# NEW SPECIES OF XANTHID CRABS FROM EARLY HANCOCK EXPEDITIONS

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# New Species of Xanthid Crabs from Early Hancock Expeditions

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ABSTRACT. Five new species of crabs of the family Xanthidae, *Eurypanopeus hyperconvexus, Micropanope ashcrafti, M. manteri, M. taylori,* and *Pilumnus? palmeri,* are described and illustrated, and a sixth species, *Pilumnus koepckei* Türkay (1967) is illustrated and described in English for the first time. All were collected during 1931–1941, the decade of activity of the *Velero III* under the command of Captain Allan Hancock, the *Eurypanopeus* from the California Channel Islands, the remaining species from the American west coast from Mexico to Ecuador. *E. hyperconvexus* forms with *E. crenatus* (Milne Edwards and Lucas) of Peru a bitemperate species pair. Each of the three *Micropanope* species appears to have its corresponding western Atlantic-Caribbean analogue. *Pilumnus? palmeri,* highly sculptured and richly ornamented, is unique among New World members of this circumtropical genus.

## INTRODUCTION

Of the new species of brachyuran crabs from the eastern tropical Pacific obtained by early Hancock expeditions aboard the *Velero III,* 1931–1941, the more obvious ones have already been described: ten from the Galapagos Islands (Garth 1939, 1946) and 15 from the Central and South American mainland (Garth 1940). Of these 25 species eight, or approximately one-third, are members of the Xanthidae, a family largely, but not exclusively, confined to the tropics. There remain, however, six additional new xanthids, five of them of uncertain affinities within the family. Three of these are members of the genus *Micropanope, sensu* Rathbun (1930), which Guinot (1967) has shown to include a miscellany of species having little in common but their minute size. Two are members of the genus *Pilumnus,* often confused with *Micropanope* but having all seven male abdominal segments free, rather than segments 3–5 fused. One of these was earlier described by Türkay (1967) from material obtained from another source.

In resuming work on a monograph of the Xanthidae of the west coast of the Americas after a lapse of many years, during which studies were made of the Xanthidae of the western Pacific and Indian oceans (Garth 1964, 1974; Garth & Kim 1983), the writer finds it advantageous to present preliminary descriptions and illustrations of these new species, including the first description in English of *Pilumnus koepckei* Türkay, in order that his later work will reflect not only his own views regarding their taxonomic status, but those of other carcinologists as well. Holotypes of early cruises of which Waldo L. Schmitt was a member are deposited in the Museum of Natural History of the Smithsonian Institution (U.S.N.M.); holotypes of later cruises are deposited in the Allan Hancock Foundation (A.H.F.). Illustrations are from the pen of Ernest R. Tinkham of Indio, California, and were funded by a grant from the National Science Foundation, G-11087.

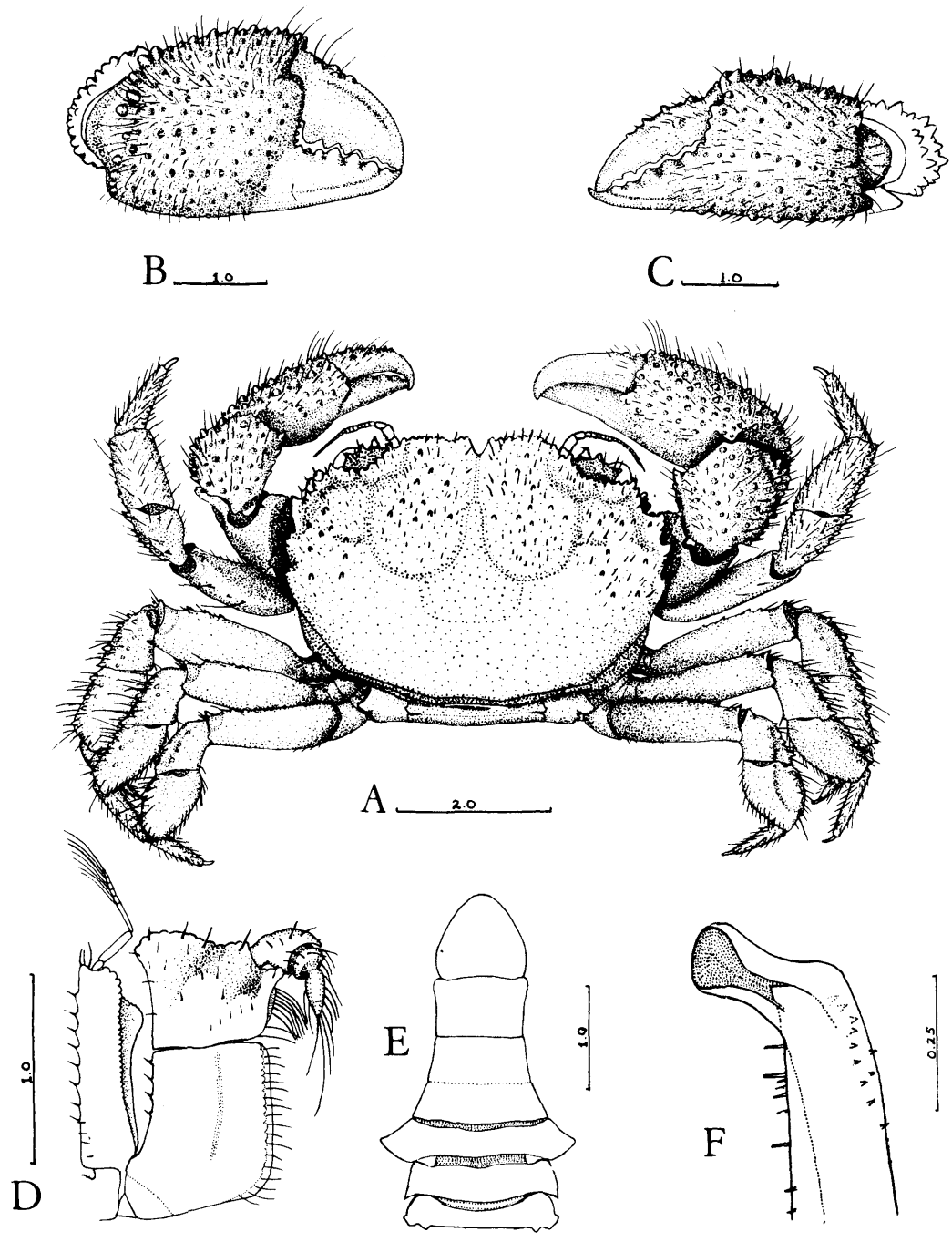


Fig. 1. *Micropanope manteri,* new species, male paratype. A. Dorsal view. B. Major chela, outer view. C. Minor chela, outer view. D. Right outer maxilliped. E. Abdomen. F. Right first pleopod.

***Micropanope manteri,*** new species
Fig. 1A–F

*Types.* Male holotype, U.S.N.M. No. 228670, and three males and four females, paratypes, from E of S end, Albemarle Island, Galapagos, Lat. 0°55′S, Long. 90°30′W, 58–60 fathoms, sand and nullipores, 26 January 1934, *Velero III* station 190-34. Female paratype, A.H.F. No. 3415, from Tagus Cove, Albemarle Island, Galapagos, Lat. 0°16′45″S, Long. 91°22′52″W, 50–60 fathoms, rock, nullipores, bryozoans, 15 January 1934, *Velero III* station 155-34. Four males, four females (two ovigerous), three young, paratypes, Sulivan Bay, James Island, Galapagos, Lat. 0°16′12″S, Long. 90°34′50″W, 36–40 fathoms,

rock, sand, 21 January 1938, *Velero III* station 795-38. One male, one female, paratypes, off Barrington Island, Galapagos, Lat. 0°47′S, Long. 90°02′W, 48–73 fathoms, sand, rock, 26 January 1938, *Velero III* station 810-38.

*Measurements.* Male holotype: length 3.8 mm, width 5.2 mm, fronto-orbital width 4.0 mm, frontal width 2.0 mm, length of chela 3.2 mm (lower margin 3.5 mm), length of dactyl 1.8 mm, height of palm 2.2 mm. Female paratype, A.H.F. No. 3415: length 4.3 mm, width 5.8 mm.

*Diagnosis.* Carapace granulate, last of three marginal teeth smallest. Merus of outer maxilliped produced externally. Chelipeds stout, major manus completely granulate, pollex short. Tip of male first pleopod produced, bent, and guttered.

*Description.* Carapace short and narrow, sparsely hairy, areolated and granulated anteriorly, smooth posteriorly, granules irregularly placed, not tending to form lines. Anterolateral margin minutely denticulate and armed, exclusive of the exorbital angle, with three small, spine-tipped, triangular teeth separated by U-shaped sinuses, posterior, or normal fifth tooth, much the smallest. Normal second tooth replaced by two or three denticles extending between exorbital and normal third tooth, two or three subhepatic denticles at a slightly lower level. Of areoles of carapace, meso- and protogastric best defined, hepatic separated from branchial by a transverse furrow; these areas also bearing randomly placed sharp granules. Front slightly projecting, deeply notched at middle, lobes arcuate, margins granulate, granules nearest median notch largest; front separated from inner supraorbital tooth by a shallow notch lodging the antennal flagellum. Superior orbital margins granulate, outer and inner notches inconspicuous; inferior margins also granulate, a spine-tipped tooth at inner angle. Pterygostomian region granulate. Basal article of antenna falling short of front. No endostomial ridge. Merus of outer maxilliped granulate, anteroexternal angle sharply produced.

Chelipeds and legs setose, major cheliped no less so than the rest. Chelipeds stout, carpus and manus covered with small, subequal, regularly crowded granules diminishing in size below; carpus with a tooth at inner angle and a sharp granule below; manus with granules completely covering outer surface and extending onto inner surface as well; pollex of major chela short, thick, not deflexed; dactylus also somewhat thickened, grooved above, denticulate at base, meeting pollex with almost no gape, basal tooth largest of four teeth. Minor chela narrower than major, granules sharper, tending to form rows, dactyls more slender, grooved, and pointed; pollex not deflexed. Legs rather short and stout, meri with a row of spinate granules above; carpi and propodi with two or more rows each.

Male abdomen with fourth and fifth, but not third, articles fused.

Male first pleopod short, stout, compressed, tip reflexed, lobate, sides curled inward enclosing channel, opening terminal; a row of progressively longer setae on concave margin, three or four rows of shorter setae on convex margin.

*Remarks.* The proposed new species is most closely allied to *Micropanope granulimanus* (Stimpson) of the western Atlantic (Bahamas and Cuba to Curacao), from which it differs in the following particulars: (1) the carapace is covered with short hairs, particularly on the anterior portion, whereas in *granulimanus* the hairs are restricted to the hepatic region; (2) the carapace is less granulate, the granules not tending to form lines; (3) the anterolateral margin, exclusive of the orbital angle, is armed with only three teeth, the normal second tooth being replaced by one or more denticles; (4) there is no short granulate ridge extending inward from the penult tooth; (5) the frontal lobes are slightly arcuate, rather than oblique and sinuous; (6) there is a suggestion of an outer superior orbital notch, but no notch at the outer angle; (7) the fingers of the chelipeds are, if anything, shorter, and the pollex of the minor chela is not deflexed as in *granulimanus*; (8) the male abdomen is narrowest at the base of the sixth segment, rather than at its middle; (9) the male first pleopod is sharply bent at the tip, the opening concealed by overlapping edges.

This species is named in memory of the late Harold W. Manter, Professor of Zoology at the University of Nebraska, Lincoln, and member of the Hancock Pacific Expedition of 1934, on which the species was first collected.

### ***Micropanope taylori,*** new species
Fig. 2A–F

*Type.* Male holotype, U.S.N.M. No. 228672, and one female paratype, U.S.N.M. No. 228673, one male and one female, paratypes, A.H.F. No. 3416, from Secas Islands, Panama, Lat.

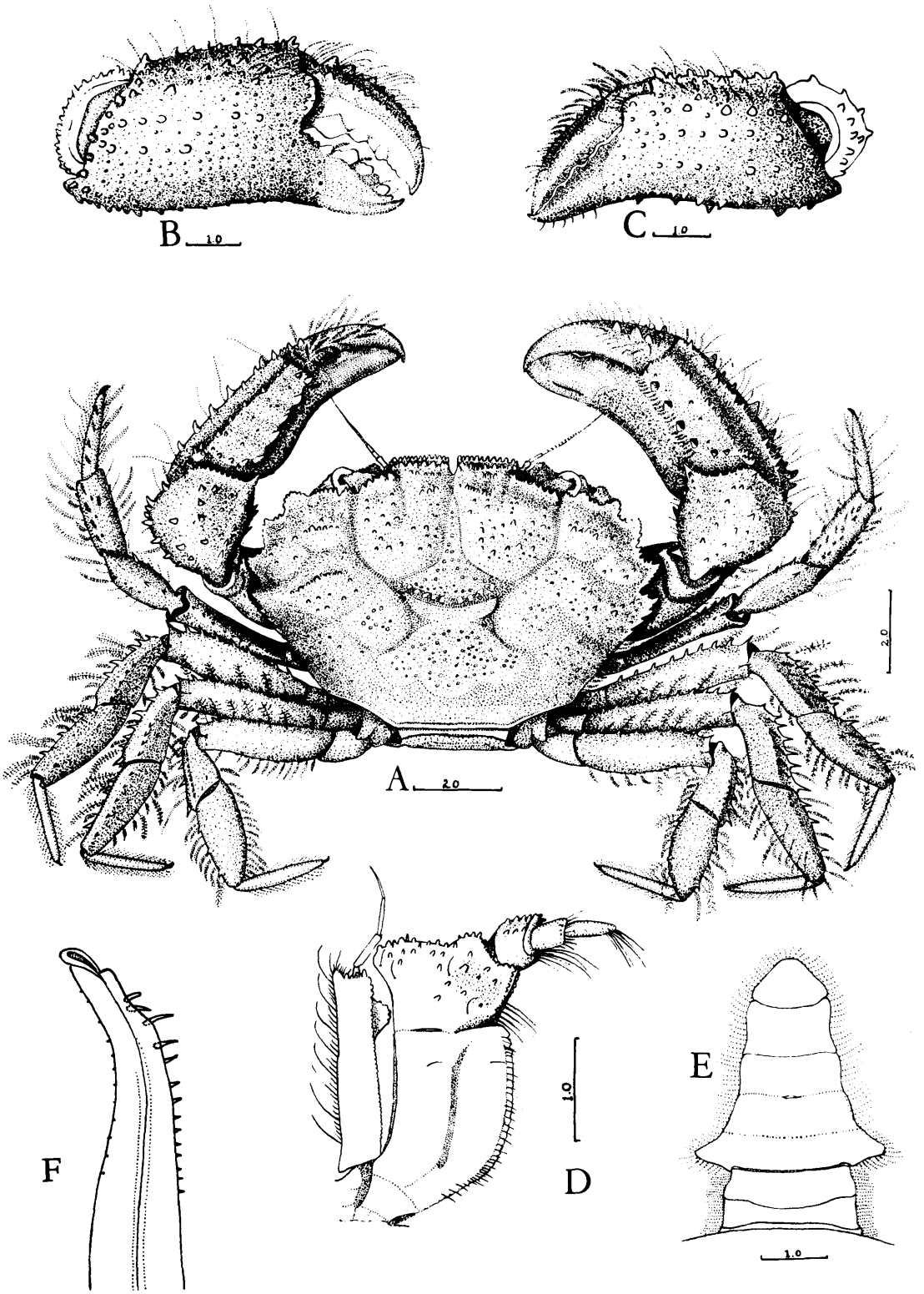


Fig. 2. *Micropanope taylori,* new species, male holotype. A. Dorsal view. B. Major chela, outer view. C. Minor chela, outer view. D. Right outer maxilliped. E. Abdomen. F. Right first pleopod.

7°57′10″N, Long. 82°00′45″W, shallow water, coral, 22 February 1934, *Velero III* station 252-34. (See also note added in proof.)

*Measurements.* Male holotype: length 6.3 mm, width of carapace 9.4 mm, of fronto-orbit 5.0 mm, of front 2.8 mm, length of cheliped 10.0 mm, of chela 5.8 mm above (6.2 mm below), of dactyl 3.3 mm, height of palm 2.8 mm. Female paratype: length 6.5 mm, width 9.5 mm.

*Diagnosis.* A rough species. Carapace granulate, short-haired, chelipeds and legs long-haired, carapace and spines white. Five anterolateral spines; a subhepatic spinule. Outer surface of both palms spinate to granulate, spines arranged in rows. Fingers grooved, ridges spinulate; dark color not covering fingers basally. Male first pleopod tapering, opening concealed by reflexed tip, extending downward on sternal side.

*Description.* Carapace broad, regions clearly indicated, sparsely granulate except in depressions, and covered with short pile. Postfrontal, protogastric, hepatic and epibranchial regions bearing spinate granules not arranged in rows except for a short ridge well behind and parallel to front. Anterolateral spines five, including exorbital; spines two to five set in stouter, denticulated bases; spines three and four largest, subequal, curved; spines two and five also subequal, spine two curved, spine five straight; carapace widest opposite spine four. Frontal lobes transverse or very slightly oblique, double edged, edges bluntly spinulate, separated by a broad, median U-shaped notch, outer angle not advanced, subrectangular, and set off from inner orbital cluster of spinules by a notch similar to the median. Orbital margin spinulous, superior margin with two gaps between spinules, outer spinule opposite cornea, inferior margin with an outer and an inner granular tooth, inner tooth nearly as advanced as front and visible in dorsal view. A few spinules on base of eyestalk. Pterygostomian region rough; a subhepatic spine or spinule. Merus of outer maxilliped subrectangular, broader than long, anteroexternal angle produced, a denticulate lobe below insertion of palpus.

Chelipeds spinulous and hairy. Two spinules on superior border of merus; carpus sparsely spinulate, a prominent spine at inner angle; manus with spinules arranged in rows of which two are superior with a smooth space between, two or three palmar; spinules of major manus changing to spinate granules below and distally; minor manus spinulate on entire outer surface. Fingers grooved, ridges sharp-granulate, brown color of dactyls and of pollex failing to cover them basally.

Legs elongate, spinulous, hairy. Meri with a row of spinules above and spinate granules below; carpi grooved and spinate above; propodi spinate above and below; dactyli long, slender, nearly straight, and with an incurved, amber nail; all members clavately setose.

Abdomen of male with segments 3–5 fused, segment 6 broader than long, segment 7 triangular, tip rounded.

Male first pleopod slender, sinuous, compressed, tapering, a row of gradually lengthening setae on convex margin, a row of short setae on concave margin, opening terminal, concealed by reflexed tip, and extending a short distance on sternal side.

*Remarks.* The proposed new species finds its closest affinity with *Micropanope urinator* (A. Milne Edwards) of the Atlantic, from which it may be distinguished by its sparser and shorter spinulation, its apparently greater breadth, and the linear arrangement of the spinules of the chelipeds. Also, the entire crab, at least after many years in alcohol, is white, so that the white spinules do not stand out against a dark background, as in *M. urinator.* Nor are the two species analogous in habitat, as the new species is from shallow water, whereas its apparent Atlantic counterpart is from deep water, 80–250 fathoms.

I take pleasure in naming this species for William Randolph Taylor, Professor of Botany at the University of Michigan, Ann Arbor, and member of the Hancock Pacific Expedition of 1934 on which the species was encountered.

### ***Micropanope ashcrafti,*** new species
Fig. 3A–F

*Type.* Male holotype, A.H.F. No. 3930, from off Medidor Island, Panama, Lat. 7°43′55″N, Long. 81°35′48″W, 30–35 fathoms, rock, mud, and coralline, 28 March 1939, *Velero III* station 948-39.

*Measurements.* Male holotype: length 5.9 mm, width of carapace 8.6 mm, of fronto-orbit 5.9 mm, of front 3.2 mm, length of major cheliped 9.5 mm, of chela 5.4 mm above (5.9 mm below), of dactyl 3.0 mm, height of palm 2.7 mm.

*Diagnosis.* Carapace and chelipeds coarsely granulate. Frontal lobes transverse, but not

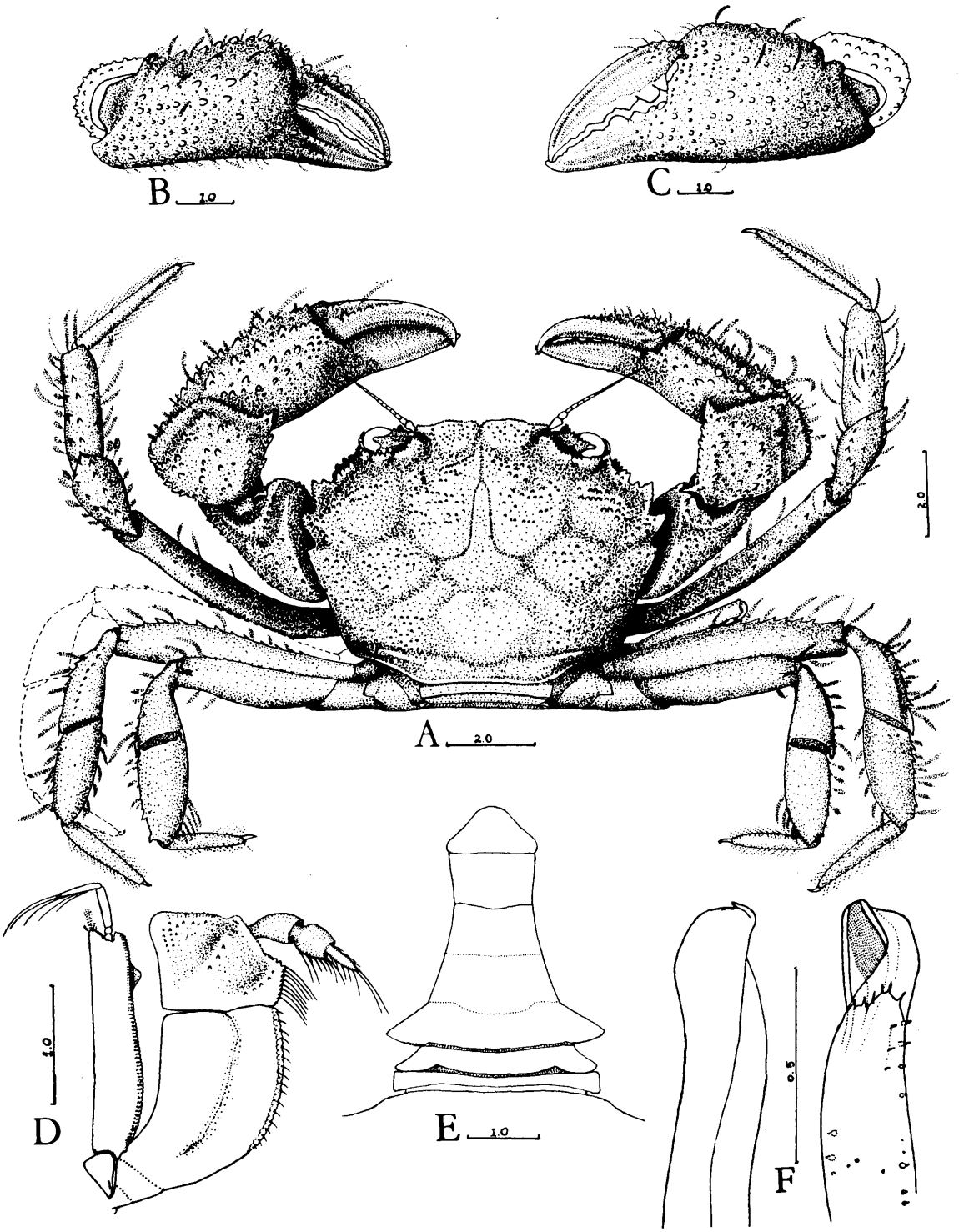


Fig. 3. *Micropanope ashcrafti,* new species, male holotype. A. Dorsal view. B. Major chela, outer view. C. Minor chela, outer view. D. Right outer maxilliped. E. Abdomen. F. Right first pleopod.

truncate. Five anterolateral teeth. A cluster of subhepatic tubercles. Legs slender. Male first pleopod with opening hooded, a transverse row of setae below tip.

*Description.* Carapace broad, moderately convex, surface granulate, granules large and conspicuous anteriorly and laterally, diminishing posteriorly. Regions well defined, interregional

furrows smooth. Conspicuous granulations, although not defining ridges, disposed as follows: a short, transverse row on each epigastric region; a somewhat longer row on each hepatic region; a transversely arcuate elevation on each epibranchial region. Outer orbital tooth small, second lateral tooth small and denticulate, third and fourth teeth larger, dentiform, third tooth directed forward with an arcuate outer border, fourth directed outward with a straight outer border, carapace widest opposite fourth tooth, fifth tooth smaller and sharper than two preceeding teeth, of same size as first or exorbital tooth; margins of all teeth denticulate. Front broad, scarcely advanced, lobes slightly arcuate or sinuous, separated by a U-shaped notch, margin thin, minutely granulate, a few more prominent granules suggesting an outer lobe, separated from orbit by a shallow groove. Orbital margin granulate, two superior fissures, outer fissure more incised, separated by a low convexity; lower margin with a sharp inner tubercle and an outer V-shaped notch. Eyes large, a few granules on eyestalks. Pterygostomian region granulate; a subhepatic cluster of denticles. Merus of external maxilliped granulate, subrectangular, external margin longer than internal, a shallow notch for insertion of palpus, and a deep basal pit.

Chelipeds unequal in the male, left cheliped larger in type specimen, coarsely granulate, and hairy. Merus granulate externally, with several spinulous granules anterodistally; carpus with sharpened granules irregularly placed, a stout spine at inner angle, a groove externally; propodus with sharpened granules linearly arranged, diminishing in size and sharpness below, completely covering both major and minor manus. Fingers white, deeply grooved, meeting without a gape, a large, backward-directed tooth at base of major dactyl; pollex of major manus not at all deflexed, of minor manus slightly so.

Legs long and slender, merus armed with sharpened granules above, carpus and propodus similarly provided, dactylus long, straight, nail amber, curved, margins of all segments hairy.

Male abdomen with somites 3–5 fused, narrowest at base of sixth somite, seventh somite broadly triangular. Male first pleopod thickened, flattened, scarcely tapered, slightly twisted near tip, opening hooded, terminal, a row of short setae along convex margin, a transverse row of longer setae below tip.

*Remarks.* The proposed new species is closely related to *Micropanope truncatifrons* Rathbun of the western Atlantic (off Havana, 182–194 fathoms; off Yucatan, 130 fathoms), placed in *Nanocassiope* Guinot (1970, p. 1076) with some uncertainty. It differs in the following particulars: (1) the carapace, while granulate, is less so than *M. truncatifrons*; (2) the carapace, chelipeds, and walking legs are more hairy; (3) the front appears less truncate and more arcuate; however, the apparently truncate front in *M. truncatifrons* is a line of granules behind the front, the front itself being arcuate or sinuous; (4) the second anterolateral tooth is less a tooth and more a cluster of granules on a raised base; (5) there is a similar cluster of granules at the hepatic level; (6) the outer orbital and inner suborbital teeth are more upstanding, the superior notches more apparent; (7) the lower spine on the inner margin of the wrist (carpus of cheliped) is reduced to a denticle.

These comparisons were made with the holotype of *M. truncatifrons* (U.S.N.M. Cat. No. 9497), a female, in which the right cheliped is the larger, there being no adult male in the U.S.N.M. collections from which a pleopod could be extracted. The correspondence of the areolation of the carapace, the granulate ridges and the intervening smooth depressions, the dentition of the fingers, and the spinulation of the walking legs is remarkable.

The new species is named in memory of the late Granville P. Ashcraft, M.D., onetime student of the Cirripedia, and a member of the Hancock Expedition of 1939 on which the species was taken.

### ***?Pilumnus palmeri,*** new species
Fig. 4A–G

*Type.* Male holotype, A.H.F. No. 3826, from off Cape San Francisco, Ecuador, Lat. 0°37′10″N, Long. 80°00′30″W, 15 fathoms, mud, rock; 23 February 1938, *Velero III* station 850-38. Additional material, consisting of a portion of one carapace, from off Cape San Francisco, Ecuador, Lat. 0°39′30″N, Long. 80°06′30″W; 2 fathoms, mud, rock; 11 February 1934, *Velero III* station 214-34.

*Measurements.* Male holotype, length of carapace 6.5 mm, width of carapace 9.3 mm, of front 2.7 mm, of fronto-orbit 6.9 mm, length of major chela 5.0 mm, height of palm 2.5 mm, length

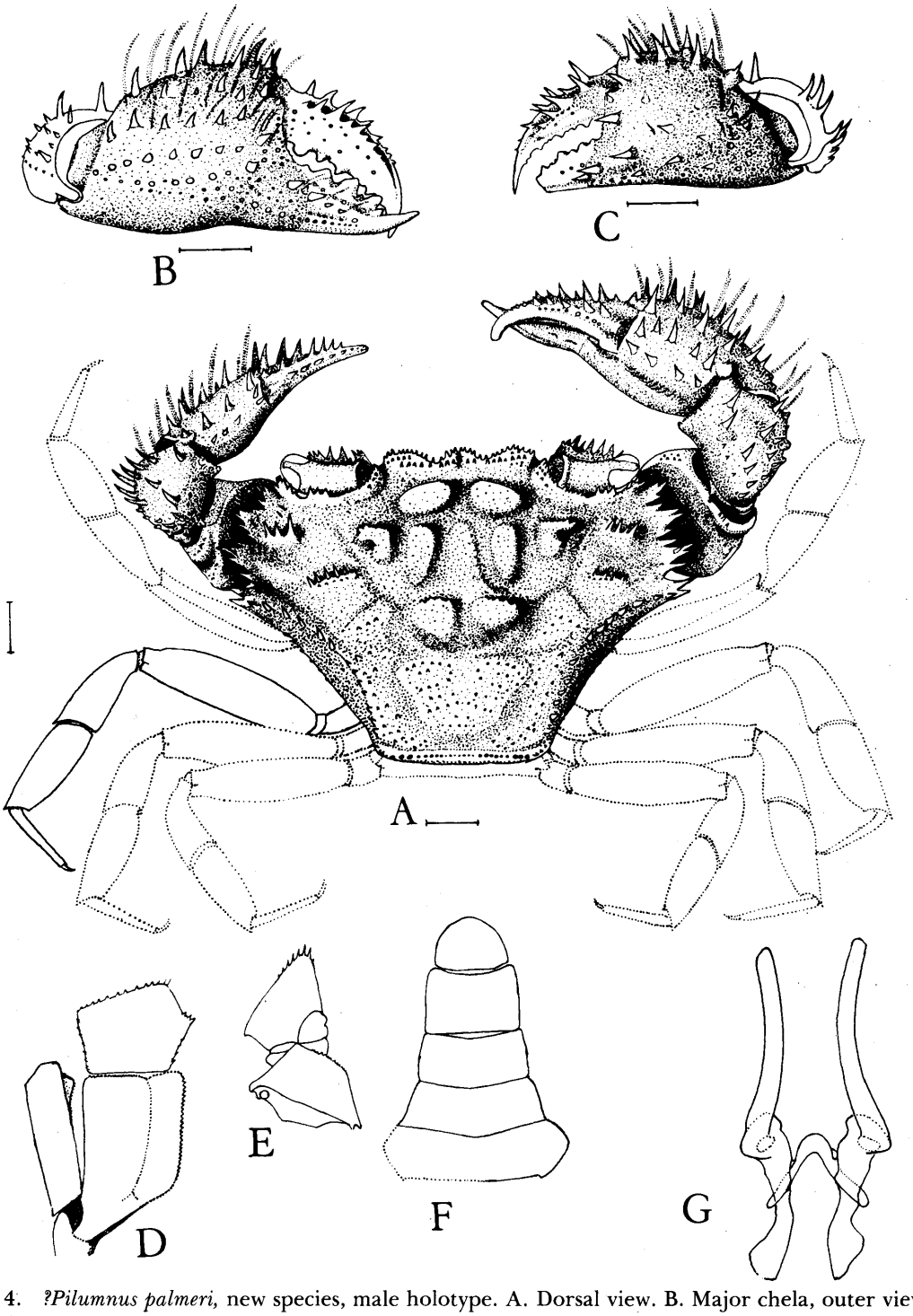


Fig. 4. ?*Pilumnus palmeri,* new species, male holotype. A. Dorsal view. B. Major chela, outer view. C. Minor chela, outer view. D. Right outer maxilliped (proximal segments only). E. Basis and coxa of walking leg. F. Abdomen (distal segments only). G. Girdle and appendages of first abdominal somite (first pleopods). (Scales = 1 mm).

of dactyl 2.8 mm, of minor chela 4.1 mm, of dactyl 2.5 mm.

*Diagnosis.* Carapace spinulate and areolate, areoles confined to gastric shield. Front biconcave, margins spinulous. Anterolateral marginal spines in four groups, a row of posterolateral marginal spinules. Chelipeds setose and spinulous, spinules extending onto slender dactyls. Tip of male first pleopod bluntly rounded.

*Description.* Carapace about 1.4 times wider

than long, areolated and spinulated in anterior two-thirds, sharply granulated in posterior one-third, margins spinate. Areoles separated by broad and deep sulci, smooth to the naked eye but microscopically punctate. Areoles disposed as follows: postfrontal, paired; protogastric, paired, each pair again divided longitudinally into an inner and an outer pair, the outer pair partially divided horizontally; mesogastric, paired. Areoles most advanced anteriorly, less declivitous posteriorly, anterior margins, except for smooth postfrontals, granulate, becoming spinulate laterally. In line with epigastric areole an hepatic ridge bearing three spinules, and in advance of mesogastric areole an epibranchial ridge bearing five spinules; hepatic and epibranchial ridges not swollen in manner of elevations of gastric shield. Front doubly concave, median V inconspicuous, giving a tri-lobed appearance, margin spinulous, a partial row of low granules immediately behind and parallel to it, a more complete row behind this; front set off from orbits by a smooth notch. Orbits horizontally inclined, spinulous margined, spinules increasing in size and sharpness from inside outwardly; two superior notches, a double row of low granules similar to those of front paralleling inner orbital margin. Eyestalks long, robust, cylindrical, laterally directed. Lower margin of orbit spinulous, a prominent inner infraorbital cluster of spinules and a single outer spine, the exorbital. Anterolateral margins lamellate, upturned, and strongly spinate, spines grouped into clusters corresponding to four teeth, excluding exorbital tooth or spine; each cluster with a stout spine, bifid in all but the first, and with a spinule on its anterior and posterior slope. On the fourth or last tooth the anterior spinule is wanting and the posterior spinule becomes the first of a row of spinules extending in a concave arch to the posterior margin. Entire posterior third of carapace sharp-granulate, a few sharp granules in the region of the branchial lobe.

Merus of external maxilliped subpentagonal, anterior margin denticulate and somewhat oblique, a slight notch at anterointernal angle for insertion of palpus.

Merus of major cheliped with a superior, spinate lobe; carpus and manus spinulous and setose, setae plumose, most not exceeding length of spines, but a few much longer. Carpus with a truncate ridge continued downward from inner distal angle, edge of ridge denticulate. Manus with inner surface smooth, a row of setae below superior margin; upper and outer surface spinate, spines arranged in rows, lower row bent downward and extending onto pollex. Lower margin of hand sinuous; fingers pointed, grooved, grooves punctate, tips crossing, a slight gape between; fixed finger with three larger triangular teeth; movable finger spinate at base and with teeth smaller than those of fixed finger. Minor chela similar to major but less robust, less coarsely spined, and more sparsely setose.

Of the walking legs, only a few segments remain attached to the type specimen. Coxae distally spinate; meri unarmed, upper margin setigerous; carpi and propodi unarmed except for a subdistal inferior spine on propodus of (?)last walking leg; dactyli long, slender, cylindrical, straight, with slightly curving, amber nails.

Of the abdominal somites, only the last three are intact. Terminal somite more circular than triangular, with strongly convex sides.

Male first pleopods simple, cylindrical, tapering slightly to blunt, hollowed-out tip. Male second pleopods not present.

*Remarks.* The second specimen, also from off Cape San Francisco, Ecuador, consists of a partial carapace including the complete gastric shield, the right anterolateral margin and orbit, but lacking the front. The hepatic, branchial, and subhepatic regions are covered with a short, dense, shaggy tomentum that explains the numerous punctae found on the carapace of the type specimen, which is otherwise bare. The smooth, raised protuberances of the gastric shield lack anterior marginal spinules. The hepatic ridge bears four, rather than three, spinules, and the epibranchial ridge is a raised areole also, with only the two outermost of the five spines shown by the type specimen. Supernumerary spines, some dorsal in position, are present along the anterolateral margin, and all but a few spines are blunted.

Despite its tentative assignment to the genus *Pilumnus,* the affinities of this delicately sculptured and richly ornamented crab remain obscure. The recent rediscovery by Takeda (1977, p. 120, test, fig. 1) of *Lophoplax sculpta* (Stimpson, 1858), a similarly tomentose species with raised, naked areolets, resulted in a search among goneplacid genera for a crab related to the proposed new species. Although the critical first abdominal somite is not present, so that it is impossible to determine whether or not it occupies the entire space between the coxae of the last pair of legs, the other characters of the crab,

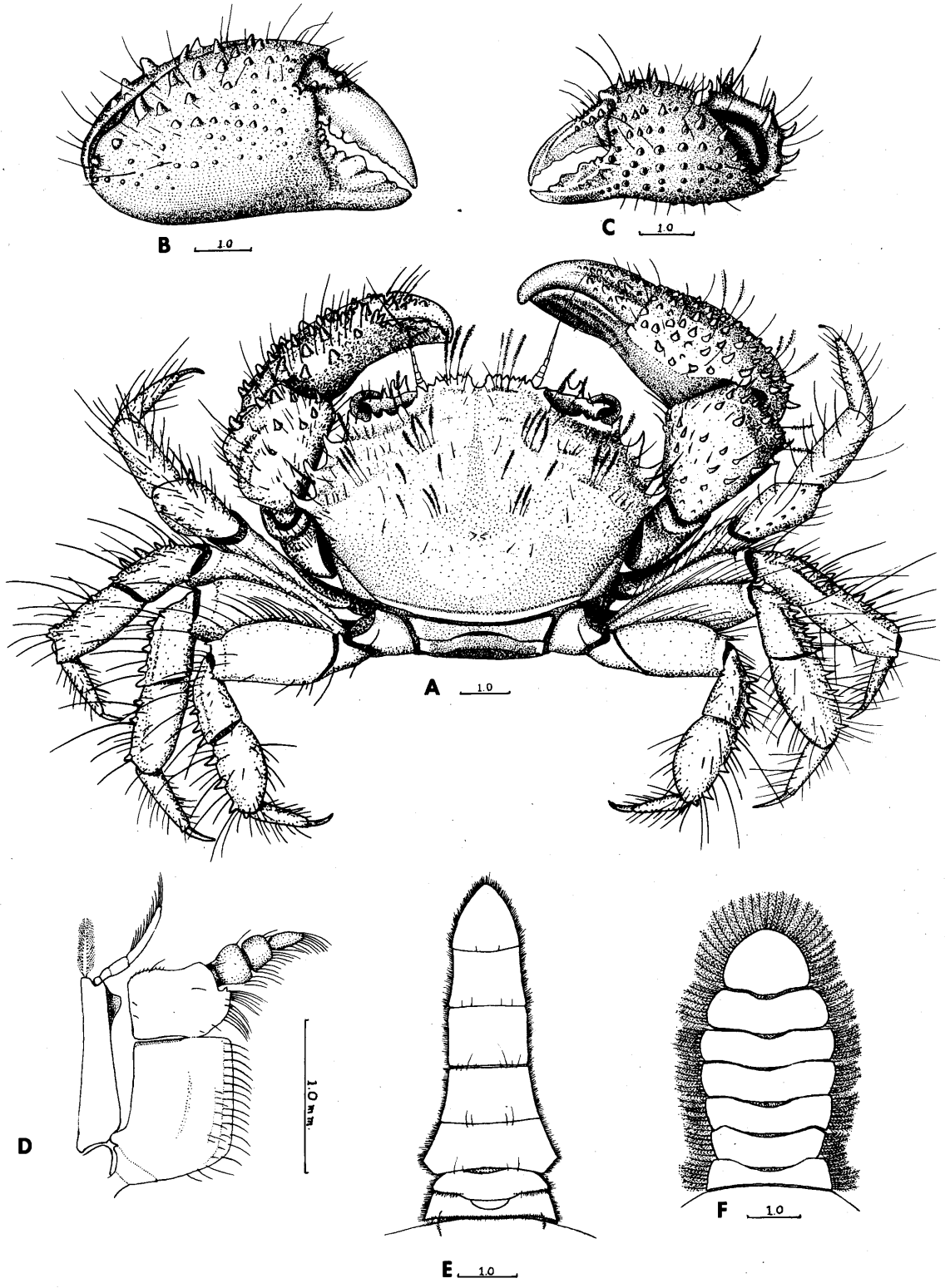


Fig. 5. *Pilumnus koepckei* Türkay. A. Dorsal view. B. Major chela, outer view. C. Minor chela, outer view. D. Right outer maxilliped. E. Male abdomen. F. Female abdomen.

including the shape of the carapace and the form of the chelipeds, are strongly xanthid. Although it might be placed in *Planopilumnus* Balss (1933), a genus containing such sculptured species as *P. vermiculatus* (A. Milne Edwards, 1873), but none apparently with spinulous margins, it seems best to refer the new species to *Pilumnus, sensu lato,* while recognizing that the partitioning of the American *Pilumnus* species among several genera, as was done by Balss for their Old World counterparts, is long overdue.

I take pleasure in naming this distinctive crab for the late Dr. Edwin O. Palmer of Hollywood, California, physician, poet, historian, philosopher, and genial companion on numerous Hancock cruises.

### ***Pilumnus koepckei*** Türkay
Fig. 5A–F

*Pilumnus koepckei* Türkay, 1967, p. 361, text-figs. 1a–c (pleopod).

*Type and repository.* Male holotype, Senckenberg Museum, Frankfurt-am-Main.

*Type locality and collector.* Cancas, Peru; H.-E. Koepcke.

*Subsequent localities and collectors.* Known only from the type locality and adjacent Bocapan, Peru.

*Material examined.* Cancas Bay, Peru, shore, 10–16 September 1950, H.-E. Koepcke, collector, M. Türkay, Natur-Museum Senckenberg, donor, one male and one female, paratypes, A.H.F. No. 5016. La Libertad, Ecuador, 4 fathoms, 19 January 1933, *Velero III* station 12–33, one male and two females. Manta Bay, Ecuador, shore, 20 January 1935, *Velero III* station 403-35, one male. Santa Lucia Bay, Acapulco, Guerrero, Mexico, 13 September 1946, C. L. Hubbs, collector, 1 young. San Lorenzo Rocks, Acapulco, Guerrero, Mexico, 0–2 fathoms, 30 January 1954, *Velero IV* station 2591-54, one male, one female. Santa Lucia Bay, Acapulco, Guerrero, Mexico, 1–4 fathoms, 1–2 February 1954, *Velero IV* station 2596-54, six males, eight females (two ovigerous).

*Description.* Carapace strongly arched from front to back, smooth, sparsely and stiffly bristled anteriorly, furrowing weak. Front 2-lobed, anterior border of lobes sloping and set with 3–4 short spinules. Between both lobes a deep V-shaped notch. Superior orbital border provided with 3 sharp spines, inferior orbital border furnished with a row of spines. Exorbital tooth sharp, spine-shaped, adjoining 3 sharp teeth on anterolateral margin, whose base is thickened behind, on which stiff bristles are found. All segments of hind body (abdomen) free. Segment 3 widest, reaching sideways to the base of coxae of P/5. P/1 differently formed. Palm of smaller chela long and strongly spined, [spines] partly arranged in long rows, between them stiff bristles. Palm of larger chela only coarse granulated, scarcely spined, bristled between them. Lower third of both palms smooth, shearing finger short, gaping, only indistinctly toothed (knot-like), darker colored than palm. P/2–5 chiefly spined on edge and stiffly haired. Go/1 [shaped] like a swan's neck, slender, distally thickened like a swan's head, and in the curve beneath it bristled on one side. (In the above description, P/1–5 = pereiopod 1–5; Go/1 = gonopod 1.) (After Türkay, 1967).

### ***Eurypanopeus hyperconvexus,*** new species
Fig. 6A–F

*Types.* Male holotype, A.H.F. No. 4114, and female paratype, from ½ to 1 mile NW of Anacapa Island light, California, 37–43 fathoms, rock, gray-green sand, 16 March 1941, *Velero III* station 1269-41.

*Measurements.* Male holotype: length 10.5 mm, width 13.5 mm, of fronto-orbit 8.6 mm, of front 4.7 mm, length of major cheliped 15.5 mm, of chela 8.6 mm (upper margin) 9.5 mm (lower margin), of dactyl 5.4 mm, height of palm 4.7 mm. Female paratype, length 9.6 mm, width 13.1 mm.

*Diagnosis.* Carapace convex, swollen, rugose lines obsolescent in male, present in female. Front not advanced beyond arc of anterolateral margins. Third lateral tooth obtusely angled. Color of fingers continued on palms; male major dactylus without a basal tooth. Seventh segment of male abdomen deeply invading sixth.

*Description.* Carapace convex, swollen, the convexity more noticeable in a longitudinal than in a transverse direction. Surface smooth, punctate, microscopically granulate, the granules forming transverse ridges on the protogastric and epibranchial regions visible in the male only with directional lighting. Regions elevated, separations indicated by shallow grooves; a deeper pit between hepatic and branchial regions,

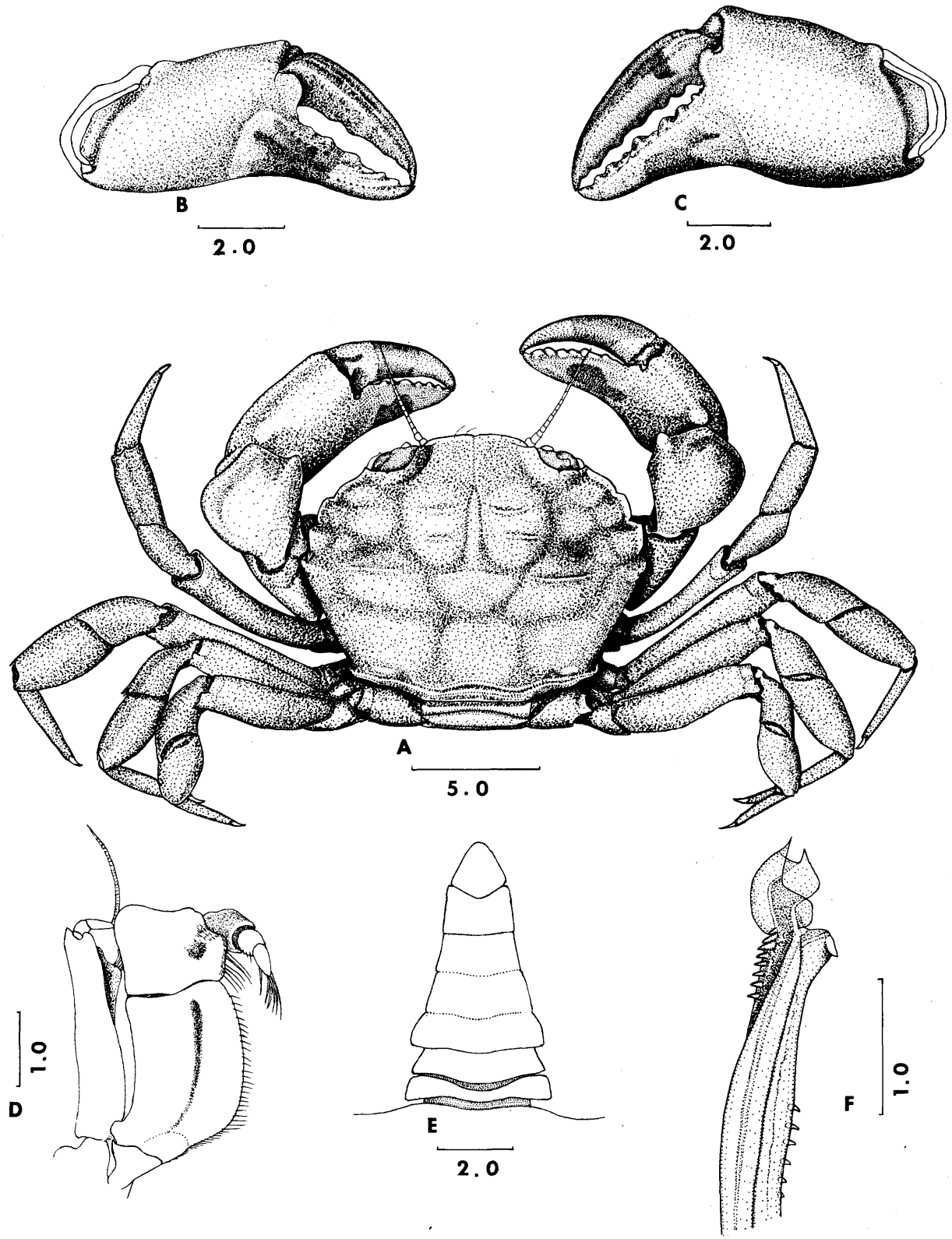


Fig. 6. *Eurypanopeus hyperconvexus,* new species, male holotype. A. Dorsal view. B. Right chela, outer view. C. Left chela, outer view. D. Right outer maxilliped. E. Abdomen. F. Right first pleopod.

another at base of ridge leading inward from fifth tooth, and a similar indentation at inner angle of each branchial region. Front arcuate, scarcely advanced beyond broad convexity described by anterolateral margins, upper surface concave, edge slightly thickened, frontal lobes advanced most medially, separated by a shallow notch and a closed fissure, outer lobes scarcely apparent. Supraorbital notches tightly closed, the outer notch obsolescent. First anterolateral tooth low and fused completely with second, having with it a sinuous margin; third and fourth teeth subequal, the third obtusely angled, the fourth rectangular, their posterior margins longer than their anterior margins, that of the fourth the straighter, separated by a deep notch with a pit at base; fifth tooth short, obtuse, triangular, separated from fourth by a similar notch and pit; a short granulate crest extending inward from both fourth and fifth teeth.

Merus of outer maxilliped subrectangular, anteroexternal angle broadly rounded but scarcely produced, anterointernal angle shallowly notched, a pit opposite insertion of palpus.

Chelipeds not markedly unequal. Subdistal tooth of merus low, rectangular. Carpal groove shallow, inner carpal tooth blunt, tuberculiform. Palm somewhat swollen, upper margins faintly double-crested, lower margins sinuous. Fingers white-tipped with brown bases, color of immovable fingers extending a short distance on palm to a line curving inward and downward from interdigital sinus. Major dactylus without a large basal tooth, but with a series of smaller, rounded teeth interdigitating with those of pollex. Fingers of minor manus longer and slenderer than those of major, and like them meeting without a gape, tips crossing.

Walking legs slender, meri compressed, carpi broadening distally, propodi, especially those of the last pair, broadened medially, dactyli long, straight or slightly curved, nails amber; all segments sparsely to moderately hairy.

Male abdomen with third segment broad as first and basally rounded; sixth segment broader than long; seventh segment almost as long as broad, its proximal margin obtusely angled and deeply invading the sixth segment, its tip subtriangular, rounded.

Male first pleopod exhibiting the three elements that characterize the Panopeinae (here called "lobe," "hood," and "spur" for want of a standard terminology), with the lobe advanced, concave, and pointed, broadly joined to the hood, and the two sharply separated from the reflexed spur, here reduced to a papilla; a row of setae immediately below the lobe and a more distant one below the spur.

Female more granulate and hairy than male, with supplementary ridges surmounted by clavate hairs, a few of which are present on the male also, the intervening areas covered with short pile. Second anterolateral tooth more apparent, separated from first by a shallow sinus. Carpus and manus of cheliped rougher and hairier, the pile serving to emphasize superior crests and transverse ridges on palm and dactyls that otherwise would be inapparent.

*Remarks.* The proposed new species is most closely related to *Eurypanopeus crenatus* (Milne Edwards and Lucas), from which it differs in the following particulars: (1) it is longer and narrower and decidedly more convex, (2) it has rugose lines, more prominent in the female than in the male; (3) the front is less prominent and more in line with the anterolateral margins; (4) the lateral teeth, especially the third, are more outstanding; (5) the relief of the carapace is greater: the regions more elevated, the pits more depressed; (6) the major dactyl in the male (as in the female) lacks a basal tooth; (7) the color of the pollex is continued appreciably on the palm; (8) the female is more hairy, the hairs clavate on the ridges, pilose between; (9) the tip of the male abdomen inserts deeply into the sixth segment; (10) the male first pleopod has the hood and lobe more completely united basally, the hood with a sharp point as well as the lobe, the spur reduced and reflexed, and the entire tip basally constricted. (For the above comparison a male specimen of *Eurypanopeus crenatus* of like size and sex as the holotype was used, collected at Independencia Bay, Peru, 10 fathoms, 9 February 1938, *Velero III* station 829-38.)

It is with singular gratification that the writer adds to the species of Xanthidae already described from the American tropics the first new species of brachyuran to have been reported from temperate California in the past 50 years or more. This achievement was made possible by Captain Hancock's decision to use the *Velero III,* during her last voyages as a research vessel, for the systematic exploration of the shallow waters of the northern Channel Islands, of which Anacapa Island is one.

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## NOTE ADDED IN PROOF

While examining a small collection of crabs from the Universidad del Valle, Colombia, sent to him for identification, the writer recognized a specimen of *Micropanope taylori*, then in manuscript, among them. The specimen was reported by von Prahl and Froidefond (1985, p. 266) as *Micropanope* sp., with the explanation that it was in process of description elsewhere. This 6.0 × 8.5 mm male, collected from *Pocillopora damicornis* in 3 m at Gorgona Island by Jacqueline Froidefond and since returned to its sender, is made a paratype of *Micropanope taylori*. The range of the species is thereby extended from Panama to Colombia, and from Central to northern South America.

Prahl, H. von, J. Froidefond. 1985. Shallow water xanthid crabs (Decapoda: Brachyura: Xanthidae) collected along the Pacific coast of Colombia. Zool. Jahrb. Syst., vol. 112, pp. 261–273.

The ALLAN HANCOCK FOUNDATION was established at the University of Southern California in 1939 by Captain G. Allan Hancock, business and educational leader, master mariner and organizer of scientific expeditions. The building housing the Foundation, which was especially designed for marine science programs and collections obtained on the Captain's expeditions, together with his ship the VELERO III, were presented to the University in 1939. The Hancock Library, built around the holdings of the Boston Society of Natural History, which were acquired by the Captain in 1944, now contains more than 90,000 volumes and 100,000 reprints and separates. The building also contains one of the most extensive collections of marine algae and invertebrates from the Eastern Pacific region.

The Foundation's principal research activities are oriented toward ecological and systematic marine biology, biological oceanography, marine geology, and paleoecology.

Dr. Richard C. Dugdale is Director of the Foundation.