace including rostral spines 31.3 mm., branchial width including lateral spines 20.0 mm., excluding lateral spines 17.0 mm., width at level of preorbital spines 10.6 mm., at level of hepatic region 9.9 mm., length of rostrum 9.2 mm., of cheliped 35.8 mm., of hand 15.2 mm.

Diagnosis: Rostral horns cylindrical and contiguous almost to tips. Postlateral spines acute, cylindrical, directed obliquely backward and upward. Four tuberculate dorsal bosses arranged in a diamond. A boss or tubercle anterior to the posterior median spine. Basal antennal spine directed obliquely outward. Cheliped of male one and one-sixth times length of carapace including rostrum.

Description: Carapace distended, subpyriform, broadened anteriorly at the orbital level and covered with a dense, wooly pile interspersed with longer, yellow, hooked hairs. Gastric, cardiac, and branchial regions swollen, each surmounted by a large boss or tubercle, the four forming a perfect diamond. Carapace constricted at the hepatic level; two small epigastric tubercles. Two strong, cylindrical, acuminate postlateral spines, directed obliquely outward, backward, and upward, the

right wanting in the holotype specimen. A smaller spine on the posterior border at the mid-point, in front of it a boss or tubercle at the intestinal level. A total of eight major prominences, with the two epigastric, ten. Rostral spines long, cylindrical, tapering, not flattened, contiguous from bases almost to tips, which are sharply divergent, except in young specimens; length of rostrum about four-fifths times the distance between the preorbital spines. Orbits tubular, protruding beyond margins of carapace, postorbital extending beyond preorbital, their tips making a straight line with the tip of the antennal spine when seen in dorsal view. Upper orbital margin deeply incised, spines separated by a fissure fused distally but open proximally and extending on to the hepatic region.

Basal antennal article broad, bearing an obliquely directed spine. Flagellum long, reaching four fifths the length of the rostrum, its first two movable segments appreciably thickened. A tubercle at the level of the green-gland opening; a similar pterygostomian tubercle. Merus of third maxilliped irregular in outline, anterointernal angle sharply produced, anteroexternal angle broadly lobate, merus inserting at a point considerably below the distal extremity of the ischium.

First ambulatory leg much the longest in the male, the remaining legs gradually diminishing; those of the female rather short; legs cylindrical, pubescent, somewhat nodose. Carpus slightly inflated and grooved superiorly; dactylus with lower border spinulous, tip yellow and incurving.

Distribution: In addition to the type series from Isabel Island, Mexico, a female specimen was dredged by *Velero III* at Playa Blanca, Costa Rica, and a young male at La Libertad, Ecuador.

Remarks: The proposed species is the Pacific counterpart of *M. trispinosum* (Latreille) (1825), from which it may be separated by the following features:

(1) The rostral horns are long, cylindrical, and contiguous throughout the greater part of their length, instead of short, flattened, and diverging almost from their bases.
(2) The preorbital spine is directed obliquely forward instead of transversely.
(3) The first two movable segments of the antenna are coarse instead of slender.
(4) The postlateral spines are more backward than sideward pointing.

(5) There are two tubercles, or a tubercle and a boss, on the median line just above the posterior margin instead of a single tubercle.

(6) The male cheliped is considerably longer than the carapace, including the long rostrum, instead of the same length, its merus reaching the middle of the rostrum instead of the level of the postorbital spine.

(7) The merus of the third maxilliped is irregular in outline, produced on either side of the maxillary palp, and inserting deeply on the outer border of the ischium, instead of squarish in outline with a moderate notch for the palp and an insertion near the distal end of the ischium. (See pl. 16, fig. 3.)

(8) The male copulatory appendages have bifurcate curled tips instead of single, lunate tips. (See pl. 16, figs. 2 and 5.)

Judging from the great variability in the Atlantic species, which has been separated into three named varieties, it is remarkable that the eight specimens of *M. maccullochae* at hand conform as remarkably as they do in these important characters. In none of them do the lateral spines tend to take on a bladelike appearance, the rostral horns to broaden and flatten, or the constriction beneath the orbits to disappear as in *M. trispinosum nodipes* (Desbonne) (1867). A larger series might, however, exhibit greater diversity.

The holotype specimen was covered with a soft sponge which has been identified by Mr. Malcolm G. Dickinson as *Hymeniacidon synapium.*

I take pleasure in naming this striking species for Dr. Irene A. McCulloch, professor of zoology of The University of Southern California, who first encouraged me in the study of marine animals.

PARTHENOPIDAE

Genus **DALDORFIA** Rathbun

Daldorfia garthi Glassell, new species

Plate 17, Figs. 1-11

Parthenope (Pseudolambrus) excavata (Stimpson), Boone, Zoologica, N. Y. Zool. Soc., vol. 8, no. 4, 1927, p. 173, text fig. 58.

Type: Male, holotype, Cat. No. 3811, Allan Hancock Foundation, The University of Southern California, from Sulivan Bay, James Island,

Galapagos, shore; January 21, 1938; collected by Allan Hancock Expedition of 1938 at Station 796-38. Female, paratype, ovigerous, Cat. No. 3811a, Allan Hancock Foundation, collected at same place and time. The remaining paratypes are considered under the heading *Material examined.*

Measurements: Male holotype: length of carapace 31 mm., width 47 mm., length of merus (major cheliped) 29 mm., carpus 13 mm., manus including pollex 46 mm., width at base of dactyl 20 mm., height of sternal pit 3.8 mm., breadth 5 mm. Female paratype: length of carapace 30 mm., width 45 mm., length of merus (major cheliped) 23 mm., carpus 12.0 mm., manus including pollex 27 mm., width at base of dactyl 16.5 mm.

Diagnosis: Carapace subtriangular, lateral regions deeply eroded and spined on the anterolateral and posterolateral margins. Posterolateral and posterior margin nearly a straight line. Basal antennal article almost reaches the orbital hiatus. Sternal pit semiovoid. Chelipeds heavy, short, unequal. Meri of ambulatory legs one and one-half times as long as wide, with teeth of upper crest having a tendency to overlap, leaving interstices between; propodi about as wide as long with two teeth on lower margin; dactyli longer than their propodi, granulated except for corneous tip.

Description: Carapace subtriangular, about five eighths as long as wide, rostrum bluntly rounded and deflexed. Protogastric regions high, with a median eroded sulcus, mesogastric region less in height, semiconical posteriorly, and margined posteriorly with a wide deep pit on each side. The ridge joining the frontal regions with the branchials has two closed sutures. Cardiac region depressed, outlined with erosions and mushroomlike tubercles. Outer and submarginal posterior border eroded, with an eroded, depressed tooth on each side of the first abdominal segment. The hepatic region is obliquely vertical, projecting downward in a broadly triangular lobe. Anterolateral margin bordered with eleven or twelve granulated, serrate-edged teeth, each with a median ridge, those on the posterior half the largest. The posterolateral margins are tangent to the anterolateral, with teeth similar to those of the latter except that the edges are interlaced and coalesced forming a subentire line.

The chelipeds are about twice the length of the carapace; merus roughly trigonous, three quarters the length of the carapace, depressed on upper surface which is punctate and lobed, the inner margin with three or four granulate lobes, the outer proximal margin with three or

four eroded spines as on the carapace, a small median lobe and a larger subdistal one with granulated top; carpus with two or three inner marginal lobes, the outer surface with lumpy granulate-tipped bumps; manus subequal in length to that of carapace, triangular in cross section, with three large lobes on upper, inner margin, the median the largest and projecting over the inner side of palm, distal upper end of hand raised and lumpy with granules, outer surface of palm with four longitudinal rows of granulous lobes, the upper two rows the largest, the first or top row with three lobes on the proximal half, the second row with four or five, the largest near the gape, the remaining rows are much smaller and extend onto the pollex. The pollex on the major hand is deflexed, short, stout, and with a subbifid tip, unarmed, the inner edge forming a right angle in the gape; the dactyl is granulous, slightly curved and armed with three inner lobes, the proximal the largest; fingers widely gaping; the pollex of the minor hand is subhorizontal, tuberculate on the outer surface, subtriangular from base to apex, the cutting edge sharp and armed with denticles; the dactyl is nearly straight on prehensile margin, an upper proximal granulous lobe, the outer surface tuberculous and eroded, the fingers not gaping.

Basal antennal article not quite reaching the ocular hiatus. Outer maxillipeds eroded and tuberculate, with longitudinal sulci, the distal anterior margin of the merus produced. Sternal pit semioval in male, the abdomen not intruding; in female it is more circular, is a continuation of the sternal trench, and is entered by the bent tip of the abdomen. The sternum, like the ischium of all of the legs, is eroded and granulate. The abdomen in both sexes is seven jointed, deeply eroded with a regular pattern; in the male the third segment is widest, the sixth the longest.

Ambulatory legs with meri compressed, nearly three fourths as wide as long, the teeth on the upper crest partly overlapping one another, leaving interstices between, the lower surface excavate between the side margins, which like the upper crest is pierced with small holes, the margins sutured; the carpus has a high narrow crest; the propodus two projections on its posterior margin; the dactyli are slightly curved and granulous up to the corneous tip.

Variation: Considerable variation is found between the adults and the juveniles, the latter being much flatter, the depressions shallower, the surface more eroded and reticulated, the entire upper surface in the merus of the chelipeds deeply eroded, the tip of the male abdomen touching the proximal margin of the sternal pit, instead of being removed from

it as in the adult. This difference between the surface structure of juveniles and adults accounts for the peculiar features of the latter. As an example, the merus of the chelipeds in the smaller specimens is heavily eroded, and these same surfaces in larger specimens have the appearance of scar tissue.

Range: From Cape San Lucas, Baja California, Mexico, to Colombia, and the Galapagos Islands.

Material examined: Octavia Bay, Colombia, January 28, 1935, shore; one female. Secas Islands, Panama, January 29, 1935, shore; two juvenile males. Bahia Honda, Panama, March 10, 1933, two fathoms; one male, juvenile. Playa Blanca, Costa Rica, February 8, 1935, shore; three adult males, three juvenile males, and one juvenile female. Sulivan Bay, James Island, Galapagos (see *Type*), also from same location, December 13, 1935, shore; one adult male. Charles Island, Galapagos, December 5, 1934, shore; one adult female. All the above specimens were collected by the Allan Hancock Expeditions of the various years mentioned.

Off the Nicaraguan Coast, lat. 12° 48′ N., long. 87° 06′ W., February 3, 1939, twelve fathoms; one adult male; collected by Captain Fred E. Lewis on the yacht *Stranger*.

Cape San Lucas, Baja California, Mexico, shore; February 1, 1938; one adult male; collected by the author.

Habitat: From the lower tidal regions, among rocks, to a depth of twelve fathoms.

Remarks: This proposed species has an affinity for *D. semicircularis* (Flipse), 1930, but differs from that species in that the dorsal edges of the meri of the ambulatory legs are overlapping instead of being more or less entire. I have not seen a specimen of *D. semicircularis,* but through the kindness of Dr. Edmondson and Dr. Bryan of the Bishop Museum, Hawaii, I examined two specimens of *D. horrida* (Linn.) from that location, and this proposed species differs from *D. horrida* in that the sternal pit is semioval instead of broadly triangular, the posterolateral margins forming a straight line with the posterior margin instead of being oblique to this margin. To Dr. Fenner A. Chace, of M.C.Z., I am indebted for comparisons and literature.

This species is named for Mr. John S. Garth of the Allan Hancock Foundation, in appreciation of his having allowed me to describe this species and to examine the materials at his disposal.

The accompanying drawings are not of the holotype.

Genus HETEROCRYPTA Stimpson

Heterocrypta colombiana, new species

Plate 18, Figs. 1-2

Type: Male, holotype, Cat. No. 78778, U.S. National Museum, from Port Utria, Choco, Colombia, shore; February 15, 1934; collected by Allan Hancock Expedition of 1934 at Velero Station 239a-34. Female, allotype, Cat. No. 351, Allan Hancock Foundation, The University of Southern California, from Salinas Bay, Costa Rica, 1½ fathoms; February 11, 1935; collected by Allan Hancock Expedition of 1935 at Velero Station 478-35.

Measurements: Male holotype: length of carapace 4.9 mm., width 7.0 mm., length of major chela 4.5 mm., of major dactyl 1.8 mm., height of gape 0.8 mm. Female allotype: length 4.5 mm., width 6.7 mm.

Diagnosis: Posterior margin of carapace almost straight, a well-defined angle at branchial ridge. Merus of fourth walking legs concealed in dorsal view. Rostrum elongate, faintly trilobate. Major chela half as high as long, fingers widely gaping.

Description: Carapace depressed, width nearly one and one-half times length, smooth and microscopically punctate. Branchial ridge paralleling the anterolateral border, although more nearly straight, and consisting of a double row of beaded granules. A short, transverse gastric ridge joining the branchial ridges, the carapace highest at their point of union. From this prominence a faint single line of granules extends half way to the orbit. Cardiac region low and nongranulate, although the punctae appear larger on this area. Posterior margin between branchial ridges almost straight, hiding the merus of the fourth walking legs from dorsal view but leaving the basal abdominal segment visible; a pronounced angle at its lateral extension beyond the branchial ridge. Rostrum broadly elongate, margin granulate, faintly trilobate. Orbit with a closed fissure above.

Under surface of carapace covered with beadlike granules except beneath lateral and posterior margins. Under side of rostrum excavate, antennules folding acutely, almost parallel to one another. Basal antennal article minute, the short flagellum not excluded from the orbit and lodged at the side of a prominent suborbital tooth, which is separated from the exorbital prominence by a deep and relatively wide fissure. External maxilliped completely granular, merus notched at inner angle for insertion of palpus and produced at the external angle so that

its outer border makes a broadly concave arc with the outer border of the ischium. A granular ridge runs from the anteroexternal angle of the buccal cavity to the base of the cheliped.

Chelipeds short, heavy, and strikingly disproportionate; the merus of each widest at its mid-point, with two serrate denticles on its inner margin and a clear row of beaded tubercles running the length of its inferior surface; carpus of each with a continuation of this granular ridge on the under side and three additional lines of granules on the superior surface; manus of the large claw with a high superior crest faintly angled at its mid-point, a median crest on the inner surface of the palm more sharply angled, and an outer row of bead granules similar to those on the carpus and merus; manus widening distally, greatest height one-half times the length; dactyl strongly curving downward, provided with spinulous ridges, and meeting pollex with a wide gape; immovable finger curving slightly upward, not constricted at base. Minor chela with a single tooth at mid-point of superior crest, widening little distally, its lower margin straight; fingers closing without a gape, tips crossing.

Segments 3-5 of male abdomen fused; abdomen narrowest at base of sixth segment, seventh segment triangular.

Color in alcohol: The specimen still retains a purplish-brown area embracing the rostrum and the anterior portion of the carapace. Against this background a light line runs inward from the base of each denticle of the lateral margins.

Remarks: This species is the Pacific analogue of *Heterocrypta granulata* (Gibbes) (1849), from which it may be distinguished by the straighter posterior margin concealing the fourth pair of walking legs and the consequently more evident angle of the posterior margin at the branchial ridge. It also differs from *granulata* by the depressed, non-granulate cardiac region, the more elongate front, the more prominent serrate teeth on the merus and manus of the cheliped, the greater height of the large claw in proportion to its length, and the upturned, rather than deflexed, immovable fingers. The lateral and posterior protuberances of the sixth abdominal segment of the male in *granulata* are wanting.

The discovery of this short-armed species at Port Utria, Colombia, fills a gap in the genus as represented in the Pacific. The other species, *Heterocrypta macrobrachia* Stimpson (1871) and *H. occidentalis* (Dana) (1854), are both long-armed species. The new species is more

likely to be confused with *Cryptopodia hassleri* Rathbun (1925), the chelae of which, however, are subequal and the laminate margins of which extend far beyond the walking legs.

PORTUNIDAE

Genus **PORTUNUS** Weber

Subgenus PORTUNUS

Portunus (Portunus) acuminatus Stimpson

Plate 19, Figs. 1-3

Achelous acuminatus Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 112[22] (type locality, Panama; type not extant;) not *Portunus (Portunus) acuminatus* Rathbun, Proc. U. S. Nat. Mus., vol. 38, 1910, pp. 538 and 577, pl. 49, fig. 4; not *Portunus (Portunus) acuminatus* Rathbun, Bull. 152, U. S. Nat. Mus., 1930, p. 56, pl. 19.

Type: Male, neotype, Cat. No. 391, Allan Hancock Foundation, The University of Southern California, from Port Parker, Costa Rica, 5-10 fathoms; March 25, 1939; collected by Allan Hancock Expedition of 1939 at Velero Station 936-39.

Measurements: Male neotype: length of carapace 13.0 mm., width including lateral spines 32.3 mm., length of lateral spine 5.8 mm., of cheliped 42.0 mm., of chela 20.4 mm., of dactyl 9.4 mm., height of manus at base of spine 2.6 mm.

Color in life: Ground color of carapace ivory yellow overcast with patches of light buffy brown, which take regular shape on gastric, cardiac, and intestinal regions. All ridges and spines garnet brown, a spot of the same color on cardiac, intestinal, and postbranchial areas. Chela as carapace with bands of garnet brown on carpus, manus, and outer surface of movable finger. Inner surface of movable finger and fixed finger bright, mallow purple; tips light brown. Ambulatory legs like carapace but lighter, banded with garnet brown. Dactyl vermilion with tinge of blue. Ventral side light buff; eggs scarlet. (Petersen)

Distribution: The 165 specimens from 16 Velero stations range from Isabel Island, Mexico, to La Libertad, Ecuador, including the original type locality, Bay of Panama.

Remarks: A consideration of the several thousand specimens of *Portunus* in the collections of the Allan Hancock Expeditions revealed the presence of a distinctive species in relative abundance which could not be

placed according to the classification proposed by Rathbun (1930), in which *Portunus (P.) acuminatus* Stimpson is considered a member of the so-called "*acuminatus-asper-panamensis* group." Reference to the original description of *Achelous acuminatus* Stimpson (1871) confirmed suspicion that the abundant species mentioned above was the real *acuminatus* rather than the photographed specimen (40270) upon which Miss Rathbun based her revised description in the Cancroid volume and her concept of *acuminatus, asper,* and *panamensis* as possible forms of a single species.

Especially significant is the fact that the real *acuminatus* is a small species, the males rarely attaining a size larger than that described by Stimpson (0.5 x 1.26 inches), while Miss Rathbun's *acuminatus,* although twice the size (1.0 x 2.5 inches), is considered by her as immature.

Particulars in which the species under consideration compares better with Stimpson's *acuminatus* than does the male specimen 40270 are as follows:

(1) The length of the chelipeds of a male specimen of like dimensions with Stimpson's type, no longer extant, is exactly three times the carapace length instead of two and one half.

(2) The length of the lateral spine is all of two-thirds times the length of the anterolateral margin instead of one half. This length increases proportionately rather than decreases as the specimens approach the size of Miss Rathbun's.

(3) The length of the merus of the cheliped is greater than the length of the carapace, as described by Stimpson, instead of less in specimen 40270.

(4) The manus is very slender instead of scarcely less slender than that of *panamensis* or *asper.*

(5) The carpus of the cheliped is thin in conformity to the slender manus.

(In connection with the carpus and manus, it seems well to point out that the thickness of the hand may refer either to its width, as seen in dorsal view, or to its height, as seen in frontal view. Not only is the chela of the true *acuminatus* very slender from above, but its proportionate height to length is 1:7 instead of 1:3.5 in the Rathbun specimen.)

(6) The second, fourth, and sixth anterolateral teeth are appreciably reduced instead of "only the second and sixth showing any

reduction" (Rathbun), a condition suggestive of the almost unreduced teeth of *Portunus (P.) asper.*

(7) The frontal teeth are equal and bluntly triangular instead of the outer pair being less triangular than the inner.

There is no particular in the Stimpson description not met in full by the species in question, which is as distinct from *panamensis* as both are from *asper.* One might desire that Stimpson had expatiated upon the extreme fragility of the carpus and manus, yet the words "very slender" convey the meaning now that additional specimens are at hand. Also, the extreme attenuation of the lateral spine, encompassing all but one, or in rare cases, all the lateral spines except the exorbital, might have been more forcibly called to attention. This was indicated by Stimpson in the designation *acuminatus,* but the meaning of the name perished with his specimen, to be recovered with ours.

In an attempt to account for the Stimpson species, Miss Rathbun has successively applied the name *acuminatus* to the most likely specimens among the meager assortment of Pacific *Portunus* at her disposal. Her *Portunus (P.) acuminatus* (1910) from Sechura Bay, Peru, was later referred by her to *P. panamensis* (1930) in the light of the above-mentioned specimen 40270, which, while not in complete agreement, as noted by her, fitted the description better than the Peruvian specimens. The writer follows the same logic in abandoning her specimen 40270 as *acuminatus* in consideration of the large series of Hancock Expedition specimens which fit Stimpson's description precisely. One of these, a male of identical dimensions, has been selected to replace Stimpson's type, which perished in one of a series of disasters which decimated his collections.

A key to the identity of the Rathbun specimen is found in the fact that on the strength of it she considered *acuminatus, panamensis,* and *asper* as possible forms of a single species. Its measurements preclude the possibility of its being the relatively narrow *panamensis;* hence it is probably an *asper,* the lateral spine of which has the maximum attenuation. Similar specimens are found in the Hancock collections, usually coming from south of Panama rather than north, the lateral spines of which are as long as the width of the five adjacent teeth. The writer was unable to locate the Rathbun specimen at the National Museum and has since learned that its misplacement was the result of a simple switch with *P. ordwayi* at the time the specimens were removed from their containers to be photographed.

Re-establishment of Stimpson's *P. acuminatus* gives equal and specific rank to the three organisms, *asper* (=*transversus* Stimpson), *panamensis,* and *acuminatus,* as conceived by Stimpson, rather than as forms of a single species, as suggested by Rathbun. Diagnostic characters are as follows:

(1) *P. asper:* Anterolateral arc broad, teeth showing little reduction; lateral spine equal to width of 4 or 5 adjacent teeth; cheliped heavy, 2⅓ times carapace length.

(2) *P. panamensis:* Anterolateral arc narrow (*Achelous*-like), teeth 2, 4, and 6 showing reduction; lateral spine equal to width of 2½ to 3 adjacent teeth; cheliped heavy, 3 times carapace length in male, 2½ in female.

(3) *P. acuminatus:* Anterolateral arc broader than *panamensis,* though not as broad as *asper,* teeth 2, 4, and 6 showing reduction; lateral spine equal to width of 6 or 7 adjacent teeth; cheliped fragile, length 3 to 3½ times carapace in male, height of manus ⅙ or ⅐ times length of chela.

XANTHIDAE

Genus PLATYXANTHUS A. Milne Edwards

Platyxanthus balboai, new species

Plate 20, Figs. 1-8

Type: Female, holotype, Cat. No. 392, Allan Hancock Foundation, The University of Southern California, and male, allotype, from outside Medidor Island, Bahia Honda, Panama, 30-35 fathoms, rock, mud, and dead coralline; March 28, 1939; collected by Allan Hancock Expedition of 1939 at Velero Station 948-39.

Measurements: Female holotype: length of carapace 26.8 mm., width 30.8 mm. Male allotype: length of carapace 31 mm., width 36 mm., of fronto-orbit 9.5 mm., of front 4.6 mm., length of major cheliped 60 mm., of chela 49 mm., of dactyl 22 mm., height of manus 19 mm., of gape 4.7 mm.

Diagnosis: Carapace narrow, convex, lumpy, proportion of length to breadth 6:7. Front advanced, quadrifid, well separated from orbit, frontal teeth tuberculiform. Four anterolateral teeth beside the exorbital. Merus of outer maxilliped longer than broad, pentagonal; ischium deeply furrowed. Chelipeds of male grossly disproportionate, major chela approaching half of carapace displacement. Epistome and antennular areas

deeply sunken beneath front. Tips of male copulatory appendages visible at sides of abdomen.

Description: Carapace superficially smooth and bare, microscopically flat granulate, uneven, narrow, breadth exceeding length by one sixth, very convex longitudinally as well as transversely, regions incompletely indicated. Front advanced, quadridentate, teeth subequal, tuberculiform, granulate, hairy, well separated; median V deep, prolonged posteriorly into a gutter, lateral separations U-shaped and of one half the depth. Orbits directed forward, inner orbital tooth triangular, almost as advanced as the front, as thick at base as half the front, and separated from it by a deep U-sinus also prolonged into a groove; three orbital fissures, two dorsal and one ventral, separating three equal and inconspicuous teeth, the median, exorbital, and outer suborbital; inner suborbital tooth prominent, visible in dorsal view at side of inner orbital, and separated from it by a wide hiatus. Eye deeply retractile, base standing in orbital hiatus, a row of granules bordering cornea. Anterolateral teeth four, exclusive of the minute exorbital, the first bluntly triangular, separated from the exorbital by a broad, swollen margin equal in width to the next two teeth, second and third teeth tuberculiform, crowded toward first, fourth tooth again separated from third by a sinus as broad as the distance between the first tooth and the exorbital; carapace widest at level of fourth tooth; a subhepatic tubercle barely concealed in dorsal view. Furrows of carapace incompletely defining the somewhat protuberant protogastric, hepatic, and epibranchial regions.

Epistome wide, deeply sunken beneath front. Antennules folding obliquely between inner and outer pair of frontal teeth. Antenna with basal article falling far short of rostrum, flagellum occupying normally the U-shaped sinus between front and orbit, rather than the orbital hiatus. (See pl. 20, fig. 2.) Merus of external maxilliped pentagonal, apex directed forward, length a shade greater than breadth, granulate and hairy. Ischium with a furrow parallel to the margin at inner two fifths superficially as definite as the separation between endognath and exognath. (See pl. 20, fig. 6.) Sternum of male with two raised, granulate areas opposite coxae of chelipeds.

Male abdomen with seven free segments, terminal joint broader than long, its sides converging, sinuous, tip pointed. Abdomen when in place not concealing hairy tips of male copulatory appendages, which are lodged in grooves between segments of the sternal plastron. (See pl. 20, fig. 7.)

Chelipeds of male grossly disproportionate, smooth, naked, faintly reticulate. Merus of larger cheliped heavy, breadth almost equal to length, a superior row of granules culminating in a near-tubercle, and a deep subdistal indentation. Carpus lumpy, a reticulate pattern exteriorly, a blunt tooth at inner angle. Chela gargantuan, approaching half of carapace displacement; palm tumid, nearly as high as wide, inferior border sinuous; dactyl fully as long as superior length of manus, color not covering basal fourth, tip deflexed; fingers meeting with a gape one third as high as wide, teeth white tipped, the larger separated by a denticle, well worn in the male specimen. (See pl. 20, fig. 3.) Minor cheliped a fraction of the size of major, carpus more uneven, manus strongly reticulate, fingers channeled, granulate, meeting without gape, pollex deflexed. (See pl. 20, fig. 4.)

Ambulatory legs moderately slender; merus granulate, especially above; carpus grooved and broadening distally; propodus, particularly of last leg, wide; dactylus long, straight, and pilose; margins of all segments hairy.

Female similar to male except for more nearly proportionate chelipeds. Major chela like minor chela of male except for the more prominent triangular cutting teeth and upturned tip of pollex, crossing dactyl. (See pl. 20, fig. 5.) Minor chela of both sexes alike.

Color in life: Carapace and cheliped dull yellow densely speckled with white and hellebore red. Ambulatory legs, including dactyl, yellow touched on upper surface with neutral red. Ventral surface also yellow, densely spotted on abdomen and sternum with red and scattered spots elsewhere. (Petersen)

Remarks: The discovery of a *Platyxanthus* in Panamanian waters extends the range of this South American genus into the Northern Hemisphere. The writer is indebted to Mr. Steve A. Glassell for a clue to the affinities of the new species, which differs so remarkably from its congeners in appearance that structural similarities are obscured. These are typically xanthid in form, being from one third to one half broader than long, having the front but little advanced beyond the anterolateral arch, which is dentate rather than tuberculate. While five lateral teeth are the rule in the genus (although any or all may be subdivided), the exorbital in *balboai* is so small and far removed that it is for all practical purposes a four-toothed species. Of the known Pacific *Platyxanthus* it is perhaps nearest *P. cokeri* Rathbun (1930) and most distant from *P. orbignyi* (Milne Edwards and Lucas) (1843), a specimen of which at hand

shows the epistomal and antennular area much less sunken and the flagellum of the antenna lodged in the orbital hiatus in the usual manner. The oblique anterior border of the merus of the outer maxilliped, the quadrifid front, well separated from the dentiform orbital angles, the inferior position of the basal antennal article, the disproportionate size of the claws, and the seven free male abdominal segments constitute the argument for placing the proposed new species in the genus *Platyxanthus*.

This handsome and readily distinguished species is named in honor of Vasco Nuñez de Balboa, who near its Panamanian type locality first set eyes on the Pacific Ocean, thereby opening it to conquest by science as well as by Spain.

Genus **HEXAPANOPEUS** Rathbun

Hexapanopeus costaricensis, new species

Plate 21, Figs. 1-4

Type: Male, holotype, Cat. No. 78779, U.S. National Museum, and female allotype, from Port Parker, Costa Rica, 5 fathoms, sand and shell; February 9, 1935; collected by Allan Hancock Expedition of 1935 at Velero Station 468-35. Six specimens, paratypes, from Puerto Culebra, Costa Rica, 3-10 fathoms, February 24, 1934; 22 specimens, paratypes, same locality, 10 fathoms, February 25, 1934; two specimens, paratypes, from coral, same locality and date; collected by Allan Hancock Expedition of 1934 at Velero stations 254-34, 257-34, and 258-34, respectively.

Measurements: Male holotype: length of carapace 5.2 mm., width 6.9 mm., of front 2.6 mm., of fronto-orbit 5.0 mm., length of major chela 5.2 mm., of dactyl 3.4 mm., height of claw 2.8 mm. Female allotype: length 4.0 mm., width 5.6 mm.

Diagnosis: Front slightly oblique, almost truncate, without lateral lobes. Second lateral tooth fused with first, their combined width equal to that of the third. Fourth and fifth teeth acute, thickened, and upturned. Chelae with prominent superior sulci. Carpus of walking legs deeply furrowed. Tip of male abdomen broad, rounded.

Description: Carapace hexagonal, regions well defined both anteriorly and posteriorly, granules becoming more distinct toward lateral and frontal margins and larger on the transverse gastric and branchial ridges.

Front thick, but not double edged, almost truncate, the merest suggestion of advancement on either side of the shallow median V and at the external angles, which are broadly rounded. Inner orbital tooth conspicuously separated from front, as large as, but less acute than, the exorbital, which it neatly apposes. Supraorbital tooth rounded, edge granulate, more advanced toward internal than near external orbital fissure. Exorbital or first lateral tooth completely fused with the second, their combined width being exactly equal to that of the third, edge granulate and sinuous. Third tooth broadest, tip almost rectangular, outer margin almost straight, obliquely angled at base, inner margin slightly concave with several denticles. Fourth and fifth teeth acute, upturned, thickened; carapace widest at fourth tooth, fifth smaller and postlateral in position. Prominent transverse ridges of carapace located on epigastric and mesobranchial regions; shorter transverse elevations, consisting of but a few granules surmounted by a hair, located on postfrontal, cardiac, and postbranchial regions; hepatic areas raised but without distinct ridges. Two thickened, granular elevations in advance of posterior margin of carapace.

Antennules folding obliquely, almost transversely. Basal antennal article meeting lateral extension of front, flagellum lodged in orbital hiatus. Lower orbital margin with beadlike granules; inner tooth advanced, outer notch deeply indicated. Merus of third maxilliped granular, proximal and distal margins subparallel, inner edge rounded, a slight concavity for the insertion of the granulate and hairy palpus.

Chelipeds unequal, coarsely granulate, and sparsely pubescent. Merus with a subterminal tooth. Carpus with three prominent tubercles in addition to the blunt spine at the anterointernal angle; granules arranged proximally in a rugose pattern; a broad, shallow sulcus paralleling the outer, distal border. Manus with a granular superior crest deeply furrowed, height of palm exceeding superior length, outer and lower two thirds of surface smooth and bare. Fingers channeled above, deflexed, incurving, a large tooth at base of dactyl of major claw, pollex irregularly denticulate, color not extending on palm. Fingers closing with a slight gape, tips crossing.

Ambulatory legs granulate, compressed. Superior margin of merus with sharpened granules and plumose hairs. Carpus deeply furrowed. Propodus wide with conspicuous hairs and acuminate granules on inferior margin. Dactyl finely granulate, pubescent, horny tip short and abruptly angled.

Abdomen of male with third segment narrower than first, second narrower than third. Terminal segment broader than long, tip rounded. Abdomen and sternum paved with fine, flat granules.

Distribution: The 33 specimens referred to this species all come from Costa Rican stations.

Remarks: The proposed new species occupies a range which overlaps that of two other common Pacific *Hexapanopeus, H. sinaloensis* Rathbun (1930) and *H. orcutti* Rathbun (1930). From the former it may be distinguished by the fused first and second lateral teeth, separated in *sinaloensis* by a U-shaped sinus and by the subquadrate merus of the outer maxilliped, that of *sinaloensis* being subtriangular. (See pl. 21, fig. 4.) From *H. orcutti* it may be separated by the absence of outer frontal lobes, the fusion of the first two lateral teeth, the presence of a basal digital tooth, and the fact that the color of the fingers ends abruptly at the interdigital sinus, that of *orcutti* extending some distance on the palm. (See pl. 21, fig. 2.)

In many respects the new species comes closest to *H. cartagoensis* Garth (1939) from the Galapagos Islands. However, the more nodose carpus and the superior furrows of the cheliped, the more nearly truncate and lobeless front, and the greater width of the male terminal abdominal segment of *H. costaricensis* will serve to distinguish it clearly. (See pl. 21, fig. 3.)

A complete analysis of the Pacific species of *Hexapanopeus* with keys to new species described from Hancock collections will appear in a forthcoming report.

Genus **HETERACTAEA** Lockington

Heteractaea peterseni, new species

Plate 22, Figs. 1-5

Type: Female, holotype, Cat. No. 79151, U. S. National Museum, from north end of channel, Octavia Bay, Colombia, 35-40 fathoms, coarse sand gravel, specimen cracked from rock; January 27, 1935; collected by Allan Hancock Expedition of 1935 at Velero Station 429-35.

Measurements: Female holotype: length of carapace 17.5 mm., width 26.8 mm., of front 7.3 mm., of fronto-orbit 14.3 mm., length of major cheliped 27.8 mm., of major chela 16.5 mm., of dactyl 8.9 mm., height of palm 9.6 mm.

Diagnosis: Anterior two thirds of carapace covered with raised, truncate areoles and tubercles. Edge of front thin. Orbits with two naked, thickened, lobate processes above, two below. Anterolateral margins irregularly spinulous. Merus of walking legs with a bladelike terminal spine; propodus with two laminate crests and an intervening gutter.

Description: Carapace approximately two thirds as long as broad, flattened posteriorly, deflexed anteriorly and toward the anterolateral margins, regions well defined. Anterior two thirds of carapace areolate, the areoles becoming increasingly upstanding and truncate anteriorly and laterally, a fine pubescence between them. Posterior third of carapace nontuberculate but coarsely and irregularly granulate.

Front broad, truncate, about two sevenths of total width, a slight median emargination, edge thin and sinuous in frontal view. (See pl. 22, fig. 2.) Orbits consisting of two naked, thickened, lobate processes above and two below, the former pair the better separated; outer notch distinct. Anterolateral margins armed with numerous spines and spinules, the larger of which are forward curving, their accessory spinules as likely to curve backward, giving the margin an exceedingly rough and irregular appearance. Lateral spine coarser and longer than other marginal spines and separated from them by a deep, U-shaped emargination from which point the margin trends forward to the corners of the buccal cavity. Principal prominences of carapace disposed as follows: three low, small areoles on mesogastric area in the form of a trefoil, two larger areoles on each epigastric region, the outer pair truncate and preceded by a sharp cluster of spinules; two hepatic tubercles at the same level; two pairs of truncate areoles posterior to the front; two mesobranchial areoles just below the hepatic; one inner branchial areole below the outer of the two epigastric; two broad blades at the level of the lateral spines and two clusters of spinules above them.

Antennules folding transversely, separation of fossae complete; basal article of antennae short, barely reaching front; second article lodged in orbital hiatus. Antennae three fourths as long as width of front. Epistome broad, channeled, lower edge emarginate. Merus of third maxilliped roughly rectangular, anteroexternal angle produced and granulate, anterointernal angle flaring to form a substantial support for the large, hairy palpus. Ischium broad, inner margin granulate, a tiny basal process impinging on the exopodite. (See pl. 22, fig. 5.)

Chelipeds unequal, merus of the larger concealed beneath carapace; carpus and manus roughened by spine-tipped tubercles interspersed with

a fine pile, manus with the four largest tubercles forming a superior crest; outer surface of palm completely roughened, spines on lower half of hand arranged in longitudinal rows. Fingers ribbed and channeled, prehensile edges strongly toothed, tips incurving; dactyl with a tubercle and three spinules above. (See pl. 22, fig. 3.) Minor chela similar to major except that tubercles are even more attenuated, fingers more slender, the dactyl provided with two rows of sharp spinules.

Meri of all ambulatory legs spinulous above, granulate below, spinules increasing in size distally, terminal spine a bladelike process. Carpi with two parallel laminate ridges with sinuous margins between which runs a deep, smooth channel, U-shaped in cross section. Propodi with a double row of long, sharp spines. Dactyli exceeding length of propodi, horn tipped; all segments short pubescent with longer marginal hairs. (See pl. 22, fig. 4.)

Female abdomen with each segment constricted at base, giving edges a scalloped appearance. Terminal segment nearly as long as broad, sides arcuate.

Color in life: Carapace bright apricot orange, pubescence pale old gold. Front, orbit, and eyestalk varying shades of orange, cornea brilliant pansy purple. Chelae reddish orange chrome with tips of tubercular spines nearly white. Fingers brilliant aster purple, extreme tips nearly white. Ambulatory legs lighter than carapace with faint indications of a light band on each segment; rims of carpus with a strong purplish hue. (Petersen, taken from an immature female specimen dredged in the Gulf of California, February 13, 1940.)

Distribution: The finding of a female and one young specimen three miles southwest of San Francisco Island, Gulf of California, Mexico, in 43-44 fathoms at Velero Station 1116-40, extends the known range of this species thousands of miles northward from Octavia Bay, Colombia, the type locality.

Remarks: The proposed new species is placed, with some uncertainty, in the American genus *Heteractaea* because of the thickened orbital border, lobed below as well as above, the spinulous anterolateral margin trending forward and downward to the anterior corners of the buccal cavity, and the remarkable processes of the carpi of the ambulatory legs which, while not lunate crests, are sufficiently similar in configuration to suggest affinity. The front, while not thick, bears a pair of thickened lobes just posterior to it in exactly the same manner as in *H. lunata* (Milne Edwards and Lucas) (1843). A comparison with specimens of

the latter reveals a similarity greater than one would be led to expect from written descriptions only, in that antennal and orbital regions, chelipeds, and maxillipeds conform to a remarkable degree.

An interesting note made by Dr. Waldo L. Schmitt at the time of capture, "cracked from rock," furnishes a possible clue to the use made of the channeled carpi. If this crab inhabits rocky crevices into which it wedges itself securely, may not the ambulatory legs, when held tightly against the under side of the carapace, form gutters for the incurrent and excurrent sea water, effective as prolongations of the afferent and efferent branchial channels?

This species is dedicated to Mr. Anker Petersen, scientific artist, in the full realization that he has depicted it more accurately in line and stipple than I can hope to do in words.

Genus **PILUMNOIDES** Milne Edwards and Lucas

Pilumnoides rotundus, new species

Plate 23, Figs. 1-5

Type: Female, holotype, Cat. No. 374, Allan Hancock Foundation, The University of Southern California, from San Esteban Island, Gulf of California, Mexico, 35 fathoms, shell; March 27, 1937; collected by Allan Hancock Expedition of 1937 at Velero Station 729-37. Male, allotype, Cat. No. 374a, from south end of Tiburon Island, Gulf of California, Mexico, 8-10 fathoms, kelp, corallines; March 10, 1936; collected by Allan Hancock Expedition of 1936 at Velero Station 564-36. Three females and one young, paratypes, from San Francisquito Bay, Lower California, Mexico, 165 fathoms, shale and mud; March 1, 1936; and one female, ovigerous, paratype, from the same locality, 125 fathoms, shale, rock, and mud; March 2, 1936; collected by Allan Hancock Expedition of 1936 at Velero stations 529-36 and 534-36, respectively.

Measurements: Female holotype: length of carapace 7.4 mm., width 8.8 mm., of fronto-orbit 5.2 mm., length of major manus 4.9 mm., height 3.5 mm. Male allotype: length 7.4 mm., width 8.7 mm.

Diagnosis: Carapace granulate posteriorly as well as anteriorly. Oblique prolongation from lateral angles wanting. Orbits with superior fissures obliterated. Merus of third maxilliped produced at outer distal angle. Manus externally hairy.

Description: Carapace suborbicular, rotund, slightly broader than long, and narrowing posteriorly. Regions well defined anteriorly, oblit-

erated posterior to the cardiac area, oblique prolongation from lateral angles wanting. Granules of carapace beadlike and regularly placed posteriorly, becoming sharper, more crowded, and irregularly placed toward the frontal and lateral margins. Front narrow, about one third carapace width, thickened, bilobed, granulate. Orbits subcircular, superior fissures obliterated, a notch at external angle. Of the anterolateral teeth, only the first two in addition to the exorbital are distinct and tuberculate, the remainder of the margin consisting of single, sharpened granules, alternately large and small. Greatest width of carapace slightly in advance of lateral angle. Postfrontal, protogastric, gastric, and hepatic regions coarsely tuberculate, sparsely hairy, raised, and separated by deep, naked sulci, giving the anterior portion of the carapace a decidedly areolate appearance. Cardiac, intestinal, and postbranchial regions low, confluent, and paved with beaded granules; a straight row of minute granules above the posterior margin.

Antennular fossae large, antennules folding obliquely above the broad septum. Antennae short, basal article all but concealed by prominent inner suborbital tooth, second article barely touching front. Epistome sinuous. Endostomial crest emarginate. Anteroexternal angle of merus of outer maxilliped produced acutely, inner angle sharpened, a prominent notch for the insertion of the large, somewhat compressed, hairy palpus. (See pl. 23, fig. 4.)

Chelipeds massive, merus totally concealed in dorsal view, carpus slightly exceeding manus in displacement, roughly tuberculate and hairy, a prominent median depression near its distal extremity. Manus with three large, compressed, sharpened teeth forming the superior crest; lower half of palm with a dense covering of plumose hairs through which granules arranged in rows are discernible. Fingers *Pilumnus*-like, stout, tips crossing; pollex greatly shortened, two flattened teeth near tip; dactyl correspondingly deflexed, channeled, tip pointed, a superior tubercle at base.

Abdomen of male with seven free segments. (See pl. 23, fig. 3.)

Walking legs finely pubescent; meri with superior margins sharp granulate; carpus with a double row of granules, widening distally; propodus widest; dactylus with a fine, yellow, pointed nail.

Color in life: Carapace dull ochraceous buff with varicolored granules, most chrome orange, some carmine red, and others bright cadmium orange. Ground color of chelae reed yellow with granular spines scarlet red. Fingers sayal brown. Merus of ambulatory legs yellowish cream buff

with two broad bands of orange. Carpus and propodus orange red, dactylus white, touched with red at base. (Petersen, taken from a male specimen secured in the Gulf of California at Velero Station 1059-40.)

Remarks: The proposed species gives the North Pacific Ocean its first representative of a genus found in the North and South Atlantic and in the South Pacific. As might be expected, it is a more nearly perfect analogue of the species from the North Atlantic, *Pilumnoides nudifrons* (Stimpson) (1871), than of the Peruvian and Chilean *P. perlatus* (Poeppig) (1836), type of the genus. With *P. hassleri* A. Milne Edwards (1880) from Uruguay and the Straits of Magellan it has little in common.

Compared to *P. nudifrons,* the new species agrees remarkably on structural points, such as orbital configuration, size and relationship of the antennular and antennal areas, endostomial emargination, and shape of the external maxilliped. The most remarkable conformity is in the height and length of the fingers and the type and location of the pubescence of the hand. (See pl. 23, fig. 2.) Dissimilarity is encountered in the naked front of *nudifrons,* almost continuous instead of bilobate, its four anterolateral teeth without denticles between, its almost smooth, though hairy, carapace (except for hepatic tubercles), and its more hexagonal, less rotund appearance.

Compared to *P. perlatus,* the new species lacks the two supraorbital fissures, the compressed anterolateral margins, the transverse striae, including the line inward from the lateral angle, and the smooth posterior half of the carapace and ambulatory legs. The hands of *perlatus* are devoid of hairs, and the merus of the third maxilliped is rounded but not attenuated as in *rotundus.*

GONEPLACIDAE

Genus **PSEUDORHOMBILA** Milne Edwards

Pseudorhombila xanthiformis, new species

Plate 24, Figs. 1-5

Type: Female, holotype, Cat. No. 3810, Allan Hancock Foundation, The University of Southern California, from north of Gorgona Island, Colombia, 40-60 fathoms, mud and rock; February 24, 1938; collected by Allan Hancock Expedition of 1938 at Velero Station 854-38.

Measurements: Female holotype: length of carapace 15.1 mm., width 22.0 mm., of front 6.5 mm., of fronto-orbit 12.6 mm., length of cheliped 25.0 mm., of chela 14.7 mm., of major dactyl 8.0 mm.

Diagnosis: Carapace granulate, regions defined. Merus of outer maxilliped produced at anteroexternal corner. Carpus of major cheliped obliquely quadrilateral. Anterolateral teeth four, margin upturned. A hepatic cluster of granules. Outer third of palm smooth, punctate.

Description: Carapace very convex longitudinally, less so from side to side; anterolateral margins upturned. Regions defined, surface granulate, granulations becoming larger and rougher toward the arcuate anterolateral margins, sulci smooth and bare. Front between one-third and one-fourth times width of carapace, truncate, edge thin, a slight emargination, and an inconspicuous outer lobe. Orbits elongate oval, separated from front by a shallow but distinct sulcus, closed fissures above indicated only by the slight convexity of the intervening margin. Anterolateral teeth four beside exorbital, well separated, triangular, and granulous margined; the first small, well removed from the orbit; the second larger, broader, and obtusely angled; third tooth largest, tip almost hooked forward; fourth tooth slender, directed obliquely upward; width of carapace at third and fourth teeth subequal. Posterolateral border longer than anterolateral, sides sharply converging. A prominent cluster of subhepatic granules.

Antennules folding transversely, separated by a strong median septum. Basal antennal article small, far removed from buccal cavity, flagellum lodged in orbital hiatus. A prominent inner suborbital tooth with a broad, lamellar tooth separated from it. Epistome broad with a transverse carina. Merus of outer maxilliped broader than long, anteroexternal angle strongly produced. (See pl. 24, fig. 4.)

Chelipeds of female similar but unequal. Merus with a granular ridge terminating in a transverse sulcus. Carpus of major claw obliquely quadrilateral, a stout spine at inner angle and a well-defined sulcus parallel to the distal border. Chela, like carpus, granulate; granules arranged proximally in rows; outer third of palm smooth and minutely punctate. Fingers long, slender, tapering, deflexed, slightly incurving, meeting with but a slight gape, and irregularly toothed. Basal lobe on dactyl lacking in minor hand. Height of palm equal to superior margin. (See pl. 24, fig. 3.)

Ambulatory legs slender, attenuated, pubescent; merus and carpus granulate above. Dactyls long, straight, and slender, that of leg four slightly upcurving.

Remarks: The reference of the proposed new species to the genus *Pseudorhombila* Milne Edwards (1837) instead of *Oediplax* Rathbun

(1893) is based upon the examination of the type of *P. octodentata* Rathbun (1906) (U.S.N.M. Cat. No. 32690) from Dominica, W.I., and a cotype of *P. quadridentata* (Latreille) (1825) (U.S.N.M. 20280), type of the genus, type locality unknown, a gift of the Paris Museum, as well as upon the type of *Oediplax granulata* Rathbun (1893) (U.S.N.M. 17465) from Consag Rock in the Gulf of California. The characters to which most importance is attached are the shape of the merus of the third maxilliped and of the carpus of the cheliped. In the new species the merus is distinctly produced as in *Pseudorhombila* instead of quadrate as in *Oediplax*. With regard to the shape of the carpus, our specimen is frankly intermediate between the two genera, but still sufficiently angled to be called obliquely quadrilateral, instead of oval, as in *Oediplax*.

Since the remaining characteristics upon which Miss Rathbun's genus *Oediplax* was based, namely, the relative proportion of front to carapace width and of anterolateral to posterolateral margins, are not borne out by the second specimen of the type series, a small female, nor by other small specimens in the Hancock collections, the necessity for the genus *Oediplax* would seem debatable. Until more specimens, particularly males, are obtainable, it will be impossible to settle this point satisfactorily.

Genus **CYRTOPLAX** Rathbun

Cyrtoplax panamensis Ziesenhenne, new species

Plate 25, Figs. 1-4

Type: Male, holotype, Cat. No. 388, Allan Hancock Foundation, The University of Southern California, and female, allotype, from Bahia Honda, District of Veraguas, Panama, 30-50 fathoms off North Island; March 1, 1938; three males and one female, paratypes, same locality and date; collected by Allan Hancock Expedition of 1938 at Velero Station 863-38. One female, paratype, same locality, shore; March 9, 1933; one male, paratype, same locality, 30-50 fathoms; March 28, 1939; collected by Allan Hancock Expeditions of 1933 and 1939 at Velero stations 111-33 and 948-39, respectively.

Measurements: Male holotype: length of carapace 5.4 mm., width 8.2 mm., width of front 2.9 mm., of fronto-orbit 5.7 mm., length of major chela 5.6 mm., of major dactyl 3.2 mm. Female allotype: length of carapace 5.1 mm., width 7.8 mm.

Diagnosis: Carapace broadly hexagonal, length two thirds width. Wrist coarsely granulate, a single, sharp spine at inner angle and a

cluster of spinules beneath it. Third lateral tooth obtuse, blunt, and with a serrate edge; larger than other teeth. Carapace widest at fourth lateral tooth.

Description: Carapace broadly hexagonal, about two thirds as long as wide, more convex longitudinally than transversely, hairy, gastric areole prominently indicated. Front approximately one third the width of the carapace, its lobes slightly convex, median notch shallow, edge thin. Eyestalks narrowing distally, a slight constriction at base of cornea. Orbits transverse, not separated from the front by a prominence, trending outward rather than forward, a superior fissure internally and a notch externally separating the broad, low, granulate, slightly convex lobe from the obtusely angled and little-advanced exorbital tooth. Lateral teeth five in number, counting the exorbital, slightly upturned, edges serrate or denticulate; second tooth low, rounded, and separated from the first by a shallow U; third tooth obtuse and blunt, larger and more prominent than other teeth, bearing several conspicuous denticles on its inner slope; fourth tooth smaller, acute, outer margin curved, inner margin straight, carapace widest at this level; fifth tooth postlateral in position, small and sharp. Posterolateral margins exceeding anterolateral and moderately convergent. Two depressions at the union of the postbranchial and metagastric regions.

Antennules large, folding transversely. Antennae minute, lodged in the orbital hiatus; flagella extending beyond eyes, slender. Epistome short. Buccal cavity broadening anteriorly. Merus of outer maxillipeds broader than long, exterior angle produced, rounded, interior angle faintly notched to receive the short, thick, hairy, cylindrical palpus. (See pl. 25, fig. 4.)

Chelipeds massive, unequal, hairy. Merus with a subterminal tooth surmounted by several sharp granules. Major carpus subglobular, granulate, bearing a single, short, sharp spine (broken in the holotype specimen) at its inner superior angle and a row of three or four spinules beneath it; a sulcus parallel to the margin adjoining the palm. Major manus bare and glistening; palms convex above and beneath; superior margin with two parallel granulate ridges interspersed with long, shaggy hairs and extending on to the dactyl, which curves inward. Fingers of major manus irregularly toothed, pollex scarcely deflexed, meeting dactyl with an elongate gape. Fingers of minor manus more slender, lower margin of manus almost straight. Color of fingers not continued on palms. (See pl. 25, fig. 2.)

Merus of ambulatory legs moderately slender, hairy, compressed, and minutely spinulous along anterior margin. Carpus hairy above, propodus along inferior margin as well. Dactylus densely hairy with an amber tip; dactylus of fourth leg outcurving.

Male abdomen widest at segment three, which does not completely cover the sternum, narrowest at base of segment six; tip of seventh segment broadly rounded. (See pl. 25, fig. 3.)

Color in life: Carapace cream color overcast with buffy brown. Fingers pale lilac, dactyls of ambulatory legs white. Ventral side pale cream buff with tinge of lilac. Legs pale cream buff and lightly touched with reddish brown. (Petersen)

Distribution: The 60 specimens collected at 15 Velero stations by Allan Hancock Expeditions range from north of Angel de la Guardia Island, Gulf of California, Mexico, to Port Utria, Colombia, from shore to 70 fathoms.

Remarks: Since the appearance of Bulletin 97 of the U. S. National Museum (1917), Miss Rathbun has described two new species of *Cyrtoplax* from the west coast of the Americas, calling each in turn the Pacific counterpart of *C. spinidentata* (Benedict) (1892) without reference to the other. The same designation accompanied her determination of the new species described above by Mr. Ziesenhenne. After consulting types the writer believes that *C. schmitti* Rathbun (1935), a large, glabrous species, is the most nearly perfect analogue of the Atlantic species. *C. valeriana* Rathbun (1928) appears to be outside the scope of the genus as conceived by him. Mr. Ziesenhenne's species is unlike any other *Cyrtoplax* examined, having a superficial resemblance to *Chasmophora macrophthalma* (Rathbun) (1898) from the same Panamic region. However, the possession of five anterolateral teeth instead of the four of *Chasmophora* and the ratio of fronto-orbital to total width (5 to 7 instead of 6 to 7) definitely removes this possibility.

An analysis of the American species of *Cyrtoplax,* exclusive of *C. valeriana,* will appear in a forthcoming paper.

Genus **CHASMOCARCINUS** Rathbun

Chasmocarcinus longipes, new species

Plate 26, Figs. 1-5

Type: Female, holotype, Cat. No. 389, Allan Hancock Foundation, The University of Southern California, from Secas Islands,

Panama, three fathoms, mud; March 2, 1938; collected by Allan Hancock Expedition of 1938 at Velero Station 865-38. Four males and one female, paratypes, from Port Utria, Colombia, 20 fathoms; February 14, 1934; collected by Allan Hancock Expedition of 1934 at Velero Station 233-34.

Measurements: Female holotype: length of carapace 8.5 mm., width at posterior border 11.9 mm., at lateral angles 10.2 mm., width of front 1.8 mm., of fronto-orbit 4.6 mm., length of cheliped 14.6 mm., of manus 7.5 mm., of dactyl 4.9 mm., of fourth ambulatory leg 20.6 mm.

Diagnosis: Carapace broad anteriorly. Front advanced, bilobed. Fingers greatly elongated. Third ambulatory leg more than twice the width of carapace measured at lateral angles. Merus of third maxilliped elongate oval.

Description: Carapace superficially smooth and bare, microscopically granulate; length between two-thirds and three-fourths times width; lateral margins less convergent anteriorly than those of *C. latipes* Rathbun (1898). Front advanced beyond general outline of carapace. Orbits curving forward and downward to a broad exorbital lobe which turns backward to become the granulate anterolateral margin. Gastric area indicated by two shallow longitudinal furrows connected by a transverse furrow in the form of an H. Branchial regions swollen. Greatest width of carapace at posterior margin. Antennules folding transversely beneath the front. Antennae long and slender. Epistome diamond shaped. Merus of third maxilliped longer than broad, oval; tip of palpus hairy. Female abdomen and sternum finely granulate.

Female chelipeds subequal, carpus and manus smooth and glabrous. Merus with a superodistal tubercle surmounted by hairs. Carpus with a granulate outer margin and a sharpened tooth at inner angle bearing a cluster of hairs. Manus with short superior margin. Fingers slightly deflexed, long, straight, slender, prehensile edges alternately large and small spinulous, tips incurving. Inferior margin of hands with a hairy ridge. Male chelipeds increasingly disproportionate with age. Manus of half-grown male as high as broad, upper and lower borders subparallel, smooth and bare except for a strip of fine granulation across lower proximal corner. Fingers strongly deflexed, meeting with an elongate gape, tips incurving. Dactyl with outer margin slightly concave, almost straight, three subequal teeth at base; pollex also with three denticles opposite basal constriction. Minor chela of male as described for female. (See pl. 26, figs. 2 and 3.)

Ambulatory legs smooth, margins finely pilumnose. Meri of ambulatory legs slender; merus of leg three almost five times as long as wide; carpus, propodus, and dactylus similarly attenuated. Length of third ambulatory leg over twice the width of carapace at lateral angles. Seccnd leg next in length; fourth shortest, its dactyl curving strongly outward.

Color in life: Carapace deep olive buff with large, irregular patches of citrine drab almost covering frontal, cardiac, gastric, and branchial areas. Eye reddish purple. Ambulatory legs lighter than carapace and netted lightly with neutral red. Fingers apricot orange gradually fading to white tips. Ventral side cream buff. (Petersen)

Distribution: The 28 specimens collected by Allan Hancock Expeditions at 8 Velero stations range from Secas Islands, Panama, to La Plata Island, Ecuador, from shore to 50 fathoms.

Remarks: This species may be separated from *C. latipes* Rathbun (1898), as shown by examination of the type (U.S.N.M. No. 21592), by its greater anterior width and less converging sides, by the configuration of the bilobed front and forward curving orbits, by the greatly elongated third ambulatory leg and slender meri of all the ambulatories with almost straight anterior margins, and by the proportionately longer and narrower ischium and merus of the outer maxilliped. In male specimens of any size the asymmetrical cheliped with its high palm and deflexed fingers becomes the most conspicuous distinguishing feature, the chelae of *C. latipes* males, of whatever age, remaining equal and similar.

The same differences will serve to distinguish the proposed new species from *C. ferrugineus* Glassell (1936), the type of which, in the laboratories of the Institute for Tropical Research of the New York Zoological Society, was examined through the courtesy of Dr. William Beebe and found to be identical with Miss Rathbun's species. The ruddy color of the Zaca specimen is due to a ferruginous mud in which *C. latipes* frequently occurs and may be removed with a stiff brush. The difference in orbital configuration is negligible.

The Atlantic *Chasmocarcinus* most nearly analogous to the proposed new species appears to be *C. cylindricus* Rathbun (1901). As shown by an examination of the type (U.S.N.M. No. 23765) from Puerto Rico, it has the broad front, the slender meri, and the spinulous fingers of *longipes,* but the joints of the third ambulatory leg are relatively short, and the merus of the maxilliped is even rounder than in *latipes.*

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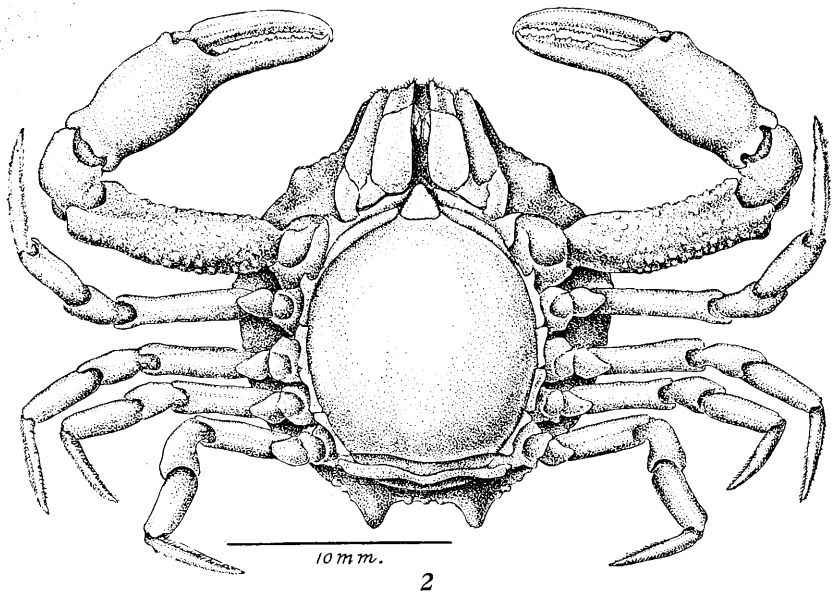
PLATE 11

Randallia angelica, new species
Female holotype

Fig. 1. Dorsal view.
Fig. 2. Ventral view.



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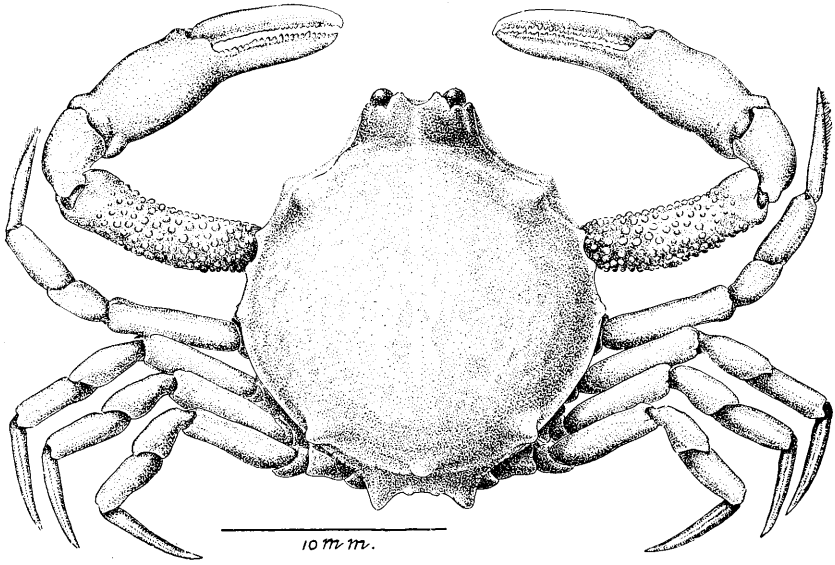


1

PLATE 12

Osachila sona, new species
Female holotype

Fig. 1. Dorsal view.
Fig. 2. Left outer maxilliped.
Fig. 3. Female abdomen.
Fig. 4. Fourth ambulatory leg.

Osachila galapagensis Rathbun
Female paratype

Fig. 5. Fourth ambulatory leg.
Fig. 6. Female abdomen.

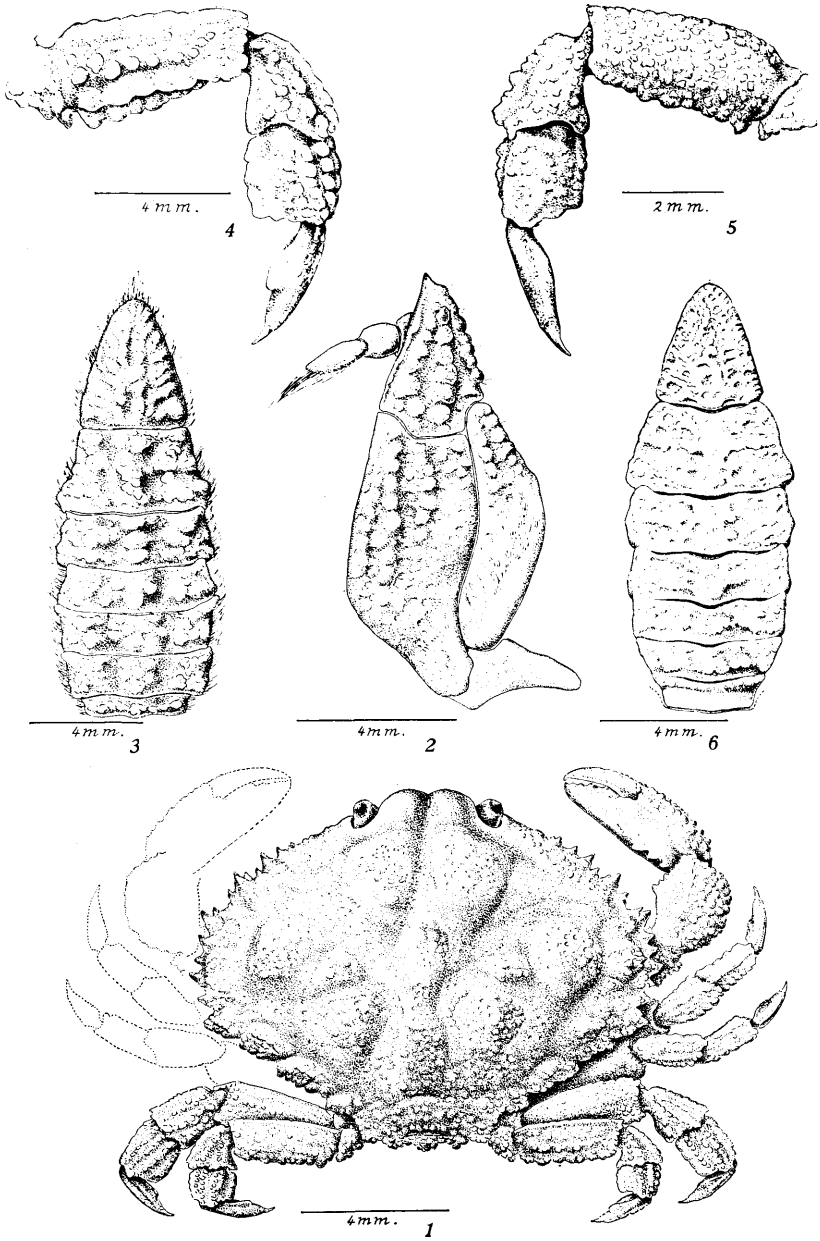

4 mm.
4
2 mm.
5
4 mm.
3
4 mm.
2
4 mm.
6
4 mm.
1

PLATE 13

Podochela ziesenhennei, new species
Male holotype

Fig. 1. Dorsal view.
Fig. 2. Ventral view of front.
Fig. 3. Right chela.
Fig. 4. Left outer maxilliped.
Fig. 5. Fourth ambulatory leg.
Fig. 6. Abdomen.

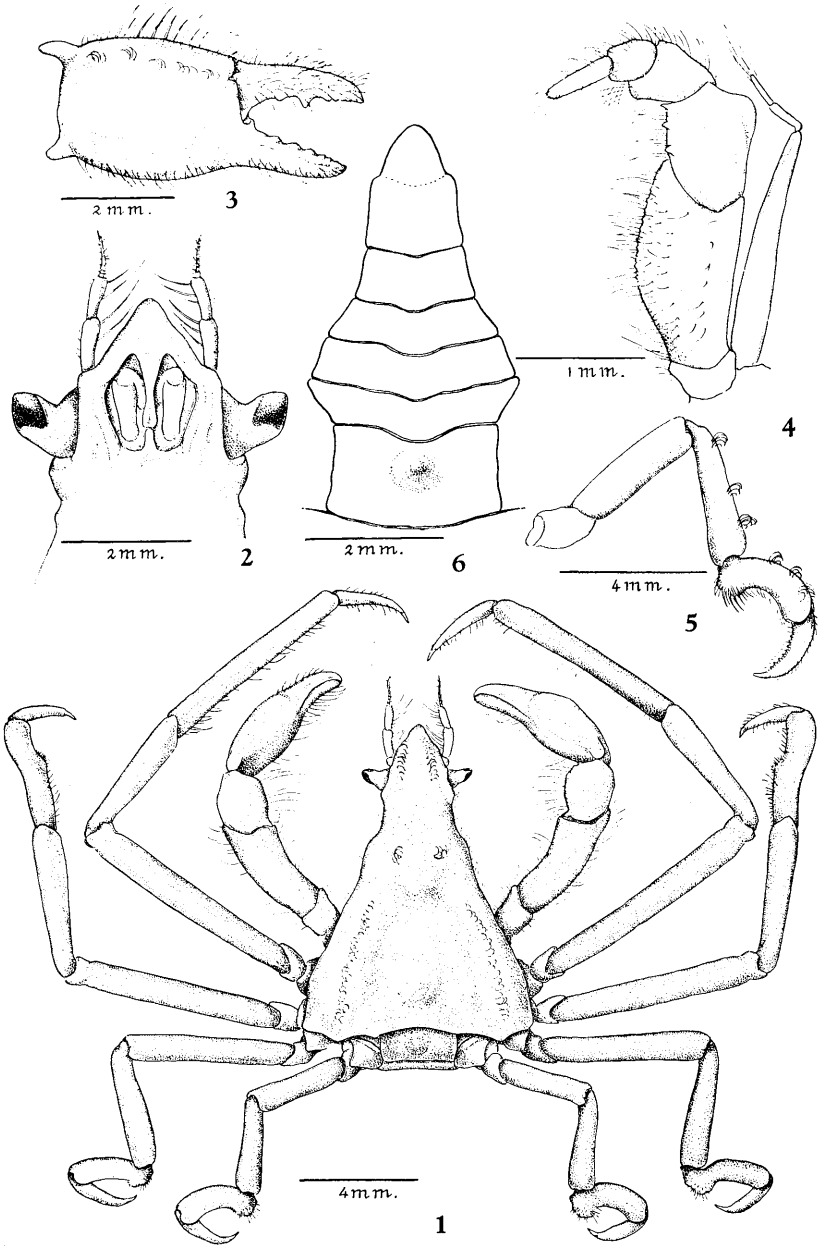
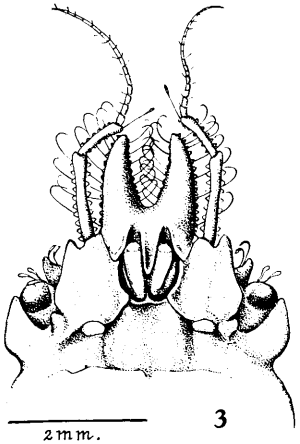

2 mm.
3
1 mm.
4
2 mm.
2
2 mm.
6
4 mm.
5
4 mm.
1

PLATE 14

Notolopas mexicanus, new species

Male holotype

Fig. 1. Dorsal view.
Fig. 2. Right chela.
Fig. 3. Ventral view of front.
Fig. 4. Left outer maxilliped.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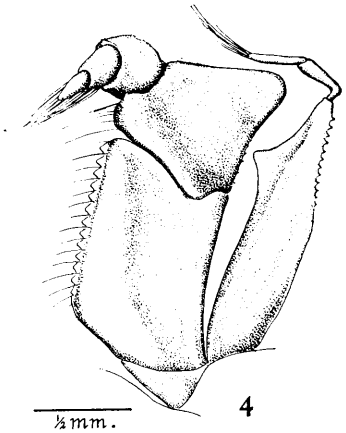
3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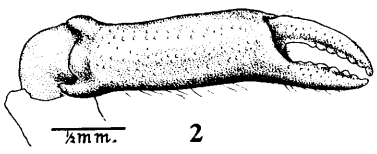
4


½ mm.
2

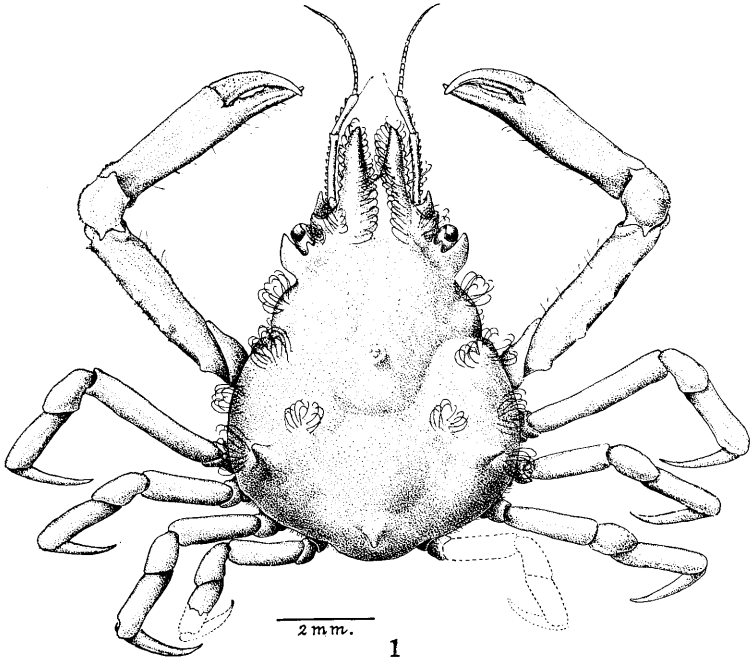

2 mm.
1

PLATE 15

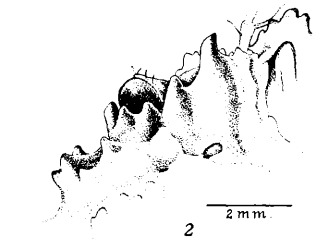
Mithrax (Mithrax) clarionensis, new species

Female holotype

Fig. 1. Dorsal view.
Fig. 2. Ventral view of orbit.
Fig. 3. Dorsal view of orbit.

Mithrax (Mithrax) sinensis Rathbun

Fig. 4. Ventral view of orbit, male holotype.
Fig. 5. Gastric shield.
Fig. 6. Dorsal view of orbit, male holotype.
(Figures 4 and 6 drawn by Miss Jane Roller.)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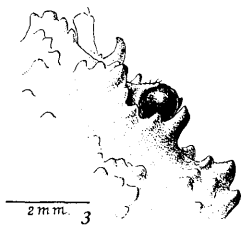
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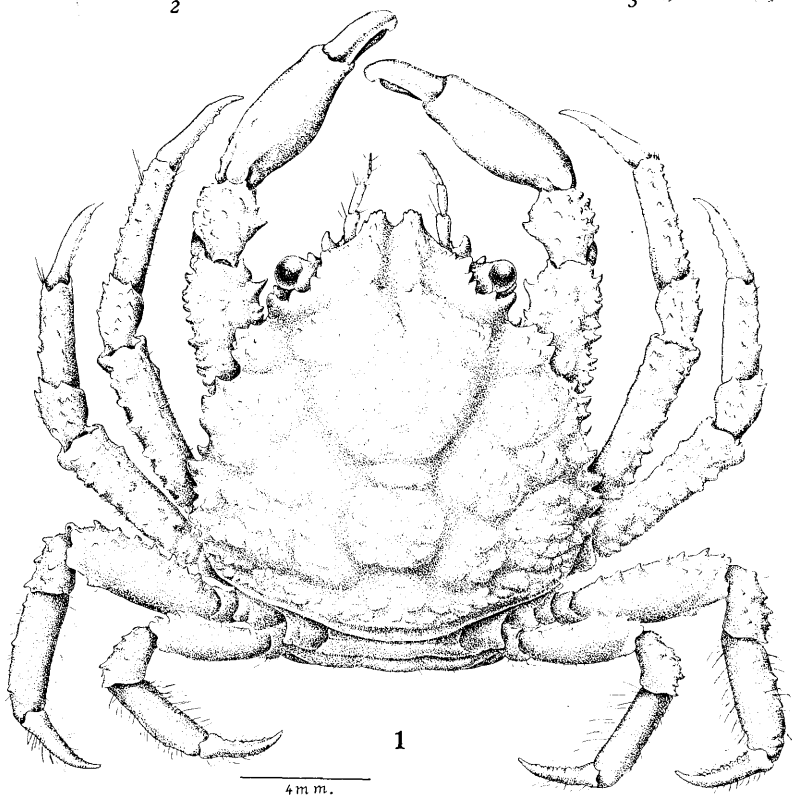
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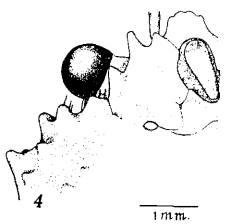
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1 mm.


5

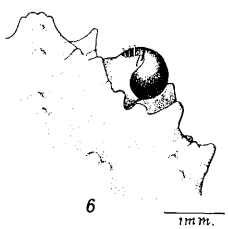

6
1 mm.

PLATE 16

Macrocoeloma maccullochae, new species
Male holotype

Fig. 1. Dorsal view.
Fig. 2. Male genitalia.
Fig. 3. Left outer maxilliped.
Fig. 4. Under side of orbit.

M. trispinosum (Latreille)

Fig. 5. Male genitalia.

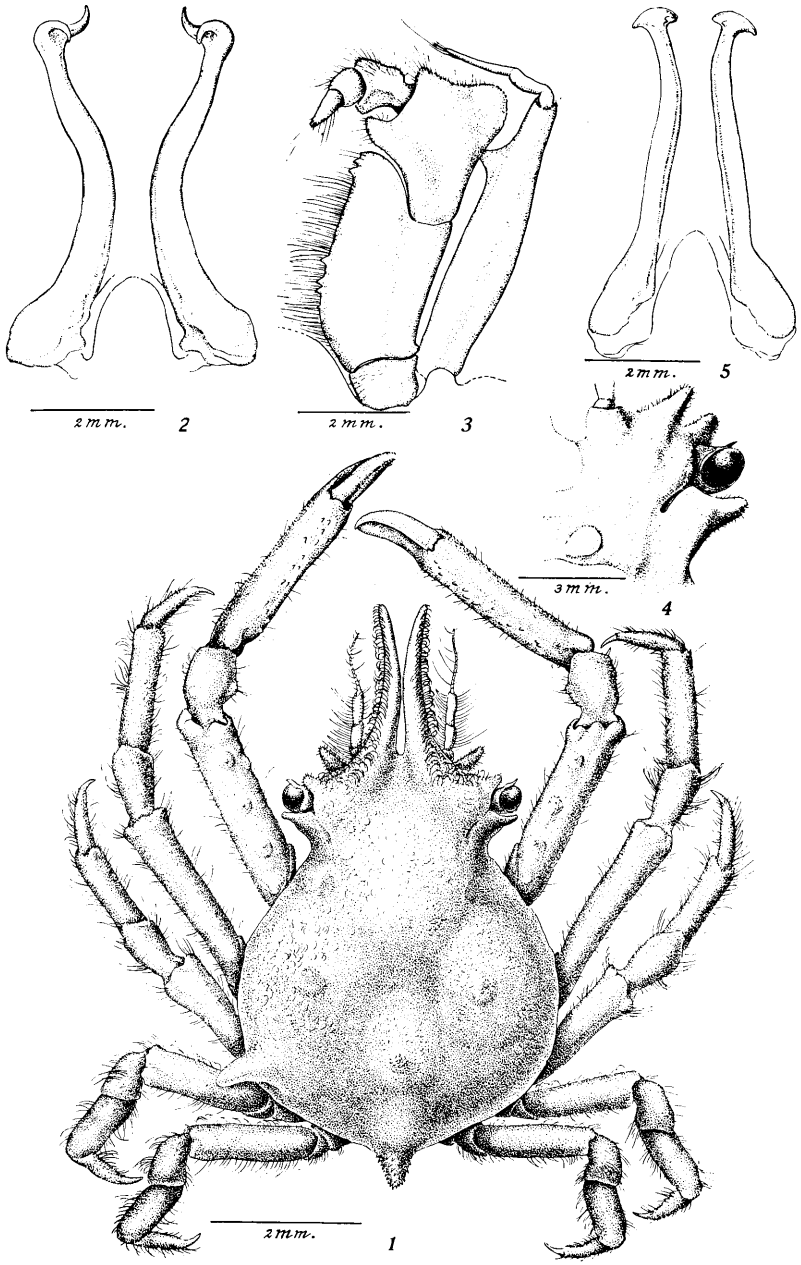

2 mm.
2
2 mm.
3
2 mm.
5
3 mm.
4
2 mm.
1

PLATE 17

Daldorfia garthi Glassell, new species

Fig. 1. Dorsal view.
Fig. 2. Frontal view.
Fig. 3. Minor chela.
Fig. 4. Major chela.
Fig. 5. Sternal pit, showing position of male abdomen.
Fig. 6. Sternal pit, showing position of female abdomen.
Fig. 7. Left outer maxilliped.
Fig. 8. Detail of lateral teeth.
Fig. 9. Right third ambulatory leg.
Fig. 10. Female abdomen.
Fig. 11. Male abdomen.

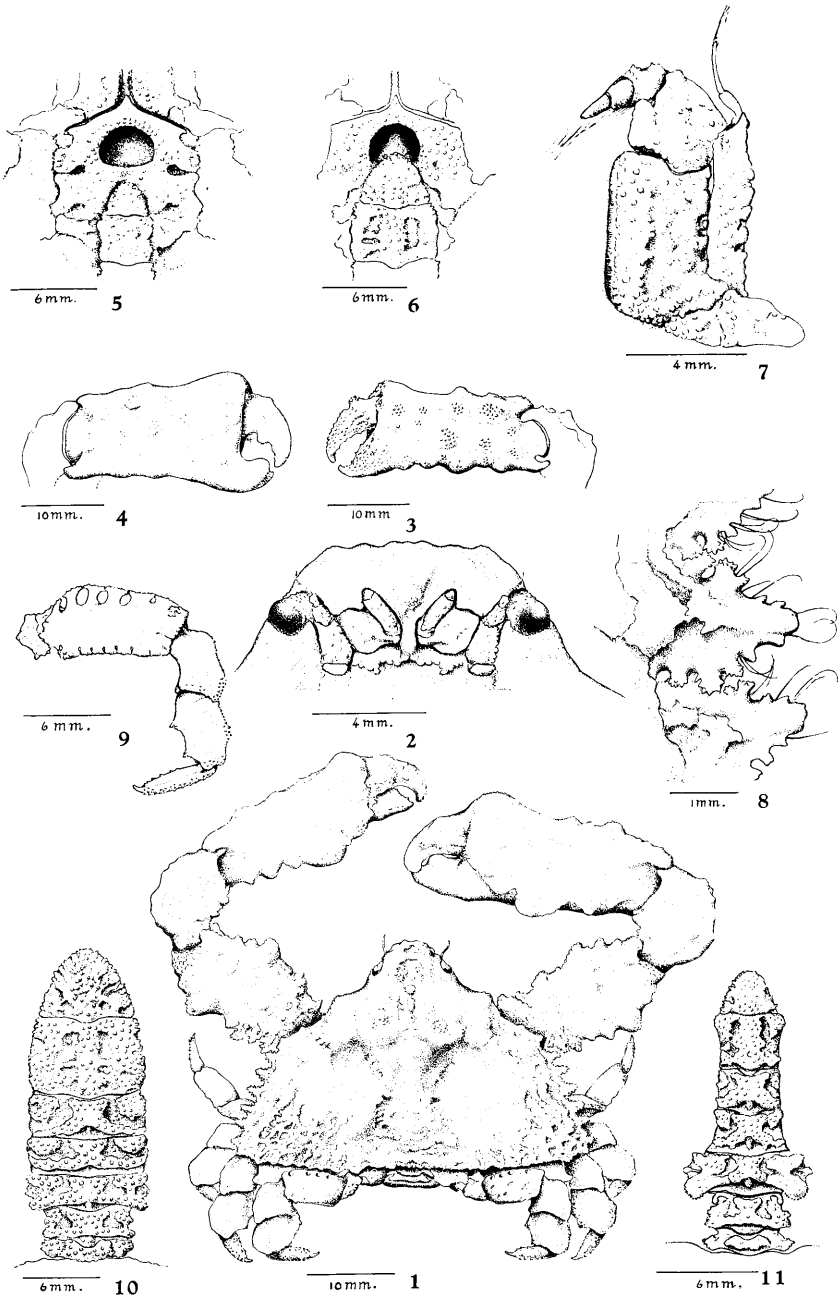
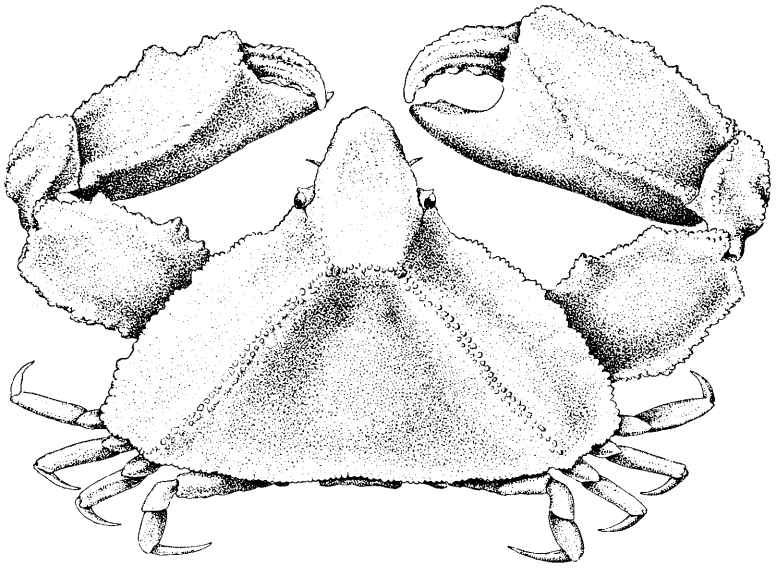

6 mm. 5
6 mm. 6
4 mm. 7
10 mm. 4
10 mm 3
6 mm. 9
4 mm. 2
1 mm. 8
6 mm. 10
10 mm. 1
6 mm. 11

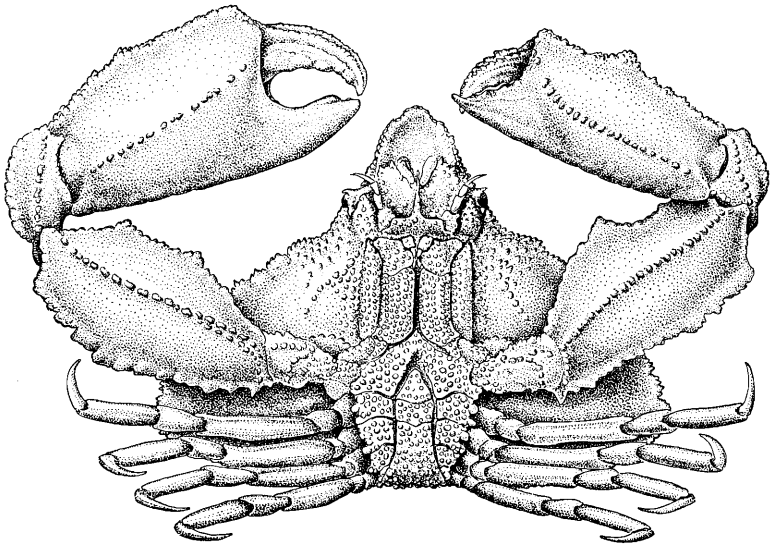
PLATE 18

Heterocrypta colombiana, new species
Male holotype

Fig. 1. Dorsal view.
Fig. 2. Ventral view.



3 m m . 1



3 m m . 2

PLATE 19

Portunus (Portunus) acuminatus Stimpson
Male neotype

Fig. 1. Dorsal view.
Fig. 2. Posterior view of carapace.
Fig. 3. Frontal view of chelae.

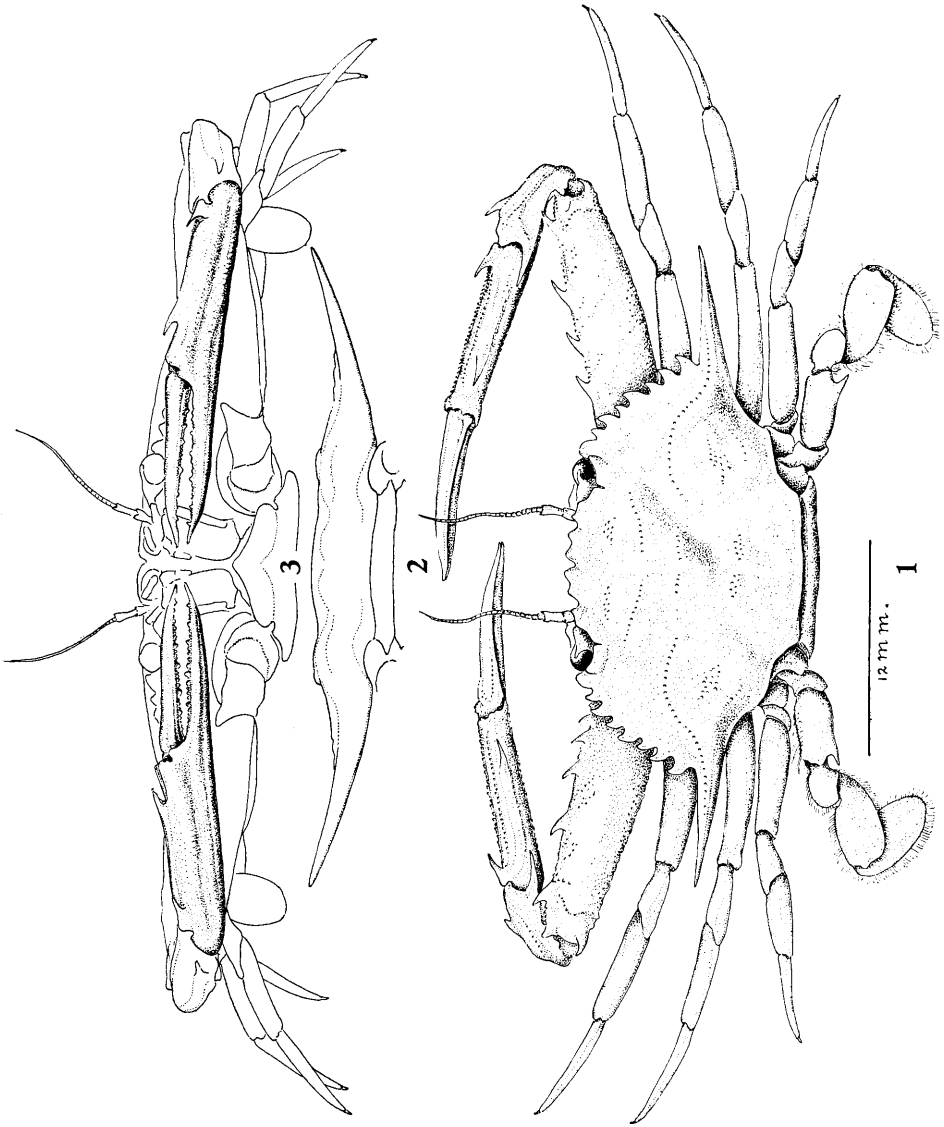

3
2
1
12 m m.

PLATE 20

Platyxanthus balboai, new species

Male allotype

Fig. 1. Dorsal view.
Fig. 2. Ventral view of front.
Fig. 3. Major chela.
Fig. 4. Minor chela.
Fig. 5. Major chela, female holotype.
Fig. 6. Left outer maxilliped.
Fig. 7. Abdomen, showing protruding verges.
Fig. 8. Tip of abdominal appendage.

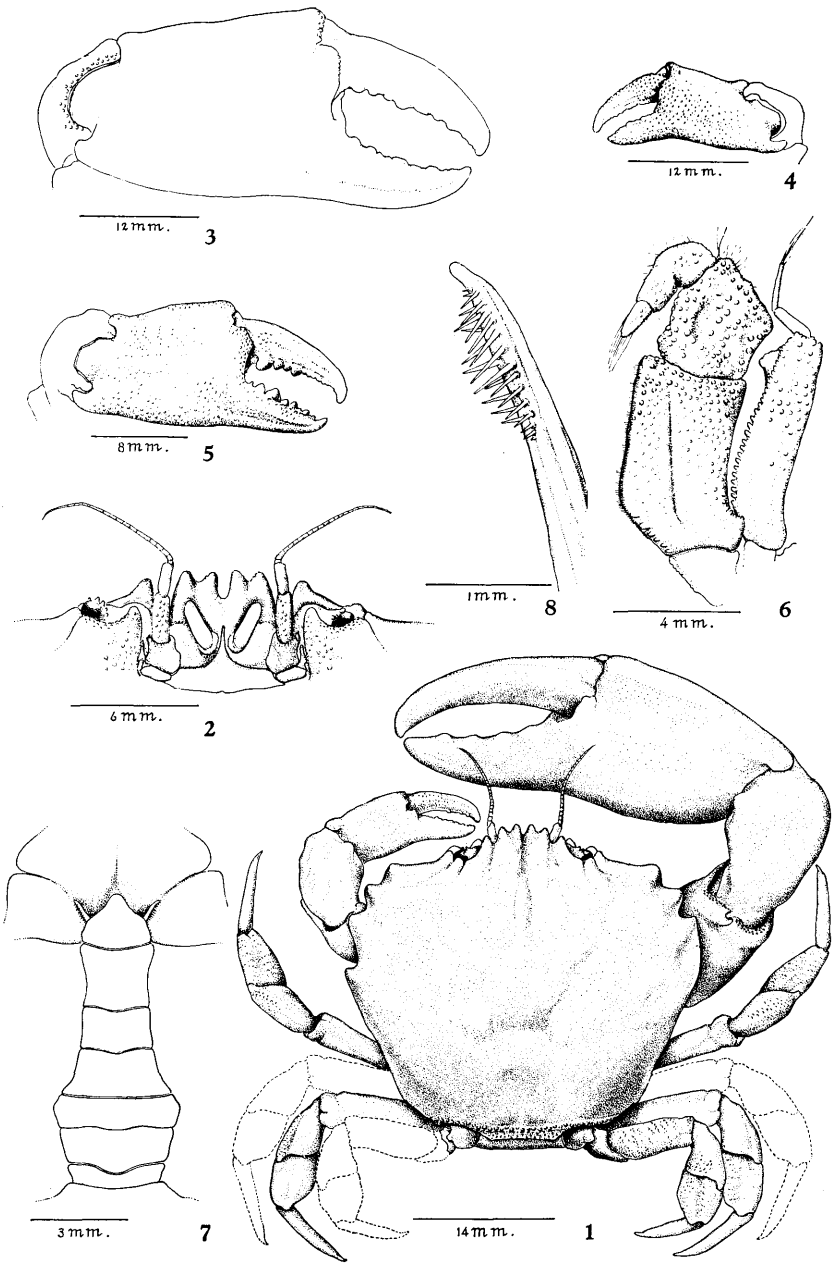
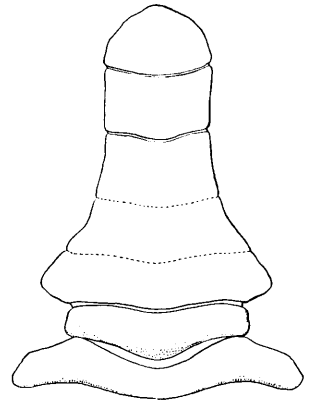

12 mm.
3
12 mm.
4
8 mm.
5
1 mm.
8
4 mm.
6
6 mm.
2
3 mm.
7
14 mm.
1

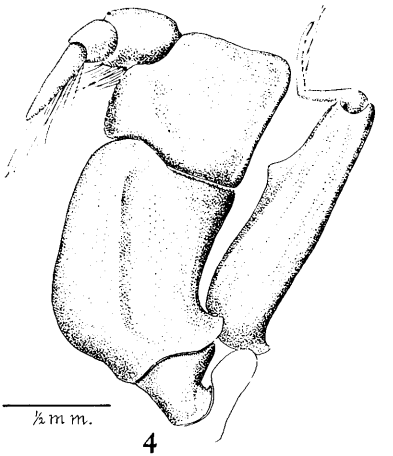
PLATE 21

Hexapanopeus costaricensis, new species
Male holotype

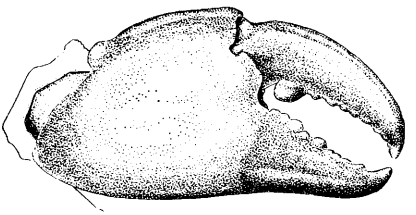
Fig. 1. Dorsal view.
Fig. 2. Major chela.
Fig. 3. Abdomen.
Fig. 4. Left outer maxilliped.



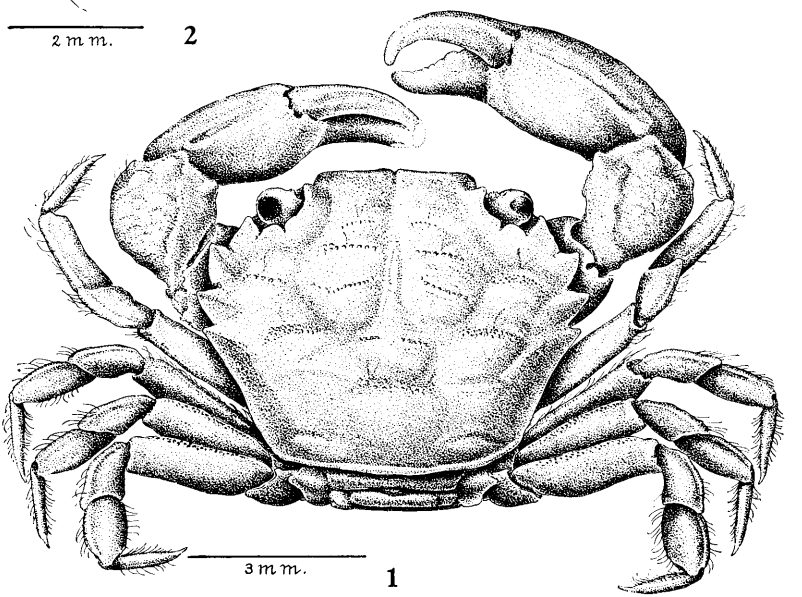
1 m m. 3



½ m m. 4



2 m m. 2

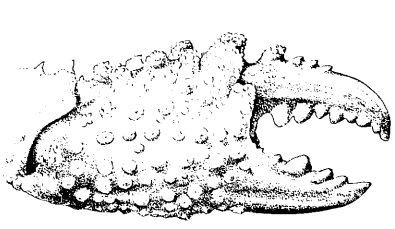


3 m m. 1

PLATE 22

Heteractaea peterseni, new species
Female holotype

Fig. 1. Dorsal view.
Fig. 2. Frontal view.
Fig. 3. Major chela.
Fig. 4. Right fourth ambulatory leg.
Fig. 5. Left outer maxilliped.



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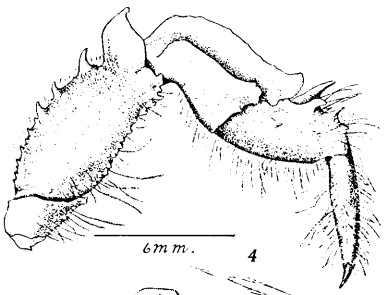

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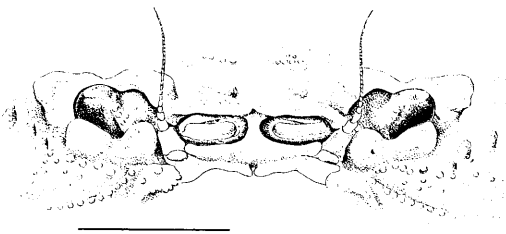

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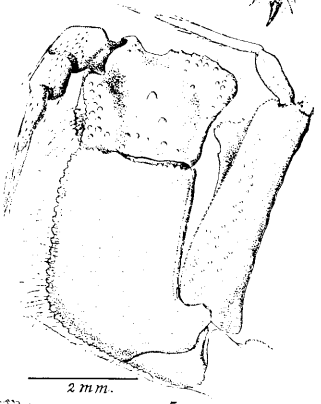

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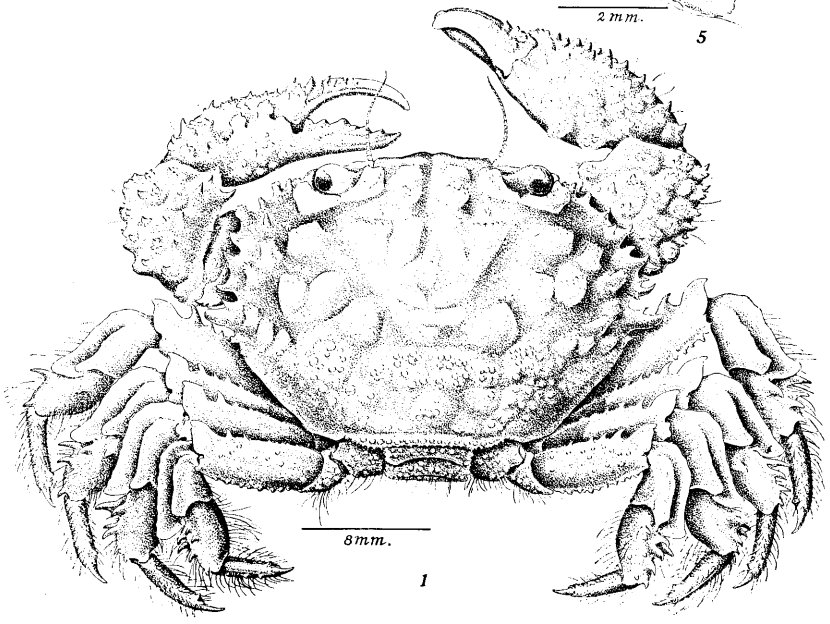


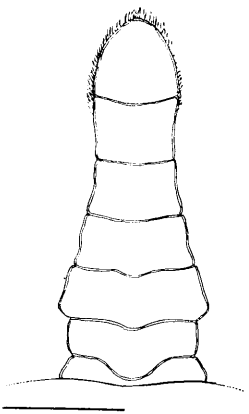
1

PLATE 23

Pilumnoides rotundus, new species

Female holotype

Fig. 1. Dorsal view.
Fig. 2. Major chela.
Fig. 3. Abdomen, male allotype.
Fig. 4. Left outer maxilliped.
Fig. 5. Frontal view.



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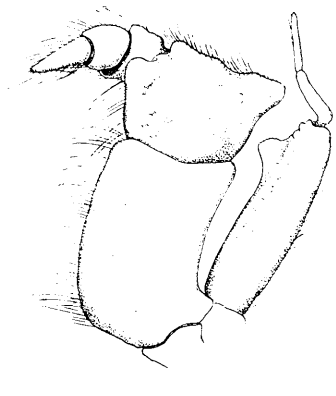

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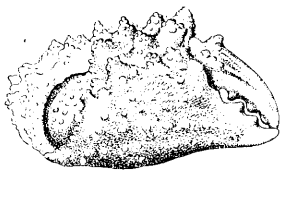

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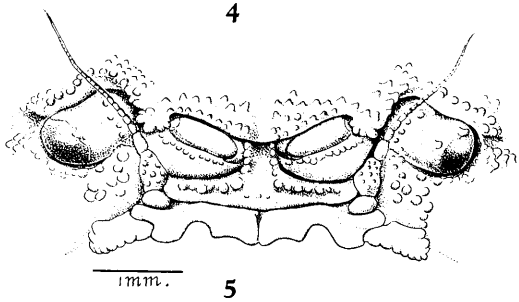

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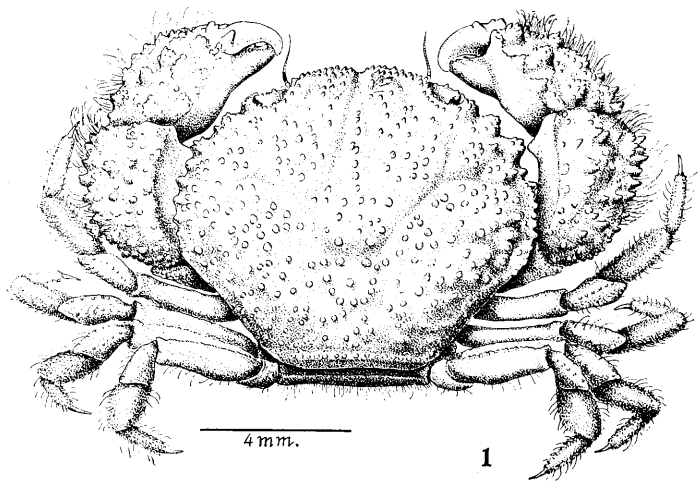
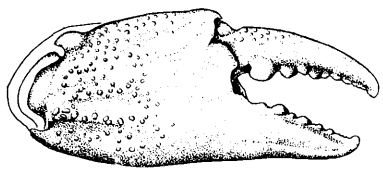


1

PLATE 24

Pseudorhombila xanthiformis, new species
Female holotype

Fig. 1. Dorsal view.
Fig. 2. Abdomen.
Fig. 3. Major chela.
Fig. 4. Left outer maxilliped.
Fig. 5. Frontal view.



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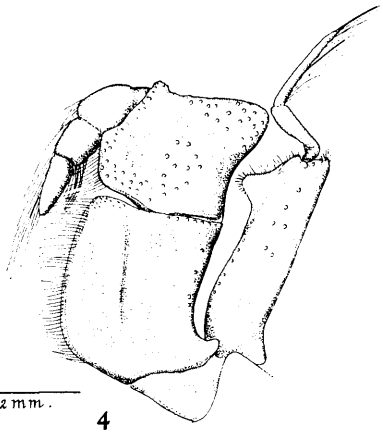

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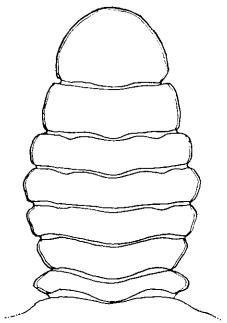

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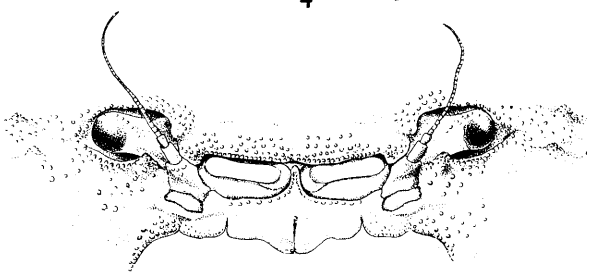

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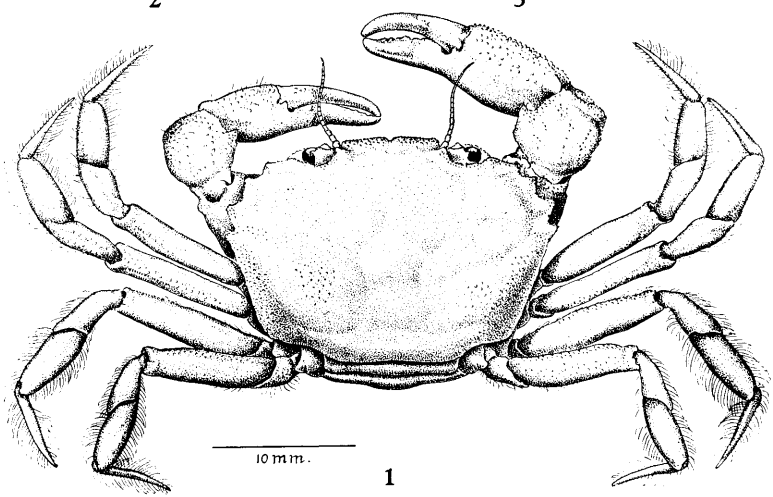
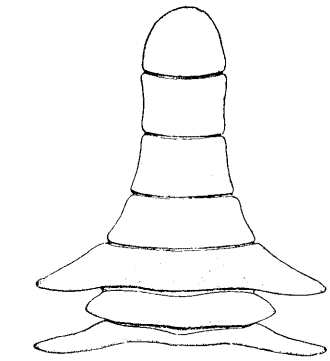


1

PLATE 25

Cyrtoplax panamensis Ziesenhenne, new species
Male holotype

Fig. 1. Dorsal view.
Fig. 2. Frontal view.
Fig. 3. Abdomen.
Fig. 4. Left outer maxilliped.



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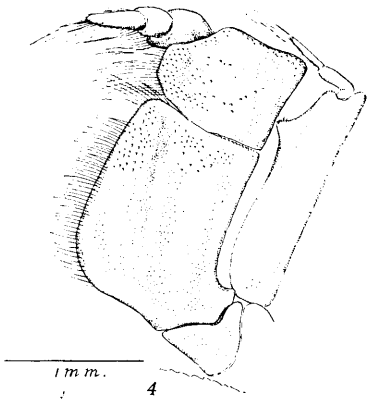

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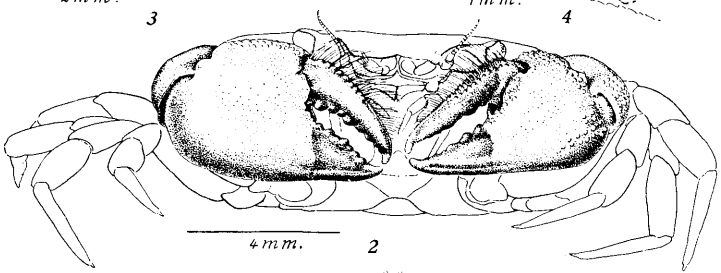

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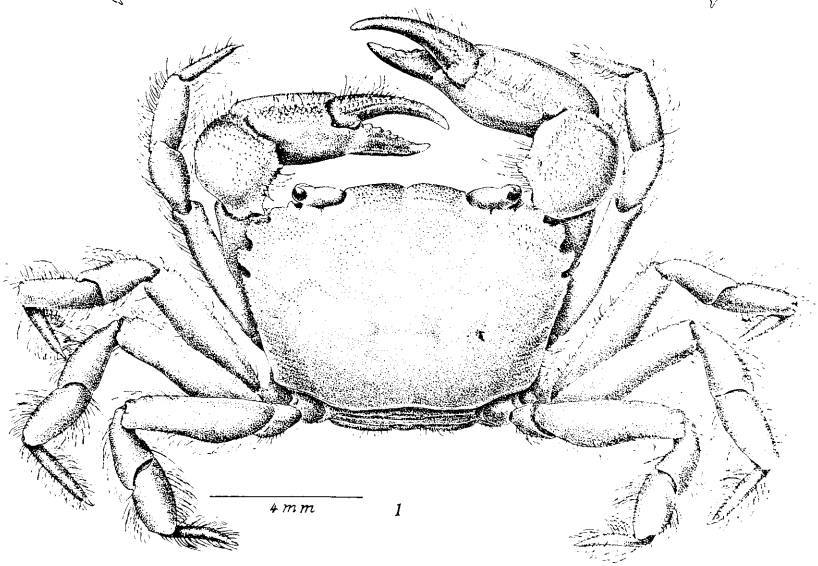
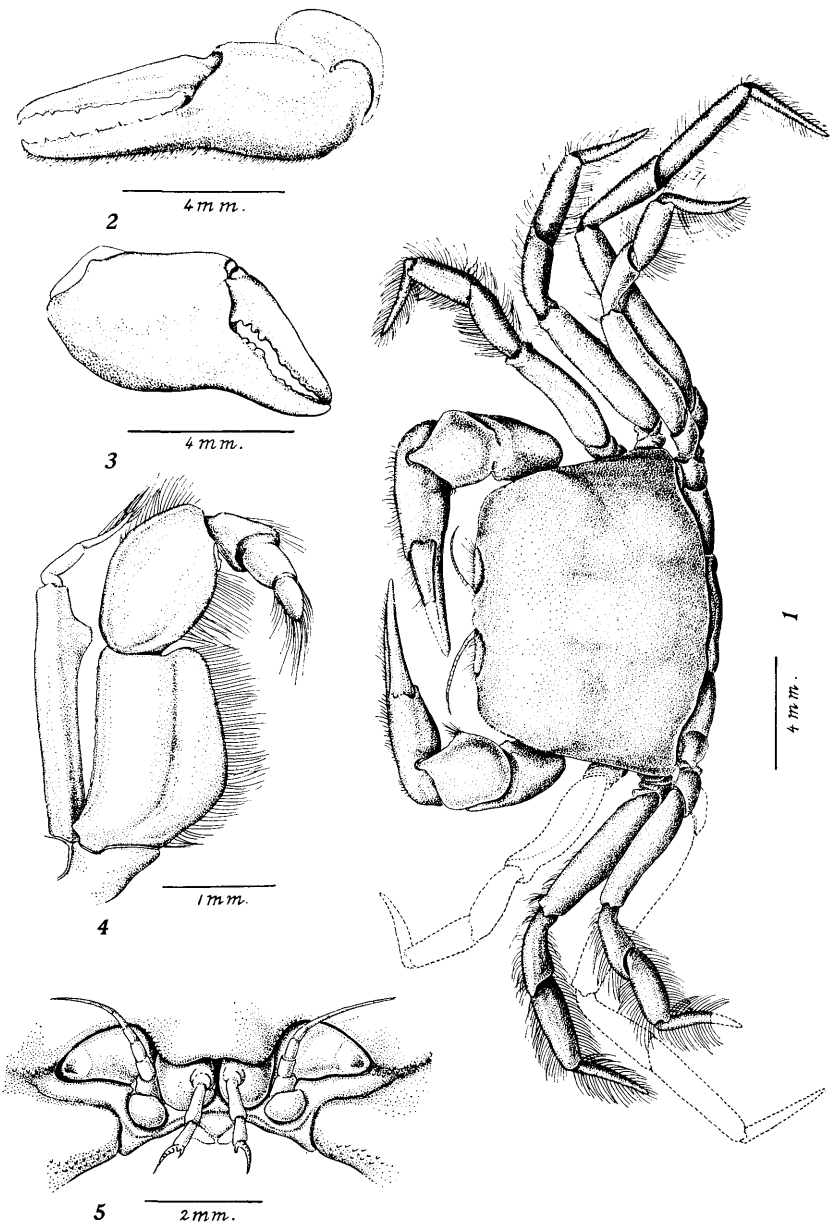


1

PLATE 26

Chasmocarcinus longipes, new species
Female holotype

Fig. 1. Dorsal view.
Fig. 2. Left chela.
Fig. 3. Major chela, male.
Fig. 4. Right outer maxilliped.
Fig. 5. Detail of frontal region.


4 mm.
2
4 mm.
3
1 mm.
4
2 mm.
5
1
4 mm.