Ralph T. Hui

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
BULLETIN 152

THE CANCROID CRABS OF AMERICA OF THE FAMILIES EURYALIDAE, PORTUNIDAE, ATELECYCLIDAE, CANCRIDAE AND XANTHIDAE

BY

MARY J. RATHBUN

Associate in Zoology, United States National Museum

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1930

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The present work forms No. 152 of the *Bulletin* series.

ALEXANDER WETMORE,
Assistant Secretary, Smithsonian Institution.

WASHINGTON, D. C., *April 14, 1930.*

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107. *Glyptoxanthus erosus.*
108. *Glyptoxanthus labyrinthicus* and *vermiculatus.*
109. *Glytoxanthus vermiculatus.*
110. *Daira americana* and *Carpoporus papulosus.*
111. *Carpoporus papulosus.*
112. *Lipaesthesius leeanus.*
113. *Medaeus spinimanus.*
114. *Medaeus lobipes.*
115. *Platyxanthus orbignyi.*
116. *Platyxanthus crenulatus* and *orbignyi.*
117. *Platyxanthus crenulatus.*
118. *Platyxanthus crenulatus.*
119. *Platyxanthus crenulatus.*
120. *Platyxanthus cokeri.*
121. *Platyxanthus cokeri.*
122. *Platyxanthus cokeri.*
123. *Platyxanthus patagonicus.*
124. *Platyxanthus patagonicus.*
125. *Platyxanthus patagonicus.*
126. *Gaudichaudia gaudichaudii.*
127. *Gaudichaudia gaudichaudii.*
128. *Homalaspis plana.*
129. *Homalaspis plana.*
130. *Homalaspis plana.*
131. *Paraxanthus barbiger.*
132. *Paraxanthus barbiger.*
133. *Paraxanthus barbiger, Cycloxanthus vittatus,* and *sexdecimdentatus.*
134. *Cycloxanthops novemdentatus, sexdecimdentatus,* and *vittatus.*

135. *Cycloxanthops sexdecimdentatus* and *novemdentatus*.
136. *Phymodius maculatus*.
137. *Leptodius floridanus, occidentalis*, and *sanguineus*.
138. *Leptodius floridanus, occidentalis*, and *sanguineus*.
139. *Leptodius snodgrassi*.
140. *Leptodius taboganus*.
141. *Leptodius parvulus* and *agassizii*.
142. *Leptodius cooksoni*.
143. *Leptodius tridentatus* and *Xanthodius stimpsoni*.
144. *Xanthodius sternberghii*.
145. *Xanthodius denticulatus* and *sternberghii*.
146. *Xanthodius denticulatus*.
147. *Xanthodius hebes*.
148. *Metopocarcinus truncatus* and *Lophoxanthus lamellipes*
149. *Lophopanopeus heathii*.
150. *Lophopanopeus bellus*.
151. *Lophopanopeus bellus*.
152. *Lophopanopeus frontalis*.
153. *Lophopanopeus lockingtoni, somaterianus, leucomanus*, and *diegensis*.
154. *Lophopanopeus lockingtoni* and *leucomanus*.
155. *Lophopanopeus distinctus* and *lobipes*.
156. *Panopeus herbstii forma typica* and *forma obesa*.
157. *Panopeus herbstii forma simpsoni* and *forma crassa*.
158. *Panopeus purpureus, convexus*, and *chilensis*.
159. *Panopeus purpureus*.
160. *Panopeus chilensis*.
161. *Panopeus occidentalis forma serrata* and *forma typica*.
162. *Panopeus rugosus*.
163. *Panopeus rugosus*.
164. *Panopeus harttii* and *americanus*.
165. *Panopeus bermudensis*.
166. *Panopeus turgidus*.
167. *Panopeus boekei*.
168. *Neopanope texana, texana sayi*, and *packardii*.
169. *Hexapanopeus angustifrons* and *schmitti*.
170. *Hexapanopeus sinaloensis, orcutti*, and *paulensis*.
171. *Hexapanopeus hemphillii* and *caribbaeus*.
172. *Eurypanopeus abbreviatus, abbreviatus ater*, and *transversus*.
173. *Eurypanopeus dissimilis, depressus*, and *ovatus*.
174. *Eurypanopeus crenatus* and *ovatus*.
175. *Eurypanopeus planissimus* and *planus*.
176. *Eurytium limosus* and *tristani*.
177. *Eurytium affine* and *tristani*.
178. *Micropanope sculptipes, lobifrons*, and *truncatifrons*.
179. *Micropanope xantusii, xantusii taboguillensis*, and *pusilla*.
180. *Micropanope granulimanus, polita, lata*, and *xanthiformis*.
181. *Micropanope spinipes* and *nitida*.
182. *Micropanope areolata* and *urinator*.
183. *Micropanope urinator* and *cristimana*, and *Rhithropanopeus harrisii*.
184. *Tetraxanthus bidentatus*.
185. *Tetraxanthus rugosus*.
186. *Chlorodiella longimana*.
187. *Xanthias inornatus*.
188. *Paraxanthias taylori*.

189. *Paraxanthias taylori, sulcatus,* and *insculptus.*
190. *Eucratodes agassizii.*
191. *Menippe mercenaria.*
192. *Menippe mercenaria.*
193. *Menippe mercenaria.*
194. *Menippe frontalis.*
195. *Menippe frontalis.*
196. *Menippe frontalis.*
197. *Menippe obtusa.*
198. *Menippe obtusa* and *nodifrons.*
199. *Menippe nodifrons.*
200. *Pilumnus sayi, caribaeus, dasypodus,* and *spinosissimus.*
201. *Pilumnus xantusii, sayi,* and *gracilipes.*
202. *Pilumnus townsendi, diomedeae,* and *longleyi.*
203. *Pilumnus spinohirsutus.*
204. *Pilumnus townsendi* and *gonzalensis.*
205. *Pilumnus lacteus, floridanus,* and *stimpsonii.*
206. *Pilumnus quoyi* and *miersii.*
207. *Pilumnus gemmatus, pygmaeus, pannosus,* and *holosericus.*
208. *Pilumnus limosus.*
209. *Pilumnus limosus* and *reticulatus.*
210. *Pilumnus reticulatus forma fragosa* and *forma tessellata.*
211. *Lobopilumnus agassizii forma typica, forma pulchella, forma trinidadensis,* and *forma bermudensis.*
212. *Heteractaea lunata* and *ceratopus.*
213. *Heteractaea ceratopus.*
214. *Heteractaea lunata.*
215. *Acidops fimbriatus.*
216. *Pilumnoides perlatus.*
217. *Pilumnoides hassleri* and *perlatus.*
218. *Pilumnoides nudifrons* and *perlatus.*
219. *Ozius verreauxii.*
220. *Ozius reticulatus* and *verreauxii.*
221. *Ozius perlatus* and *agassizii.*
222. *Eriphia gonagra.*
223. *Eriphia squamata.*
224. *Eriphia squamata* and *granulosa.*
225. *Eriphides hispida.*
226. *Eriphides hispida.*
227. *Domecia hispida.*
228. *Trapezia cymodoce ferruginea, cymodoce maculata,* and *digitalis.*
229. *Quadrella nitida.*
230. *Melybia thalamita.*

THE CANCROID CRABS OF AMERICA

By MARY J. RATHBUN

Associate in Zoology, United States National Museum

INTRODUCTION

This volume is the third of the series of handbooks on American crabs. The first volume "The Grapsoid Crabs of America" forms Bulletin 97, and the second volume "The Spider Crabs of America" forms Bulletin 129, of the U. S. National Museum. The introductory remarks in Bulletin 97, relating to sources of material, special researches, acknowledgments, and glossary of terms apply to the present work also.

In recent years the Museum has been enriched by vast collections of crabs from South America obtained by Dr. Waldo L. Schmitt in the course of two extended series of explorations in South American waters under the auspices of the Walter Rathbone Bacon scholarship. Besides the material collected, Doctor Schmitt was able to arrange advantageous exchanges with various South American museums and when that was not feasible, to borrow for study. In this way many gaps in this Museum were filled, both as to species and numbers, and our knowledge of the fauna greatly increased. Among the valuable discoveries was an example of the insignificant little crab, *Metopocarcinus truncatus* Stimpson, of which the type is not extant and no other specimen is known to exist in any collection. More striking is the discovery of a giant *Cancer* on the Atlantic coast of South America, the property of the Museu Paulista. Through the courtesy of the assistente, Dr. H. Luederwaldt, the author is permitted to describe this species from a series of excellent photographs. The carapace has a width of 25 cm. (9.5 inches) and is the largest American species known.

Next in importance are the investigations made through several seasons for the Carnegie Institution by Doctor Schmitt and Mr. Clarence R. Shoemaker at the Tortugas and vicinity, in cooperation with Dr. William H. Longley in charge of the laboratory. These have provided long series of various forms and have extended the range of many, aside from the primary object of the inquiry, to ascertain the food habits of fishes. The University of Southern California and the California Academy of Sciences have submitted special collections from the Pacific coast, the result of which, so far as the Cancroidea are concerned, are recorded here.

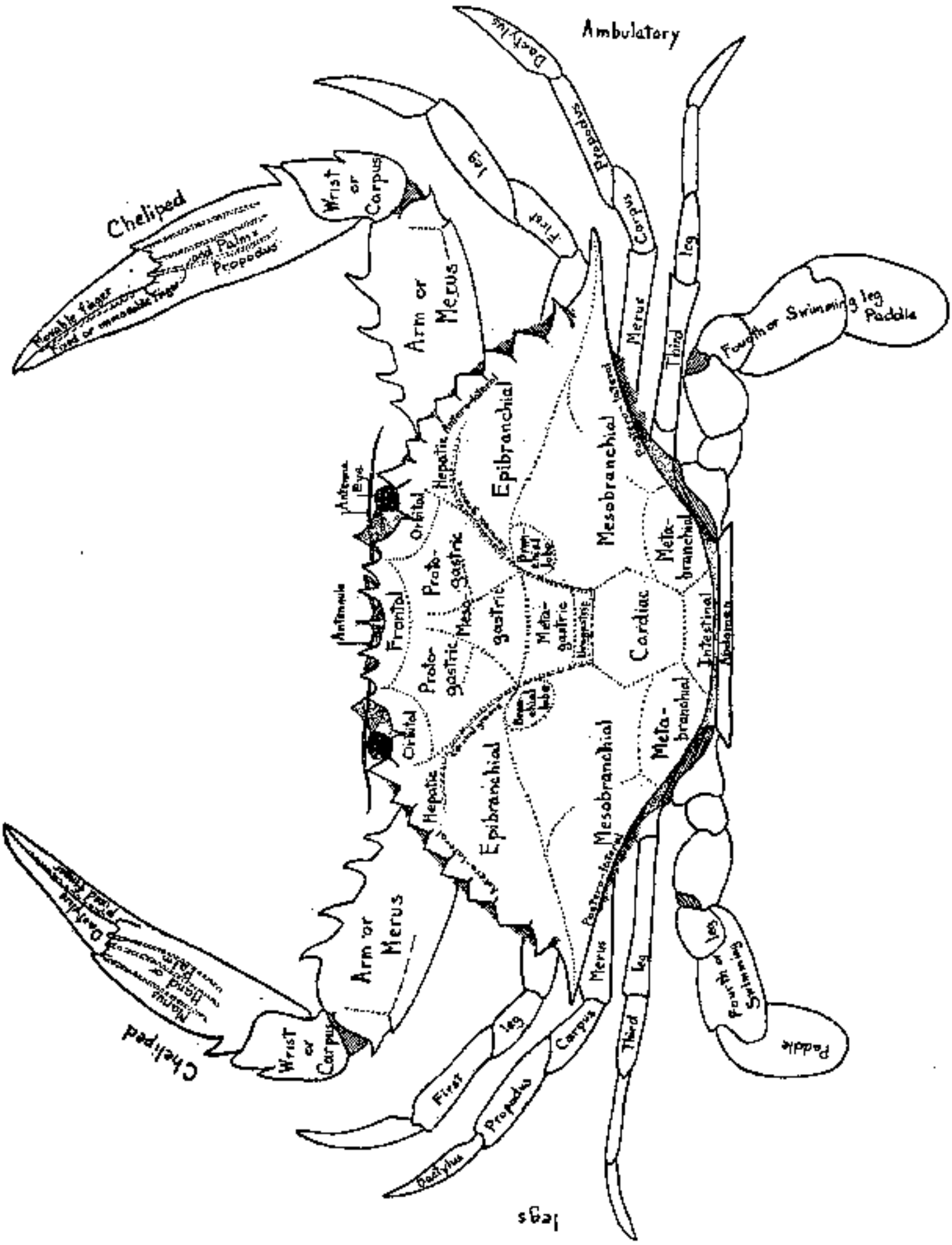

FIGURE 1.—DIAGRAMMATIC DORSAL VIEW OF A PORTUNID CRAB, SHOWING THE TERMS USED IN DESCRIPTION. BY W. L. SCHMITT

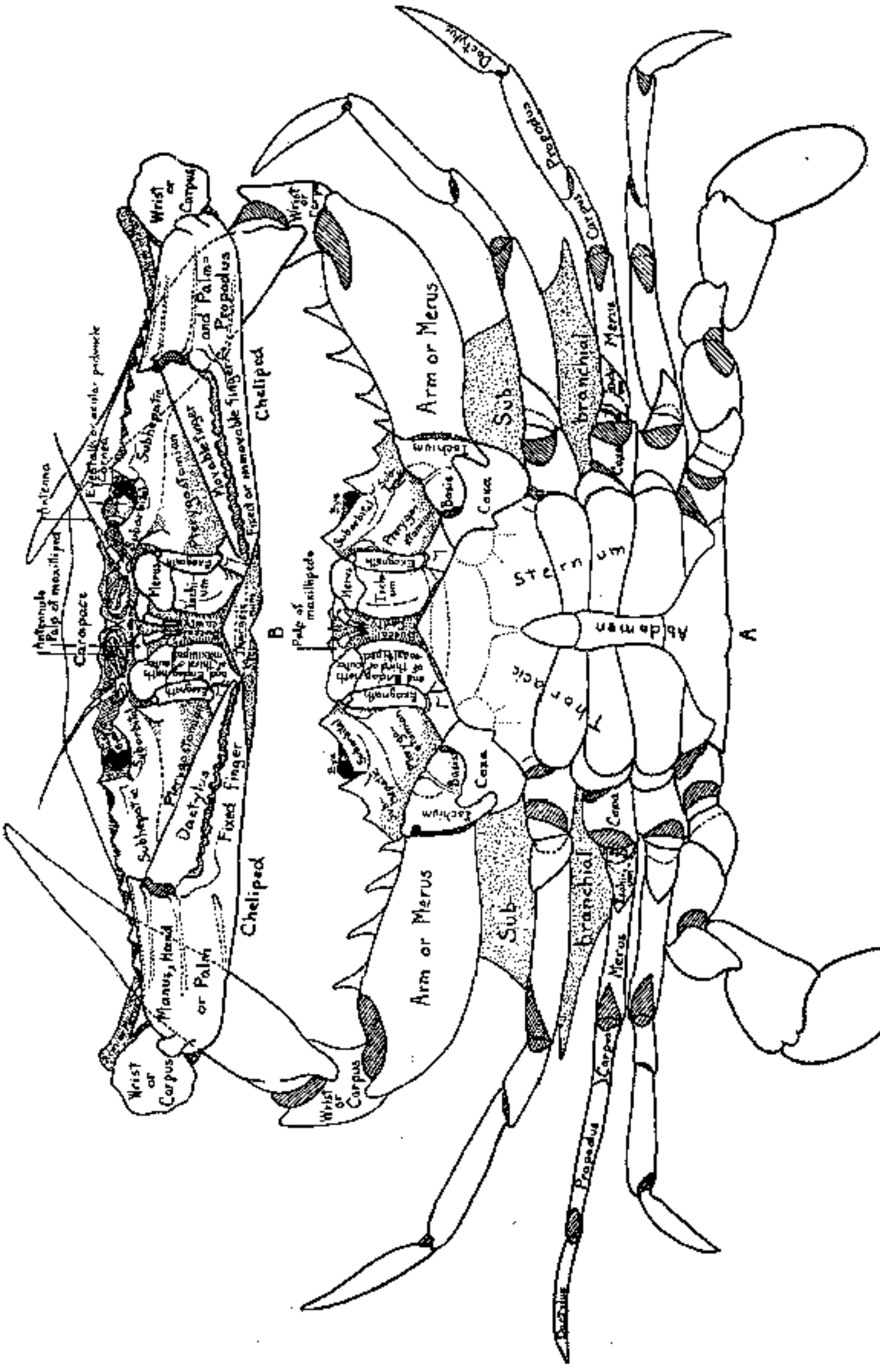

FIGURE 2.—DIAGRAMMATIC VIEWS OF A PORTUNID CRAB, SHOWING THE TERMS USED IN DESCRIPTION. BY W. L. SCHMITT. A, VENTRAL; B, FRONTAL.

EXPLANATION OF MEASUREMENTS AND ABBREVIATIONS USED

Explanation of measurements

The length of the carapace, unless otherwise stated, is measured on the median line, from the anterior to the posterior margin.

The width of the carapace is measured at the widest part.

The fronto-orbital width or exorbital width is measured from the outer angle of one orbit to the outer angle of the other.

The length of the segments of the chelipeds and legs is measured on the upper or anterior margin. The length of the whole cheliped or leg is measured on the lower margin, from the articulation of the coxa with the sternum to the tip of the dactylus.

The width of the segments of the chelipeds and legs is measured at the widest part.

The length of the immovable finger is measured from the tip to the extremity of the sinus between the fingers.

Character of bottom

Under "Material examined," the abbreviations indicating the character of the bottom, are those employed by the Bureau of Fisheries. Nouns begin with a capital, adjectives with a small letter.

bk.....black	gy.....gray	S.....sand
br.....brown	hrd.....hard	sctrd.....scattered
brk.....broken	lge.....large	sft.....soft
bu.....blue	lt .....light	Sh.....shells
Co.....coral	M.....mud	sm.....small
crs.....coarse	Oz.....ooze	Sp.....specks
dk.....dark	P.....pebbles	St.....stones
fne.....fine	Ptr.....Pteropod	stky.....sticky
For.....foraminifera	R.....rock	vol.....volcanic
G.....gravel	rd.....red	W.....seaweed
Glob.....globigerina	Rf.....reef	wh.....white
gn.....green	rky.....rocky	yl.....yellow

Additional abbreviations and notes

In the synonymy an attempt has been made to give all the different names or combinations which have been used, but not all the references to a species.

In the lists under "Material examined" a number in parenthesis following an indication of a specimen or specimens denotes a catalogue number of the United States National Museum unless otherwise indicated. M.C.Z. = Museum of Comparative Zoölogy; P.M.Y.U. = Peabody Museum of Yale University; Mus. S.U.I. = Museum of the State University of Iowa; y. = young; B.A. = Museo Nacional de Historia Natural, Buenos Aires, Argentina. The words "U. S. Fisheries" should be understood before "Str. *Albatross*," "Str. *Fish Hawk*," and "Sch. *Grampus*."

In the same lists there have been entered, besides specimens in the National Museum, many types examined elsewhere, as well as such specimens from other collections as increase our knowledge of the range of the species, but for lack of space no attempt has been made to record all of the many specimens examined in museum and private collections.

In the color notes made by Doctor Schmitt on Tortugas specimens the 1886 edition of Ridgway's "Nomenclature of Colors" is used.

THE CANCROID OR CYCLOMETOPOUS CRABS OF AMERICA

The term "Cancroid or Cyclometopous" is used in contrast to "Grapsoid or Catometopous." Together they form the Brachyrhyncha of Borradaile.[1]

1. In general, the carapace of the Cancroids is broader than long. At the outset we find an exception to the rule in the family formerly known as Corystidae but latterly, in obedience to the International Rules of Nomenclature, as Euryalidae. They have affinities with the anomuran crabs and have not only elongate carapaces but long, coarse antennae and a rather prominent front (between the orbits), which is more than one can say of most of the group. The buccal cavity narrows forward while the outer pair of maxillipeds reach forward almost to the antennules. A small family, especially in our hemisphere, where it is restricted to South America.

2. The Portunidae or swimming crabs can with few exceptions be distinguished by their hind legs which are broad and flat, adapted for swimming. The carapace is of good width with teeth or spines on the margins. A large family, including the so-called "blue crab," the chief edible crab of the Atlantic coast of North America, formerly very abundant, now rapidly becoming a luxury.

3. The family Atelecyclidae is limited in species and distribution. The carapace is narrow, often approaching the circular, oblong or pentagonal. Typically the movable part of the antennae is well developed but it may on the other hand be absent or rudimentary, giving rise to a series of curious forms peculiar to South America.

4. The Cancridae are represented in America by the genus *Cancer*, recognized by its broad oval carapace, and numerous side teeth. The species are numerous and many of them attain a large size and include several of economic value, especially on the west coast of North America.

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[1] Ann. Mag. Nat. Hist., ser. 7, vol. 19, 1907, p. 466.

5. The Xanthidae are by far the most numerous in genera, species, and individuals. They include the large stone crabs, the coral crab of the West Indies, and several of the most important South American forms, but the vast majority are crabs of small or medium size, such as the various mud crabs and coral-reef crabs.

The Potamonidae or fresh-water crabs will be dealt with in another volume.

AREOLATE MARKINGS ON THE CARAPACE OF CRABS

Figure 3 from Dana's "Crustacea, United States Exploring Expedition," part 1, 1852, page 29, is inserted here for convenience of description, especially of Xanthids. The principal parts of the carapace are indicated by letters: F, frontal; M, medial; P, posterior; L, antero-lateral; R, postero-lateral; D, E, N, T, S, antero-lateral teeth; d', s', smaller, occasional teeth. Subdivisions of the above regions are indicated by a number before the letter.

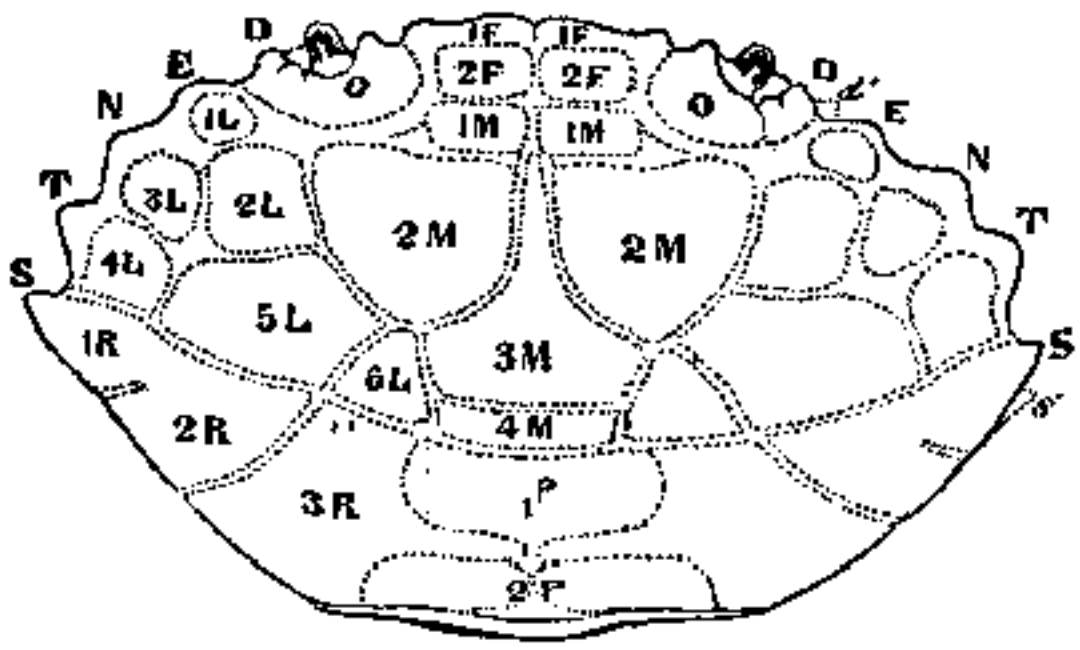

FIGURE 3.—CARAPACE OF A XANTHID CRAB SHOWING THE PRINCIPAL AREOLATIONS. AFTER DANA

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Family PORTUNIDAE

Atlantic	Pacific
Portunus (Portunus) gibbesii.	*Portunus (Portunus) xantusii.*
Portunus (Achelous) spinimanus.	*Portunus (Achelous) brevimanus.*
Portunus (Achelous) ordwayi.	*Portunus (Achelous) angustus.*
Portunus (Achelous) spinicarpus.	*Portunus (Achelous) iridescens.*
Callinectes sapidus acutidens.	*Callinectes bellicosus.*
Callinectes danae.	*Callinectes arcuatus.*
Callinectes bocourti.	*Callinectes toxotes.*
Arenaeus cribrarius.	*Arenaeus mexicanus.*

Family CANCRIDAE

Atlantic	Pacific
Cancer borealis.	*Cancer edwardsii.*
Cancer luederwaldti.	*Cancer porteri.*
	Cancer plebejus.

Family XANTHIDAE

Atlantic	Pacific
Platypodia spectabilis.	*Platypodia rotundata.*
Actaea setigera.	*Actaea dovii.*
Actaea bifrons.	*Actaea angusta.*
Actaea rufopunctata nodosa.	*Actaea sulcata.*
Glyptoxanthus erosus.	*Glyptoxanthus labyrinthicus.*
Medaeus spinimanus.	*Medaeus lobipes.*
Platyxanthus crenulatus.	*Platyxanthus cokeri.*
Leptodius floridanus.	*Leptodius occidentalis.*
Leptodius agassizii.	*Leptodius tridentatus.*
Leptodius parvulus.	*Leptodius cooksoni.*
Xanthodius denticulatus.	*Xanthodius stimpsoni.*
Panopeus herbstii forma crassa.	*Panopeus purpureus.*
Panopeus occidentalis.	*Panopeus convexus.*
Hexapanopeus schmitti.	*Hexapanopeus sinaloensis.*
Hexapanopeus paulensis.	*Hexapanopeus nicaraguensis.*
Eurypanopeus abbreviatus.	*Eurypanopeus ovatus.*
Eurytium limosum.	*Eurytium tristani.*
Micropanope granulimanus.	*Micropanope polita.*
Micropanope truncatifrons.	*Micropanope xantusii.*
Micropanope xanthiformis.	*Micropanope lata.*
Menippe mercenaria.	*Menippe frontalis.*
Pilumnus sayi.	*Pilumnus xantusii.*
Pilumnus longleyi.	*Pilumnus spinohirsutus.*
Pilumnus holosericus.	*Pilumnus limosus.*
Heteractaea ceratopus.	*Heteractaea lunata.*
Pilumnoides hassleri.	*Pilumnoides perlatus.*
Ozius reticulatus.	*Ozius perlatus.*
Eriphia gonagra.	*Eriphia squamata.*

SPECIES ON BOTH SIDES OF THE CONTINENT

Family PORTUNIDAE

Carcinides maenas.
Ovalipes punctatus.
Cronius ruber.

Family ATELECYCLIDAE

Acanthocyclus albatrossis.
Corystoides chilensis.

Family XANTHIDAE

Panopeus bermudensis.
Pilumnus reticulatus.
Domecia hispida.

SYSTEMATIC DISCUSSION

Order DECAPODA

Suborder REPTANTIA

Tribe BRACHYURA

Subtribe BRACHYGNATHA

Superfamily BRACHYRHYNCHA

KEY TO SUBTRIBES OF THE TRIBE BRACHYURA [2]

A[1]. Anterior thoracic sterna very broad, posterior thoracic sterna narrow and keel-like. Posterior thoracic epimera largely exposed by reduction of the branchiostegite.....Subtribe *Gymnopleura*.[3]

A[2]. Anterior thoracic sterna not unusually broad, posterior thoracic sterna not keel-like. Posterior thoracic epimera covered by the branchiostegite.

B[1]. Mouth field (endostome) prolonged forward to form a gutter. Last pair of legs normal or abnormal. Female openings generally sternal. First *abdominal limbs wanting in female. Gills few.*

Subtribe *Oxystomata*.

B[2]. Mouth field roughly square.

C[1]. Last pair of legs abnormal, dorsal. Female openings coxal. First abdominal limbs of female present. Gills usually many.

Subtribe *Dromiacea*.

C[2]. Last pair of legs normal, rarely reduced, not dorsal, except in *Cymopolia* and *Retropluma*. Female openings sternal. First abdominal limbs of female wanting. Gills few.

Subtribe **BRACHYGNATHA**.

KEY TO SUPERFAMILIES OF THE SUBTRIBE BRACHYGNATHA

A[1]. Fore part of body narrow, usually forming a distinct rostrum. Body more or less triangular. Orbits generally incomplete.

Superfamily *Oxyrhyncha*.

A[2]. Fore part of body broad. Rostrum usually reduced or wanting. Body oval, round, or square. Orbits nearly always well inclosed.

Superfamily **BRACHYRHYNCHA**.

KEY TO FAMILIES OF THE SUPERFAMILY BRACHYRHYNCHA

A[1]. Orbits formed, but more or less incomplete. Second antennal flagella, when present, long and hairy. Rostrum present. Body elongate-oval. Fore edge of mouth indistinct.....Family **EURYALIDAE**=*Corystidae*.

A[2]. Orbits complete (though fissures may remain), except in the Mictyrinae, where the eyes are almost or quite unprotected. Body rarely elongate-oval. Rostrum often wanting. Second antennal flagella usually short, not hairy.

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[2] The keys are for the most part from Borradaile's On the Classification of the Decapod Crustaceans, Ann. Mag. Nat. Hist., ser. 7, vol. 19, 1907, pp. 477–483. The names in the right hand margin which are printed in capitals indicate the families and higher divisions treated of in this volume.

[3] Bourne, The Raninidae, in Journ. Linn. Soc. London, Zool., vol. 35, 1922, p. 55.

B¹. Carpus of third maxillipeds articulates at or near antero-internal angle of the merus. Body usually round or transversely oval. Male openings nearly always coxal. In many species the right chela is always larger than the left.

C¹. Legs more or less distinctly adapted for swimming. Usually a small lobe on the inner angle of the endopodite in the first maxillipeds. The first antennae fold slanting or transverse.

Family **PORTUNIDAE.**

C². Legs not adapted for swimming, or if so modified, then the male genital duct opens sternally or runs in a sternal groove. Inner lobe on the endopodite in the first maxillipeds wanting.

D¹ Fresh-water crabs with the branchial region much developed and swollen. Body often squarish, but male openings coxal.

Family *Potamonidae.*

D². Marine crabs with the branchial region not greatly swollen.

E¹. First antennae fold lengthwise.

F¹. Carapace subcircular. Second antennal flagella either long and hairy or wanting_Family **ATELECYCLIDAE.**

F². *Carapace broadly oval or hexagonal. Second antennal* flagella present, short, not hairy_Family **CANCRIDAE.**

E². First antennae fold slanting or transversely.

F¹. Body usually transversely oval. Male openings rarely sternal. Not sharply separated from the following family_____Family **XANTHIDAE.**

F². Body usually square or squarish. Male ducts open on the sternum, or, if coxal, pass along a groove in the sternum. Not sharply separated from the foregoing family_____Family *Goneplacidae.*

B². Carpus of third maxillipeds does not articulate at or near the inner angle of the merus. Body usually square or squarish. Male openings sternal except in *Retropluma*, where the duct passes along a sternal groove to the coxopodite. In no species (*Cymopoliidae* excepted) is the right chela always larger than the left.

C¹. Small, usually commensal crabs, with very small eyes and orbits. Body usually more or less rounded____Family *Pinnotheridae.*

C². Free-living crabs, with eyes not specially reduced and usually a square body.

D¹. Last pair of legs dorsally placed and weaker than the others. Interantennular septum very thin. No distinct epistome. Exopodites of third maxillipeds not hidden.

E¹. Front narrow. Female openings in normal position. Third maxillipeds subpediform, not covering the mouth.

Family *Retroplumidae=Pteroplacidae.*

E². Front moderately broad. Female openings on the sternal segment corresponding to the first pair of walking legs. Third maxillipeds cover the mouth to a large extent and have very small meropodites.

Family *Cymopoliidae=Palicidae.*

D². Last pair of legs not dorsally placed nor markedly weaker than the rest. Interantennular septum not very thin.

E¹. A gap of greater or less size is left between the third maxillipeds. Front very or moderately broad.

F¹. Sides of the body either straight or very slightly arched. Shape squarish. Front broad. Rarely true land crabs_____Family *Grapsidae.*

F². Sides of the body strongly arched. Shape transversely oval. Front narrower. Land-crabs.

Family *Gecarcinidae.*

E³. The third maxillipeds almost or quite close the mouth. Front moderately or very narrow.

Family *Ocypodidae.*

B³. Merus of third maxillipeds small, bearing terminally a carpus of nearly its own width. Ischium very broad. Body somewhat oblong. First antennae not retractile into sockets. *Parasitic* on corals.

Family *Hapalocarcinidae.*

Superfamily BRACHYRHYNCHA

The fore part of the body is broad, the rostrum reduced or altogether wanting. The body is oval, round, or square, usually broader than long. The orbits are nearly always well enclosed.

Family EURYALIDAE[4] (CORYSTIDAE *restricted*[5])

Corystiens (part) MILNE EDWARDS, Hist. Nat. Crust., vol. 2, 1837, p. 139.
Corystoidea—Corystidae (part) DANA, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, pp. 296 and 297.
Corystoidea (part) MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 209.
Majoidea corystoidea (part) ORTMANN, Zool. Jahrb., Syst., vol. 7, 1893, pp. 26 and 28.
Oxyrhyncha—Corystidae (part) ORTMANN, in Bronn's Thier-Reich, vol. 5, pt. 2, 1898, p. 1166.
Corystidae (part) ALCOCK, Journ. Asiat. Soc. Bengal, vol. 68, 1899, p. 103.

Carapace longer than broad, suboval, convex from side to side, *regions not well defined. Front rather prominent, cut into three* (in American species) or two teeth. Antennules normal, small, folding longitudinally. Antennae long, unusually coarse and setaceous. There is no epistome and the external maxillipeds, which are elongate and sometimes have a slight pediform cast, extend almost up to the antennules. Buccal orifice elongate and square cut with the anterior angles rounded and slightly convergent.

KEY TO THE AMERICAN GENERA OF THE FAMILY EURYALIDAE

A¹. Legs gressorial. Lateral teeth of carapace both before and behind the middle. Size small, not over 10 mm. in length.....**Gomeza**, p. 10.
A². Legs somewhat natatory. Lateral teeth of carapace before the middle only. Size large, over 50 mm. in length.....**Pseudocorystes**, p. 11.

Genus GOMEZA Gray

Gomeza GRAY, Zool. Misc., 1831, p. 39; type, *G. bicornis* Gray.
Oeidea DE HAAN, Fauna Japon., Crust., 1833, pp. 4 and 15; type, *O. vigintispinosa* DE HAAN.

Carapace elongate, subelliptical, sides dentate behind as well as in front of middle, rostrum triangulate. Eyes small or medium. Merus

[4] *Euryala* Weber, 1793 takes precedence of *Corystes* Latreille 1802, both having the same type; hence Euryalidae instead of Corystidae. See Rathbun, Proc. Biol. Soc. Washington, vol. 17, 1904, p. 171.
[5] For the genera *Bellia* and *Corystoides*, see under Family Atelecyclidae, subfamily Acanthocyclinae.

of outer maxillipeds about as broad as long, obliquely truncate at inner distal angle. Legs gressorial; dactyli nearly equal. Of small size. Inhabits the west coast of South America; also Indo-Malaysian, Japanese and Australian seas.

GOMEZA SERRATA Dana

Plate 1, Figures 4–6

Gomeza serrata Dana, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 305, atlas, 1855, pl. 18, fig. 7*a–c* (type-locality, off Patagonia, 50 fathoms; type not extant).—Miers, Proc. Zool. Soc. London, 1881, p. 68; *Challenger* Rept., Zool., vol. 17, 1886, p. 212.—Lenz, Zool. Jahrb., Syst., vol. 2, Suppl. 5, 1902, p. 754, pl. 23, fig. 6.—Porter, Revista Chilena Hist. Nat., vol. 22, 1918, p. 53, text-fig. 3.

Diagnosis.—Carapace scabrous, short hirsute, lateral margin 5-toothed, fourth tooth about at middle, teeth minutely denticulate; rostrum truncate, margin near apex incised.

Description.—Truncate margin of rostrum sinuous and either side just at the angle there is a longitudinal incision separating a narrow, acute lobe; behind this the margin of the beak is minutely denticulate. Lateral teeth of carapace except the first pointing obliquely forward. Cardiac region far behind middle of carapace. Eyes on rather short pedicels, directed straight outward. Length of outer antenna beyond carapace not one-third length of carapace; flagellum with 9 or 10 articles and a few short hairs. Outer maxillipeds short hirsute, not quite meeting on median line; merus about half as long as ischium, inner distal angle deeply truncate. Abdomen hirsute. Hand short; fingers a little incurved, inner margin denticulate. Margins of legs pubescent; dactylus slender, tapering; carpus and propodus subequal.

Measurements.—Type (after Dana), length of carapace 3.1, width at fourth tooth 2.5, fronto-orbital width 1.5, width of front just anterior to inner orbital tooth 0.42 mm. Male (Lenz), size 4.5 mm. Largest specimen (Miers), 10.6 mm. long.

Range.—Callao, Peru, to Straits of Magellan, shallow water to 30 fathoms (Miers); off Patagonia, 50 fathoms (Dana).

Genus PSEUDOCORYSTES Milne Edwards

Pseudocorystes Milne Edwards, Hist. Nat. Crust., vol. 2, 1837, p. 149; type *P. armatus* Milne Edwards.

Carapace nearly oval, much swollen. Front narrow, advanced, horizontal. Ocular peduncles of medium size, orbits shallow, quite open exteriorly. Antennules small, completely covered above by the front; the flagellum folds longitudinally. Antennae very large, inserted under the eye in a hiatus of the orbital border; the gland at its base is especially large. Buccal cavity quite open anteriorly and prolonged laterally to the base of the outer antennae where it is limited by a large conical tooth which, along with the antenna, forms the

lower border of the orbit. Outer maxilliped rather wide, ischium very large; merus small, subtriangular, nearly as wide as long; palp very short, inserted near summit of merus. Sternal plastron narrow, oblong. Chelipeds large, compressed, of medium length. The four pairs of legs are all nearly the same length, much compressed; dactylus lamellate, broad and lanceolate, especially those of first and last pairs. Abdomen very small and narrow-oblong; third, fourth, and fifth segments fused.

Contains but one species.

PSEUDOCORYSTES SICARIUS (Poeppig)

Plate 1, Figures 1–3

Corystes sicarius POEPPIG, Arch. f. Naturg., vol. 2, pt. 1, 1836, p. 139 (type-locality, deep water opposite Bay of S. Vincent, Chili; type in Leipzig Mus.).
Pseudocorystes armatus MILNE EDWARDS, Hist. Nat. Crust., vol. 2, 1837, p. 151 (type-locality, Valparaiso; cotype in Paris Mus.; cotype, Cat. No. 20276, U. S. Nat. Mus.).—MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol 6, pt. 1, 1844, p. 30; atlas, vol. 9, 1847, pl. 15, figs. 2–2c.
Pseudocorystes sicarius WHITE, Cat. Crust. Brit. Mus., 1847, p. 53.—RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 576.—PORTER, Bol. Mus. Nac., Chile, 1913, p. 359, text-fig. 2 and synonymy; Revista Chilena Hist. Nat., vol. 22, 1918, p. 54, text-fig. 4 and synonymy.
Corystoides armatus PHILIPPI, Zool. Anz., vol. 17, 1894, p. 265.

Diagnosis.—Carapace nearly as broad as long, granulate; sides marginate, bidentate. Legs broad, natatory.

Description.—Carapace convex antero-posteriorly as well as from side to side; width about equal to length exclusive of rostrum. Two shallow crescentic furrows near center of carapace. Surface rough with crowded granules which are more acute and upstanding on the anterior half. Rostrum triangular, tridentate, median tooth the largest and most advanced. A sinus at middle of upper orbital border followed by two large teeth on the anterior margin of the carapace, the inner of which represents the external angle of the orbit. Two small teeth on the antero-lateral margin, the posterior one rudimentary; margin of teeth as well as of middle half of carapace thickly denticulate. Surface of chelipeds similar to that of carapace, granulation coarser and sharper toward upper margin. Merus armed with a small triangular spine near distal end of lower, outer margin; a strong spine-tipped tooth at inner angle of carpus, a spinule on inner surface, another smaller one on outer surface, sometimes absent; a denticle near middle of lower edge of propodus, and a series of spinules on upper margin of dactylus and adjacent margin of palm. Fixed finger triangular, broader at base than the dactylus. Fingers nearly meeting, each with about 6 or 7 low prehensile teeth. Remaining legs almost smooth, margins ciliated. Dactylus of last pair thinner than the others, which are flat on the anterior surface and convex on the posterior.

Color.—Carapace tawny-olive lighter in the center; chelipeds and legs wood brown. (After Milne Edwards and Lucas, fig.)

Measurements.—Male (54212), length of carapace 52.4, width of same 47.8, fronto-orbital width 19.5, width of front just anterior to supraorbital eave 6.6 mm.

Range.—West coast of South America, from Independencia Bay, Peru, to Straits of Magellan.

Material examined.—Independencia Bay, Peru; November 1919; Robert Cushman Murphy; 1 male (54212), received from Brooklyn Mus.

Valparaiso, Chile: Gay; 1 female, cotype of *P. armatus* Milne Edwards (20276), received from Paris Mus. 1 male (Copenhagen Mus.).

Chile; 1 ovigerous female, lent by São Paulo Mus.

Family PORTUNIDAE

SWIMMING CRABS

Portunidae Miers, *Challenger* Rept., Zool., vol. 17, 1886, p. 169.

Carapace depressed, moderately transverse, and usually widest at the last antero-lateral marginal spine. Front horizontal. Orbits and eye-stalks nearly always of moderate length. Lateral teeth usually from five to nine. Last trunk legs usually adapted for swimming, with terminal joint ovate, flatly expanded.

KEY TO THE SUBFAMILIES AND GENERA OF THE GENUS PORTUNIDAE

A¹. Eye-stalks of normal size.
  B¹. No swimming paddles. Carapace with five antero-lateral teeth.
    Subfamily **Carcinidinae**, p. 14.
    Carcinides, p. 14.
  B². The last pair of legs are swimming paddles.
    C¹. Carapace not very broad, antero-lateral teeth 3 to 5.
      Subfamily **Liocarcininae**, p. 18.
      D¹. Antero-lateral teeth five. Front dentate. Antenna not excluded from orbit.
        E¹. Antero-lateral teeth similar, dentiform. Dactylus of swimming paddles broadly oval. Male abdomen oblong ..... **Ovalipes**, p. 18.
        E². A long spine at lateral angle of carapace instead of a tooth. Dactylus of swimming paddles broadly lanceolate, pointed. Male abdomen triangular ... **Bathynectes**, p. 27.
      D². Antero-lateral teeth three. Front subentire. Antenna excluded from orbit ..... **Coenophthalmus**, p. 30.
    C². Carapace usually very broad, antero-lateral teeth 9.
      Subfamily **Thalamitinae**, p. 33.
      D¹. Movable portion of antenna not excluded from orbit.
        E¹. A longitudinal ridge on the palate.
          F¹. Outer maxillipeds not remarkably advanced; segments of palp subcylindrical.
            G¹. Abdomen of male triangular ..... **Portunus**, p. 33.

G². Abdomen of male L-shaped. Antero-external angle of merus of third maxillipeds strongly produced outward ..... **Callinectes**, p. 98.

F². Outer maxillipeds remarkably advanced, overreaching the front margin of carapace; last two articles of palp compressed and lamellate. Chelipeds of male extremely long and slender ..... **Lupella**, p. 132.

E². No longitudinal ridge on the palate. Superior fissures of orbit open, V-shaped ..... **Arenaeus**, p. 134.

D². Movable portion of antenna excluded from orbit by a prolongation of its basal article. Antero-lateral teeth alternately large and small ..... **Cronius**, p. 138.

A². Eye-stalks and orbits extremely long. Antero-lateral teeth 5 or 4. Front very narrow ..... Subfamily **Podophthalminae**, p. 143.
Euphylax, p. 143.

Subfamily CARCINIDINAE (CARCININAE Alcock)

The legs have a tendency to be stout; all four pairs are similar, although the last pair has a broader and flatter dactylus. Carapace not very broad, antero-lateral borders cut into 4 or 5 teeth. Basal article of antenna fixed, longer than broad, and longitudinal in position.

Genus CARCINIDES Rathbun

Carcinus LEACH, Edin. Encycl., vol. 7, 1814, pp. 390 and 429; type, *C. maenas* (Linnaeus). Preoccupied by Latreille, 1796, for a genus of Amphipoda.
Carcinides RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 164; type, *C. maenas* (Linnaeus).

Carapace hexagonal, not broad, convex, regions well defined, no transverse ridges. Front projecting beyond the inner supraorbital angles, three lobed, between a fourth and a sixth as wide as the carapace. Antero-lateral borders shorter than the postero-lateral, thin, oblique, arched, cut into five strong teeth, including the outer orbital angle. Orbits with a notch in the upper and one in the concave lower border, inner lower angle dentiform, not prominent. Antennules transversely oblique. Basal joint of antenna slightly longer than broad, fixed; the flagellum stands in the inner hiatus. Buccal cavern square, a little longer than broad; external maxillipeds rather elongate, especially the merus which projects beyond the edge of the endostome, episteme diamond-shaped. The ridges that define the efferent branchial canals do not approach the edge of the endostome. Chelipeds massive, about as long as the first three pairs of legs, slightly unequal; arm short, unarmed; inner angle of wrist dentiform or spiniform; no spines on hand, which is deep and not prismatic; fingers stout, a little shorter than the length through the middle of the palm, not very strongly toothed. Legs stoutish; the last pair has the merus elongate and unarmed, carpus not dilated, propodite shortened and somewhat broadened, dactylus acutely lanceolate. Third to fifth abdominal terga fused.

Contains only one species.

CARCINIDES MAENAS (Linnaeus)

GREEN CRAB; JOE ROCKER

Cancer marinus sulcatus RUMPH, Amboinsch. Raritcitk., 1705, pl. 6, fig. O.

Cancer maenas LINNAEUS, Syst. Nat., ed. 10, vol. 1, 1758, p. 627 (type-localities, in Oceano Europaeo, Asiatico; type not extant); Fauna Suecica, 1761, p. 492.

Portunus maenas LEACH, Edin. Encyc., vol. 7, 1814, p. 390.

Carcinus maenas LEACH, Edin. Encyc., vol. 7, 1814, p. 429.—R. RATHBUN, Fisheries and Fishery Industries of the United States, sec. 1, 1893, p. 774, pl. 265.

Portunus menoides RAFINESQUE, Amer. Monthly Mag., vol. 2, 1817, p. 42, (type-localities, New York, Long Island, New Jersey, etc.; types not extant).

Cancer granulatus SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, Aug. 1817, p. 61 (type-locality, "bays and inlets near the sea" [east coast of the United States]; type not extant, according to Say).

Carcinus moenas DE KAY, Nat. Hist. New York, pt. 6, Crust., 1844, p. 8, pl. 5, figures 5 and 6.

Carcinus granulatus S. I. SMITH, in Verrill and Smith, Rept. Commr. of Fish and Fisheries, vol. 1, 1871–1872 (1873), pp. 313 [19] and 547 [253].

Carcinides maenas M. J. RATHBUN, Occas. Papers Boston Soc. Nat. Hist., vol. 7, 1905, p. 8.—SUMNER, Bull. Bur. Fisheries, vol. 31, 1911, part 2, 1913, p. 672.

Diagnosis.—Legs of last pair partially natatory. Front three-toothed. Lateral teeth six, similar. Palms and legs unarmed.

Description.—Carapace about three-fourths as long as broad, gastric region divided into 3 areolae, surface finely granular, especially in anterior half. Middle lobe of front acute, antero-lateral teeth acuminate. Posterior border forming a curve with the postero-lateral borders. Major diameter of orbit about half the width of interorbital space. Antennal flagella about 1½ times the length of the orbit.

Major cheliped 1½ times length of carapace; hand with two costae on upper surface, otherwise smooth. Legs smooth and unarmed, second and third pairs longest and about 1⅞ times the length of the carapace; fourth pair shorter than first pair. Sixth abdominal tergum of male about twice as broad as long, with gradually convergent sides.

Color.—Male (Woods Hole), green ground, mottled with black, granules for the most part yellow; anterior half darker than posterior. Lateral teeth tipped with yellow. Claws similar; on the palm there are small black spots arranged longitudinally. Fingers and adjacent portion of palm bright light blue, with black stripes in the grooves. Prehensile teeth and tips of fingers flesh color. Legs green, speckled with black; distal portion of dactyli light; tips horny. Under side yellowish, deepest on the anterior portion. Female differs from the male in having the ground color orange in place of green, granules whitish. Chelae a duller blue. Under side deep orange.

Measurements.—Male (9006), length of carapace 60, width of same 79.4, fronto-orbital width 33, width of front 15 mm.

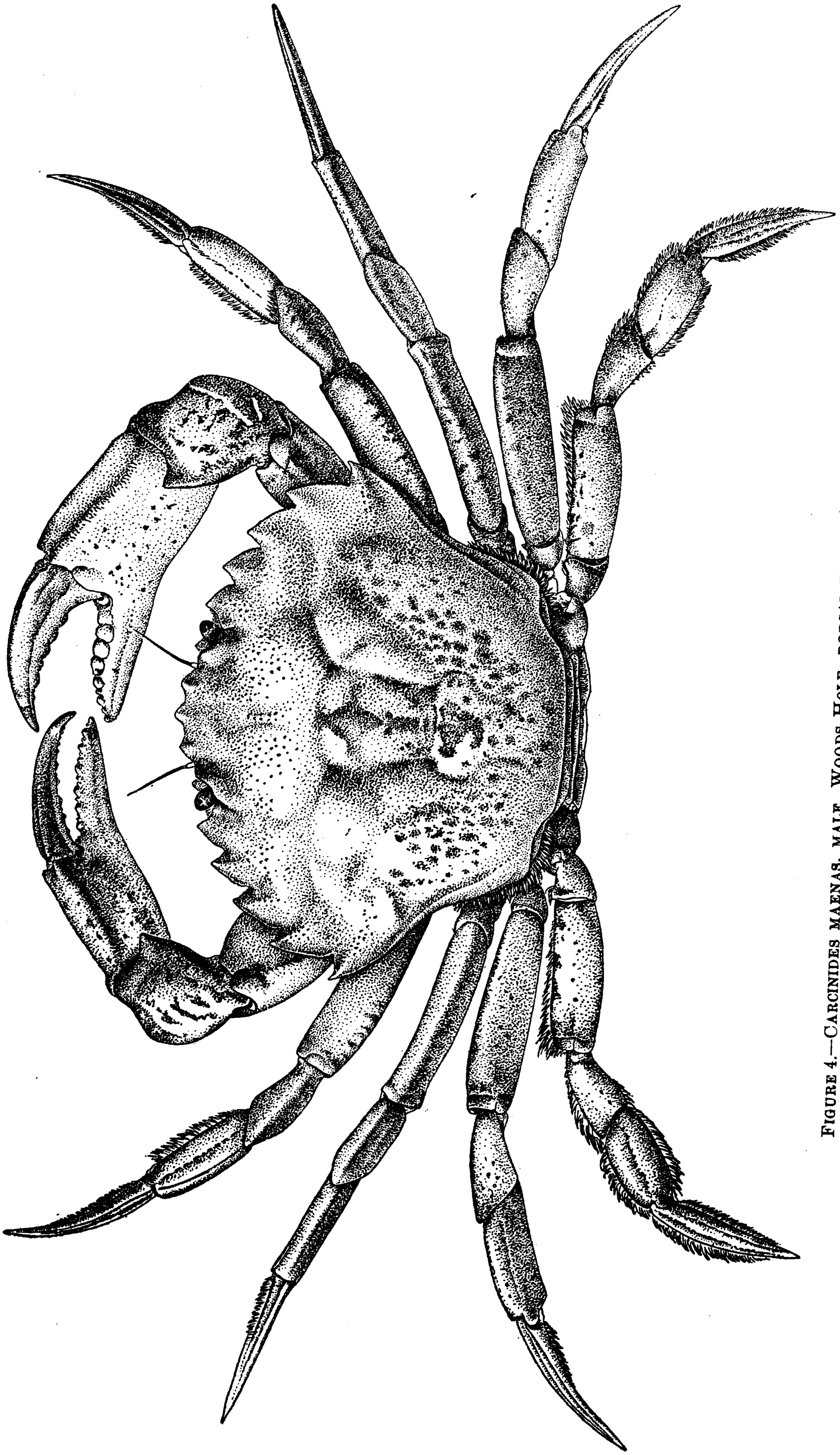

FIGURE 4.—CARCINIDES MAENAS, MALE, WOODS HOLE, DORSAL VIEW. AFTER R. RATHBUN

Habitat.—Under stones toward high water mark to a few fathoms and in tidal pools.

Range.—Atlantic coast of the United States from Thomaston, Maine, to New Jersey. Off Pernambuco, Brazil. Bay of Panama. Also coasts of Europe and north Africa; Suez Canal and Red Sea; Ceylon; Australia; and Hawaiian Islands.

Abundant in Casco Bay; only one record farther east. Seen swimming in Georges River at Thomaston, June, 1922, by William Procter.

Material examined.—

MAINE.—Casco Bay; 1911; Rathbun and Dandridge: August; 14 specimens (43727, 43728); color varieties. S. Harpswell; behind laboratory; August 3; 1 specimen (43180). Vicinity of S. Harpswell; August; 5 specimens (43161). Potts Point; August 5; 22 specimens (43157). Potts Harbor; mud flats; August 10; 1 specimen (43159); grey color. Mackerel Cove Point; August 7; 12 specimens (43158). Ram Island; August 10; 3 specimens (43160). Basin Cove; very low tide; August 11; 1 male (47971).

MASSACHUSETTS.—Ipswich; October 29, 1903; Owen Bryant; 1 specimen (29935). Mattapoisett Harbor; November 1882; Willard Nye; 2 males, 3 females (5757).

Vineyard Sound; U. S. Fish Comm.: 1875; 2 males, 1 female (40118). 1882; 5 young (15020).

Vicinity of Woods Hole; 1887; M. J. Rathbun; 3 males, 1 female (32374).

Great Harbor, Woods Hole; U. S. Fish Comm.: September 23, 1882; Willard Nye, jr.; 9 specimens (9160). July 30, 1892; 1 young (31483).

Woods Hole; U. S. Fish Comm.: 1882; 2 males, 1 female (4901). 1882; Willard Nye, jr.; 1 male (9006), figured. Low water; moulted August 28, 1883; 2 males (36968). August 5; T. Lee; 1 specimen (36967). August 1885; 1 young (34921). 1885; 18 young (11019). 1887; *Fish Hawk;* 4 specimens (12729). January 9, 1888; V. N. Edwards; 1 ovigerous female (13088). 1887; 6 specimens (40004).

Naushon Island, Elizabeth Islands; August 15, 1882; U. S. Fish Comm.; 1 young (40782).

RHODE ISLAND.—Sakonnet Point; 1 specimen (9159).

Newport Harbor; U. S. Fish Comm.: Shore; sand; 1880; 22 young (36321). Shore; 1880; 15 young (36326). Lime Rock; with mussels; July 24, 1880; 15 young (36310, 61062).

Newport; 1880; U. S. Fish Comm.: Shore; 7 males and females (4534), 1 young (34012), 50 young, 1 shedding (36765), 2 young (40126). Outer shores; 1 young (40783). Shore; July 26, 3 young (34010), Sept. 2, 2 young (36779). Shore; in washings of *Mytilus*;

July 27; 2 young (40792). Shore; mud; July 28, 2 young (36296); July 29, 4 young (36356). Wharf; August 20; 3 young (40125).

LONG ISLAND SOUND.—Low water; August 29, 1874; U. S. *Fish. Comm.; 13 young (36266).*

NEW YORK.—Fire Island, Great South Bay, Long Island; September 27, 1884; T. H. Bean; 1 specimen (8919).

NEW JERSEY.—1929; H. G. Richards: Longport; October 20; 1 young male (62959). Cape May Point: September 27, 1 young, returned; in tide pool, September 29, 1 female (62960).

EUROPE.—England; 1923; H. C. Kellers: Medway River, Chatham; October 10; 22 males, 14 females (57417). Cowes; October; 5 males, 2 females (57419); 1 specimen with rhizocephalid parasite.

Channel Islands; Edward Lovett; 2 specimens (6546).

Jersey Island; A. M. Norman; 2 specimens (6776).

Ostend, Belgium; specimen in Mus. Comp. Zoöl.

Helgoland Island, Germany; beach; Roy. Biol. Station, Helgoland; 2 males, 2 females (19899).

Marseilles, France; August 1922; H. C. Kellers; 42 males, 46 females (57416).

Gibraltar; H. C. Kellers: December, 1922; 2 females (57422). August, 1923; 3 males, 2 females (57418).

Constantinople, Turkey: G. P. Marsh, collector; 2 specimens (2051). H. C. Kellers; March, 1923, 9 males (2 hermaphroditic), 21 females (57420); September and October 1923, 15 males, 15 females (57428).

EGYPT.—Port Said; July, 1922; H. C. Kellers; 17 females (57421).

HAWAIIAN ISLANDS.—T. H. Streets; 1 male (2299).

Subfamily LIOCARCININAE (PORTUNINAE Alcock)

The legs often have a tendency to be stout and at least one pair is as long as the chelipeds; the last pair are swimming paddles. Carapace seldom very broad, antero-lateral borders cut into 3 to 5 teeth. Basal article of antenna either fixed or movable, usually longer than broad, and lying almost in the longitudinal axis of the carapace.

Genus OVALIPES Rathbun

Platyonichas LATREILLE, *Encyc. Méth., Entom., vol. 10, 1825,* p. *151;* not *Platyonichus* Latreille, Nouv. Dict. Hist. Nat., vol. 27, 1818, p. 4, which was proposed as a substitute for *Portumnus* Leach, 1814.

Anisopus DE HAAN, Fauna Japon., Crust., 1833, pp. 3 and 12; type, *Corystes* (*Anisopus*) *punctata* de Haan. *Anisopus* preoccupied by Meigen, 1803, for a genus of Diptera.

Platyonychus DANA, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 130.

Ovalipes RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 597; type, *O. ocellatus* (Herbst).

Carapace a little broader than long; five subequal teeth on antero-lateral margin; three or four teeth on margin of front between orbits.

Basal article of antennules advanced and visible dorsally between frontal teeth. Chelipeds elongate. Terminal article of last pair of legs broadly oval, rounded at extremity. Abdomen of male oblong.

Nova Scotia to Gulf of Mexico; South America from Peru and Uruguay southward; South Africa; eastern Asia; Australia and New Zealand.

KEY TO THE SPECIES OF THE GENUS OVALIPES

A¹. Three frontal teeth between orbits. Lateral teeth of carapace widely separated. No tooth on upper margin of orbit.

B¹. Carapace covered with minute color dots arranged in small annular clusters; granules enlarged along median line. Outer surface of palm nearly smooth ..... **ocellatus ocellatus**, p. 19.

B². Carapace of a uniform color, without spots; granules not enlarged along median line. Outer surface of palm rough ..... **ocellatus guadulpensis**, p. 23.

A². Four frontal teeth between orbits. Lateral teeth of carapace broad, narrowly separated. A strong tooth on upper margin of orbit ..... **punctatus**, p. 24.

OVALIPES OCELLATUS OCELLATUS (Herbst)

LADY CRAB; SAND CRAB; CALICO CRAB

Plates 2 and 3

Cancer ocellatus HERBST, Natur. d. Krabben u. Krebse, vol. 3, pt. 1, 1799, p. 61, pl. 49, fig. 4 (type-locality, Long Island near New York; type not extant).

Portunus pictus SAY, Journ, Acad. Nat. Sci. Philadelphia, vol. 1, 1817, p. 62 (type-locality, "sandy shores of the sea" [eastern United States]: type not extant).

Platyonichus ocellatus LATREILLE, Encyc. Méth., Hist. Nat., Insectes, vol. 10, 1825, p. 152.—DE KAY, Nat. Hist. New York, pt. 6, Crust., 1844, p. 9, pl. 1, fig. 1; pl. 5, fig. 7.—SMITH, Rept. U. S. Commr. Fish & Fisheries, vol. 1 for 1871 & 1872 (1873), pp. 338 [44], 533 [239], 547 [253].—R. RATHBUN, Fisheries & Fishery Industries of U. S., sec. 1, 1893, p. 774, pl. 266.

Ovalipes ocellatus M. J. RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 597; Occas. Papers Boston Soc. Nat. Hist., vol. 7, 1905, p. 9.

Ovalipes ocellatus ocellatus HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 426, and synonymy.

Diagnosis.—Three frontal teeth. Lateral teeth widely separated. No tooth on upper margin of orbit. Color dots of carapace arranged in small annular clusters. Outer surface of palm nearly smooth. Male abdominal segments 3 to 5 fused.

Description.—Carapace about one-fourth wider than long, convex, finely granulate everywhere except in the median line where there is a longitudinal band of slightly enlarged granules. Front with three acute teeth, the median about twice as long as the lateral ones. Orbit with one shallow fissure above. Antero-lateral teeth strong, acute, directed forward. Inner suborbital angle projecting as far as the median tooth. Pterygostomian region with a long curved stridulating ridge made up of approximately 50 close set striae which narrow into tubercles at the inner end of the ridge; a short complementary ridge exists at the proximal end of the inner margin of the

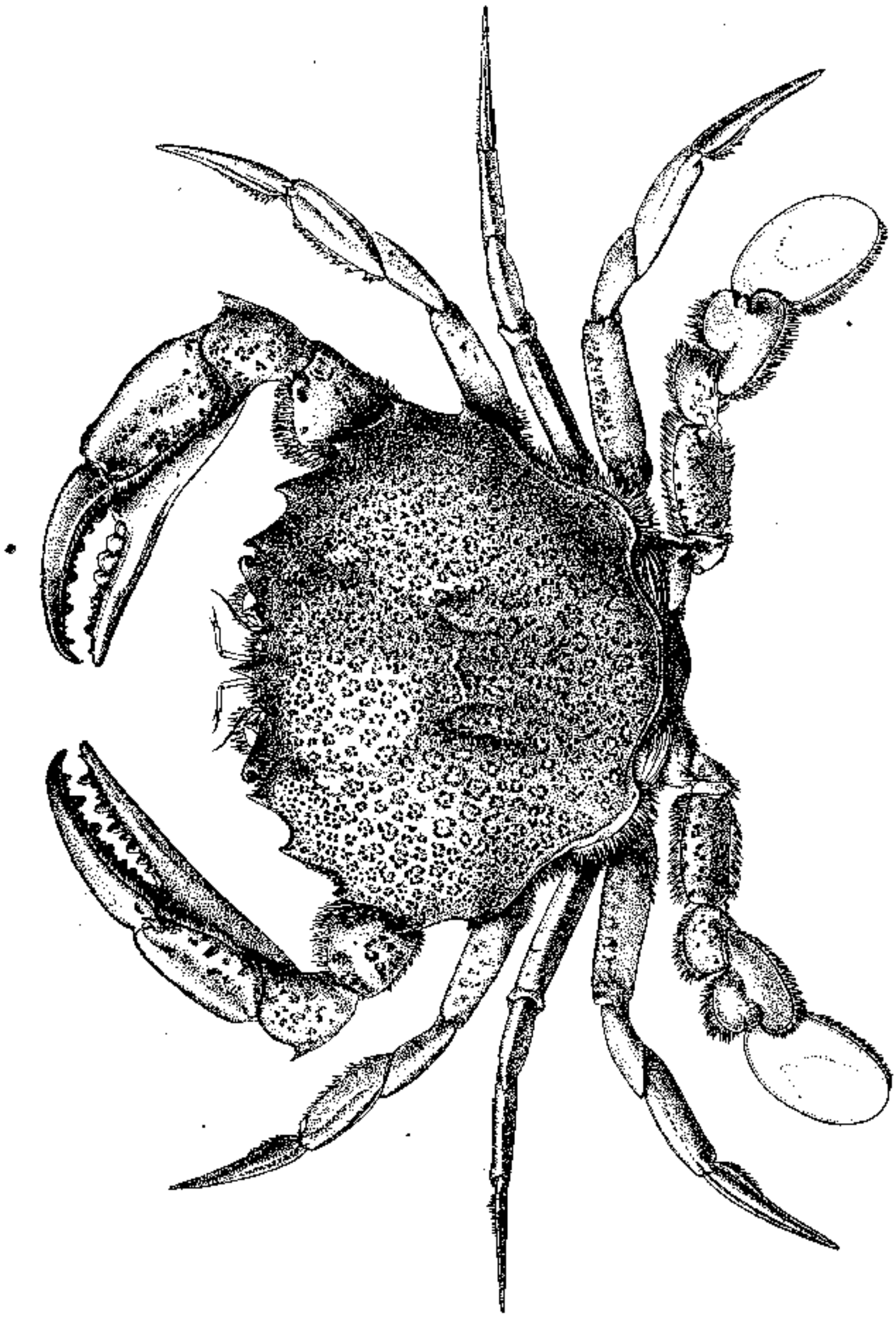

FIGURE 5.—OVALIPES OCELLATUS, MALE, WOODS HOLE, DORSAL VIEW. AFTER R. RATHBUN

arm. Tooth at distal inner angle of merus of outer maxilliped longer than broad.

Chelipeds rather large; distal three-fifths of anterior margin of merus with several small spines and a dense fringe of hair; carpus with two spines the inner one very long; hand triangular in section, external border costate, internal border with an overhanging densely ciliated ridge which ends distally in a sharp spine; external costa and internal line of cilia continued on the dactyl. Fingers about as long as palm, tapering very gradually, tips turned abruptly toward each other. Abdomen of male narrow, sides nearly parallel; sixth segment nearly twice as long as seventh measured on the median line; seventh segment subcircular. Abdomen of adult female suboval and small compared to the sternum.

Color.—Yellowish gray, closely set with small annular spots of reddish purple; carapace and chelipeds with a silvery or brassy iridescence. (Hay and Shore.) Ground color of chelipeds and legs light brownish tending to orange and bluish; large irregular bluish purple spots on upper surface of chelipeds; large part of wrist including spine bluish; similar but lighter spots on proximal half of other legs; paddles greenish yellow, with deep yellow rim.

Measurements.—Male (32448), length of carapace 55.2, width of same 69.2, fronto-orbital width 29.4, width of front, between tips of spines 10.2 mm.

Range.—Minas Basin at Bass River, Nova Scotia (Leim). From Provincetown, Cape Cod, Massachusetts, to South Carolina. In sand at low-water mark and off shore to 10 fathoms.

Material examined.—

MASSACHUSETTS.—Provincetown; swimming in schools at surface by laboratory dock about 9. a. m.; August 16, 1879; U. S. Fish Comm.; many very young (3888).

Provincetown; shore, sand; September 3, 1879; U. S. Fish Comm.; 22 young (3887); undoubtedly the same brood as the preceding.

Provincetown; 1899; J. E. Benedict; 1 male, 1 female (29320).

Muskeget Channel; surface; August 12, 1887; U. S. Fish Comm.; 10 specimens (12791).

Woods Hole; U. S. Fish Comm.: 1882; 4 males, 4 females (4894). Low water; 1883; 1 exuvia of female (5803). Low water; 1883; 1 young with its exuvia, August 8 (6392). 1885; 1 male and exuvia, moulted September 2 (36969). Nobska beach; July 20, 1892; V. N. Edwards; 9 young (26185). Vicinity of Woods Hole; 1911; 1 male, 3 females (32448), 1 specimen (43186). Surface, by electric light; September 5; 4 males, 3 females (40710). Low water; 1 male, moulted; September 5 (36970).

Vineyard Sound; U. S. Fish Comm.: 1871; 1 young (34926). 1875; 24 very small to medium (2557). Surface; July 31, 1882;

1 young (12562). 1883; 1 male (40709). 1 female with malformed claw (40521). West Chop Light, E. ½ N., 1½ miles; 6 fathoms; S. G.; temperature 65° F.; September 22, 1881; station 1042, *Fish Hawk*; 1 female, medium size, with small barnacles attached (4006). Cuttyhunk Light, N. ¾ W., 3¾ miles; 17 fathoms; S.; temperature 61° F.; September 3, 1880; station 861, *Fish Hawk*; 1 female (4540).

Cataumet; July 22; U. S. Fish Comm.; 1 young (40790).

Buzzards Bay; 1881; U. S. Fish Comm.; 1 young (31485).

GEORGES BANK.—Lat. 41° 15′ 30″ N., long. 68° 15′ 00″ W.; 18 fathoms; crs. wh. S. yl. Sp.; station 2576, *Albatross;* 1 male (10796).

RHODE ISLAND.—Sakonnet River; 5–5½ fathoms; S.; temperature 68°–71° F.; August 27, 1880; stations 837, 838, *Fish Hawk;* 11 male and female (4541). Newport; shore; 1880; U. S. Fish Comm.; 3 young (5756).

Narragansett Bay; S. end of Hope Island, NE.; 5–5½ fathoms; M. brk. Sh.; temperature 70° F.; August 23, 1880; stations 820, 821, *Fish Hawk;* 1 young (40722), 1 young (34061).

CONNECTICUT.—*Fish Hawk:* Between Stratford Point Light and Middle Ground Light; 6 fathoms; sft.; temperature 63° F.; October 10, 1890; station 1620; 1 young (32277). Between Stratford Point Light and Bridgeport Light; 4.5 fathoms; hrd.; temperature 68° F.; September 22, 1890; station 1553; 1 male, 2 females (18205). Off Norwalk Light; 14 fathoms; sft.; temperature 62° F.; October 10, 1892; station 1778; 1 male (32259).

NEW YORK.—Gardiners Bay, Long Island; 1874; U. S. Fish Comm.; 1 young (40791).

Fire Island, Great South Bay; September 27, 1884; T. H. Bean; 22 specimens (8917).

Clam Pond Cove; October 8, 1898; T. H. Bean; 2 males (42564).

NEW JERSEY.—Beesleys Point; S. F. Baird; 10 specimens (2099).

DELAWARE.—Bethany Beach; July 4–10, 1912; W. D. Appel; 3 young (44570).

MARYLAND.—Crisfield; August 1879; T. B. Ferguson, U. S. Fish Comm.; 2 males, medium size (3262).

VIRGINIA.—Eastern shore of Virginia; H. E. Webster; 1 male. 1 female (13857).

Smith Island: May 16–25, 1894; Charles W. Richmond; 2 males, 2 females (18288). May 19, 1898; William Palmer; 4 specimens (21620). E. A. Mearns; 2 males (41020).

End of Cape Charles; May 23, 1922; W. R. Schroeder, U. S. Bur. Fisheries; 1 female (57149).

Cape Charles [City]; September 1890; W. P. Seal; 1 male (31486).

Cherrystone; August 27, 1881; M. McDonald, U. S. Fish Comm.; 6 young (3474).

Off Back River Light, Chesapeake Bay; May 9, 1888; *Grampus;* 1 young (61074).

Chesapeake Bay; No. 2 B Buoy, N. by W. ⅜ W., No. 3 B Buoy W. ¼ N.; 11.44 m.; July 9, 1920; station 8830, *Fish Hawk*; 19 males, 6 females, (55734).

Off mouth of Chesapeake Bay; *Fish Hawk*: Lat. 37° 01′ 09″ N., long. 75° 59′ 20″ W.; 4½ fathoms; hrd. brk. Sh.; 49° F.; April 22, 1916; station 8501; 1 young (58365). Lat. 37° 03′ 18″ N., long. 75° 58′ 12″ W.; 7½ fathoms; sft. fne. S. brk. Sh.; 48.5° F.; December 3, 1915; station 8371; 1 female (58364). Lat. 36° 59′ 55″ N., long. 76° 00′ 42″ W.; 7½ fathoms; hrd. fne. gy. S.; 53.4° F.; December 3, 1915; station 8369; 1 specimen (58363).

Cape Henry; William Evans; 2 males, small (2510).

Lynnhaven Roads; 1916; *Fish Hawk:* Beach; June 7; 2 males, 3 females (55556). In seine; July 16; 10 males, 1 female (61890).

NORTH CAROLINA.—Off Cape Hatteras; October 19, 1884; *Albatross:* Lat. 35° 21′ 30″ N.; long. 75° 25′ 00″ W.; 11 fathoms; crs. gy. S.; station 2286; 3 females (8791). Lat. 35° 21′ 25″ N.; long. 75° 24′ 25″ W.; 13 fathoms; crs. gy. S.; station 2285; 2 females (P.M.Y.U.).

Middle Sound, near Wilmington; April 18, 1880; R. E. Earll, U. S. Fish Comm.; 2 males (4016).

SOUTH CAROLINA.—Charleston; 6 males and females (4493).

Charleston Harbor; 7.8 fathoms; stky.; temperature 58° F.; March 13, 1891; station 1659, *Fish Hawk;* 3 males, 1 female, 2 young (17174).

OVALIPES OCELLATUS GUADULPENSIS (Saussure)

Plate 4

Cancer Ciri Apoa, seu Aratu Pinima, Brasiliensis SEBA, Thesaurus, vol. 3, 1758, p. 44, pl. 18, fig. 9. "*Color ab omni parte idem dilute flavus, splendens.*"

Portunus guadulpensis SAUSSURE, Mém. Soc. Phys. Hist. Nat. Genève, vol. 14, 1858, p. 433 [17], pl. 2, fig. 10 (type-locality, Guadeloupe; type [6] in Geneva Mus.).

Platyonichus ocellatus var. SMITH, Rept. U. S. Commr. of Fish and Fisheries for 1885 (1886), p. 632.

Ovalipes ocellatus floridanus HAY AND SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 427, pl. 32, fig. 8 (type-locality, Pensacola, Florida; type, Cat. No. 47959, U.S.N.M.).

Diagnosis.—Color uniform, unspotted. No median band of enlarged granules. Orbits wider than in the preceding, distance between outer and inner orbital spines exceeding distance between suborbital spines.

Description.—Carapace less arched than in *O. ocellatus ocellatus* and evenly granulate all over. Antero-lateral spines, especially the outer orbitals, more acute. Orbits usually wider and in consequence

[6] Examined by Dr. J. Carl.

the distance between suborbital spines narrower, but this character is not constant, varying in the region where the two forms meet.

Color.—Uniform grayish yellow (Hay), except the spine on the inner side of the carpus and a few tubercles on the chela which are dark brown in many specimens (Smith).

Measurements.—Male (17915), extreme length of carapace 34, greatest width of same 46, fronto-orbital width 20.9, width of orbit 7.7, width between suborbital spines 6.6 mm. Largest specimen, female (8856), extreme length of carapace 52, greatest width of same 63 mm.

Range.—North Carolina to Texas; Guadeloupe (Saussure); Brazil (Seba).

Material examined.—See table, page 25.

OVALIPES PUNCTATUS[7] (de Haan), new combination

Plates 5, 6, 7, and 8

Corystes (*Anisopus*) *punctata* DE HAAN, Fauna Japon., Crust., 1833, p. 13; 1835, p. 44, pl. 2, figs.1–1*d* (type-locality, Japan; type in Leiden Mus.).

Corystes (*Anisopus*) *trimaculata* DE HAAN, Fauna Japon., Crust., 1833, p. 13, *nomen nudum* (not Seba, pl. 18, fig. 9) (type-locality, Cape of Good Hope; type in Leiden Mus.); 1835, p. 44 (considered identical with *P. bipustulatus*).

Platyonichus bipustulatus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 437, pl. 17, figs. 7–10 (type-locality, Indian Ocean; type in Paris Mus.).

Anisopus trimaculatus M'LEAY, Illustrations Zool. South Africa, 1838, p. 62.—KRAUSS, Die südafrik. Crust., 1843, p. 27.

Platyonychus africanus A. MILNE EDWARDS, Arch. Mus. Hist. Nat. Paris, vol. 10, 1861, p. 413, pl. 34, figs. 2 and 2*a* (type-locality, Simons Bay, Cape Colony; type in Paris Mus.).

Anisopus punctatus STIMPSON, Proc. Acad. Nat. Sci. Philadelphia, vol. 10, 1858, p. 39 [37]; Smithsonian Misc. Coll., vol. 49, 1907, p. 86.

Platyonychus purpureus DANA, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 291; pt. 2, 1853, p. 1593; atlas, 1855, pl. 18, figs. 3*a*, 3*b* (type-locality, Valparaiso; cotypes, Cat. Nos. 4280, 4281, M.C.Z.).

Ovalipes bipustulatus RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 597.—PORTER, Revista Chilena Hist. Nat., vol. 9, 1905, p. 32.

Ovalipes trimaculatus STEBBING, South African Crustacea, pt. 2, 1902, p. 13.—DOFLEIN, Wiss. Ergeb. deutschen Tiefsee-Exp. "Valdivia," vol. 6, 1904, p. 92, pl. 32, fig. 6.

Diagnosis.—Four frontal teeth. Lateral teeth broad. No abdominal segments fused. Three large color spots on carapace; dots not arranged in clusters. A strong tooth on upper margin of orbit. Outer surface of palm very rough.

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[7] In my previous use of the specific name *bipustulatus* instead of *punctatus* it was considered that *Corystes* (*Anisopus*) *punctata* was a *nomen nudum* in 1833 and should give way to *Platyonichus bipustulatus* 1834. Subsequently it was brought to my notice by Stebbing (S. Afric. Crust., pt. 2, 1902, p. 14) that the species *punctata* was sufficiently defined by de Haan under the subgenus *Anisopus*, where he described the peculiarity of the dactylus of the second pair of trunk legs, a character not shared by *ocellatus*, the only other valid species of the genus.

Material examined of Ovalipes ocellatus guadulpensis

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temp.	Date	Station	Collector	Specimens	Cat. No.	Remarks
	° ′ ″	° ′ ″			°F.						
North Carolina: Off Cape Hatteras.	35 25 30	75 20 30	16	gy. S. brk. Sh		Oct. 20, 1884.	2291	*Albatross*	2 ♀	8856	Subsp. *guadulpensis* as to color and granulation, but not as to measurements.
Do	35 22 50	75 26 00	7	crs. S		do	2289	do	1 y	7244	
Do	35 21 15	75 23 15	14	gy. S		Oct. 19, 1884	2283	do	2 ♂	P. M. Y. U.	
									1 ♀	Amer. Mus.	
Do	35 17 00	75 01 00	41	fne. gy. S		Oct. 21, 1884	2303	do	2 ♂	P. M. Y. U.	
Do	35 16 00	75 09 00	26	crs. gy. S. bk. Sp		Oct. 19, 1884	2271	do	1 ♂	S. I. S.	
Do	35 14 00	75 03 00	49	S. Co	71	Oct. 21, 1884	2302	do	1 ♀	P. M. Y. U.	
Do	35 12 30	75 05 00	48	crs. gy. bk. S	77	Oct. 19, 1884	2269	do	2 ♂	8751	Do.
Off Beaufort						May, 1907		*Fish Hawk*	3 y	51015	
					°C.						
Georgia,: Off Sapelo Island.	16 miles off Sapelo Island lighthouse.	(1)			23	May 3, 1915	8259	*Fish Hawk* (E. Danglade).	1 ♂ 20 y	61891	
					°F.						
Florida: Off Pensacola	Pensacola Light, N. NW. ½ N., 9⅜ miles.	12	S		59.7	Jan. 18, 1913		do	2 y	61075	
Pensacola								J. E. Kauser	16	17915, 17916.	
Do								do	1 immature ♀	47959	Holotype of *O. o. floridanus.*
Alabama: Perdido						Jan. 27, 1912		Biological Survey, Department of Agriculture.	Fragments	B.S.D.A	1 movable finger, 1 inner spine of wrist, 1 fragment of anterior end of sternum. From stomach of *Larus argentatus*, No. 99940. Supposed to be subsp. *guadulpensis.*
Gulf of Mexico [2]						1891		Joe D. Dantagnan	1 ♂	15815	

[1] Surface, 8-9 p. m.
[2] Young lady crabs were observed at Pass Cabello, Texas, by the late J. D. Mitchell; they were probably subsp. *guadulpensis.*

Description.—Carapace about one-third wider than long, convex, covered with crowded granules of rather uniform size. Front with four acute teeth, the median pair narrower than the lateral, the median sinus shallower than the lateral sinuses. Orbit with two fissures above; between them a strong triangular tooth pointing obliquely *outward. Antero-lateral teeth broad, their outer margins much longer* than the inner and conspicuously denticulate; sinuses narrow, semicircular. Inner suborbital tooth or spine advanced beyond the frontal teeth. Tooth at distal inner angle of merus of outer maxilliped no longer than broad.

Chelipeds shorter than in *ocellatus;* a fringe of hair along the inner side of the upper margin; merus overreaching carapace but little, inner surface granulate, also distal end of upper surface; inner carpal spine broad, having a superior carina, outer spine lacking, upper surface rough; palm with five carinae on upper-outer surface, two carinae at middle of inner surface. Most striking is the broad lower surface of the palm which is crossed by from 20 to 25 or more strong' well separated, granulated striae, the striae breaking into short pieces toward the distal end of the palm. Complementary to this stridulating ridge there is a short, thick, transverse horny ridge on the distal margin of the anterior surface of the merus of the first ambulatory leg. Fingers strongly carinated, carinae granulate; movable finger with three longitudinal rows of spinules above, those of the inner row longest and sharpest; prehensile teeth unequal, the larger ones with dentate or lobulate margins. Legs broad, *especially last two articles. Dactylus of first pair in adult male falciform,* dilated, upper (dorsal) edge deeply grooved, the furrow beginning near the base, its edges then spread out and give a broad, somewhat flattened appearance to the upper surface when viewed from above. Lower edge of first leg heavily furred in the old; swimming feet also margined with hair.

Color.—Ground yellow thickly mottled with blood-red, reddish-brown or purple dots besides a crescent-shaped median spot and a round or oblong spot near the postero-lateral angle of the carapace.

Measurements.—Male (61019), length of carapace to end of submedian spine 85, greatest width of same 109.5, fronto-orbital width 49.7, width of front between tips of spines 15 mm.

Range.—Peru; Chile as far south as Trinidad Channel (Miers); Uruguay; Argentina. South Africa; Japan; China; Australia; New Zealand. On sandy shores.

Material examined.—

PERU.—Independencia Bay; 1919; Robert Cushman Murphy; 1 male (54213), from Brooklyn Mus.

CHILE.—Valparaiso; H. Kröyer collector; specimen in Copenhagen Mus. U. S. Exploring Expedition; 1 male, 1 female, cotypes of *Platyonychus purpureus* Dana (4280, 4281, M.C.Z.).

Tome; February 20, 1888; *Albatross;* 4 males, 10 females (22048).

Lota: February 15, 1888; *Albatross;* 3 males, 3 females (22049). January 16, 1927; W. L. Schmitt; 1 male (61022).

Juan Fernandez Islands; 1926; W. L. Schmitt: 11 males, 9 females (1 ovigerous) (61021). Cumberland Bay; 7–10 fathoms, December 10, 1 young (61103); in seine haul on beach, December 19, 1 ovigerous female (61020).

Chile; May 10, 1898; F. Silvestri collector; 1 male (61073), from Buenos Aires Mus.

URUGUAY.—Cabo Santa Maria, Rocha; Florentino Felippone; 1 male (54632).

ARGENTINA.—Mar del Plata: March 1918; M. Doello-Jurado; 1 young, lent by Buenos Aires Mus. F. Felippone; 2 females (62365, 62475).

Golfo Nuevo, Chubut Territory; from Buenos Aires Mus.: *Independencia* collector; 1 male (61019). 1915; Puerto Madryn; 1 male, 1 female (61018).

AFRICA.—Cape Town; February 1890; W. H. Brown; 5 males, 4 females (14882), from United States Eclipse Expedition.

JAPAN.—Oshoro, Hokkaido; Madoka Sasaki; 1 male (54479).

Hakodate, Hokkaido; September 19, 1896; *Albatross;* 1 female (20178).

Off northeast coast of Nippon; William Stimpson, N. Pacific Exploring Expedition; 3 males (2038), received from U. S. Navy Department.

Same, Rikuoku, Nippon; 1900; Jordan and Snyder; 1 male (26256), from Stanford University.

Yenoshima; Imperial University, Tokyo; 2 males, 5 females (45868), 2 males, 5 females (45877).

Sibushi, Osumi, Kiusiu Island; T. Urita; 1 male (48327).

Japan; H. Loomis; 2 males, 1 female (17561).

Japan or China; Dale and Jouy, U. S. S. *Palos;* 1 young (5284).

CHINA.—Foochow, Fukien; 1924; C. R. Kellogg; 1 male (58727).

AUSTRALIA.—Port Jackson, New South Wales; Australian Museum; 1 male, 1 female (17031).

Genus BATHYNECTES Stimpson

Bathynectes STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 145; type, *B. longispina* Stimpson, 1871 = *B. superba* (Costa, 1853).

Thranites BOVALLIUS, Öfvers. K. Vetensk.-Akad. Förh., 1876, p. 59 (1877); type, *T. velox* Bovallius, 1877 = *B. superba* (Costa, 1853).

Thranistes A. MILNE EDWARDS, Bull. Soc. Philom. Paris, 1881, p. 60; error for *Thranites*.

Antero-lateral teeth five, spiniform, separated by considerable intervals, the posterior one much the longest. Front without a median tooth. Inner hiatus of orbit wide open, not filled by the

basal article of the outer antenna which is narrow and firmly soldered anteriorly to the process of the front. The merus of the outer maxillipeds is as broad as long, does not project beyond the buccal cavity but fits close to its anterior edge. Legs very slender, first shorter than second, second and third very long, third a little the longer; fourth nearly two-thirds as long as third, its last two articles broad and flat, the terminal one without midrib.

Contains only one species.

BATHYNECTES SUPERBA (Costa)

Plates 9 and 10

Portunus superbus O. G. Costa, Fauna del Regno di Napoli, Addizioni a i Decapodi Brachyuri, 1853[8], p. 19, pl. 7, colored (type-locality, near Naples; type in Naples Mus.).—Carus, Prod. Fauna Medit., vol. 1, p. 517.

Bathynectes longispina Stimpson, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 146 (young male) (type-localities, off Sand Key, Key West, and American Shoal, all in the Florida Straits, 100–150 fathoms; types in M.C.Z.).—A. Milne Edwards, Crust. Rég. Mex., 1879, p. 234, pl. 42, fig. 1–1c (young male).—Smith, Proc. U. S. Nat. Mus., vol. 6, 1883, p. 17.

Bathynectes brevispina Stimpson, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 147 (female) (type-locality, off the Marquesas, Florida Straits, 107 fathoms; type in M.C.Z.).—A. Milne Edwards, Crust.Rég. Mex., 1879, p. 235.

Thranites velox Bovallius, K. Vetensk.-Akad. Forhand., 1876 (1877), No. 9, p. 60, pls. 14 and 15 (type-locality [Storeggen], northwest of Bergen, Norway, 150 fathoms; type in Stockholm Mus.).—G. O. Sars, Den Norske Nordhavs Exped., vol. 15, Crust., pt. 2, 1886, p. 1.

Bathynectes superba Norman, Ann. Mag. Nat. Hist., ser. 6, vol. 7, 1891, p. 274, and synonymy.—A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 311.

Diagnosis.—Frontal teeth four. Spine at lateral angle of carapace unusually long. Chelipeds spinous. Legs very long.

Description of adult.—Carapace covered with a close-cut pubescence and dense granulation. A transverse blunt ridge connects the spines at the lateral angle; a similar ridge crosses the cardiac region; the antero-lateral spines increase in length from the first to the last; last spine about twice as long as the next. Of the frontal teeth those of the middle pair are subspiniform, more advanced and much narrower than the outer teeth, which are broad and triangular. Inner upper angle of orbit small, acute; sinuses short and open; lower border denticulate and with a prominent inner spine, and a small outer spine, below which is a deep narrow fissure, and above it a broad, shallow fissure. From the base of the inner spine a small projecting lobe crosses the bottom of the hiatus of the orbit and reaches the basal article of the antenna. This article is oblong and bears a crest or carina along the outer side, terminating anteriorly in a slight tooth. Flagellum of outer antennae more than half as long as the carapace.

[8] For the dates of the various parts of Costa's work, see Sherborn, Ann. Mag. Nat. Hist., ser. 8, vol. 5, 1910, p. 132, and Index Animalium, pt. 1, 1922, p. xxxix.

Material examined of Bathynectes superba

Locality	Bearings: Latitude N.			Bearings: Longitude W.			Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
New England:	°	′	″	°	′	″			°F.						
Off Nantucket Shoals	39	57	30	69	41	10	78	gy. S.		Aug. 6, 1884	2199	*Albatross*	1 ♀	8041	
Off Marthas Vineyard	39	54	00	69	44	00	158	fne. S.	45	Aug. 11,1882	1097	*Fish Hawk*	1 ♂	6743	To A. M. Norman.
Do	39	54	00	69	51	30	134	brd. S. sponges	52	Aug. 4, 1881	940	do	1 ♂	4987	
Do	39	58	00	70	06	00	146	S. Sh.	47	Sept. 21, 1881	1038	do	1 ♂	4557	
													1 y	18810	
Do	40	02	54	70	23	40	115	M. fne. S.	49	Sept. 4, 1880	871	do	2 y	P. M. Y. U.	
Do	40	05	39	70	23	52	86	S. Gr. Sh. sponges	50.5	do	872	do	2 y	5108	
Do	39	58	00	70	35	00	115	S.	48	Oct. 4, 1882	1152	do	1 ♂	18760	
													1 ♂	P. M. Y. U.	
Do	39	49	30	70	54	00	225	S. bu. M.	42	Sept. 13, 1880	879	do	1 y	5107	
Do	40	00	00	70	57	00	85	sft. stky. M.	51	do	874	do	1 y	P. M. Y. U.	
Delaware: East of Cape Henlopen.	38	39	00	73	11	00	130	S.	49	Oct. 10, 1881	1043	do	1 ♀	18759	
													1	P. M. Y. U.	
Virginia: Off mouth of Chesapeake Bay.	37	07	50	74	34	20	167	gy. S.	46.8	Oct. 18, 1884	2264	*Albatross*	1 ♂	7209	
Do	37	07	40	74	35	40	70	gn. M. G.	57.9	do	2265	do	1 ♂	7210	
													2 ♂	P. M. Y. U.	
North Carolina: Off Currituck Sound.	36	01	30	74	47	30	93	crs. gy. bk. S. brk. Sh.	52	June 4, 1885	2426	do	1 ♂ 2 ♀	14949	
Georgia:															
East of Sapelo Island	31	26	00	79	07	00	276	Co. brk. Sh.	53.8	Apr. 1, 1885	2416	do	1 ♂ 3 ♀ 2 y	9856	
East of Altamaha Sound	31	20	00	79	22	00	280	gy. S. dead Co.		May 5, 1886	2671	do	2 ♀ 1 y	11373	
East of Cumberland Island.	30	44	00	79	26	00	440	Co. crs. S. Sh. For.	45.6	Apr. 1, 1885	2415	do	1 y	14948	
Florida:	°	′	″	°	′	″									
Off Fernandina	31	09	00	79	33	30	352	gy. S. dead Co.	43.7	May 5, 1886	2669	do	7 ♂ 11 ♀ 18 y	11366	
Do	30	58	30	79	38	30	294	gy. S. dead Co.	46.3	do	2668	do	1 ♂ 1 ♀	14950	
									°C.						
Gulf Stream off Key West.	24	18	37	81	36	00	127	rky.	18	Mar. 4, 1902	7301	*Fish Hawk*	1 ♀	60976	
Do	Sand Key Light, NNW.						[1] 100			June 20, 1893	30	State Univ. Iowa Exped.	1 ♂	Mus. S. U. I.	
Do	Sand Key Light, NNW., about 5 miles.						[1] 90			June 21, 1893	35	do	1 ♀	do	
							Meters								
Europe:															
Off Santander, Spain							564			July 6, 1882		*Travailleur*	1 y	22949	From Paris Museum.
Near Naples, Italy												Zoological Station Naples.	2 ♀	18942	

[1] About.

Chelipeds one half longer than the carapace; merus with a long spine on the inner edge and a short one on the upper edge, both distant from the anterior extremity of the arm about one-third of its length. Carpus with a very long spine at inner angle, which spine is itself armed with two or three small spines on the anterior edge; carpus also with three other spines and several spinules on the upper-outer surface. Hand costate, three ridges on the outer, two on the upper, and one on the inner side; of the superior ridges, the outer one is armed with five spines and the inner one is denticulated and has a long spine at the summit anteriorly; fingers nearly as long as palm, strongly carinate and irregularly dentate within. Ambulatory legs of the third pair two and a half times as long as carapace. Dactylus of swimming paddles broadly lanceolate, pointed.

Young.—A transverse ridge interrupted at the middle is apparent on the gastric region. The frontal teeth are blunt, those of the middle pair are rounded lobes. The lateral teeth are proportionally wider and the intersinuses narrower.

Color.—Dull red, grayish between granules; marginal spines bright red. Ventral surface and appendages including proximal portion of ambulatory legs pale red or tinged with red. Chelipeds specked and slightly mottled with red. Terminal third of digits scarlet, somewhat obscured at the tips by blackish. Merus and carpus of legs and propodus of last leg specked and mottled with scarlet; propodus of first 3 pairs, except a narrow band at distal end, and dactyli of all four pairs, bright scarlet. (After Smith.)

Measurements.—Male (11366), length of carapace including frontal teeth 34.2, excluding teeth 32.4, width of carapace in front of lateral spines 40.2, width between tips of lateral spines 52, fronto-orbital width 27, width of front 11.6 mm. Longest specimen, with unusually short lateral spine, male (11366), total length of carapace 42.2, total width 63, width in front of lateral spines 52.9 mm.

Range.—North Atlantic Ocean: From off Marthas Vineyard, Massachusetts, to the Gulf Stream in Florida Straits; Europe, from Norway to Great Britain and southward to Cape Verde Islands. Mediterranean and Black Seas. Depth, 70 to 492 fathoms.

Material examined.—See table, page 29.

Genus COENOPHTHALMUS A. Milne Edwards

Coenophthalmus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 236; type, *C. tridentatus* A. Milne Edwards.

Carapace almost quadrilateral. Front very wide, united with the suborbital border for a considerable distance so as to completely exclude the antenna from the orbit. Basal article of antenna short and narrow; movable part reaching a little beyond outer orbital angle.

First article of antennules very broad. Buccal cavity rounded anteriorly. The endostome has a strong crest defining the respiratory canal. Merus of outer maxillipeds subquadrate and slightly truncate at its inner angle for insertion of palp. Chelipeds short. Ambulatory dactyls slightly widened; those of last pair shorter and more compressed than the preceding, their penult article elongate.

Contains only one species.

COENOPHTHALMUS TRIDENTATUS A. Milne Edwards

Plates 11 and 12; Plate 13, Figures 3–5

Coenophthalmus tridentatus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 237, pl. 42, figs. 2–2*b* (*Ctenophthalmus* on explanation of plate) (type-locality, Montevideo; figured type in Paris Mus.).[8]

Diagnosis.—Subquadrilateral. Three lateral teeth. Front arcuate. Legs spinuous.

Description.—Carapace broader than long; surface uneven and rugose with numerous short transverse lines on which very short hairs are inserted. Front very wide, arcuate, subentire, or slightly wavy and obscurely four lobed; a slight sinus separates it from the inner orbital angles which are shallow rounded lobes. Orbital border deeply cut and with two small open fissures above and a large V-shaped outer emargination. Eye short and thick. Antero-lateral border three-toothed; first tooth at outer angle of orbit shallow, with a minute point; the others tipped with a slender spine, the third narrower than the second. Postero-lateral borders nearly twice as long as antero-lateral, thick and slightly convergent. Posterior border very wide. Pterygostomian region, sternum and legs covered with a short velvet like that on dorsal surface of carapace.

Chelipeds stout. The arm overreaches the carapace very little; it has three spines on its inner margin, four on its upper. Carpus with a strong acuminate inner spine, and various spinules on the upper-outer surface. Palm with a double denticulate crest above, outer surface rugose. Fingers short, channeled, prehensile borders sharp, cut into several close-set teeth. Merus of first three ambulatory legs spinous above; the last leg has two or three spines below on the distal half; the propodus of each leg has a pair of spines at distal end below, one spine outside, the other inside. Abdomen of male triangular from the fourth segment to the tip; a naked, transverse swelling on each segment from the second to the sixth inclusive.

Measurements.—Male (15406, B. A. Mus.), length of carapace 11, width of same at last tooth 15.6, fronto-orbital width 11.8, width between orbits 7.9 mm. In the specimens examined the females run larger than the males: Female (Mar del Plata), length of carapace

[8] The figured type is said to be female in explanation of plate (probably correct), but male in text, p. 238.

Material examined of Coenophthalmus tridentatus

Locality	Bearings: Latitude S.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Cat. No.	Remarks
	° ′ ″	° ′ ″									
Uruguay: East of Rocha	34 21 00	53 41 30				Mar. —, 1925	6	*Atair*	1♂ 1♀	(15405)	Lent by Buenos Aires Museum.
Argentina:											
Off Cape San Antonio	36 42 00	56 23 00	11.5	S. brk. Sh.		Jan. 12, 1888	2764	*Albatross*	4♂	22050	
Do	36 43 00	56 23 00	10.5	S. brk. Sh.		do	2765	do	2♂ 1♀	22051	
Do	36 47 00	56 23 00	10.5	S. brk. Sh.		do	2766	do	1♀ 1 y	22052	
			Meters								
Off Punta Mogotes to the south of Mar del Plata.			[1] 25			1914	76	*Patria*	3♀	(8620)	Do.
Do			[1] 25			1914	76	do	2♂ 1♀		Do.
Do			[1] 25			1914	76-77	do	1♀		Do.
Do			[1] 25			1914	77	do	1♂ 3♀		Do.
Mar del Plata						Aug. 7, 1918		M. Doello-Jurado	1♀ ovig	(9445)	Do.
Do						Aug. 20, 1919		do	1♀ ovig	(10113)	Do.
Do						Aug. 28, 1920		do	2♀ (1 ovig.)	(11381)	Do.
Mar del Plata, from the market.								do	1♀		Do.
Mar del Plata						Apr. 14, 1921		M. Lesieux	1♀		Do.
			Fathoms								
Southwest of River Quequen Grande.	39 02 00	59 27 00	25			Sept. —, 1917		*Alferez Mackinlay*	3♂ 6♀ (1 ovig.)	(9149)	Do.
Between Union Bay and Anegada Bay, Prov. Buenos Aires.						Feb. —, 1920		*Uruguay*	1♂ 2♀ ovig	(10395)	Do.
Patagonia:											
Off Bermeja Head	41 17 00	63 00 00	17			Mar. 4, 1872	28	*Hassler* Exped	1♀	2970, M.C.Z.	Paratype.
Off Gulf of San Matias	41 30 00	61 20 00	27			Jan. 19, 1920		*Sarmiento*	1♂	(10502)	Lent by Buenos Aires Museum.
Puerto Madryn									1 y		Do.

[1] About.

12.3, width at last tooth 17.4, fronto-orbital width 14, width between orbits 10 mm.

Range.—Uruguay to Patagonia.

Material examined.—See table, page 32.

Subfamily THALAMITINAE (LUPINAE Alcock)

Chelipeds longer, usually much longer, than any of the legs, the first three pairs of which have a tendency to be slender; the last pair are swimming paddles. Carapace commonly conspicuously broad; antero-lateral borders usually cut into 9 distinct teeth, exceptionally 5 or 4.

Genus PORTUNUS Weber

Portunus WEBER, Nomenclator entomologicus, 1795, p. 93; type, *P. pelagicus* (Linnaeus, 1758) = *Cancer reticulatus* Herbst, 1799.—FABRICIUS, Supplementum Entomologiae Systematicae, 1798, p. 325.—RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, pp. 155 and 160. Not *Portunus* Leach, Edin. Encyc., vol. 7, 1814, p. 390 [228].

Lupa LEACH, Edin. Encyc., vol. 7, 1814, p. 390 [228]; type, *L. pelagica* (Linnaeus). Not *Lupa* de Haan, Fauna Japon., Crust., 1833, p. 11.

Lupania RAFINESQUE, Amer. Monthly Mag., vol. 3, 1818, p. 272 (substituted for *Lupa* Leach).

Neptunus DE HAAN, Fauna Japon., Crust., 1833, pp. 3 and 7; subgenus of *Portunus;* type, *P.* (*N.*) *pelagicus* (Linnaeus).

Achelous DE HAAN, Fauna Japon., Crust., 1833, pp. 3 and 8; subgenus of *Portunus;* type, *P.* (*A.*) *spinimanus* Latreille.

Amphitrite DE HAAN, Fauna Japon., Crust., 1833, pp. 3 and 8; subgenus of *Portunus;* type, *P.* (*A.*) *gladiator* Fabricius.

Pontus DE HAAN, Fauna Japon., Crust., 1833, pp. 3 and 9; subgenus of *Portunus;* type, *P.* (*Pontus*) *convexus* de Haan.

Monomia GISTEL, Naturgeschichte des Thierreichs, 1848, p. VIII (substituted for *Amphitrite,* preoccupied).

Posidon HERKLOTS, Addit. Faun. Africae Occid., 1851, p. 3; type, *P. validus* Herklots.

Xiphonectes A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat. Paris, vol. 9, 1873, p. 157; type, *X. vigilans* (Dana).

Hellenus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, pp. 210 and 221; subgenus of *Neptunus;* type, *N.* (*H.*) *spinicarpus* (Stimpson).

Carapace transverse, usually broad, and depressed or little convex, often with surface areolated. Front proper well delimited from inner supra-orbital angles and cut into from three to six—usually four—teeth; its breadth is from a sixth to a fifth the greatest breadth of carapace (lateral epibranchial spines not included). Antero-lateral borders oblique, arched, longer than postero-lateral, cut into nine teeth (including outer orbital angle), of which the ninth may be enlarged. The orbit usually has two fissures or sutures in upper border, which border is less prominent than lower border, so that the orbit very often has a dorsal inclination; the lower border has a fissure or suture near the outer angle, inner angle dentiform and usually very prominent.

The antennules fold transversely. The basal antennal article is peculiarly short and has its antero-external angle produced to form a lobule or spine extending into the orbit; the flagellum, of moderate length, stands in the orbital hiatus. Epistome short or even linear, sometimes prolonged in the middle line to form a spine lying below the interantennulary septum. Buccal cavity squarish, broader than long, efferent branchial channels almost always well defined. Palpus of outer maxillipeds subcylindrical. Chelipeds longer, usually much longer than any of the legs, and massive; arm with spines; both inner and outer angles of wrist spiniform; palm prismatic, costate, and usually with spines, fingers usually nearly as long as the palm and strongly toothed. Ambulatory legs compressed; in the last pair the merus and carpus are short and broad; propodus and dactylus typically foliaceous and paddle-like for swimming. Abdomen of male triangular, five-segmented, the third, fourth, and fifth segments being fused; the first segment in both sexes is almost entirely concealed beneath the carapace.

Found in tropical and temperate seas.

The chelipeds of the female are shorter than those of the male and sometimes stouter or more swollen; the carapace may be narrower than in the male. In the young the carapace is often narrower in proportion to its length than in the old; the antero-lateral teeth may be more unequal; usually the lateral spine is longer than in the full grown but the reverse is true in some cases. The descriptions of species are based on the old so far as possible.

KEY TO THE AMERICAN SUBGENERA AND SPECIES OF THE GENUS PORTUNUS

A¹. Carapace wide; antero-lateral margin the arc of a circle with long radius, whose center is near the posterior margin of the carapace.
Subgenus **Portunus**, p. 36.

B¹. Without stridulating apparatus. Posterior angles of carapace unarmed.

C¹. Postero-distal margin of merus of swimming feet unarmed.

D¹. Carapace convex, for the most part smooth and glossy; palms swollen, only one spine on upper margin.....**sayi**, p. 37.

D². Carapace uneven, not smooth and glossy; two spines on upper margin of palm; submedian teeth of front very small.

E¹. A spine at extremity of outer margin of arm. Submedian teeth of front much less advanced than outer teeth.
anceps, p. 42.

E². No spine at extremity of outer margin of arm. Submedian teeth of front nearly or quite as advanced as outer teeth.
ventralis, p. 43.

C². Postero-distal margin of merus of swimming feet armed with a spine and spinules or with spinules only.

D¹. Postero-distal margin of merus of swimming feet armed with spinules and with a spine at the angle.

E¹. Carapace very wide; lateral spine nearly two-thirds as long as antero-lateral margin.....**acuminatus**, p. 56.

E². Carapace narrower; lateral spine not longer than the width of four adjacent teeth.

F¹. Chelipeds heavy, propodus dilated, its lower margin convex ..... **asper**, p. 56.

F². Chelipeds elongate, propodus not dilated, its lower margin straight or nearly so..... **panamensis**, p. 58.

D². Postero-distal margin of merus of swimming feet armed with a row of spinules but no spine.

E¹. Frontal teeth blunt. Width of merus of swimming feet equal to length of anterior margin..... **gibbesii**, p. 49.

E². Frontal teeth sharp. Width of merus of swimming feet less than length of anterior margin..... **xantusii**, p. 50.

B². A stridulating ridge on lower surface of carapace. A spine at posterior angle of carapace..... **vocans**, p. 60.

A². Carapace narrow; antero-lateral margin the arc of a circle with short radius, whose center is near the center of the cardiac region.

Subgenus **Achelous**, p. 62.

B¹. Carapace with posterior corners (marginal line) rounding, unarmed.

C¹. Postero-distal margin of merus of swimming feet unarmed. Two spines on upper margin of palm.

D¹. Lateral spine or tooth of carapace larger than the next tooth.

E¹. Lateral spine of carapace similar to, and very little larger than the next spine or tooth. Upper margin of movable finger conspicuously fringed with long hair.

depressifrons, p. 84.

E². Lateral spine much larger than the next spine or tooth and directed more outward. Hair on upper margin of movable finger inconspicuous..... **floridanus**, p. 82.

D². Lateral tooth no larger than the preceding teeth.

bahamensis, p. 90.

C². Postero-distal margin of merus of swimming feet armed with one or two spines or with spinules or with both.

D¹. An erect spine on basis of swimming feet. A large round persistent red spot on postero-lateral slope of carapace..... **sebae**, p. 79.

D². No erect spine on basis of swimming feet. No large persistent red spot on postero-lateral slope of carapace.

E¹. Postero-distal margin of merus of swimming feet armed with one or two spines besides inconspicuous spinules.

F¹. One spine at postero-distal angle of merus of swimming feet.

G¹. Frontal teeth sharp, spiniform. Lateral spine short.

H¹. Merus of swimming feet as broad as long or nearly so. Eight antero-lateral teeth equal.

spinimanus, p. 62.

H². Merus of swimming feet half again as long as broad. Antero-lateral teeth 2, 4 and 6 slightly reduced. Carapace lumpy in the middle.

stanfordi, p. 69.

G². Frontal teeth blunt-tipped. Antero-lateral teeth very unequal. Lateral tooth similar to and scarcely larger than seventh tooth..... **angustus**, p. 70.

F². Two spines at postero-distal angle of merus of swimming feet; this merus distinctly longer than broad.

brevimanus, p. 68.

E². Postero-distal margin of merus of swimming feet armed with spinules but no spines.

F¹. A shallow, spinulous lobe at postero-distal end of merus of swimming feet. Inner spine of carpus of male longer than palm_____**spinicarpus**, p. 92.

F². No lobe at postero-distal end of merus of swimming feet. Inner spine of carpus shorter than palm.

G¹. Upper half of outer surface of palm smooth, iridescent. Chelipeds conspicuously fringed with hair above. **ordwayi**, p. 71.

G². Upper half of outer surface of palm crossed by a longitudinal carina. Hair of chelipeds inconspicuous.

H¹. Lateral spine of carapace less than twice as long as preceding tooth. Carapace very convex. **affinis**, p. 80.

H². Lateral spine of carapace twice or more than twice as long as preceding tooth. Antero-lateral teeth unequal.

J¹. Lateral spine of carapace twice as long as preceding tooth. Antero-lateral teeth closely placed_____**minimus**, p. 76.

J². Lateral spine of carapace as long as the width of the next three teeth. Front prominent_____**pichilinquei**, p. 78.

B². Carapace with posterior corners angled, armed with a spine or tooth.

C¹. A spine at posterior angles. Lateral spine very long. Merus of swimming feet unarmed. Ten tubercles on carapace. **tuberculatus**, p. 90.

C². A tooth at posterior angles. Merus of swimming feet with postero-distal margin spinulous. Inner spine of carpus of male as long as palm_____**iridescens**, p. 93.

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
gibbesii	*xantusii*
spinimanus	*brevimanus*
ordwayi	*angustus*
spinicarpus	*iridescens*

SPECIES PROBABLY ERRONEOUSLY REFERRED TO AMERICA

Portunus pusillus LEACH, said to be a Californian species by Filhol, Rec. Passage de Vénus, vol. 3, pt. 2, Mission de l'Ile Campbell, 1885, p. 381.

Neptunus gladiator var. *argentatus* WHITE. Payta given as locality by Cano, Boll. Soc. Nat. Napoli, scr. 1, vol. 3, 1889, p. 214. In his geographical list on p. 101, however, this species is not given under Payta.

Subgenus PORTUNUS

Carapace very wide, the antero-lateral margin being the arc of a circle with long radius, whose center is near the posterior margin of carapace. Last spine of antero-lateral margin usually much larger and longer than the others.

PORTUNUS (PORTUNUS) SAYI (Gibbes)

Plate 14

Portunus hastatus Fabricius, Suppl. Entom. Syst., 1798, p. 367, *in Americae Insulis;* not *Cancer hastatus* Linnaeus, 1767, Adriatic.—Latreille, Hist. Nat. Crust., vol. 6, 1802–1803, p. 18.

Portunus pelasgicus Bosc, Hist. Nat. Crust., vol. 1 [an X], 1801–1802, p. 219, pl. 5, fig. 3, not *P. pelagicus* (*Linnaeus, 1758*); "dans la haute mer parmi les fucus."

Lupa pelagica Say, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1817, p. 97; Gulf Stream.

Lupa sanguinolenta Krauss (not Herbst), Sudafrik. Crust., 1843, p. 11; Sargasso Sea.

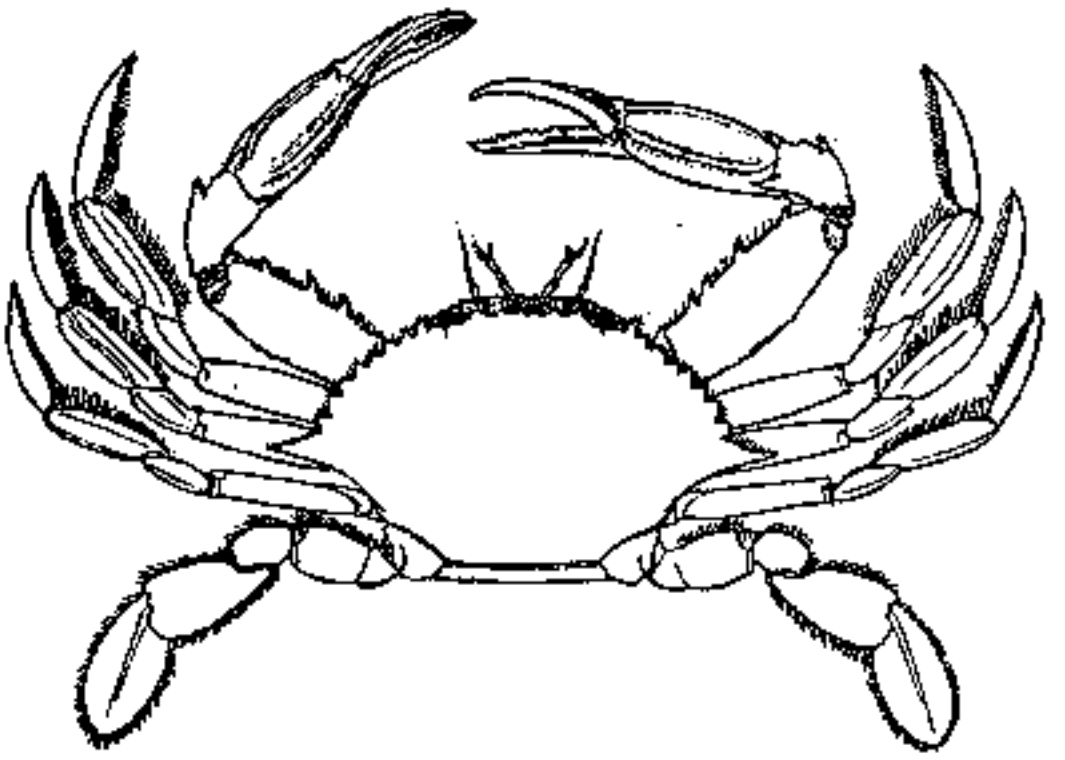

Figure 6.—Portunus (Portunus) sayi, male, natural size, dorsal view

Lupa cranchiana Leach (*nomen nudum*) in White, List Crust. Brit. Mus., 1847, p. 27, not *Neptunus sanguinolentus* (Herbst); lat. 30° N., long. 36° W., on a floating thalassiophyte, Tuckey's Congo Expedition, 1816 (specimen in Brit. Mus.).

Lupa sayi Gibbes, Proc. Amer. Assoc. Adv. Sci., 3d meeting, 1850, p. 178 [14] (type-locality, South Carolina; no types in Charleston Mus.).

Lupea pudica Gerstaecker, Arch. f. Naturg., vol. 22, pt. 1, 1856 (1857), p. 130 (type-locality, Brazilian coast; type in Berlin Mus.).

Neptunus sayi A. Milne Edwards, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 317, pl. 29, fig. 2.

Lupea parvula Desbonne in Desbonne and Schramm, Crust. Guadeloupe, 1867, p 40 (type-locality, Guadeloupe; type not extant).

Portunus sayi Rathbun, Ann. Inst. Jamaica, vol. 1, 1897, p. 22.—Verrill, *Trans. Connecticut Acad. Arts and* Sci., vol. 13, 1908, p. 376.

Figure 7.—Portunus (Portunus) sayi, outer maxilliped, enlarged

Diagnosis.—Carapace very convex, rather smooth and glossy; only four ridges; eight lateral teeth shallow. Palms swollen, bidentate.

Description.—Carapace high in the middle, sloping downward in all directions; furrows shallow, granulation fine, scarcely visible to the naked eye; two low granulated ridges concave forward across the gastric region; a sinuous ridge leading up on the branchial region from the branchial spine. Frontal or rostral teeth four, the median and submedian pairs about equally advanced, the median very small. Inner supraorbital tooth simple, undivided. Inner suborbital tooth large, advanced far beyond the front. Antero-lateral teeth trending forward, their posterior margins longer than their anterior; lateral spine long and strong, directed outward.

Material examined of Portunus (Portunus) sayi

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Temp. at surface	Date	Station	Collector	Specimens	Cat. No.	Remarks
	° ′ ″	° ′ ″		°F.						
Nova Scotia: South of Nova Scotia.	40 50 00	60 53 00			July 2, 1915		C. W. Furlong, *Kitty A.*, W. African Islds. Exped.	1 ♀ ovig	53352	From gulf weed.
Georges Bank:										
Off Georges Bank	41 43 00	65 21 50		69	Sept. 3, 1883	2074	*Albatross*	50 y	40719	
Do	41 15 30	64 23 00	Surface	69	June 19, 1885	Hyd. 743	do	1	11040	
Do	40 09 00	68 52 00					W. E. Safford, U. S. Navy, U. S. S. *Vandalia*.	4 ♂ 4 ♀	12585	
Do	40 03 30	67 27 15	Surface	70	July 15, 1885	2535	*Albatross*	10	10852	
Do	40 02 00	68 50 30	do	72	July 31, 1883	2048	do	2	5802	
Do	38 19 26	68 20 20	do	81	July 28, 1883	2039	do	1 ♀ ovig	40522	
Georges Bank					Sept. 1, 1872		U. S. Fish Commission	1 y	40720	
Do					Sept. 14, 1872 / Sept. 16, 1872		do	1 y	40727	
Massachusetts:										
Woods Hole			Surface		Sept. 3, 1904		V. N. Edwards, U. S. Fish Commission.	3 y	32480	
Do							do	1 y	3815	
Vineyard Sound			Surface		1881		do	1 ♂	4560	
Menemsha Bight			do		Aug. 29, 1906		Bureau of Fisheries	1 ♀	33103	Very large. On floating gulf weed.
South of Nantucket			do		July 16, 1896		U. S. Fish Commission	100	11842	Megalops.
Do	39 45 00	69 44 45	do	70	Aug. 4, 1881	935	*Fish Hawk*	2 ♀	4561	
Do	39 49 25	69 49 00		72	do	937	do	1 y	34046	
Do	39 58 00	70 06 00		67	Sept. 21, 1881	1038	do	1,000	43386	Eggs.
Do					do	Near 1038	do	2	40523	
Off Marthas Vineyard	Between 39 59 15 and 40 06 60	Between 70 34 15 and 70 36 30	Surface	67–68	Sept. 20, 1883	2085–2088	*Albatross*	65	9921	
Do	39 59 40	70 41 10		68	do	2090	do	2 ♀ 23 y	5820	
Do	39 57 45	70 50 30		73	Aug. 7, 1885	2541	do	1 y	40726	
Do	39 57 30	70 51 15		74	do	2538	do	2	11056	
Do	39 22 20	70 52 20		69	Sept. 30, 1883	2096	do	1 ♂ 11 y / 2 y	31459 / 5427	
Do	Between 39 58 35 and 40 01 50	Between 70 59 00 and 71 00 30	Surface	67.5–69	Sept. 21, 1883	2091, 2092	do	1 ♀ 55 y / 15 y	5813 / 31548	

Rhode Island:													
South of Block Island	39	40	30	71	31	00	do	68	Sept. 8, 1881	Near 995	*Fish Hawk*	1 y	40728	On floating plant
Do	39	38	00	71	39	45	do	67	Aug. 19, 1884	2202	*Albatross*	10	8217	
Do	39	34	15	71	41	15	do	74	do	2203	do	6	8218	
New York: South of Long Island.	39	02	00	72	36	00	do	71	Sept. 20, 1885	2588	do	1 claw	34931	
New Jersey:														
Off Barnegat	39	45	00	73	58	00	do	75	July 31, 1913	10081	*Grampus*	21 y	61321	
Off Cape May	39	04	00				do		July 23, 1892		do	10 y	61330	
East of Cape May	38	59	00	70	07	00			Sept. 16, 1886	2711	*Albatross*	3 y	12019	
Maryland: East of Maryland.	38	20	00	70	08	30	do		Sept. 17, 1886	2713	do	{12 {3 ♂	18804 12013	With *Conchoderma virgatum* attached.
Virginia:														
East of Chincoteague Island.	37	56	20	70	57	30	do	72.5	Oct. 1, 1883	2097	do	16	5822	
East of Accomac County.	37	46	30	73	66	30	do	69	Sept. 17, 1887	2742	do	6 y	12871	
East of Northampton County.	37	23	00	68	08	00	do	80	Aug. 29, 1885	2366	do	{12 {1 y	10857 40725	
East of Chesapeake Bay.	37	08	30	74	33	30	do	63	June 3, 1885	2422	do	1 ♂ 1 y	10097	
East of Princess Anne County.	36	47	00	73	25	00	do		Oct. 23, 1886	2724	do	10	37852	
Smith Island											Percy Sbufeldt	1 y	23125	
North Carolina:														
Off Currituck	36	20	24	74	46	30	Surface	69	June 4, 1885	2425	*Albatross*	100 y	10112	
Off Cape Hatteras	35	16	00	75	02	30		78.5	Nov. 9, 1883	2108	do	2 ♀	5654	
Do	Between 35 10 40 and 35 12 30			Between 75 05 00 and 75 06 10				75–79	Oct. 19, 1884	2268, 2269	do	12	8833	
Do							Surface		June 5, 1885		do	2 ♀ 11 y	10123	
Edge of Gulf Stream, off Cape Hatteras.							do		June 6, 1903		B. A. Bean, for Geogr. Soc. of Baltimore.	2 ♂ 2 ♀ 23 y	31075	In *Sargassum*.
Off Beaufort	¼ mile N. NE. of can buoy.								Aug. 12, 1914	8220	*Fish Hawk*	1 y	51388	
Do	One W. from buoy.								Aug. 10, 1914	8205	do	1 y	51384	
Mouth of Cape Fear River.							Surface	83	July 12, 1915	8275	do	6 y	61328	
Off Southport							do		July 18, 1915		do	1 y	61327	Net out from 11.16 p. m. to 12 midnight.
South Carolina:														
Off Charleston	32	43	00	77	51	00	do	69	Jan. 5, 1885	2314	*Albatross*	30	9447	
Open ocean off Gulf Stream.	32	00	00	74	00	00	do		June 12, 1903		B. A. Bean, for Geogr. Soc. of Baltimore.	1 ♂	31077	
Georgia	31	16	00	71	50	00	do		Nov. 23, 1887		*Albatross*	10	22022	

Material examined of Portunus (Portunus) sayi—Continued

Locality	Bearings		Fathoms	Temp. at surface	Date	Station	Collector	Specimens	Cat. No.	Remarks
	Latitude N.	Longitude W.								
Florida, east side:										
Off Indian River	28 17 07	66 17 37	Surface		Jan. 14, 1884	Hyd. 38	*Albatross*	1♂ 3♀ 3 y	7746	
				°C.						
Off Biscayne Bay	25 33 00	80 03 00	do	21.75	Mar. 20, 1914	10204	*Bache*	1 y	61331	
Mid-ocean, Sargasso Sea	25 14 00	59 33 00	do				U. S. Fish Commission.	1 y	34181	On Sargasso weed.
Do	21 00 00	51 00 00	do				Dr. C. C. Craft	1♀	61326	
Gulf Stream			do				U. S. Fish Commission.	12 y	21395	
Do			do				J. D. Dana, U. S. Exploring Exped.	3	2368	
Bahamas:										
About 120 miles North by East of Abaco Island.			do		June 15, 1903		Bean and Riley, for Geogr. Soc., Baltimore.	1♂ 3♀ 7 y	31074	In *Sargassum*.
60 miles North of Abaco Island.			do		June 16, 1903		B. A. Bean, for Geogr. Soc., Baltimore.	2♂ 2♀	31078	Do.
Between Nassau and Elbow Bay.			do		July 21, 1903		do	12 y	31055	Do.
Between Nassau and Andros Island.			do				Frederick Stearns	Specimens returned to sender.		In floating gulf-weed.
Andros sponge banks							do	do	do	From sponges.
Opposite Mangrove Key, Andros Island.					June 27, 1903		B. A. Bean, for Geogr. Soc., Baltimore.	1♂	31073	
Open sea between Cat Island and Eleuthera.			Surface		July 18, 1903		do	1♀ 3 y	31076	In *Sargassum*.
				°F.						
Exuma Sound	24 30 43	76 23 45	do	73	Mar. 13, 1886	2632	*Albatross* (W. Nye, jr.)	2♀	11386	
Tongue of Ocean	23 34 30	76 34 00	do	74	Apr. 12, 1886	2650	do	1 y	11405	By electric light.
				°C.						
Florida, west side:										
Atlantic Ocean near Hillsboro lighthouse.	3½ miles offshore		do	26	May 1, 1915	8257	*Fish Hawk* (E. Dangiade.	1 y	61329	In tow net.
Lignum Vitae Lake	¼ miles ESE. of Eagle Nest Key.		do	26	Feb. 4, 1903	7456	do	1♂ 6 y	61320	From *Sargassum*.
Cotton Key Lake					Feb. 5, 1903		do	1 y	61322	From seaweed.
Main ship channel, Key West.					Feb. 12, 1903		do	3 y	61323	

Loggerhead Key, Tortugas.							July 15, 1924		W. L. Schmitt, for Carnegie Institution.	1 y	61324	Under *Sargassum* on beach.
Do	Off pier				Surface		July 25, 1924		do	40 y	61319	From floating gulf weed. Collected by cook's boy.
Long Key, Tortugas							July 30, 1924		do	1 y	61325	
Tortugas					Surface				E. W. Gudger	1♀ 7 y	61318	In gulf weed.
Do							July 31, 1926		C. R. Shoemaker	15♂ 23♀	62487	From floating gulf weed.
Do							Aug. 5, 1926		do	1♂ 4♀ (2 ovig.) 2y.	62488	Do.
Do					Surface		July 8, 1906		Charles Zeleny	6	33498	Do.
Do							June 13, 1893		State Univ., Iowa, Bahama Exped.	100, returned to sender.		In gulf weed.
						°F.						
Alabama:												
Gulf of Mexico	28	00	15	87	42	00	Surface	66	Mar. 2, 1885	2379	*Albatross*	1 y	9661	
Do	28	02	30	87	43	45	do	69	do	2380	do	2	9666	
Louisiana: Grand Isle									July 7, 1928		E. H. Behre	2 y	returned	
Cuba:														
Gulf of Mexico	23	48	14	84	06	55	do		Apr. 14, 1884	Hyd. 419	*Albatross* (W. Nye, jr.)	1♀	9116	
Off eastern Cuba							do		1923		Williams Galapagos Exped.	1♂	57740	From *Sargassum*.
South of Cuba	19	55	55	75	48	03	do	79	Feb. 27, 1884	2133	*Albatross* (W. Nye, jr.)	1♂	7817	
Do	19	45	00	75	04	00	do	77	Feb. 25, 1884	2127	do	2♂ 1♀	7723	
Jamaica: Kingston Harbor									May–July, 1896		F. S. Conant	1♀ ovig	19598	
Porto Rico: Northeast of Porto Rico.	20	00	00	63	00	00					Dr. E. Kershner	1	6729	
St. Thomas									Jan. 17–24, 1884		*Albatross*	1♀	18548	
Trinidad: Monos Island							Surface		1884		do	1♂	7726	By electric light.
Guiana: Northeast of Guiana.	11	05	00	50	01	00					C. W. Furlong, *Kitty A.*, W. African Islands Exped.	2♀ ovig	53349	
Brazil												1♂	Berlin Mus.	Type of *Lupea pudica* Gerstaecker.
Bermuda									1876–1877		G. Brown Goode	10	42819	
Eastern Atlantic Ocean	30	00	00	36	00	00	Surface		1816		Tuckey's Congo Exped.	Specimens	Brit. Mus.	On a floating thalassiophyte. "*Lupea cranchiana* Leach," *nomen nudum*.
Kerguelen Island									Sept. 28, 1874		Dr. J. H. Kidder, U. S. Navy, Transit of Venus Exped.	1♂	6703	
(?)											Capt. W. Herrendean	2♂ 6♀ (large)	13883	Labeled "Galapagos Islands."

Merus of cheliped extending far beyond the carapace, armed with three spines on the inner margin. A strong spine at inner angle of carpus, a smaller spine near distal end of outer margin. Seven carinae on manus, a spine on outer surface at articulation with carpus, another spine at distal end of upper margin. First three pairs of legs flat, lamellate. Swimming legs unarmed.

Penult segment of male abdomen suboblong; terminal segment small, somewhat invaginated in the preceding.

Color.—Mottled olive green or purplish and variegated yellow-brown with white patches corresponding to their environment of gulf-weed encrusted with white colonies of bryozoa.

Measurements.—Male (13883), total length of carapace 29, total width 55.6, width at anterior base of lateral spine 47.7, fronto-orbital width 20.4, width of front between tips of inner orbital teeth 11.2 mm. Female (2368), total length of carapace 37.1, width of same 76.1, width at anterior base of lateral spine 62.7, fronto-orbital width 30, width of front between tips of inner orbital teeth 14.4 mm.

Habitat.—Normally in masses of floating gulf-weed in mid-ocean and especially along the Gulf Stream.

Range.—North Atlantic Ocean from Nova Scotia (43° N. lat.) south via Gulf of Mexico to Guiana; Brazil (Gerstaecker). Mid-Atlantic; Bermuda. Kerguelen Island, South Indian Ocean.

Material examined.—See table, pages 38–41.

PORTUNUS (PORTUNUS) ANCEPS (Saussure)

Plate 15

Lupea anceps Saussure, Mém. Soc. Phys. Hist. Nat. Genève, vol. 14, 1858, p. 434 [18], pl. 2, fig. 11–11*b* (type-locality, Cuba; type in Geneva Mus.).

Neptunus anceps A. Milne Edwards, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 328 (not *Lupa bellicosa* Stimpson); Crust. Rég. Mex., 1879, p. 213.

Lupea duchassagni Desbonne, in Desbonne and Schramm, Crust. Guadeloupe, 1867, p. 39, pl. 4, fig. 25 (type-locality, Guadeloupe; cotype (?) in Geneva Mus.).

Achelous anceps Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 113 [23].—Verrill, Amer. Journ. Sci., vol. 25, 1908, p. 378, text-fig. 26, pl. 20, figs. 1 and 2; pl. 27, fig. 4 (not *Neptunus ventralis* A. Milne Edwards).

Neptunus sulcatus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 216, pl. 39, fig. 3–3*c* (type-localities, Guadeloupe and *11° 49′ S.* lat., *37° 27′ W.* long., 17 fathoms; cotype from latter locality in M.C.Z.).

Portunus ventralis Rathbun, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 45 (not *Neptunus ventralis* A. Milne Edwards).

Portunus (*Achelous*) *anceps* Rathbun, in Boeke, Rapport Visscherij Kolonie Curaçao, pt. 2, 1920, p. 17 (not Amer. Nat., vol. 34, 1900, p. 14).

Diagnosis.—A spine at extremity of outer margin of arm. Subdistal spine of palm at distal fifth of upper margin. Median pair of frontal teeth very small.

Description.—A small species. Carapace about twice as wide as long, not very uneven, covered with fine depressed granules; the long branchial and the two gastric ridges low, the cardiac region with a median furrow. Of the four triangular and blunt frontal teeth the median are very small, much smaller than the outer ones, which are more advanced than the outer and inner supraorbital teeth. This last tooth is oblique with an obtusangular projection, scarcely a tooth, on its outer slope. Antero-lateral teeth 2 to 8 are very small, spine-tipped, similar, the first four directed forward, the last three narrower at base and directed more outward. Lateral spine as long as the space occupied by the 3 adjacent spines and directed outward or slightly backward,

The 4 or 5 teeth of the inner margin of the arm are slender and distant; a terminal spine on the outer margin. Two spines on carpus, the inner somewhat larger than the outer. Three spines on palm, two of which are on the upper margin, terminal and subterminal or at the distal fifth; 5 carinae on upper and outer surfaces. Postero-distal margin of merus of swimming-leg oblique, unarmed.

Color.—Grayish yellow with marblings or spots of yellowish, white and blackish; inner face of chelipeds reddish. (Desbonne.)

Measurements.—Male (15227), total length of carapace 14.1, width of same 26.3, width at base of lateral spine 21.7, fronto-orbital width 12.6, width of front 3.8 mm.

Habitat.—Lives on sandy shores where it ordinarily buries in the sand. (Desbonne.)

Range.—North Carolina to Brazil; Bermudas.

Material examined.—See table, pages 44–46.

PORTUNUS (PORTUNUS) VENTRALIS (A. Milne Edwards)

Plate 13, Figures 1 and 2

Neptunus ventralis A. Milne Edwards, Crust. Rég. Mex., 1879, p. 215, pl. 40, fig. 3–3*b* (type-locality, Guadeloupe; type in Paris Mus.). Not *Portunus ventralis* Rathbun, 1901.

Portunus sulcatus Rathbun, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 45 (not *Neptunus sulcatus* A. Milne Edwards).

Portunus (Portunus) sulcatus Rathbun, Univ. Iowa Studies Nat. Hist., vol. 9, 1921, p. 67.

Diagnosis.—No spine at extremity of outer margin of arm. A spine at distal third of upper margin of palm. Four teeth of front about equally advanced.

Description.—Akin to *anceps*. Carapace short pubescent, granulation coarse and extensive forming an elaborate pattern. Frontal teeth of median pair smaller than those next but nearly or in small specimens quite as advanced; they are not triangular but almost semicircular or with arcuate edge; outer teeth subtriangular with blunt,

Material examined of Portunus (Portunus) anceps

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Cat. No.	Remarks
	° ′ ″	° ′ ″			° F. Surface						
North Carolina:											
Off Currituck	36 20 24	74 46 30	Surface.	dk. gy. M. fne. S.	69	June 4, 1885	2425	*Albatross*	9 y	17942	
Off Cape Hatteras	35 22 50	75 25 00	7	crs. S. bk. Sp.		Oct. 29, 1884	2289	do	2 ♀	8855	
Do	35 22 40	75 25 30	7	crs. S. brk. Sh.		Oct. 20, 1884	2288	do	2 ♂ 5 ♀ (3 ovig.)	8842	
Do	35 22 30	75 26 00	7	crs. gy. S.		do	2287	do	1 ♀	8854	
Do	35 21 25	75 24 25	13	crs. gy. S.		Oct. 19, 1884	2285	do	1 ♂ 3 ♀	7233	
Do	35 21 05	75 22 05	16	gy. S. brk. Sh.		do	2281	do	1 ♂ 1 ♀	8852	
East of Cape Lookout	34 35 15	75 52 00	25	wh. S. bk. Sp.		Oct. 18, 1885	2606	do	1 y	11228	
Bahamas:											
The Current, Eleuthera Island						July 5, 1903		B. A. Bean, for Geogr. Soc., Baltimore.	11 ♂ 8 ♀ 7 y	31050	
Nassau, Hog Island						June 20, 1903		do	7 ♂ 5 ♀	31054	
Do						July 20, 1903		do	1 ♂	31052	
Riding Rock, Watlings Island						July 11, 1903		do	1 ♂	31051	
Clarence Harbor, Long Island						July 14, 1903 July 15, 1903		do	7 ♂ 4 ♀	31053	
Florida:											
Key West								D. S. Jordan	1 ♂	6365	
Tortugas								W. H. Longley	1 ♂	61301	
Loggerhead Key, Tortugas						June 25, 1925		Fermin	1 ♂	61300	Gift of Carnegie Institution.
Off laboratory dock, Loggerhead Key						Aug. 24, 1924		W. L. Schmitt	2 ♂	61302	Do.
Inside of North point of Loggerhead Key						Aug. 12, 1924		do	3 ♂ 1 ♀	61299	Do.
South of Loggerhead Key toward old wreck						June 19, 1925		Taylor	1 ♀	61307	Do.
Tortugas	Stomach of fish No. 281, gray snapper, *Neomaenis griseus* (L.).					June 13, 1925		W. L. Schmitt	1 ♀	61306	Do.
Do	Stomach of fish No. 318, gray snapper, *Neomaenis griseus* (L.).					do		do	1 cheliped	61305	Do.

Do	Stomach of fish No. 353, gray snapper, *Neomaenis griseus* (L.).					do		do	1 ♀	61304		Do.
Do	Stomach of fish No. 710, gray snapper, *Neomaenis griseus* (L.).					June 25, 1925		do	1 ♀	61303		Do.
Bird Key						1889		*Grampus*	1 ♂ 2 ♀	15227		
Mexico: Cozumel, Yucatan						Jan. 29, 1885		*Albatross*	1 ♂	15044		In seine.
Cuba:												
Cuba									Type specimen	Geneva Mus.		
Ensenada de Cajon, off Cape San Antonio.						May 22, 1914 May 23, 1914	11	Henderson and Bartsch, *Tomas Barrera* Exped.	5 ♂ 1 ♀	49158		
Between Cape San Antonio and Cape Cajon.					Pure sand to weedy.	May 24, 1914	12	do	2 ♂ 1 ♀	49184		
On reef flat between Cayo Hutia and Little Cayo northeast of Light.						May —, 1914 June —, 1914		do	2 ♂	49185		
Bahia Honda								do	1 ♀	49188		
On reef Lavesos Italienos, opposite Cayo Lavesos.					C.S.R.	June 2, 1914		do	1 ♀ ovig.	49187		
Cabañas					S. Sh. grass to M.	June 8, 1914 June 9, 1914	16	do	1 ♀	49186		
Southeast of Cuba	19 46 00	75 04 00	Surface.			Feb. 24, 1884	2127	*Albatross*	1 y 1 y	18440 18442		
Jamaica:												
Montego Bay					Coral reef	July 20, 1910		C. B. Wilson	1 ♂	42861		
Do					Sponges and algae *in brackish pond.*	July 2, 1910		do	1 y	42860		
Do								E. A. Andrews	3 y	42871		
Porto Rico:												
Mayaguez						Jan. 19, 1899		*Fish Hawk*	1 ♀	24500		
Off Puerto Real	Point Guaniquilla, S. ¼ E., 2 miles.		8.5			°C. 26 Jan. 25, 1899	6074	do	1 y	24504		
Boqueron Bay						Jan. 26, 1899		do	1 ♀	24501		
Ponce reefs						Jan. 30, 1899		do	1 ♂ 4 ♀	24502		
Ensenada Honda, Culebra Island.						Feb. 10, 1899		do	1 ♂	24503		
St. Thomas								Riise	1	Copenhagen Mus.		

Material examined of Portunus (Portunus) anceps—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Cat. No.	Remarks
	Latitude N.	Longitude W.									
Leeward Islands:	° ′ ″	° ′ ″									
Saba	10 miles SW. of Saba		15			Aug. 12, 1905		J. Boeke	1♂ 3♀	Leiden Mus. or Amsterdam.	
St. Eustatius	W. of Oranjestad		4	sdy		Aug. 17, 1905		do	1♀	do	
Do	Near Tumble-Down Dick Bay.		4–6	stony		Aug. 21, 1905		do	1♀ ovig	42984	
Do	SE. of St. Eustatius		40			Aug. 9, 1905		do	2♀ ovig	Leiden Mus. or Amsterdam.	
Guadeloupe									1	Geneva Mus.	Perhaps cotype of *Lupea duchassagni*.
Panama:											
Porto Bello						Mar. 19, 1912		Meek and Hildebrand.	3♂	61298	
Colombia:											
Sabanilla						1884		*Albatross*	3 y	17941	
Brazil:											
Bahia Harbor								Andrea	1	Copenhagen Mus.	
East of Bahia	*Lat. S.* 11 49 00	37 27 00	17			Jan. 18, 1872		U. S. Coast Survey str. *Hassler*.	1♀	2963, M.C.Z.	Cotype of *Neptunus sulcatus*.

rounded tips, and more advanced than the outer and inner supraorbital teeth. This last is similar to that of *anceps*. Of the antero-lateral teeth the second, fourth and sixth are smaller than the others; all are appressed and sharp-pointed, and directed obliquely inward except the last 2 or 3 which are directed forward or a little outward. Lateral spine broad at base, as long as the space occupied by the three adjacent teeth, and curved a little forward.

The 2 spines on the distal half of the inner margin of the merus of the cheliped are much longer and stronger than the pair on the proximal half; at the distal end of the outer margin there is no spine but a flattened plate (*lame* of A. Milne Edwards) or fold with a sharp edge which projects almost imperceptibly beyond the adjacent distal edge of the arm. The figure of the type shows, incorrectly, a projecting spine of good length. A longer, stronger spine at the inner angle of the wrist than on the outer side. Of the two spines on the upper margin of the palm the proximal one is high and laminar and situated at the distal third of the margin. Merus of swimming leg unarmed. Terminal segement of male abdomen longer than in *anceps*.

Color.—On the carapace a large postero-lateral area and a postorbital triangle are slate-color, as are also the greater part of the upper surface of the merus of the cheliped, the infero-proximal two-thirds of outer face of manus and the basal half of fingers; rest of surface a sort of ecru drab and buff pink; fingers distally almost salmon buff with extreme tips nearly white. Spines on inner margin of arm nearly white. The ambulatory legs have areas of gray on the middle portion of merus, carpus and propodus, these patches being much less extensive on the third ambulatory, where there is also a small patch of maroon on the same three articles; a maroon spot on merus and propodus of swimming leg; remainder of this propodus as well as the whole of the dactylus transparent. Some specimens are much lighter, slate areas on carapace considerably reduced and lighter, chelipeds with just a median spot of color, and other legs transparent instead of slate; light areas on carapace and legs almost white, cream with the slightest trace of pinkish buff. Eggs of female cadmium yellow. The blackest specimen had the black areas of the carapace united across posterior margin, the spots on the hind legs almost dragon's blood red and inside of base of fixed finger almost carmine; no drab area present. (Schmitt.)

Measurements.—Female (53763), total length of carapace 14.2, width of same 27.4, width at base of lateral spine 22.2, fronto-orbital width 11.8, width of front 4.1 mm.

Range.—Georgia or Florida to Brazil.

Material examined.—See table, page 48.

Material examined of Portunus (Portunus) ventralis

Locality	Bearings		Fathoms	Bottom	Date	Station	Collector	Specimens	Cat. No.	Remarks
	Latitude N.	Longitude W.								
	° ′ ″	° ′ ″								
	Between									
Georgia: Off Satilla River	31 00 00	78 40 00						1♂	Copenhagen Mus.	
Florida: Off St. John County	and									
	29 30 00	79 00 00								
Tortugas, east side of Loggerhead Key				S	Aug. 17, 1924		Bender	4♂ 1♀ ovig	61334	Gift of Carnegie Institution.
Do			Beach		1924		do	1♀	62489	Do.
Tortugas, outer lighthouse reef	Stomach of fish No. 114, schoolmaster (*yellow snapper*), *Neomaenis apodus* (Walbaum).				June 7, 1925		W. L. Schmitt	1♀	61335	Do.
Tortugas, off North end Loggerhead Key			About 4 feet		July 14, 1926	1	C. R. Shoemaker	1♂	62490	Do.
West Indies:										
Northwest of Cuba	23 48 14	84 06 55	Surface		Apr. 14, 1884	Hyd. 419	*Albatross*	1 y	18441	
Ensenada de Cajon, off Cape San Antonio, Cuba.					May 22, 1914 May 23, 1914		Henderson and Bartsch, *Tomas Barrera* Exped.	1♀ ovig	61336	
Robins Bay, Jamaica					1923		C. R. Orcutt	1♀	61361	
Mayaguez, Porto Rico					Jan. 20, 1899		*Fish Hawk*	1♂	24505	
Magens Bay, St. Thomas			Shore near small pool.		July 4, 1915		C. R. Shoemaker	1♀ ovig	53763	Do.
Caribbean Sea	15 02 00	67 13 30	Surface		Feb 7, 1884		*Albatross*	1 y	7724	
Bethsheba, Barbados					1918		Barbados - Antigua Exped., State Univ. of Iowa.	1 y.♂	58046	
Brazil: Off Cape Frio								1 y.♂	Copenhagen Mus.	

PORTUNUS (PORTUNUS) GIBBESII (Stimpson)

Plates 16 and 17

Lupa gibbesii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 57 [11] (type-localities, South Carolina and St. Augustine, Florida; types not extant).

Achelous gibbesii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 222 [94]; as far north as Beaufort, N. C.

Neptunus gibbesii A. MILNE EDWARDS, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 326, pl. 31, fig. 1–1*b*.

Portunus gibbesii RATHBUN, Amer. Nat., vol. 34, 1900, p. 140.

Diagnosis.—Carapace broad and rough. A round bare spot on the postlateral slope. Arms 5 or 6 spined. Merus of swimming legs spinulous.

Description.—Carapace very broad, moderately convex; surface uneven, coarsely granulate, granules irregularly disposed. Two transverse granulate gastric ridges and an oblique sinuous one, extending from the tip of the lateral spine across the branchial region; two short oblique branchial ridges; a broad transverse band of granules on the cardiac region, interrupted at middle, and forming a T with a median ridge behind it. Surface pubescent except on the elevations and on an iridescent round spot on the postlateral slope just above the insertion of the penult leg. Usually two small bare spots along the antero-lateral margin, a small spot at base of fourth tooth and a longer one at sixth and seventh teeth. Rostral distance narrow, the teeth of the median pair smaller than those of the outer pair and slightly more advanced. Inner orbital angle bidentate, the inner tooth nearly as advanced as the outer tooth of the front. Orbital fissures with V-shaped openings, the inner angle of the outer fissure, produced in a small denticle. Inner suborbital tooth very large, much more advanced than the superior teeth. On the antero-lateral margin the first or orbital tooth is broader and blunter than the others; the seven following teeth are subequal, outer margins convex, tips spined; lateral spine between 3 and 4 times as long as the preceding tooth, nearly transverse, tip curved forward.

Chelipeds very long, pubsecent, granulate on the carinae; merus armed with 5, sometimes 6, spines on the inner margin, and one at end of outer margin; outer half of lower-outer surface hairy. A spine at inner and at outer angle of carpus. Manus with 6 carinae, the one on inner edge of lower surface very blunt; a line of granules through middle of inner surface; a spine at articulation with carpus, another not far behind distal end of upper margin. Merus of swimming-leg nearly as broad as long, its postero-distal margin spinulous.

79856—30——5

Second and third segments of male abdomen very broad, reaching past the middle of the coxae of the last legs; fifth, sixth, and seventh segments together subtriangular.

Color.—Brownish red, the transverse ridges on the carapace and the spines and margins of the chelipeds carmine red. (Hay and Shore.) Surface silvery wherever the hairs are rubbed off by friction (Verrill.)

Habitat.—Hay [10] says of this crab at Beaufort, "often taken in the deeper channels of the harbor."

Measurements.—Male (26104), total length of carapace 29, total width 56.4, width between anterior bases of lateral spines 46.4, fronto-orbital width 22.7, width across four frontal teeth 6.8 mm.

Variation.—In the young the teeth of the outer pair of the front are broader and blunter than in the adult, the lateral teeth show a reduction in size in the fourth and sixth and sometimes in the second. The bare, iridescent spots of the old are lacking.

Range.—From southern Massachusetts to Texas. Venezuela.

Material examined.—See table, pages 51–52.

PORTUNUS (PORTUNUS) XANTUSII (Stimpson)

Plate 18

Achelous xantusii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 222 [94] (type-locality, Cape St. Lucas; cotypes in M. C. Z.).

Neptunus xantusii A. MILNE EDWARDS, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 429; Crust. Rég. Mex., 1879, p. 213 (part), pl. 38, figs. 1–1*d*, not pl. 39, figs. 4–4*c*; San Diego, not Mazatlan and Chile.

Portunus xantusii RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 593.

Portunus (Portunus) xantusii RATHBUN, Bull. Amer. Mus. Nat. Hist., vol. 48, 1923, p. 620 (part).

Diagnosis.—Carapace twice as long as wide. Front not prominent; teeth acute. Lateral spine about 3 times as long as preceding tooth. Merus of swimming legs spinulous.

Description.—Carapace uneven. Surface of carapace and chelipeds pubescent except on the elevations. Gastric region with a median granulated ridge and two transverse ridges slightly concave forward; on the branchial region an arcuate granulated ridge begins at the lateral spine, curving forward and then inward opposite the seventh lateral tooth; behind it two short, oblique parallel ridges; on the cardiac region a transverse ridge interrupted at middle and forming a T with a lower median ridge. Frontal teeth thick and narrow, not projecting beyond the inferior orbital teeth, submedian teeth a little narrower and usually a little more advanced than those of the outer pair and a little further from them than from each other. Tooth at inner angle of orbit bidentate, outer tooth more advanced. Postorbital

[10] Bull. Bur. Fisheries, vol. 35, 1915-16 (1918), p. 428.

Material examined of Portunus (Portunus) gibbesii

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			°F.						
Massachusetts: Woods Hole.						Nov. , 1883		V. N. Edwards, (U.S.F.C.)	4	11203	
New Jersey: Off New Jersey.								Joseph F. Reed	1♂	18046	
Maryland: Magothy Bay						July 22, 1916		*Fish Hawk*	1 y. ♀	61308	
Virginia:											
Off mouth of Chesapeake Bay.	37 10 00	75 08 00	18	S		Nov. 16, 1880	901	*Fish Hawk*	2 y. ♀	40273	
Chesapeake Bay, 2¼ miles W. ¾ S. from Cherrystone Light.	37 15 05	76 04 40	25	Sh. S. sft. gn. M.	68.2	Aug. 22, 1915	8339	do	2♀	58370	
North Carolina:											
Off Cape Hatteras	35 35 20	74 58 45	27	crs. gy. S		Oct. 20, 1884	2296	*Albatross*	1♂ 1 y. ♀	8812	
Do	35 21 25	75 24 25	13	crs. gy. S		Oct. 19, 1884	2285	do	4♂ 4 y	7232	
Do	35 19 30	75 15 20	16.5	fne. dk. gy. S. sm. Sh.		Nov. 9, 1883	2107	do	1♂ 2♀	5633	
Do	35 12 30	75 05 00	48	crs. gy. bk. S	77	Oct. 19, 1884	2269	do	1♀	7219	
Cape Lookout						Apr. 9, 1891		*Fish Hawk*	1♀	17199	
Off Cape Lookout	34 20 00	76 12 00	22	fne. gy. S		Oct. 19, 1885	2809	*Albatross*	1♂ 2♀	11218	
Do	34 20 00	76 12 00	22	wh. S. bk. Sp. brk. Sh.		do	2810	do	1♂	11217	
Do	25 miles E. S. E. of Lookout Lightship.					July 28, 1915		*Fish Hawk*	1 y	61315	
Bogue Sound						July 7, 1911		do	9 y	61308	
Middle Sound, near Wilmington.			12			Apr. 18, 1880		R. E. Earll, U.S. F.C.	1♂ 1♀	5277	
Off Cape Fear River	33 57 00	78 03 30	6	sft. M		July 13, 1915	8277	*Fish Hawk*	1 y	61314	
Off Cape Fear	33 48 15	77 59 15	3.5	M. S	73	Sept. 24, 1913	7980	do	1	51106	
South Carolina:											
Bull Creek						do		do	1 y	18207	
Charleston Harbor			7	stky	58	Mar. 13, 1891	1659	do	8♂ 9♀	17198	
Do						Mar. 14, 1891	4	do	3♂ 1♀	17300	In one male the front and merus of right maxilliped are deformed.
Charleston								L. Agassiz	1♂ 1♀ 2 y	5259, M. C. Z.	
Blackfish Bank, 12 miles off Charleston.			12			Mar. 8, 1880		E. E. Earll	1♂	5276	

Material examined of Portunus (Portunus) gibbesii—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida:	° ′ ″	° ′ ″									
St. Mary's River, Fernandina.						Dec. 5, 1919		*Albatross*	1♂	61309	
Fernandina						Dec. 6, 1919		do	2♂ 2♀	61400	In shrimp trawl.
Straits of Florida	24 24 30	81 33 30		bn. M		Dec. 4, 1919	20032	do	2♂ 3♀	61399	
Key West								do	2 y	17940	
Tortugas								W. H. Longley	1♂	61310	
Southwest of Cape Romano.	25 49 00	82 08 30	Surface.		°C. 22	Apr. 28, 1915	8256	*Fish Hawk* (E. Danglade).	3♀ (2 ovig.).	61395	7-8 p. m.
Marco								H. Hemphill	3♂ 1♀ 14y	17936	
Off Sanibel Island	Bell buoy off Light, N. E., 10-2½ miles.		4.75	Sh. wh. M		Jan. 1, 1913	7795	*Fish Hawk*	1♂	61396	
Punta Rassa			1					H. Hemphill	2♀ 1 y	6663	
Anchorage, St. James City.						Dec. 31, 1912		*Fish Hawk*	8 y		Tidal tow, 4 ft. net, 5.15-6.45 p. m.
Charlotte Harbor								H. Hemphill	1♂	17937	Among grass, low tide.
Sarasota Bay			1-2					do	2 y	17939	
Egmont Key						Apr. 5, 1889		*Grampus*	1♀	15228	
Goodland Point								H. Hemphill	1 y	17938	
Off Port Tampa						Jan. 19, 1898		*Fish Hawk*	6♂ 10♀	28104	
Anclote section	28 08 00	82 53 30	3	sdy. brk. Sh	°C. 13	Jan. 23, 1902	7228	do	1 y	61312	
Cedar Keys								H. Hemphill	4 y	17935	
Pepperfish Key section.	29 14 00	83 18 20	2.75	Sh. S	13.5	Nov. 27, 1901	7168	*Fish Hawk*	1♀	61311	
Pensacola						July —, 1893		James E. Benedict.	1♂ 4♀	17922	
Texas: Alligator Head, Matagorda Bay.								J. D. Mitchell	1♂	22816	
Venezuela: Cumana						1858-59		Capt. J. P. Couthouy.	3♂ 2♀ 6 y	5262, M. C. Z.	

tooth larger than the next or second lateral tooth and about as advanced as the frontal teeth. Lateral teeth sharp, curving forward, and having a tendency to alternate in size, the second, fourth and sixth a little smaller; sinuses wide. Lateral spine about three times as long as the adjacent tooth. Orbital fissures V-shaped, the angles of the outer fissure thickened, subdentiform.

Merus of cheliped with 4 to 6 (most often 5) spines on the inner margin, and a distal spine on the posterior margin. Carpus with a longish spine at inner angle and a smaller spine at distal end of outer carina. Manus with 7 granulated ridges, a spine at the proximal end and another at the distal fifth of the inner margin of the upper surface. Infero-distal end of merus of swimming legs spinulous.

Measurements.—Male (21782), total length of carapace 28.6, width of same 57.1, width between anterior bases of lateral spines 45.6, fronto-orbital width 20.8, width across four frontal teeth 6.9 mm. Male (22026), total length of carapace 12.6, width of same 26, width at anterior base of lateral spine 18.7, fronto-orbital width 11, width of front 3.4 mm.

Young.—The carapace is a little narrower than in the full grown, the lateral spine relatively longer, as long as the width of the next four or five teeth, the frontal teeth wider. In the very young, 7 mm. long and smaller, the lateral spine is inclined more forward and is about as long as the width of three teeth, the frontal teeth are much shorter and broader, the antero-lateral teeth more unequal.

Range.—Puget Sound (accidental). From Santa Monica Bay, California, to Gulf of California, Mexico.

Material examined.—See table, pages 54–55.

THE *ACUMINATUS-ASPER-PANAMENSIS* GROUP

The species of this group have so much in common and the variation within the species is so great that is is difficult to determine whether they should be considered as forms of a single species or be recognized as three species, as described by Stimpson. The characters common to all are as follows: Carapace pubescent except on the elevated granulated ridges and patches; protuberances few in number and large, being on the gastric, cardiac, and inner branchial regions; marginal teeth granulated and pubescent; middle pair of frontal teeth smaller and more advanced than the outer pair, and the outer tooth of the orbit; inner orbital tooth bidentate; the antero-lateral teeth in general diminish in width from the first to the eighth, at the same time becoming longer and more spiniform. There is a small spine at distal end of outer margin of arm, no spine at distal end of upper margin of palm, but a spine is present behind the extremity. A spine at distal lower angle of merus of swimming leg terminates a row of spinules on the distal edge.

Material examined of Portunus (Portunus) xantusii

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			°C.						
Washington: Puget Sound								*Albatross*	1♂	21783	
California:											
Santa Monica Bay	½ mile out between El Segundo and Pt. Del Rey.					Aug. 2, 1913		*Anton Dohrn*	2♂ 9♀ (1♀ soft shell).	50318	From Venice Marine Biol. Sta.
Do	2 miles S. by E. from Pt. Del Rey.					Aug. 8, 1913		do	1♂ 3♀ ovig.	50319	Do.
Do	3 miles S. of Venice		14			July 29, 1913		do	1♂ soft shell.	50314	Do.
Wilmington						1880		D. S. Jordan (U. S. Fish Comm.).	3♂	3084	
Near Rocky Point			12			May 10, 1921		Univ. Southern California.	{3♂ 1♀ / 1♂ 1 y	62493 / 62491	
Point Vincente			8			July 5, 1924		do	1♀	62494	
San Pedro								H. N. Lowe	3♀	23058	
Do								do	1♂	32963	
Anaheim Bay								E. P. Chace	1♂	53989	
S. side San Pedro Bay	600 feet W. of pier near inlet.			crs. yl. S.		Oct. 13, 1914		Univ. Southern California.	2♂ 1♀	Returned.	
Long Beach	Off inlet to Long Beach Harbor.		5			Mar. 24, 1912		*Anton Dohrn*	1♂	50315	From Venice Marine Biol. Sta.
Off Long Beach			12			Oct. 21, 1922		Univ. Southern California.	1♂	Returned.	
Do			5.5		19.5	May 16, 1925		do	8 y	62692	
Between Long Beach and Seal Beach			5			Feb. 4, 1922		do	1 y	62492	
Newport Bay						Nov. 26, 1914		do	1♂ 2♀	62687	
Do						Nov. 27, 1914		do	3♂	62495	
Balboa						Dec. 16, 1914		do	3♂ 3♀, all immature.	62496	
Laguna Beach								W. A. Hilton	1♀ ovig.	50625	
Santa Catalina Island						Apr. —, 1897		*Albatross*	4♂	20169	
Do	Entrance to Catalina Harbor.					Dec. 30, 1912		*Anton Dohrn*	1 y	50317	From Venice Marine Biol. Sta.
Do	Catalina Harbor					Dec. 28, 1912		do	3♂ 1♀	50313	From Venice Marine Biol. Sta. By lamplight.
Do	do					do		do	1 y	50316	Do.
Do	do	Beach.				1874		W. H. Dall	1♂ 1♀	14859	
Do	Island and harbor					1874		do	1♂	14860	
San Clemente Island					°F.	Jan. 23, 1889		*Albatross*	2♂	15550	
Near San Diego	Pt. Loma Light, S. 81° E., 5.5 miles.		Surface.		59	Mar. 16, 1904	4364	do	1♀	61337	

San Diego						Aug. —, 1880		D. S. Jordan	3♂ 2♀	3562	
Do								Rosa Smith	1♀	13910	
Do						Jan. 21, 1889		*Albatross*	1♂	15552	
Do						Mar. 9, 1898 Mar. 15, 1898		do	2♂ 1♀	21782	
Do								San Diego Soc. Nat. Hist.	1♂	53361	
San Diego Bay	North Island					Apr. 2, 1896		*Albatross*	7♂ 9♀	20170	
Do			3	fne. S. blk. Sh.		Mar. 21, 1894	3567	do	1 y	19349	
Do			1.5–12			Mar. 21, 1894 to Mar. 24, 1894	3573 3574 3575 3578 3580 3581 3588 3590 3591	do	24♂ 12♀	18969	
Do			3	R. oyster Sh.		Mar. 24, 1894	3589	do	1 y	19339	
South of San Diego Bay	32 35 00	117 13 30	22	gn. M. G.	66	Mar. 24, 1898	3679	do	1♂	21781	
Mexico: West coast Lower California—											
San Bartolome Bay						Apr. 11, 1889		do	5♂ 1♀	15549	
Point San Bartolome						Mar. 13, 1911		do	3♂ 5♀ 2 y	60018 60013	
Santa Maria Bay						Mar. 18, 1911		do	50	60016	
Off Abreojos Point	26 42 30	113 34 15	5.5	gn. M.		May 4, 1888	2835	do	6 y	22028	
Do	26 14 00	113 13 00	48	yl. M.	53.9	May 3, 1888	2834	do	1 y	22027	
Ballenas Bay						do		do	2♀ 1 y	22029	
Magdalena Bay	24 35 30	111 50 35	13.5	S. brk. Sh.		Mar. 21, 1911	5678	do	1♂ 1♀	60012	
	Sail Rock, Entrado Pt., S. 53° W.; Redondo Pt., S. 15° W.										
Do	24 32 00	111 59 00	12	fne. gy. S.		May 2, 1888	2831	do	1 y. ♂ 1 y. ♀	22026	
Do						1925		Hanna and Jordan, California Acad. Sci. Exped.	3♂ 1♀ 1 y. 1♂ 1♀ 1 y.	62707 Returned	
Off Santa Margarita Island	24 24 30	111 53 00	31	gy. S. brk. Sh.	65.5	Apr. 8, 1889	3038	*Albatross*	3♂	17441	
Cape San Lucas								John Xantus	5 sm	1627, M. C. Z.	Cotypes.
Mexico: Gulf of California—											
Agua Verde Bay, Lower California.						Apr. 1, 1911		*Albatross*	1 y	60015	
Concepcion Bay, Lower California.								do	1♂ 1♀	17433	
Gulf of California						Apr. 29, 1888		do	25 y	22030	

[1] At surface.

PORTUNUS (PORTUNUS) ACUMINATUS (Stimpson)

Plate 19

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.

Neptunus acuminatus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 219 (after Stimpson).

Diagnosis.—Lateral spine nearly two-thirds as long as the antero-lateral margin. Cheliped 2½ times as long as carapace. Superior spine of manus at distal fifth in male.

Description.—Carapace 2½ times as broad as long. The sinuous branchial ridge bends gradually forward and inward from the base of the lateral spine. The median pair of teeth are subtriangular, the outer pair less so. Of the lateral teeth only the second and sixth teeth show any reduction; the lateral spine is very long, as long as the width of the next five teeth, its carina nearly transverse, bent a little forward. Chelipeds of moderate length, 2½ times as long as carapace; the spine of the carapace nearly reaches the terminal spine of the arm. Spines on inner margin of arm 4 right, 5 left. Inner spine of wrist subequal to proximal spine of palm; subterminal spine of palm at distal fifth of upper margin. Sternum and abdomen of male relatively smooth and polished, terminal segment of abdomen a little over two-thirds as long as sixth segment.

Measurements.—Male (40270), total length of carapace 26.7, width of same 65.4, width to anterior base of lateral spines 44.3, fronto-orbital width 20.8, width of front 6.5 mm.

Range.—Known only from Panama.

Material examined.—Panama Bay; lat. 8° 38′ 00″ N., long. 79° 31′ 30″ W., 16 fathoms; gn. M.; March 30, 1888; station 2802, *Albatross*; 1 male (40270).

Remarks.—Stimpson's type was a young male only half an inch (about 13 mm.) long; the lateral spine of the carapace was as long as or even longer than in the large specimen described above, "nearly two-thirds as long as the antero-lateral margin." The second, fourth, and sixth teeth were somewhat smaller than the others. The frontal teeth were equal; this is not true of our specimen, which though larger is not mature.

PORTUNUS (PORTUNUS) ASPER (A. Milne Edwards), new combination

Plate 20, Figures 2 and 3; Plate 21; Plate 22, Figures 1 and 2

Neptunus asper A. MILNE EDWARDS, Arch. Mus. Hist. Nat. Paris, vol. 10, 1861, p. 325, pl. 30, figs. 3–3c, male (type-locality, Chili; types in Paris Mus.); not *Neptunus xantusii* A. Milne Edwards, 1879.

Achelous transversus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 111 [21] (type-locality, Manzanillo, Mexico; type not extant).

Neptunus xantusii A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 213 (part), pl. 39, figs. 4–4c; Mazatlan.
Neptunus transversus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 220.
Portunus transversus RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 592.
Portunus (Portunus) transversus RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 577.

Diagnosis.—Densely pubescent. Lateral spine as long as the width of the next four teeth. Superior spine of manus at distal fourth (in female).

Description of female (22025).—The largest specimen is a mature female. Carapace 2⅛ times as broad as long; surface pubescent. The long branchial ridge similar to that of *acuminatus*, the next short ridge is formed by a broad band of coarse granules. The lobule at the inner angle of the branchial region is deeply defined. Both pairs of frontal teeth are triangular, deeply separated, similar, those of middle pair somewhat smaller and more advanced than those of outer pair. Of the lateral teeth the third is the widest, its outer margin somewhat angled; the lateral spine is of good length, as long as the width of the next four teeth, its carina is directed a little forward.

The cheliped (the right is missing) is not more that 2⅓ times as long as carapace and is rather heavy, merus armed on inner margin with 7 spines, the proximal one very small, distal interval doubly wide. Inner spine of wrist subequal to proximal spine of palm; subterminal spine of palm at distal fourth of upper margin. Sternum and abdomen pubescent.

Measurements.—Female (22025), total length of carapace 34.7, width of same 77.2, width to anterior base of lateral spines 56.2; fronto-orbital width 26.1, width of front 8.5 mm.

Additional material.—The specimen next in size, a female (3267), is broken but is about 59 mm. wide. All the marginal teeth and spines are relatively narrower than in the specimen above described; the lateral spine is as long as the width of the next three teeth and is strongly curved forward. The merus of the left cheliped (the right is missing) bears only 5 spines.

A female cotype in the Paris Museum was loaned for comparison through the courtesy of Doctor Gravier. The abdomen is mature in form but the size small: Total length of carapace 19.3, width of same 39.4, width between base of lateral spines 30.6, fronto-orbital width 16.2, width of front 5 mm. Outer pair of frontal teeth definitely larger than inner pair; lateral teeth corresponding to those described for female No. 22025; lateral spine as long as the width of the next 3½ teeth; merus of cheliped armed with five inner spines; the wrist and palm are like those of the large female described. It should be noted that the right natatory foot of the specimen does not pertain to it and was attached by mistake. (See plate 2.) It is larger

than the corresponding left leg, its articles are of different shape, the ischium being absent, and appears to belong to another species.

The smaller specimens in the United States National Museum, five in number, four male and one female, are immature with the exception of one male. They resemble one another in most respects but differ from female 22025 in having the frontal teeth less triangular, more oblong and with arcuate margins, the sinuses correspondingly narrower. There is some variation in length of lateral spines; the smallest specimen (male 22025) 12 mm. long having the longest, straightest, and most transverse spines, 4 mm. long, as long as the four adjacent teeth. The mature male (61332), length 24.7 mm. has the most curved spine, curvature intermediate between the two mature females, length of spine 6.6 mm., a little longer than the width of the three adjacent teeth; meral spines 6 left, 5 right, terminal segment of abdomen about three-fourths as long as sixth segment. The four immature specimens show only 4 spines on the arm.

Range.—Mazatlan and Manzanillo, Mexico; Panama; Chile.

Material examined.—

PANAMA.—Capt. J. M. Dow; 1 female (3267).

Island at end of breakwater, Panama Bay; February 5, 1912; Meek and Hildebrand; 2 males (1 young) (61332).

Panama Bay; March 30, 1888; *Albatross:* Lat. 8° 51′ 00″ N., long. 79° 31′ 30″ W.; 7 fathoms; gn. M.; station 2800; 1 young male, 1 female (22025). Lat. 8° 38′ 00″ N., long. 79° 31′ 30″ W.; 16 fathoms; gn. M.; station 2802; 1 young male, 1 young female (61333).

CHILE.—Coast of Chile; Fontaines collector; 1 female cotype (Paris Mus.).

PORTUNUS (PORTUNUS) PANAMENSIS (Stimpson)

Plate 20, Figure 1; Plate 22, Figure 3; Plates 23 and 24

Achelous panamensis STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 112 [22] (type-locality, Panama; type in M.C.Z.).

Amphitrite paucispinis LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 107 [13] (type-localities, Angeles Bay and Mulege Bay, both in the Gulf of California, and Magdalena Bay, west coast of Lower California; types not extant).

Neptunus panamensis A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 219.

Portunus panamensis RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 592.

Portunus (Portunus) acuminatus RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, pp. 538 and 577, pl. 49, fig. 4; not *Achelous acuminatus* Stimpson.

Portunus (Portunus) panamensis RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, pp. 577 and 610.

Diagnosis.—Lateral spine as long as two adjacent teeth and part of a third. Cheliped of male over 3 times as long as carapace. Superior spine of manus at distal sixth in male.

Description.—Covered with a very short pubescence. Carapace twice as broad as long and regardless of lateral spines is sensibly

narrower than the allied species and the antero-lateral border more arched. The branchial ridge runs obliquely forward from the lateral spine, then turns rather abruptly inward in an almost transverse direction, the line being a little concave forward. Frontal teeth small, triangular with blunt points, those of outer pair not much the larger, wider at base than those of the inner pair, and not quite so advanced. The second, fourth, and sixth lateral teeth are somewhat reduced. The lateral spine is about as long as the width of the next 2½ or 3 teeth, and curves a little forward. The margin of the carapace at the obtuse latero-posterior angles has a tendency to form a raised rim. Chelipeds very long, more than 3 times as long as carapace in male, more than 2½ times in female. Merus little enlarged, armed normally with 4 spaced spines (occasionally a fifth small one) on the anterior margin, and one very small spine at extremity of outer margin. Inner spine of wrist about twice as long as proximal spine of palm; outer spine of wrist much smaller than either. The male abdomen resembles that of *acuminatus*.

In this species the outer tooth of the orbit (first antero-lateral tooth) is wider than in *asper*, having a more decided angle on its outer margin; the intramedial area (that part of the gastric region behind the posterior of the gastric carinae) is shorter and broader than in *asper*, the intermediate of the gastric ridges is formed by a narrow irregular row of coarse granules instead of the band of coarse granules in *asper*.

Measurements.—Male (22023), total length of carapace 22.5, width of same 45, width from base of lateral spines 35.4, fronto-orbital width 17.7, width of front 5.6 mm.

Range.—From east and west coasts of Lower California, Mexico, to Peru. Chile (A. Milne Edwards).

Material examined.—

PANAMA.—Panama Bay; March 5, 1888; *Albatross:* Lat. 8° 10′ 30″ N., long. 78° 50′ 30″ W.; 18 fathoms; gy. S. brk. Sh.; station 2798; 1 female (22024). Lat. 8° 06′ 30″ N., long. 78° 51′ 00″ W.; 33 fathoms; gy. S. brk. Sh.; station 2797; 32 males, 11 females (22023, 25429).

Taboga Island; June, 1924; Elizabeth Deichmann; 1 male, 1 ovigerous female (61316).

Panama; March 15, 1860; A. Agassiz; 1 male (5271, M.C.Z.).

PERU.—Paita; October 7, 1926; W. L. Schmitt; 1 young (62486).

Bay of Sechura, W. of Matacaballa; 1907; R. E. Coker; gift of Peruvian Government: About 5 fathoms; April 8; 2 females (40440). 5–6 fathoms; April 10; 1 male (40439).

PORTUNUS (PORTUNUS) VOCANS (A. Milne Edwards), new combination

Plate 25

Neptunus vocans A. MILNE EDWARDS, Bull. Soc. Philom. Paris, ser. 7, vol. 2, 1878, p. 225 [6] (type-locality, Cape Verde Islands; type in Paris Mus.).—A. MILNE EDWARDS and BOUVIER, Expéd. Sci. *Travailleur* et *Talisman*, 1880–1883, Crust. Déc., part 1, 1900, p. 68, pl. 14, figs. 6–9.
Neptunus (*Amphitrite*) *vocans* MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 174.

Diagnosis.—Four large tubercles on gastric region. A slender spine at posterior angles of carapace; a stridulating ridge on lower surface. Chelipeds stout, ambulatory legs slender.

Description.—Carapace granulate and covered with a thin short pubescence. Four pointed granulate tubercles are arranged on the gastric region in a light transverse curve concave forward. Behind these a transverse line of fine granules interrupted on the median line; beyond the cervical suture the granules are coarser, the line slightly sinuous for half the width of the branchial region where it turns diagonally backward and outward across the middle of the lateral spine. On this line of granules there is at the branchial angle a low elevation surmounted by a small tubercle, behind which are two broad transverse low and well separated tubercles. Cardiac region with a transverse granulate ridge widely interrupted at middle. Front arcuate, four broad teeth, those of median pair narrower, rounder, and more advanced than the lateral; median sinus narrower than lateral. Preorbital tooth acute, little prominent. Antero-lateral teeth denticulate, increasing in length and sharpness from the first to the eighth,

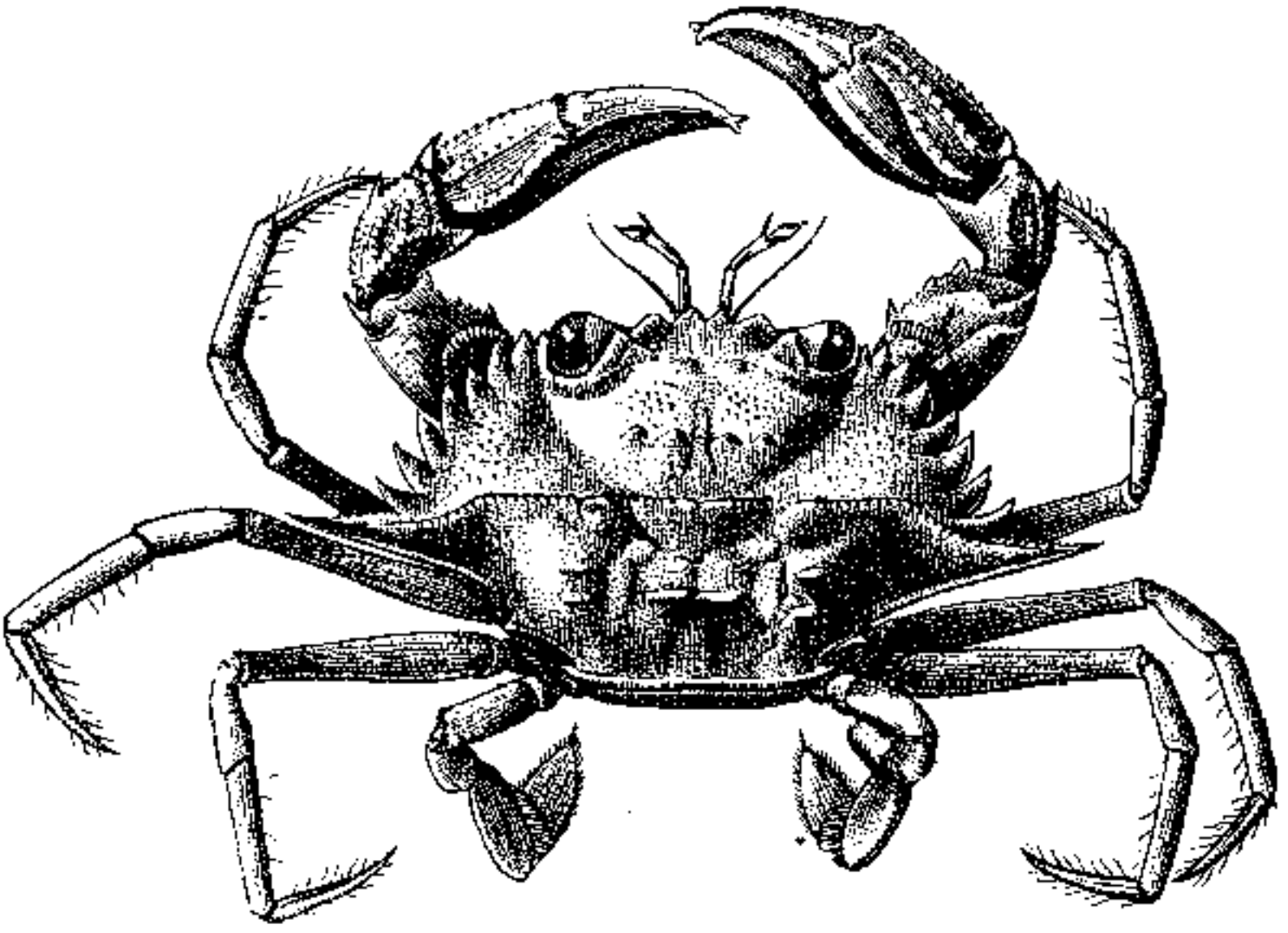

FIGURE 8.—PORTUNUS (PORTUNUS) VOCANS, MALE (6030). CARAPACE 23.5 MM. WIDE, DORSAL VIEW

eighth narrower than seventh, first and second equally advanced, first very small, on a higher level than the second and bent so as to form part of the orbital margin. Lateral spine long and narrow, directed outward and upward; 20 to 25 denticles on its anterior margin. Posterior angles of carapace with a slender curved spine directed upward, forward, and outward.

Superior fissures of orbit open, V-shaped, as are also the two outer fissures; one of these is in line with the second antero-lateral tooth, the other is below, in the customary place; on the intervening lobe a stridulating mechanism begins and continues to a point opposite the penult lateral sinus, gradually curving away from the margin; the striae are about 24 and become progressively shorter, the last being only a granule. Inner suborbital tooth large, concave below; next it a smaller tooth, followed by an oblique margin cut into 6 or 7 symmetrical denticles, situated so as to form a continuation of the stridulating apparatus.

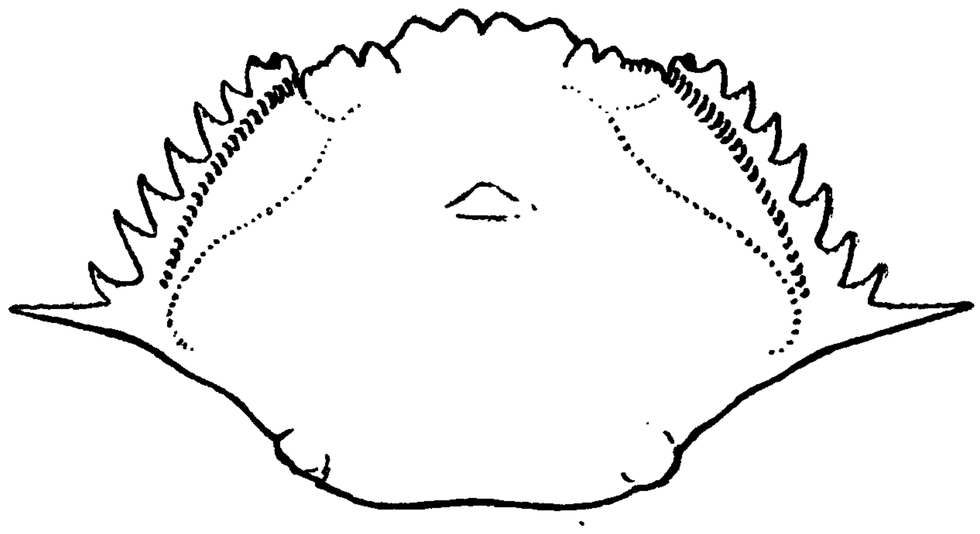

FIGURE 9.—PORTUNUS (PORTUNUS) VOCANS, MALE (6930), CARAPACE 23.5 MM. WIDE, VENTRAL VIEW TO SHOW STRIDULATING RIDGE

Chelipeds short and stout. Anterior margin of merus denticulate and with two spines and a tubercle, the proximal spine narrower and sharper than the other; a slender spine at postero-distal angle; the upper surface has a crescentic stridulating ridge halfway across its middle which plays against the ridge on the carapace. Carinae of carpus and manus prominent, denticulate; inner carpal spine large, outer small. Two spines on manus, the supero-subdistal one a little smaller than the prominent proximal one; 5 carinae on upper-outer surface; upper carina sinuous, overhanging inner surface. Fingers thick at base, the large tooth on each finger of the major chela strongly outstanding. Ambulatory legs long and very slender. Merus of swimming leg small, about three times as long as wide, slightly enlarged at middle, a slender spine at postero-distal angle; propodus and dactylus elongate, the latter with a terminal spine. Male abdomen after the third segment triangular, not constricted.

Measurements.—Male (6930), total length of carapace 11.8, width of same 23.5, width at anterior base of lateral spine 18, fronto-orbital width 10, width of front 4.4 mm. Holotype (carapace only) (Paris Mus.), length of carapace 22, width of same 43 mm. (A. Milne Edwards).

Range.—West Indies; east Atlantic (Cape Verde Islands); South Atlantic (Ascension Island).

Material examined.—See table, page 62.

Material examined of Portunus (Portunus) vocans

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Date	Station	Collector	Specimens	Catalogue No.
West Indies: Off Havana	° ′ ″ 23 10 48	° ′ ″ 82 19 15	121	fne. gy. Co.	Jan. 17, 1885	2330	*Albatross*	1 ♀	19867
Do	23 10 36	82 19 12	169	fne. wh. Co.	Jan. 19, 1885	2333	do	1 ♂	9506
Between Jamaica and Haiti	17 44 05	75 39 00	23	Co. brk. Sh.	Feb. 29, 1884	2138	do	1 ♂	6930
South Atlantic Ocean: Ascension Island.			20–30		Mar. 25, 1890		U. S. Eclipse expedition to Africa, Wm. Harvey Brown, naturalist.	2 y	19868

Subgenus ACHELOUS de Haan

Carapace narrow, the antero-lateral margin being the arc of a circle with short radius, whose center is near center of cardiac region. Last spine of antero-lateral margin usually not much if any larger than the others.

PORTUNUS (ACHELOUS) SPINIMANUS Latreille

Plates 26, 27 and 28

Cancer hastatus J. C. FABRICIUS, Entomologia Systematica emendata et aucta, vol. 2, 1793, p. 448, "in Americae Insulis"; not *C. hastatus* Linnaeus, 1767.

Portunus hastatus FABRICIUS, Supp. Entom. Systemat., 1798, p. 367; (a specimen in the Copenhagen Museum labeled "*Portunus hastatus*" may be a type).

? *Lupa banksii* LEACH, Trans. Linn. Soc. London, vol. 11, 1815, p. 319, according to White.[11]

Portunus spinimanus LATREILLE, Nouv. Dict. Hist. Nat., ed. 2, vol. 28, 1819, p. 47 (type-locality, American waters, common in Brazil; type not located); Encyc. Méth., Hist. Nat., Entom., vol. 10, 1825, p. 189; Cayenne, Brazil.

Lupa spinimana DESMAREST, Consid. Génér. Crust., 1825, p. 98; Brazil.

Portunus (*Achelous*) *spinimanus* DE HAAN, Fauna Japon., 1833, p. 8.—RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 276.

Lupea spinimana MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 452.

Achelous spinimanus WHITE, List Crust. Brit. Mus., 1847, p. 28.—A. MILNE EDWARDS, Arch. Mus. Hist. Nat., vol. 10, 1861, p. 341, pl. 32 (the locality "Chile" is incorrect, but the figures represent the Atlantic species); Crust. Rég. Mex., 1879, p. 230, pl. 39, figs. 2–2*a* (very young).

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[11] Doctor Calman, who was consulted on the validity of the name "*banksii*," wrote as follows: "Our evidence on the subject of *Lupa banksii* Leach is a little unsatisfactory. There is only one specimen [in the British Museum] which might be one of his types, but the evidence from our register is not quite conclusive that it is so. Leach says that there are 5 branchial spines on the chelipeds, in this specimen there are 5 on one side and 4 on the other. The specimen seems to be identical with others which we have identified as *Achelous spinimanus*, but I think it would be a little hazardous to venture on an alteration of names on the unsatisfactory evidence provided by this specimen."

Achelous spinimana KINGSLEY, Proc. Acad. Nat. Sci. Philadelphia, 1878, p. 320[5].
Achelous spinimanus smithii VERRILL,[12] Trans. Connecticut Acad. Sci.,vol. 13, 1908, p. 387, text-figs. 32 and 33, pl. 19, figs. 2, 2*a*; pl. 21, fig. 2 (type-locality, off Hatteras, *Albatross* station 2285; type not yet returned to United States National Museum.

Diagnosis.—Lateral teeth 1 to 8 subequal; lateral spine not much longer than teeth in adult; two spines on manus; superior outer surface of manus with a longitudinal, tuberculate ridge; posterior distal angle of merus of swimming legs armed with a spine.

Description of large specimen.—Surface covered with a short close pubescence except on the elevated portions; and on the anterior surface of the merus of the ambulatory legs and on the sternum where the pubescence forms a regular pattern with the bare spaces. Carapace about 1⅗ times as broad as long. Besides the customary ridges on gastric, cardiac and branchial regions, there is a curved ridge beginning behind the orbit and continued along the base of the third to sixth lateral teeth. The teeth of the front and of the bidentate inner orbital angle form a regular arch. Frontal teeth spiniform, the sinuses U-shaped, the median sinus just equal to or a little narrower than the lateral; the lateral sinus is about the same width as but shallower than the sinus on the inner side of the inner orbital tooth; the inner branch of this tooth is spiniform, the outer branch an acute tooth. The upper margin of the orbit has a prominent denticle on the inner side of the outer fissure. Outer orbital tooth equilateral, suborbital fissure V-shaped, a marginal lobule on either side of it; inner infraorbital tooth more advanced than the front. The second to eighth antero-lateral teeth shallow, sharp-pointed, ninth or lateral spine half again as long as the preceding.

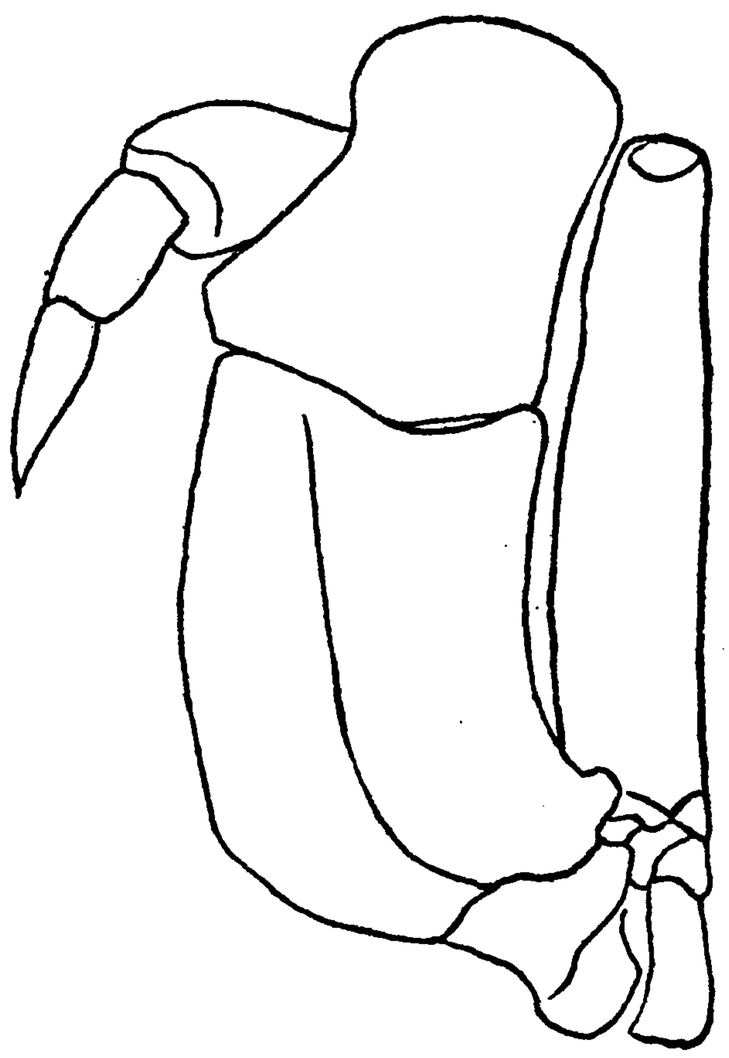

FIGURE 10.—PORTUNUS (ACHELOUS) SPINIMANUS, MALE (61277), OUTER MAXILLIPED, ×3

Chelipeds heavy; four or five strong teeth on inner margin of merus; a very small tooth at end of outer margin; inner spine of carpus equal to proximal spine of manus; outer spine of carpus small; one superior spine on manus situated at distal fourth. A very short blunt spine at posterior distal angle of merus of swimming leg, followed by a row of spinules on distal margin. Outer margin of male abdomen sinuous.

Age variation.—In the young (13 mm. long and under) the front is more advanced than in the old, the teeth are not spinous but lobiform

[12] Professor Verrill unfortunately compared his type material with the "très-jeune" figure of A. Milne Edwards, which is copied in the "Decapod Crustacea of Bermuda," with the caption "about ½ nat size."

Material examined of Portunus (Achelous) spinimanus

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			°F.						
New Jersey: Near Brandywine Lightship.			10			Oct. 19, 1929	55	H. G. Richards	1 ♂	62958	
Virginia:											
Chincoteague						July —, 1913		Henderson and Bartsch.	1 y	46304	
Off mouth of Chesapeake Bay.	37 10 00	75 08 00	18	S		Nov. 16, 1880	901	*Fish Hawk*	1 y	40274	
Smith Island						Dec. 24, 1888		Wm. Palmer	1 y. ♀	22329	
North Carolina:											
Off Cape Hatteras	35 35 20	74 58 45	27	crs. gy. S		Oct. 20, 1884	2296	*Albatross*	1 y	7251	
Do	35 23 00	75 24 30	9.75	S. brk. Sh		do	2290	do	1 ♂	17569	
Do	35 20 50	75 19 50	16	gy. S. brk. Sh		Oct. 19, 1884	2277	do	1 y	17570	
Bogue Sound						July 7, 1911		*Fish Hawk*	3 y	51098	
South Carolina:											
Charleston Harbor			7.8	stky	58	Mar. 13, 1891	1659	do	3 ♂ 2 ♀	17196	
Do						Mar. 14, 1891	4	do	1 ♂	17195	
Charleston						Sept. —, 1880		C. C. Leslie	1 ♂	3140	
Blackfish Bank, 12 miles off Charleston.			12			Mar. 8, 1880		R. E. Earll	1 ♂	5265	
Broad River								*Fish Hawk*	1 y	18208	
Calibogue Sound						1891		do	1 ♂	17197	
South Carolina									2	2452	
					°C.						
Georgia: 16 miles off Sapelo Island Lighthouse.			(1)		23	May 3, 1915	8259	*Fish Hawk* (E. Danglade).	1 y. ♂	61393	8 to 9 p. m.
Bahamas:											
Great Bahama Bank						1893		State Univ. Iowa Exped.	1 ♀	S. U. I	
Bahama Banks						May 15, 1893 May 17, 1893		do	1 ♂ 4 ♀ 1 y	do	
Florida:											
Cape Florida						Oct. 29, 1896		B. W. Evermann	1 y	22255	
Lignum Vitae Lake	¼ miles ESE. of Eagle Nest Key.			From sargassum.		Feb. 4, 1903	7456	*Fish Hawk*	1 y	61297	
Straits of Florida	24 24 30	81 33 30		bu. M		Dec. 4, 1919	20032	*Albatross*	3 ♂ 3 ♀	61389	
					°F.						
Off Sand Key	Sand Key, W., 8½ miles.		31		74.5	Dec. 18, 1912	7787	*Fish Hawk*	2 ♀	61390	

Off Key West	24 25 30	81 47 45	50			74	Jan. 15, 1885	2316	*Albatross*	3♀	9462	
Do	24 26 00	81 48 15	37	Co			do	2315	do	6♀	9458	
Do							Apr. 15, 1884 to Apr. 27, 1884		do	1♀ 2 y	18542	
Do							Apr. 12, 1889		*Grampus*	3♂	15248	
Do							Mar. 26, 1886		*Albatross*	1♀	15047	By electric light.
Do							Dec. —, 1883		D. S. Jordan	2♂	5786	
Do	In fish trap off Curry's dock.						July 29, 1924		Mills	1♂	61279	Gift of Carnegie Institution.
Do			(2)				June 26, 1893	46	State Univ. Iowa Exped.	1♀	S.U.I.	
Do	About 1 mile from light		5.25				do	44	do	1 y	do	
Do	Inside reef. E. Martello Tower to Key West Light, 36°00′; to Sand Key Light, 52°36′.		5.25	co. S. Grs		20 °C	Feb. 13, 1902	7277	*Fish Hawk*	1♀	61280	
West Channel entrance to Key West.	Midchannel buoy, W. by S. ¼ S., ½ mile.		7.75	co. S		20	do	7271	do	1♀	61284	
Do	Beacon 2 to Sand Key Light, 48°20′; to Key West Light, 77°07′.		7.25	co. S. brk. Sh		20.2	do	7272	do	1♂	61289	
Northwest Passage to Key West.	5 miles off breakwater		6.5						J. B. Henderson	1♀	61286	
Tortugas			4						do	1 y	61290	
Do	From floating gulf weed						July 31, 1926		C. R. Shoemaker	2 y	62481	
Do							1893		State Univ Iowa Exped.	2♂ 2♀	S.U.I.	
Do			(3)				1893		do	1 y	do	
1½ miles north of Loggerhead Key.	tomach of fish No. 249, yellow goat fish, *Upeneus martinicus* Cuv. and Val.						June 9, 1925		W. L. Schmitt	1 y	61293	Gift of Carnegie Institution.
Off north end of Loggerhead Key.	From conch shell						Aug. 10, 1924		do	1♂ 1♀ (Soft shell.)	61283	Do.
Cove at north end of Loggerhead Key.			Seined.				Aug. 21, 1924		do	1♂ y	61394	Gift of Carnegie Institution. Color note.
Loggerhead Key			(4)				July 15, 1924		do	1♀	61285	Gift of Carnegie Institution.
East of Loggerhead Key			5				June 11, 1925	213	do	1 y 1 arm	62482	Do.
About 11 miles Southwest of Loggerhead No. 10 buoy.			30	dk. bk. and gy. crs. co. S.			July 23, 1924	47	do	1 y	61296	Gift of Carnegie Institution. Color note.
West side Loggerhead Key.	Off laboratory dock			Sargassum			1924		W. L. Schmitt (Bender coll.).	1 y. Soft shell.)	62483	Gift of Carnegie Institution.
At head of White Shoal, Tortugas.	Stomach of fish No. 454, gray snapper, *Neomaenis griseus* (L.)						June 20, 1925		W. L. Schmitt	1 cheliped	61294	Do.

[1] Surface. [2] Shallow water. [3] Gulf weed. [4] Beach under sargassum.

Material examined of Portunus (Achelous) spinimanus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued.	° ′ ″	° ′ ″			°C.						
South of White Shoal						July 19, 1924	26	W. L. Schmitt	1 very young	62484	Gift of Carnegie Institution.
Near Fort Jefferson landing, Garden Key.	From bunch of dead eel grass between pipes					Aug. 17, 1924		do	1 y	61295	Do.
South Florida								Silas Stearns	1♂	5260	
Off Cape Sable	25 07 05	81 25 50	4.5	gy. S	23	Dec. 18, 1902	7360	*Fish Hawk*	1♀	61281	
			Feet								
2 miles west of Cape Romano.			15–18					Lieut. J. F. Moser, U. S. Navy.	1♂	13052	
Marco								H. Hemphill	5♂	17929	
Gordon's Pass						Feb. 27, 1889		*Grampus*	1♂	15249	
Sanibel Island						Feb. 22, 1928		O. C. Van Hyning	1♂	Fla. State Mus.	
Anchorage, St. James City			Surface.			Dec. 31, 1912		*Fish Hawk*	1 y.♂	61392	5.15 to 6.45 p. m.
			Fathoms								
Off Gasparilla Island	Gasparilla Light, E. by S., 6¼ miles.		7	hrd. S. brk. Sh.		Jan. 4, 1912	7799	do	1 y	61391	
Sarasota Bay								H. Hemphill	1 y	17930	
Tampa Bay			3.5–6.5		20.4–20.7	Mar. 29, 1901	7109–7112	*Fish Hawk*	2♂	25580	
Just outside Tampa Bay						1901		do	2♂	25582	
Goodland Point								H. Hemphill	1 y	17931	
Anclote section	28 08 00	83 04 30	7.75	rky. grsy	13.5	Jan. 23, 1902	7230	*Fish Hawk*	1 y	61288	
North Key section	29 08 45	83 14 45	3	sdy	14.2	Nov. 27, 1901	7179	do	1 y	61292	
Pepperfish Key section	29 08 45	83 28 00	6.25	S. G	16	do	7170	do	1 y	61287	
Pensacola						July —, 1893.		J. E. Benedict	3♂ 2 y	17921	
West Florida								Henderson and Simpson.	1 y	17932	
Dollar Harbor								J. B. Henderson	1♂	45715	
Texas:											
Alligator Head, Matagorda Bay.								J. D. Mitchell	1♂	22815	
Pass Cabello			(5)					do	2 y	20594	
Jamaica:											
Jamaica								J. E. Duerden	Specimens returned to sender.		
Do								T. H. Morgan	1♂ 1♀	17218	
Do						1884		*Albatross*	1♂ 1♀	18276	
Do								C. R. Orcutt	2 chelipeds	62485	

Dominican Republic: Boca del Infierno, Samana Bay.						Feb. —, 1928		Gerrit S. Miller	2 y	61885	
Porto Rico:											
Mayaguez						Jan. 20, 1899		*Fish Hawk*	1♂	24485	
Mayaguez Harbor	Customhouse, E. by S., 2 miles.		7	stky. M	27	Jan. 19, 1899	6059	do	2♂ 3♀	24488	
Boqueron Bay						Jan. 25, 1899		do	1♂ 2♀	24486	
Puerto Real						Jan. 26, 1899		do	1♂	24487	
. Thomas:											
St. Thomas								A. H. Riise	1♂	2454	
Do						Jan. 17, 1884 to Jan. 24, 1884		*Albatross*	1♀	7649	
Buck Island						July 30, 1915		C. R. Shoemaker	3♂ 1 ovig. ♀	54316	
. Martin Island:											
Bay of Philipsburg						Aug. —, 1905		Doctor Shaw (for J. Boeke).	1♂	Returned to J. Boeke.	
Simsons Bay Lagoon			.5			Sept. —, 1905		J. Boeke	1♂	42966	
orth coast of South America:											
Paarden Bay, Aruba (lagoon).			(2)	sdy		June 15, 1905		do	1♂ large	Returned to J. Boeke.	
Off Trinidad	10 37 00 to 10 37 40	61 42 40 to 61 44 22		dk. slate-col. M.	°F. 73	Feb. 3, 1884		*Albatross*	1♀	18543	Frontal sinuses shallow.
azil:											
Plataforma, Bahia						1876–1877		R. Rathbun, Hartt explorations	1♀ ovig	40580	
									1♂ 1♀	40581	
Rio de Janeiro						do		do	1 ♂	40579	
Bay of Rio de Janeiro			3–4			do		do	1 y	19970	
Villa Bella, Ilha São Sebastião, São Paulo			Beach.			Sept. 23, 1925		W. L. Schmitt	3♂ 3♀	61278	
Do								H. Luederwaldt	6♂ 8♀	61277	
Barro, Santos			(6)			Sept. 12, 1925		W. L. Schmitt	2♂	61282	
Bahia Guanavara, Santa Catharina.						1923		C. Fernetz	3♂ 1♀ 4 y	------	Lent by Buenos Aires Museum.
ocality not given									1	Copenhagen Mus.	Labeled "*Portunus hastatus*," perhaps by Fabricius.

[2] Shallow water.

[5] On floating seaweed.

[6] In seine.

and broadly rounded at the end, the median sinus is very narrow; the superior inner and outer teeth of the orbit are subacute; the antero-lateral teeth are relatively longer and more outstanding; the lateral spine is more than twice as long as the adjacent tooth; the inner spine of the carpus is rather longer than the neighboring spine of the manus; the spine on the merus of the last leg is sharp and distinct. This form gradually changes to that of the adult and full grown.

Color.—Pubescence light yellowish, ridges russet. Lateral teeth reddish at base, white at tips. Fingers whitish, extremity red. (Desmarest.)

Young specimen white with a very faint tinge of vinaceous buff; another had a longitudinal median area of slate-color on the carapace. (Schmitt.)

Measurements.—Male (61277) total length of carapace 51.7, width of same 85.6, width at anterior base of lateral spine 77.7, fronto-orbital width 37.8, width of front 12 mm. Male (S. U. I.) from Bahama Banks, total length 58, width 95, length of cheliped 200 mm. A. Milne Edwards records a male with carapace 60 by 100 mm.

Range.—New Jersey to State of Santa Catharina, Brazil. Bermuda (rare).

Material examined.—See table, pages 64–67.

PORTUNUS (ACHELOUS) BREVIMANUS (Faxon)

Plates 29 and 30

Achelous spinimanus Faxon, Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 23; not *Portunus spinimanus* Latreille.

Achelous brevimanus Faxon, Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 23 (type-locality, near Cocos Island, 66 fathoms, station 3368, *Albatross;* 1 male cotype, Cat. No. 20608, U.S.N.M., and 1 male cotype in M. C. Z.).

Portunus (*Achelous*) *brevimanus* Rathbun, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 593; vol. 38, 1910, p. 578 (part; not the Galapagos specimens).

Diagnosis.—Branchial ridge subparallel to lateral margin as far as the line of the anterior margin of the sixth lateral tooth where it turns inward. Inner spine of wrist reaching about half way to the proximal spine of the upper manus. Two spines at postero-distal angle of merus of swimming leg.

Description.—The Pacific analogue of *P. spinimanus*, from which it differs in being less pubescent, surface more uneven, the long branchial ridge more strongly arched forward, the two short branchial ridges more oblique, median lobe of superior orbital margin more advanced at outer angle, inner spine of wrist longer; merus of swimming legs also longer and armed with two spines at the postero-distal angle.

Measurements.—Male cotype (20608), total length of carapace 44.5, width of same 74, width at anterior base of lateral spine 63.8, fronto-orbital width 30.4, width of front 9.7 mm.

Range.—Revilla Gigedo Islands, Mexico, and Cocos Island, Central America.

Material examined.—San Benedicto Island, Revilla Gigedo Islands; A. W. Anthony; 3 males, 2 females (20696).

Off Cocos Island; lat. 5° 32′ 45″ N., long. 86° 54′ 30″ W.; 66 fathoms; rky.; temperature 58.4° F.; February 28, 1880; station 3368, *Albatross;* 1 male cotype (20608), 1 male cotype (4488, M. C. Z.).

PORTUNUS (ACHELOUS) STANFORDI Rathbun

Plate 31

Portunus (*Achelous*) *brevimanus* RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 593; vol. 38, 1910, p. 578 (part; the Galapagos specimens).

Portunus (*Achelous*) *stanfordi* RATHBUN, Proc. Washington Acad. Sci., vol. 4, 1902, p. 282, pl. 12, fig. 11 (type-locality, Tagus Cove, Albemarle Island; type, Cat. No. 24833, U. S.N.M.).

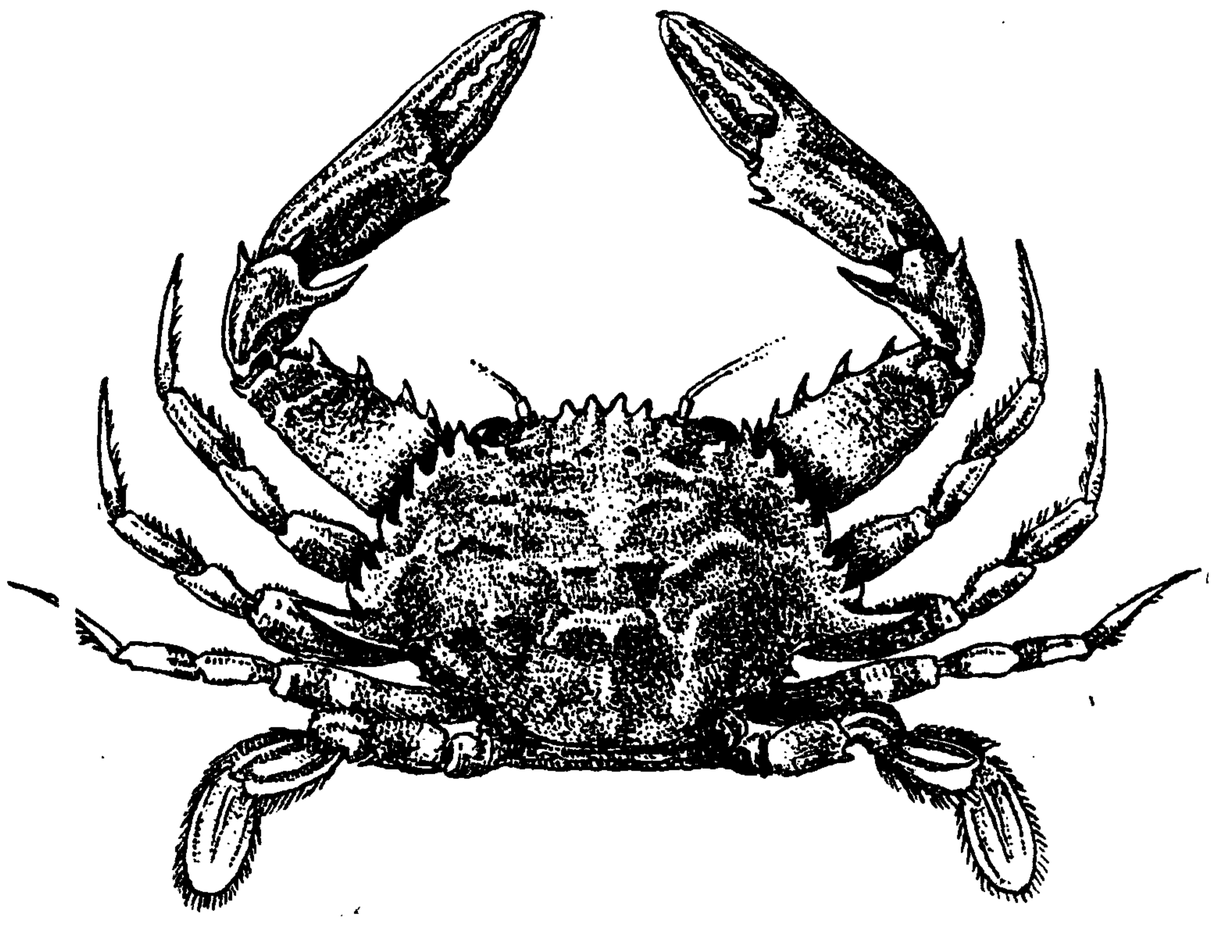

FIGURE 11.—PORTUNUS (ACHELOUS) STANFORDI, MALE, TYPE, DORSAL VIEW, × 1.5

Diagnosis.—Carapace lumpy in the middle. Five inner arm spines. No terminal spine on manus. A spine at postero-distal angle of merus of last leg.

Description.—Near *brevimanus*, with which it is easily confused when of good size. The configuration of front, orbits and antero-lateral teeth is similar, but the lateral spine is transverse, scarcely curved forward. Pubescence of carapace shorter and more fugitive, postero-median area more lumpy, with three large bosses in a triangle at inner angle of branchial region, and on the cardiac region two bosses and in the very young a third, median. Arms with five spines, sometimes six, on inner margin and one at extremity of outer margin. Inner spine of carpus longer than any other cheliped spine but about half as long as the same spine in *brevimanus*. Manus without terminal spine above, subterminal spine near the extremity, about at the distal fifth; carina below the superior carina less parallel to the latter than in *brevimanus*, approaching nearer the top in the proximal half. Merus of swimming leg half again as long as broad, a single spine at postero-distal angle. Terminal segment of male abdomen narrower than in the allied species.

Measurements.—Male (22032), total length of carapace 29, width of same 48, width to anterior base of lateral spine 40.7, fronto-orbital width 20, width of front 6.2 mm.

Range.—Galapagos Islands.

Material examined.—Reef N. of Tagus Hill, Tagus Cove, Albemarle Island; March 16, 1889; Stanford Galapagos Expedition; 1 male holotype, 1 young (24833), 1 male, 2 young (Stanford Univ.).

1888; *Albatross:* Albemarle Island; April 10; 1 young female (22033). April 7; off Hood Island: Lat. 1° 21′ 30″ S., long. 89° 39′ 45″ W.; 20 fathoms; co. S.; station 2812; 1 young male (22031). Lat. 1° 21′ 00″ S., long. 89° 40′ 15″ W.; 40 fathoms; co. S.; station 2813; 5 males, 8 females (22032).

PORTUNUS (ACHELOUS) ANGUSTUS Rathbun

Plate 32

Portunus (*Achelous*) *angustus* RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 594, pl. 44, fig. 2 (type-locality, off Hood Island, Galapagos, 20 fathoms' station 2812, *Albatross;* type, Cat. No. 21587, U.S.N.M.); Proc. Washington Acad. Sci., vol. 4, 1902, p. 282.

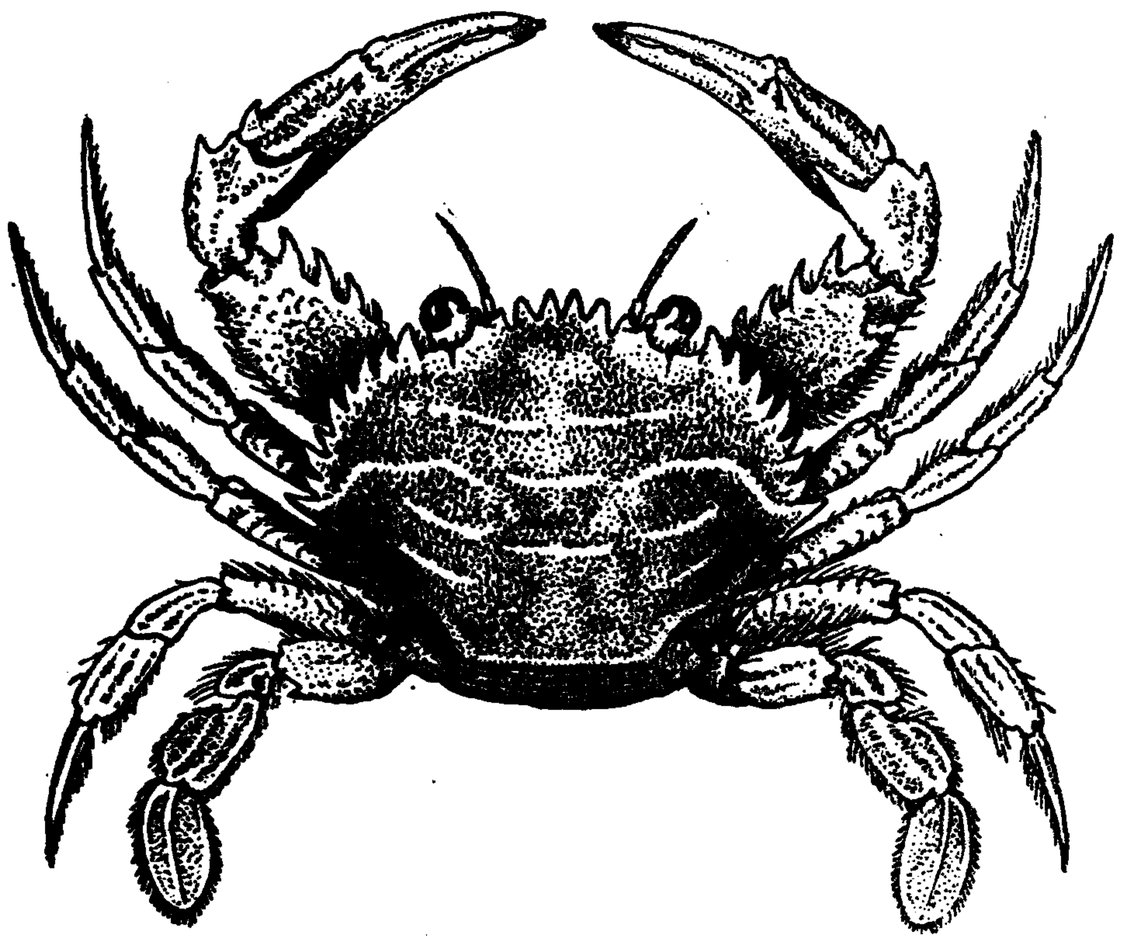

FIGURE 12.—PORTUNUS (ACHELOUS) ANGUSTUS, FEMALE, HOLOTYPE, CARAPACE 37.2 MM. WIDE, DORSAL VIEW

Diagnosis.—Antero-lateral teeth very unequal, four small ones, lateral tooth very short. One spine at postero-distal angle of merus of swimming feet.

Description.—Closely related to *P.* (*A.*) *brevimanus.* Carapace narrower, branchial ridges stronger, front more advanced, outer teeth broader at base than inner teeth from which they are separated by sinuses wider than the median sinus. Antero-lateral teeth alternately large and small, the second, fourth, sixth, and eighth teeth distinctly smaller than the others, as in *Cronius*, the ninth or lateral tooth or spine very little longer than the seventh. Inner suborbital tooth equally advanced with the second pair of frontal teeth. Outer spine of wrist smaller than in *brevimanus.* Merus of natatory feet more than half again as long as wide; postero-distal angle armed with a sharp spine. This is true of the two young specimens (25671) and of the left merus of the type female; the right merus of the type shows the base of a spine which has been broken and formed two small denticles.

Measurements.—Female holotype, total length of carapace 25.5, width of same 37.2, width to anterior base of lateral spine 33.5, fronto-orbital width 21, width of front 7.2 mm.

Range.—Galapagos Islands.

Material examined.—Reef N. of Tagus Nill, Tagus Cove, Albemarle Island; March 16, 1899; Stanford University Expedition; 2 young (Stanford Univ.), 2 young (25671).

Tagus Cove; 12 fathoms; 1899; 1 young (Stanford Univ.).

Off Hood Island; lat. 1° 21′ 30″ S., long. 89° 39′ 45″ W.; 20 fathoms; co. S.; April 7, 1888; station 2812, *Albatross;* 1 female holotype (21587).

PORTUNUS (ACHELOUS) ORDWAYI (Stimpson)

Plate 33

Achelous ordwayi STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 224 [96] (type-localities, Key Biscayne and Tortugas, Florida, and St. Thomas; types not extant).

Neptunus cruentatus A. MILNE EDWARDS, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 326, pl. 31, figs. 2, 2*a* (type-locality, Antilles; type in Paris Mus.).

Neptunus ordwayi A. MILNE EDWARDS, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 430; Crust. Rég. Mex., 1879, p. 217, pl. 40, figs. 2–2*b*.

Portunus aurimanus FORNS in Gundlach and Torralbas, An. Acad. Cien. Habana, vol. 37, 1900, p. 63 (type-locality, Cuba; type in Acad. Cien. Habana).

Portunus (*Achelous*) *ordwayi* RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 46.

Diagnosis.—Chelipeds fringed with hair above. Upper outer surface of palm smooth, iridescent. Postero-distal margin of merus of swimming legs spinulous. Lateral spine of carapace in male twice as long as adjacent tooth.

Description.—Carapace narrow, covered with a short pubescence, and with granulation on raised portions and near lateral and anterior borders. Front prominent, the four teeth similar, narrow, subtriangular, acute or nearly so, the inner pair distinctly more advanced than outer pair. Inner orbital tooth with a sharp spiniform tip, separated from the front by a wide and very deep sinus, and having a slight hump but not an accessory denticle on its outer margin. Orbits and eyes large. Antero-lateral teeth a little longer than wide, spine-pointed, the first six directed forward, the others obliquely outward. Lateral spine narrow, curved forward, length in adults twice or a little more than twice as long as the adjacent tooth. Postero-lateral border near the spine almost transverse. Epistomial spine not developed.

Chelipeds short, a little more than twice as long as carapace, merus and manus both enlarged at middle; a small curved spine at distal end of outer margin of merus and a row of four spines on inner margin. The carpus is armed outside with a very small spine, and inside with a long spine reaching halfway to the manus spine, which is at the distal third (in the largest) or fourth of the upper margin or the widest part of the hand. The upper half of the outer face of the palm is smooth, shining and iridescent, widest at its middle. Inner margin of merus, distal margin of carpus and upper margin of manus and dactylus with a fringe of long hair. Merus of swimming legs a little longer than wide, its postero-distal margin spinulous.

Material examined of Portunus (Achelous) ordwayi

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			°C.						
North Carolina: Between Capes Hatteras and Lookout.	34 35 30	75 45 30	32	wh. S. bk. Sp.	-----	Oct. 18, 1885	2605	*Albatross*	2♂ 3♀ 2 y	11208	
Bahamas:											
Spanish Wells, Eleuthera Island.	-----	-----	-----	-----	-----	July 4, 1903	-----	B. A. Bean, for Geogr. Soc., Baltimore.	1♂	31048	
Green Cay	-----	-----	-----	-----	-----	June 30, 1903	-----	do	1♂	31049	In oyster dredge.
Bahama Banks	-----	-----	-----	-----	-----	May 18, 1893	-----	State Univ. Iowa Expd.	1 y	Mus. S.U.I.	
Florida:											
Off Miami	-----	-----	30	-----	-----	-----	-----	John B. Henderson	1y	61187	
Off Miami in Gulf stream	-----	-----	25	-----	-----	1915	-----	do	1♂	61174	
			Feet								
Off Biscayne Key	-----	-----	16–34	-----	-----	May 29, 1912	-----	Paul Bartsch	1 y	61185	
Cape Florida	-----	-----	-----	-----	-----	1859	-----	George Wurdemann.	3♂ 3♀	5272, M.C.Z.	
Metacumbe Key	-----	-----	(1)	Grs	-----	1885	-----	Henry Hemphill	1	14977	
Bahia Honda Key	-----	-----	(2)	S	-----	-----	-----	do	1♂	14090	
Inside Sombrero	-----	-----	-----	-----	-----	-----	-----	William Stimpson	2	3051, M.C.Z.	
			Fathoms								
Hawk Channel	4¼ miles W. by N. of Elbow Reef Beacon.		2.75	barry; S	20.5	Feb. 19, 1903	7467	*Fish Hawk*	1 y	61190	
Do	½ mile SE. by S. of SE. end of Duck Key.		2.25	rky	24.5	Jan. 27, 1903	7429	do	1 y	61189	
					°F.						
Off Duck Key	Duck Key, N., 1.25 miles.		2.75	Co. Sh.	69.5	Dec. 20, 1912	7790	do	2♂ 1 y	61179	
Off Key West, inside the reef.	Key West Light to E. Channel Bar Buoy, 71° 53′; to Beacon A, 74° 46′.		5.25	co. S. Grs	-----	Feb. 13, 1902	7278	do	1♂ 1♀	61178	
					°C.						
Do	E. Martello Tower to Key West Light, 36° 00′; to Sand Key Light, 52° 36′.		5.25	co. S. Grs	20	do	7277	do	2 y	61188	
West side Key West	-----	-----	25	-----	-----	-----	-----	*Eolis* (John B. Henderson).	1 ♀	62480	
Tortugas, in gulf weed	-----	-----	-----	-----	-----	June 13, 1893	-----	State Univ. Iowa Exped.	1 y	Mus. S.U.I.	

Tortugas		4					John B. Henderson	5 y	61186	
Do							W. L. Schmitt	1 ♀	61191	Gift of Carnegie Institution.
Off west side Fort Jefferson, Garden Key.	Between beach to south and moat entrance.				Aug. 19, 1924		do	1 ♂	61181	Do.
		Feet								
East side Bird Key Harbor.		10			Aug. 8, 1924		do	2 y	61196	Do.
¼ mile south of Bird Key Harbor.	Stomach of fish No. 491, gray snapper, *Neomaenis griseus* (L.).				June 21, 1925		do	3 ♀	61175	Do.
Do	Stomach of fish No. 504, gray snapper, *Neomaenis griseus* (L.)				do		do	1 ♀	61176	Do.
White Shoals, Tortugas					July 19, 1924	22	do	1 ♂	61198	Do.
Do					July 20, 1924	35, 36	do	1 y	61199	Do.
At head of White Shoals	Stomach of fish No. 455, gray snapper, *Neomaenis griseus* (L.).				June 20, 1925		do	1	61206	Do.
Rocks East side Loggerhead Key.					July 28, 1924		do	1 ♀	61195	Do.
		Fathoms								
South of Channel Buoy, Loggerhead Key.		20			Aug. 16, 1924	2	do	3 y	61182	Do.
About 11 miles south west of Loggerhead No. 10 buoy.		30	dk. bk. and gy. crs. co. S.		July 23, 1924	47	do	1 ♂ 1 ♀	61177	Do.
North side Loggerhead Bank.					July 16, 1924		W. R. Taylor	1 y	61194	Do.
1½ miles north of Loggerhead Key.	Stomach of fish No. 301, gray snapper, *Neomaenis griseus* (L.).				June 13, 1925		W. L. Schmitt	2	61204	Do.
Do	Stomach of fish No. 345, gray snapper, *Neomaenis griseus* (L.).				do		do	1 ♂	61205	Do.
Off north end of Loggerhead Key.	Stomach of fish No. 198, schoolmaster (yellow snapper) *Neomaenis apodus* (Walbaum).				June 9, 1925		do	1 ♂	61202	Do.
Do	Stomach of fish No. 217, gray snapper, *Neomaenis griseus* (L.).				do		do	1 ♀	61184	Do.
Do	Stomach of fish No. 249, yellow goat fish, *Upeneus martinicus* Cuv. and Val.				do		do	3 chelipeds of young.	61203	Do.
7 miles south of No. 2 buoy, Tortugas.		[3]20			July 22, 1924	40	do	1 y	61197	Do.
6 miles south of No. 2 buoy, Tortugas.		18			do	44	do	2 ♂ 1 ♀	61180	Do.

[1] Below low tide.

[2] Between tides.

[3] About.

Material examined of Portunus (Achelous) ordwayi—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued.	° ′ ″	° ′ ″									
4–5 miles south of No. 2 buoy, Tortugas.			340	S.		July 22, 1924	38	W. L. Schmitt	3 y	61192	Gift of Carnegie Institution.
Between south and southeast of Southwest Channel buoy, Tortugas.			25			Aug. 16, 1924	8	do	1 ♂	61183	Do.
South of Southwest Channel buoy, Tortugas.						do	7	do	1 y	61193	Do.
Outer Tortugas reef	Stomach of fish No. 45, yellow grunt, *Haemulon sciurus* (Shaw).					June 5, 1925		do	Fragments of 1.	61201	Do.
Do	Stomach of fish No. 46, yellow grunt, *Haemulon sciurus* (Shaw).					do		do	do	61200	Do.
Southwest of Sanibel Island.	26 18 30	83 08 45	27	fne. gy. S. bk. Sp. brk. Sh.		Mar. 19, 1885	2412	*Albatross*	1 ♀ 1 y	15048	
Do	26 19 00	83 11 00	27	S. algae	°F. 68	Mar. 21, 1889	5108	*Grampus*	1 y	15251	
Captiva Key, Charlotte Harbor.						1859		George Wurdemann	1 ♀ ovig., 2 y	5273, M.C.Z.	
Pensacola	Stomach of fish					1882		Silas Stearns	1 ♂	4605	
Mexico:											
Off Cape Catoche, Yucatan.	Stomach of fish 22 07 30	87 06 00	21	wh. R. Co.		Jan. 30, 1885	2363	*Albatross*	1 ♂	9575	
Off Cozumel Island, Yucatan.			(4)			Jan. 29, 1885		do	1	13935	
Caribbean Sea: Old Providence Island.			(5)					do	1 ♂ 1 ♀ 2 y	9128	By electric light.
Cuba:											
Cape San Antonio						1884		*Albatross* (W. Nye, jr.).	3 ♂ 3 ♀	7837	
Ensenada de Cajon, off Cape San Antonio.						May 22, 1914 May 23, 1914		Henderson and Bartsch, *Tomas Barrera* Exped.	2 y	49181	
Santa Lucia Bay, about ship's anchorage.			2-3			May 13, 1914	4	do	1 y	49175	
Dimas Bay				M. plants		May 17, 1914	5	do	2 y	49173	
Ensenada de Santa Rosa						May 19, 1914	7	do	1 y	49183	
On reef Lavesos Italienos			2-3	Co. S. R.		June 2, 1914	14	do	1 y	49174	

Jamaica:											
Salt Pond, Montego Bay						Aug. 1, 1910		E. A. Andrews	1 y	42869	
Montego Bay			40			Aug. 4, 1910		C. B. Wilson	1 y	42859	Dredged.
Porto Rico:											
Mayaguez			(4)			Jan. 19, 1899		*Fish Hawk*	1 ♀	24491	
Do						Jan. 20, 1899		do	1 y	24492	
					°C.						
Off Culebra Island	Pt. Mula Lighthouse, SW. ½ S., 8½ miles.		14.75	Co. S	25.5	Feb. 8, 1899	6086	do	4 y	24493	
Off Vieques Island	Culebrita lighthouse, NE. ⅜ E., 7¼ miles.		16	Co	25.2	Feb. 10, 1899	6092	do	1 y	24494	
Off Humacao	Humacao, N. ½ W., 3 miles.		12.5	Co	26.4	Feb. 14, 1899	6098	do	1 y	24495	
St. Thomas						Jan. 17, 1884 to Jan. 24, 1884		*Albatross*	1 y	18565	
Do								*Hassler* Exped	1 ♂ 1 ♀	5274, M.C.Z.	
St. Eustatius, west of Oranjestad.			4	sdy		Aug. 17, 1905		J. Boeke	1 s. ♂	Leiden Mus.	
Saba Bank			21			1878–79	144	U.S.C.S. Str. *Blake*	1 y	2574, M.C.Z.	
Dominica:											
Roseau			15					A. H. Verrill	1 ♀	32513	
Roseau Harbor			10					do	1 ♀	32716	
Brazil: Abrolhos Islands						Dec. 27, 1887		*Albatross*	3 ♂ 1 ♀	22034	
Bermuda								F. V. Hamlin	1 ♂ 1 ♀	4025	From Wesleyan University.

[3] About. [4] In seine. [5] Surface.

Material examined of Portunus (Achelous) pichilinquei

Locality	Bearings: Latitude N.			Bearings: Longitude W.			Fathoms	Bottoms	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Mexico															
Gulf of California:	°		″	°	′	″			°F.						
Off Cape Tepoca	30	37	30	113	07	00	7	gy. S. bk. Sp		Mar. 24, 1889	3020	*Albatross*	1 ♂ 1 ♀	17440	
San Luis Gonzales Bay, Lower California										Mar. 27, 1889		do	1 ♀	17432	
Southeast of Tiburon Island	28	28	00	112	04	30	29	gy. S	62.9	Mar. 23, 1889	3014	do	3 ♀	61248	
Off San Pedro Martir Island	28	23	45	111	58	00	14	gy. S. brk. Sh	65	do	3013	do	1 ♀	17439	
Pichilinque Bay, Lower California										Apr. 18, 1911		do	6 ♂ 1 ♀ ovig	60011	Types.
West coast of Lower California: Magdalena Bay	24	38	00	112	05	30	17	fne. gy. S	65	Apr. 9, 1888	3042	do	1 ♂	17442	

Color.—Pale reddish or brownish, mottled; gastric region usually deep crimson. (Stimpson.) Backs mottled with coral red, madder brown and rufous; legs banded, paddles transparent olive yellow; bands on fingers almost maroon; (61177). Another Tortugas specimen (61181) was darker, of a brownish-reddish color; carapace and chelipeds a grayish chestnut, with French gray caste in spots and ecru drab tinges and spots; ambulatory legs more tawny, articles of paddles transparent faint ocher yellow with ochraceous margins; fingers distally tawny with a white band, then a band of burnt carmine, largely crimson; median fifth white, basal two-fifths burnt carmine and crimson; spines of cheliped mostly white with a faint ring of burnt carmine near base and another near tip. (Schmitt.)

Measurements.—Female (7837), total length of carapace 33.3, width of same 47, width at anterior base of lateral spine 41.6, fronto-orbital width 26.5, width of front 8.6 mm.

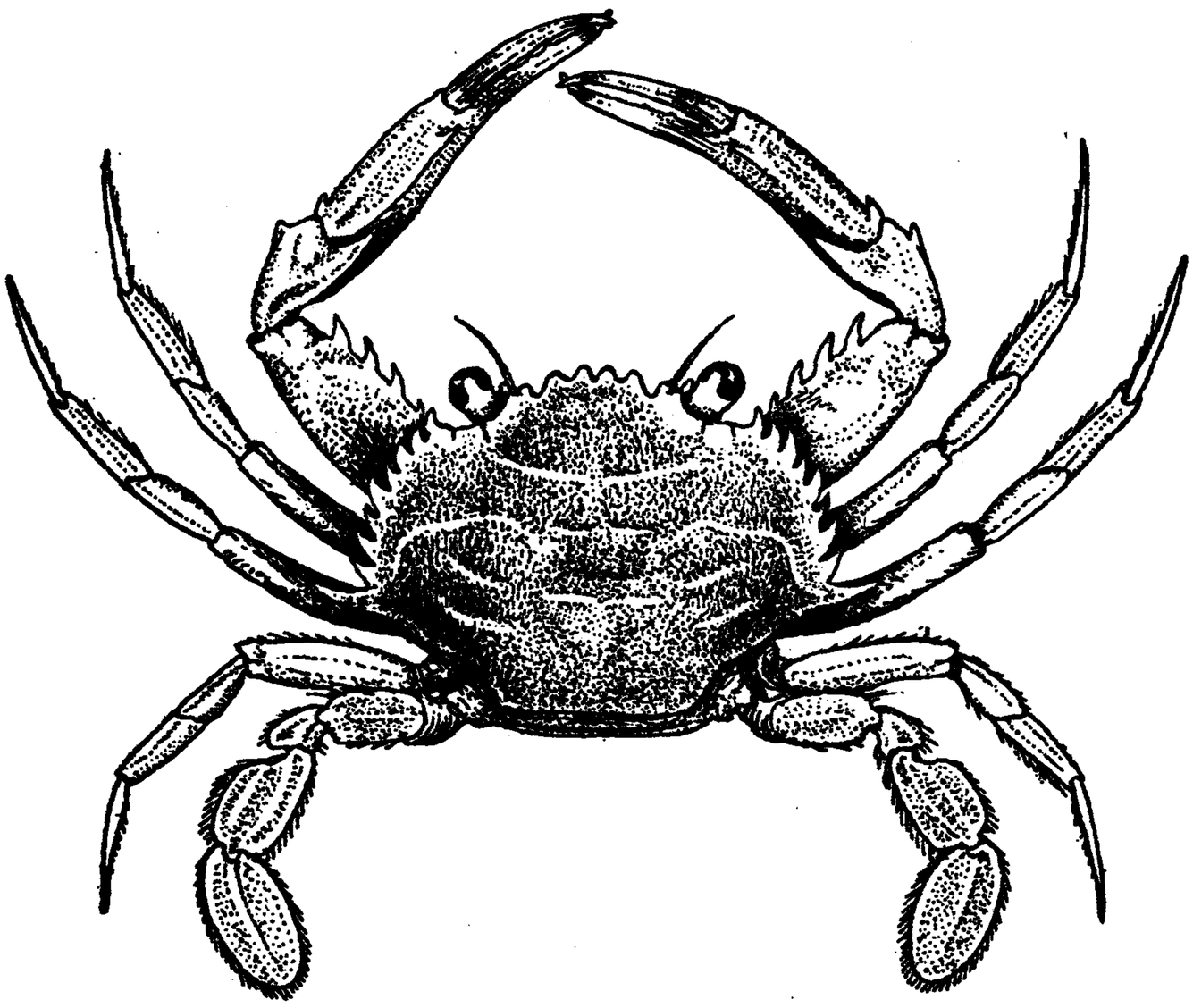

FIGURE 13.—PORTUNUS (ACHELOUS) MINIMUS, MALE, HOLOTYPE, CARAPACE 17 MM. WIDE, DORSAL VIEW

Range.—Vineyard Sound, Massachusetts (Sumner); North Carolina to the Abrolhos Islands, Brazil; Bermuda.

Material examined.—See table, pp. 72–75.

PORTUNUS (ACHELOUS) MINIMUS Rathbun

Plate 36

Portunus (*Achelous*) *minimus* RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 595, pl. 44, fig. 3 (type-locality, Gulf of California, 10 fathoms, station 2827, *Albatross*; Cat. No. 21588, U.S.N.M.); Proc. California Acad. Sci., ser. 4, vol. 13, 1924, p. 374.

Portunus (*Portunus*) *xantusii* RATHBUN, Bull. Amer. Mus. Nat. Hist., vol. 48, 1923, p. 620 (part).

Diagnosis.—Second, fourth, and sixth lateral teeth reduced; lateral spine twice as long as eighth tooth; four or five spines on anterior margin of arm; postero-distal margin of merus of swimming feet armed with spinules.

Description.—Surface of carapace resembling that of *P*. (*P*.) *xantusii*, but the carapace narrower; frontal teeth broader, triangular, extremities arcuate, sides more or less convex; median sinus V-shaped; antero-lateral teeth closely placed, sinuses narrow; second, fourth, and sixth teeth reduced in size, most markedly so in the half grown; lateral tooth twice as long as eighth tooth or as long as the width of

Material examined of Portunus (Achelous) minimus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Mexico											
Gulf of California:	° ′ ″	° ′ ″			°F.						
Mejia Island, Lower California.						1921		Fred Baker	1♂	Cal. Acad.	
Southeast of Tiburon Island.	28 28 00	112 04 30	29	gy. S	62.9	Mar. 23, 1889	3014	*Albatross*	2♂	18206	
50 miles South of Guaymas.			(1)			1891		do	7 y	21245	
Ballandra Bay, Carmen Island, Lower California.						Apr. 12, 1921		Fred Baker	2	58110	From California Acad. Sci.
San Jose Island, Lower California.						1921		do	1♀ ovig	Cal. Acad.	
Do						Mar. 31, 1911		*Albatross*	1♂ 1♀	60017	
Off San Jose Island, Lower California.	25 02 45	110 43 30	21	S. Sh. coralline		Mar. 17, 1889	3005	do	1♂ 2♀	17438	
Do	24 55 15	110 39 00	33	fne. gy. S. brk. Sh.	64.5	Mar. 16, 1889	3001	do	9♂ 7♀	17437	
Do	24 54 30	110 39 00	39	crs. S	63.6	do	2999	do	1♀	17436	
Do	24 51 00	110 39 00	40	S. brk. Sh	64	do	2998	do	1♂ 1♀	17435	
Pichilinque Bay, Lower California.						Apr. 18, 1911		do	1 y	60014	
Ceralbo Channel, Lower California.	24 12 00	109 55 00	9.5	Sh		Apr. 30, 1888	2826	do	1♀ ovig	22038	
Do	24 11 45	109 55 00	10	Sh		do	2827	do	1♂ 3♀	21588	Types.
Do	24 11 30	109 55 00	10	Sh		do	2828	do	1♂ 6♀ (1 ovig.)	22039	
Cape San Lucas, Lower California.						Mar. 23, 1911		do	5♂ 8♀ (2 ovig.)	60019	
Maria Madre Island, Tres Marias Islands.			4–10			1925		Hanna and Jordan, California Acad. Sci. Exped.	8 y 9 y	62705 Returned	

[1] Surface.

the next two teeth. Five spines, proximal one small, on anterior margin of arm of largest specimen, four spines only in smaller specimens; a small spine at extremity of outer margin of arm; inner wrist spine twice as long as proximal spine of palm; outer wrist spine small, slender; superior spine of palm about at distal fifth.

In small specimens, the lateral spine is about the same relative length as in large.

Measurements.—Largest male (Mejia Island), total length of carapace 21, width of same 35.5 mm. Male (18206), total length of carapace 16, width of same 28, width at anterior base of lateral spine 24, fronto-orbital width 13.7, width of front 4.7 mm. Male (60019), total length of carapace 12.2, width of same 21, width at anterior base of lateral spine 17.4, fronto-orbital width 11.3, width of front 3.7 mm.

Range.—Mexico: From Tiburon Island, Gulf of California to Tres Marias Islands.

Material examined.—See table, page 77.

PORTUNUS (ACHELOUS) PICHILINQUEI, new species

Plate 37

Portunus (*Portunus*) *xantusii* RATHBUN, Bull. Amer. Mus. Nat. Hist., vol. 48, 1923, p. 620 (part).

Type locality.—Pichilinque Bay, Lower California; holotype male, Cat. No. 60011, U.S.N.M.

Diagnosis.—Front advanced. Antero-lateral teeth spiniform, unequal; lateral spine long. Postero-distal margin of merus of swimming feet spinulous.

Description.—Another species allied to and easily confounded with *P.* (*P.*) *xantusii.* It differs as follows: The carapace is narrower; the front more prominent, its teeth flatter and blunt; antero-lateral margin straighter, less arched, teeth slenderer, very unequal, more spiniform and outstanding; lateral spine of good length, as long as the width of the next three teeth; abdomen of male more broadly triangular.

From *P.* (*A.*) *minimus*, this species may be recognized by its longer lateral spine, slender antero-lateral teeth and advanced front.

Measurements.—Male (holotype), total length of carapace 14.4, width of same 26; width at anterior base of lateral spine 21, fronto-orbital width 13.3, width of front 4 mm.

Range.—Mexico: From Magdalena Bay to the head of Gulf of California.

Material examined.—See table, page 75.

PORTUNUS (ACHELOUS) SEBAE (Milne Edwards)

Plates 34 and 35

Cancer marinis, scutiformis SEBA, Thesaurus, vol. 3, 1758, p. 52, pl. 20, fig. 9.
Portunus sanguinolentus LATREILLE, Tableau Encyc. Méth., pt. 24, Crust., 1818, pl. 272, fig. 6 (after Seba); (not *P. sanguinolentus* Herbst, 1783).
Lupea sebae MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 455 (type-locality, Brazil; type in Paris Mus.).
Neptunus sebae A. MILNE EDWARDS, Arch. Mus. Hist. Nat., vol. 10, 1861, p. 329, pl. 28, figs. 2, 2*a*; Crust. Rég. Mex., 1879, p. 217.
Achelous sebae SMITH, Trans. Connecticut Acad. Arts and Sci., vol. 2, 1869, p. 34.—VERRILL, Trans. Connecticut Acad. Arts and Sci., vol. 13, 1908, p. 380, text fig. 27 (after A. Milne Edwards).
Lupa biocellata FORNS in Gundlach and Torralbas, An. Acad. Cien. Habana, vol. 37, 1900, p. 57, text fig. 78 (type-locality, Cuba; type in Acad. Cien. Habana).
Portunus (*Achelous*) *sebae* RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 46.

Diagnosis.—An erect spine on basis, and a postero-distal spine on merus, of swimming paddle. A large round red spot above each postero-lateral margin. A longitudinal carina on manus just below upper margin.

Description.—Has much in common with *P.* (*A.*) *ordwayi*, namely, the elevations of the carapace, the shape of the front and orbit, the character of the lateral teeth, the fringes on the inner-upper margin of the cheliped, and the shape of the male abdomen. On the other hand, *sebae* attains a larger size; has a relatively wider carapace, not including the lateral spine; a large red spot on the postero-lateral slope, which persists in alcohol; all the spines except those of the front and inner orbit have a dark horny tip; the lateral spine is as long as the next 2½ teeth in the old; chelipeds more elongate, less enlarged at middle of merus and manus, one spine at extremity of ischium, six or five spines on inner margin of merus veiled by a fringe of long hair, posterior distal spine situated a little behind, not at, the extremity; inner carpal spine same length as proximal spine of manus; upper-outer surface of palm elongate, not enlarged or iridescent but bearing a granulated carina just below upper margin; all the carinae of the palm, 5 outside and 2 inside, more or less fringed with hair; two superior spines, one at distal third, a small one at extremity; on the basis of swimming paddles a curved spine directed upward, outward and forward; a spine at postero-distal angle of merus, and a second, smaller spine on the distal margin next to the articulation with the carpus.

Age variation.—As customary in the genus the lateral spine is longer in the young than in the old; in a specimen (24498) about 13 mm. long the spine is exceptionally long, length equal to width of next 5 teeth.

Color.—General color, lighter end of Mars brown and of burnt umber. Areolations picked out in red. Under parts white. Pubescence

light lemon yellow. Antero-lateral teeth margined and tipped with purple madder with a splotch of white on median dorsal surface. Branchial spots a cross between purple madder and Indian red, a dark deep rich color, margined or surrounded by a white ring. Fringe of anterior margin of merus of cheliped light brown ocher. Tips of fingers like dark end of purple madder; ridges on carpus, tips and bases of all spines same color; spines elsewhere white. Paddles and extremities of ambulatory legs tending toward middle of brown ochre. (Schmitt.)

Measurements.—Male (61249), total length of carapace 47, width of same 88, width to anterior base of lateral spine 71, fronto-orbital width 28, width of front 10.7 mm.

Range.—Gulf of Mexico [13] and Florida Straits to Brazil. Bermuda.

Material examined.—See table, page 81.

PORTUNUS (ACHELOUS) AFFINIS (Faxon)

Plates 38 and 39

Achelous affinis FAXON, Bull. Mus. Comp. Zoöl., vol. 24, 1893, p. 155, except the Mexican specimens (type-localities, off Panama, 56 fathoms, and Ecuador, 52 fathoms; cotypes in M.C.Z. and U.S.N.M., Cat. No. 20613); Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 23, pl. 4, figs. 1-1*b*.

Portunus (*Achelous*) *affinis* RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 595; Mem. Mus. Comp. Zoöl., vol. 35, 1907, p. 71.

Diagnosis.—Carapace 1.7 times as long as wide. Lateral spine or tooth very little longer than preceding tooth. Merus of swimming legs spinulous.

Description.—Carapace rather strongly convex, surface rugose, granulate and pubescent, but not so uneven as *P.* (*P.*) *xantusii*. Front not prominent, four triangular blunt teeth, the two submedian a little more advanced and separated from each other by a triangular notch, and by a much broader and shallower sinus from the outer tooth. Inner orbital angle bidentate, inner tooth more advanced. Antero-lateral teeth shallow, becoming progressively sharper from front to back; last tooth, at lateral angle, very little longer than the one before it. Normally five spines on inner margin of arm and a small one at end of outer margin. Inner spine of carpus about twice as long as proximal spine of manus; outer spine of carpus very small. Palm elongate, carinae similar to those of *xantusii*, the second area below the top narrowing at both ends; superior spine not far behind the extremity, or about the distal seventh. Distal end of merus of last leg spinulous.

Has much in common with *P.* (*P.*) *xantusii*, but is narrower and has a shorter lateral spine. It replaces that species in more southern waters.

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[13] An earlier record "North Carolina" is erroneous.

Material examined of Portunus (Achelous) sebae

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimen	Catalogue No.	Remarks
Florida:	° ′ ″	° ′ ″			°C.						
Anclote section	28 20 15	83 12 15	10.25	S. Grs	13.5	Jan. 24, 1902	7241	*Fish Hawk*	1 y	61254	
Tortugas						Aug. 2, 1912		E. W. Gudger	3♂	48275	From T. W. Vaughan.
Do								W. H. Longley	1♂ soft shell	61251	Gift of Carnegie Institution.
1½ miles north of Loggerhead Key.	Stomach of fish No. 345, gray snapper, *Neomaenis griseus* (L.).					June 13, 1925		W. L. Schmitt	1 deformed cheliped	61255	Do.
Bird Key Reef						June 20, 1925		do	1♂1♀	61250	Do.
Do						July 16, 1924		do	1♂	61249	Do.
West Channel entrance to Key West.	Midchannel buoy, W. by S. ¼ S., ½ mile.		7.75	co. S		Feb. 13, 1902	7271	*Fish Hawk*	1 y	61252	
Key West			(1)			1885		*Albatross*	1♂1♀	9905	
			Feet								
Off Cape Sable	25 06 30	81 12 25	11.5	rky	22	Dec. 18, 1902	7356	*Fish Hawk*	1y	61253	
West Indies:											
Montego Bay, Jamaica						Aug. 8, 1910		E. A. Andrews	1♀	42870	
Porto Real, Porto Rico						Jan. 26, 1899		*Fish Hawk*	1♂	24498	
Boqueron Bay, Porto Rico						Jan. 27, 1899		do	1♂	24499	
St. Thomas						Jan. 17, 1884 to Jan. 24, 1884		*Albatross*	1♀	7836	
Pointe Michel, Dominica			15					A. H. Verrill	1♂	32713	Malformed. Left lateral spine and next three teeth wanting, instead a second color spot has developed on the margin.
North coast of South America:											
Aruba, beach			(2)			June 21, 1905		J. Boeke	1♂	Returned to sender.	
Curaçao: Rifwater			(2)			Aug. 23, 1905		do	1♂	do	
Bermuda						1876–1877		G. Brown Goode	1♀	42818	

[1] In seine.

[2] Shallow.

Measurements. Male (22035), total length of carapace 29, width of same 49, width at anterior base of lateral spine 44.4, fronto-orbital width 22.7, width of front 7.2 mm.

Variation.—Two specimens in a lot of 125 have a longer lateral spine than usual, but it is not twice as long as the preceding tooth.

Range.—Cape San Lucas, Mexico, to Ecuador.

Material examined.—See table, page 83.

PORTUNUS (ACHELOUS) FLORIDANUS, new species

Plate 40

Portunus (*Achelous*) *anceps* RATHBUN, Amer. Nat., vol. 34, 1900, p. 141; not *P.* (*P.*) *anceps* (Saussure).

Type locality.—Off Key West, Florida, 45 fathoms; holotype male, Cat. No. 15043, U.S.N.M.

Diagnosis.—Median teeth of front minute. Lateral spine of carapace short. Two spines on upper margin of palm. Postero-distal margin of merus of swimming legs entire.

Description.—Carapace narrow, without strong ridges but with an extensive pattern formed by bands of fine granules; branchial ridge short, starting well forward at the gastric region, trending obliquely backward and forming an obtuse angle opposite the seventh lateral tooth; pubescence short, inconspicuous. Frontal teeth triangular, very unequal, median pair acute, much smaller and much less advanced than the lateral, which are blunt; median sinus reaching farther back than lateral sinuses. Inner tooth of orbit obtusangled, anterior margin obliquely transverse; only one superior orbital fissure and that with a V-shaped opening; outer tooth narrow, viewed from above, very wide and flat viewed from the side, and furnished with a tuft of hair; outer sinus large, a little less than a right angle; inner tooth very broad and blunt. Antero-lateral teeth 2 to 8 small, similar, spiniform; sinuses U-shaped, the first the widest, the next three wider than the succeeding three. Lateral spine short, strong, much larger than the adjacent spines, tip curving obliquely forward.

Arm and chela expanded at middle; inner margin of merus armed with two larger spines on distal half and 1 to 3 smaller spines or spinules on proximal half; a small curved spine at distal end of outer margin. Inner spine of carpus larger and outer spine smaller than the propodal spine at the articulation. Two incurved spines on upper margin of manus, one at the extremity, the other not far behind. Merus of swimming leg longer than wide, postero-distal extremity unarmed. Proximal half of sixth segment of male abdomen with parallel sides, sides of distal half convergent.

Measurements.—Male holotype, total length of carapace 13, width of same 20.6, width at anterior base of lateral spine 17.6, fronto-orbital width 11.8, width of front 3.6 mm. Female paratype, total length of carapace 15.2, width 23.2 mm.

Material examined of Portunus (Achelous) affinis

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Speicmens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Mexico:	° ′ ″	° ′ ″			° *F.*						
Cape San Lucas, Lower California.	----------	----------	----------	----------	------	Mar. 23, 1911	----------	*Albatross*	1♂	61173	
Off Acapulco	17 20 00	101 32 00	Surface.	----------	------	Oct. 14, 1904	Near 4594	do	6	33371	From stomach of turtle.
Central America: Near Cocos Island.	5 26 20	86 55 00	Surface.	----------	------	Mar. 1, 1891	3371	do	5♂	20610	
Panama:											
Bay of Panama	8 27 00	79 35 00	26	gn. M	------	Mar. 30, 1888	2803	do	1♀	22036	
Do	7 57 00	78 55 00	33	gy. S. bk. Sp. brk. Sh.	[2]64.1	Mar. 5, 1888	2795	do	48♂ 77♀	22035	
Do	7 33 12	79 17 15	Surface.	----------	[1]73	Mar. 8, 1891	3386	do	2 y	20612	
Do	7 26 10	79 53 50	56	fne. gy. S. G.	[2]62.6	Mar. 9, 1891	3390	do	1♂	20613	Cotype.
Do	7 12 20	80 55 00	Surface.	----------	[1]81	Feb. 23, 1891	3355	do	2♂	20609	
Do	6 21 00	80 41 00	Surface.	----------	[1]75	Mar. 7, 1891	3382	do	3 y	20611	
Do	3 59 40	81 35 00	52	R	------	Mar. 5, 1891	3379	do	5♂ 4♀	4489, M.C.Z.	Cotypes.
Do	----------	----------	Surface.	----------	------	Mar. 7, 1891	----------	do	50 sm	20636	
Ecuador:											
Off Ecuador	0 36 00	82 45 00	Surface.	----------	[1]81	Mar. 25, 1891	Hyd. 2627	do	9	20616	
Do	1 07 00	80 21 00	Surface.	----------	[1]84	Mar. 23, 1891	3398	do	25 y	20614	
West coast tropical America	----------	----------	Surface.	----------	------	1891	Sur. 59	do	1 y	20615	
Galapagos Islands: Gardner Bay, Hood Island.	----------	----------	Surface.	----------	------	1888	Anchorage 24	do	15 y	22037	

[1] Surface.

[2] Bottom.

Range.—Known only from the type lot of specimens.

Material examined.—Off Key West, Florida; lat. 24° 25′ 45″ N., long. 81° 46′ 00″ W.; 45 fathoms; coral; temperature 75° F.; January 15, 1885; station 2318, *Albatross;* 1 male holotype, 2 females paratypes (15043).

PORTUNUS (ACHELOUS) DEPRESSIFRONS (Stimpson)

Plate 41

Amphitrite depressifrons STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 58 [12] (type-localities, South Carolina and Florida Keys; types not extant).

Achelous depressifrons STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 223 [95].—A. MILNE EDWARDS, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 342; Crust. Rég. Mex., 1879, p. 230, pl. 40, figs. 4 and 4*a*.—VERRILL, Trans. Connecticut Acad. Arts and Sci., vol. 13, 1908, p. 391, text-fig. 36, pl. 20, fig. 3.

Neptunus (*Achelous*) *depressifrons* MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 181.

Portunus (*Achelous*) *depressifrons* RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 276.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915-16 (1918), p. 430, pl. 33, fig. 7.

Diagnosis.—Lateral spine or tooth very little longer than those in front of it. Upper half of outer surface of palm granulate between the carinae. Upper margin of movable finger fringed with hair. Postero-distal margin of merus of swimming legs entire.

Description.—Size medium, shape suboblong, owing to the great fronto-orbital distance, the small lateral spine and the narrow inconspicuous front. Pubescence of carapace short and fugitive, granulated lines and patches low. Teeth of front small, triangular, those of inner pair a little the smaller and usually a little more advanced than those of outer pair. Inner tooth of orbit simple, a little behind line of front; fissures ending in V-shaped emarginations; inner lower tooth broad, well advanced. Antero-lateral teeth sharp-pointed, directed mostly forward, fourth and sixth teeth somewhat reduced, second not uniformly so; ninth or lateral tooth similar to the others in shape and curvature and very little longer. Posterior angles below the granulated marginal line bluntly angled.

Chelipeds stout, 2½ times as long as carapace. Merus broad, armed with 5 or 6 spines on inner margin and one small distal spine at end of outer margin; an outstanding fringe of short hair on inner surface below marginal spines. Inner spine of carpus full twice as long as proximal spine of palm; outer spine small. Upper carina of manus strong, reaching nearly to finger and ending in a large ascending spine; a smaller spine at extremity of margin; a fringe of hair projects downward from the inner lower edge of the carina. A strong ridge through the middle of the palm forms an oblong upper

half and a distally widening lower half; the upper half has a longitudinal compound row of distant spinules or granules above its middle, the lower half has a carina leading to the interdigital sinus. Above the proximal half of the lower margin there is an outstanding fringe of long hair. An erect fringe of hair on upper margin of dactylus. Postero-distal margin of merus of swimming leg unarmed.

Color.—Male, (61208) surface of carapace mottled and speckled or spotted with cream buff, olive buff, bice green or oil green + olive; upper surface of hands and carpus same, upper surface of merus more tawny olive, with tinge of gallatine yellow. Upper margin of hand in spots and middle third of carpal spine, and basal half of meral spines on inner margin maroon + crimson. Teeth of fingers and distal half of cutting edges and distal half of hairs on upper margin of movable finger rich dahlia purple; inside of tip of upper finger and inside of distal third of lower finger magenta shading into antwerp blue, on proximal third of finger and inside of hand shading into primrose yellow with tinging of olive buff. Hairs on proximal half of upper margin of movable finger ochraceous. Hairs on upper anterior margin of merus white gray. Ambulatory legs: Dactyls, propodi, and carpi antwerp blue, shading on proximal half into a pale grass green; near upper margin meri are green, shading into blue (but a light greenish one) on lower two thirds of merus, lower margin of merus white; dactyls margined with dahlia purple and propodi on upper margin and hairs on lower margin of first leg propodus dahlia purple. Corneae grayish.

Five small specimens of the same lot: The chelipeds near proximal and upper margin of propodus and distal half of merus are a sort of ochraceous. Distally the blue on the dactyls gets lighter and the purple more magenta just before the ochraceous corneous claw. Paddle joint pale transparent almost turquoise blue margined with ochraceous; next article, same blue and margins, but down the center has a tinged line of grass green which is a little stronger and diffused over a larger area near either articulation; rest of swimming foot like carapace but with same darker olive + oil green spots. (Schmitt.)

Measurements.—Male (61208), total length of carapace 25.2, width of same 40, width at base of lateral spine 37, fronto-orbital width 21.2, width of front 5.6 mm.

Range.—North Carolina (Coues) to Caribbean Sea. Bermudas.

Material examined.—See table, pages 86–89.

Material examined of Portunus (Achelous) depressifrons

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Cat. No.	Remarks
Florida:	° ′ ″	° ′ ″			°C.						
Pepperfish Key section.	29 15 30	83 27 30	5.5	sdy	16.2	Nov. 21, 1901	7166	*Fish Hawk*	1♂	61209	
St. Martin's section	28 34 30	83 15 45	7.5	rky. sdy	13	Jan. 15, 1902	7220	do	1 y	61225	
Anclote section	28 13 30	83 04 30	6.75	S. brk. Sh	13	Jan. 24, 1902	7244	do	1 y	61210	
Off Cape Sable	25 01 00	81 25 30	4.5	Sp. S. Sh	23	Dec. 19, 1902	7373	do	1♂	61211	
Tortugas			4					John B. Henderson.	1 y	61228	
Do								W. H. Longley	1♂ 1♀ ovig	61214	
Do	From floating gulf weed.					July 31, 1926		C. R. Shoemaker	2♂ 2♀	62476	
Do						1893		State Univ. Iowa Exped.	2♂ 1 y	Mus. S. U. I.	
Outer Tortugas Reef	Stomach of fish No. 16, gray snapper, *Neomaenis griseus* (L.).					June 5, 1925		W. L. Schmitt	1♂ 1♀	61234	Gift of Carnegie Institution.
Do	Stomach of fish No. 79, yellow goatfish, *Upeneus martinicus* Cuv. and Val.					do		do	1	61235	Do
Outer Lighthouse Reef, Tortugas.	Stomach of fish, No. 123, schoolmaster (yellow snapper) *Neomaenis apodus* (Walbaum).					June 7, 1925		do	4 y	61236	Do.
			Feet								
3 miles north of Loggerhead Key.	On shoals		10–45			June 17, 1925		Taylor and Dexter.	2 chelipeds	61233	Do.
1½ miles north of Loggerhead Key.	Stomach of fish No. 317, gray snapper *Neomaenis griseus* (L.).					June 13, 1925		W. L. Schmitt	1♂ 1♀	61237	Do.
Do	Stomach of fish No. 318, gray snapper, *Neomaenis griseus* (L.).					do		do	3 chelipeds	61238	Do.
Do	Stomach of fish No. 330, gray snapper, *Neomaenis griseus* (L.).					do		do	1♂	61220	Do.

Do	Stomach of fish No. 338, gray snapper, *Neomaenis griseus* (L.).				do		do	2 y	61239	Do.
Do	Stomach of fish No. 345, gray snapper, *Neomaenis griseus* (L.).				do		do	2 y	61240	Do.
Off north end of Loggerhead Key.	Stomach of fish No. 249, yellow goatfish, *Upeneus martinicus* Cuv. and Val.				June 9, 1925		do	1 y	61241	Do.
Do	Stomach of fish No. 266, gray snapper, *Neomaenis griseus* (L.).				do		do	1♂	61221	Do.
Inside of north point of Loggerhead Key.					Aug. 12, 1924		do	3♂ 2♀ 11 y	61215	Do.
Off west side of Loggerhead Key.		[1] 30			July 24, 1924	15–17	do	1 y	61229	Do.
South of Loggerhead Key, toward old wreck.					June 19, 1925		Taylor	1♂ 1♀ 1 y	61223	Do.
About 5½ miles south of No. 2 buoy.		*Fathoms* 16	shy. S. foraminifera.		June 11, 1925	214	W. L. Schmitt	1 y	61232	Do.
Head of White Shoal	Stomach of fish No. 471, yellow tail, *Ocyurus chrysurus* (Bloch).				June 20, 1925		do	2 chelipeds	61242	Do.
¼ mile south of Bird Key Harbor.	Stomach of fish No. 499, gray snapper. *Neomaenis griseus* (L.).				June 21, 1925		do	1♂	61243	Do.
Do	Stomach of fish No. 515, gray snapper, *Neomaenis griseus* (L.).				do		do	1♀	61244	Do.
Do	Stomach of fish No. 524, gray snapper, *Neomaenis griseus* (L.).				do		do	2♂ 1♀	61222	Do.
Do	Stomach of fish No. 534, gray snapper, *Neomaenis griseus* (L.).				do		do	1♂ 1♀	61245	Do.
Do	Stomach of fish No. 550, gray snapper, *Neomaenis griseus* (L.).				do		do	1♂	61246	Do.

[1] About.

Material examined of Portunus (Achelous) depressifrons—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Cat. No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued.	° ′ ″	° ′ ″			°C.						
¼ mile south of Bird Key Harbor.	Stomach of fish No. 571, gray snapper, *Neomaenis griseus* (L.).					June 21, 1925		W. L. Schmitt	1♀	61247	Gift of Carnegie Institution.
			Feet								
East side of Bird Key Harbor.			10			Aug. 8, 1924		do	1♂ 1♀ ovig. 1 y	61216	Do.
Bird Key						Apr. 8, 1889		*Grampus*	2♂ 2♀	15250	
Do						1889		do	1♂	17945	
Bird Key Reef						July 16, 1924		W. L. Schmitt	1♀	61230	Gift of Carnegie Institution.
Off west side of Fort Jefferson, Garden Key.						Aug. 19, 1924		do	1♂ 5 y	61208	Do.
Rocks off Fort Jefferson.						June 15, 1925		Dexter	1♂	61224	Do.
Long Key Shoal			3–4	Eel-grass		Aug. 7, 1924		W. L. Schmitt	2♂ 1♀ 1 y	61217	Do.
West of Long Key			5–6			Aug. 5, 1924		do	5♂	61207	Do.
Long Key						July 30, 1924		do	2 y (1 shedding)	61231	Do.
Do			(2)			June 6, 1925		do	1♂ 1♀ ovig	61219	Do.
South of Long Key			5–6			Aug. 5, 1924		do	1♂ 2♀	61218	Do.
Bush Key Reef, Tortugas.						July 15, 1926		C. R. Shoemaker	4♂ 1 y	62477	Do.
Do			1 6			Aug. 17, 1926	23	do	1♂ 1♀	62478	Do.
			Fathoms								
Off Northwest Channel.	24 40 45	81 53 40	6	hd. S	19	Feb. 24, 1902	7287	*Fish Hawk*	1 y	61227	
West Channel entrance to Key West.	Midchannel buoy, W. by S. ¼ S., ½ mile.		7. 75	co. S	20	Feb. 13, 1902	7271	do	2 y	61226	
Off Key West			(3)			June 26, 1893	46	State Univ. Iowa Exped.	1 y	Mus. S. U. I.	
Key West						Dec. —, 1883		D. S. Jordan	6♂ 5 y	5790	
Do						Apr. 15, 1884 to Apr. 27, 1884		*Albatross*	123	7513	
Do			(4)			1886		do	2♂ 3♀	11376	By electric light.
Summerland Key						Dec. 6, 1906		B. A. Bean	1♂ 1♀ 1 y	33130	From Geogr. Soc., Baltimore.

Hawk Channel	1¾ miles S. ¾ E. of Pigeon Key.		3	S. G	23.5	Jan. 27, 1903	7426	*Fish Hawk*	1♂	61212	
Lower Metacumbe Key.						Dec. 4, 1906		Pine, Vandegrifft and Bean, Yacht *Orian*.	1 y	33137	From Geogr. Soc., Baltimore.
Ocean front, Broad Creek.						Dec. 17, 1096		Pine and Bean	1♂ 2 y	33128	Do.
Bahamas:											
Bahama Banks				Millepores		May 17, 1893		State Univ. Iowa Exped.	1 y	Mus. S. U. I.	
Spanish Wells, Eleuthera Island.						1893		do	1 ♂	do	
Governor's Harbor, Eleuthera Island.						July 7, 1903		B. A. Bean	1 ♀	31070	From Geogr. Soc., Baltimore.
Tarpum Bay, Eleuthera Island.						do		do	3	31068	Do.
Clarence Harbor, Long Island.						July 15, 1903		do	14♂ 9♀	31071	Do.
West Indies:											
Punta Colorado, Cuba			2–3	Sh. Grs		June —, 1914	10	Henderson and Bartsch, *Tomas Barrera* Exped.	1 y	49163	
Ensenada Honda, Culebra.						Feb. 10, 1899		*Fish Hawk*	3♂ 3♀	24496	
Culebra						Feb. 11, 1899		do	1 ♀	24497	
St. Thomas								Riise	specimen	Copenhagen Mus.	
Caribbean Sea:											
Old Providence						Apr. 4–9, 1884		*Albatross*	1 y	18443	
Aruba, lagoon			(3)	algae		Aug. 8, 1905		J. Boeke	1♀ ovig	Leiden Mus.	
Bermuda						1876–1877		G. Brown Goode	2	42784	
									5	42785	

[1] About. [2] Seined. [3] Shallow. [4] Surface.

PORTUNUS (ACHELOUS) BAHAMENSIS, new species

Plates 42 and 43

Type-locality.—The Current, Eleuthera Island, Bahamas; July 15, 1903; B. A. Bean; 5 males, 5 females; received from the Geographic Society of Baltimore; 1 male is type, Cat. No. 31069, U.S.N.M.

Diagnosis.—Lateral spine no longer than those in front of it. Upper half of outer surface of palm without granules between the carinae. Upper margin of movable finger fringed with hair. Postero-distal margin of merus of swimming legs entire.

Description.—Very close to *P.* (*A.*) *depressifrons*. Differs as follows: Antero-lateral teeth shorter, the fourth, sixth and eight teeth slightly reduced; the tooth at the lateral angle of the carapace is not enlarged, but is similar to the other lateral teeth. The outer orbital tooth is less advanced than in the related species and does not reach the line of the frontal teeth. Fronto-orbital distance greater in proportion to carapace-width. The posterior of the two granulated lines on the protogastric regions is less sinuous than in *depressifrons*. Chelipeds narrower, teeth of merus smaller; outer surface of palm just above median carina wrinkled, nongranulate. Merus of swimming foot shorter and broader.

Age variations.—In specimens smaller than the type the upper half of the palm shows transverse rows of fine spinules in the wrinkles, and in the space above there may be a single longitudinal line of scanty granules or spinules. Antero-lateral teeth sharper in the young than in the adult, the last or ninth tooth a little longer than the others in carapaces 15 mm. wide or less.

Color.—In alcohol the color pattern so persistent in *depressifrons* has disappeared. There is a trace of red on the fingers especially on the teeth, and a reddish spot on the condyle of the manus at the articulation with the dactylus.

Measurements.—Male type (31069), length of carapace to end of teeth of median pair 25, width of same 37.2, fronto-orbital width 22.1, width of front between antennae 6 mm.

Additional locality.—Bahama Bank, east of Cat Key; 3 feet; John B. Henderson; 2 young (61213).

PORTUNUS (ACHELOUS) TUBERCULATUS (Stimpson)

Plate 44

Achelous tuberculatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 223 [95] (type-locality, Cape St. Lucas; cotypes in Brit. Mus., M. C. Z., and U.S.N.M., Cat. No 19679).

Neptunus tuberculatus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 221, pl. 39, fig. 1–1*b*.

Portunus (*Ach.*) *tuberculatus* RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 596.

Diagnosis.—Carapace tuberculated, a spine at posterior angles. Lateral spine very long. Merus of swimming feet unarmed.

Description.—A small species. Carapace very broad, lateral spine very long, an erect spine at posterior angles. Width of carapace two and a half times length. Two tubercles on mesogastric region form a quadrilateral with two on cardiac region which are farther apart; a protogastric tubercle is in oblique line with two branchial tubercles. Behind these but smaller and less evident is a tubercle at the beginning of a branchial ridge which is formed of a single row of granules. There is a low posterior median cardiac tubercle. The long branchial ridge running from the lateral spine to the inner angle is high, blunt and forms a single arch reaching forward to the level of the sixth tooth. A hepatic arch of granules nearly parallels the branchial ridge. Front arcuate, teeth triangular, blunt, similar, submedian more advanced, median sinus deepest. Inner end of upper margin of orbit oblique, divided into two low blunt teeth; upper fissures closed in large part; outer tooth large, subacute. Lateral teeth 2 to 8 sharp, the first 5 shallow, seventh and eighth longer and more outstanding; fifth larger than third; second, fourth and sixth smaller than their neighbors; lateral spine transverse, as long as the width of the five spines or teeth in front of it, its anterior margin fringed with hair. Posterior spines curved, directed upward, outward, and forward.

Four spines on anterior margin of arm and one terminal posterior spine. Outer spine of carpus of good size, shorter than inner spine and longer than proximal spine of manus; superior spine of manus at distal fourth of margin. Merus of last leg unarmed.

Measurements.—Male (22040), total length of carapace 12.4, width of same 31, width at anterior base of lateral spine 20.5, fronto-orbital width 10, width of front 3.6 mm.

Young.—Usually in this genus the lateral spine is longer proportionally in young or small specimens than in full grown. Such is not the case in *tuberculatus*; in one 14.4 mm. wide the spine is equal to the width of the next four teeth, and in one 12 mm. wide the spine is equal to the width of only two teeth.

Range.—From Cape St. Lucas, Mexico, to Panama.

Material examined.—Cape St. Lucas, Lower California; John Xantus; 1 male cotype (19679) from British Museum; 8 specimens, cotypes (1626, M. C. Z.); 7 specimens, cotypes (Brit. Mus.).

Maria Madre Island, Tres Marias Islands, Mexico; 4–10 fathoms; 1925; Hanna and Jordan, California Academy of Sciences Expedition; 1 young (Cal. Acad. Sci.) 1 young (62706).

Bay of Panama; 1888; *Albatross*: Lat. 8° 44′ 00″ N., long. 79° 09′ 00″ W.; 29½ fathoms; gn. M.; March 6; 1 male (22041). Lat. 8° 10′ 30″ N., long. 78° 50′ 30″ W.; 18 fathoms; gy. S. brk. Sh.; March 5; 1 male (22040).

PORTUNUS (ACHELOUS) SPINICARPUS (Stimpson)

Plate 45

Achelous spinicarpus STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 148 (six type-localities in Florida, namely, off Tortugas, off Carysfort Reef, off Conch Reef, off Alligator Reef, off Pacific Reef, off American Shoal, and one in Georgia, lat. 31° 31′ N., long. 79° 41′ W.; depths ranging from 13 to 150 fathoms; types not extant).

Neptunus (*Hellenus*) *spinicarpus* A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 221, pl. 40, fig. 1–1*b*; Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 11 (Saba Bank excepted).

Portunus (*Achelous*) *spinicarpus* RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 47.

Diagnosis.—Inner spine of carpus of male longer than palm. No toothe at posterior angles of carapace. Marginal teeth narrow, spiniform. A spinulous lobe at postero-distal end of merus of swimming foot.

Description.—Surface pubescent, granules on elevations beadlike, not crowded. Teeth of front and antero-lateral margin narrow, spiniform, separated by broad U-shaped sinuses. Of the frontal teeth those of the median pair are more advanced than those of the outer pair, which in turn overreach those at the inner angle of the orbit. This angle is bidentate but the outer denticle is low and blunt. Supra-orbital fissures V-shaped, a spine on the inner side of the outer fissure. The orbit has a strong dorsal aspect, the lower outer emargination is a wide V. Lateral spine long, in the full grown as long as the width of the next four teeth. The second, fourth, and sixth teeth are somewhat reduced.

Chelipeds of male 3 times as long as carapace; merus with 4 or 5 slender spines on inner margin and one spine at extremity of outer margin. Carpus with a very small spine outside but a long flattened swordlike spine at inner angle; it is curved and is bordered on its lower concave margin with a fringe of hair; it is longer than the manus and in flexion fits between merus and manus. The superior spine of the manus is small and is about at the distal fifth of the article; the manus is dilated below the union of palm and finger. The postero-distal angle of the merus of the swimming legs is irregularly spinulous or denticulate, some of the denticles in the old male are situated on a shallow lobe pointing distad.

Sex and age variations.—The berried females examined run smaller than the males, their chelipeds are shorter, only about 2⅓ times as long as the carapace, the carpal spine does not reach beyond the superior spine of the manus.

In mature individuals the lateral spine is slightly curved forward; in the young and half grown it is straight or nearly so, transverse or directed slightly backward. It is longer than in the old, as long as five lateral teeth in the half grown, and as six teeth in the very young.

Color.—Half grown male (61265), sand gray and clay colored mottled carapace; general cast of carapace cream buff and pinkish buff,

under parts white. Corneae mottled white and cinnamon, mostly white. Proximal side of each spine of merus or arm with crimson spot; a crimson line parallels the posterior white ridge. The carpus has a spot of crimson at articulation; its long spine has a longitudinal splotch of color on the posterior surface, whereas on the anterior surface there is a clay colored one as though the color showed through; fringe of hair on this spine between crimson and pomegranate purple. Fingers marked inside with crimson, outside the corresponding spots are clay color. Extremity of dactyls of ambulatory legs crimson, most extensive on first one, diminishing progressively on second and third. Three crimson spots on the coxa-basis of swimming legs; a narrow crimson stripe on last two articles, one parallel to posterior edge of propodus, the other parallel to antero-distal quarter of dactylus.

Full grown specimens (61257) much as smaller one above. Carapace more buff pink with highest ridges touched with cinnamon rufous. Fingers bordered with crimson and maroon; two basal teeth of dactylus and margins of palm white, rest of chela maroon purple and lake red, same color on fringe of hair on carpal spine; ambulatories wine purple.

Two very young, the larger 6 mm. long (61270) have a large spot of vinaceous buff either side of the middle of the carapace; smaller one with darker spots of clay color.

Eggs (61256), those eyed are Prout's brown; those non eyed are a more compact mass, flame scarlet + Saturn red + salmon. (Schmitt.)

Measurements.—Male (61256), total length of carapace 28.3, width of same 52.5, width measured from base of lateral spine 43.2, fronto-orbital width 20.6, width of front 6.6 mm.

Range.—From North Carolina to the Province of São Paulo, Brazil; 5 to 208 fathoms.

Material examined.—See table, pages 94–96. It is worthy of note that whereas this species is abundant on the Florida Keys no remains were found among the contents of the hundreds of fish stomachs examined in recent years. This is attributable to the formidable armature of the chelipeds which is sufficient to ward off the enemy.

PORTUNUS (ACHELOUS) IRIDESCENS (Rathbun), new combination

Plate 46

Neptunus (*Hellenus*) *iridescens* RATHBUN, Proc. U. S. Nat. Mus., vol. 16, 1893, p. 240 (type-locality, Gulf of California, station 3017, *Albatross;* type, Cat. No. 17445, U.S.N.M.).

Diagnosis.—A tooth at posterior angles of carapace. Inner spine of carpus of male as long as palm. Postero-distal end of merus of swimming foot spinulous.

Description.—Closely related to *P.* (*A.*) *spinicarpus* from which it differs as follows: The posterior corners of the carapace have each a sharp, erect tooth; the principal regions are more prominent; the front

Material examined of Portunus (Achelous) spinicarpus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
North Carolina:	° ′ ″	° ′ ″			°F.						
Off Cape Hatteras	35 42 00	74 54 30	43	gy. and bk. S	57.3	Oct. 21, 1884	2307	*Albatross*	1 ♀	7254	
Do	35 38 00	74 53 00	49	bk.M.brk.Sh		Oct. 20, 1884	2297	do	3 y	7260	
Do	35 11 30	75 05 00	59	crs.S.bk.Sp	75	Oct. 21, 1884	2301	do	2 ♀	8796	
Do	35 10 40	75 06 10	68	gy. M	71.3	Oct. 19, 1884	2268	do	1 ♂	7216	
Do	35 08 30	75 10 00	49	gy. S		Oct. 17, 1885	2596	do	25	19087	
Off Cape Lookout	34 38 30	75 33 30	124	S. R		Oct. 18, 1885	2602	do	1 y	17927	
South Carolina:					°C.						
East of South Carolina	33 34 00 to 41 00	76 41 00	62–105	S. Sh	21.9	Dec. 12, 1919	20037	do	3 ♂ 1 ♀	61387	In otter trawl.
					°F.						
East of Winyah Bay	33 18 30	77 07 00	95	fne. gy. S	65.8	Apr. 2, 1885	2417	do	1 ♂ 1 ♀	9863	
Louisiana: East of Delta of Mississippi River.	29 14 30	88 09 30	68	gy. M		Feb. 11, 1885	2378	do	14 ♂ 5 ♀	9657	
Alabama: Off Mobile Bay	29 24 30	88 01 00	35	yl. S. bk. Sp		Mar. 4, 1885	2388	do	1 y	15037	
Florida:											
Southwest of Cape San Blas.	29 14 00	85 29 15	25	Co		Feb. 7, 1885	2373	do	1 y	15036	
South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co		Mar. 15, 1885	2406	do	1 y	15040	
South of Cape St. George.	28 45 00	85 02 00	30	gy. S. brk. Co		do	2405	do	5 y	15039	
South of Bay San Blas	28 44 00	85 16 00	60	gy. S		do	2404	do	2 ♂ 2 ♀	9777	
Southwest of Cape San Blas.	28 42 30	85 29 00	88	gy. M		do	2403	do	1 ♂ 1 ♀ 1 y	15038	
Off Charlotte Harbor	26 33 00	83 10 00	28	sdy	66	Apr. 1, 1901	7123	*Fish Hawk*	1 y	25583	
Do	26 29 00	82 57 00	21	gy. S	66	Mar. 22, 1889	5113	*Grampus*	1 ♂ 1 ♀	15235	
Southwest of Sanibel Island.	26 19 00	83 11 00	27	S. algae	68	Mar. 21, 1889	5108	do	1 ♂	15234	
Do	26 19 00	83 22 00	31	S. G. bk. Sp	67.5	Mar. 18, 1889	5107	do	1 ♂	15233	
Do	26 19 00	83 33 00	36	S. Co	69.5	do	5106	do	1 y	15232	
Do	26 18 30	83 08 45	27	fne. gy. bk. Sp. brk. Sh.		Mar. 19, 1885	2412	*Albatross*	1 ♂	17926	
West of Cape Romano	25 54 00	82 42 55	20.5	gy. M	65.5	Mar. 15, 1889	5095	*Grampus*	1 ♂	15231	
Southwest of Cape Romano.	25 44 32	83 21 15	34	fne. S	69	Mar. 11, 1899	5088	do	2 y	15230	
West of Ten Thousand Islands.	25 33 30	82 39 00	20	fne. S	67	Mar. 3, 1889	5081	do	1 ♂	15229	
Northwest of Tortugas	25 04 30	82 59 15	26	fne. wh. S. brk. Sh.		Mar. 19, 1885	2414	*Albatross*	1 y	15041	

Do	25 00 31	83 03 00	29	mod. hrd., some Sh.	68	Feb. 16, 1889	5054	*Grampus*	1♂	15228	
Tortugas						1893		State Univ. Iowa Exped.	7♂ 5♀	Mus. S.U.I.	
Do	8 miles SW. of No. 10 buoy.			crs. S. few algae.		July 23, 1924	46	*Dohrn*, W. L. Schmitt.	1♂	61265	Gift of Carnegie Institution.
Do	4-5 miles S. of No. 2 buoy.		40	S		July 22, 1924	39	do	1 y	61269	Do.
Do	do		[1] 40	S		do	38	do	7 y	61268	Do.
Do	6 miles S. of No. 2 buoy		18	sponge belt, crs. S.		do	44	do	18 y	61266	Do.
Do	7 miles S. of No. 2 buoy		[1] 20			do	40	do	2 y	61270	Do.
Do	do		20			July 11, 1925	216	do	3 y	61275	Do.
Do	10 miles S. of No. 2 buoy.		50			July 22, 1924	42	do	3♂ 8♀ (4 ovig.)	61256	Do.
Do	About 11 miles S. of No. 2 buoy.		37			June 10, 1925	207	do	1 y	61276	Do.
Do	About 12 miles S. of No. 2 buoy.		50	sft. gy. Oz		do	208	do	1♀	61262	Do.
Do	About 13 miles S. of No. 2 buoy.		45			do	210	do	4♂ 1♀	61258	Do.
Do	About 15 miles S. of No. 2 buoy.		75			July 22, 1924	41	do	3♂ 3♀	61257	Do.
Do	S. of SW. Channel buoy.		20			Aug. 16, 1924	2	do	1 y	61271	Do.
Do	do		20			do	7	do	1 y	61272	Do.
Do	SE. of SW. Channel buoy.		20			do	9	do	1 y	61273	Do.
Do	Between black, mid-channel spar buoy and E. Channel red buoy.		10	muddy S., algae.		June 11, 1925	211	do	2 y	61274	Do.
South of Tortugas	24 [25 00 to 23 00]	82 [57 00 to 58 00]	*Meters* 87	wh. M		Nov. 26, 1919	20030	*Albatross*	2 y	61388	
			Fathoms								
Off Sand Key	Sand Key, W., 8½ miles.		31		74.5	Dec. 18, 1912	7787	*Fish Hawk*	3♂ 2♀	61386	
Do			40			May —, 1913		J. B. Henderson	1♂	46060	
South by east from Sand Key Light.			61					do	1♂ 3♀	61261	
Off Key West			[2]			June 26, 1893	46	State Univ. Iowa Exped.	4♂ 11♀	Mus. S.U.I.	
Do	Sand Key Light, W NW.; Key West Light, N.		60			June 19, 1893	24	do	1 y	do	
Key West			40			May —, 1913		J. B. Henderson	1♂ 1♀ y	46068	
South of Key West			60			May —, 1911		do	1♂ 2♀	61260	
10 miles south of Key West.			[3]					do	1♂	61264	

[1] About.

[2] Shallow.

[3] In floating gulf weed.

Material examined of Portunus (Achelous) spinicarpus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued	° ′ ″	° ′ ″			°F.						
Off Key West	24 25 45	81 46 45	45	Co	75	Jan. 15, 1885	2317	*Albatross*	1 ♀	15103	
Do	24 25 45	81 46 00	45	Co	75	do	2318	do	1 ♂ 2 y	14979	
Off Sombrero			54					William Stimpson.	1	M.C.Z.	
Ragged Key			75			May —, 1917	365	*Eolis*, J. B. Henderson.	1 y	50926	
Off Carysfort	25 11 30	80 10 00	60	co. S	69.2	Apr. 9, 1886	2641	*Albatross*	1 y	15042	
Off Fowey			90			Aug. —, 1916	352	*Eolis*, J. B. Henderson.	1 y	50925	
					°C.						
Gulf Stream off Cape Florida.	1 mile E. ¼ N. of Fowey Rock Light.		50	fne. gy. S. Co	20.5	Mar. 30, 1903	7516	*Fish Hawk*	1 ♀ ovig	61259	
Off Miami			30			May 12 ——		J. B. Henderson	1 y	61267	
Gulf Stream off Miami			25			1915		do	1 ♀	61263	
Cuba:											
San Antonio			5			1884		*Albatross*, W. Nye, jr.	1 y	7734	
Off Havana	23 10 39	82 18 48	130	fne. Co		Jan. 17, 1885	2320	do	1 ♂	9482	
					°F.						
Porto Rico: Mayaguez Harbor.	Pt. del Algarrobo, E., 2¾ miles.		75–76	rky. S. Co	68.5	Jan. 20, 1899	6063	*Fish Hawk*	2 ♀	24490	
North coast of South America:											
Sabanilla, Colombia						1884		*Albatross*	1 y. ♀	17928	
Near Trinidad	10 37 00 to 10 37 40	61 42 40 to 6 44 22	31–34	dk.slate-col.M	67–73	Feb. 3, 1884	2121–2122	do	4 ♂ 2 ♀ 1 y	18544	
Brazil:											
Rio de Janeiro								H. von Ihering	1 ♀ ovig	47836	From Mus. Nac. Rio de Janeiro.
Ilha Victoria, São Paulo						1907		Fr. Günther	1 ♂	S. Paulo Mus.	

less advanced, not reaching the line of the outer orbital teeth; the frontal teeth blunt, not sharp, at tip; the inner of the two teeth at the supra-orbital angle deltiform, not spiniform; merus of swimming leg a little longer, its postero-distal angle spinulous but not forming a lobe; long spine of wrist straight, not curved, in dorsal view, though sinuous in side view. The only full-grown specimen in hand lacks cheliped except for a long carpal spine.

The type-specimen (female) is only half grown; it is very deeply areolated, presenting a very different appearance from the full-sized male. The antero-lateral teeth are wider, the lateral spine longer. The merus of the cheliped has four inner spines and a broader postero-distal spine; the long carpal spine just reaches the distal third of the manus, outer spine smaller than proximal spine of manus; superior spine of palm at distal fifth of margin. Three smaller specimens (male) from as many localities agree substantially with the type.

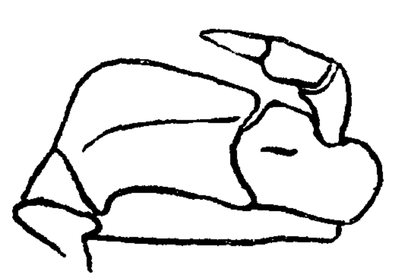

FIGURE 14.—PORTUNUS (ACHELOUS) IRIDESCENS, FEMALE, TYPE, OUTER MAXILLIPED, ×8

Measurements.—Male (17434), total length of carapace 26.4, width of same 51.8, width at anterior base of lateral spine 22, fronto-orbital width 12, width of front 3.8 mm.

Range.—Mexico: West coast of Lower California and Gulf of California.

Material examined.—See table, p. 97.

Material examined of Portunus (Achelous) iridescens

Locality	Bearings						Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.			Longitude W.											
	°	′	″	°	′	″			°F.						
West coast of Lower California: Off Santa Margarita Island.	24	27	00	111	59	00	47	fne. yl. S	68.5	Apr. 8, 1889	3039	*Albatross*	1♂ y.	17447	
Gulf of California:															
Off La Paz Bay, Lower California	24	30	15	110	29	00	112	gn. M	56	Mar. 16, 1889	2996	do	1♂	17434	
Northwest of Guaymas	28	07	00	111	39	45	71	fne. gy. S. brk. Sh.	57.9	Mar. 23, 1889	3011	do	1♂y	17444	
Off Cape Lobos	29	54	30	113	01	00	58	gn. M	61.8	Mar. 24, 1889	3017	do	1♀	17445	Holotype.
Off Diggs Point, Lower California	30	50	45	114	29	45	18	gy. M	63.5	Mar. 27, 1889	3033	do	1♂ y	17446	

Genus CALLINECTES Stimpson

Callinectes STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 220 [92]; type, *C. diacanthus* (Latreille) = *C. sapidus* Rathbun.

Differs from *Portunus* in having the abdomen of the male very narrow, ⊥-shaped, and the merus of the outer maxillipeds strongly produced outwardly at the antero-external angle. The different species agree also in being of large size; in having only four dorsal carinae, formed of single granules; two transverse, usually curved and subparallel lines on the gastric region and one sinuous oblique line on the branchial region leading inward from the lateral spine; eight strong antero-lateral teeth followed by a stout spine at the lateral angle; stout chelipeds, the manus with five external carinae, a supero-distal spine and a proximal spine at articulation with carpus; the carpus without an inner spine, an outer spine at widest part of article; merus with three (exceptionally 4) stout spines on inner margin and a small spine at postero-distal end; paddles without spines. Maximum size of female less than that of male; abdomen of immature female triangular from fourth segment to extremity.

Inhabits the shores of tropical and temperate America; West Africa; South Pacific islands.

KEY TO THE AMERICAN SPECIES OF THE GENUS CALLINECTES

A¹. Front bidentate between the teeth at inner end of orbits. Appendages of male abdomen reach end of terminal segment_____**sapidus**, p. 99.

A². Front quadridentate between the teeth at inner end of orbits.

B¹. Median pair of frontal teeth low, rudimentary.

C¹. Inner orbital fissure closed.

D¹. Appendages of male abdomen reach end of terminal segment. Antero-lateral teeth acuminate. Intramedial area[14] about twice as broad as long_____**sapidus acutidens**, p. 111.

D². Appendages of male abdomen do not reach beyond middle of penult segment. Antero-lateral teeth broad and shallow. Intramedial area about three times as broad as long. **ornatus**, p. 114.

C². Inner orbital fissure open. Appendages of male abdomen reach only to distal fourth of penultimate segment_____**bellicosus**, p. 112.

B². Median pair of frontal teeth well developed, even if small.

C¹. Lateral spine of carapace more than twice length of posterior margin of preceding tooth.

D¹. Intramedial region shorter than its posterior width.

E¹. Second to sixth antero-lateral teeth with anterior and posterior margins subequal. Tips of male appendages straight, reaching terminal fourth of penultimate segment. **danae**, p. 118.

E². Second to fifth or sixth antero-lateral teeth trending forward, their posterior margins convex and longer than anterior margins.

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[14] That part of the gastric region behind the posterior of the gastric carinae.

F¹. Median frontal teeth one-third the size of outer pair. Anterior width of intramedial area twice its length. Appendages of male abdomen reach or nearly reach last segment, tips slightly curved_**arcuatus**, p. 121.

F². Median frontal teeth very small. Anterior width of intramedial area more than twice its length. Appendages of male abdomen very short, overreaching third (or coalesced) segment but little if at all. **marginatus**, p. 123.

D². Intramedial area longer than its posterior width. Frontal teeth large, typically blunt and rounded. Appendages of male abdomen reaching nearly to end of terminal segment. **toxotes**, p. 127.

C². Lateral spine of carapace not more than twice length of posterior margin of preceding tooth.

D¹. Antero-lateral region of carapace smooth, nongranulate. Frontal teeth typically broadly rounded. Appendages of male abdomen reaching end of terminal segment___**bocourti**, p. 128.

D². Antero-lateral region granulate. Frontal teeth triangular. Appendages of male abdomen reaching middle of penultimate segment_____**exasperatus**, p. 130.

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
sapidus acutidens	*bellicosus*
danae	*arcuatus*
bocourti	*toxotes*

CALLINECTES SAPIDUS Rathbun

BLUE CRAB; COMMON EDIBLE CRAB

Plate 47

Lupa hastata SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1817, p. 65, in bays, etc. [east coast United States]; p. 443, St. John River, Florida. Not *L. hastata* Desmarest, 1823=*Cancer hastatus* Linnaeus, 1767, Adriatic.

Portunus diacantha LATREILLE, Encyc. Méth., Hist. Nat., Insectes, vol. 10, 1825, p. 190 (variety only) (type-localities of *diacantha*, North America, Antilles, Brazil, etc.; types not extant).

? Lupea dicantha MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 451 (part).

Lupa dicantha GOULD, Invert. Massachusetts, 1841, p. 324.—DE KAY, Nat. Hist. New York, Zool., pt. 6, Crust., 1844, p. 10, pl. 3, fig. 3.

Callinectes hastatus ORDWAY, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 568.—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 224 (variety of *C. diacanthus*).—R. RATHBUN, Fisheries and Fishery Industries of the U. S., sec. 1, 1884, p. 775, pl. 267.

Callinectes sapidus RATHBUN, Proc. U. S. Nat. Mus., vol. 18, 1895 (1896) p. 352, pls. 12; 24, fig. 1; 25, fig. 1; 26, fig. 1; 27, fig. 1.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 432, pl. 35, fig. 1.—PIERS, Proc. Nova Scotia Inst., Halifax, vol. 15, 1923, p. 83; Cow Bay, near Halifax.

Diagnosis.—Frontal teeth two. Appendages of first segment of male abdomen reach extremity of abdomen.

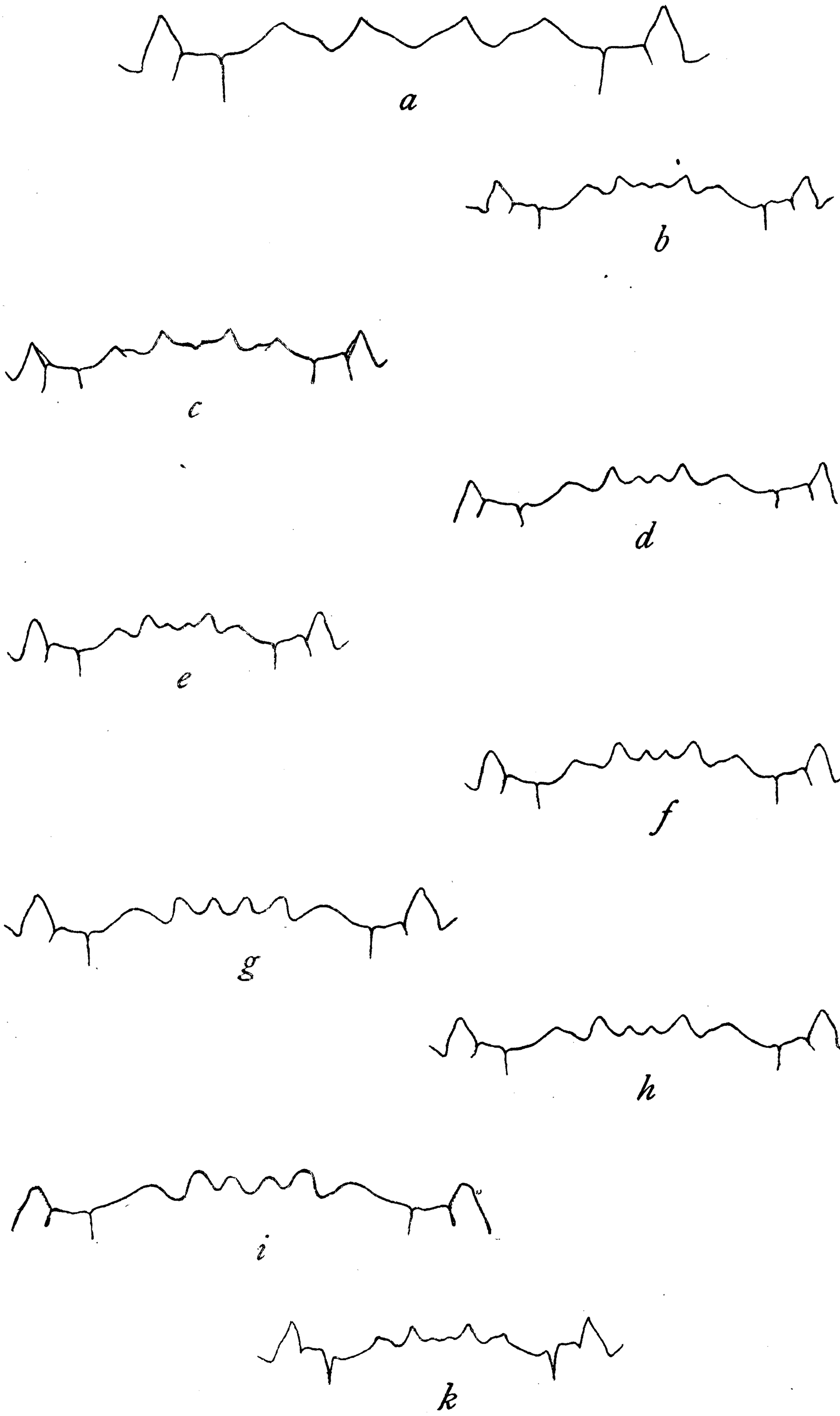


FIGURE 15.—CALLINECTES, FRONTAL OUTLINES. *a*. SAPIDUS. *b*. ORNATUS. *c*. SAPIDUS ACUTIDENS. *d*. DANAE. *e*. MARGINATUS. *f*. EXASPERATUS. *g*. BOCOURTI. *h*. ARCUATUS. *i*. TOXOTES. *k*. BELLICOSUS

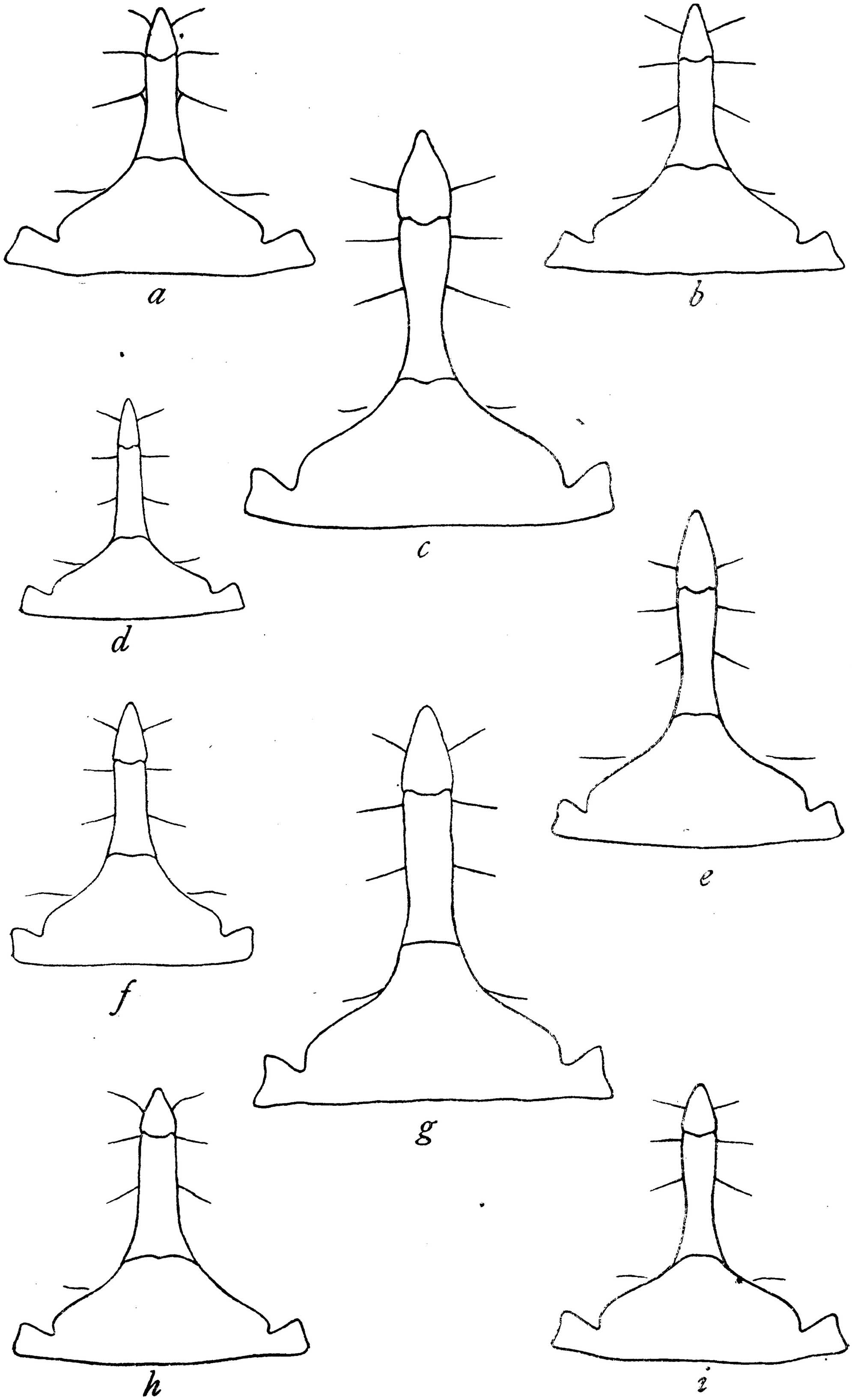


FIGURE 16.—CALLINECTES, ABDOMINAL OUTLINES OF MALE. *a*. ORNATUS. *b*. DANAE. *c*. SAPIDUS. *d*. MARGINATUS. *e*. BOCOURTI. *f*. EXASPERATUS. *g*. TOXOTES. *h*. ARCUATUS. *i*. BELLICOSUS

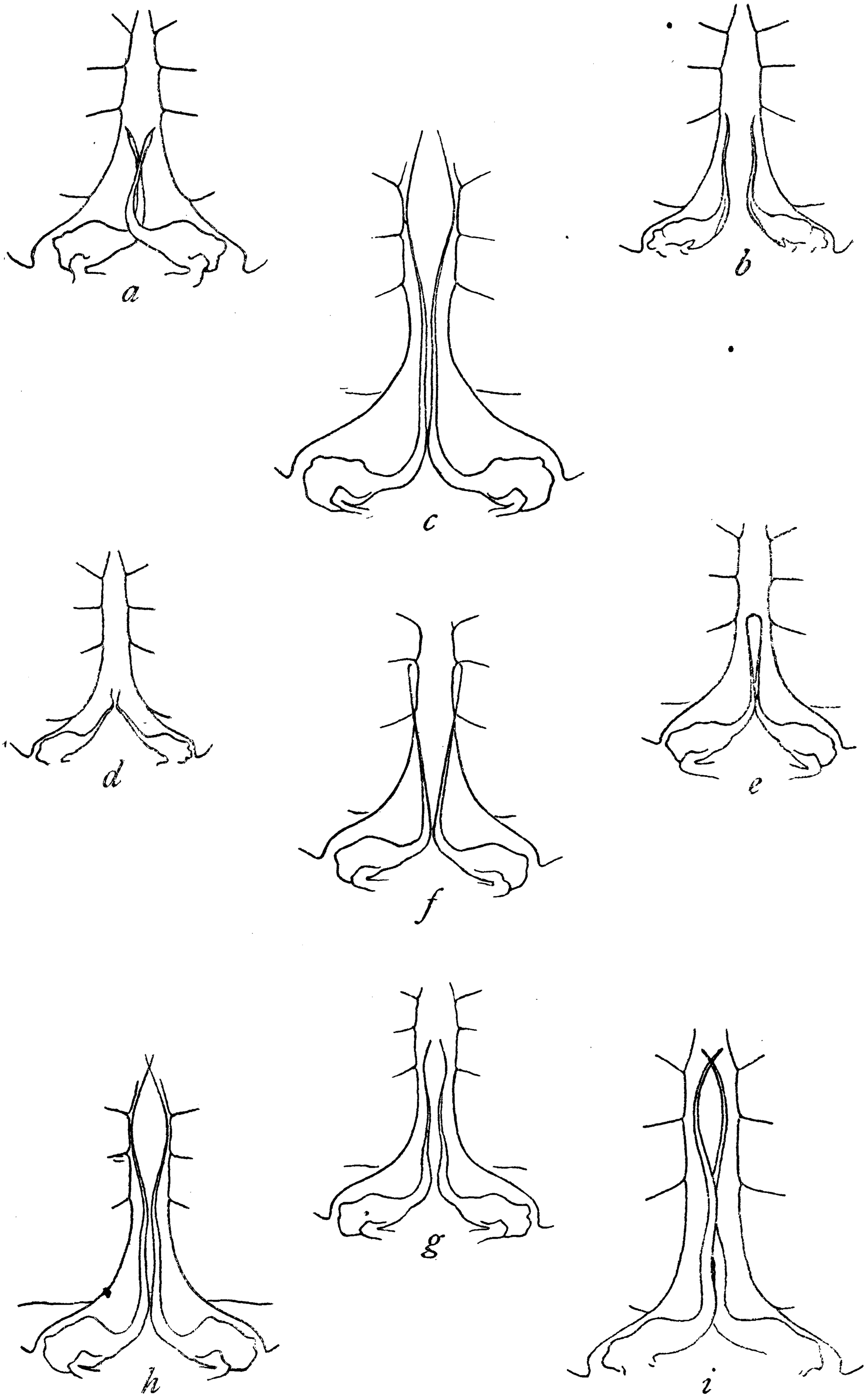
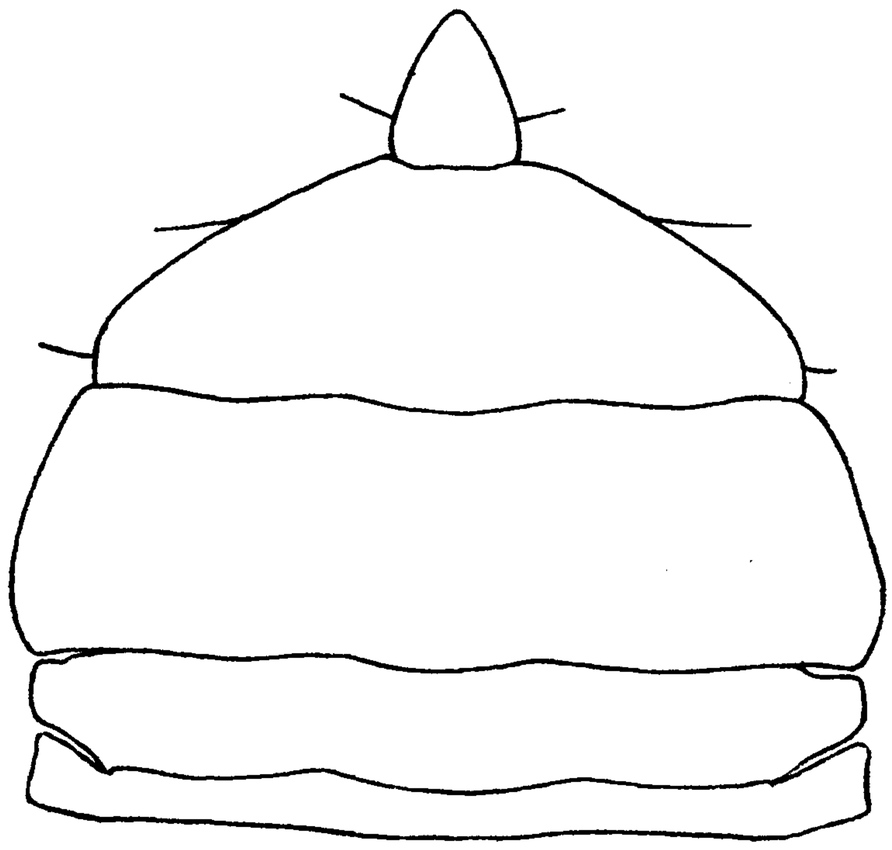


FIGURE 17.—CALLINECTES, ABDOMINAL APPENDAGES OF MALE. *a*. ORNATUS. *b*. DANAE. *c*. SAPIDUS. *d*. MARGINATUS. *e*. EXASPERATUS. *f*. ARCUATUS. *g*. BELLICOSUS. *h*. BOCOURTI. *i*. TOXOTES



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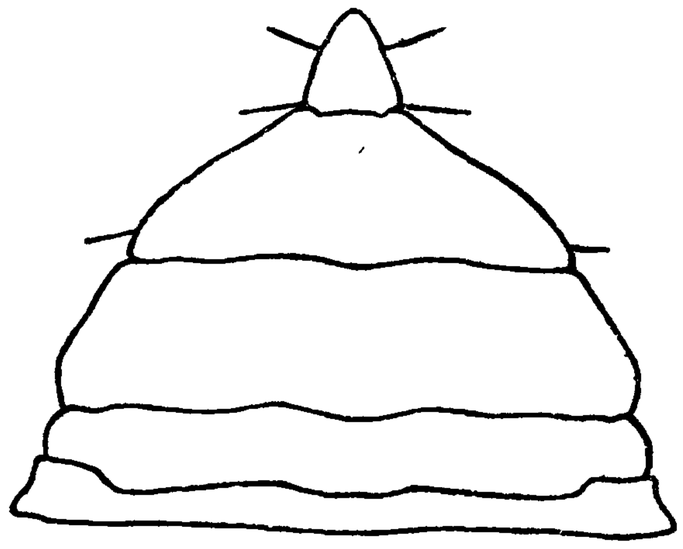

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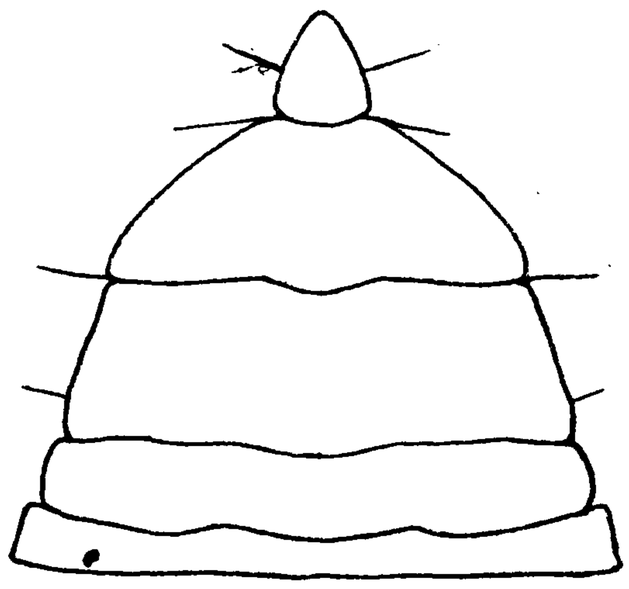

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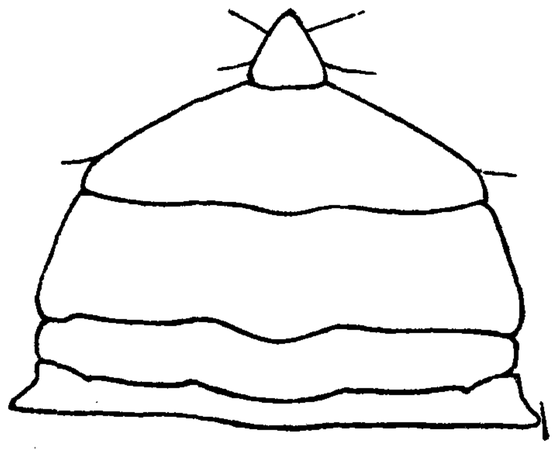

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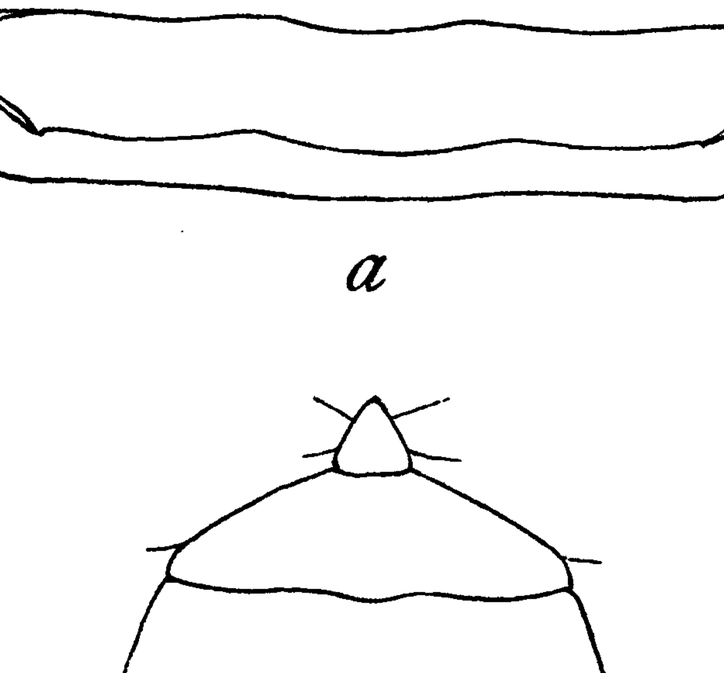

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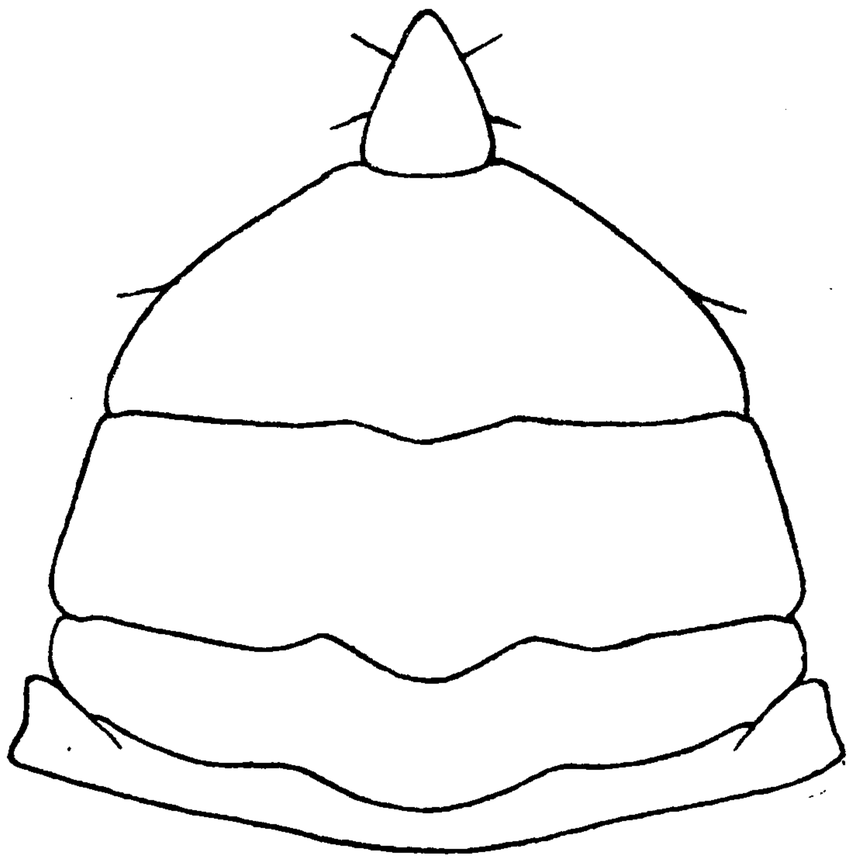

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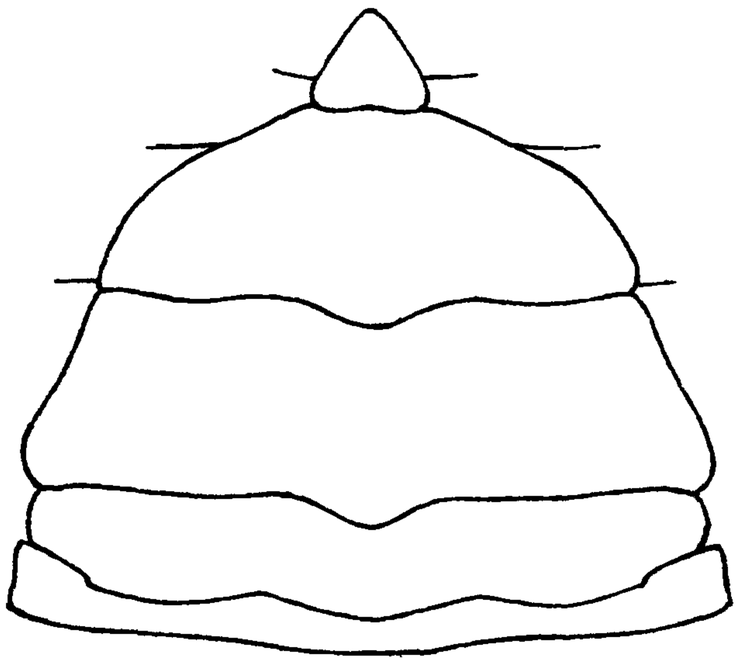

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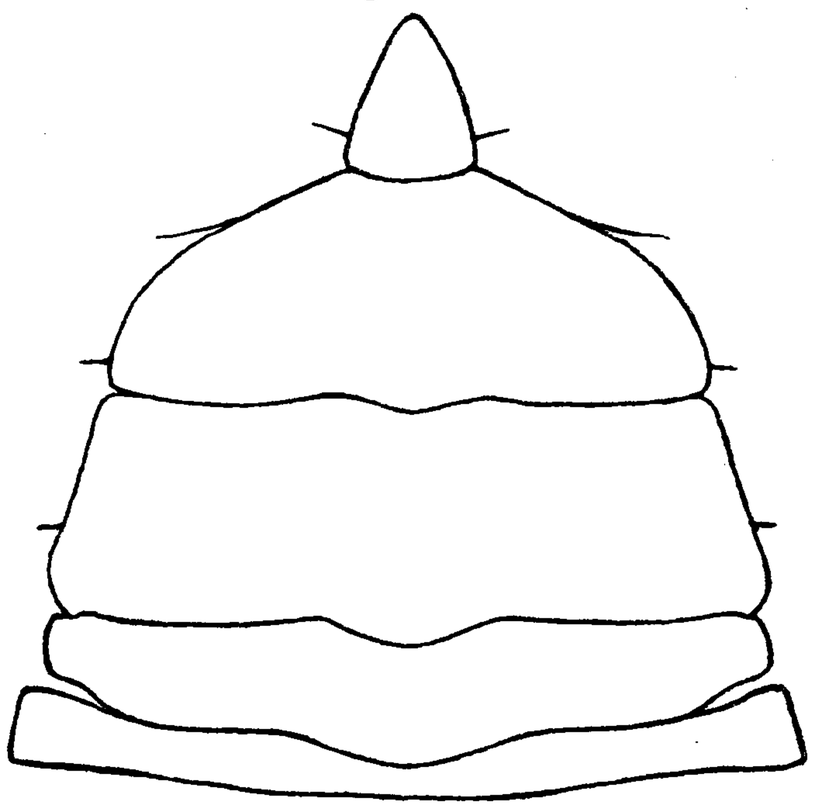

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FIGURE 18.—CALLINECTES, ABDOMINAL OUTLINES OF FEMALE. *a*. SAPIDUS. *b*. ORNATUS. *c*. MARGINATUS. *d*. DANAE. *e*. EXASPERATUS. *f*. BOCOURTI. *g*. ARCUATUS. *h*. TOXOTES. (FOR BELLICOSUS, SEE FIG. 20, P. 113)

Description.—Carapace of adult male from 2⅙ to 2½ times as broad as long, moderately convex; granules of medium size, crowded on the cardiac and inner branchial regions, scattered and faintly marked on the anterior half of the carapace. Length of intramedial region about one-half or a little less than one-half its anterior width. Frontal teeth two, broadly triangular, subacute, extremities almost rectangular; faint indications of a median pair of denticles on their oblique inner margins sometimes present; median subfrontal spine conical and strong. Inner supraorbital tooth broad, faintly bidentate, less advanced than the front; of the superior fissures the outer is shorter than the inner, both are closed except at anterior extremity where there is a shallow V-shaped opening; outer tooth elongate-triangular, acute; inner suborbital tooth acute. Lateral teeth 2 to 8 acuminate, concave on both margins; lateral spine in males from two to about four times the length of preceding tooth. Costae of wrist and hand marked with depressed granules, often almost smooth to the eye; lower costa obsolete on greater part of palm.

Penultimate segment of male abdomen much constricted in its proximal half, widening at both extremities; terminal segment elongate, obtuse, lateral margins convex proximally, slightly concave or straight distally; appendages of first segment reaching nearly to or beyond the extremity of the abdomen, approximate for their basal half, with only a slight outward curve, distal portions widely divergent except at tips. Abdomen of adult female very broad, margins of third, fourth, and fifth segments separately convex; terminal segment longer than wide.

Age variation.—In small and medium sized specimens the granules are more distinct on anterior half of carapace and on costae of wrist and hand, the antero-lateral teeth broader, their margins more or less convex, inner suborbital tooth broader and obtuse, abdominal appendages shorter than in the old.

Color.—Grayish or bluish green of varying shades and tints relieved by more or less brilliant red on the spines of carapace and on the fingers. (Hay and Shore.) Occasional examples of albinism have been noted, either a claw (23840) or a wholly white crab (Maryland).

Size.—Adult males vary in width from 6¼ to 8¾ inches; adult females from 5 to 7 inches. Male (19051), total length of carapace 75.4, width of same 178, width at anterior base of lateral spine 139.2, fronto-orbital width 62.6, width of front 19.6 mm. Male (59885), total length of carapace 93.6, width of same 223, width at anterior base of lateral spine 169, fronto-orbital width 76, width of front 23 mm.

Habitat.—Muddy shores to deep water; brackish water of estuaries, and occasionally in fresh water. Common; used abundantly for food.

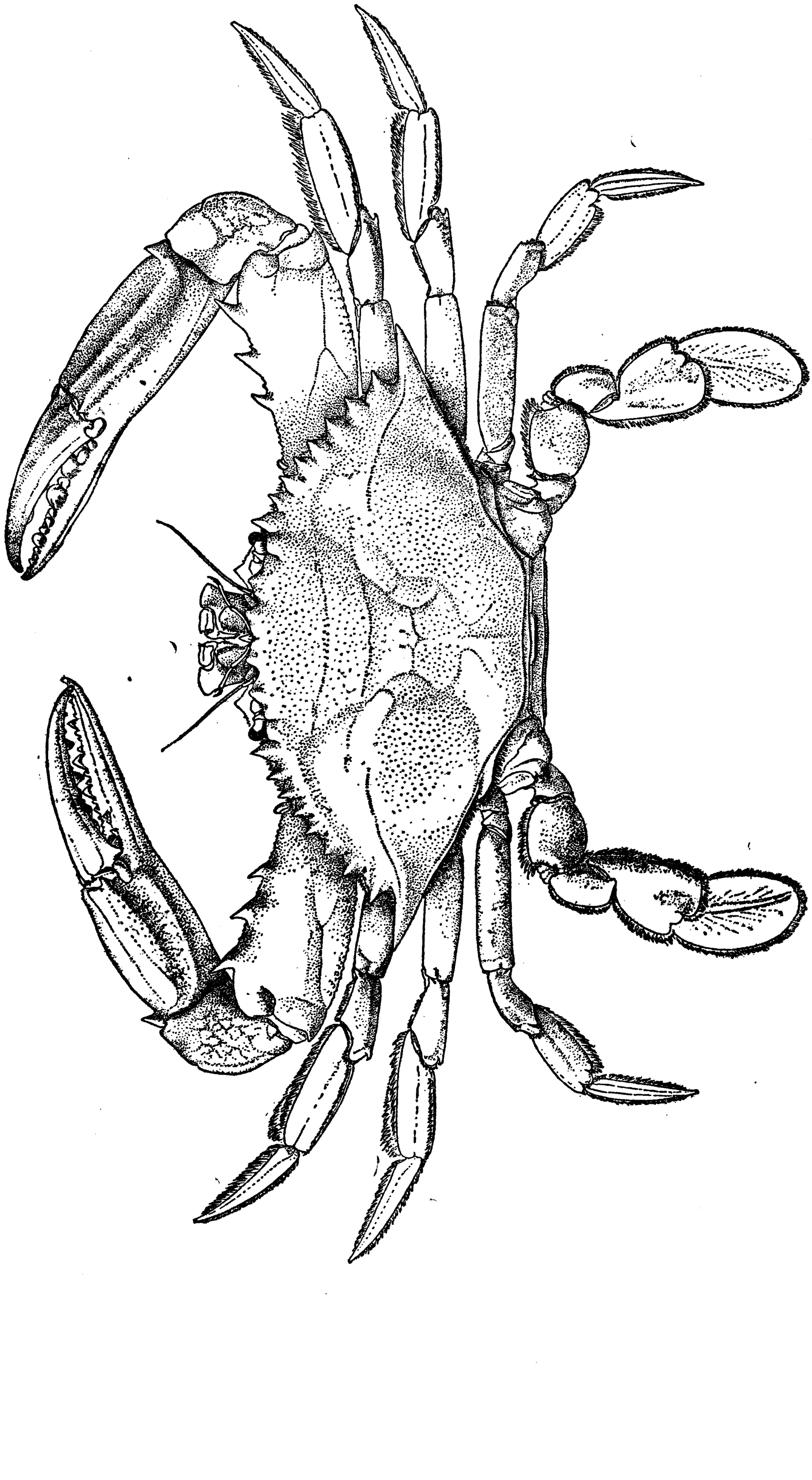

FIGURE 19.—CALLINECTES SAPIDUS, MALE, WOODS HOLE, DORSAL VIEW. AFTER R. RATHBUN

Range.—Nova Scotia to Uruguay; Bermudas.[15] Uncommon north of Cape Cod; occasionally in Massachusetts.

Material examined.—

MASSACHUSETTS.—U. S. Fish Commission: Vineyard Sound; 6 young (2249). Woods Hole: 1882, 3 large. (4946); 1883, 1 female (5860); August, 1885, 1 young (40788); surface, by electric light, September 5, 2 young (40723). Vicinity of Woods Hole; 1911; 1 specimen (43178).

RHODE ISLAND.—Newport; 1880; U. S. Fish Commission: 2 young (4537); shore, sand, 1 young male (36324); shore, 1 young (36327).

NEW YORK.—Hudson River at West Point; August 18, 1910; E. A. Mearns; 2 males (41457). Creek near West Point; E. A. Mearns; 6 young (19648). Sing Sing; brackish water; S. F. Baird; 1 male, 2 young (2449). Patchogue, Long Island; September 17 and 19, 1884; T. H. Bean; 8 specimens (8922). Great South Bay; 1898; T. H. Bean; 5 young (42566). Clam Pond Cove; October 8, 1898; T. H. Bean; 1 male (42565).

NEW JERSEY.—Great Egg Harbor; William Stimpson; 2 males (3218). Near Cape May; 1928; Horace G. Richards; 1 young, returned to sender.

MARYLAND.—(For *Fish Hawk* dredgings in Chesapeake Bay, see table, p. 108.) Fork Point; Thomas Stine; 1 deformed claw (41753). Magothy Bay; July 22, 1916; *Fish Hawk;* 1 young (61055). South Bend (an estuary of the Chesapeake about 12 miles below the Severn River); De Lancy Gill; 1 deformed claw (43351). Chesapeake Beach: September 27, 1905, Bureau of Fisheries, 2 specimens (47287); June 23, 1910, A. C. Weed and W. W. Wallis, 1 young male (40269); July 24, 1920, Earl D. Reid; 2 young (61057). Mouth of creek half way between Chesapeake Beach and Plum Point; May 30, 1912; William Palmer and A. C. Weed; 1 young (48872). Beach about 2 miles N. of Plum Point; Weed, Wallis, Palmer, and Hasbrouck: July 3, 1912, 2 young (44489); July 4, 1912, 1 young (44492). Plum Point; June 1, 1912; Palmer and Weed; 6 young (48865). Plum Point Creek; July 4, 1912; Weed, Wallis, Palmer, and Hasbrouck; 3 young (44491). Parker Creek; Weed, Wallis, and Palmer; 1 young (48871). Beach about 1 mile N. of Dare's Wharf, Calvert County; July 5, 1912; Weed, Wallis and Palmer; 3 young (44490). Near Barren Island; 20 fathoms; 1882; *Fish Hawk;* 1 specimen (5189). Rock Point, Neals Creek, Deans shore, Charles

[15] For its accidental occurrence at Rochefort, France, in fresh water, see Bouvier, Bull. Mus. Hist. Nat. Paris, vol. 7, 1901, p. 16.

County; September 5, 1927; A. A. Dean; 1 male (61370); Blackistone Island; November 4, 1897; Bureau of Fisheries; 3 young (48864). South side Piney Point; October 4, 1897; A. Marmaduke, Bureau of Fisheries; 4 young (48867). St. Georges Island; brackish pond; August 11, 1890; H. M. Smith, U. S. Fish Commission; 10 young (20113). Rock Hole Creek, Little Annemessex River; August 26, 1891; *Fish Hawk;* 1 male (26093), with oyster spat attached.

POTOMAC RIVER.—March 25, 1891; J. F. H. Sisson: 1 deformed claw (15624). Washington, D. C., market; Violet Dandridge; 1 male, 1 female (45656).

VIRGINIA.—(For *Fish Hawk* dredgings in Chesapeake Bay, see table, p. 108.) Back River; 1897; Capt. Wm. Thompson; 3 deformed claws (21694). Kinsale, Westmoreland County; Capt. J. H. Johnson; 1 male (33018), with oyster attached. Mathews Court House, Mathews Co.; January 15, 1893; Capt. Alex. James; 1 female (26092), with young oyster attached. Cape Charles City; October 25, 1897; U. S. Bureau of Fisheries; 4 specimens (48866). York River, Gloucester Point; April 3, 1894; *Fish Hawk;* 1 young (48869). Mouth of Hampton Creek; February 24, 1898; U. S. Bureau of Fisheries; 1 young (48868). Hampton Bar; N. Raynor; 1 female (23220; right claw white. Willoughby Point; January 21, 1880; M. McDonald; 2 deformed claws (3327, 3328). Lynnhaven Roads; in seine; July 16, 1916; *Fish Hawk;* 1 y. female (61383). Chincoteague; July, 1913; Henderson and Bartsch; 5 young (46283). Accomac; 1851; Samuel J. Adams; 3 claws (1 deformed) (2451). Cheriton, Northampton County; August 9, 1927; T. B. Smith; 2 males, 1 female, immature (61061). Off Hampton Roads; April 8, 1887; *Albatross:* 11 fathoms, 1 young female (12456). 12 fathoms, 1 young (12455).

NORTH CAROLINA.—Gallant Point, Beaufort; mud flats; September 13, 1928; Schmitt and Shoemaker; 3 young (62462).

SOUTH CAROLINA.—Near Charleston Harbor; 1–12 fathoms; March 20, 1880; R. E. Earll; 1 female (3153). 1891; *Fish Hawk:* Winyah Bay; 1 young (20114). Off North Island, Winyah Bay; 6 feet; January 6; 3 males, 3 females, 1 young (17192). Creek flowing into Ashley River between bridge and Wappoo cut; January 9; 4 young (18411). Jericho Creek; January 23; 1 young (17193). Coosaw River; February 18; 25 young (17190). Cat Island Creek, Port Royal; February 2; 1 specimen (17194). One mile inside May River; January 17; 1 female, 1 young (32275).

Material examined of Callinectes sapidus from Chesapeake Bay survey

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.
	Latitude N.	Longitude W.								
Chesapeake Bay, Maryland:	° ′ ″	° ′ ″			°F.					
½ mile ENE. from Sandy Point Light	39 01 12	76 22 30	9.5	hrd. brk. Sh	43.9	Dec. 10, 1915	8401	*Fish Hawk*	1 y	58344
2¾ miles ENE. of Thomas Point Shoal Lighthouse.	38 55 09	76 23 12	23	hrd. bk. M	65.5	Oct. 27, 1915	8361	do	1 y	58343
Thomas Point Light, NW. by N., 2½ miles			13	bk. M. Sh		Mar. 11, 1882	1073	do	1 y	14459
Thomas Point Light, N. by E. ½ E.; Bloody Point Light, E. ⅞ S.	38 50 15	76 27 16	5	hrd. S. brk. Sh	50.5	Apr. 26, 1916	8529	do	2 y	58346
Governors Run Wharf, W. ¼ S., approx. ⅞ mile	38 30 15	76 28 45	5	hrd. brk. Sh	51.8	Apr. 25, 1916	8526	do	1 y	58345
Point No Point, W. by S.; Hooper Island Light, NW. by N.; Holland Island Bar Light, SSE.	38 09 20	76 09 06	4	hrd. fne. gy. S	63.7	Oct. 25, 1915	8351	do	1 y	58342
Chesapeake Bay, Virginia:			*Meters*		°C.					
Smith Point Light, NW. by N.; buoy, NNW			43.92	G. Sh	10	Dec. 6, 1920	8911	do	1 y	58347
Smith Point Light, 270°; Great Wicomico Light, 236°.			12.81		11	Mar. 31, 1921	8975	do	1 y	58348
			Fathoms							
½ mile SE. of Tangier Light	37 47 00	75 58 00	12			Jan. 18, 1914	8018	do	2 y	61053
			Meters							
No. 2 B Buoy, N. by W. ⅜ W.; N. 3 B Buoy W. ¼ N.			11.44			July 9, 1920	8830	do	4♂ 3♀	55733

FLORIDA.—1879; J. W. Milner; 2 young (18245). St. Mary's River, Fernandina; December 5, 1919; *Albatross;* 1 young (61056). Salt Springs, Marion County; November 19, 1926; Edward J. Brown,[16] 3 males (59885). Indian River at Titusville; January 14, 1896; U. S. Fish Commission; 5 young (20110). Indian River Inlet; January 23, 1896; U. S. Fish Commission; 1 female (20109). Stuart, St. Lucie River; January 29, 1896; U. S. Fish Commission; 2 young (20111). Lantana; February 12, 1892; H. M. Smith; 2 young (20112). Cocoanut Grove; shallow water at edge of bay; November 1923; James Silver, U. S. Biological Survey; 1 male, soft shell, 2 females, all young (58425). Bamboo Key, Florida Bay; January 23, 1903; *Fish Hawk;* 1 young (48881). Key West; H. Hemphill; 10 young (13827). Boca Grande, just inside of Pass; surface; April 27, 1915; 7.30–8.30 p. m.; *Fish Hawk* (E. Danglade); 1 young male, 2 young females (61381). Tortugas; W. L. Schmitt; gift of Carnegie Institution: June 13, 1925, Dexter collector, 1 male (61058); Long Key beach, from sand, August 20, 1924, 1 young (61005); Long Key, in 50-foot seine, July 30, 1924, 1 female (61004). Cape Sable Creek; February 19, 1889; *Grampus;* 6 females, 1 young (15244). Marco; H. Hemphill; 2 young (15030). Marco; February 25, 1889; *Grampus;* 9 specimens (15236). Gordon's Pass; February 27, 1889; *Grampus;* 1 male (15243). Puntarasa; 1 fathom; February 1884; H. Hemphill; 1 young male (23283). Naples; April 4, 1928; O. C. Van Hyning; 2 males, 2 females, returned to Florida State Mus. Fort Thompson, Caloosahatchie River; in fresh water; 1 male (21332) St. James City, anchorage; surface; December 31, 1912; 5.15 to 6.45 p. m.; *Fish Hawk;* 1 young female (61382). Big Gasparilla Pass; March 5 and 16, 1889; *Grampus;* 5 males, 3 females (15240). Little Gasparilla Pass; March 17, 1889; *Grampus;* 1 male, 2 females (15239). Punta Gorda; *Fish Hawk;* 2 young (15245). Little Sarasota Bay; May, 1884; H. Hemphill; 2 males (6957). Tampa Bay; 3½–6½ fathoms; March 29, 1901; stations 7109–7112, *Fish Hawk;* 1 male (25581). Off Port Tampa; 4 fathoms; mud; January 19, 1898; *Fish Hawk;* 3 young females (61059). Clearwater; July 14, 1879; S. T. Walker; 1 young (3280). Cedar Keys; December, 1883; H. Hemphill; 6 young females (15033). Apalachicola Bay, vicinity of New Inlet; 1915; *Fish Hawk;* 1 young male (61384). St. Vincent Sound, Apalachicola; April 7, 1915; E. Danglade, Bureau of Fisheries 1 male (61054).

[16] "The country is a rolling one and in a depression the waters from the spring emerge from the ground forming a basin 100 feet or more across and making quite a considerable stream flowing into Lake George, fresh water, 6 miles away. The water emerges from openings in the rock bottom of the basin with considerable force, one "boil" especially resembling a turbulent kettle in action over a hot fire, and the water so deep in several of the "boils" that bottom could not be seen. Here we secured the crabs. We took a sample of the water from the most active "boil" and could hardly class it as salt. I doubt if sodium chloride is present in any quantity. Lake Kerr, about half a mile from Salt Springs, is fresh water". (Edward J Brown.) These specimens have attained a remarkable size, the result perhaps of their unusual environment. The three specimens in the National Museum are from 8 to 8¾ inches (206 to 223 mm.) in width.

MISSISSIPPI.—Biloxi; specimens in Copenhagen Mus.

LOUISIANA.—Lake Pontchartrain; November 9, 1882; Dr. R. W. Shufeldt, U. S. A.; 3 males, 2 females (5280); purchased in New Orleans market. New Orleans; 1883; Dr. R. W. Shufeldt, U. S. A.; 7 specimens (13795). Near oyster bank in bay, St. Bernard Parish; 3 feet; mud; February 7, 1898; *Fish Hawk;* 1 young female (26094). West of island at S. end of Nine Mile Bayou; 2–3 fathoms; hard bottom; *Fish Hawk;* 1 young (49225). Cameron; R. P. Cowles; 1 female (30567).

TEXAS.—1891; B. W. Evermann, U. S. Fish Comm.: Galveston Bay, November 4, 1 male (17105); jetty, Galveston, November 5–15, 1 young male (17104); Swan Lake, Galveston, 2 young (17107); Dickinson's Bayou, November 14, 1 young male (17109); Corpus Christi, November 27–30, 1 male, 3 females, all young (17106); Shamrock Point, Corpus Christi, November 27–30, 1 young female (17108). Virginia Point; Vernon Bailey, U. S. Biological Survey; 1 male (23654). Matagorda Peninsula; February 15, 1892; William Lloyd, Department of Agriculture; 1 male (17710). Near Indianola; 8 males,. 9 females, 10 young (2069). J. D. Mitchell: Matagorda Bay, 1 male with abnormal abdomen (25035), approaching subspecies *acutidens;* Old Indianola, Matagorda Bay, November 3, 1903, 2 specimens (29325), showing injuries received in soft shell; near Bat Dupuy Lake, Jackson County, 1 full grown, immature (21647); cove, Sand Point, Port Lavaca Bay, 1 male, 2 females (19051); Keller's Bay, Calhoun County, 2 large, immature females (23089), 1 deformed claw, 1 carapace (23090), 1 male with left albino claw (23840); Big Dam Lake, O'Connor's Ranch, Calhoun County, 1 male with deformed abdomen, 3 deformed claws (25234). Espiritu Santo Bay; J. Forestier; 1 deformed claw (21630).

EAST COAST OF NORTH AMERICA.—S. I. Smith; 2 deformed claws (40862).

CUBA.—Santiago Harbor; January 30, 1913; John T. Nichols; 1 young (45976).

JAMAICA.—March, 1884, *Albatross,* 1 male (7679). C. R. Orcutt, 1 cheliped, varying toward *sapidus acutidens* (62464). Big River of Twin Rivers, Lucea; July 27, 1910; E. A. Andrews; 1 specimen (42866). Montego Bay; November 12, 1910; E. A. Andrews; 3 males (1 soft shell) 1 female (42867). Montego Bay; July 10, 1910; C. B. Wilson; 1 female (42857). Kingston Harbor: 1893, R. P. Bigelow, 1 female (17976); May 31, 1927, C. R. Orcutt, 1 male, varying toward *sapidus acutidens* (62463). Mouth of Rio Cobre (fresh water); R. P. Bigelow; 1 young (18244).

NICARAGUA.—1892; Charles W. Richmond; specimens varying toward *sapidus acutidens:* Escondido River; September 6; 1 male (18630). Greytown; March 27; 1 male, 3 females (18246).

BRAZIL.—Rio Grande do Sul; 1 old male (Brit. Mus.).

URUGUAY.—F. Felippone: Cape Polonio, Rocha; 1 male (61369), right cheliped malformed. Twenty miles off Punta del Este; 1923; 1 male (57566).

CALLINECTES SAPIDUS ACUTIDENS Rathbun

Plate 48

Callinectes sapidus acutidens RATHBUN, Proc. U. S. Nat. Mus., vol. 17, 1895 (1896), p. 354, pl. 13; pl. 24, fig. 2 (type-locality, Santa Cruz, Brazil; type, Cat. No. 4696, M. C. Z.); Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 47.

Diagnosis.—Teeth of carapace acuminate, spiniform. A pair of small median frontal teeth.

Description.—Carapace wider, prominences more strongly marked than in typical *sapidus*. Areolations separated by deeper depressions, granules more raised, gastric carinae stronger and more sinuous. There is also a transverse granulate ridge on each cardiac lobe. Frontal teeth narrower and more acute, and there are also two small intermediate teeth. Subfrontal and suborbital spines acuminate. Lateral teeth of carapace broad at base, narrowed abruptly to long, acuminate tips, margins granulate; seventh and eighth teeth very long, adding to the effect of width and making the antero-lateral margin less arcuate. Costae of cheliped very prominent and strongly granulate; two spines on carpus, one at outer angle and a shorter one close to the propodal spine.

Measurements.—Type male, total length of carapace 50.8, length to median sinus of front 49, width of carapace 121, length of lateral spine 16, of preceding tooth 5 mm. Male (43921), total length of carapace 67, width of same 148.6, width at anterior base of lateral spine 122, fronto-orbital width 55, width of front 16.4 mm.

Range.—From the east coast of Florida to Rio de Janeiro, Brazil. This is the tropical form of *C. sapidus*, which prevails in both the north and south temperate zones.

Material examined.—

FLORIDA.—St. Johns River, Palatka; January 25, 1897; W. C. Kendall, U. S. Fish Commission; 1 male (22276).

LOUISIANA.—Lake Palourde, Morgan City; April 21, 1897; H. R. Center, U. S. Fish Commission; 2 males (22275).

PORTO RICO.—1899; *Fish Hawk*: Arroyo; February 4; 1 young male (24469). Mayaguez Harbor; Custom House, E. by S., 2 miles; 7 fathoms; stky. M; temperature 27° C; station 6059; 1 female (24470).

PANAMA.—Canal Zone; 1911; Meek and Hildebrand, Smithsonian Biological Survey: Toro Point: April 12, 1 male (43922), 1 male (Field Mus.); May 20, 1 female (43920). Fox Bay, Colon: January 20, 1 immature male (Field Mus.); January 27, 2 males (1 soft shell), (59290). French Canal, Mindi, January 19, 1 immature

female, soft shell (Field Mus.). Mindi Cut, Mindi: January 28, 1 young (43918), 2 young (Field Mus.); February 3 and 4, 1 male (43921). Creek near Gatun, January 19, 1 male, 2 females (43919), 1 male, 2 females (Field Mus.).

BRAZIL.—Santa Cruz, State of Bahia; Thayer Expedition; 1 male holotype (M.C.Z.). São João da Barra, State of Rio de Janeiro; November 11; E. Garbe collector; 1 immature female (returned to H. von Ihering). Rio de Janeiro; Thayer Expedition; 1 male paratype (19083), 1 male paratype (M.C.Z.).

CALLINECTES BELLICOSUS Stimpson

Plate 49

Lupa bellicosa (Sloat, MS.) STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 57 [11] (type-locality, Guaymas; type not extant).

Callinectes bellicosus ORDWAY, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 577.—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 227 (var. of *C. diacanthus*).—RATHBUN,Proc. U. S. Nat. Mus., vol. 18, 1895 (1896), p. 365, pl. 22; pl. 24, fig. 10; pl. 25, fig. 8; pl. 26, fig. 8.—HOLMES, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 73.

Lupa bellicosa? LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 105 [11].

Diagnosis.—Middle pair of frontal teeth rudimentary. Inner orbital fissure open. Outer-upper carina of palm rough with short sharp tubercles. Lateral spine of carapace short.

Description.—Carapace rather evenly convex, furrow at inner angle of branchial region deeply impressed, gastro-cardiac furrow shallow, cardiac region not medially divided. Granules fine, closely set except on the antero-lateral region where they are scanty and in the old absent. Transverse carinae low, the gastric ones much curved; all become indistinct with age especially on the inner half of the branchial region. Median length of intramedial region less than half its anterior width and only ¾ or ⅔ of its posterior width. Front with two slender sharp spiniform outer teeth and between them a pair of very faintly marked broad, shallow teeth. Submedian tooth sharp, longer than the lateral frontal pair. Inner supraorbital tooth acute; inner fissure open, often throughout its length; orbital border outside the fissure advanced beyond that portion inside the fissure. Suborbital tooth slender, sharp and well advanced. Antero-lateral teeth shallow, margins more or less concave and tipped with sharp white spines. Lateral spine very short; about twice the length of the preceding tooth in adults, longer in the young. Merus of chelipeds armed with four spines on inner margin; a fifth spine less sharp but grading in size and position with these, is situated on the condyle of the ischium. Ridge on outer upper margin of manus very prominent, marked with large tubercles which are sharp or spiniform; other carinae less strongly marked, often almost smooth. Terminal segment of male abdomen half again as long as wide; appendages of first segment

forming a double curve, tips straight, reaching to distal fourth of penultimate segment.

Color.—Almost brown above, cream-colored below, tubercles and ridges of manus tinged with red. (Lockington.)

Measurements.—Male (57909), total length of carapace 78.3, width of same 152.8, width at anterior base of lateral spine 136, fronto-orbital width 54, width of front 11.5 mm.

Range.—From Point Loma, California (Holmes), to Gulf of California, Mexico.

Material examined.—

CALIFORNIA.—San Diego; C. R. Orcutt; 1 male (51111).

MEXICO.—Pichilinque Bay, Gulf of California, *Albatross*, April 29, 1888, 1 male, 3 females (22047), March 29, 1911, 1 young male (48863). Magdalena Bay; 1925; Hanna and Jordan; 1 young, returned to Calif. Acad. Sci. 1889; *Albatross:* San Bartolome Bay, 3 males (15442); Magdalena Bay, April 8, 2 males, 4 females (15441); La Paz Harbor, March 12, 1 male, 2 females (15436); San Josef Island, March 16, 5 males, 2 females (15435); Carmen Island, March 18, 2 males, 4 females (15439); Concepcion Bay, mouth of Rio Mulege, March 19, 7 males, 2 females, mostly young (15440); Guaymas,
March 21, 6 males, 1 female (15444); San Luis Gonzales Bay, March 27, 5 males, 2 females (15438); St. Georges Bay, March 25, 1 male, 2 females (15443); Shoal Point, Colorado River, March 26, 5 males, 8 females (15437). 1911; *Albatross:* Point San Bartolome, with boat dredge, March 13, 3 males, 2 females (6007), in seine, March 14, 4 young (6005); Abreojos Point, March 16, 2 females (60010); Ballenas Bay, March 16, 2 young males, 1 young female (Amer. Mus.); S. end of Magdalena Bay, March 20, 10 males, 2 females (Amer. Mus.); Pichilinque Bay, by electric light, March 27, 6 young (Amer. Mus.), March 29, 1 young male (Amer. Mus.); Agua Verde Bay, April 2, 2 immature females (60008); Mulege, at mouth of river, in 100-foot seine, April 4, 1 male (60006); Ricason Island, Concepcion Bay, April 7, 5 males, 2 females (60009). Turtle Bay; August 1, 1896; A. W. Anthony; 6 males, 7 females (19514). Magdalena Bay; 1925; Hanna and Jordan; 1 young (Cal. Acad. Sci.). La Paz; L. Belding; 2 males, 3 females (4630). Santo Domingo; 1899; C. R. Orcutt; 1 young male (51108). Guaymas, inner harbor; February 23, 1891; P. J. Jouy; 1 young male (17291). Angeles Bay; 1921; 1 male (57909), from California Academy of Sciences.

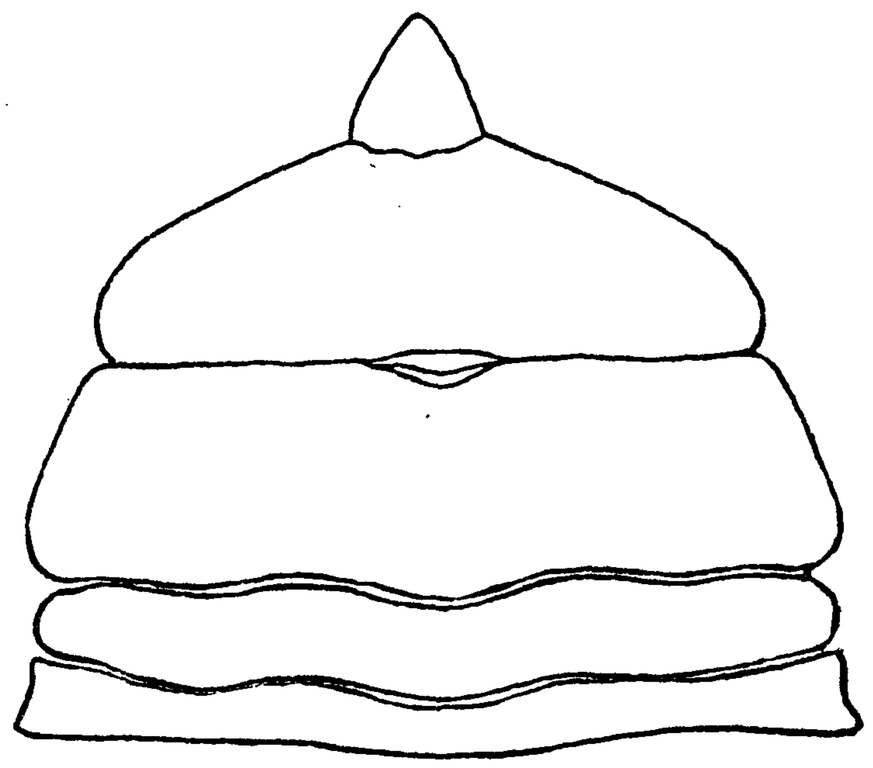

FIGURE 20.—CALLINECTES BELLICOSUS, FEMALE ABDOMEN

CALLINECTES ORNATUS Ordway

SHELLIGS (ANTIGUA)

Plate 50

Callinectes ornatus Ordway, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 571 [6] (type-localities, Cumana, Hayti, Bahamas, Tortugas and Charleston Harbor; cotypes in M.C.Z. from Cumana, Hayti (5137) and Charleston).—A. Milne Edwards, Crust. Rég. Mex. 1879, p. 225 (var. of *C. diacanthus*).—Rathbun, Proc. U. S. Nat. Mus., vol. 18, 1895 (1896), p. 356, pl. 15; pl. 24, fig. 3; pl. 25, fig. 2; pl. 26, fig. 2; pl. 27, fig. 2.

Diagnosis.—Submedian teeth of front much broader than long, rudimentary. Intramedial area very short, three times or nearly three times as broad as long. Antero-lateral teeth broad and shallow.

Description.—Carapace rather convex; depressions shallow; length of intramedial area much less than half, sometimes a third of its anterior width. Surface finely and rather evenly granulated. Frontal teeth four, the two outer subtriangular, blunt, margins slightly concave; inner teeth very small, tuberculiform, almost rudimentary, broader than long, margin arcuate. Subfrontal tooth a prominent spine; inner suborbital tooth a more prominent, broad, subtriangular lobe. Lateral teeth broad and shallow; margins convex at base, concave in terminal half; posterior margins longer than anterior; tips acute in first five or six teeth, acuminate in remainder. Lateral spine 2.5 to 3 times the length of preceding tooth, directed obliquely forward. Abdomen of male with penultimate segment widest at proximal end, its margins slightly concave; the appendages reach or nearly reach the middle of the penultimate segment; proximally they curve inward and touch or overlap each other; distal portions straight and divergent, widening a little behind the slender tip. Abdomen of female very broad at proximal end (to third segment), tapering more rapidly to the terminal segment, and appearing more triangular, than in any other species.

Color.—General color of half grown male (61002) a sort of sage green and hair brown with porcelain white patches, wax yellow teeth, whitish behind white tips, top and front dragons blood red. Chelipeds largely the same as the general color of the carapace, hair brown with greenish tinge, spines nearly all porcelain white, their hind margin and margin of carpus between them shiny clove brown; inner face of hand and carpal articulation china blue, fingers all white. A sort of cinnamon with white between ambulatories; dactyls of the latter coral red to scarlet; propodus, carpus, and merus china blue, stippled on merus stronger from distal end to middle of merus. Swimming legs like chelipeds, margins of articles salmon near the articulations; proximal half of paddle and adjacent propodus white, distal half of paddle a sort of raw sienna and gall stone yellow; the paddle transparent. Under parts whitish. (Schmitt.)

Measurements.—Males attain a width of 5 inches, females 4¼ inches. Male (48394), total length of carapace 60.2, width of same 125.7, width at anterior base of lateral spine 103.7, fronto-orbital width 46, width of front 14 mm.

Range.—New Jersey; North Carolina to State of São Paulo, Brazil; Bermudas. Exceptionally in fresh water (Brues).

Material examined.—

NEW JERSEY.—1928; Horace G. Richards; specimens returned to sender: Avalon; August 29; 1 young male. On floating Zostera, 4 miles off Cape May; August 28; 1 young female.

NORTH CAROLINA.—Off Cape Hatteras; lat. 35° 21′ 15″ N., long. 75° 23′ 15″ W.; 14 fathoms; gy. S.; October 19, 1884; station 2283, *Albatross;* 1 male (8863). Shackleford Banks (inside), Beaufort; September 12, 1928; Schmitt and Shoemaker; 1 young (62460). Off Cape Fear River; 6 to 7 fathoms; July 13, 1915; stations 8278–8280, *Fish Hawk*; 1 young (58366).

SOUTH CAROLINA.—Winyah Bay; lat. 33° 49′ 45″ N., long. 78° 04′ 00″ W.; 7 fathoms; hrd.; temperature 80.5° F.; July 12, 1915; station 8275, *Fish Hawk*; 2 young (51029). Off E. end of Sullivan's Island, Charleston Harbor; on oyster bed; Whiteside and Leslie; 1 young female (3185). Charleston; L. Agassiz; 3 male and female, cotypes (5128, M.C.Z.).

BAHAMAS.—Andros Bank and Island, in sponges, Frederick Stearns (specimens returned to sender). 1903, B. A. Bean, gift of the Geographic Society of Baltimore: Eleuthera Island: Spanish Wells, July 4, 1 young (31087), 3 males, 7 young (31088); Governor's Harbor, July 7, 1 male, 3 young (31090); Tarpum Bay, July 7, 1 male, 6 young (31089). Long Island: Clarence Harbor, July 14, 1 male (soft shell), 1 young (31086).

FLORIDA.—Baker collector; 5 males, 4 females (2076). Miami; G. M. Gray; 1 young (42135). Bonefish Banks, SW. end Biscayne Bay; November 26; B. A. Bean; 1 young (33132). Broad Creek; November 24, 1906; B. A. Bean; 2 young (33133). Bamboo Key; January 23, 1903; *Fish Hawk;* 1 young male (48879). Big Pine Key; H. Hemphill; 3 males (14889). Summerland Keys; December 6, 1906; B. A. Bean; 1 specimen (33127). Key West: December, 1883, D. S. Jordan, 6 males, 12 females, 12 young (5847); 1884, *Albatross*, 7 males, 1 female, 5 young (18229); H. Hemphill, 8 young (18230), 11 males, 4 females (10053). Marco; H. Hemphill; 1 young (18231). Punta Rassa; April, 1883; C. W. Ward; 6 males (5753). Tortugas; 1924; W. L. Schmitt; gift of Carnegie Institution: Long Key, July 30, 5 young (60996); near Fort Jefferson landing, Garden Key, from bunch of dead eel grass between pipes, August 17, 3 young (60997); off W. side Fort Jefferson, between beach to south and moat entrance, August 19, 1 male, soft shell (60998). Bird Key; April 8, 1889; *Grampus;* 1 male (15246).

LOUISIANA.—Mouth of Mississippi River; Northeast Pass tower, NW. by W. ⅞ W.; Pass a Loutre Light, NW. by N.; 12 fathoms; sft. M.; temperature 72° F.; June 24, 1913; station 7916, *Fish Hawk;* 1 young male, 1 young female (61428).

TEXAS.—San Antonio Bay; in middle of bay (E. and W.) and about 10 miles S. of mouth of Guadalupe R., between Mosquito Point and Little Bird Island; about 5 feet; J. D. Mitchell; 1 female (21631).

CUBA.—1914, Henderson and Bartsch, *Tomas Barrera* Expedition: Ensenada de Cajon, off Cape San Antonio, May 22–23, 2 young (49167); Cape Cajon, May, 3 specimens (47921, 48401), 6 males from traps (48394); Cayo Punta Colorado, 2–3 fathoms, station 10, May 21, 17 young (48408, 48409); Los Arroyas, station 8, May 20, 24 young (48412); Ensenada de Santa Rosa, 1 to 3 fathoms, sand, shell, mud and sponge bottom, station 7, May 19, 23 young (49156, 49164, 49168, 48389); off Santa Lucia, May 12, 2 young (49166); Cayo Arenas, 2 fathoms, station 3, May 12, 1 young (48399); Bahia Honda, June 7, 2 young (49160), 1 young male, by submarine light (48398). Mariel; May 10, 1900; Palmer and Riley; 1 young (23834).

JAMAICA.—Dr. Smith; 1 male (2448). 1884; *Albatross;* 3 males, 4 females (18227). C. R. Orcutt; 1 male (62461). February 4, 1928; C. R. Orcutt; 1 young male (61365). Montego Bay: 1910, C. B. Wilson: June 24, 1 female, soft shell (42856), 2 males, 1 female (42855); from coral reef, July 20, 1 young male (42854). Montego Bay, November 12, 1910, E. A. Andrews; 4 males, 2 females (42865).

HAITI.—Gonaives; 1860; A. Hilchenbach; 1 male cotype (5137, M.C.Z.).

PORTO RICO.—1899; *Fish Hawk:* Mayaguez, January 19, 1 female (24431), January 20, 1 young (24432); Mayaguez Harbor, Custom House, E. by S., 2 miles, 7 fathoms, stky. M., temperature 27° C., January 19, station 6059, 3 females (24441); Boqueron Bay, January 26–27, 5 males, 3 females (24433); Porto Real, January 26, 4 young males, 5 young females (24434); Guanica, January 28, 2 young (24435); Playa de Ponce, January 31, 1 female (24436); Arroyo, February 4, 1 female (24437); Hucares, February 13, 1 male, 1 young (24439); Fajardo, February 17, 1 male (24440); Ensenada Honda, Culebra Island, February 10, 1 male (24438).

ST. THOMAS.—A. H. Riise, 1 male (2457); January 17–24, 1884, *Albatross*, 1 male, 7 young (18546); in lagoon, July 9, 1915, C. R. Shoemaker, 4 young (53761).

ST. CROIX.—Specimens in Copenhagen Museum.

ST. MARTIN.—Simsons Bay lagoon, shallow water, sandy, September, 1905, J. Boeke, 1 female (returned to sender). St. Eustatius; 1905; J. Boeke: NW. of Jenkins Bay, 30 fathoms, dredged, August 15, 1 young male (returned to sender); Tumble Down Dick

Bay, 40 fathoms, sandy, in beam trawl, September 17, 1 young male (42967).

GUADELOUPE.—Specimen in Paris Museum.

ST. LUCIA.—Port Castries; November 30, 1887; *Albatross*; 6 males, 4 females, 3 young (22043).

MEXICO.—Cozumel, Yucatan; shore, in net; 1 male, 5 females (9557).

BRITISH HONDURAS.—Belize; Harry J. Huwe, S. J.; 1 female (50949).

PANAMA.—Fox Bay, Colon; March 31, 1911; Meek and Hildebrand, Smithsonian Biological Survey; 1 young male, 1 young female (43915).

COLOMBIA.—Cartagena; A. Schott; 1 male (M.C.Z.). Sabanilla; 1884; *Albatross*; 1 young female (18228).

VENEZUELA.—1905; J. Boeke: Aruba: Paarden Bay, shallow water, June 2, 1 adult male (returned to sender); lagoon, very shallow water, July 3, 1 young male (returned to sender). Curaçao: Rifwater (lagoon), 1 fathom, July 26, 1 young male, fifth left tooth reduced, 1 young male (returned to sender). Bonaire: Lagoon, very shallow, stony, June, 1 immature female (42918).

VENEZUELA.—Curaçao; February 10–18, 1884; *Albatross*; 4 males, 5 females (7584). Cumana; 1859; Capt. Couthouy; 1 male cotype (5136, M. C. Z.).

TRINIDAD, EAST OF.—From lat. 10° 37′ 00″ to 10° 37′ 40″ N., long. 61° 42′ 40″ to 61° 44′ 22″ W.; 31–34 fathoms; dk. slate-col. M.; temperature 67°–73° F.; stations 2121–2122, *Albatross*; 2 males, 1 female (6900).

BRAZIL.—State of Maranhão: Maranhão; Lieut. F. E. Sawyer, U. S. Navy; 1 female (18232). Rio Poty, Thayer Expedition, 1 male (M.C.Z.). State of Espirito Santo: Victoria; specimens in M.C.Z. State of Rio de Janeiro; 1925; W. L. Schmitt: São Francisco, Nictheroy, August 25, in 50-meter seine, 1 young (61001); Paqueta, Bay of Rio de Janeiro, mud flats, August 19, station 1, 1 young (61060). State of São Paulo; 1925; W. L. Schmitt: Villa Bella, Ilha São Sebastião, beach, September 23, 1 young female (61000), weeds from rock in front of hotel, September 24, 1 young male (61002); Ilha São Sebastião, September, H. Luederwaldt collector, 2 young (60999), Barro, Santos, in seine, September 12, 1 male, 1 female (61003).

BERMUDAS.—J. Walter Fewkes; 1 male (M.C.Z.). G. Brown Goode; 1 young female (3175). F. V. Hamlin, Wesleyan University; 2 males, 1 young (4028). Hungry Bay; July–September; F. G. Gosling; 1 male, 1 female, 1 young (25445).

CALLINECTES DANAE Smith

Plate 51

? *Ciri Apoa* MARCGRAVE, in Piso and Marcgrave, Hist. Nat. Brasil., 1648, p. 183, text-fig. [17]

Lupa dicantha DANA, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 272; atlas, 1855, pl. 16, fig. 7*a–c*. Not *Lupea dicantha* Milne Edwards, 1834.

Callinectes diacanthus ORDWAY, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 575.

Callinectes danae SMITH, Trans. Connecticut Acad. Sci., vol. 2, 1869, p. 7 (type-locality, Pernambuco; cotypes in M. C. Z. (5143) and P. M. Y. U.).—RATHBUN, Proc. U. S. Nat. Mus., vol. 18, 1895, p. 357, pl. 16; pl. 24, fig. 4; pl. 25, fig. 3; pl. 26, fig. 3; pl. 27, fig. 3.

Callinectes diacanthus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 226 (var. of *C. diacanthus*).

Diagnosis.—Frontal teeth small, unequal, acute. Tips of appendages of first segment of male abdomen straight and reaching terminal fourth of penultimate segment.

Description.—Intramedial region wider behind than in *sapidus*, its length less than half the anterior width. Front with two distinct submedian teeth, small, subacute; lateral teeth narrow, acute. Of the antero-lateral teeth of the carapace, the second to sixth, inclusive, do not trend forward, posterior margin of each tooth not much longer nor more convex than anterior margin; all teeth acute, the seventh and eighth especially so; eighth tooth directed forward. Lateral spine 3½ to 4 times length of preceding tooth in the old male. Inner suborbital tooth prominent and rather narrow. Penultimate segment of abdomen of male very broad at proximal end. The appendages reach to middle or terminal third of penultimate segment and taper regularly to the tips; they sometimes touch each other proximally, but more often are separated. Abdomen of female similar to that of *C. ornatus* but wider in its fifth and sixth segments. Costae of chelipeds very closely set with fine granules interspersed with larger ones. Two sharp tubercles or spinules on wrist between outer spine and the spine at proximal end of palm.

Color.—Specimens from Rio olive green, eight posterior legs in part bluish, arm and hand blue with some reddish purple. (Dana.)

Measurements.—Males attain a size of 5½ inches, females 4 inches. Male (2371), total length of carapace 57.5, length to median sinus of front 55.5, greatest width 131.5, width at anterior base of lateral spine 101.2, fronto-orbital width 45.8, width of front 13.5 mm.

Range.—From Indian River Inlet, Florida, to State of Santa Catharina, Brazil.

Material examined.—

FLORIDA.—Indian River Inlet; January 23, 1896; U. S. Fish Comm.; 3 young (20115). Florida, 1859; G. Wurdemann; 2 males, not typical (M.C.Z.).

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[17] As *Callinectes danae* is perhaps the commonest swimming crab in Brazil, it is likely that Marcgrave's species is identical with it, in spite of his grotesque figure.

TEXAS.—Alligator Head, Matagorda Bay; J. D. Mitchell; 1 male (22817).

CUBA.—1914; Bartsch and Henderson, *Tomas Barrera* Expedition: Cayo Punta Colorado, 2–3 fathoms, algae covered broken shell bottom, May 21, station 10, 1 male (48407). Los Arroyas, May 19, station 8, 1 female (48400). Bahia Honda; 1898; Biol. Exped. State Univ. Iowa; 1 male (Mus. S.U.I.). Marianaõ Playa; C. F. Baker; 2 females (31892). Cardenas Bahia; shallow water; April, 1927; Melbourne Ward; 1 male (61050).

JAMAICA.—1884; *Albatross*; 3 males, 1 female (18237). Montego Bay; November 12, 1910; E. A. Andrews; 2 males, 1 female (42862). Kingston; 1928; C. R. Orcutt; 2 males, 1 immature female, 1 young, 2 large chelipeds (62456–62459). Kingston Harbor and Port Royal; P. W. Jarvis; specimens returned to sender. Bull Bay; C. R. Orcutt; 1 male (62455).

DOMINICAN REPUBLIC. — 1928; Gerrit S. Miller, jr.; Samana: February 22; 2 males, 4 females, 3 young (61887). On flats at low tide; March 15; 6 males (2 soft shell), 1 female, 2 young (61886).

PORTO RICO.—1899; *Fish Hawk*: San Juan; 1 young female (24423); Rio Bayamon, above Palo Seco, January 16, 5 males (24424); Mayaguez, in seine, January 19, 4 males, 4 females (24425); Mayaguez Harbor, Custom House, E. by S. 1½ miles, 7¼ fathoms, sticky mud, temp. 26° C., January 19, station 6058, 1 female (24428); Mayaguez Harbor, Custom House, E. by S., 2 miles, 7 fathoms, sticky mud, temperature 27° C., January 19, station 6059, 1 female (24429); Hucares, February 13, 1 male, 1 young (24427). Arecibo; April 1, 1900; C. W. Richmond; 1 young (23664).

ST. THOMAS.—(Specimens in Copenhagen Mus.).

MARTINIQUE.—(Specimens in Paris Mus.).

Port Castries, St. Lucia; November 29, 1887; *Albatross*; 5 males, 6 females (22044).

BARBADOS.—F. G. Beckford; 2 small males (Brit. Mus.).

HONDURAS.—Near Belize; W. A. Stanton; 1 male, 1 female (21379).

PANAMA.—Colon; 4 fathoms; 1884; Willard Nye, jr., *Albatross;* 5 females (18239); "caught at night with a small hoop net baited and set a little way from the ship." Meek and Hildebrand, Smithsonian Biological Survey: Toro Point, C. Z.: May 19, 1911, 3 males, 2 females (43930), 2 males, 2 females (Field Mus.); May 20, 1911, 1 male (43923), 1 male (Field Mus.); January 25, 1912, 4 males (Field Mus.). French Canal, Mindi, C. Z.: January 19, 1911, 1 young male (43929). Mindi Cut, Mindi, C. Z.: January 28, 1911, 1 male (Field Mus.); February 3–4, 1911, 5 males, 3 females (Field Mus.), 5 males, 4 females (43925). Fox Bay, Colon: January 3, 1911,

1 male, 1 young female (43927); January 11, 1911, 5 males, 3 females (Field Mus.), 3 males, 2 females (1 soft shell) (43924); March 25, 1911, 4 males, 3 females (43931); March 31, 1911, 9 males, 3 females (Field Mus.), 6 males, 1 female (43928); January 22, 1912, 1 male (59284); January 27, 1912, 5 males, 2 females, 7 young (Field Mus.); March 22, 1912, 8 young, some with internal parasites (59286). Porto Bello: April 24–28, 1911, 3 males (Field Mus.), 2 males (43926); March 19, 1912, 2 males, 5 females (Field Mus.), 2 males, 1 ovigerous female (59285).

COLOMBIA.—Old Providence Island, Caribbean Sea (east of Nicaragua); 1884; *Albatross;* 1 young female (18238). Sabanilla; March, 1884; *Albatross;* 1 male, 19 females, 25 young (7559).

VENEZUELA.—Puerto Cabello; 1 ovigerous female (Copenhagen Mus.).

TRINIDAD.—1884; *Albatross;* 2 males, 1 female (7636).

BRAZIL.—State of Parahyba; 1899; A. W. Greeley, Branner-Agassiz Expedition: Mamanguape stone reef, 1 young female (Stanford Univ.); Rio Parahyba do Norte, Cabedello, on mangroves, June 20, 1 male, 1 young female (25746), June 21, 1 young (25747). State of Pernambuco: Pernambuco, 1867, C. F. Hartt, cotypes in Peabody Museum, Yale University, and in Museum of Comparative Zoölogy (1 male, 1 female, Cat. No. 5143). State of Bahia: Bahia, June, 1896, Bisego collector, 1 male, from H. von Ihering, returned to sender; Plataforma, Bahia, 1876–77, R. Rathbun, Hartt Explorations, 2 males, 1 ovigerous female (40591); Porto Seguro, specimens in M.C.Z. State of Espirito Santo: San Matheos, specimens in M.C.Z. State of Rio de Janeiro: São Francisco, Nictheroy, August 25, 1925, W. L. Schmitt, 6 males (1 soft shell), 5 females (2 ovigerous) (60983), 3 young (60982), taken in 50-meter sardine seine. Paqueta, W. L. Schmitt, August 19, 1925, 3 males, 2 females (60988), August 29, 1925, 1 young (60984). River on Ilha Governador, Bay of Rio de Janeiro, August 27, 1925, W. L. Schmitt, 6 males (60987). Rio de Janeiro: J. D. Dana, U. S. Exploring Expedition, 1 male (2371) 1 male (4278, M.C.Z.); Thayer Expedition, 1 male, 2 females (19427), received from Museum of Comparative Zoölogy; 1876–1877, R. Rathbun, Hartt Explorations, 1 male (40589). State of São Paulo: 1925, W. L. Schmitt: Villa Bella, Ilha São Sebastião, in dip net, September 20, 1 young female (60980); Ilha São Sebastião, September, H. Luederwaldt collector, 2 males, 1 young (60979); Barro, in seine, September 12, 7 males, 5 ovigerous females (60990); between canals 4 and 5, Estuario, September 13, 3 males, 3 females, 6 young (1 soft shell) (60981). Santos, 1901, H. von Ihering (specimens returned to sender). Ilha Casquerintia, Santos, September, 1910, C. Maas, 1 female (47863), received from H. von Ihering. Matuba, 1905 E. Garbe, 1 male (47844), received from H. von Ihering. State of

Parana: Paranagua; October 3, 1925; W. L. Schmitt; 2 young (60986). State of Santa Catharina: Saco São Francisco, 1923, Dr. C. Fernetz, 2 males, 1 female, lent by Buenos Aires Museum. 1925, W. L. Schmitt: Praia Inglese, São Francisco, November 1, 1 male (60989); Florianopolis, Praia de Fora, November 5, 1 male, 1 female, 1 young (60985).

CALLINECTES ARCUATUS Ordway

Plate 52

Callinectes arcuatus ORDWAY, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 578 [13] (type-locality, Cape St. Lucas; type, Cat. No. 61833, U.S.N.M.—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 228 (var. of *C. diacanthus*).—RATHBUN, Proc. U. S. Nat. Mus., vol. 18, 1895 (1896), p. 362, pl. 20; pl. 23, fig. 1; pl. 24, fig. 8; pl. 25, fig. 7; pl. 26, fig. 7; pl. 27, fig. 7.

Callinectes pleuriticus ORDWAY, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 579 [14] (type-locality, Panama; cotypes, Cat. No. 4701, M.C.Z.).—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 228 (var. of *C. diacanthus*).

Callinectes species SMITH, Third Ann. Rept. Peabody Acad. Sci., 1869 (1871), p. 91, Gulf of Fonseca.

Callinectes dubia KINGSLEY, Proc. Boston Soc. Nat. Hist., vol. 20, 1879, p. 156 (type-locality, Gulf of Fonseca, west coast of Nicaragua; type, Cat. No. 5178, M.C.Z.).

Callinectes nitidus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 228 (var. of *C. diacanthus*) (type-locality, Tanesco, on the borders of the Estéros, Guatemala; cotypes in U.S.N.M. (20269) and Paris Mus.).—RATHBUN, Proc. U. S. Nat. Mus., vol. 18, 1895 (1896), p. 366.

Callinectes diacanthus var. *C. nitidus* A. MILNE EDWARDS, Crust. Rég. Mex., 1879, explanation of pl. 41.

Callinectes diacanthus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, pl. 41.

Diagnosis.—Penult segment of male abdomen mostly with parallel sides; appendages about reaching terminal segment. Frontal teeth narrow. Antero-lateral teeth chiefly with convex margins, lateral spine longish.

Description.—Carapace very convex, finely granulate, granules very numerous in the median region. Length of intramedial area about one-half its anterior width and much less than its posterior width; length greater than in *C. danae*. Front with four stout triangular blunt teeth with concave sides, the middle pair about one-third the size of the outer pair; subfrontal spine produced well beyond the lateral frontal teeth. Suborbital tooth rounded. Antero-lateral margin very arcuate; teeth large, well separated, their posterior longer than their anterior margins, the first four or five teeth with more or less convex margins and subacute tips, the succeeding ones becoming regularly sharper and more spiniform. Lateral spine about two and a half to three times length of adjoining tooth. Costae of manus coarsely and closely granulate. Spine at extremity of outer carina of carpus well developed. Penultimate segment of male abdomen broad at base, but for the greater part of their length the margins are subparallel. The appendages of the first segment

reach or nearly reach the last segment and are slightly curved at the tip in the adult. Abdomen of female with fifth segment much narrower distally than proximally, and shorter than sixth.

Color.—Carapace violet blue. Under parts grayish yellow except abdomen of female which is rose with a broad band of black on each segment. Chelipeds violet above, inner surface of chelae bluish. Ambulatory legs tinged with blue, ends of dactyls and fingers red. Swimming feet mostly yellowish, paddle mostly blue. (After A. Milne Edwards.)

Measurements.—Male with short lateral spine (15432), total length of carapace 59, width of same 119, width at anterior base of lateral spine 99, fronto-orbital width 45.3, width of front 14.6 mm. Male with long lateral spine (40442), total length of carapace 52, width of same 120.5, width at anterior base of lateral spine 90.5, fronto-orbital width 39, width of front 11.5 mm. A. Milne Edwards's Plate 41,[18] of this species under the name *nitidus*, shows a very large specimen, carapace 71 by 165 mm.

Range.—Southern California to Chile (A. Milne Edwards).

Material examined.—

CALIFORNIA.—Anaheim Slough; 1928; Lena Higgins; 1 ovigerous female (62050).

MEXICO.—Magdalena Island, Lower California; December 5, 1905; Nelson and Goldman, U. S. Department of Agriculture; 1 male (33417). Turtle Bay, L. Cal.; August 1, 1986; A. W. Anthony; 1 small male (19515). Cape St. Lucas, L. Cal.; John Xantus; 1 male, type (61833), 1 half grown (5174, M. C. Z.). San Jose del Cabo, L. Cal.; A. W. Anthony, 4 males (20693); March 2, 1911, *Albatross*, 2 males, 1 female, immature (60004). 1889, *Albatross:* San Bartolome Bay, 1 male (15433); Concepcion Bay, mouth of Rio Mulege, March 19, 1 male, 1 female (15432); Algodones Lagoon, March 31, 17 males, 10 females (15431); Horseshoe Bend, Colorado River, 1 male (15434). Guaymas; H. F. Emeric; 2 specimens (14854). Mazatlan; Nov., 1920; U. S. Bureau of Fisheries; 1 male, returned to sender. Acapulco; *Hassler* Expedition; 2 half grown (M. C. Z.).

GUATEMALA.—Tanesco, on the borders of the Estéros; 1 male cotype (20269), received from Paris Museum; 1 male, 1 female, cotypes (Paris Mus.).

SALVADOR.—El Cutaco; February 14, 1924; Hildebrand and Foster; 3 males, 2 females, all young (58175). El Triunfo; Feb. 10, 1924; Hildebrand and Foster; 1 young male (58176). Gulf of Fonseca J. A. McNiel; 1 male type of *C. dubia* Kingsley (5178, M. C. Z.).

NICARAGUA.—Realejo; 1 young (Copenhagen Mus.).

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[18] Crust. Rég. Mex., 1879.

COSTA RICA.—Punta Arenas; Örsted collector; 2 males (Copenhagan Mus.). Rio Punta Mala; Mar., 1892; H. Pittier; 1 small male (Brit. Mus.).

PANAMA.—Cotypes in M. C. Z. C. F. Davis; 3 males (18511), received from Museum of Comparative Zoölogy. J. Zetek: June, 1914, 2 males (48778); July 27, 1915, 7 males (48808). Meek and Hildebrand, Smithsonian Biological Survey: Balboa, Canal Zone; tidewater, May 5, 1911, 1 male (43899), January 31, 1912, 47 males, 6 females, all young (59277), 48 males, 5 females (Field Mus.), tide pool, February 8, 1912, 1 young male, soft shell (59279); Chame Point, February 14, 1912, 1 male (47905), 3 males (1 young), 1 young female (59280); Island at end of breakwater, Panama Bay; February 5, 1912; 1 male, 2 females, 2 young (59278); Taboga Island, May 11–15, 1911, 2 males, 4 females immature, 17 young (43900), 1 male, 3 females, 18 young (Field Mus.). Panama, March 24, 1912, 2 males (1 soft shell), 1 female (Field Mus.), tide pools, March 21, 1912, 1 young female (Field Mus.). 1888; *Albatross:* Panama, March 15, 8 males, 1 female, all young (22045); off Taboga Island, March 7, 1 young male (22046).

ECUADOR.—Salinas; September 17, 1926; W. L. Schmitt; 3 males (60977).

PERU.—Tumbes; R. E. Coker; 2 photographs. Paita; October 8, 1926; W. L. Schmitt; 1 male (61425). Oyster beds of Matapalo, near Capon; February 3; R. E. Coker; 2 males, 1 female (40442), received from Peruvian Government. On the beach at Las Vacas, near Capon; January 23, 1908; R. E. Coker; specimens returned to Peruvian Government. Pacasmayo; Stolzman; 1 male (Brit. Mus.)

CALLINECTES MARGINATUS (A. Milne Edwards)

Plate 53

Neptunus marginatus A. MILNE EDWARDS, Arch. Mus. Hist. Nat., Paris, vol 10, 1861, p. 318, pl. 30, fig. 2 (type-locality, Gaboon; types in Paris Mus.).

Callinectes larvatus ORDWAY, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 573 [8] (type-localities, Key West, Tortugas, Bahamas, and Hayti; types from each in M. C. Z.—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 225 (var. of *C. diacanthus*).—RATHBUN, Proc. U. S. Nat. Mus., vol. 18, 1895, p. 358, pl. 18; pl. 24, fig. 5; pl. 25, fig. 4; pl. 26, fig. 4; pl. 27, fig. 4.

Callinectes africanus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 229 (var. of *C. diacanthus*) (type-locality, Cape Verde Islands; types in Paris Mus.).

Callinectes larvatus var. *africanus ?* BENEDICT, Proc. U. S. Nat. Mus., vol 16, 1893, p. 537.

Callinectus marginatus RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 149; Proc. Washington Acad. Sci., vol. 2, 1900, p. 142; Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 48; Bull. Amer. Mus. Nat. Hist., vol. 43, 1921, p. 395, text-fig. 2, pl. 19, fig. 1; pl. 20, fig. 1.—DE MAN, Mém. Soc. Zool. France, 1900, p. 41, pl. 1, figs. 5, 5*a* (female not male).— BOUVIER, Bull. Mus. Hist. Nat., Paris, 1901, p. 16.

Callinectes marginatus var. *larvatus* VERRILL, Trans. Connecticut Acad. Arts and Sci., vol. 13. 1908, p. 368, text-fig. 22*b*, pl. 18, fig. 1.

Diagnosis.—Appendages of first segment of male abdomen very short, reaching about to penult segment. Lateral spine short, not more than 2.5 times length of preceding tooth. Carapace coarsely granulate, lateral teeth long.

Description.—Regions well marked; surface speckled with coarse granules rough to the touch; length of intramedial area a little less than half its anterior width. Front four-toothed; median teeth small, thick, more prominent than in *C. ornatus;* outer teeth oblong-triangular, extremities broader and more arcuate, tip curved upward. Antero-lateral margin little arched; sinuses deep and rounded; teeth long (from base to tip), trending forward, anterior margins concave, the second to fifth, inclusive, having convex posterior margins; first three or four teeth obtuse, the remainder sharp. Lateral spine between 2 and 2.5 times the length of the preceding tooth. Costae of manus prominent, with medium granules. Terminal portion of abdomen of male unusually slender; penultimate segment wider at proximal than at distal end, margins slightly concave; appendages very short, overreaching the third (or coalesced) segment but little or not at all. Abdomen of female much narrower than in any other species; terminal segment much longer than wide.

Color.—Dull brown, with areas of bluish black; claw brown above, blackish blue and on inner side; last segments of swimming feet a brighter brown.

Measurements.—Male (42863), total length of carapace 48.7, width of same 107, width at anterior base of lateral spine 87.4, fronto-orbital width 39, width of front 12.6 mm.

Range.—Bahamas and Florida Keys to State of São Paulo, Brazil. Bermudas. West Coast of Africa, from Cape Verde Islands to Lobito, Angola.

Material examined.—

BAHAMAS.—Mangrove Key, Andros Island; May 11, 1912; Paul Bartsch; 1 male (45546). New Providence Island; 1886; *Albatross;* 1 male (17948). Clarence Harbor, Long Island; July 14, 1903; B. A. Bean; 3 males, 1 female, 3 young (31091), from Geographic Society of Baltimore. Bahamas; Dr. H. Bryant; 3 males, cotypes of *C. larvatus* (5152, M. C. Z.).

FLORIDA.—Ocean front, Broad Creek; December 17, 1906; Pine and Bean; 2 young (33131). Caesars Creek; 1901; J. E. Benedict, 1 male (25657). Near Indian Key; H. Hemphill; 3 males (14032). Lower Metacumbe Key; December 4, 1906; B. A. Bean; 1 young female, soft shell (33153). Conch Keys; January 28, 1903; *Fish Hawk*; 3 males (33456). Knights Key; December 16, 1908; Bean, Pine and Vandergrift, Yacht *Orian;* 3 young (39191). Summerland Keys; December 6, 1906; B. A. Bean; 1 young female (33129). Key West: J. E. Mills; 3 male and female cotypes of

C. larvatus (5151, M.C.Z.); H. Hemphill, 7 males, 1 female (10052). Tortugas: J. E. Mills; 1 male, cotypes of *C. larvatus* (M.C.Z.); C. F. Holder, 2 males, 1 female (2142). Tortugas; W. L. Schmitt; gift of Carnegie Institution: June 13, 1925, Dexter collector, 4 males (61052); Long Key, July 30, 1924, 10 males, 10 females (60992); beach off Fort Jefferson, Garden Key (not in moat, outside, dock side), June 3, 1925, W. R. Taylor, collector, 1 male (61051); off west side Fort Jefferson, between beach to south and moat entrance, August 19, 1924, 1 male, soft shell (60994); Bird Key reef, July 28, 1924, Bender collector, 1 young female (60993).

LOUISIANA.—Cameron; L. R. Cary; 1 young (33103).

CUBA.—On reef flat between Cayo Hutia and little Cayo NE. of Light; May, 1914; Henderson and Bartsch, *Tomas Barrera* Expedition; 1 male, 1 female (48384). Bahia Honda; 1877–78; U.S.C.S. Str. *Blake;* 1 male (M.C.Z.). La Esperanza, Pinar del Rio; 1924; Mario Sanchez Roig; 1 male (returned to sender), 1 young female (58665). Mariel; from branches hanging in river mouth; May 10, 1900; Palmer and Riley; 1 male, 1 female (23833). Cienfuegos; J. Aviles; 1 female (M.C.Z.). Baracoa; W. O. Crosby; 1 female (56780), received from Boston Society of Natural History.

JAMAICA.—1884; *Albatross;* 3 males, 1 female (18240). February 4, 1928; C. R. Orcutt; 2 young females (61364). Montego Bay; November 12, 1910; E. A. Andrews; 1 male (42863). Umbrella Point, near Montego Bay; July 14, 1910; E. A. Andrews; 3 males (42864). Kingston Harbor; J. E. Duerden; specimens returned to sender. Port Royal; P. W. Jarvis; specimens returned to sender.

HAITI.—Jeremie, Haiti; Dr. D. F. Weinland; 2 males, cotypes of *C. larvatus* (5155, M.C.Z.). Dominican Republic; 1878; W. M. Gabb; 3 males (4172).

PORTO RICO.—1899; *Fish Hawk:* San Antonio Bridge, San Juan; January 12; 12 males, 4 females (24443). Mayaguez; January 19; 1 male (24444), 8 males, 2 females (24445). Puerto Real, January 26; 3 young (24446). Reefs at Ponce; January 30; 3 males, 3 females (24447). Playa de Ponce; January 31; 1 male (24448). Playa de Ponce reef; February 1; 1 male (24449). Hucares; February 13 and 14; 3 males, 7 females (24451). Fajardo; February 17; 7 males, 9 females, 3 young (24454). Ensenada Honda, Culebra Island; February 9; 1 male, 2 females (24450).

ST. THOMAS.—A. H. Riise; 1 male (2446). January, 1884; *Albatross;* 1 female (7648). Shore near town; July 10, 1915; C. R. Shoemaker; 3 young (53762), gift of Carnegie Institution.

ST. CROIX.—K. Levinsen; specimens in Copenhagen Museum.

GUADELOUPE.—Specimens in Paris Museum.

DOMINICA.—Roseau; 10 fathoms; A. Hyatt Verrill; 1 female (32514).

MEXICO.—Vera Cruz; 1926; C. R. Orcutt; 1 male (60079). Cozumel Island, Yucatan; shore, in net; 1885; *Albatross;* 1 female (14893).

NICARAGUA.—Old Providence Island, Colombia [E. of Nicaragua]; 1884; *Albatross;* 5 males, 1 female (18241).

PANAMA.—Meek and Hildebrand, Smithsonian Biological Survey: Toro Point, Canal Zone: May 19 and 20, 1 male, 4 females (43908), 1 female with Rhizocephalid parasite (43905), 5 females (Field Mus.); January 25, 1912, 1 female with Rhizocephalid (62684). Fox Bay, Colon: January 3, 1911, 1 male, 2 females (43907), 1 male, 2 females (Field Mus.); January 11, 1911, 1 male, 1 female (43903), 1 male (Field Mus.); March 31, 1911, 1 female with Rhizocephalid parasite (43904); January 20, 1912, 1 male (59287), 2 females with Rhizocephalid parasite (62685), 2 males, 3 females (Field Mus.); January 27, 1912, 1 male, 1 female (Field Mus.); March 22, 1912, 3 females (59288). Porto Bello: April 24–28, 1911, 1 young male, 1 female with Rhizocephalid (43906), 2 females (1 with Rhizocephalid) (Field Mus.); March 19, 1912, 1 female, soft shell, 1 young female (59289), 5 females with Rhizocephalids (U.S.N.M.), 3 females (Field Mus.).

Margarita Island; low tide, coral rocks; June, 1924; E. Deichmann; 2 females, with Rhizocephalids (61427).

COLOMBIA.—Sabanilla; 1884; *Albatross;* 1 male (9915), 4 young females (17947).

VENEZUELA, islands off.—Aruba, playa, July 2, 1905, J. Boeke, 1 young male (returned to sender). Curaçao: February 1884, *Albatross,* 6 males, 1 female (7582); Rifwater, shallow water, muddy bottom, September 4, 1905, J. Boeke, 1 ovigerous female (returned to sender); Spanish Water, April 3, 1920, C. J. van der Horst, 1 immature female (56782); Spanish Port, C. J. van der Horst, April 10, 1920, 1 male, May 20, 1920, 1 young female, both returned to sender.

BRAZIL.—State of Rio Grande do Norte, specimens in M.C.Z. 1899; A. W. Greeley, Branner-Agassiz Expedition: State of Parahyba: Mamanguape stone reef, June 20 and 23, 4 young (25748); Rio Parahyba do Norte, on mangroves, June 21, 2 young (25749). State of Pernambuco: Rio Goyanna stone reef, 1 male (Stanford Univ.); Pernambuco stone reef, 1 male (Stanford Univ.). State of Alagoas: Maceio coral reef, July 25, 4 males, 1 young female (25750).

State of Bahia: Porto Seguro, Thayer Expedition, 2 males (M.C.Z.); Rio Vermelho, 1876–77, R. Rathbun, Hartt Explorations, carapace of a young one (19969).

State of Rio de Janeiro: Rio de Janeiro; specimens in Copenhagen Mus.

State of São Paulo: Villa Bella, Ilha São Sebastião; September 23, 1925; W. L. Schmitt; 1 young (60995).

BERMUDAS.—Hungry Bay; F. G. Gosling; 1 male (25444).

AFRICA.—Cape Verde Islands: 2 large males (Paris Mus.), types of *C. africanus* A. Milne Edwards. Porto Grande, St. Vincent; November 11, 1889; W. H. Brown, U. S. Eclipse Expedition to Africa; 1 young (14880). La Praya, Santiago; end of July, 1883; *Talisman;* 1 male (22950), received from Paris Museum.

Liberia; 1 immature female (Berlin Mus.).

Ashanti: Baya River, Elmina; November 27, 1889; W. H. Brown, U. S. Eclipse Expedition to Africa; 1 male (14878).

French Congo (Gabon); 3 immature females, types of *Neptunus marginatus* (Paris Mus.).

Belgian Congo; Herbert Lang, American Museum of Natural History: Moanda, July, 1915, 2 immature males (Amer. Mus.). Banana, July, 1915, 1 female (54255), 7 males, 6 females, 1 young (Amer. Mus.); August, 1915, 5 males, 4 females (54256), 5 males, 5 females (Amer. Mus.).

Portuguese West Africa: St. Paul de Loanda: December 11, 1889, W. H. Brown, U. S. Eclipse Expedition to Africa, 2 males (14877); September 23, 1915, Herbert Lang, American Museum of Natural History, 1 young female (Amer. Mus.).

CALLINECTES TOXOTES Ordway

Plate 54

Callinectes toxotes Ordway, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 576 [11] (type-locality, Cape St. Lucas; cotypes, Cat. No. 2413, U.S.N.M., Cat. No. 5182 and 5183, M.C.Z.).—A. Milne Edwards, Crust. Rég. Mex., 1879, p. 227 (var. of *C. diacanthus*).—Rathbun, Proc. U. S. Nat. Mus., vol. 18, 1896, p. 363, pl. 21; pl. 24, fig. 9; pl. 25, fig. 9; pl. 26, fig. 9; pl. 27, fig. 8; Proc. U. S. Nat. Mus., vol. 38, 1910, p. 536, pl. 55.

Callinectes robustus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 227 (var. of *C. diacanthus*) (type-locality, Colombia; type in Paris Mus.).

Diagnosis.—Intramedial area longer than posterior width. Lateral spine between two and three times as long as preceding tooth. Male abdominal appendages reaching nearly to end of abdomen. Frontal teeth large, typically blunt and rounded.

Description.—Carapace very convex and uneven, coarsely granulate; cervical groove deep except at outer end; branchial lobes very high; two sharply marked lobules at inner angle of branchial region. Cardiac region distinctly divided into two lobes by a median furrow. Intramedial area narrow, its length greater than its posterior width and also exceeding half its anterior width. Front slightly upturned, having four broad rounded lobes, the inner pair the smaller and slightly less advanced or in the young equally advanced with the outer pair. Submedian tooth small, not overreaching front. Inner suborbital tooth obtuse, very prominent. Antero-lateral margin

little arched, teeth triangular, margins denticulate, the second to seventh inclusive with anterior margins partly concave, or in the case of the first few, sometimes straight; posterior margins a little wider than anterior, tips acute; eighth tooth narrow, spiniform; in general the teeth, after the fourth, are progressively longer and sharper. Lateral spine from 2⅓ to 3 times as long as preceding tooth. Costae of manus coarsely and rather sparingly granulate. Sternum flat. Penultimate segment of male abdomen constricted in its proximal half, appendages reaching almost to end of abdomen.

Measurements.—Male (43916), largest male known, total length of carapace 91.3, width of same 196, width at anterior base of lateral spine 157.2, fronto-orbital width 63.2, width of front 21.5 mm. This old male has sharper marginal teeth than the typical form, with the exception of the outer right frontal tooth which is broad and bifid at tip.

Range.—From Cape San Lucas, Mexico, to Juan Fernandez Islands, Chile.

Material examined.—

MEXICO.—Cape San Lucas, Lower California; John Xantus; 1 male cotype (2413), 2 males, 5182, and 1 male, 5183, cotypes (M. C. Z.). Acapulco; *Hassler* Expedition; 2 males, 1 female (18507), received from Museum of Comparative Zoölogy.

COSTA RICA.—Boca Jesús Maria; J. Fid. Tristan; specimen returned to sender. Santo Domingo, Gulf of Dolce; April, 1896; H. Pittier; 1 young male, 1 young female (19438).

PANAMA.—Meek and Hildebrand, Smithsonian Biological Survey: Chame Point; February 14, 1912; 1 male, soft shell (59291). Rio Chorrera, Chorrera; April 3, 1911; 1 male (43916). Corozal, Canal Zone; April 20 and 21, 1911; 1 male (43917), 2 males (Field Mus.).

ECUADOR.—W. L. Schmitt: Salada, Guayaquil; September 30; 1 male (61429). Purchased in market, "Mercado del Sur," Guayaquil; September 21 and 22; 3 males, 8 females (61006). Guayaquil; Prof. James Orton; 1 male (P. M. Y. U.). Punta Salinas; 3 males, 1 female (61008).

PERU.—Mouth of River Tumbes; January 15, 1908; R. E. Coker; 1 male (40443), gift of Peruvian Government.

CHILE.—Juan Fernandez Islands; 1926; W. L. Schmitt; 1 male, 8 females (61007).

CALLINECTES BOCOURTI A. Milne Edwards

Plate 55

Callinectes bocourti A. Milne Edwards, Crust. Rég. Mex., 1879, p. 226 (var. of *C. diacanthus*) (type-locality, Mullins River, 20 miles S. of Belize, British Honduras; 2 male cotypes in Paris Mus.).—Rathbun, Proc. U. S. Nat. Mus., vol. 18, 1895 (1896), p. 360, pl. 19; pl. 24, fig. 7; pl. 25, fig. 6; pl. 26, fig. 6; pl. 27, fig. 6; Proc. Biol. Soc. Washington, vol. 11, 1897, p. 151 (part; not African specimens); Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 49; not Proc. U. S. Nat. Mus., vol. 22, 1900, p. 290 (*C. latimanus*).

Callinectes cayennensis A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 226 (var. of *C. diacanthus*) (type-locality, Guiana; 2 male cotypes in Paris Mus.).

Diagnosis.—Antero-lateral region smooth, non-granulate. Lateral spine less than twice as long as preceding tooth. Male abdominal appendages as long as abdomen. Six prominent bosses at middle of carapace. Frontal teeth typically broadly rounded.

Description.—Carapace very convex; deeply furrowed about the middle; two prominent bosses at inner angle of each branchial region; a deep median cardiac groove; surface coarsely granulate, except along the lateral margin and on the hepatic region, where the carapace is smooth. Intramedial region very long, length about equal to posterior width and barely half of anterior width. Front with four large, bluntly rounded teeth, the median pair the smaller and a little less advanced than or quite as advanced as, the lateral pair. Suborbital tooth short, triangular, narrow, obtuse. Antero-lateral teeth broad, triangular, their posterior margins a little longer than the anterior, tips acute, the last two or three teeth spiniform. Lateral spine short, usually less than twice the length of the preceding tooth. Costae of chelipeds rough with depressed granules, often appearing almost smooth to the naked eye. Outer distal spine of merus and carpus usually normal, though sometimes in old specimens reduced to blunt projections. A short stout tooth or spine on anterior margin of carpus just below inner angle. Penultimate segment of male abdomen constricted in its proximal portion, widening at both extremities; terminal segment long; appendages reaching to end of abdomen, and doubly curved, tips crossing. The sternum has a deep longitudinal groove in front of abdomen. Abdomen of female very long, especially the penult segment; terminal segment longer than wide.

Color.—The carapace may be variegated with green, yellow, red, brown, and blue, spotted with yellow or red; chelipeds purplish brown.

Measurements.—Male (18234), total length of carapace 74, width of same 140, width at anterior base of lateral spine 121.8, fronto-orbital width 59.8, width of front 21 mm.

Variety.—Occasional specimens (42852 and 43913) present a striking variation from type in the form of the marginal teeth of the carapace. Those of the front are triangular, and pointed instead of rounded at tip, approaching *exasperatus;* those of the sides are much shallower than in true *bocourti* and have rapidly convergent margins and narrow spiniform tips, resembling *sapidus;* in other respects the specimens are typical.

Range.—West Indies to State of Santa Catharina, Brazil.

Material examined.—

JAMAICA.—1928, C. R. Orcutt; 1 female (61340). Montego Bay; caught in seine near shore; June 24, 1910; C. B. Wilson, 1 male, variety (42852).

PORTO RICO.—1899; *Fish Hawk:* Cataño, San Juan Harbor; January 4, 1 male (24455); January 13, 5 females (24456). Rio Bayamon, above Palo Seco; January 16; 1 female (24457). Aguadilla; January 18; 3 males (24458). Mayaguez; on coral reef; January 20; 1 female (24459). Hucares; February 13 and 14; 1 female, 2 young (24460).

BRITISH HONDURAS.—Near Belize; W. A. Stanton; 1 male, 1 female (21377). Mullins River, 20 miles S. of Belize; 2 males, cotypes (Paris Mus.).

NICARAGUA.—1892; C. W. Richmond: Bluefields; April 29; 1 young (17949). Greytown; March 27; 1 male (18234).

PANAMA.—Meek and Hildebrand, Smithsonian Biological Survey: Toro Point, Canal Zone, January 24, 1912, 1 immature female (Field Mus.). Creek at Mindi, Canal Zone, January 14, 1911, 1 young male (43910). Mindi Cut, Mindi, January 28, 1911, 7 males, 5 females (43912); 6 males, 6 females (Field Mus.); February 3, 1911, 1 male (43914). French Diversion, New Gatun, Canal Zone, January 19, 1 male, variety (43913). Colon, in ditch at slaughterhouse, March 19, 1912, 1 male, 2 females (Field Mus.), 1 female shedding (59282). Fox Bay, Colon, January 11, 1911, 1 male (43911); March 25, 1911, 1 young female (43909); January 20, 1912, 1 male (Field Mus.); January 27, 1912, 2 females (59281), 1 ovigerous, 1 abnormal, having the median sinus of the front unusually wide, the submedian teeth correspondingly nearer to the lateral teeth.

COLOMBIA.—Turbo (specimen in M.C.Z.). Cartagena; 1857; Dr. A. Schott, Atrato Expedition; 1 male (2460). Sabanilla; 1884; *Albatross;* 1 male, 3 females (18235).

GUIANA.—British Guiana; 2 males (Brit. Mus.). Cayenne, French Guiana; 2 males (Paris Mus.), cotypes of *C. cayennensis.*

BRAZIL.—Para; specimens in M.C.Z. Maranhão; Lieut. F. E. Sawyer, U. S. Navy; 5 males (18233). Pernambuco; Thayer Expedition; 1 male (M.C.Z.). Cannavierias; specimens in M.C.Z. Caruca, Rio Maria; Thayer Expedition; 7 males, 2 females (M.C.Z.). Itabapuana; specimens in M.C.Z. Rio de Janeiro; specimens in Copenhagen Museum. Praia Inglese, São Francisco, State of Santa Catharina; November 1, 1925; W. L. Schmitt; 1 ovigerous female (60978).

CALLINECTES EXASPERATUS (Gerstaecker)

Plate 56

? *Lupa trispinosa* LEACH, Trans. Linn. Soc. London, vol. 11, 1815, p. 319 (type-locality not given; type said to be in Mus. Brit., but can not now, 1928, be positively determined).

? *Amphitrite trispinosa* WHITE, List Crust. Brit. Mus., 1847, p. 27; Jamaica.

Lupea exasperata GERSTAECKER, Arch. f. Naturg., vol. 22, pt. 1, 1856, p. 129 (type-locality, Puerto Cabello, Venezuela; type in Berlin Mus.).

Callinectes tumidus ORDWAY, Journ. Boston Soc. Nat. Hist., vol. 7, 1863, p. 574 [9] (type-localities, Key West and Hayti; types from both localities in M.C.Z.).—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 226 (var. of *C. diacanthus*).—RATHBUN, Proc. U. S. Nat. Mus., vol. 18, 1895 (1896), p. 359, pl. 18; pl. 24, fig. 6; pl. 25, fig. 5; pl. 26, fig. 5; pl. 27, fig. 5.

Callinectes exasperatus RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 150; Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 49.

Diagnosis.—Lateral spine of carapace less than twice as long as preceding tooth. Male abdominal appendages reaching to middle of penultimate segment. Frontal teeth triangular.

Description.—Carapace very convex; depressions in center of carapace deep; length of intramedial area no more than half its anterior width. Frontal teeth four, triangular, tips rounded, the two median larger and more prominent than in *ornatus* or *marginatus* but not so far advanced as the lateral pair. Median epistomial tooth short, exceeding the front but little if at all. Suborbital lobe broadly rounded. Antero-lateral margin very arcuate; teeth broad, the first six with very convex posterior margins and obtuse or subacute tips, the fifth tooth the largest; next two teeth acute or acuminate. Lateral spine less than twice the length of preceding tooth. Spine at outer distal end of arm and outer spine of wrist almost obsolete, being replaced by blunt prominences. A blunt tooth or lobe on distal margin of the carpus just below the inner angle. Costae of manus coarsely and sparingly tuberculate. Penultimate segment of male abdomen similar in shape to that of *C. ornatus*, but much shorter; appendages reaching to about middle of penultimate segment, tips incurved. In the female abdomen the sixth segment is shorter than the fifth and its margins are very arcuate.

Measurements.—Males attain a width of 4⅞ inches. Male (61426), total length of carapace 62.7, width of same 117.5, width at anterior base of lateral spine 113.2, fronto-orbital width 52.2, width of front 17 mm.

Range.—From Florida Keys to State of Parana, Brazil. Bermudas.

Material examined.—

FLORIDA.—Long Key; along shore; H. Hemphill; 1 male, 1 female (14087). Key West; J. E. Mills; 2 males, cotypes of *C. tumidus* (5159, M.C.Z.). Tortugas; C. F. Holder; 1 male (2143).

CUBA.—Mariel; from branches hanging in river mouth; May 10, 1900; Palmer and Riley; 1 female (23832).

JAMAICA.—1884; *Albatross;* 1 male (18236). Montego Bay; July 10, 1910; C. B. Wilson; 1 male (42853), with spine on right side bifid.

HAITI.—Gonaives; 1860; A. Hilchenbach; 1 female, cotype of *C. tumidus* (5162, M.C.Z.).

PORTO RICO.—1899; *Fish Hawk*: San Antonio Bridge, San Juan; January 12; 1 male (24462). Cataño, San Juan Harbor, January 4,

2 males (24461); January 13, 1 male, 10 females (24463). Rio Bayamon, above Palo Seco; January 16; 8 females (24464). Mayaguez, in seine, January 19, 3 females (24465); January 20, 1 male (24466). Porto Real; January 27; 1 male, 1 female (24467). Hucares; February 13 and 14; 1 male, 1 female (24468).

ST. MARTIN.—Simsons Bay lagoon; shallow water; coral rocks; September 7, 1905; J. Boeke; 1 ovigerous female (returned to sender).

MEXICO.—Mexican Commission, World's Columbian Exposition; 1 young male, 2 young females (18631).

BRITISH HONDURAS.—Near Belize; W. A. Stanton, S. J.; 1 male (21378).

OLD PROVIDENCE ISLAND.—(E. of Nicaragua); April 4–9, 1884; *Albatross;* 2 males (7541).

PANAMA.—Meek and Hildebrand, Smithsonian Biological Survey: Toro Point, Canal Zone; April 12, 1911; 1 ovigerous female (43901). Fox Bay, Colon; March 31, 1911; 1 male (43902), 1 female (Field Mus.).

VENEZUELA.—Puerto Cabello; Schibbye collector; specimens in Copenhagen Museum.

BRAZIL.—State of Rio Grande do Norte; specimens in M.C.Z. State of Bahia: Cannavieiras, specimens in M.C.Z.; Porto Seguro, Thayer Expedition, 3 females (M.C.Z.). State of Espirito Santo: San Matheos, specimens in M.C.Z.; Victoria, Hartt and Copeland, Thayer Expedition, 1 large male (19428), from M.C.Z. State of Rio de Janeiro: Rio de Janeiro, 1 male (18736), from Paris Museum; River on Ilha Governador, Bay of Rio de Janeiro, August 27, 1925, W. L. Schmitt, 1 male (61426), with encrusting barnacles. State of São Paulo: Santos; Thayer Expedition; 1 female (M.C.Z.). State of Parana: Paranagua; October 3, 1925; W. L. Schmitt; 1 female (60991).

BERMUDAS.—Bickmore collector; 1 female (M.C.Z.).

Genus LUPELLA Rathbun

Lupa DE HAAN, Fauna Japon., Crust., 1833, p. 11. Not *Lupa* Leach, 1814, which is a synonym of *Portunus*.

Lupella RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 155; type, *L. forceps* (Fabricius); Bull. U. S. Fish Comm. for 1900, vol. 20, part 2 (1901), p. 49.

Closely allied to *Portunus*. Inner suborbital angle remarkably prominent and firmly united with a prolongation from the basal article of the antenna. The outer maxillipeds extend far beyond the front; merus rounded anteriorly, its outer angle obtuse and strongly produced; last two segments of palpus flattened and laminate. Abdomen of male narrow, third segment narrowing rapidly toward distal end. Transverse sutures of posterior half of sternum interrupted either side of the abdomen, under which they do not pass. The median suture of the sternum crosses the four posterior segments.

Contains but one species.

LUPELLA FORCEPS (Fabricius)

Plate 57

Cancer 4 (larger long-shanked crab) BROWNE, Hist. Jamaica, 1756, p. 421, pl. 41, fig. 2.

Cancer pelagicus LINNAEUS, Syst. Nat., ed. 10, vol. 1, 1758, p. 626 (part).

Xaiva de horquilla PARRA, Desc. difer. piezas hist. nat., Havana, 1787, p. 138, pl. 51, fig. 3.

Cancer forceps FABRICIUS, Entom. Syst. emend. et auct., vol. 2, 1793, p. 449 (type-locality; "*in Oceano*"; a specimen in the Copenhagen Mus. may be the type).

Lupa forceps LEACH, Zool. Misc., vol. 1, 1814, p. 123, pl. 54.—A. MILNE EDWARDS, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 352, pl. 28, figs. 1–1*g*.—VON MARTENS, Arch. f. Naturg., vol. 38, 1872, p. 95 (not *L. anceps* Saussure).

Lupella forceps RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 155; Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 50.

Diagnosis.—Chelipeds and legs long and narrow; fingers of male filiform, much longer than palm. Lateral spine of carapace several times as long as adjacent tooth.

Description.—Carapace rather flat, hexagonal, granulate. Epigastric and epibranchial lines rather well marked. Posterior margin very wide, arcuate, meeting the postero-lateral margin at an obtuse angle. Antero-lateral margin armed with eight very small, sharp teeth, separated by wide sinuses; lateral spine long, slender, and extending directly outward. The front (between antennae) is four-toothed, teeth triangular, middle pair small and subacute, outer pair longer and blunt. Inner orbital teeth broad, subtruncate; epistomal tooth slender. Chelipeds smooth and remarkably long and slender. Anterior border of arm with four to six slender spines; posterior border with a spine at extremity. Wrist with a spine at inner angle, another on outer surface. Hand prismatic, widening distally, with a spine above articulation with carpus and another subdistal. Fingers very slender, filiform in male, with numerous small teeth on their occludent edges, tips acuminate. Ambulatory legs very compressed; merus of swimming pair short, almost orbicular, armed above and below with a terminal spine; propodus elongate; dactylus oval. Chelipeds of females shorter and wider than those of males. In young males the fingers are shorter than in adult males, and in females still shorter.

Measurements.—Male (19360) length of carapace to median sinus of front 24, extreme width 59.7, width at sinus between lateral spine and next tooth 42, length of propodus of cheliped 66.8, length of dactylus of same 45.2 mm. Female (18290), length of carapace to median sinus of front 33, extreme width 76.6, width at sinus between lateral spine and next tooth 57.6, length of propodus of cheliped 56.6, length of dactylus of same 30.6 mm.

Range.—West Indies.

Material examined.—

CUBA.—1914; Henderson and Bartsch, *Tomas Barrera* Exped.: Ensenada de Cajon, off Cape San Antonio; station 11, May 22–23; 1 young (49169). Dimas Bay; station 5; bottom, mud and plants; May 17; 1 male (49170).

JAMAICA.—1884; *Albatross;* 1 female (18290). T. H. Morgan; 1 male (17217). Montego Bay; caught in fish-pot; C. B. Wilson; 1 male (42872). Kingston: Surface, by electric light, 1884, W. Nye, jr., *Albatross*, 7 males, 2 females, (7838); April 7, 1928, C. R. Orcutt, 6 males, 5 females (62474). Kingston Harbor; P. W. Jarvis; 1 male, 1 female (19360).

HAITI.—Specimens in Paris Museum.

PORTO RICO.—1899; *Fish Hawk:* San Juan Harbor between Palo Seco and Cataño; January 13; 1 arm (24506). Mayaguez; in seine; January 19; 1 female (24507). Mayaguez Harbor; 7 fathoms; station 6059; 7 males (24509). Mayaguez Harbor; 7¼ fathoms; station 6058; 4 males (24508). Off Puerto Real; 8½ fathoms; station 6074; 1 male (24510).

ST. THOMAS.—Dredged; January 17–24, 1884; *Albatross;* 1 male, 2 females (18547).

MARTINIQUE.—Specimens in Paris Museum.

Genus ARENAEUS Dana

Arenaeus Dana, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 130; type, *A. cribrarius* (Lamarck).

Euctenota Gerstaecker, Arch. f. Naturg., vol. 22, pt. 1, 1856, p. 131; type, *E. mexicana* Gerstaecker.

Allied to *Portunus*. Differs in having the palate smooth or without a longitudinal ridge; the two superior fissures of the orbit open throughout their length, V-shaped; male abdomen narrower but not ⊥-shaped as in *Callinectes*.

Contains only two species.

KEY TO THE SPECIES OF THE GENUS ARENAEUS

A¹. Four frontal teeth. One spine at distal end of manus_____**cribrarius**, p. 134.
A². Two frontal teeth. Two spines at distal end of manus____**mexicanus**, p. 137.

ARENAEUS CRIBRARIUS (Lamarck)

SPECKLED CRAB; SIRI DA ARÊA (Brazil)

Plate 58, Figures 2 and 3; Plates 59 and 60

? *Ciri Obi* Marcgrave, in Piso and Marcgrave, Hist. Nat. Brazil., 1648, p. 184.

Portunus cribrarius Lamarck, Hist. Nat. Anim. sans Vert., vol. 5, 1818, p. 259 (type-locality, Brazil; type in Paris Mus.).

Lupa maculata Say, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1818, p. 445 (type-localities, Georgia and Florida; types not extant).

Lupea cribraria Milne Edwards, Hist. Nat. Crust., vol. 1, 1834, p. 452.—Desbonne and Schramm, Crust. Guadeloupe, 1867, p. 38.

Lupa cribraria MILNE EDWARDS, Hist. Nat. Crust., explanation of plates, p. 15, pl. 17, figs. 1–4.

Arenaeus cribrarius DANA, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 290; atlas, 1855, pl. 18, figs. 2*a*, 2*b*.—RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 50.—SUMNER, Bull. Bur. Fisheries, vol. 31, pt. 2, 1911, p. 672.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 434, pl. 34, fig. 3.

Neptunus cribrarius A. MILNE EDWARDS, Arch. Mus. Hist. Nat. Paris, vol. 10, 1861, p. 324; Crust. Rég. Mex., 1879, p. 211.

Diagnosis.—Four frontal teeth. One spine at distal end of manus. Outer and inner spines of wrist subequal.

Description.—Carapace more than twice as wide as long, almost smooth to the naked eye, but through the lens closely covered with fine granulation. Front narrow, much less advanced than the outer orbital angles and armed with four small teeth (between the orbital teeth) the two median more prominent and more widely separated from each other than from the outer ones, with which they are partly coalesced; median sinus U-shaped, outer sinuses nearly rectangular. Inner tooth of orbit bluntly triangular; superior border divided by two wide incisions, the inner deeper than the outer, intermediate lobe narrow, subtruncate; inferior border forming a broad sinus between outer and inner tooth. Antero-lateral teeth wide, covered below with a fringe of hair which screens the interspaces; teeth very unequal, the first five narrower than the next three, the seventh widest. Lateral horn strong, as long as the space occupied by the last two teeth. Pterygostomian and antennal regions and epistome covered with hair.

Chelipeds short and stout. Three or four spines on anterior border of merus; a short spine or tubercle, sometimes obsolete, on the posterior border at the sinus and another at distal end a little above or in front of the posterior border. Wrist with two short spines, one inside, the other outside; two denticles on the outer distal margin; and one or two on the dorsal surface terminating longitudinal carinae. Five tuberculate longitudinal carinae on the manus, the upper-inner one terminating in a spine. Ambulatory legs wide. Swimming legs also very wide, the merus arcuate and unarmed below. Sixth segment of abdomen of male narrow; margins of last segment sinuous, extremity very narrow.

Color.—Grayish formed by a multitude of small white or light yellow spots on a background of fawn or light brown. (Desbonne.) Light vinaceous brown or olive brown thickly covered over the dorsal surface with small, rounded, white spots; tips of walking legs yellow. (Hay and Shore.) The spots on the dorsal surface of the chelipeds are larger than those of the carapace. The color pattern persists in alcohol.

Measurements.—Male (32710), total length of carapace 55, width of same 121, width at anterior base of lateral spine 91.3, fronto-orbital width 36, width of front (4 teeth) 6.7 mm.

Habitat.—Lives in rather shallow water close to the shore but is sufficiently adroit as a swimmer to escape the dangers of the tumbling surf. (Hay and Shore.)

Range.—From Vineyard Sound, Mass., to State of Santa Catharina, Brazil.

Material examined.—

MASSACHUSETTS.—Vineyard Sound; in gulf-weed; October 10, 1905; Bureau of Fisheries; 10 young (33125).

NEW JERSEY.—South Cape May; October 20, 1928; H. G. Richards; 1 male (61997) from Univ. Penna.

VIRGINIA.—Smith's Island; October 1, 1897; Charles W. Richmond and William Palmer; 5 specimens (20588); common off shore; the red drum comes in to feed on them. Cape Charles; sandy beach; August 20–21, 1921; W. C. Schroeder, Bureau of Fisheries; 2 males, 2 females, all immature (57151).

NORTH CAROLINA.—Off Cape Hatteras; surface; June 5, 1885; *Albatross;* 1 young (15029). Shackleford Banks (inside), Beaufort; September 12, 1928; Schmitt and Shoemaker; 2 specimens (62453).

FLORIDA.—4 specimens (2029). Indian River; 3 male and female (2079). Norris Cut, Miami; April, 1901; J. E. Benedict; 4 males (25560). Lignum Vitae Lake, 1¼ miles ESE. of Eagle Nest Key; from Sargassum; February 4, 1903, station 7456, *Fish Hawk* 1 young (61049). Sarasota Bay, in Longboat Pass, S. end of Anna Maria Key; close to shore; July 7, 1929; Wm. W. Wallis; 1 female (62736). Tortugas; from floating gulf weed; July 31, 1926; C. R. Shoemaker; 1 young (62454). Pensacola; from fish stomach; 1882; Silas Stearns; 1 male, 2 females (4508). Off Pensacola, near the Life Saving Station; Benjamin Harrison; 1 female (17994).

TEXAS.—Galveston; M. A. Davey; 1 specimen (18905). San Bernardo River; New York Aquarium; 1 male (returned to sender). Corpus Christi Bay; November 27–30, 1891; B. W. Evermann; 5 males, 1 female (17110).

JAMAICA.—Montego Bay; caught in seine near shore; June 24, 1910; C. B. Wilson; 1 male (42851). Kingston Harbor; 1893; R. P. Bigelow; 1 male (17978).

PORTO RICO.—1899; *Fish Hawk:* Palo Seco, San Juan Harbor; January 13; 3 young males, 1 young female (24471). Between Palo Seco and Cataño, San Juan Harbor; January 13; 2 young males, 3 young females (24472). Mayaguez; in seine; January 19; 4 males, 2 females, 1 young (24473). Mayaguez; on coral reef; January 20; 4 males, 7 females (24474). Boqueron Bay; January 27; 1 young male, 1 young female (24475). Playa de Ponce; January 31; 1

male (24476). Arroyo; February 4; 1 young (24477). Vieques Island; February 8; *Fish Hawk;* 2 young females (24478).

DOMINICA.—A. Hyatt Verrill; 1 male (32710).

ST. LUCIA.—Port Castries; December 2, 1887; *Albatross;* 1 male (22042).

MEXICO.—Vera Cruz; 1926; C. R. Orcutt; 1 male (60078).

BRITISH HONDURAS.—Stann Creek; shallow water; Rev. W. A. Stanton; 1 male (22595); common.

NICARAGUA.—Gorda Point; beach 1 mile N. of Point; March 7, 1915; Charles G. Holland, U. S. S. *Leonidas;* 1 male (61380). Greytown; Charles W. Richmond; 1 female (17909).

PANAMA.—Fox Bay, Colon; March 31, 1911; Meek and Hildebrand; 2 young (Field Mus.), 3 young (44202); received from Smithsonian Biological Survey.

COLOMBIA.—Sabanilla; 1884; *Albatross;* 3 young (17946).

CURAÇAO.—Bay of Wacao; shallow water; stony bottom; October 6, 1905; J. Boeke; 1 large male (returned to sender).

BERMUDAS.—Hungry Bay; July–September; F. S. Gosling; 1 male (25446).

BRAZIL.—1876–1877; R. Rathbun, Hartt Explorations; 1 young (40586). Mamanguape stone reef, State of Parahyba; June 23, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 male, 1 female (25751). Copacabana, Rio de Janeiro; out of sand with forked stick; week of September 1, 1925; Carlos Moreira; 2 females (1 ovigerous) (60974); received through W. L. Schmitt. Conceição de Ytanham, near Santos, State of São Paulo; June, 1914; H. Luederwaldt; 1 male (48303); received from H. von Ihering. Iguape, State of São Paulo; R. Krone; 1 male (47839); received from H. von Ihering. Saco, São Francisco, State of Santa Catharina; 1923; Dr. C. Fernetz; 1 male; lent by Buenos Aires Museum.

ARENAEUS MEXICANUS (Gerstaecker)

Plate 58, Figure 1; Plate 61

Euctenota mexicana GERSTAECKER, Arch. f. Naturg., vol. 22, pt. 1, 1856, p. 131, pl. 5, figs. 3 and 4 (type-locality, Mexico; type in Berlin Mus.).

Arenaeus bidens SMITH, Rept. Peabody Acad. Sci., 1869, p. 90 (type-locality, Corinto, Nicaragua; types in Mus. Comp. Zoöl.).

Neptunus mexicanus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 212, pl. 42, fig. 3–3*e*.

Arenaeus mexicanus FAXON, Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 22.—RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 537, pl. 37, fig. 2.

Diagnosis.—Two frontal teeth. Two spines at distal end of manus. Outer spine the smallest of the wrist spines.

Description.—Bears a strong resemblance to *A. cribrarius*. Interregional furrows in center of carapace deeper and inner branchial lobule more prominent. Only two frontal teeth (between the orbital teeth),

which are small, blunt or subtruncate. Orbit with two teeth above beside those at the extremities, one between the sinuses narrower than in *cribrarius*, the other small but well developed and lying further inward, close to the sinus. Antero-lateral teeth longer and narrower than in *cribrarius*, seventh and eighth teeth of subequal width, eighth considerably longer.

Three spines on anterior border of merus, one tooth at distal end just above posterior border. The outermost of the carpal spines is the smallest. Both superior carinae of the manus terminate in a spine, the outer the smaller. The merus of the swimming foot is a little longer in proportion to width than in *cribrarius*.

Color.—The color pattern of the carapace is similar to that of the preceding species but the light spots are less uniformly round. The spotting of the chelipeds is very much reduced or altogether absent.

Measurements.—Male (60975), total length of carapace 40, width of same 91, width at anterior base of lateral spine 70, fronto-orbital width 28.8, width of front (two teeth) 5 mm.

Range.—Lower California, Mexico, to Peru.

Material examined.—

MEXICO.—Lower California: Ballenas Bay; March 16, 1911; *Albatross;* 1 male, 1 female (60003). Magdalena Bay; San Diego Society of Natural History; 1 male (returned to sender). Carmen Island, Gulf of California; 1889; *Albatross;* 1 young (17448).

NICARAGUA.—Corinto: J. A. McNiel; 2 males, cotypes of *A. bidens* (5315, M.C.Z.). C. F. Baker; male (29316).

PANAMA.—Cocos Island, off Bay of Panama; Feb. 28, 1891; *Albatross;* 3 males (20607). Taboga Island, Bay of Panama; May 11–15, 1911; Meek and Hildebrand; 1 male (Field Mus.), 1 male, 1 female (44203); received from Smithsonian Biological Survey.

PERU.—Salavery; October 21, 1926; collected from surf by men and boys for W. L. Schmitt; 11 males, 56 females (60975). Ancon; sand beach; February 13; R. E. Coker; 1 male (40441); received from Peruvian Government.

Genus CRONIUS Stimpson

Cronius Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 225 [97]; type, *C. ruber* (Lamarck).

Charybdella Rathbun, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 166; substituted for *Cronius*, preoccupied, according to a rule then valid, by *Cronia* H. and A. Adams, 1858; Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 51.

Allied to *Portunus*, differing chiefly in the orbit more nearly circular, the basal lobe of the antenna prolonged into the orbital hiatus and the flagellum more remote from the orbital cavity. Carapace narrow;

interorbital space wide; antero-lateral teeth very unequal, alternating large and small; chelipeds heavy.

Contains only two species.

KEY TO THE SPECIES OF THE GENUS CRONIUS

A¹. Four spines on manus. A spine at postero-distal angle of merus of swimming feet ..... **ruber**, p. 139.

A². Two spines on manus. A row of spinules but no spine on postero-distal margin of merus of swimming feet ..... **tumidulus**, p. 142.

CRONIUS RUBER (Lamarck)

Plates 62 and 63

Portunus ruber LAMARCK, Hist. Nat. Anim. sans Vert., vol. 5, 1818, p. 260 (type-locality, Brazil; type not located).

Lupa rubra MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 454.—STREETS, Proc. Acad. Nat. Sci. Philadelphia, ser. 3, vol. 1, 1871, p. 239; Isthmus of Panama.

Cronius ruber STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 225 [97].

Achelous ruber A. MILNE EDWARDS, Arch. Mus. Hist. Nat., Paris, vol. 10, 1861, p. 345, pl. 33, fig. 1–1*b*.

Goniosoma millerii A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 4, 1869, p. 54, pl. 18, figs. 1–3 (type-locality, Cape St. Vincent, Cape Verde Islands; type in Paris Mus.).

Amphitrite edwardsii LOCKINGTON, Proc. California Acad. Sci., vol 7, 1876 (1877), p. 43 [3] (type-locality, Mazatlan; type not extant); p. 106 [12], Lower California.

Cronius milleri A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 232.

Cronius edwardsii A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 232.

Charybdella rubra RATHBUN, Proc. U. S. Nat. Mus., vol. 22, 1900, p. 291.

Charybdella edwardsii RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 611.

Diagnosis.—Two gastric, one branchial ridge. Upper inner orbital angle distinctly divided into two teeth. All spines black-tipped. Four spines on wrist, 4 on hand. A strong spine at postero-distal angle of merus of swimming foot.

Description.—Carapace hexagonal, smooth and pubescent. A sinuous branchial ridge, two gastric ridges, the anterior one bi-arcuate. Front proper cut into four teeth, the two median more advanced, larger, and with convex sides; those of second pair more pointed, directed slightly outward and separated from the antennal tooth by a deep cut; this pair narrow, sharp, directed forward, and not deeply separated from the inner orbital angles and are subrectangular and carinate. Orbit nearly circular. The basal article of the external antennae bears a spine below the insertion of the movable portion. Of the antero-lateral teeth or spines the ninth is scarcely longer than the seventh; intermediate spines strikingly smaller. Merus of chelipeds armed in front with from four to six spines of unequal size, one of which is terminal, and at extremity of its posterior border with a very small spine. Wrist with granulous crests, a large spine inside and

Material examined of Cronius ruber

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Atlantic coast of America											
South Carolina:	° ′ ″	° ′ ″			°C.						
Charleston Harbor			1–12			Mar. 20, 1880		R. E. Earll, U. S. Fish Commission.	1♀	3157	
Florida:											
Hawk Channel	½ mile SE. by S. of S. end of Duck Key.		2.25	rky	24.5	Jan. 27, 1903	7429	*Fish Hawk*	1♀	61063	
South of southwest Channel buoy, Tortugas.			20			Aug. 16, 1924	7	*Dohrn*, W. L. Schmitt.	1♂	61009	
Mexico:											
Campeche Snapper Banks.			[1]26					Joseph Lee	1♂	44322	
West Indies:											
Jamaica—Port Royal								C. R. Orcutt	1 right chela	62511	
Porto Rico—											
San Antonio Bridge, San Juan.						Jan. 12, 1899		*Fish Hawk*	1♂	24480	
San Juan Harbor						Jan. 13, 1899		do	1♂	24481	In fish trap.
Mayaguez				coral reef		Jan. 20, 1899		do	5♂ 4♀	24483	
Do						Jan. 19, 1899		do	1♂	24482	In seine.
Arroyo						Feb. 4, 1899		do	1♂ 1♀	24484	
St. Thomas								A. H. Riise	1♂	2445	
St. Martin	Shore near Philipsburg.					June, 1905		Dr. Shaw for J. Boeke.	1♀	Returned to sender.	
St. Eustatius	W. of Oranjestad		4	sdy		Aug. 17, 1905		J. Boeke	1 y. ♂	do	
Dominica—Pointe Michel			40					A. Hyatt Verrill	1♂	32709	
Panama:											
Exact locality not given.						1862		C. F. Davis	1♀	21325	From Mus. Comp. Zöol.
Fox Bay, Colon						Jan. 27, 1912		Meek and Hildebrand.	1♂	59294	From Smithsonian Biological Survey.
Porto Bello						Apr. 24–28, 1911		do	1♂	44190	Do.
									1♀, soft shell	Field Mus.	
Do						Mar. 19, 1912		do	2♂ 2♀ (1 ovig.)	59292	Do.
									1♂ 1♀ ovig	Field Mus.	
Rio Casjal, Porto Bello.						Mar. 17, 1912		do	2♂	do	Do.

Brazil:											
Rio de Janeiro						1876–1877		R. Rathbun	1♀	40583	Hartt Explorations.
Do								Selenka	1♂	Berlin Mus.	
Villa Bella, Ilha São Sebastião, State of São Paulo.						Sept. 20, 1925		W. L. Schmitt	1♂	61010	In dip net.
Do						Sept. 23, 1925		do	1♂	61385	
Ilha São Sebastião								H. Luederwaldt	2♀	61013	
Iguape, State of São Paulo.						1902		R. Krone	1♀ immature.	47846	From H. von Ihering.
Saco, São Francisco, State of Santa Catharina.						1923		Dr. C. Fernetz	2♂ 3♀	Returned to sender.	Lent by Buenos Aires Museum.
Pacific coast of America											
Mexico:											
Point San Bartholome, Lower California.						Mar. 4, 1911		*Albatross*	1♂ 1♀	60020	
Maria Madre Id., Tres Marias Islands.			4–10			1925		Hanna and Jordan	2 y	62698	From California Academy Sciences.
									2 y	Returned	
Do						Mar. to May, 1927		Sec. Agr. y Fomento, Mexico.	3 y	61139	
Acapulco									1	M. C. Z.	
Central America:											
San Salvador								John M. Dow	1♂	2447	
Punta Arenas						Jan. —, 1907		P. Biolley	1♀	39087	From J. Fid. Tristan.
Panama:											
Panama								John M. Dow	1 y	3271	
Panama City								J. Zetek	1♂	48793	
Do						Oct. 3, 1914		do	1♂ 1 y. ♀	48801	
Do			(2)			Mar. 21, 1912		Meek and Hildebrand.	1♀ ovig	59293	
Do						Mar. 24, 1912		do	1♂ 1♀	Field Mus.	
Naos Island								G. M. Gray	1♂	42137	
Ecuador:											
Off Eden Island, northwest of Indefatigable Island, Galapagos Islands.			5			Apr. 1, 1923		Williams Galapagos Expedition.	1 y	57728	From New York Zoological Society.
Salinas						Sept. 12, 1926		W. L. Schmitt	6♂ 1♀ 8 y	61011	
						Sept. 13, 1926					
Do						Sept. 17, 1926		do	2♂	61012	
Peru: Paita						Oct. 8, 1926		do	1♂ soft-shell	62473	
Eastern Atlantic Ocean											
Cape Verde Islands:											
Cape St. Vincent									1♀	Paris Mus.	

[1] About.

[2] Tide pools.

three small spines on outer face. Hand crossed by granulous carinae inside and out and armed above with four spines alternately placed, two on inner border and two on outer border of upper surface. A strong spine followed by a deep sinus and a small spine at postero-distal end of merus of swimming foot.

Color.—Violet red or deep purple red more or less marbled with a lighter shade or white. Extremity of all spines black.

Young.—The front is less advanced, the median pair of teeth subtruncate. In specimens 7 mm. wide the front is arcuate, cut into shallow lobes, the four small antero-lateral teeth are scarcely distinguishable.

Measurements.—Male (48801), total length of carapace 50.2, width of same 75, fronto-orbital width 40.4, interorbital width 26.5, width of front 13.7 mm.

Range.—Charleston Harbor, South Carolina, to the State of Santa Catharina, Brazil. Lower California, Mexico, to Peru and the Galapagos Islands. West Africa from Cape Verde Islands to Loanda.

Material examined.—See table, pages 140–141.

CRONIUS TUMIDULUS (Stimpson)

Plate 64

Achelous tumidulus STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 149 (type-localities, West of Tortugas, 37 fathoms, and off Conch Reef, 40 fathoms; types not extant).

Neptunus tumidulus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 218.

Cronius bispinosus MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 188, pl. 15, fig. 2–2*b* (type-locality, Bahia; type in British Museum).

Charybdella tumidula RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 51.—VERRILL, Trans. Connecticut Acad. Arts and Sci., vol. 13, 1908, p. 393, pl. 19, fig. 1.

Cronius tumidulus RATHBUN, in Boeke, Rapport Vischerij Kolonie Curaçao, part 2, 1920, p. 18.

Diagnosis.—Two gastric, three branchial and one cardiac ridge. Upper inner orbital angle feebly bidentate. Spines not black tipped. Two spines on wrist, two on hand. A row of spinules but no spine on lower half of distal end of merus of swimming foot.

Description.—Carapace narrower than in *C. ruber*, pubescent, granulated toward margins. Two short granulate carinae behind the long branchial carina, also a transverse carina on the cardiac region. Last spine of antero-lateral border half again as long as seventh spine. The small alternate spines are unequal, diminishing in the following order: Second, fourth, sixth, eighth. Front convex, prominent, projecting much beyond level of outer angles of orbits; teeth rounded, the two middle ones being smaller than the second pair and most prominent, separated from second pair by a rather broad, shallow sinus; a narrow sinus between second pair and the antennal tooth or inner angle of orbit; this angle is very

slightly bidentate. The separation of the antennal flagellum from the orbit by a process from the basal article is not so well marked as in *C. ruber*. Chelipeds rather short and stout; merus armed with three large and one small spine on the front edge; spine of outer extremity of posterior edge of merus minute, almost obsolete. Inner spine of carpus long, reaching about a third the length of palm. Only one spine on superior margin of hand at distal third; another at articulation of carpus. On the merus of the swimming legs there is a denticulated postero-distal margin, but no spine.

Color.—Variegated hazel and rufous. (Schmitt.)

Young.—Carapace narrower and more tumid than in the old, front less advanced, teeth shallower, interspaces shorter. The outer denticle at the upper inner angle of the orbit is very slight. The four small intermediate teeth of the antero-lateral margin are minute and closely appressed. Lateral spine not much longer proportionately than in the adult.

Measurements.—Male (14053), total length of carapace 21, width of same 30.7, width at anterior base of spine 27.2, fronto-orbital width 18.3, width of front (4 teeth) 6.7 mm. Verrill records a larger specimen, carapace of male 27 by 41 mm.

Range.—Bahamas and Florida Keys to the State of Bahia, Brazil. Bermuda.

Material examined.—See table, pages 144–146.

Subfamily PODOPHTHALMINAE

Orbits occupying the whole of the anterior border of the carapace except for a very narrow front; eyes on very long stalks.

Genus EUPHYLAX Stimpson

Euphylax STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 225 [97]; type, *E. dovii* Stimpson.

Carapace transversely oval, convex; antero-lateral margin short, rounded, sparingly dentate; fronto-orbital distance about ⅘ of width of carapace. Orbits very long, outwardly deeply cut, outer angle a tooth or spine closing orbit outside; inner suborbital lobe extensive, smooth above, margin crenulate. Eyes large, stalk slender, greatly elongate, compressed; cornea stout. Front very narrow between bases of eyestalks but anteriorly strongly dilated and deflexed, and with a median tooth on the anterior or lower margin. Peduncle of antennae embedded between outer extremity of the front and the adjoining lower margin of the orbit, basal article short, movable part about half as long as orbit. Antennules close together, folded horizontally but not completely retractile. Epistome linear, well defined, armed in front with a spine which projects between the antennules. Merus of outer maxillipeds obliquely quadrate, little

Material examined of Cronius tumidulus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Bahamas:	° ′ ″	° ′ ″			°F.						
New Providence Island						1886		*Albatross*	1♀	17943	
East end of Hog Island, Nassau.						July 20, 1903		B. A. Bean	1♂	31041	From Geogr. Soc. Baltimore.
Florida:											
Key Largo			(1)	Grs				H. Hemphill	1♂	14053	
Lower Metacumbe Key			(1)	Grs		1885		do	1♀	15049	
Crawfish Bar, Key West						Oct. 21, 1896		B. W. Evermann, U. S. Fish Commission.	1♂ 1♀	22274	
Tortugas—											
Off west side Fort Jefferson, Garden Key.	Between beach to south and moat entrance.					Aug. 19, 1924		W. L. Schmitt	1♂	61016	Gift of Carnegie Institution.
Off north end Loggerhead Key.				Seaweed		Aug. 10, 1924		do	1♂	61014	Do.
6 miles south of No. 2 buoy, Southwest Channel.			18			July 22, 1924	44	do	1♂	61015	Do.
Outer Tortugas Reef	Stomach of fish No. 54, yellow grunt, *Haemulon sciurus* (Shaw).					June 5, 1925		do	Fragments of 1	61064	Do.
Outer Lighthouse Reef	Stomach of fish No. 114, school-master (yellow snapper, *Neomaenis apodus* (Walbaum).					June 7, 1925		do	2♂ 1♀	61065	Do.
Off north end of Loggerhead Key.	Stomach of fish No. 184, school-master (yellow snapper), *Neomaenis apodus* (Walbaum).					June 9, 1925		do	1♀	61066	Do.
Do	Stomach of fish No. 198, school-master (yellow snapper), *Neomaenis apodus* (Walbaum).					do		do	1♂ 1♀	61067	Do.

Do	Stomach of fish No. 209, gray snapper, *Neomaenis griseus* (L.).					June 9, 1925		W. L. Schmitt	1 cheliped, 1 leg.	61038		Do.
1½ miles North of Loggerhead Key.	Stomach of fish No. 330, gray snapper, *Neomaenis griseus* (L.).					June 13, 1925		do	1♂	61017		Do.
Do	Stomach of fish No. 419, yellow goatfish, *Upeneus martinicus* Cuv. & Val.					do		do	1 cheliped	61069		Do.
¼ mile south of Bird Key Harbor.	Stomach of fish No. 496, gray snapper, *Neomaenis griseus* (L.).					June 21, 1925		do	1♀	61070		Do.
Do	Stomach of fish No. 550, gray snapper, *Neomaenis griseus* (L.).					do		do	1♂ 1♀	61071		Do.
Tortugas	Stomach of fish					June 13, 1925		do	3 y	61072		Do.
West Florida			19					U.S.C.S. str. *Bache*	1♀	2969, M.C.Z.		
Cuba:												
San Antonio Point						1884		*Albatross*	1♂	18545		
Ensenada de Cajon						May 22, 1914 May 23, 1914	11	Henderson and Bartsch, *Tomas Barrera* Exped.	1 y	49157		
Reef Lavesos Italienos, opposite Cayo Lavesos.			2–3	Co. S.R.		June 2, 1914	14	do	1 ♀ ovig. 1 y	49162		
Southeast of Cuba	19 55 55	75 48 03	(2)		79	Feb. 27, 1884	2133	*Albatross*	1y	18444		
Off Cuba			(2)	In sargassum.		1923		Williams Galapagos Exped.	1 y	57729	From New York Zool. Soc.	
Jamaica:												
Montego Bay; off bathing beach.						July 19, 1910		E. A. Andrews	1♀ ovig	42868		
Montego Bay; off Salt Pond						Aug. 1, 1910		do	1♂ y	42873		
Do			40			Aug. 4, 1910		C. B. Wilson	1♀ y	42858		
Port Antonio								J. E. Duerden	1	Returned to sender.		
Porto Rico:												
Mayaguez						Jan. 20, 1899		*Fish Hawk*	1♂ 1♀	24511		
Mayaguez Harbor						do		do	1♂	24512		
Boqueron						Jan. 25, 1899		do	1♂	24513		

[1] Below low tide.

[2] Surface.

Material examined of Cronius tumidulus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Porto Rico—Continued.	° ′ ″	° ′ ″			°C.						
Off Vieques Island	Pt. Mula lighthouse, SSW. ⅜ W., 5¾ miles.		14	Co. S	25.6	Feb. 8, 1899		*Fish Hawk*	1 y♂	24514	
St. Thomas, Virgin Islands						Jan. 17, 1884 to Jan. 24, 1884		*Albatross*	1 y	18570	
St. Eustatius; west of Oranjestad			4	sdy		Aug. 17, 1905		J. Boeke	1♂ 1♀	Returned to sender.	
Aruba, lagoon			(3)	algae		Aug. 8, 1905		do	1♀	do	
Curacao:											
Lagoon			(3)	do		May 26, 1905		do	1♂ 3♀ (1 ovig)	do	
Do			(3)			Sept. 28, 1905		do	1♀ ovig	42968	
Old Providence Island, Caribbean Sea.						1884		*Albatross*	1♂ 1 y	17944	
Brazil:											
Northeast of Bahia	11 49 00	37 27 00	12–17			Jan. 18, 1872		U.S.C.S. Str. *Hassler*.	1♂	2968, M.C.Z.	
									1♀	237, M. C. Z.	
Porto Seguro, State of Bahia									1	M.C.Z	

[3] Shallow.

longer than broad, margins not incised, outer angle broadly rounded. Chelipeds long, hand strongly compressed. Posterior feet natatory; dactylus ovate. Dactylus of first 3 pairs broadly lanceolate.

Contains two species from middle America.

KEY TO THE SPECIES OF THE GENUS EUPHYLAX

A[1]. Antero-lateral margin of carapace armed with 5 small teeth or spines. Carapace smooth ..... **dovii**, p. 147.

A[2]. Antero-lateral margin of carapace armed with 3 large spines and one small one. Carapace with granulated lines and elevations ..... **robustus**, p. 148.

EUPHYLAX DOVII Stimpson

Plate 65

Euphylax dovii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 226 [98], pl. 3 [not 5], figs. 5, 5*a* (type-locality, western coast of Central America; type not extant).—A. MILNE EDWARDS. Crust. Rég. Mex., 1879, p. 204, pl. 38, figs. 2–2*d*.

Diagnosis.—Five small teeth or spines on antero-lateral margin. Carapace and lower orbital plate smooth. Front narrow, broadly T-shaped. Eyes very long. Palms carinated.

Description.—Carapace more than half again as broad as long, smooth and glabrous, minutely punctate, unevenly convex, cardiac region more protuberant than gastric. Antero-lateral margin much shorter than the postero-lateral, undulated and obscurely 5-toothed including the angle of the orbit, which is much larger and more prominent than either of the other teeth; posterior tooth minute, subspiniform; intermediate ones very minute, indistinct and unequally distant. Margins of orbit crenulated; two small fissures above. Suborbital lobe large and very prominent, with polished superior surface; distance between its anterior and posterior margins much exceeding width of eye-peduncle. Front nearly three times as wide at its anterior extremity as at its base between the eyes; with a supra-marginal crest interrupted at the middle. Chelipeds rather large, nearly smooth above; merus broad, armed with 3 or 4 very small spines anteriorly and one small terminal one posteriorly; carpus one-spined within, and with a crenulated outer margin usually indistinctly one-toothed or spined; hands ornamented outside with four slight longitudinal ridges sparsely granulated or short-spinulated, besides the ridge on the upper and on the lower margin, also a superior distal spine and a proximal spine at carpal articulation; on inner side of palm a few elongated tubercles forming a short row along middle of distal end, and above that and behind base of dactylus a spine with one or two granules on its slope; fingers much compressed, not gaping, strongly toothed within and with crenulated exterior margins.

Color.—Rosy with zones of a deeper red on the front of the carapace and on the arm. The shell has iridescent reflections which are very apparent on inner face of chela. (A. Milne Edwards.)

Measurements.—Male (17290), length of carapace 46.5, width of same 76, fronto-orbital width 60, greatest width of front 12 mm.

Range.—West coast of Mexico? (A. Milne Edwards). Central America to Chile.

Material examined.—

PANAMA.—1 male (17290), purchased from H. A. Ward.

Montuosa Islet, N. 12° W., 12 miles; lat. 7° 17′ N., long. 82° 11′ W.; surface; October 20, 1904; station 4619, *Albatross*; 1 female (33369).

PERU.—Paita, *Hassler* Exped., 9 females (21320), received from the Museum of Comparative Zoölogy.

CHILE.—Talcahuano, specimen in M.C.Z.

EUPHYLAX ROBUSTUS A. Milne Edwards

Plates 66 and 67

Euphylax robustus A. MILNE EDWARDS, in Les fonds de la mer, by Fischer, Folin and Périer, vol. 2, 1874, p. 249 (type-locality, Mazatlan; type in Paris Mus.); Crust. Rég. Mex., 1879, p. 205, pl. 37.

Diagnosis.—Three strong spines on antero-lateral margin. Carapace with granulated lines and prominences. Lower orbital plate granulated. Otherwise as in *E. dovii.*

Description.—A granulated epigastric line; a similar line runs from the base of the lateral spine transversely inward, not reaching the branchio-cardiac suture. Prominent parts of carapace granulated, granules little apparent. Supra-orbital border more granulate than in *dovii.* The upper surface of the advanced lower orbital plate is ornamented with distinct granules. Lateral border of carapace granulated and with three strong spines, the first most developed, and a small spine in the first interspace. (After A. Milne Edwards.)

Color.—Carapace greenish; chelae same color above and yellowish inside and below; ambulatory legs reddish yellow. (A. Milne Edwards.)

Measurements.—Female, holotype, length of carapace 56, width of same 90, fronto-orbital width 79 mm. (A. Milne Edwards.)

Range.—Known only from the unique type from Mazatlan, Mexico.

Relation.—Perhaps conspecific with *E. dovii.* Its peculiarities may be due to its greater size.

Family ATELECYCLIDAE

Atelecyclidae (p. 421) + *Cheiragonidae* (p. 419) ORTMANN, Zool. Jahrb., Syst., vol. 7, 1893; Bronn's Thier-Reich, vol. 5, pt. 2, 1898, p. 1169.

Atelecyclinae (p. 99) + *Corystidae*, part (p. 103), ALCOCK, Journ. Asiat. Soc. Bengal, vol. 68, 1899.

Atelecyclidae BORRADAILE, Ann. Mag. Nat. Hist., ser. 7, vol. 19, 1907, p. 481.

The antennules fold lengthwise. The movable part of the antennae is either well developed and hairy or rudimentary or altogether

absent. Carapace never very broad, but either subcircular, suboval, oblong, or pentagonal.

KEY TO THE AMERICAN SUBFAMILIES OF THE FAMILY ATELECYCLIDAE

A[1]. Movable part of antennae, or that part succeeding the basal article, stout, provided with a flagellum. Antennules folding within their cavity. Front, between the antennae, cut into two, three, or four teeth or spines. **Atelecyclinae**, p. 149.

A[2]. Movable part of antennae absent or rudimentary. Antennules stout, too large to retract within their cavity. Carapace rotund. Front between the antennae entire or subentire----------**Acanthocyclinae**, p. 170.

Subfamily ATELECYCLINAE

Carapace suboval, oblong or pentagonal. Movable part of antennal peduncle well developed, stout, provided with a flagellum. Antennules folding normally within their cavity. Front, between the antennae, cut into two, three, or four spines.

KEY TO THE AMERICAN GENERA OF THE SUBFAMILY ATELECYCLINAE [19]

A[1]. Orbits transverse. Lateral margins of carapace well defined by a more or less sharp edge. Legs stout.

B[1]. A triangular projection from the basal antennal article fills the inner hiatus of the orbit. Lateral margins of carapace cut into 6 or 7 large teeth. Surface of body and appendages covered with short bristles which give them the name "horse crabs." Genital openings of female very large, not covered by the appressed abdomen.

C[1]. Carapace pentagonal; lateral teeth 6; frontal denticles 4. Legs spinulous----------**Telmessus**, p. 150.

C[2]. Carapace oblong; lateral teeth 7; frontal teeth 2 in old, sometimes 4 in young. Legs coarsely spined---------- **Erimacrus**, p. 155.

B[2]. Basal antennal article without a projection filling the orbital hiatus. Lateral margins cut into spines or shallow teeth edged with spinules.

C[1]. Carapace oval or oblong-oval and without a long lateral spine; surface smooth or granulous---------- **Peltarion**, p. 160.

C[2]. Carapace with long lateral spines.

D[1]. Carapace orbicular, smooth except near the margins, and covered with a fine velvet, like *Dromia*------- **Trichopeltarion**, p. 167.

D[2]. Carapace pentagonal, tuberculate----- **Trachycarcinus**, p. 164.

A[2]. Orbits and eyes pointing forward. Carapace oval; lateral margin not defined except by a few long spines. Legs slender---------- **Pliosoma**, p. 169.

NOMEN NUDUM

Atelecyclus dilatatus PHILIPPI, Zool. Anzeiger, vol. 17, 1894, p. 264; Chile.

[19] Milne Edwards (Hist Nat. Crust., vol. 2, 1837, p. 143) makes a species *Atelecyclus chilensis*, which according to the description is so closely allied to *A. cruentatus* Desmarest (in Guérin, Iconographie du Règne Animal, vol. 2, pl. 2, fig. 2–2*c*) that it is but a variation of it. Milne Edwards gives as a possible synonym the *Cancer undecimdentatus* of Herbst (Naturg. d. Krabben u. Krebse, vol. 1, 1783, p. 181, pl. 10, fig. 60). I am able to confirm its identity, as there lies before me a photograph of one of Herbst's three type-specimens in the Berlin Museum which are labeled "Am. bor."; also a photograph of a female of the same species in the Copenhagen Museum and labeled "ex Ind. or. Daldorf." Both of the photographs agree with Desmarest's figure (*loc. cit.*); therefore the valid name of the European species is *Atelecyclus undecimdentatus* (Herbst, 1783)=*A. rotundatus* (Olivi, 1792, Zool. Adriat., p. 47, pl. 2, fig. 2)=*A. cruentatus* Desmarest (1825, Consid. Génér. Crust., p. 89). The localities Chile, North America, and East Indies should be considered erroneous.

Genus TELMESSUS White

HORSE CRABS

Cheiragone? Latreille, Fam. Nat., 1825, p. 270.

Cheiragonus? Berthold, Latreille's Nat. Fam. Thierreichs, 1827, p. 256; *nomen nudum.*

Telmessus White, Ann. Mag. Nat. Hist., vol. 17, 1846, p. 497; type, *T. serratus* White.—Benedict, Proc. U. S. Nat. Mus., vol. 15, 1892, p. 223, and synonymy.

Platycorystes Brandt, Bull. Phys.-Math. Acad. St. Pétersbourg, vol. 7, 1848, p. 179; type, *P. ambiguus* Brandt.

Cheiragonus Brandt, Middendorff's Sibirische Reise, vol. 2, Zool. pt. 1, 1851, p. 147; type, *C. hippocarcinoides* Brandt.

Carapace broader than long, pentagonal. Lateral margins dentate. Front between the antennae projecting, its anterior edge cut into four small denticles. A broad tooth at inner angle of orbit. Basal article of antenna short, broad and flattened; a triangular winglike projection from it fills the inner hiatus of the orbit. Epistome with a triangular point extending forward on the median line between the antennules. Chelipeds short; ambulatory legs moderately long. Sternum of female thickened and sculptured around the genital openings; lateral margins of sixth abdominal segment broadly incised leaving the openings fully exposed. Abdomen of male narrow triangular from the fourth segment to tip.

California to Bering Sea; Siberia to Japan.

TELMESSUS CHEIRAGONUS (Tilesius)

Cancer cheiragonus Tilesius, Mém. Acad. Impér. Sci. St. Pétersbourg, vol. 5, 1812 (1815), p. 347, pl. 7, fig. 1 (type-locality, Awatscha, Kamchatka; type, Mus. St. Petersburg [Leningrad]).

Telmessus serratus White, Ann. Nat. Hist., vol. 17, 1846, p. 497 (type-locality, not given; type in Brit. Mus.); List Crust. Brit. Mus., 1847, p. 124.

Platycorystes ambiguus Brandt, Bull. Phys.-Math. Acad. St. Pétersbourg, vol. 7, 1848, p. 179 (type-localities, Okhotsk Sea, Kamchatka, and Aleutian Islands, Alaska; types, Mus. St. Petersbourg [Leningrad]).

Platycorystes cheiragonus Brandt, Middendorff's Sibirische Reise, vol. 2, pt. 1, 1851, p. 85.

Cheiragonus hippocarcinoides Brandt, Middendorff's Sibirische Reise, vol. 2, part 1, 1851, p. 147; substituted for *Platycorystes cheiragonus.*—Stimpson, Boston Journ. Nat. Hist., vol. 6, 1857, p. 465.

Telmessus cheiragonus Benedict, Proc. U. S. Nat. Mus., vol. 15, 1892, p. 224, pl. 25, pl. 26, figs. 2–4.—Rathbun, Harriman Alaska Exped., vol. 10, 1904, p. 179.

Cheiragonus cheiragonus Ortmann, Zool. Jahrb., Syst., vol. 7, 1894, p. 420.

Telemessus cheiragonus Holmes, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 69, and synonymy.

Diagnosis.—Carapace broader than long. Epistome produced to a point on the median line. Lateral margins of sixth segment of female abdomen deeply incised. Lateral teeth of carapace six.

Description.—Surface of carapace set with large granules, forming lines in the posterior regions; from the granules arise numerous short

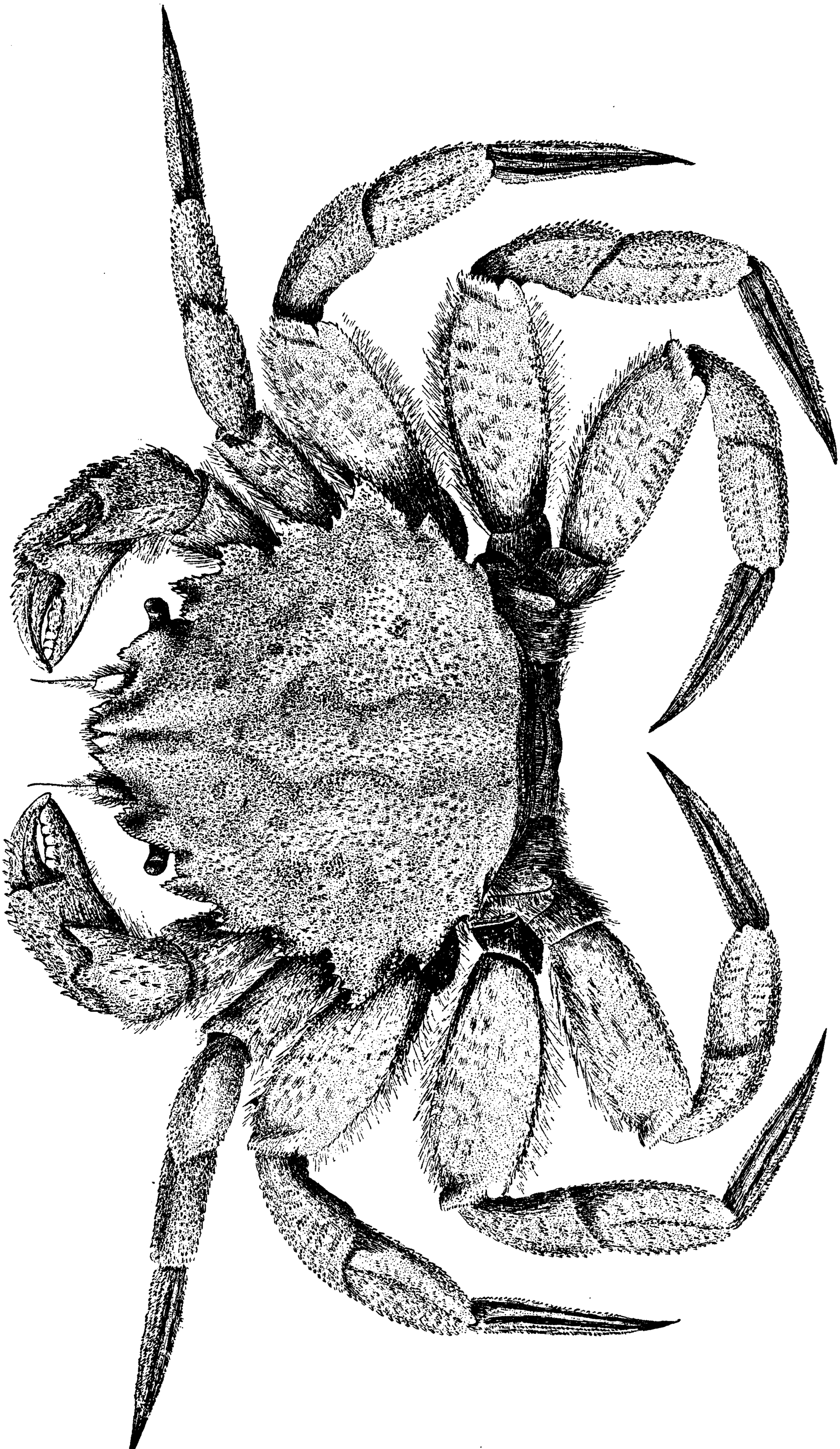

FIGURE 21.—TELMESSUS CHEIRAGONUS, MALE, DORSAL VIEW, REDUCED. AFTER BENEDICT

bristles of even length which bend forward and are enlarged at the end. Regional furrows deep. Denticles of the front often wanting in old worn specimens. Inner supraorbital tooth triangular, its anterior end forming a right angle. Lateral teeth six including the outer orbital tooth; fourth tooth much the largest, situated at the lateral angle; the post-lateral teeth are the smallest, especially the hinder one; margins of all the teeth armed with stout acute denticles which are applied against the upper surface along the posterior margins but are larger and project forward normal to the anterior margins.

The chelipeds are granulate and hairy, the granules ranged in longitudinal rows on chelae. The merus has three nearly equal surfaces; the carpus has a groove along its outer distal margin, its inner angle is produced in a long flat spine. Fingers deeply grooved, prehensile edges armed with stout tuberculiform teeth. Ambulatory

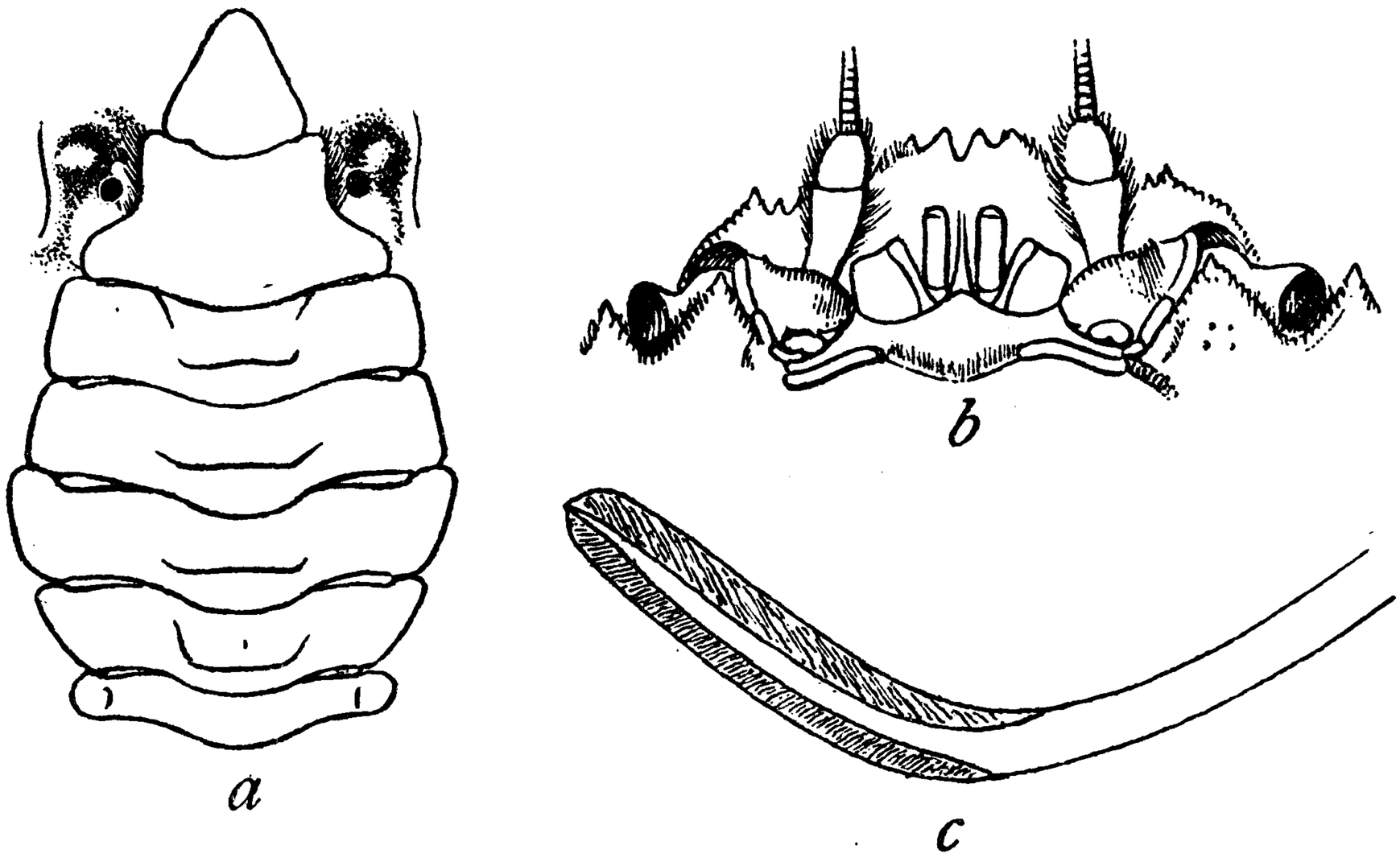

FIGURE 22.—TELMESSUS CHEIRAGONUS. *a*. FEMALE ABDOMEN AND STERNUM. *b*. EPISTOME. *c*. BRISTLE FROM CARAPACE, ENLARGED. AFTER BENEDICT

legs much compressed and bearing short transverse lines of granules bearing coarse bristles; the dactyls have horny tips, two longitudinal grooves on each side and one groove above which is bordered on either side by two rows of small spinules and a fringe of bristles; a double row of spinules with accompanying bristles on the lower margin.

Color.—Yellowish with purple spots (Steller).

Measurements.—Male (47965), length of carapace 83.5, width of same 97, fronto-orbital width 54, width of front at base, between antennae, 21.3 mm.

Range.—Off northern California (Stimpson) to Bering Sea and southward from Siberia to Japan.

Material examined.—

WASHINGTON.—Port Orchard, Puget Sound; July, 1889; O. B. Johnson; 6 males, 11 females (14965).

Kilisut Harbor, near Port Townsend; July 1, 1903; *Albatross;* 3 females (31629).

Quarantine Dock, near Port Townserd; June 28, 1903; *Albatross;* 2 males, 1 female (31628).

Puget Sound; 1880; D. S. Jordan, U. S. Fish Comm.; 2 males (3110).

Port Angeles; Sept. 3, 1891; *Albatross;* 2 males, 1 female (17092).

Straits of Fuca: 1 young female (3398). 1880; D. S. Jordan, U. S. Fish Comm.; 1 male (3065).

Sucia Islands; May 6, 1894; *Albatross;* 5 specimens (18974).

BRITISH COLUMBIA.—Alert Bay, Vancouver Island; *Albatross;* 1 specimen (19320).

ALASKA.—Metlakahtla, Annette Island; *Albatross;* 3 males, 1 female (21785).

Loring; June 16, 1904: Chamberlain and Aller, Bureau of Fisheries; 1 female (50507).

Observation Island, Cordova, Clarence Strait; June 27, 1914; Bur. Fisheries, 1 male (48835).

Hunters Bay, Prince of Wales Island; April 18, 1897; *Albatross;* 2 males (32218).

Kasa-an Bay, Prince of Wales Island; Dr. T. H. Streets, U. S. Navy; 5 males, 5 females (14824).

Reid Harbor, Stewart Island; May 5, 1892; *Albatross;* 1 female (18976).

Sitka; December 23, 1880; L. A. Beardslee, U. S. Navy; 1 female (3168).

Freshwater Bay, Chichagof Island; 1903; *Albatross;* 1 male (31631).

Hooniah, Chichagof Island; San Diego Soc. Nat. Hist., 1 specimen (53362).

Cordova Bay, Prince William Sound; August 24, 1897; *Albatross;* 1 female (21784).

Refuge Cove, Port Chatham; July 6, 1880; W. H. Dall; 1 male (14815).

Coal Point, Kachemak Bay, Cook Inlet; W. H. Dall; 1 male (31498).

Chugachik Bay, Cook Inlet; 20–60 fathoms; sdy. M.; June 30, 1880; W. H. Dall; 6 young (12509).

Litnik (now Afognak) Bay; shore; *Albatross:* August 13, 1900; 1 male (25209). August 3, 1903; 1 male, 1 young (31630).

Chiniak Bay, Kodiak; July 12, 1880; W. H. Dall; 4 young (12533).

Chajafka Cove, Kodiak; 12–14 fathoms; 1874; W. H. Dall; 2 young males (14814).

Chignik Lagoon; tide flats west of A. P. A. Cannery; July, 1911; *Albatross;* 1 male (61371), 1 specimen (50494).

Popof Strait; 6 fathoms; 1872; W. H. Dall; 2 young males, 5 young (14813).

Coal Harbor, Unga; 3–9 fathoms; 1872; W. H. Dall; 26 males, 9 females (14812).

Issannakh (now Isanotski) Strait; July 15, 1894 (?); *Albatross;* 1 male (18975).

New Morzhovoi; July 17, 1894; *Albatross;* 4 specimens (18973).

Off Unimak Island; lat. 55° 06′ 00″ N., long. 163° 28′ 00″ W.; 9 fathoms; fne. dk. vol. S.; temperature 40° F.; June 26, 1894; station 3600, *Albatross;* 7 specimens (18971).

Unalaska Island: July 28; Bur. Fisheries; 1 male, deformed (47318). May 20, 1892; *Albatross;* 2 males, 2 females (18984.) Off village, Iliuliuk; 5–15 fathoms; sand; 1871; W. H. Dall; 4 young (13115). Dutch Harbor; May 25–27, 1906; *Albatross;* 1 female, 4 young (47964).

Nazan Bay, Atka Island: 10–16 fathoms; sand; 1873; W. H. Dall; 3 males, 2 females (14817). Shore; May 30, 1906; *Albatross;* 1 male, 1 female (47963).

St. Paul Island, Bering Sea: *Albatross;* 1 specimen (19313). 1890; William Palmer; 9 large (15342). October 1911; M. C. Marsh, Bur. Fisheries; 1 female (45507).

Bristol Bay; lat. 58° 23′ 45″ N., long. 157° 42′ 45″ W.; 7¼ fathoms; S. P.; temperature 44.5° F.; June 2, 1890; station 3233, *Albatross;* 10 specimens (15997), "about 40 discarded."

Off Cape Newenham; lat. 58° 40′ 45″ N., long. 162° 08′ 30″ W.; 17 fathoms; P. St.; temperature 40.6° F.; June 13, 1890; station 3247, *Albatross;* 1 specimen (16002).

Southwest of Hagemeister Island; lat. 58° 31′ 20″ N., long. 161° 13′ 00″ W.; 11½ fathoms; S. P.; June 9, 1890; station 3245, *Albatross;* 4 young (16001).

Anchorage, Hagemeister Island; beach; 1874; W. H. Dall; 1 male (14819).

Kouloulak Bay; lat. 58° 44′ 30″ N., long. 160° 08′ 45″ W.; 11 fathoms; bk. M.; June 8, 1890; station 3242, *Albatross;* 3 specimens (15998).

St. Michael: October 26, 1874; L. M. Turner; 1 male (3258). "This specimen was found on the beach after a hard south wind; the only one ever seen here, though the natives catch them on their fishing lines, as was told me by a Malemut woman." 1878; E. W. Nelson; 1 female (14820).

Port Clarence; beach; July 31, 1913; Canadian Arctic Exped.; 2 carapaces (54165).

SIBERIA.—Bering Island, Commander Islands: 1882–1883; L. Stejneger; 2 young (13406), 1 female (14821). Nikolski; low water; July, 1897; L. Stejneger; 1 young (21248). *Albatross:* 1 male (18985); shore, June 15, 1906, 10 males, 4 females (47962).

Petropaulski Harbor, Avatcha Bay, Kamchatka: September 1, 1895; L. Stejneger; 2 males (19043). August 13, 1896; *Albatross;* 8 males, 2 females (32220). 7 fathoms; taken in crab net; June, 1900;

Albatross; 3 males (33459). Shore; June 19, 1906; *Albatross;* 2 males (47965).

Rakovaya Bay, Avatcha Bay, Kamchatka; August 13, 1896; *Albatross;* 4 males, 2 females (32219).

Tareinski Harbor, Kamchatka; 9 fathoms; taken in crab net; June 21, 1900; *Albatross;* 3 males, 1 female (32229).

JAPAN.—Shana Bay, Yatorup Island, Kurile Islands; September 4, 1896; *Albatross;* 6 specimens (20124).

Nemoro, Hokkaido; August, 1914; Fred Baker; 2 males (48846).

Mororan, Hokkaido; 1900; Jordan and Snyder; 2 males, 5 females, 8 young (26247); from Stanford University.

Genus ERIMACRUS Benedict

HORSE CRABS

Podacanthus BRANDT, Bull. Phys.-Math. Acad. St. Pétersbourg, vol. 7, 1848, p. 180; subgenus of *Platycorystes* Brandt; type, *Platycorystes* (*Podacanthus*) *isenbeckii* Brandt. *Podacanthus* used by Gray in 1833 for a genus of Orthoptera.

Erimacrus BENEDICT, Proc. U. S. Nat. Mus., vol. 15, 1892, p. 229; substituted for *Podacanthus*.

Carapace longer than broad, oblong-oval. Lateral margins arcuate, armed with seven teeth. Front between the antennae cut into two teeth. A tooth at inner angle of orbit. Antennae as in *Telmessus*. Epistome with a nearly straight anterior margin. Chelipeds stout; ambulatory legs very broad and spinous. The genital openings of the female occupy the posterior wall of a deep depression in the sternum and are not covered by the abdomen. The side margins of the sixth segment of the abdomen are not deeply incised. Abdomen of male triangular from the third segment.

Contains only one species.

ERIMACUS ISENBECKII (Brandt)

Plate 68

Platycorystes (*Podacanthus*) *isenbeckii* BRANDT, Bull. Phys.-Math. Acad. Impér. Sci. St. Péterbourg, vol. 7, 1848, p. 180 (type-locality, Unalaska; type, Mus. St. Petersburg [Leningrad]).

Platycorystes isenbeckii BRANDT, Middendorff's Sibirische Reise, vol. 2, pt. 1, 1951, p. 83.—RICHTERS, Abh. Senck. Natur. Gesell., Frankfurt, vol. 13, part 4, 1884, p. 402, plate, figs. 1 and 2.

Cheiragonus isenbeckii BRANDT, Middendorff's Sibirische Reise, vol. 2, pt. 1, 1851, p. 147.

Erimacrus isenbeckii BENEDICT, Proc. U. S. Nat. Mus., vol. 15, 1892, p. 229, pl. 26, figs. 5–7, and pl. 27.

Diagnosis.—Carapace longer than broad. Epistome with nearly straight anterior margin. Lateral margins of sixth segment of female abdomen not deeply incised. Lateral teeth of carapace seven.

Description.—Carapace covered with short bristles and acute tubercles which form also about nine small elevations, 5 gastric,

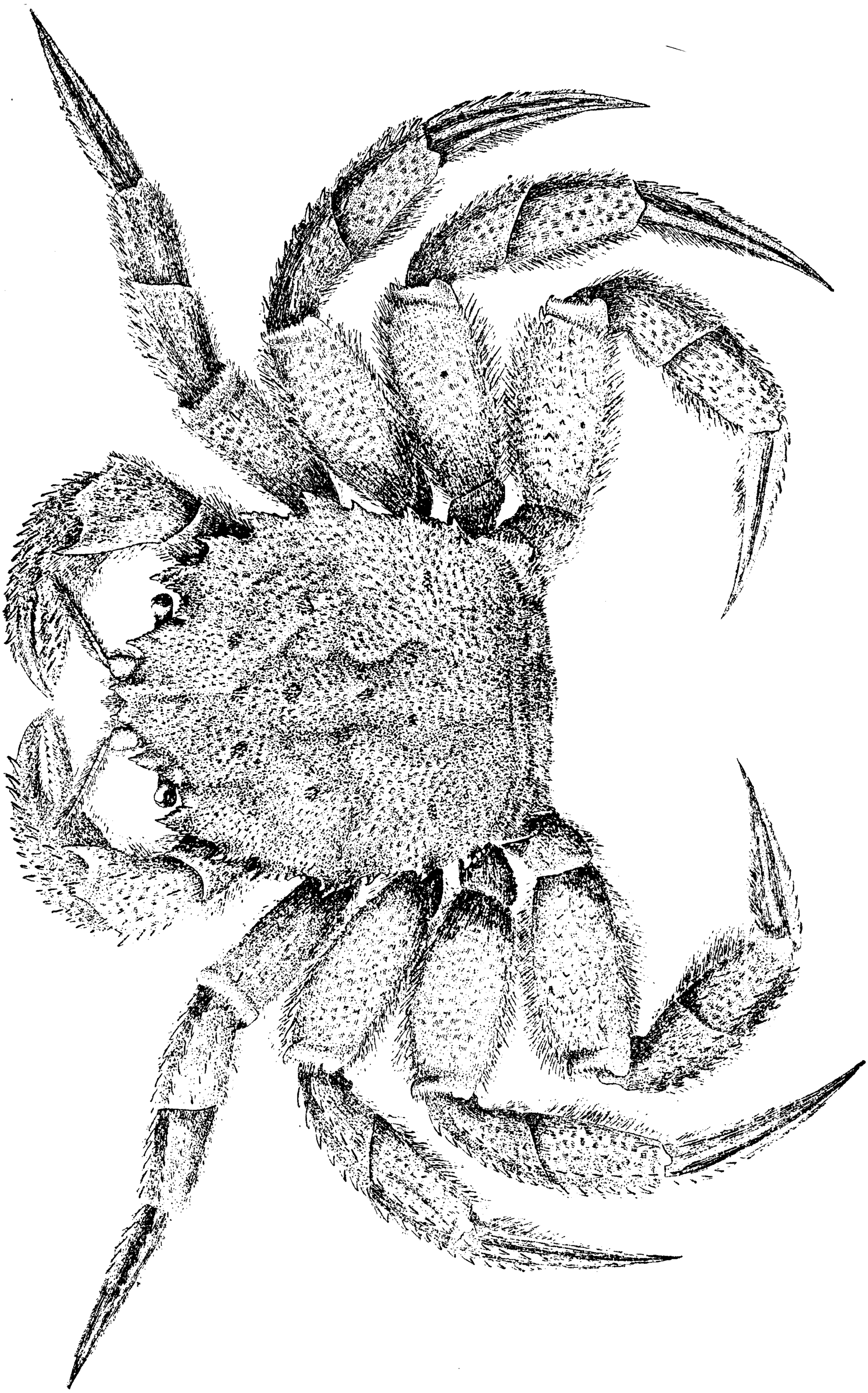

FIGURE 23.—ERIMACRUS ISENBECKII, MALE, DORSAL VIEW, REDUCED. AFTER BENEDICT

2 cardiac, and 2 branchial. Crescentic furrows at center of carapace deep. Margins denticulate. The two frontal teeth are broad, each tipped with an acute denticle; in the young, however, there are two extra teeth, one each side of the median line; eventually their tips break off, leaving between the outer teeth a transverse margin broken by the median suture. Inner orbital tooth narrow, acute. The fourth lateral tooth of the carapace is midway of its length, is very little larger than the preceding but projects farther laterally; the next three teeth are small, but the sixth is larger than the other two.

Chelipeds spinous; 6 longitudinal rows of spines on the outer-upper surface of the palm, two rows continued part way on each finger. Ambulatory legs thick, armed with stout spines, which are longer and stronger on the last three articles where they border each side of the

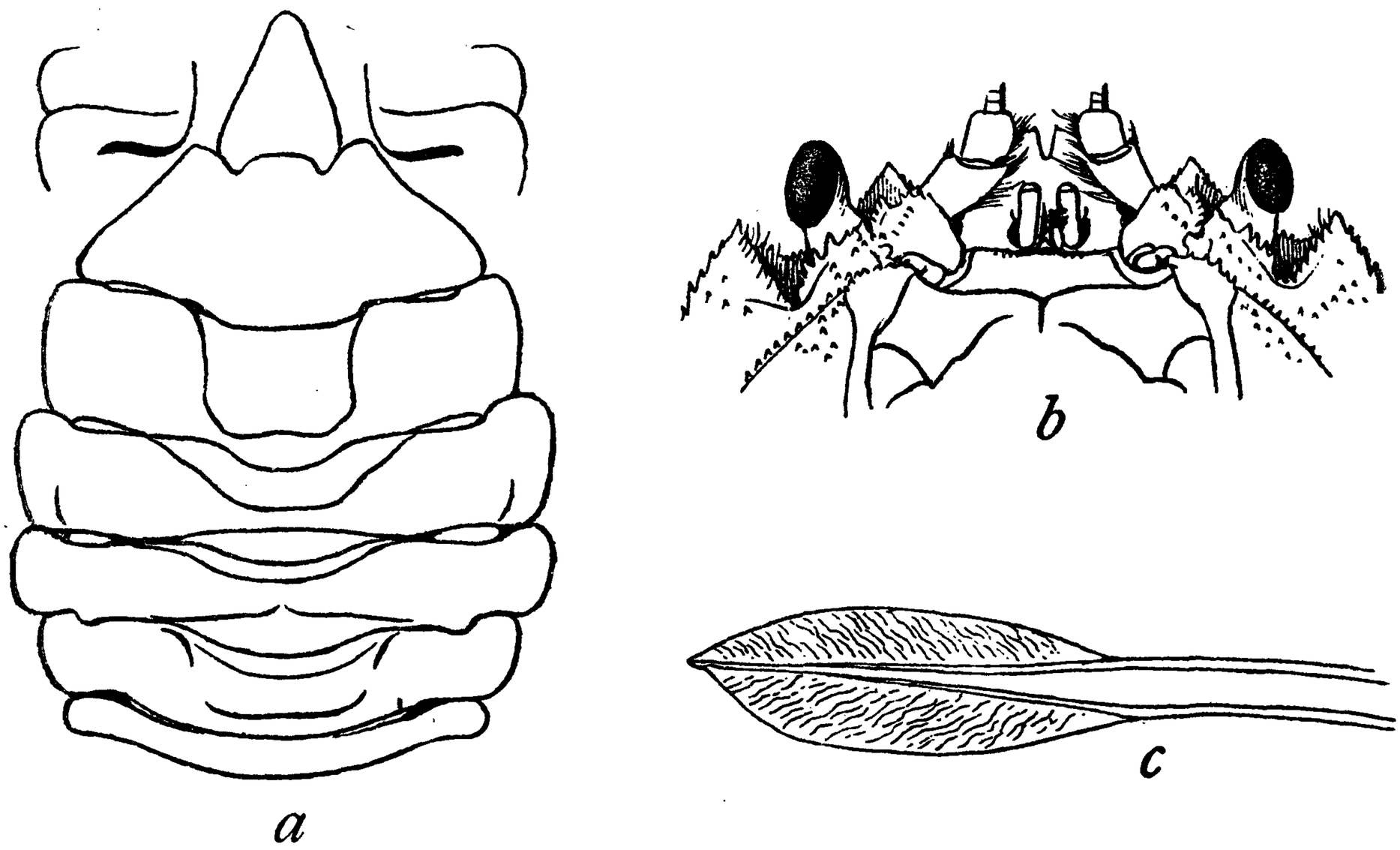

FIGURE 24.—ERIMACRUS ISENBECKII. *a*. FEMALE ABDOMEN AND STERNUM. *b*. EPISTOME. *c*. BRISTLE FROM CARAPACE, ENLARGED. AFTER BENEDICT

upper surface as far as the middle of the dactylus; a row of spines on anterior surface of carpus and propodus, on lower margin of propodus and base of dactylus. Dactyli twice as long as propodi, having a deep groove through the middle of each side, a finer groove higher up which disappears toward the proximal end, and a superior groove broad and shallow on the proximal half only. The crab is hairy all over, the hair longest on the maxillipeds, anterior sternum, inner surface of chelipeds, and lower margins of legs.

Measurements.—Male (47266), total length of carapace 127.6, width of same 125, fronto-orbital width 70.7, width of front at base, between antennae, 25 mm.

Range.—From Cooks Inlet, Alaska, westward and northward to the Pribilof Islands (Bering Sea) and Kamchatka, thence southward to Korea and southern Japan.

Material examined.—See table, pages 158–159.

Material examined of Erimacrus isenbeckii

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Alaska:	° ′ ″	° ′ ″			°F.						
Coal Point, Kachemak Bay, Cooks Inlet.								W. H. Dall	1 y	45568	
Off Round Island, Coal Harbor, Unga.			6–8	M		1872		W. G. Hall	1	14830	
East of Amak Island	55 29 15	162 58 00	25	bk. S	41.9	June 26, 1890	3271	*Albatross*	2 1	16009 16016	
South of Amak Island	55 19 00	163 04 30	16	fne. gy. S. brk. Sh.	42.3	June 25, 1890	3269	do	1 1	16008 16015	
North of Amak Island	55 31 40	163 07 00	31	bk. & rd. S	42	June 27, 1890	3272	do	1	16017	
West of Amak Island	55 29 00	163 13 00	26	bk. S. G	41.2	June 25, 1890	3268	do	1	16007	
Unimak Pass	54 20 00	165 30 00	50	bk. S. P. Sh	39.7	May 22, 1890	3222	do	1 y	16006	
Captains Bay, Unalaska						1872		W. H. Dall	1 ♀	14832	
Do								do	1 y	19501	
Port Levashef, Unalaska						1880		do	1 y	14833	
Iliuliuk Harbor, Unalaska	53 59 36	166 29 43	85	gn. M	41	Aug. 15, 1890	3311	*Albatross*	1 y	16014	
Off Rocky Point, Iliuliuk			10	S. G		1871		W. H. Dall	4 y	13141	
Nazan Bay, Atka			10–16	S		1873		do	6 y	14828	
		Long. E.									
Off Semisopochnoi Island	52 11 00	179 49 00	52–43	fne. G		June 5, 1906	4777	*Albatross*	1 y	48273	Thin shell.
Off Rat Islands	52 05 00	177 40 00	55	rky. fne. S. Sh		June 9, 1894	3599	do	1 y	18954	
Kiska Harbor, Kiska Islands			6–12			1873		W. H. Dall	1 ♀ 2 y	14831	
		Long. W.									
Off Cape Strogonof, Bristol Bay	57 16 45	159 03 30	30	bk. G	41	July 18, 1890	3294	*Albatross*	2 y	16013	
Off Seal Islands	56 44 30	159 16 00	16	bk. S		do	3289	do	1 y	16012	
Off Kudobin Islands	56 14 00	161 41 15	36	gy. S. bk. Sp		June 28, 1890	3281	do	1	16018	
Do	55 58 45	161 46 30	18	G. S. R	43.2	do	3277	do	1	16011	
St. George Id., Pribilof Islands						May 2, 1914		G. D. Hanna, Bur. Fish.	4 ♂ 4 ♀	48287	
Do						July 4, 1914		do	1 y	48290	From stomach of cod.
St. Paul Id., Pribilof Islands						1872		H. W. Elliott	2	14834	
Do			Beach.			June 17, 1890		Wm. Palmer	6	15344	
Do						1890		do	8	15345	
Off Pribilof Islands	56 31 00	169 17 00	48	gy. S. bk. Sp	40.7	Sept. 3, 1893	3561	*Albatross*	2 ♀	18306	
Do	56 57 00	169 27 00	34	fne. gy. S. bk. Sp.	37.8	July 28, 1893	3504	do	1 ♂ 2 y	18302	
Do	57 00 00	169 43 00	35	fne. gy. S. Sh	40.8	July 31, 1893	3509	do	1 y	18303	
Do	57 24 00	169 56 00	36	gy. S. P	40.3	Aug. 4, 1893	3524	do	5 sm	18304	

Do	57	21	00	170	05	00	29	bk. S. Sh	41.6	do	3525	do	1♂ 18305	
Do	57	06	30	170	28	00	32	crs. G	39	July 18, 1896	3637	do	1 y 20125	
Do	57	07	30	170	28	15	33	G	38.7	do	3638	do	1 y 20126	
Do	57	06	00	170	35	00	41	fne. bk. S	44	Aug. 3, 1891	3439	do	1 y 17089	
Siberia:				*Long. E.*										
Off Kamtchatka	52	47	00	158	43	00	48	S. P. Sh		June 20, 1906	4796	do	1♂ 48268	Covered with *Balanus.*
Okhotsk Sea												Madoka Sasaki.	2♂ 54483	Thin shell.
Gulf of Tartary, off southwest coast of Sakhalin Island.	47	38	20	141	39	00	31	gy. M. gn. S	42.5	Sept. 23, 1906	4999	*Albatross*	1♂ 48266	With a few *Balanus.*
Japan:														
Etrup Island, Kuril Group												Madoka Sasaki.	1♂ 54484	Soft shell.
Sapporo market, Hokkaido												do	1♂ 54526	
South coast of Hokkaido	42	16	30	142	04	00	140–61	br. M. fne. bk. S. Co. S.	41.1	Oct. 3, 1906	5041	*Albatross*	2 y 48274	
Miyagi Prefecture, Honshiu												Madoka Sasaki.	1♀ 54482	
Sea of Japan	N. point Sado Island, S. 31° W., 15 m. 38	33	00	138	40	00	176–200	fne. br. M?	34.9	July 18, 1906	4812	*Albatross*	1♂ 1♀ 48272	
Do	Sudzu Misaki Light, N. 60° W., 12 m. 37	25	00	137	32	00	114	fne. gy. S. bk. Sp.	42.5	July 21, 1906	4826	do	1♂ 48270	
Northwest of Nagasaki	Nomo Zaki, N. 64° E., 20.5 m. 32	26	00	129	22	00	100			Aug. 8, 1906	4889	do	1♂ 48267	Soft shell.
Korea: Sea of Japan	36	32	00	129	45	00	150	gn. M. fne. gy. S.		Aug. 1, 1906	4868	do	1♂ 48269	

Genus PELTARION Jacquinot

Peltarion [20] JACQUINOT, d'Urville's Voy. au Pole Sud 1837–1840, atlas, Crust., 1847 (?),[21] pl. 8, figs. 1–3; type, *P. magellanicus;* text, Zool., vol. 3, 1853, p. 80.—WHITE, List Crust. Brit. Mus., 1847, p. 52.—DANA, U. S. Expl. Exped. vol. 13, Crust., pt. 1, 1852, p. 298; pt. 2, 1853, p. 1425.—STEBBING, Proc. Zool. Soc. London, 1900, p. 519, and synonymy.

Hypopeltarium MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 210; type, *H. spinulosum* (White).—RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 165.

Hypopeltarion ORTMANN, Zool. Jahrb., vol. 7, 1893, p. 421.

Carapace suborbicular or broad oval; anterior half broader; very convex, strongly deflexed anteriorly; surface rough, median sutures deep. Rostrum horizontal, triangulate, tridentate, median tooth larger and more advanced than lateral. Anterior and lateral margins dentate, teeth shallow, edges spinulous. Orbits 4-toothed. Eye stalks slender, curved, capable of concealment within the orbits. Basal article of antenna very short, next article longer. Merus of outer maxilliped somewhat longer than wide, broadly truncate at insertion of palp. Chelipeds stout. Carpus and propodus of legs of subequal length. Abdomen of male small, narrow.

South and middle America.

KEY TO THE SPECIES OF THE GENUS PELTARION

A[1]. Carapace as broad as long or nearly so. Chelipeds equal. Third, fourth, and fifth segments of male abdomen fused----------*spinulosum*, p. 160.

A[2]. Carapace distinctly longer than broad. Chelipeds very unequal. No abdominal segments fused----------*dextrum*, p. 161.

PELTARION SPINULOSUM (White)

Plate 69, Figures 1 and 2

Atelecyclus spinulosus WHITE, Ann. Mag. Nat. Hist., ser. 1. vol. 12, 1843, p. 345 (type-locality, Falkland Islands; type in Brit. Mus.).

? *Atelecyclus chilensis* NICOLET in Gay, Hist. Chile, Zool., vol. 3, Crust., 1849, p. 175 (type-locality, Bay of Valparaiso; type not extant). Not *A. chilensis* Milne Edwards, 1837.

Peltarion magellanicus JACQUINOT, d'Urville's Voy. au Pole Sud 1837–1840, atlas, Crust., 1847 (?), pl. 8, figs. 1–3; text, Zool., vol. 3, 1853, p. 83 (type-locality, Sts. of Magellan; type in Paris Mus.).

Peltarion spinulosum (=*Corystes spin.*) WHITE, List Crust. Brit. Mus., 1847, p. 52.—DANA, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 304; atlas, 1855, pl. 18, fig. 6*a* and *b;* southern Patagonia.—CUNNINGHAM, Trans. Linn. Soc. London, vol. 27, 1871, p. 494; Sts. of Magellan.—MIERS, Proc. Zool. Soc. London, 1881, p. 68.—A. MILNE EDWARDS, Miss. Sci. du Cap Horn 1882–1883, vol. 6, zool., Crust, 1891, p. F. 17.—STEBBING, Proc. Zool. Soc. London, 1900, p. 519, and synonymy.—BOUVIER, in A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 306.

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[20] *Peltarion* not to be displaced by *Peltarium* Fischer de Waldheim, 1844. See International Rules of Zoological Nomenclature, Art. 36, Recommendations, in Proc. Biol. Soc. Washington, vol. 39, 1926, p. 87.

[21] As White in 1847 cites the atlas of Hombron and Jacquinot, it must have been issued as early as 1847.

Hypopeltarium spinulosum MIERS, *Challenger* Rept., Zool., vol. 17,1886, p. 211; (Chiloe, etc.).

Hypopeltarion spinulosum ORTMANN, Zool. Jahrb., vol. 7, Syst., 1893, p. 421.—LENZ, Zool. Jahrb., Suppl. 5, vol. 2, part 3, 1902, p. 758.

Diagnosis.—Carapace as broad as long or nearly so. Chelipeds subequal. Third, fourth, and fifth segments of male abdomen fused.

Description.—Carapace suborbicular, broader than long, or sometimes longer than broad in the young and half grown; covered with crowded, unequal granules, most prominent on posterior part, and becoming lower and less apparent with age. Lateral teeth 4 or 5 besides the orbital tooth; 3 are antero-lateral, the third being at the widest part of the carapace; one, and sometimes two, are postero-lateral. Median tooth of front narrow, gradually diminishing to a bidentate tip; lateral teeth slender, about half as long as median and longitudinally placed. Cornea black. Basal article of antenna less advanced than suborbital tooth; next two articles stout. Merus of outer maxilliped equal in its greatest width to distal end of ischium, distal half of margin spinulous. Upper margin of chelipeds spinous, surface rough with stout, sharp spinules which become tubercles or granules in the old and which form about 5 longitudinal rows on outer surface of palm. Fingers compressed, subtriangular, narrowly gaping. Legs spinulous above, especially on carpus and propodus, the former with a longitudinal row of spinules on outer surface in the first three pairs, and two rows in the last pair; dactyli long and slender. Ambulatory legs fringed with long silky hair, also upper margin of chelae, lower surface of carapace and sternum and margins of abdomen and maxilliped. Terminal segment of male abdomen slightly longer or shorter than breadth, and deeply invaginated in the preceding segment.

Color.—Above red spotted with white, beneath entirely white (White).

Measurements.—Male (61098), length of carapace 50, width of same 52.6 mm. Male (22061), length of carapace 37.2, width of same 36 mm.

Range.—From Uruguay by way of the Straits of Magellan to the Island of Chiloe, Chile. Bay of Valparaiso (Nicolet). Falkland Islands. Shallow water to 77.5 fathoms.

Material examined.—See table, page 162.

PELTARION DEXTRUM (Rathbun), new combination

Plate 69, Figure 3

Hypopeltarium dextrum RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 277, pl. 6, fig. 2 (type-locality, off Cozumel, Yucatan, 231 fathoms; Cat. No. 9558, U.S.N.M.).

Material examined of Peltarion spinulosum

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude S.	Longitude W.									
	° ′ ″	° ′ ″			°F.						
Uruguay, off Cape Santa Maria.						July —, 1925		*Undine*	2♂	61099	From Buenos Aires Museum.
Argentina (Patagonia):											
Off Gulf of San Matias	40 03 00	58 56 00	52	fne. dk. S		Jan. 13, 1888	2767	*Albatross*	3♂	40628	
Do	42 24 00	61 38 30	43	dk. S. bk. Sp		Jan. 14, 1888	2768	do	2♂	22054	
Puerto Madryn			15–20					M. Doello-Jurado	4 y	Buenos Aires Mus.	
San Julian						May 6, 1927		W. L. Schmitt	1♂	61094	
Off Cape Virgins	52 23 00	68 31 30	17	S. G		Jan. 18, 1888	2774	*Albatross*	1♂	22055	
Falkland Islands:											
Teal Inlet						Apr. 2, 1927 Apr. 4, 1927		W. L. Schmitt	1♂	61091	
Port William						Apr. 9, 1927		do	3♂ 3♀	61095	
Between Pembroke lighthouse and Tussuck Island.			10–15			Apr. 22, 1927		do	2♂ 2♀	61093	
Straits of Magellan, Chile:											
Gregory Bay						Jan. 18, 1888		*Albatross*	1♂ 3♀	22061	
Do	52 41 00	69 55 30	21	S. G		do	2776	do	1♂ 3♀	22056	
South of Elizabeth Island.	53 01 00	70 42 15	61	gy. S. bk. Sp	47.9	Jan. 23, 1888	2778	do	1 y	22057	
Do	53 06 00	70 40 30	77.5	gn. Oz	46.9	do	2779	do	25	22058	
Laredo Bay						Jan. —, 1888		do	1♂	17431	Shed shell.
Punta Arenas or Sandy Point.						Jan. 24, 1888		do	3♂ 4♀	22063	
Do								*Hassler*	2♂ 2♀	18508	From Mus. Comp. Zoöl.
Do						Feb. 2, 1927		W. L. Schmitt	3♂	61097	
Do						Feb. 3, 1927		do	19♂ 23♀ (3 soft shell).	61098	
Do						Feb. 4, 1927		do	1♂ 1♀	61096	
Do									1♂	61100	From Buenos Aires Museum.
Port Churruca						Feb. 2, 1888		*Albatross*	2♀	22062	
Chile:											
Otter Bay, Smyth Channel.						Feb. —, 1888		do	1♂ 1♀	40629	
Port Grappler						Feb. 8, 1888		do	1♀	22064	
Off Port Otway	46 47 30	75 15 00	61	gn. M	53.9	Feb. 9, 1888	2787	do	3♂ 2♀ 25 y	22059 22060	

Diagnosis.—Carapace distinctly longer than broad. Chelipeds very unequal. No segments of male abdomen fused. A spine on eye stalk.

Description.—Carapace elongate-oval, covered with numerous well-separated, small, white, beadlike tubercles which posteriorly become subacute or spiniform. Surface between tubercles covered with very short, light-colored setae. Lateral teeth three besides the orbital tooth; two are antero-lateral, one postero-lateral. Lower surface of carapace spinulous. Median tooth of front oblong, twice as

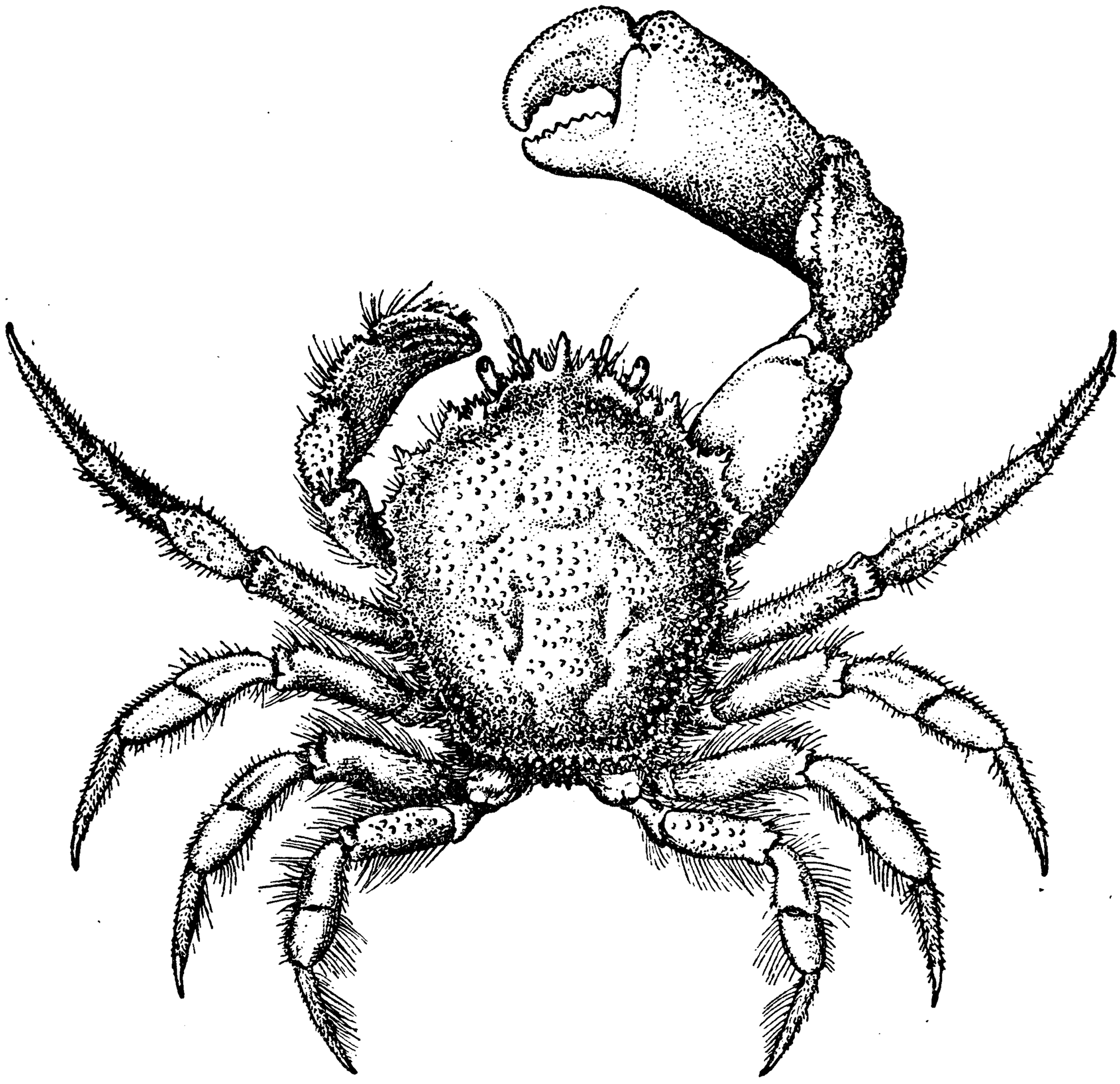

FIGURE 25.—PELTARION DEXTRUM, MALE, HOLOTYPE, DORSAL VIEW, × 15/16

long as lateral, which are divergent, each tooth tipped with a sharp spine and having two or more spinules near the tip. Cornea imperfectly developed, light brown; a small spine on anterior or inner surface of eye stalk about one-third the distance from tip. Basal article of antenna attaining end of suborbital tooth, next two articles successively much slenderer. Ischium of outer maxilliped wider distally than the merus, its antero-internal angle produced; inner angle of merus spinulous. Chelipeds very unequal, the right the larger (in the single specimen); surface finely granulate. Merus very thick, trigonal, spinulous on upper and outer margins and toward distal

end. Carpus with outer surface tuberculate, inner margin thick, rough with sharp spinules; inner angle prominent, rectangular. Manus very deep distally, upper surface spinulous and tuberculate; fixed finger short, triangular; dactylus wide, upper margin arcuate, spinulous. Smaller cheliped very spinulous, upper margin spinous, fingers proportionally longer and more slender, gaping slightly at base. Merus of legs spinous above, and in last pair spinulous on hinder surface; carpus spinulous in first three pairs; dactyli very long and slender. Legs fringed with long silky hair, also upper margin of left cheliped, lower margin of carapace, and margins of abdomen, sternum, and maxilliped. Sternum granulate. Terminal segment of male abdomen broader than long, not invaginated in the preceding segment. Median third of abdomen spinulous, spinules diminishing in size from first to sixth segment.

Measurements.—Male holotype, length of carapace 42.5, width of same 36.5, length of right cheliped 72, of left one 37.5 mm.

Range.—East coast of Mexico, deep water.

Material examined.—Off Cozumel Island, Yucatan, 231 fathoms, station 2359, *Albatross;* one male holotype (9558).

Genus TRACHYCARCINUS Faxon

Trachycarcinus Faxon, Bull. Mus. Comp. Zoöl., vol. 24, 1893, p. 156; type, *T. corallinus* Faxon; Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 25.—Alcock, Journ. Asiat. Soc. Bengal, vol. 68, 1899, p. 100.

Carapace pentagonal, very convex, antero-lateral margins long, nearly straight, toothed. Front narrow, produced, three toothed or spined. Orbits large, with forward aspect, imperfect; two hiatuses above, one below, and one at inner angle; lower wall formed chiefly by the carapace. Anterior margin of buccal cavity not distinctly defined, epistome short, ridges of endostome developed. Sternum long and rather narrow. Abdomen of male narrow. Eyestalks very small, retractile within orbits; eyes dull and faintly pigmented. Antennules longitudinally folded. Antennae lying in inner hiatus of orbit, basal segment but slightly enlarged, not filling hiatus at inner angle of orbit nor attaining to the front, subcylindrical, unarmed, imperfectly fused with carapace; second article longer and slenderer than first, the third article about equal to the second in length but slenderer; all are furnished with long, coarse setae; antenna less than half as long as carapace. Ischium of outer maxillipeds produced at antero-internal angle; merus rounded at antero-external angle, obliquely truncated without emargination at antero-internal angle. Legs of moderate length; dactyli styliform, straight, slender, longer than the penult article.

Inhabits deep water off middle America, and Japan, the Indian Ocean and the East Indies.[22]

KEY TO THE AMERICAN SPECIES OF THE GENUS TRACHYCARCINUS

A[1]. Tubercles of carapace furnished with smooth, flat, white granules. Chelipeds of male very unequal ..... **corallinus, p. 165.**

A[2]. Tubercles of carapace rough with acute or spine-tipped granules. Chelipeds subequal ..... **spinulifer, p. 166.**

TRACHYCARCINUS CORALLINUS Faxon

Plate 72

Trachycarcinus corallinus FAXON, Bull. Mus. Comp. Zoöl., vol. 24, 1893, p. 156 (type-localities, Bay of Panama, 546 and 695 fathoms, and off Acapulco, 660 fathoms; cotypes in M.C.Z. and U.S.N.M.); Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 26, pl. A.—RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 599.—Not *T. corallinus* BALSS, Arch. f. Naturg., vol. 88, 1922, p. 99, which may be called *T. balssi*.

Diagnosis.—Protuberances of carapace large, covered with smooth, flat tubercles; chelipeds of male very unequal; outer surface of hands smooth.

Description.—Antero-lateral margin longer than postero-lateral. General surface densely clothed with a dark brown coat consisting of a multitude of close-set club-shaped setae; underneath this the shell is smooth and white. Regions well marked; on the prominent parts of each are groups of flattened, ivory white tubercles. The principal groups are: two antero-lateral and one posterior median on the gastric region; four in two pairs on the cardiac; five or six on each branchial; and one crescentic on each hepatic region. Front with three acute teeth, median twice as long as lateral. Preorbital tooth subrectangled, edge denticulate. Behind the postorbital spine there are three prominent teeth increasing in length successively; a minute tooth just back of the largest lateral tooth. Posterior margin denticulate, concave at middle.

The end of the antennal peduncle does not quite reach the end of the rostrum. Chelipeds of male very unequal, the larger may be right or left; large chela smooth and ivory white; merus with a few small teeth along upper margin, mostly near the two ends of the article, and there are also a few still smaller teeth along the postero-inferior margin; carpus inflated, upper margin armed with one strong tooth and denticulate along its whole length; propodus somewhat swollen, the finger bent down at an obtuse angle with the lower border of the palm; usually two or three small tubercles or teeth on upper margin of propodus, besides a tubercular process at articu-

[22] If the three genera *Peltarion*, *Trichopeltarion*, and *Trachycarcinus* be retained, then *Trichopeltarium alcocki* Doflein (in Chun, Aus den Tiefen des Weltmeeres, vol. 2, 1903, p. 531, text-fig.) should be removed from *Trichopeltarion* and be known as *Trachycarcinus alcocki*.

Material examined of Trachycarcinus corallinus

Locality	Specimens	Catalogue No.	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector
			° ′ ″	° ′ ″			°F.			
Mexico: Off Acapulco	1♂	20618	16 33 00	99 52 30	660	br. S. bk. Sp.	39	Apr. 11, 1891	3418	*Albatross*
Panama: Bay of Panama	5♂ 4♀ (2 ovig.)	M.C.Z. 20619	7 09 30	81 08 30	546 695	sft. bu. M gn. M	40.1 39	Feb. 23, 1891	3356	do
Do	1♀		7 06 15	80 34 00				do	3353	do
Galapagos Islands: Off Chatham Island	1♀	22065	*Latitude S.* 0 36 30	89 19 00	634	co. S	39.9	Apr. 4, 1888	2808	do

lation of carpus; dactylus strong, downcurved, granules on upper border, both fingers armed with large, blunt, prehensile teeth. The smaller chela is furnished with setae, is slenderer than the large one, has proportionally longer fingers and is sparsely granulate. Chelipeds of female approximately equal, resembling smaller one of male. Legs covered with coarse setae, dactyls tipped with a small, acute, horny nail. Third, fourth, and fifth segments of male abdomen partially fused, divisions plainly indicated.

Color.—Wood brown. Larger cheliped of male, and tubercles of carapace ivory white.

Measurements.—Male cotype (20618), length of carapace 27.5, width of same 30.4, length of left cheliped 48.7, length of right cheliped 23.7 mm.

Range.—From Acapulco, Mexico, to Galapagos Islands. 546 to 695 fathoms.

Material examined.—See table, p. 166.

TRACHYCARCINUS SPINULIFER Rathbun

Plates 70 and 71

Trachycarcinus spinulifer RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 278, pl. 6, fig. 1, (type-locality, off the Delta of the Mississippi, 324 fathoms; type, Cat. No. 9639, U.S.N.M.).

Diagnosis.—Protuberances of carapace small, spinulous; chelipeds subequal, outer surface of hands rough.

Description.—Shape much as in *T. corallinus*, antero-lateral margins more arcuate. Surface covered with a thin, fine, light-colored pubescence. Regions well marked, elevations small and numerous, covered with small conical tubercles, many spiniform; slender spinules scattered on carapace, especially on posterior half and near lateral margins. Lateral spines long and slender,

armed with spinules; antero-lateral spines three, third the longest; postero-lateral two; small spines along posterior margin. Front with three slender spines of equal width at base, directed forward (tips broken off). Orbital spines very slender, spinuliferous, preocular having a small spine at base on outer side. Segments of male abdomen all distinct; first and second with a few small spines or spinules.

Chelipeds small, nearly equal, the right large; setose; arm not exceeding carapace, lower and outer margin spinulous; outer surface of wrist and hand spinulous, larger spines at inner angle of wrist and along upper margin of hand. Legs rather long and slender, pubescent, bearing spinules except on the dactyli.

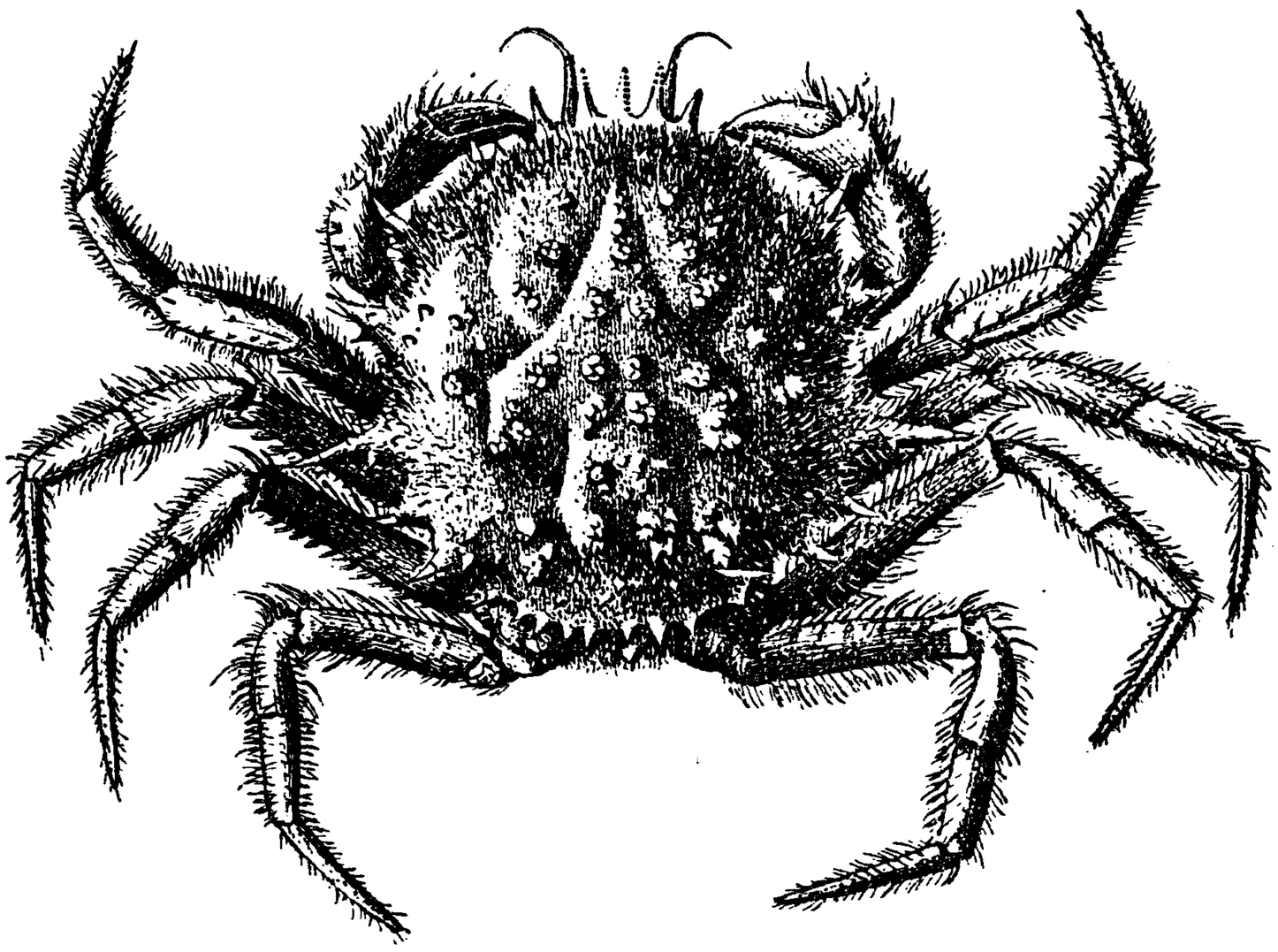

FIGURE 26.—TRACHYCARCINUS SPINULIFER, MALE, HOLOTYPE, DORSAL VIEW, × 1⅛

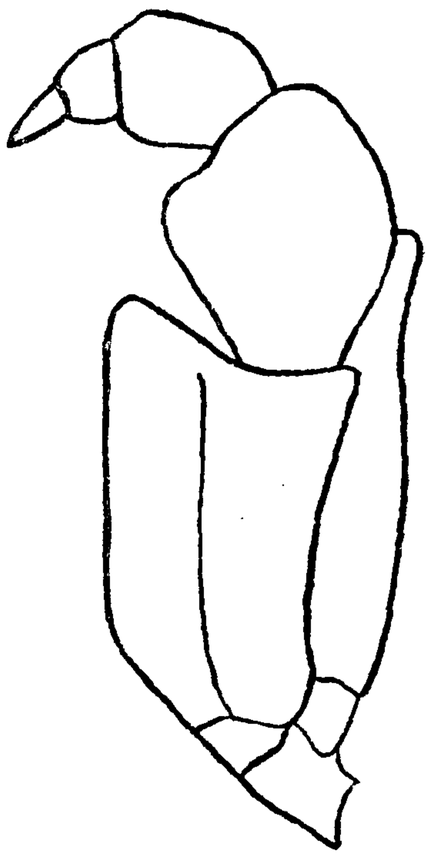

FIGURE 27.—TRACHYCARCINUS SPINULIFER, MALE, HOLOTYPE, OUTER MAXILLIPED, × 5

Measurements.—Male, holotype, length to base of frontal spines 26, width exclusive of spines 23.3, width inclusive of spines 34 mm. Larger carapace (20596), length to base of frontal spines 40.6, width exclusive of spines 38.6, width inclusive of spines (tips broken off) 50.4 mm.

Range.—Gulf of Mexico, 324 to 347 fathoms.

Material examined.—Gulf of Mexico; 1885; *Albatross:* SE. of Pensacola, Florida; lat. 28° 36′ 15″ N., long. 86° 50′ 00″ W.; 347 fathoms; gy. M.; temperature 44.1° F.; March 13; station 2395, 1 carapace (20596). S. of Alabama; lat. 29° 03′ 15″ N., long. 88° 16′ 00″ W., 324 fathoms; gy. M.; temperature 46.5° F.; February 11; station 2376; 1 male, holotype, and 1 carapace (9639).

Genus TRICHOPELTARION A. Milne Edwards

Trichopeltarion A. MILNE EDWARDS, Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 19; type, *T. nobile* A. Milne Edwards.—FAXON, Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 25.

Trichopeltarium ALCOCK, Journ. Asiat. Soc. Bengal, vol. 68, 1899, pp. 96 and 99.

Carapace subcircular, broader than long or nearly as broad as long, strongly convex, borders spinate. Front prominent, not very broad, cut into three sharp teeth or spines. Orbits shallow, defined by spines separated by wide gaps; inner suborbital angle spiniform. Eye-stalks slender. Basal article of antenna short, subcylindrical; flagellum coarse, stout, setaceous. Epistome of fair length, fairly well defined, sunken, and overlapped by the external maxillipeds. Buccal orifice square-cut, longer than broad, not completely covered by the outer maxillipeds, which are somewhat elongate and have the merus a little narrower than the ischium. Efferent branchial channels defined by ridges which do not reach the epistome. Chelipeds massive and unequal in the male. Legs stout, hairy, more or less spiny, ending in stout, styliform dactyli; they are longer and nearly as massive as the female chelipeds. (After Alcock.)

Caribbean Sea and Indian Ocean, in deep water.

TRICHOPELTARION NOBILE A. Milne Edwards

Plate 73

Trichopeltarion nobile A. MILNE EDWARDS, Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 20, pl. 2 (type-locality, off St. Lucia, 151 fathoms; type in Mus. Comp. Zoöl).

Diagnosis.—Carapace broader than long; surface thickly velvety as in *Dromia*. Median frontal spine shorter than the lateral ones.

Description.—Carapace broader than long, much swollen, covered with a short thick velvet through which the bare spines protrude; a prominent median carina. Of the frontal spines the median is shorter than the lateral. Second movable article of antenna reaching nearly as far as outer frontal spines. Superior orbital border emarginate, armed inwardly by a spine enlarged at base, followed by a smaller middle spine, and an outer, somewhat larger spine; orbit shallow, eye very slender, much reduced and curved; inner suborbital angle triangular, spine-pointed, directed slightly inward. Orbital and lateral spines bordered with spines. Antero-lateral borders armed with three large spines or teeth, bifurcate or trifurcate; the strongest is at the middle of the branchial region; posterior border ornamented with pointed tubercles or small spines. Other similar tubercles are found in the metabranchial and intestinal regions as well as along the postero-lateral margins. Branchio-cardiac furrows very deep. Chelipeds very unequal; the major (right) one enormous and almost entirely smooth; some spinules on the posterior margin of the arm, the inner border of the wrist and the superior border of the palm. Minor cheliped very small, compressed, hairy and spinous. Legs hairy, rather long, armed above with a row of spines or spinules which are strongest on the first leg and diminish on the succeeding legs.

Measurements.—Male holotype, length of carapace 66, width of same including spines 77, width without spines 65, length of right cheliped 96, of left cheliped 55 mm.

Range.—Known only from the unique type, taken off St. Lucia, in 151 fathoms, temperature 57° F., station 219, U.S.C.S.S. *Blake* (3054, M.C.Z.).

Genus PLIOSOMA Stimpson

Pliosoma Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 227 [99]; type, *P. parvifrons* Stimpson.

Body rotund-ovate, longer than wide. Fronto-orbital region very narrow, tumid. Front shallow, rostrum medially fissured. Eyes small, retractile, longitudinally extended. Orbits deep, directed anteriorly, external angle prominent, upper margin with one fissure. Basal article of antenna just filling the inner hiatus of the orbit; movable part of medium size, excluded from orbit. Epistome very short, almost obsolete, concealed by the apex of the outer maxillipeds. These last are elongate; distal inner part of ischium produced, merus notched at inner angle; exognath large, narrowing toward the apex, armed inwardly with a tooth. Chelipeds very long in well developed male. Legs slender, first and second pairs cylindrical, first pair much the longer; third and fourth pairs compressed toward the extremity and ciliate; dactylus of last pair almost natatory. Sternum anteriorly very broad, narrowing behind.

Contains only one species.

PLIOSOMA PARVIFRONS Stimpson

Plate 74

Pliosoma parvifrons Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 228 [100], pl. 3, fig. 6 (type-locality, Cape St. Lucas; types, Cat. No. 2084, U.S.N.M.; Cat. No. 1242, M.C.Z.).—Rathbun, Bull. Amer. Mus. Nat. Hist., vol. 48, 1923, p. 621, pl. 26; p. 636 (*megalops*), pl. 36, fig. 2.

Diagnosis. Carapace longer than broad. Orbits and eyes directed forward. Chelipeds and first two legs long and slender. Last two legs subnatatory.

Description.—Carapace convex, pubescent; median regions well separated from the hepatic and branchial ones. Upper surface armed with erect blunt spines, as follows: Four large and seven small ones on the gastric region, the large ones on its posterior part; one on the cardiac, and one on the intestinal region, curved forward; two on the inner part of the branchial, and two longer ones on the anterior part of its lateral margin; two or three small ones on the hepatic region. In the old, well developed individual the dorsal spines are reduced in size, the gastric, hepatic, and two inner branchial prominences being scarcely more than tubercles. There is also a spine on the middle of the pterygostomian ridge. The fronto-orbital region occupies about

one-third the width of the carapace in the old, but is proportionally narrower in the immature. In the old male, the first leg is nearly twice as long as the carapace; the cheliped is stronger than the legs and one and two-thirds times as long as the carapace; surface finely granulate except on distal half of fingers; merus subcylindrical, carpus subspherical; propodus a little compressed, increasing in width gradually and regularly almost to the fingers where the lower margin bows outward, giving the fixed finger a sinuous edge and making a considerable gape between the proximal halves of the fingers, into which a very low, broad tooth projects from the dactylus; meeting edges crenulate.

Color.—Brownish or buff (Stimpson).

Measurements.—Male (60021), length of carapace 20, width of same 18.8, fronto-orbital width 6, width of front 2.2, length of cheliped 34.4, of first leg 39.4 mm.

Range.—Cape San Lucas; ? Carmen Island.

Material examined.—Cape San Lucas, Lower California, Mexico: J. Xantus; 175 immature cotypes (2084); 12 males, 6 females, cotypes (1242, M. C. Z.). March 23, 1911; *Albatross;* 1 male (60021). A megalops (60065), thought to be this species, was taken on southeast side of Carmen Island by the *Albatross*, 1911.

Subfamily ACANTHOCYCLINAE

Cyclinea or *Cancroidea Corystidica* (*Acanthocyclidae*) + *Bellidea* (*Bellidae*) DANA, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, pp. 145, 294, and 403; pt. 2, 1853, pp. 1424 and 1428.

Brachyura orbata STRAHL, Monats. k. Pr. Akad. Wiss. Berlin, 1861 (1862) p. 717.

Bellinae BOUVIER, in A. Milne Edwards & Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 309.

Outer antenna much reduced, with or without movable peduncle and flagellum; the latter if present are insignificant; the first article forms the antennal gland, the second is dentiform, lies close to the outer frontal tooth, and forms a boundary wall closing the inner end of the orbit. Antennules strongly developed, unable to retract within their basal cavity. Carapace subcircular or suboblong. Front ending in a subtriangular point. Epistome very short, sunken.

KEY TO THE GENERA OF THE SUBFAMILY ACANTHOCYCLINAE

A¹. Carapace broader than long. Antennae terminating at basal article. **Acanthocyclus, p. 171.**

A². Carapace longer than broad. Antennae with two or more articles beyond the basal article.

B¹. Anterior half of carapace wider than posterior half. Pterygostomian region not advanced beyond line of front----------**Corystoides, p. 173.**

B². Anterior half of carapace not wider than posterior half. Pterygostomian region advanced beyond line of front----------**Bellia, p. 175.**

Genus ACANTHOCYCLUS Milne Edwards and Lucas

Acanthocyclus Milne Edwards and Lucas, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 29; type, *A. gayi* Milne Edwards and Lucas.
Plagusetes Heller, Verh. k. k. zool.–bot. Ges. Wien, vol. 12, pt. 1, 1862, p. 522 [4]; type, *P. elatus* Heller.

Carapace slightly broader than long, rotund, sides dentate, teeth extending a little way on the postero-lateral margin. Orbit small; eye short, peduncle stout. Pterygostomian region not prominent. Front heavily margined, teeth rounded, median tooth much larger than lateral. The antennae terminate with the basal article. Merus of outer maxilliped subcircular, with a very shallow distal emargination. Chelipeds stout, very unequal. Dactyli of legs curved, acuminate. Male abdomen small, narrow.

Three species inhabit the South American coast, so nearly related that they may easily be mistaken for one another. The differences are arranged below in tabular form as most convenient for quick determination.

Characteristics of the species of Acanthocyclus

A. gayi	*A. albatrossis*	*A. hassleri*
Narrow; width 1.05 to 1.08 times length.	Width intermediate, 1.08 to 1.13 times length.	Wide; width 1.16 times length.
Lateral teeth intermediate	Teeth prominent, acute	Teeth appressed.
Front entire	Front faintly bilobed	Front entire.
Dactyli of ambulatory legs short, much curved from base.	Dactyli long, little curved	Dactyli short, much curved.
End of basal antennal article swollen in a wide, smooth, round protuberance curving, over on to the front.	Antennal article not swollen at the very end, but furnished with a blunt, projecting tooth, between which and the front a narrow furrow runs.	Antennal article as in *albatrossis*
Abdomen of male narrow; sides of fourth, fifth, and sixth segments subparallel.	Abdomen wide; sides of the sixth segment convex, of fifth concave, of third and fourth converging distally.	Abdomen intermediate; sides of the sixth segment convex, of fifth straight, of third and fourth converging distally.
Both carapace and legs very hairy	Less hairy	Less hairy.
Carapace almost smooth	Carapace tuberculate or granulate	Carapace tuberculate.
Ischium joints of maxillipeds with inner margins subparallel, but leaving a wide hiatus.	Ischium joints with inner margins in contact.	Ischium joints with inner margins diverging anteriorly; gape less than in *gayi*.
Merus joints of maxillipeds with their outer margins subparallel and continuous with the outer margins of the ischium joints.	Merus joints divergent, i. e., their outer margins make quite an angle with the outer margin of the ischium joint.	Merus joints similar to those of *gayi*.
Orbit viewed from above less than twice as wide as deep.	Orbit viewed from above less than twice as wide as deep.	Orbit viewed from above more than twice as wide as deep.

ACANTHOCYCLUS GAYI Milne Edwards and Lucas

Plate 75; Plate 76, Figure 4

Acanthocyclus gayi Milne Edwards and Lucas, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 30; atlas, vol. 9, 1847, pl. 15, fig. 1–1*f* (type-locality, coasts of Valparaiso; cotype in Paris Mus., and in Mus. Phila. Acad. Sci.).—Nicolet, in Gay's Hist. Chile, Zool., vol. 3, 1849, p. 176.—Dana, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 295; atlas, 1855, pl. 18, figs. 4*a–c*.—Heller, Reise Fregatte *Novara*, vol. 2, pt. 3, Crust., 1865, p. 70.—?Cunningham, Trans. Linn. Soc. London, vol. 27, 1871, p. 494; Lota.—Kingsley, Proc. Acad. Nat. Sci., Philadelphia, 1880, p. 37.—Rathbun, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 597.—Lenz, Zool. Jahrb., suppl. 5, vol. 2, 1902, p. 753; Tumbes, Talcahuano, Cavancha.

Acanthocyclus villosus STRAHL, Monats. Akad. Wiss. Berlin, 1861 (1862), p. 714, plate, 1 fig. (type-locality, Chile; type in Berlin Mus.).
Plagusetes elatus HELLER, Verh. k. k. zool.-bot. Ges. Wien, vol. 12, pt. 1, 1862, p. 522 [4] (type-locality, Chile; type in Vienna Mus.).

Description.—See page 171.

Color.—Male (61569), dark blackish olive, lighter behind, where it is suffused with tawny olive; legs tawny olive, especially propodi; carpi and meri darker; all articulations whitish; dactyli with blackish olive spot on upper margin; under side of crab and lower two thirds of palms white. (Schmitt.)

Measurements.—Male (17617), length of carapace 21.5, width of same 23.2 mm.

Range.—Tumbes, Peru, to Lota, Chile.

Material examined.—

PERU.—Salavery; Oct. 19, 1926; W. L. Schmitt; 2 females, 2 young (60843).

San Lorenzo Island; Dr. H. E. Ames, U. S. Navy; 1 male (17617).

Mollendo; J. Orton; 1 ovigerous female (61991), received from Boston Society of Natural History.

Peru; 1 male (M.C.Z.).

CHILE.—Tocopilla; November 14, 1926; W. L. Schmitt; 2 males, 2 females (60842).

Antofagasta: November 1914; J. N. Rose; 1 carapace (49060), from Carnegie Institution of Washington. W. L. Schmitt; November 15, 1 female (61568); November 16, 1 male (61569).

Valparaiso: 1 female, cotype (Mus. Phila. Acad. Nat. Sci.). *Hassler* Exped.; 1 male (M.C.Z.). January 6, 1927; W. L. Schmitt; 1 immature female (61993).

Talcahuano; 1 female (M.C.Z.).

Lota; January 16, 1927; W. L. Schmitt; 1 ovigerous female (61994).

Chile: 1838–1842; U. S. Exploring Expedition; 1 female (Mus. Phila. Acad. Nat. Sci.). 1 specimen, cotype of *A. villosus* (Berlin Mus.).

ACANTHOCYCLUS ALBATROSSIS Rathbun

Plate 76, Figures 2, 3, 5, and 6; Plate 77

Acanthocyclus gayi STRAHL, Monats. Akad. Wiss. Berlin, 1861 (1862), p. 713, plate, 2 figs.; not *A. gayi* Milne Edwards and Lucas, 1844.—?MIERS, Proc. Zool. Soc. London, 1881, p. 69; Isthmus Bay, Sts. Magellan.
Acanthocyclus gay TARGIONI-TOZZETTI, Zool. *Magenta*, vol. 1, 1877, p. 95, pl. 7, fig. 1*a-f;* west coast of Patagonia.
Acanthocyclus albatrossis RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 599 (type-locality, Port Otway; type, Cat. No. 21589, U.S.N.M.).—LENZ, Zool. Jahrb., suppl. 5, vol. 2, 1902, p. 753; Cavancha and Almirantazgo, Tierra del Fuego.—STEBBING, Proc. Zool. Soc. London, 1914, p. 344; Roy Cove, Falkland Islands.

Description.—See page 171.

Measurements.—Male (Puerto Harris), length of carapace 26.2, width of same 29.3 mm.

Range.—From Talcahuano, Chile, to the Falkland Islands.

Material examined.—

CHILE.—Talcahuano: 1 male, 2 young (M.C.Z.). January 15, 1927; W. L. Schmitt; 2 males, 1 female, 3 young (61995).

Corral; January 20, 1927; W. L. Schmitt; 2 males, 2 females, 6 1927; young (61992).

San Carlos, Chiloe Island; 1 female (M.C.Z.).

Port Otway (now Port Barroso); February 9–10, 1888; *Albatross*; 3 males (1 is holotype), 11 females (21589).

Eden Harbor, Smith Canal: 30 males and females (M.C.Z.). Paessler collector; 1 female (43316), received from Munich Mus.

Latitude Cove; February 6, 1888; *Albatross*; 4 males, 1 female (22053).

Mayne Harbor; 3 males (M.C.Z.).

Puerto Harris, Dawson Island; February, 1921; Exped. Facult. Ciencias; 4 males, 2 females; lent by Buenos Aires Mus. (12710).

FALKLAND ISLANDS.—Teal Inlet; April 2–4, 1927; W. L. Schmitt; 1 young female (61996).

Port Stanley; April 16, 1927; W. L. Schmitt; 2 males, 2 females (60841).

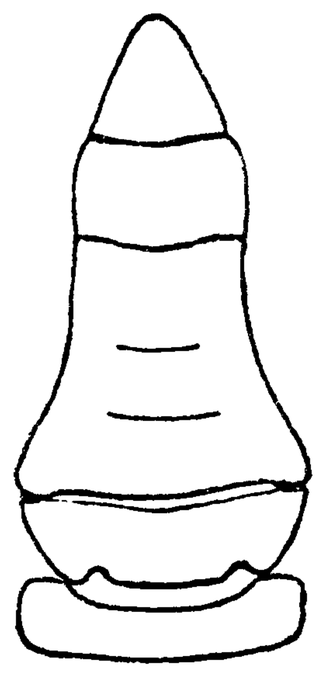

FIGURE 28.—ACANTHOCYCLUS HASSLERI, MALE ABDOMEN, ×2

ACANTHOCYCLUS HASSLERI Rathbun

Plate 76, Figure 1

Acanthocyclus hassleri RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 599, pl. 43, fig. 1 (abdomen) (type-locality, Valparaiso; holotype, Cat. No. 4889, M.C.Z.).—LENZ, Zool. Jahrb., suppl. 5, vol. 2, 1902, p. 754; Cavancha.

Description.—See page 171. In small specimens the rim of the median frontal tooth has a tendency to divide in the middle.

Measurements.—Male holotype, length of carapace 16, width of same 18.6 mm. Male (3265), length 12, width 13.9 mm. Male (Cavancha), length 22, width 25 mm. (Lenz).

Range.—Panama to Valparaiso, Chile.

Material examined.—Panama; John M. Dow; 2 males, 1 female (3265). Valparaiso; *Hassler* Exped.; 1 male holotype (4889, M.C.Z.).

Genus CORYSTOIDES Milne Edwards and Lucas

Corystoides MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 31; type, *C. chilensis* Milne Edwards and Lucas.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 307.

Carapace longer than broad, convex, dentate on the sides and rounded posteriorly, somewhat truncate anteriorly. Front little

advanced, tridentate. Ocular peduncles elongate, slender, stout at base, situated in small orbits. The second or basal article of the antenna is soldered to the infero-external surface of the frontal tooth along with the two last peduncular articles; at the end of the peduncle may be seen a rudimentary flagellum formed of two or three extremely short and narrow articles which are soldered to the peduncle and to each other and which seem also to be glued to the same surface of the frontal tooth. Buccal area longer than broad, narrowed forward; outer maxillipeds elongate, obliquely placed. Legs narrow, of moderate length. Male abdomen narrow, third, fourth, and fifth segments fused.

Contains only one species.

CORYSTOIDES CHILENSIS Milne Edwards and Lucas

Plate 78

Corystoides chilensis MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 32; atlas, vol. 9, 1847, pl. 16, figs. 1–1*e* (type-locality, coasts of Valparaiso; type in Paris Museum).—NICOLET, in Gay, Hist. Chile, Zool., vol. 3, Crust., 1849, p. 179.—PORTER, Revista Chilena Hist. Nat., vol. 22, 1918, p. 52.

Corystoides abbreviatus A. MILNE EDWARDS, Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 20 (type-locality, Rio de la Plata, below Montevideo; cotypes in M.C.Z., Paris Mus., and U.S.N.M.).—BOUVIER, in A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 309, pl. 2, fig. 7; pl. 4, fig. 6; pl. 5, fig. 1.

Diagnosis.—Anterior half of carapace wider than posterior half and bearing conspicuous raised bead granules. Pterygostomian region not advanced beyond the line of the front. Dactyli of legs slender.

Description.—Carapace irregularly granulate anteriorly and at the sides, posteriorly almost smooth; some depressions in the median line. Antero-lateral borders armed with six teeth on each side, third and fourth most pronounced, second and sixth reduced; these teeth and those which form the front are finely granulate on the upper edge, with a large bead granule at the tip of each tooth, except the median rostral tooth which has two beads side by side. Antennules ciliated. Pterygostomian region very prominent and granulated. Outer maxillipeds finely punctate, ischium with a longitudinal groove. Chelipeds finely granulate except the first three articles which are smooth; fingers long, curved, strongly denticulate on inner margin. Legs smooth, ciliated. Sternum finely punctate.

Color.—Yellowish white (Milne Edwards and Lucas). Bright red, in life (Porter).

Measurements.—Length of carapace 27, width of same 22 mm. (Milne Edwards and Lucas). Male, length 18, width 16 mm. (Bouvier for *chilensis*). Male, length 20, width 18 mm. (Milne Edwards and Bouvier for *abbreviatus*).

Range.—Chile: Valparaiso (Milne Edwards and Lucas); Curanipe, province of Maule (Porter). Uruguay.

Material examined.—

PATAGONIA.—Dr. Wilson; 1 male (Phila. Acad. Nat. Sci.), labeled "type."

URUGUAY.—Rio de la Plata, below Montevideo; lat. 35° 12′ S., long. 55° 30′ W.; 7 fathoms; February 29, 1872; station 25, *Hassler* expedition; 3 males, 3 females, cotypes (18509), received from Mus. Comp. Zoöl.; 12 male and female (3961, M.C.Z.).

Genus BELLIA Milne Edwards

Bellia Milne Edwards, Ann. Sci. Nat., ser. 3, Zool., vol. 9, 1848, p. 192; type, *B. picta* Milne Edwards.—Dana, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 403; part 2, 1853, p. 1428.—Bouvier, in A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, pp. 308 and 309.

Carapace elongate, oblong, high, anteriorly dentate. Ocular peduncles short. Pterygostomian region prominent, well advanced beyond the margin of the front and forming below the orbit a thin plate which underlaps the infero-orbital tooth. Between this tooth and the outer frontal tooth there is wedged a smaller triangular tooth which represents the basal article of the antenna. From the posterior half of the upper surface of the latter springs the movable part of the peduncle which is free, directed obliquely forward and consists of a stout article followed by a more slender one, on the end of which there is a minute lump, the rudiment of a flagellum. Outer maxillipeds similar to those of *Corystoides* except that the merus is not notched at the antero-internal angle. Legs stout, dactyli dilated. Male abdomen subtriangular, short and broad.

Contains only one species.

BELLIA PICTA Milne Edwards

Plate 79

Bellia picta Milne Edwards, Ann. Sci. Nat., ser. 3, Zool., vol. 9, 1848, p. 192 (type-locality, Bay of Saint Nicolas, Peru; type in Paris Mus.).—Porter, Revista Chilena Hist. Nat., vol. 22, 1918, p. 52; Antofagasta.

Diagnosis.—Anterior half of carapace not wider than posterior half; no conspicuous granules. Pterygostomian region advanced beyond the line of the front. Dactyli of legs enlarged.

Description.—Regions fairly well indicated. Surface finely and densely granulated. Antero-lateral margin cut into six very irregular blunt teeth of which the first (or orbital) and second are distant and the third and sixth are reduced. Behind the teeth a raised granulate line is continued along the margin of the middle third of the carapace and is punctuated by several elongate tubercles. Lower side margins of carapace fringed with hair. Teeth of front subequal, the median slightly surpassing the lateral. Eyes small, well protected by the

orbits. Upper orbital suture short but deep. Antennules heavily ciliated as is also the pterygostomian ridge, which is visible in dorsal view below and outside the antero-lateral dentation. Chelipeds unarmed; surface similar to that of carapace; merus and carpus ciliated; prehensile edge of fingers closely and evenly dentate. Dactyli of legs of first three pairs broad especially at middle, midrib thick; dactylus of last pair flat, broad-lanceolate, natatory. The last propodus also short and broad; dactylus fringed below, next three articles fringed on both margins.

Color.—Generally yellowish, with a multitude of irregular and confluent red spots.

Measurements.—Male (22066), length of carapace 53.3, width of same 49, fronto-orbital width 16.8, front between tips of outer teeth 6.1 mm.

Range.—Peru and Chile.

Material examined.—

PERU.—Independencia Bay; 1919; Robert Cushman Murphy; 1 female (54211) received from Brooklyn Museum; 1 male (Brooklyn Mus.).

CHILE.—Lota; 1888; *Albatross;* 7 males, 2 females, 26 young (22066).

Family CANCRIDAE

Cancridae Alcock (part: *Cancrinae*+*Pirimelinae*), Journ. Asiat. Soc. Bengal, vol. 68, 1899, p. 94.

Carapace broadly oval, front with several teeth, one of which is median. Antennules folded lengthwise. Antennal flagella present, short, more or less hairy. Third maxillipeds usually overlapping endostome.

Genus CANCER Linnaeus

Cancer Linnaeus, Sys. Nat., ed. 10, vol. 1, 1758, p. 625; type, *C. pagurus* Linnaeus.

Alpheus Weber, Nomenclator Entomologicus, 1795, p. 91; type, *A. pagurus* (Linnaeus). Not *Alpheus* Fabricius, Suppl. Entom. Syst., 1798, p. 380.

Pagurus Berthold, Latreille's Natürliche Familien des Thierreichs, 1827, p. 255; type, *P. pagurus* (Linnaeus). Not *Pagurus* Fabricius, Syst. Entom., 1775, p. 410.

Trichocera de Haan, Fauna Japon., Crust., 1833, pp. 4 and 16; type *T. gibbosula* (de Haan). Not *Trichocera* Meigen, Illig. Mag., vol. 2, 1803.

Platycarcinus Milne Edwards, Hist. Nat. Crust., vol. 1, 1834, p. 412; type, *P. pagurus* (Linnaeus).

Romaleon Gistel, Natur. des Thierreichs, 1848, p. 11. Substituted for *Trichocera*.

Metacarcinus A. Milne Edwards, Ann. Sci. Nat., Zool., ser. 4, vol. 18, 1862, p. 33; type, *M. magister* (Dana).

Trichocarcinus Miers, Proc. Zool. Soc. London, 1879, p. 34; type, *T. gibbosula* (de Haan). Substituted for *Trichocera*.

Carapace transversely subelliptical, often indistinctly areolated. Front narrow, cut into five teeth or lobes, those of the outer pair form-

ing the inner angles of the orbit. Eyestalks short; orbits small, with two fissures in both upper and lower margins. Basal article of antenna usually somewhat enlarged and united with the front, thus excluding the flagellum from the orbit.

KEY TO THE AMERICAN SPECIES OF THE GENUS CANCER

A¹. Antero-lateral and postero-lateral margins meeting at a distinct angle. Lateral teeth 9, 10 or 11; carapace widest at ninth or tenth (sometimes eighth) tooth.
B¹. Branchial regions not nearly meeting on median line.
C¹. Front between the eyes markedly produced beyond outer orbital angles and formed of 5 subequal teeth. Fingers of chelipeds dark-tipped----------**productus**, p. 203.
C². Front between the eyes not markedly produced beyond outer orbital angles and formed of 5 unequal teeth.
D¹. Antero-lateral teeth 10, carapace widest at tenth tooth. Postero-lateral margin of carapace unbroken, entire. Fingers without dark color----------**magister**, p. 222.
D². Antero-lateral teeth 9, carapace widest at ninth (sometimes eighth) tooth. Postero-lateral margin of carapace with one, two or three small teeth or notches.
E¹. Antero-lateral margin of merus of outer maxilliped arcuate. First 8 antero-lateral teeth of carapace projecting less than one-third the width of base, not spiny-pointed. Fingers without dark color----------**gracilis**, p. 219.
E². Anterior and outer margins of merus of outer maxilliped nearly straight and meeting at a blunt angle. (Maxilliped of *luederwaldti* not known.)
F¹. Fingers wholly light colored. Carapace coarsely granulate.
G¹. Edge of antero-lateral teeth entire. Chelipeds granulate, not denticulate-----**irroratus**, p. 180.
G². Edge of antero-lateral teeth denticulate. Upper margin of palm denticulate-----**borealis**, p. 182.
F². Fingers partially or almost entirely dark colored.
G¹. Antero-lateral teeth dentiform, more or less projecting.
H¹. Antero-lateral teeth not prominent, projecting at the utmost scarcely more than half the width at base.
J¹. Carapace slightly uneven. Edges of lateral teeth denticulate. Median tooth of front very narrow, subacute.
anthonyi, p. 218.
J². Carapace very uneven especially in female. Edges of lateral teeth entire. Median tooth of front blunt or subtruncate.
amphioetus, p. 205.
H². Antero-lateral teeth prominent, projecting from a half to two-thirds or more of the width at base; teeth sharp-pointed, hooked forward, posterior margins convex, anterior concave.

J¹. A postero-lateral spine, not projecting sideways beyond the carapace margin. A strong tooth at middle of supraorbital margin_____**branneri**, p. 211.

J². No superimposed spine on posterior margin of carapace.

K¹. A strong tooth at middle of supraorbital margin. Carapace widest at eighth tooth. Lateral teeth denticulate on anterior margin. A single tooth or spine on wrist.
antennarius, p. 210.

K². No strong tooth but a shallow lobe at middle of supraorbital margin. Carapace widest at ninth tooth.

L¹. Movable finger spinous above. Lateral teeth with spinous margins. Carapace and legs coarsely hairy_____**polyodon**, p. 202.

L². Movable finger granulate above. Lateral teeth with granulate margins and a slender spine at tip. Downy-hairy. Size small.
jordani, p. 215.

G². Antero-lateral teeth truncate or subtruncate.

H¹. Edge of antero-lateral teeth denticulate or lobulate; first tooth narrower than the others.

J¹. Outer orbital tooth not dentiform. Carapace very convex. Basal article of antenna twice as long as broad.
edwardsii, p. 193.

J². Outer orbital (half of the first antero-lateral) tooth small, triangular, acute. Carapace moderately convex. Basal article of antenna about two-thirds as broad as long_____**plebejus**, p. 198.

H². Edge of antero-lateral teeth entire; first tooth as wide as any of the next five; closed sinuses deep, more than half as long as width of teeth. Basal article of antenna more than twice as long as wide.
luederwaldti, p. 200.

B². Branchial regions nearly meeting on median line. First antero-lateral (orbital) tooth wider than any of the next 7 teeth_____**porteri**, p. 199.

A². Antero-lateral and postero-lateral margins not meeting at a distinct angle. Lateral teeth 12 or 13; carapace widest at seventh or eighth tooth. Dark color of fingers reaching nearly to their bases_____**oregonensis**, p. 226.

ANALOGOUS SPECIES OF CANCER ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
borealis	*edwardsii*
luederwaldti	*porteri*, *plebejus*

INDETERMINABLE SPECIES

Cancer amoenus HERBST, Naturg. Krabben u. Krebse, vol. 3, 1799, p. 64, pl. 49, fig. 3 (type-locality unknown; type not extant).

NOMEN NUDUM

Pirimela chilensis PHILIPPI, Zool. Anzeiger, vol. 16, 1894, p. 264. Probably a young *Cancer*.

KEY TO THE AMERICAN SPECIMENS OF CANCER 20 MM. AND LESS IN WIDTH [23]

A[1]. Antero-lateral and postero-lateral margins meeting at a distinct angle. Carapace widest at ninth or tenth antero-lateral tooth.

B[1]. Carapace widest at tenth and last antero-lateral tooth; postero-lateral margin unbroken, entire. Carpus of cheliped with a single spine above, at distal angle; fingers light colored_____**magister**, p. 222.

B[2]. Carapace widest at ninth antero-lateral tooth.

C[1]. Branchial regions not nearly meeting on median line.

D[1]. First postero-lateral tooth prominent.

E[1]. First postero-lateral tooth usually spiny pointed, never broadly rounded.

F[1]. Carpus of cheliped with two prominent spines (not counting that at articulation), one spine above at distal end and the second below it at inner angle.

G[1]. First postero-lateral tooth projecting laterally beyond carapace as seen from above. Carapace comparatively smooth, without pubescence. Fingers without dark color_____**gracilis**, p. 219.

G[2]. First postero-lateral tooth projecting dorsally, not reaching beyond outline as seen from above; carapace hairy, rough; antero-lateral teeth spiny pointed. Fingers with color across middle, tips light.

H[1]. Antero-lateral teeth conspicuously alternating large and small. A tooth at middle of supra-orbital margin. Outer maxillipeds fitting in buccal cavity___**branneri**, p. 211.

H[2]. Antero-lateral teeth very long, denticulate, slightly alternating in size. A rounded lobe at middle of supra-orbital margin Outer maxillipeds overreaching epistome.

polyodon, p. 202.

F[2]. Carpus of cheliped with only one prominent spine on inner side that at distal end.

G[1]. A tooth at middle of supra-orbital margin. Antero-lateral teeth prominent, curved forward. Sometimes an inconspicuous spine present at inner angle of carpus. Fingers mostly dark, tips light_____**antennarius**, p. 210.

G[2]. Middle of supra-orbital margin truncate. Antero-lateral teeth shallow. Distal half of fingers light brown except tips which are whitish.

borealis, p. 182.

E[2]. First postero-lateral tooth broadly rounded, never spiniform, a second tooth usually present.

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[23] Young of *C. luederwaldti* not known.

F¹. Second postero-lateral tooth absent. Ninth lateral tooth strongly produced. Middle of supra-orbital margin truncate_____**irroratus**, p. 180.

F². Second postero-lateral tooth present.

G¹. Antero-lateral teeth simple, not denticulate nor lobulate; seventh tooth enlarged and prominent; width of carapace nearly or quite as great at seventh as at ninth tooth. Carapace very uneven, lumpy_____**amphioetus, p. 205.**

G². Antero-lateral teeth denticulate or lobulate and subtruncate.

H¹. Antero-lateral teeth 1 to 8 bidenticulate, the denticles alternating large and small. Median tooth of front very small, not advanced beyond adjacent pair. Middle projection of supra-orbital border a shallow tooth or lobe. **edwardsii, p. 193.**

H². Antero-lateral teeth multidenticulate. Median tooth of front well advanced beyond adjacent pair. Middle portion of supra-orbital border truncate_____**plebejus**, p. 198.

D². First postero-lateral tooth absent or represented by a rudiment.

E¹. Hairy all over. Antero-lateral teeth alternately large and small, more or less narrowly triangular, spiny pointed. Middle portion of supra-orbital margin a shallow lobe. **jordani**, p. 215.

E². Dorsal surface naked or nearly so. Antero-lateral teeth not regularly alternating (except in *anthonyi* 5 mm. wide or less).

F¹. Carapace naked, nearly smooth. Interocular frontal teeth united in a flat, produced lamina with arcuate edge, the teeth indicated by closed fissures. Antero-lateral teeth never spiny-pointed. Middle of supra-orbital margin subtruncate_____**productus**, p. 203.

F². Carapace uneven, lumpy. Frontal teeth thick, subacute. Antero-lateral teeth broadly triangular becoming quite blunt anteriorly. Middle of supra-orbital margin a shallow tooth or lobe_**anthonyi**, p. 218.

C². Branchial regions nearly meeting on median line. Interocular front well advanced beyond outer orbital angle, and divided into 5 very shallow lobes. Edge of middle of supra-orbital margin concave. **porteri**, p. 199.

A². Antero-lateral and postero-lateral margins not meeting at a distinct angle. Lateral teeth 12 or 13; carapace widest at seventh or eighth tooth. Three middle teeth of front truncate. Fingers almost wholly dark colored. **oregonensis**, p. 226.

CANCER IRRORATUS Say

ROCK CRAB

Plate 85, Figure 1

Cancer irroratus SAY (part, male), Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1817, p. 59, pl. 4, fig. 2 (type-locality, "inhabits the ocean"; type not extant).—SMITH, Rept. U. S. Commr. Fisheries, vol. 1, for 1871 and 1872 (1873), pp. 312 [18], 530 [236], 546 [252].—R. RATHBUN, Fisheries and Fishery

Industries of U. S., sec. 1, 1884, p. 766, pl. 260, figs. 1–3.—SUMNER, Bull. Bur. Fisheries, vol. 31, 1911, part 2, 1913, p. 671.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 435, pl. 35, fig. 1.

Platycarcinus irroratus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 414.—DEKAY, Nat. Hist. New York, pt. 6, Crust., 1844, pl. 2, fig. 2.

Cancer sayi GOULD, Rept. Invert. Massachusetts, ed. 1, 1841, p. 323 (type-localities, Cape Ann, Nahant, etc.; types not located).

Platycarcinus sayi DEKAY, Nat. Hist. New York, pt. 6, Crust., 1844, p. 7.

Cancer borealis PACKARD, Mem. Boston Soc. Nat. Hist., vol. 1, 1867, pl 303; not *C. borealis* Stimpson.

Cancer amoenus CONNOLLY, Contrib. Canad. Biol., n. s., vol. 1, 1923, p. 337, text-figs. 1 and 2, pls. 1–4. Not *Cancer amoenus* Herbst, 1799.

Diagnosis.—Nine antero-lateral and two postero-lateral teeth, the last one obscure; edges entire. Chelipeds granulate, not denticulate.

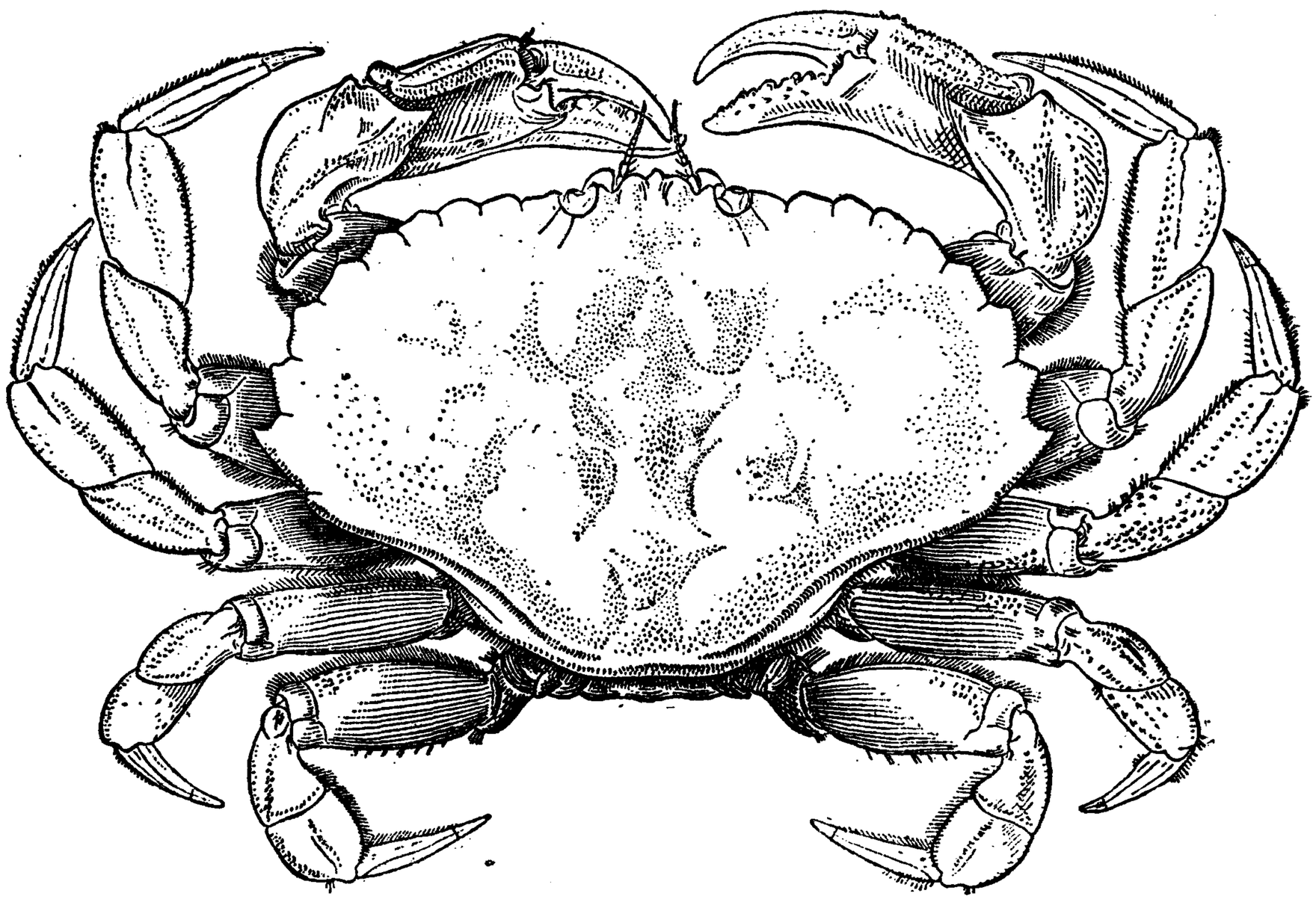

FIGURE 29.—CANCER IRRORATUS, MALE, DORSAL VIEW, REDUCED. AFTER R. RATHBUN

Description.—Carapace convex, uneven, finely granulate. Antero-lateral teeth 9, the first one broad and in part produced to form the orbital tooth; teeth shallow, edge granulate, the notches between them continued on the carapace as short, closed fissures giving a pentagonal aspect to the teeth. Postero-lateral margin a raised granulate carina furnished with two teeth, the one nearest the lateral angle small, the other obscure. The median tooth of the front is the most advanced and depressed.

Chelipeds shorter than first pair of legs, granulate; upper margin of merus ending in a short, subdistal tooth; carpus with granulated ridges and a sharp pyramidal inner tooth; manus with 6 longitudinal costae, the two lower ones continued on the finger, the upper one cristate. Legs rather long, compressed; merus of first and second pairs extending well beyond carapace. Side margins of 5th–6th abdominal segment in male converging distally.

Color.—Ground white or yellowish, covered with small, irregular, purplish or crimson spots formed by minute rings; color darkest on the nodules. Lower half of chelipeds white. Legs sparingly purplish above, darker at distal end of the merus. Some specimens have a great deal of yellow in the ground color, especially on the legs.

Measurements.—Male (14822), length of carapace 87.2, width of same 135.5, fronto-obrital width 32, width of front between antennae 12 mm.

Range.—Labrador to South Carolina. Under stones, low water, to 314 fathoms.

Material examined.—See table, pages 183–192.

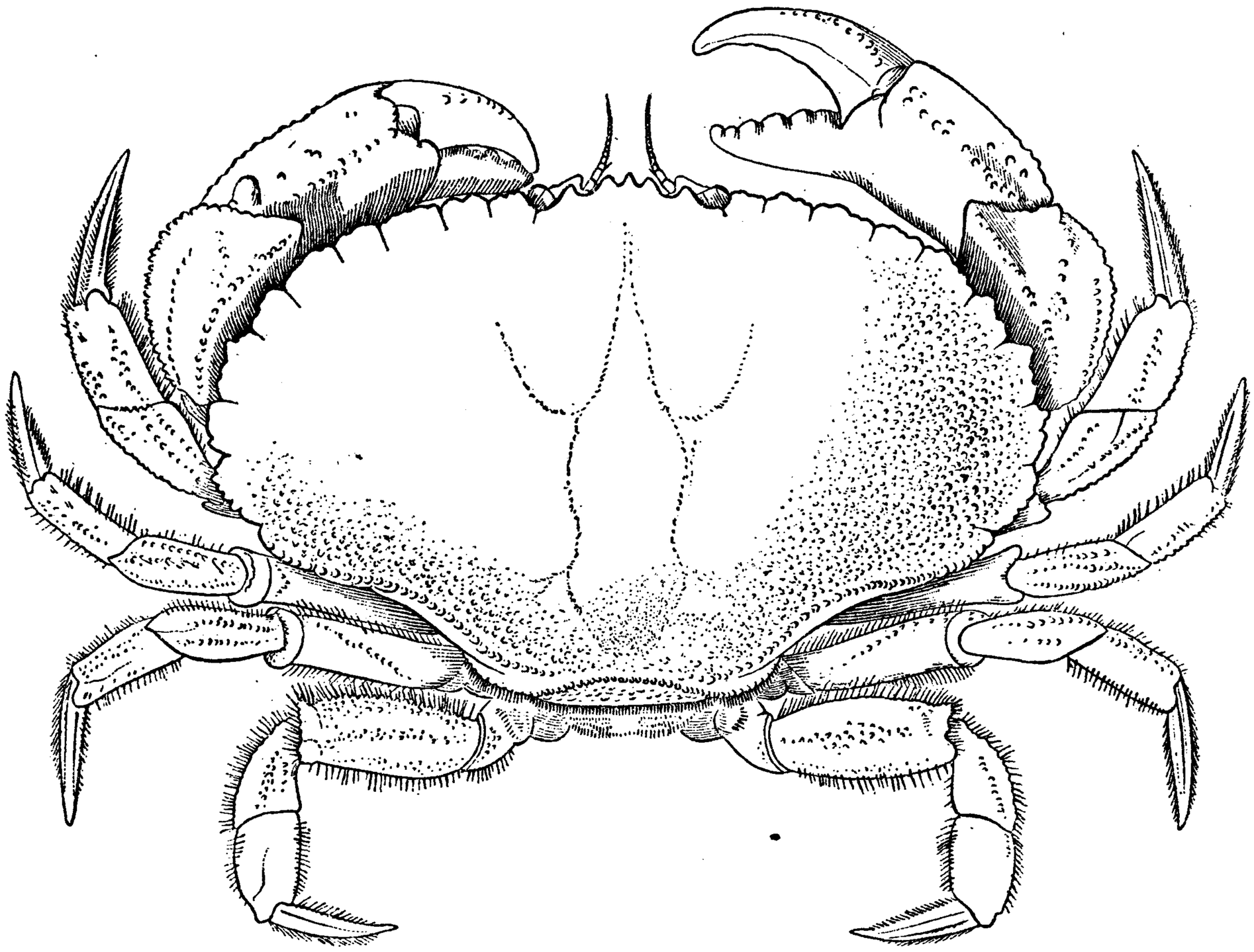

FIGURE 30.—CANCER BOREALIS, MALE, CASCO BAY, DORSAL VIEW, REDUCED. AFTER S. I. SMITH

CANCER BOREALIS Stimpson

JONAH CRAB

Cancer irroratus SAY (part, ♀), Journ. Acad. Nat. Sci., Philadelphia, vol. 1, 1817, p. 60.—GOULD, Rept. Invert. Massachusetts, ed. 1, 1841, p. 322.

Platycarcinus irroratus GIBBES, Proc. Amer. Assoc. Adv. Sci., vol. 3, 1850, p. 176 [12].

Cancer borealis STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 50 (locality, Nova Scotia to Cape Cod; types not extant).—R. RATHBUN, Fisheries and Fishery Industries of U. S., sec. 1, 1884, p. 769, pl. 260, figs. 4–6.—SUMNER, Bull. Bur. Fisheries, vol. 31, 1911, pt. 2, 1913, p. 672.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 434, pl. 35, fig. 2, and synonymy.

Diagnosis.—Teeth of lateral margins with denticulate edges. Carapace very rough with irregular granules.

Material examined of Cancer irroratus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Newfoundland:	° ′ ″	° ′ ″	*Meters*		° *C.*						
Exact locality unknown.								Thedore Gill	3♂ 1♀	3215	
Do								J. W. Jones	4♂ 6♀	5119	
Quebec, Province of:											
Matemek River						Summer, 1927		Amory-Bowman Exped.	1♀ 6 y	61368	
North side Matemek River.						do		do	4♂	61827	
Anticosti								J. Schmitt	1♂	26196	
Pleasant Bay, Magdalen Ids.						July 9, 1927		*Grampus*	2	13023	
Do			18	S.		July 14, 1917	41	*Prince*	1♂		Returned to Biological Board of Canada.
Near Amherst Island., Magdalen Islands.			8	S. M. eel-grass		July 13, 1917	40	do	1♂ 7 y		Do.
New Brunswick:											
Escuminac Point						Aug. 19–23, 1926		F. Johansen	1 carapace	61618	
Geddes Point				Under stones, low tide.		Sept. 1, 1926		do	1 y	61616	
Cape Bald Harbor						Sept. 7, 1926		do	1 y ♀	61617	
Grand Manan Island						August to September, 1898.		M. J. Rathbun	6	21688	
Nova Scotia:											
Aspey Bay						July 27, 1917		Biol. Board of Canada.	1♀		Do.
North of Cheticamp Island.			30	From haddock stomach.		Aug. 23, 1917	29	*Prince*	3 y		Do.
Do			20	rky	18, 42	Aug. 9, 1917	50	do	1		Do.
Eastern Harbor, northeast of mouth.						July 9, 1917			1 y		Do.
Eastern Harbor, near mouth.						June 28, 1917			1♂ 1♀		Do.
Do			8	bk. M		June 26, 1917	34	*Prince*	1♂ 1♀		Do.
			Fathoms								
Off Halifax			16			1877	56–58, 74	*Speedwell*	3 y	2692	
Halifax			l. w.			July 10, 1885		*Albatross*	8♂ 10♀	10135	

Material examined of Cancer irroratus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Maine:	° ′ ″	° ′ ″			°F.						
Eastport						1872		U. S. Fish Commission.	1 lge	3897	
Casco Bay						August, 1911		Rathbun and Dandridge.	1♂ 2♂ 1♂	43201 43733 47972	
Potts Point, Casco Bay.						August 5. 1911		do	2 1	43170 43179	
Mackerel Cove Point, Casco Bay.						Aug. 7, 1911		do	3	43171	
Basin Cove, Casco Bay.						Aug. 8, 1911		do	4	43169	
Merriconeog Sound, Casco Bay.						Aug. 22, 1911		do	1 y ♂ 1 y ♀	61415	
New Hampshire: Hampton Beach						July 15, 1924		Kenneth Hobbs	1 y ♂	61414	
Georges Bank:											
Exact locality unknown.						Oct. 30	Gl. Don. 925	Sch. *Otis P. Lord*	1♂ 2♀	3768	
Northern part Georges Bank.	42 01 00	68 00 30	86	crs. S. bk. Sp. brk. Sh.		Aug. 30, 1883	2057	*Albatross*	1♂	5806	
Do	41 57 30	67 58 00	35	gy. S	°F. 50	do	2058	do	1♂	5810	
Middle of Georges Bank.	41 15 30	68 15 00	18	crs. wh. S. yl. Sp.		Sept. 4, 1885	2576	do	22 y	10794	
Massachusetts:											
Gloucester			Shore.			1878		U. S. Fish Commission.	11♂ 5♀ 19 y	2621	
Ten Pound Island, Gloucester Harbor.						Oct. 2, 1880		do	2	13863	
Off Norman's Woe, Gloucester Harbor.			8–10	Abundant red algae.		Sept. 9, 1878	202	*Speedwell*	1 y	61082	
Off Plymouth	41 58 00	70 33 30 Gurnet Point Light, N. 40° W., 2¾ m.	11. 5	br. S Sp. eelgrass.	50	Sept. 9, 1879	336	do	2 y	34023	
Barnstable						Aug. 30, 1875		Verrill and Merriam.	5 y	36887	
Cape Cod Bay	41 55′–56′	70 07 00 Wood End Light, NW.	6–10	crs. S. G.	56–61	Aug. 29, 1879	314–315	*Speedwell*	22 y	3987	

Do	41 49 00	70 09 00 Billingsgate Light, N. 48° E., 5½ m.	7.5	fne. br. S.	64	Sept. 15, 1879	357	do	2 s. ♀ 18 y	3934 4312
Mouth Cape Cod Bay	42 01 30	70 30 00 Gurnet Point Light, S. 74° W. 4½ m.	21	fne. br. S.	45	Aug. 20, 1879	299	do	1♂ 2♀ (1 ovig.)	3913
Off Cape Cod	41 52 30	70 15 00 Wood End Light, N. 19° E., Rocky Point, N. 74° W.	18		64.5	July 21, 1879	240	do	1 y ♂	3937
Do	42 02 15	70 15 00 Race Point Light, N. 10° E., 1¾ m.	26.5	bu. M.	44.8	Aug. 30, 1879	319	do	2♂ 3♀	3941
Do	42 08 30	70 17 00 Race Point Light, S. 23° E.	27	fne. yl. S.	40.8	Aug. 25, 1879	309	do	3 y	3988
Do	42 08 00	75 15 00 Between Stellwagens Bank and Race Point.	34	S.	48–50	1873	35	*Bache*	1 y 2 y	2694 38153
North Truro						July, 1904		F. W. True	1	31898
Provincetown				Eel-grass		Aug. 23, 1879		U. S. Fish Commission.	1 y	3007
Do			Shore.			1879		do	1♂ 1♀	4105
Race Point beach, Cape Cod.						1879		do	6 y	5129
Do						Aug. 19, 1879		do	1 y	3006
Off Race Point Light			25–30	fne. gy. S.		July 22–25, 1879	244–246	*Speedwell*	4 y	3986
Off Race Point			42			1874		U. S. Fish Commission.	2 y	34920
Off Chatham	41 37 30	69 51 00 Chatham Light, N. 55° W., 4¼ m.	11	fne. S.		Sept. 19, 1879	366	*Speedwell*	1 y	41026
Do	41 35 30	69 42 00 Chatham Light, N. 75° W., 12 m.	18	spkld. S.		do	370	do	15 y	4320
Do	41 35 30	69 35 00 Chatham Light, N. 72° W., 16 m.	34.5	crs. spkld. S.		do	371	do	1 y	40759
Crab Ledge		Chatham Light, WNW. ¼ W., 6¼ m.	16	S. G. St.	52	Aug. 30, 1881	975	*Fish Hawk*	1♂ 1♀	4578
Nantucket Shoal						Sept. 15, 1875		U. S. Fish Commission.	1 y	36071
Off Nantucket			15			Sept. 8, 1875		do	20 y	2696
North of McBlair's Shoal			13.5			do	747	*Bluelight*	2 y	34008
South of Nantucket	40 05 00	70 34 45	70	bu. M.		Sept. 20, 1883	2085	*Albatross*	1	7014

Material examined of Cancer irroratus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Massachusetts—Contd.	° ′ ″	° ′ ″			°F.						
Woods Hole						July, 1875		U. S. Fish Commission.	25 y	36630	
Do								V. N. Edwards	3 y	15028	
Do						1905		M. J. Rathbun	22♂ 22♀	32369	
Vineyard Sound						1875		U. S. Fish Commission.	3 y	40115	
Do						1881		do	21♀	3905	Barnacles attached.
Do						1883		do	2♂	40707	
Do						1884		do	3 y	40690	
Do						1881	1001	*Lookout*	1♂ 1♀	3386	
Do	Cape Poge Light, E. by S. ½ S., 3 m.; Buoy 19, Squash Inlet, NE. by N. ¼ N., 2⅛ m.		4	hrd. S	72	Aug. 20, 1892	1672	*Fish Hawk*	3 y	26100	
Do	E. Chop Light, W. by N. ¼ N., 4 m.; Edgartown Light, S.SW. ¼ W., 4¾ m.		9	hrd	73	Aug. 23, 1892	1676	do	1 y	26101	
Do	Nobska Point Light, W.SW. ¼ W., 1¼ m.		4.75	S. G. Sh	71.5	Aug. 18, 1882	1100	do	1♂	5118	
Menemsha Bight						Sept. 9		U. S. Fish Commission.	30	6715	
Do			9–14	S. M	63.5–65	Aug. 28, 1882	1126–1128	*Fish Hawk*	5 y	34218	
Off Menemsha Bight	Gay Head, W. by S. ¾ S., 2¾ m.; N. end Nashawena, N. NW. ¼ W., 5¾ m.		12	S	64.5	Aug. 27, 1883	1169	do	13	13842	
Vineyard Sound	Vineyard Sound Lightship, W. ¾ S., 8¾ m.; Gay Head Light, S. by W., 4¾ m.		10	hrd	68	Aug. 20, 1892	1665	do	1 y	26099	
Do	Gay Head Light, W. ¾ S., 2⅛ m.		10	S	60	July 20, 1881	928	do	3♀	3365	

Do	Gay Head Light, S. ¾ E., 2¾ m.; W. end Nashawena I., NW. by W., 2 m.	13	hrd	69	Aug. 20, 1892	1663	do	25 y	26097
Do	Vineyard Sound Lightship, W. ⅛ S., 8¾ m.; GayHead Light, S. ⅞ E., 3¾ m.	9.5	hrd	68	do	1664	do	2 y	26098
Off Gay Head, from buoy.					Sept. 15, 1883		U. S. Fish Commission.	1 y	40694
Off Marthas Vineyard.					Sept. 6, 1875		U. S. Fish Commission.	1 y	40715
Do		4–9.5		62–64	Sept 2 and 6, 1882.	1129–1134	*Fish Hawk*	2 y	34200
Off No Mans Land	SE. end No Mans Land, W. by S., 7½ m.	13	S	60	Sept. 6, 1883	1176	do	5	15024
Southwest of Marthas Vineyard.	40 54 00 | 70 48 30	28	S	49	Sept. 7, 1881	987	do	5 y	40717
Do		28–30	S	49–49.5	do	987–989	do	9 y	40736
Do	41 02 00 | 71 00 00	26.5	S	55	Sept. 6, 1887	1248	do	1 y	12735
10 miles southwest of Cuttyhunk.		25	hrd		1871		U. S. Fish Commission.	4 y	36883
Buzzards Bay	Penikese Island, E., 2 m.	7	bk. M. Sh	66	Aug. 13, 1881	948	*Fish Hawk*	21 y	4579
Do	Nye's Neck, NE. ¾ E., 2¾ m.	8	bk. M	68	Aug. 26, 1881	961	do	3 y	38140
Rhode Island:									
Mouth of Sakonnet River.	Cormorant Rock, NW. by N., ¼ m.	9	G. St	65	Aug. 27, 1880	829	do	6 y	40699
Do	West Island, SE. by E. ½ E., ¾ m.	10.5	S. G	65	do	830	do	1 y	36322
Off Brentons Reef Lightship.	Lightship, NW. ½ W., 4½ m.	19	M. fne. S	53.5	Aug. 12, 1880	786	do	1 y	34136
Do	Lightship, N. NW. ½ W., 4 m.	19	M. fne. S	53.5	do	787	do	2 1 y	4532 36742
Do		8.5–10	S. brk. Sh	63–66	Aug. 23, 1880	816–818	do	15 y	40697
Narragansett Bay	Beaver Tail Light, SE. by S., ⅞ m.	8.25	S. Sh	62.5	Aug. 6, 1880	770	do	9 y	40701
Do	Beaver Tail Light, S. by E., 1¼ m.	8	S. Sh	67	do	772	do	6 y 10 y	36746 61405
Do	Beaver Tail Light, W., 1 m.	18	G. S. Sh	57.5	Aug. 7, 1880	780	do	1 y 1 y	38137 38145
Do	Beaver Tail Light, W.NW., 1 m.	16	S	57	do	781	do	2 y	40732
Do	Beaver Tail Light, W. ¾ N., 1¼ m.	16	S. G. brk. Sh	60	Aug. 12, 1880	782	do	1 y 25	34014 40702

Material examined of Cancer irroratus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Rhode Island—Continued.	° ′ ″	° ′ ″			°F.						
Narragansett Bay	Beaver Tail Light, SW. by S., 2 m.		4.5	S.	67	Sept. 1, 1880	853	*Fish Hawk*	2 y 4 y	38149 40713	
Do	Beaver Tail Light, SW. ¼ S., 1¾ m.		6	S.	67	do	854	do	12 y 2 y	40698 40737	
Do	Beaver Tail Light, W.SW. ¾ W., 6/10 m.		19	S.	66	do	857	do	4 y 22 y	36736 36752	
Do	Beaver Tail Light, W.NW. ¼ W., ⅓ m.		14	crs. S. brk. Sh.	66	do	858	do	4 y 3 y	40703 40733	
Do	Fort Dumpling, NW. by W. ½ W., 5/8 m.		27.5	S. Sh.	58.5	Aug. 7, 1880	776	do	1 y	36721	
Do	Fort Dumpling, NW. by W. ½ W., 5/8 m.		27.5	S. Sh. G.	58.5	do	776–777	do	10 y 1 y 1 chelped.	40695 58060	
Do	Off Fort Dumpling.		26–27.5	S. Sh. G.	58.5	do	777–778	do	2 y	40731	
Do	Fort Dumpling, N. ¾ E., 800 yds.		26	G. S. brk. Sh.	58.5	do	778	do	2 y	40734	
Do	Fort Dumpling, NE., 1¼ m.		22.5	G. S. Sh.	57.5	do	779	do	4 y	40692	
Do	Off the Dumplings.		20.5–27.5	G. S.	61	Aug. 31, 1880	839–840	do	1 y	34011	
Do	Goat Island Light, NE. by E., 7/8 m.		21	M. S. lge. St.	60	do	841	do	25	40705	
Do	Off Newport					1880		U.S. Fish Commission.	1♂ 1 y	3135	
Do	Halfway Rock, W., ¾ m.		12.5	M.	62	Aug. 16, 1880	802	*Fish Hawk*	2 y	40696	
Do	Halfway Rock, N. ¼ W., 1 m.		12.5	M.	62	Aug. 31, 1880	847	do	17 y	40704	
Do	Off Halfway Rock.		12.5–13	M.	63.5–67	Sept. 17, 1880	882–883	do	5 (♀ and y)	5117	
Do	Prudence Light, N. by E. ¾ E., 1½ m.		14.5	sdy. M. brk. Sh.	63	Aug. 31, 1880	846	do	1 y	40714	
Do	Off S. end Hope Island.		5–5.5	M. brk. Sh.	70	Aug. 23, 1880	820–821	do	11 y	36758	

Do	N. end Dutch Island., S., ½ m.	10.5	S. M. Sh	69	Aug. 6, 1880	774	do	5 y	61407
Do	N. end Dutch Island, S., 1 m.	12	G. S. M	68	do	775	do	5 y 1 y	36325 40801
Do	Poplar Point Lights, W. by N., 2¼ m.	4.5	M	68	Aug. 16, 1880	801	do	23 y	36784
Off Point Judith	Point Judith, W. NW. ¾ W., 8½ M.	16	fne. S	54.5	Aug. 13, 1880	790	do	5 y 3 y	34020 38150
Do	Point Judith, W. NW., 12.5 m.	20	fne. sdy. M	60	Aug. 15, 1880	791	do	1 y	61410
Do	Point Judith, W. NW. ½ W., 6 m.	19	S. brk. Sh	63	Aug. 14, 1880	793	do	7 y	61409 34005
Do	Point Judith, W. NW. ½ W., 4 m.	19	fne. sdy. M	53	do	795	do	1 y 5 y	40700
Do	Point Judith, W. NW., 3¼ m.	19	fne. sdy. M	53	do	796	do	1 y ♀	61408
Do	Point Judith, NW. by W. ¾ W., 2¼ m.	16.5	sft. M. crs. S	55	do	797	do	4 y 9 y	40691 40693
Do	Point Judith, NW. by W. ¾ W., 1¼ m.	12.5	S. G. few lge. St.	59	do	798	do	25 y	36725
Off Block Island	S. Light of Block Island, N. ¾ E., 5¾ m.	19	Sh. crs. G	62	Sept. 21, 1880	886	do	1 y	34007
Off Watch Hill		17–21			Aug. 21, 1874		U. S. Fish Commission.	1 y	40706
Connecticut:									
Long Island Sound	Falkner Island Light, NW. by N., 2⅞ m.; Madison Spire, N. by E. ⅛ E., 6⅛ m.	15.5	sft	70	Sept. 17, 1892	1701	*Fish Hawk*	1 y	26102
Do	Falkner Island Light, NW. ⅝ N., 2¼ m.; Goose Island., NW. ¾ W., 1⅞ m.	14	hrd	69	Sept. 10, 1892	1692	do	2 y	26141
Do	Branford Beacon, NE. ⅛ N., 4¼ m.; SW. Ledge Light, N. by W. ¾ W., 4⅞ m.	11.6	sft	69	Sept. 20, 1892	1710	do	1 y	26143
Do	Old Tower, N. ⅜ E., 4¾ m.; SW. Ledge Light, N. ¼ W., 4 m.	9	sft	69.5	Sept. 16, 1892	1695	do	2 y	26142

Material examined of Cancer irroratus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Connecticut—Continued.	° ′ ″	° ′ ″			°F.						
Long Island Sound	Stratford Point Light, W. by S. 5/8 S., 3 m.; Middle Ground Light SW. by S. ¼ S., 7½ m.		5.8	sft	64	Oct. 13, 1890	1633	*Fish Hawk*	1 y	17155	
Do	Bridgeport Light, NW, by N. ½ N., 5½ m.; Penfield Reef Light, NW. ¼ W., 5½ m.		27.5	sft	67	Oct. 1, 1890	1578	do	1 ♀	17151	
Do	Bridgeport Light, N. by W. ½ W., 4⅞ m.; Penfield Reef Light, NW. by W., 4½ m.		12	sft		Sept. 25, 1890	1560	do	1	17154	
Do	Bridgeport Light, N. ¼ W., 2½ m.; Penfield Reef Light, W. ¾ N., 2½ m.		6	sft	70	Sept. 19, 1890	1537	do	1 ♀	17150	
Do	Bridgeport Light, N. by W. ½ W., 2⅜ m.; Penfield Reef Light, W. ¾ N., 3½ m.		6	sft	70	do	1547	do	1 ♂ 2 y	17149	
Do	Bridgeport Light, NW. ¾ N., 2¼ m.; Penfield Reef Light, W. ¼ S., 3⅝ m.		3	hrd	69	Sept. 22, 1890	1552	do	1 y	17152	
Do	Bridgeport Light, NW., 1⅜ m.; Penfield Reef Light, W. by S. ¾ S., 3⅜ m.		4	hrd	69.8	Sept. 19, 1890	1550	do	1 y	17153	
Do	Norwalk Light, NW. ¾ N., 2 m.; Eatons Neck Light, SW. ¼ W., 4⅞ m.		14	sft	62	Oct. 10, 1892	1778	do	4 y	32279	

New York:										
Off Montauk						1874		U. S. Fish Commission.	1 y	40716
Great South Bay						1898		T. H. Bean	1♂	42567
Fire Island						Oct. 11, 1898		U. S. Fish Commission.	1 y	61403
Oak Island Beach						Sept. 14, 1898		T.H. and B. A. Bean.	4 y	22173
New Jersey: East of Cape May.	38 53 30	72 52 00	188	gn. M. S		Sept. 21, 1885	2591	*Albatross*	1	35303
Delaware:										
Bethany Beach						July 4–10, 1912		W. D. Appel	1 y	44569
East of Delaware	38 31 00	73 21 00	156	S	49	Oct. 10, 1881	1047	*Fish Hawk*	1♂ 1♀	4829
Virginia:										
Chincoteague						July, 1913		Henderson and Bartsch.	12 y	46286
East of Virginia	37 31 00	74 52 36	19	fne. S. Sh		May 5, 1883	2016	*Albatross*	1♂ 1♀	5615
Do	37 31 00	74 53 30	19	fne. S. Sh		do	2015	do	1♂ 1♀	5609
Do	37 30 48	74 51 24	18	fne. S. Sh	45.5	do	2017	do	2♂	5613
Do	37 22 00 to 37 26 00	74 19 00 to 74 29 00	56–57.5	S. Sh	54–55	Nov. 16, 1880	896, 899	*Fish Hawk*	1 y ♀ 1♂ 1♀	61406 3816
Do	37 10 15	74 32 00	143	gn. M. fne. S		June 3, 1885	2423	*Albatross*	3	14983
Do	37 10 00	75 08 00	18	S		Nov. 16, 1880	901	*Fish Hawk*	2♂ 12♀	4816
East of mouth of Chesapeake Bay.	37 07 00	74 34 30	64	fne. gy. S. P		June 3, 1885	2421	*Albatross*	3	14982
Do	37 03 20	74 31 40	104	bk. S. M. G	47.7	Apr. 5, 1885	2420	do	1	14981
Mouth of Chesapeake Bay.	37 03 24	75 58 24	9.75	hrd. fne. gy. S.	38.5	Mar. 7, 1916	8463	*Fish Hawk*	1♂	58349
Do	36 57 06	75 59 56	12.75	hrd. fne. S. brk. Sh.	43.9	Apr. 22, 1916	8499	do	1 y 1 y 1 y	58350 61083 61530
Do	36 57 02	76 00 26	12	hrd	69.5	June 26, 1915	8595	do	1 y	58352
Do	36 59 45	76 00 34	9	hrd. brk. Sh	47	Apr. 22, 1916	8500	do	1♂	58351
			Meters		°*C.*					
Off York Spit	York Spit 252°; Old Plantation Light 308°.		42.5	bk. M	11.5	Apr. 2, 1921	8985	do	1♀	58354
Off Plantation Light	Plantation Light, SE. ⅜ S.; Buoy 10, N. ¼ E.; Cherrystone Light E. by N.		45.75		21.9	July 8, 1920	8826	do	1 y	55730
Do	Plantation Light, SE. ⅜ S.; Buoy 10, N. ¼ E.; Cherrystone Light, E. by N.		do	gy. S. Sh	4.9	Jan. 23, 1921	8933	do	1♂	58353
Cherrystone						Aug. 27, 1881		M. McDonald	1 s	3476
Mobjack Bay	Head of creek, East River.					July 16, 1892	5	*Grampus*	1 carapace	31479

Material examined of Cancer irroratus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
North Carolina:	° ′ ″	° ′ ″	*Fathoms*		°*F.*						
East of Currituck Light.	36 20 24	74 46 30	119	dk. gy. M. fne. S.	51.5	June 4, 1885	2425	*Albatross*	12	10108	
East of Croatan Sound.	35 43 00	74 53 30	45	gy. & bk. S		Oct. 21, 1884	2308	do	5♂ 2♀	8861	
Do	35 42 00	74 54 30	43	gy. & bk. S	57.3	do	2307	do	1♂ 1 y	8859 40735	
Do	35 40 00	74 51 30	296	bk. M		Oct. 20, 1884	2299	do	2	14398	
Do	35 39 00	74 52 00	80	bk. M. brk. Sh.		do	2298	do	1	8858	
Do	35 38 00	74 53 00	49	bk. M. brk. Sh.		do	2297	do	1♂	8857	
East of Cape Hatteras	35 01 00	75 12 00	160	crs. gy. S. brk. Sh.		Oct. 17, 1885	2594	do	2♂	11222	
East of Cape Lookout	34 38 30	75 33 30	124	S. R		Oct. 18, 1885	2602	do	4	14028	
East of Cape Fear	34 09 00	76 02 00	168	gy. S. bk. Sp		Oct. 19, 1885	2614	do	3♂ 1♀	11214	
Do	34 00 30	76 10 30	178	glob. Oz	49.5	July 15, 1880	327	U. S. C. S. Str. *Blake*.	1♂	5776	From A. Agassiz.
South Carolina: Southeast of Charleston.	32 10 00 to 32 11 00	79 04 00 to 79 07 00	*Meters* 214	gn. M. S	°*C.* 13.21	Dec. 9, 1919	20035	*Albatross*	1♂	61081	
East coast United States								E. G. Blackford	3 lge. ♂	14822	

Description.—Similar to *C. irroratus*. Antero-lateral margins more broadly rounded; surface much rougher with coarse unèven granules; carapace higher, the convexity ending rather steeply at the dentate rim; lateral teeth with denticulate edges; behind the two postero-lateral teeth there are in old specimens one or two more smaller teeth indicated by slight notches. Chelipeds heavier and rougher; hand high, 7 coarsely granulate carinae on outer-upper surface, the uppermost one denticulate; movable finger with a very rough upper margin; ambulatory legs correspondingly rough. Side margins of 5th–6th abdominal segments in male more nearly parallel than in *irroratus*.

Color.—Brick red above, yellowish beneath, the limbs corresponding more or less in coloration with the lower surface, but of a light reddish tint above.

Measurements.—Male (2134), length of carapace 97.8, width of same 154, fronto-orbital width 36, width of front between antennae 13.6 mm.

FIGURE 31.—CANCER BOREALIS, MALE, CASCO BAY, REDUCED. *a*. RIGHT CHELA. *b*. LEFT CHELA. AFTER S. I. SMITH

Range.—Nova Scotia to Florida; Bermudas. Among rocks, between tides to 435 fathoms.

Material examined.—See table, pages 194–197.

CANCER EDWARDSII Bell

Plate 80; Plate 85, Figure 2

Cancer edwardsii BELL, Proc. Zool. Soc. London, vol. 3, 1835, p. 87 (type-locality near Valparaiso; types not extant); Trans. Zool. Soc. London, vol. 1, 1835, p. 338, pl. 44; pl. 47, figs. 2 and 3.—DANA, U. S. Expl. Exped., vol. 13, Crust. pt. 1, 1852, p. 153 (part; not *C. novae-zelandiae* Jacquinot).—KINAHAN, Journ. Roy. Soc. Dublin, vol. 1, 1858, p. 336.—A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat. Paris, vol. 1, 1866, p. 193.—MIERS, Proc. Zool. Soc. London, 1881, p. 63.

Platycarcinus edwardsii MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid. vol. 6, pt. 1, 1844, p. 20.—NICOLET, in Gay, Hist. Chile, Zool., vol. 3, Crust., 1849, p. 144.

Cancer edwardsi MIERS, Proc. Zool. Soc. London, 1881, p. 67.

Cancer edwardsii var. *annulipes* MIERS, Proc. Zool. Soc. London, 1881, p. 63 (type-locality, Trinidad Channel; type in Brit. Mus.).

Cancer edwardsi var. *annulipes* MIERS, Proc. Zool. Soc. London, 1881, p. 67.

Material examined of Cancer borealis

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			°F.						
Northeast coast of North America: Fishing Banks.								T. H. Bean	1 lge. ♂	21602	
Nova Scotia: Dauphinee's Beach, Hubbards, Halifax County.						July 26, 1920		Provincial Museum, Halifax.	1 left chela		Returned to sender.
New Brunswick: Grand Manan.								Wm. Stimpson	1♂ 1♀	2134	
Maine: Casco Bay:											
Exact locality unknown						1873		U. S. Fish Commission.	1♂ 2♀	40708	Figured.
Do						1873		do	1♂	40179	Do.
Eagle Island						July —, 1903		W. C. Kendall	9♂	32438	
Between Baileys Island and Orrs Island.			(1)			Aug. 9, 1911		Mr. Haskell	2	43166	From Rathbun and Dandridge.
Mackerel Point						Aug. 7, 1911		Rathbun and Dandridge.	2	43167	
Ram Island						Aug. 10, 1911		do	1 y	43165	
Vicinity of Harpswell						Aug. —, 1911		do	1	43168	
Mouth of Casco Bay	43 37 00	70 00 00	30			July 25, 1912	15	Grampus	1 y	46003	
Massachusetts:											
Ten Pound Island, Gloucester.						Sept. 14, 1894		do	1♀	32254	
Vicinity of Woods Hole								M. J. Rathbun	3 y	32368	
Vineyard Sound						1882		U. S. Fish Commission.	1♂	5122	
Menemsha Bight	Gay Head Light, W. by S. ⅜ S., 2½ m.			S	59	July 20, 1881	927	*Fish Hawk*	1♂	3364	
Off Nantucket Shoals	39 57 30	69 41 10	78	gy. S		Aug. 6, 1884	2199	*Albatross*	2♂ 4♀	8040	
Do	39 54 00 to 40 01 00	69 51 30 to 69 56 00	79–134		52	Aug. 4, 1881	940–941	*Fish Hawk*	5♂ ♀	3343	1 soft shell.
Do	40 03 00	69 57 00	78	gn. M. S	51.9	Sept. 27, 1884	2247	*Albatross*	3♂ 7♀	8643	
South of Marthas Vinyard	40 15 30	70 27 00	58	gn. M	51.4	Sept. 26, 1884	2242	do	1♂	8658	
Do	40 21 00	70 29 15	50	gn. M	51.4	do	2241	do	2♂ 2♀	8654	
Do	40 06 50	70 34 15	65	gn. M. wh. S.	50	Sept. 20, 1883	2087	do	1♂ 1♀	5420	
Do	40 05 05	70 35 00	69	gn. M. wh. S.	50	do	2086	do	2♂ 2♀	5408	

Do	40 20 00	70 35 00	55	sft. M	44	Aug. 23, 1883	1159	*Fish Hawk*	1 ♀ 1 y	5883	
Do	39 59 15	70 36 30	143	yl. S	48	Sept. 20, 1883	2088	*Albatross*	1 y ♂	5372	
Do	39 58 30	70 37 00	125	S	48	Oct. 4, 1882	1151	*Fish Hawk*	1 ♀	5126	
Do	40 02 00 to 40 03 00	70 37 30 to 70 38 00	89–101		48–49	Aug. 22, 1882	1108, 1109	do	11 ♂ ♀	4761	
Do	40 32 00	70 39 00	45	bk. M	46.5	Aug. 23, 1883	1162	do	1 y	5880	
Do	39 58 50	70 39 40	168	gy. S	45	Sept. 20, 1883	2089	*Albatross*	1	5369	
Do	39 59 40	70 41 10	140	gy. S. brk. Sh.	48.5	do	2090	do	3	5364	
Do	40 16 18	70 41 18	35	gn. M	42.5	July 16, 1881	919	*Fish Hawk*	3 ♂ 1 ♀	3344	
Do	SE. end of No Man's Land, W. by S., 7½ m.		13	S	60	Sept. 6, 1883	1176	do	1	6375	
Do	40 50 00	70 49 00	32	gy. S	45	Aug. 23, 1883	1165	do	1 ♀	5878	
Southwest of Marthas Vineyard	40 00 45	70 54 15	129	gn. M. S	51	Aug. 2, 1884	2185	*Albatross*	2 ♂	8038	
Do	41 04 00	70 59 30	22.5	S	57	Sept. 6, 1887	1249	*Fish Hawk*	1	12854	On sailor's shoe.
Do	39 57 00	70 57 30	126	sft. stky. M	53	Sept. 13, 1880	875	do	1 ♂ 1 y	5127	
Rhode Island:											
Southwest of Browns Ledge	Cuttyhunk Light, NE. by E., 12 m.		21.25	fne. S	52	Aug. 17, 1880	809	do	2 y	40685	
Mouth of Sakonnet River	Cormorant Rock, NW. by N., ¼ m.		9	G. St	65	Aug. 27, 1880	829	*Fish Hawk*	1 y	36718	
Near Newport								Dr. E. A. Mearns, U. S. A.	1 lge. ♂	24800	
South of Narragansett Bay	39 54 00	71 22 00	110			Sept. 23, 1882	1148	Sch. *Josie Reeves*	1 ♂	5128	
Narragansett Bay	Goat Island Light, NE. by E., ⅞ m.		21	M. S. lge. St.	60	Aug. 31, 1880	841	*Fish Hawk*	1 y	36740	
Do	Poplar Point Lights, W. by N., 2¼ m.		4.5	M	68	Aug. 16, 1880	801	do	1 y	40689	
Narragansett Bay and off Newport						1880		U. S. Fish Commission.	2 lge. ♂ 1 ♀	3912	
Off Point Judith	Point Judith, NW. by W. ¾ W., 2¼ m.		16.5	sft. M. crs. S.	55	Aug. 14, 1880	797	*Fish Hawk*	1 y	58061	
Off Block Island	Block Island Light, NW. by N., 17 m.		29	S. G	48	Aug. 18, 1880	815	do	1 y	31464	
Do	SE. of Block Island Light.		27.5–29		46–48	do	812–815	do	1 y	40686	
Off Watch Hill			17–21			Aug. 21, 1874		*Bluelight*	2 y	40688	
South of Watch Hill	39 37 00 to 39 40 00	71 52 00 to 71 55 00	168–291		44–46	Sept. 8, 1882	1137–1139	*Fish Hawk*	4 y	5098	
Connecticut: Noank						1874		U. S. Fish Commission.	1 y ♂	61404	
New York: Off Montauk						1874		do	1 y	40718	
Delaware:			*Meters*		°*C.*						
Off southern Delaware	38 55 00	72 54 00	118	gy. gn. S	9.47	Aug. 3, 1916	10370	*Grampus*	1 ♂	61411	
			Fathoms		°*F.*						
Do	38 31 00	73 21 00	156	S	49	Oct. 10, 1881	1047	*Fish Hawk*	1 ♂	4828	
Do	38 28 00	73 22 00	435	M	40	do	1049	do	1 y	4826	

[1] In lobster pot.

Material examined of Cancer borealis—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Virginia:	° ′ ″	° ′ ″			°C.						
East of Virginia	37 57 00	73 53 30	155	gy. S.		July 20, 1884	2170	*Albatross*	8♂ 8♀	7938	
			Meters								
Do	37 55 00	74 15 00	120		6.75	Aug. 12, 1916	10382	*Grampus*	1 y ♂ 1 y ♀	61412	
			Fathoms		°F.						
Do	37 30 48	74 51 24	18	fne. S. Sh.	45.5	May 5, 1883	2017	*Albatross*	1 y	5582	
Do	37 26 00	74 19 00	56	S. Sh.	55	Nov. 16, 1880	896	*Fish Hawk*	1 y	5021	
Do	37 25 00	74 18 00	157.5	S. M.	48	do	897	do	1♂	4827	
Do	37 22 00	74 29 00	57.5	S.	54	do	899	do	1♂ 2♀	4849	
Do	37 19 45	74 26 06	102	gn. M. Sh.		Mar. 23, 1883	2004	*Albatross*	6 y	5519	
East of mouth of Chesapeake Bay.	37 07 40	74 35 40	70	gn. M. G.	57.9	Oct. 18, 1884	2265	do	13♂ ♀	8767	
East of Princess Anne County.	36 41 37	74 42 15	85	bk. M.	52.5	June 24, 1885	2424	do	4	10103	
Do	36 41 15	74 39 50	66.5			Apr. 30, 1883	2012	do	15	5592	
Do	36 41 05	74 38 55	373	gn. M. fne. S.		May 1, 1883	2014	do	2♂ 4♀	5614	
Do	36 38 30	74 40 10	81	S. brk. Sh.		Apr. 30, 1883	2011	do	1 2♀ 1 y	5577 5616	
North Carolina:											
East of Cape Hatteras	35 02 50	75 18 00	15.5	S. bk. Sp.	73.5	Nov. 10, 1883	2112	do	1♂	5678	
Do	35 02 20	75 12 00	120	fne. gy. S.		Oct. 17, 1885	2592	do	1 y	11229	
East of Cape Lookout	34 38 30	75 33 30	124	S. R.		Oct. 18, 1885	2603	do	1 y	34923	
East of Cape Fear	34 09 00	76 02 00	168	gy. S. bk. Sp.		Oct. 19, 1885	2614	do	1♂	7290	
Do	34 00 30	76 10 30	178	glob. Oz.		July 15, 1880	327	U. S. C. S. S. *Blake*.	4 y.	4917	
South Carolina:											
East of Long Bay	33 37 15	77 35 30	17	crs. yl. S. brk. Sh.		Oct. 20, 1885	2618	*Albatross*	1♀	17777	
			Meters		°C.						
Do	33 34 00 to 33 41 00	76 41 00	210	S. Sh.	21.9	Dec. 12, 1919	20037	do	1♀	61401	
			Fathoms		°F.						
East of Charleston Harbor.	32 43 25	77 20 30	233	glob. Oz.	53.5	July 13, 1880	321	U. S. C. S. S. *Blake*.	2♂ 2♀	4931	
Do	32 43 00	77 51 00	159	crs. S. bk. Sp. brk. Sh.	47.4	Jan. 5, 1885	2314	*Albatross*	60	9446	
Do	32 35 00	77 30 00	247	gy. S. bk. Sp.		Oct. 21, 1885	2625	do	2♂ 4♀	11206	

| | | |

Valparaiso, Chile; specimen in Copenhagen Mus.

Talcahuano, Chile; January 15, 1927; W. L. Schmitt; 1 young male (62361).

Talcahuano or Lota; January 15 or 16, 1927; W. L. Schmitt; 1 female (61080).

Lota; January 16, 1927; W. L. Schmitt; 1 male, 5 females (61079).

West coast of South America; Dr. W. H. Jones, U. S. Navy; 1 female (14844).

CANCER PLEBEJUS Poeppig

Plate 81; Plate 82, Figure 1; Plate 85, Figure 3

?*Cancer coronatus* Molina, Saggio sulla Storia Naturale del Chili, 1782, p. 207, (type-locality, Chile; type not extant); French translation, 1789, p. 183.

Cancer irroratus Bell, Proc. Zool. Soc. London, vol. 3, 1835, p. 87; Trans. Zool. Soc. London, vol. 1, 1835, p. 340, pl. 46; pl. 47, figs. 6 and 7.—Heller, Reise *Novara*, Zool., vol. 2, 1865, p. 6.—Lenz, Zool. Jahrb., Suppl. 5, vol. 2, 1902, p. 759. Not *C. irroratus* Say.

Cancer plebejus Poeppig, Arch. f. Naturg., vol. 2, pt. 1, 1836, p. 134 (type-locality, on muddy shores, Chile; type in Mus. Zool. Univ. Leipzig.—Kinahan, Journ. Roy. Soc. Dublin, vol. 1, 1858, p. 335.—Miers, Proc. Zool. Soc. London, 1881, p. 67.—Ortmann, Zool. Jahrb., Syst., vol. 7, 1893, p. 425.—Rathbun, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 581; vol. 38, 1910, p. 539, pl. 38, fig. 1.

Platycarcinus irroratus Milne Edwards and Lucas, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 19.—Nicolet, in Gay, Hist. Chile, vol. 3, 1849, p. 142; not *C. irroratus* Say nor *C. amaeneus* Herbst.

Cancer plebeius Dana, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 155.—A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat., vol. 1, 1866, p. 188.

Diagnosis.—First antero-lateral (orbital) tooth narrower than any of the others. Basal antennal article about two-thirds as broad as long. Chelipeds narrow, merus widening distally very little. Black of fingers restricted on outer margin to one-fourth or less of their length.

Description.—Carapace very broad-oval, nearly smooth, having a fine depressed granulation, convex, not very uneven; antero-lateral teeth 9, shallow, edge crenate or denticulate, first 7 teeth truncate, lobiform, last two dentiform; one strong postero-lateral tooth, followed sometimes by a slight notch. Fronto-orbital distance less than one-fourth width of carapace; frontal teeth between the antennae triangular, median one narrower and more projecting; inner orbital tooth short, outer tooth little advanced, forming part of the first antero-lateral tooth. Tooth of basal antennal article large, triangular in cross-section, flat below, well advanced. The outer maxillipeds overlap and conceal the epistome; the truncate distal margin of the merus makes a slightly acute angle with the outer margin, the outer corner rounded. Merus of cheliped with 2 triangular acute teeth at end of upper margin; inner tooth of carpus acute; palm with 4 outer and 2 upper carinae, the uppermost spinous, the next spinulous; upper

surface of movable finger also spinulous; dark color of fingers covering prehensile edge and extending but a short distance on outer margins. Legs nearly naked.

Color.—A light lively red above, with several curved lines of white spots over the branchial and hepatic regions, a white lengthened spot on each side of the genital region, and a white mark like a V over the intestinal region. The anterior feet are of a darkish red above, the remaining legs dotted with purplish red. Under side whitish (Bell).

Measurements.—Male (2376), length of carapace 68.9, width of same 117.2, fronto-orbital width 28, width of front between antennae 9, width between tips of inner orbital teeth 13.2 mm.

Range.—From Callao, Peru, to Port Otway, Magallanes Territory, Chile. To a depth of 6 fathoms (Miers).

Material examined.—Callao, Peru; May 18, 1908; R. E. Coker; specimen returned to Peruvian Government.

Peru; specimens in Paris Museum.

Valparaiso, Chile; J. D. Dana, U. S. Exploring Expedition; 1 male (2376), 4 young (2375). November 1883; Dr. W. H. Jones, U. S. Navy; 1 female (14845).

Talcahuano; low tide; January 15, 1927; W. L. Schmitt; 1 male (61086).

Lota; February 15, 1888; *Albatross;* 1 male, 2 females (21975).

Port Otway; February 9, 1888; *Albatross;* 1 male, 1 female (21976).

CANCER PORTERI,[24] new name

BOCO

Plates 83 and 84; Plate 85, Figure 4

Cancer longipes Bell, Proc. Zool. Soc. London, vol. 3, 1835, p. 87 (type-locality, near Valparaiso; type not extant); Trans. Zool. Soc. London, vol. 1, 1835, p. 337, pl. 43; pl. 47, fig. 1. Not *C. longipes* Linnaeus, 1758.—Kinahan, Journ. Roy. Soc. Dublin, vol. 1, 1858, p. 336.—A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat., vol. 1, 1866, p. 199.—Miers, *Challenger* Rept., Zool., vol. 17, 1886, p. 110.—Ortmann, Zool. Jahrb., Syst., vol. 7, 1893, p. 424.—Faxon, Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 16.—Lenz, Zool. Jahrb., Suppl. 5, vol. 2, 1902, p. 760.

Platycarcinus longipes Milne Edwards and Lucas, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 20.—Nicolet, in Gay, Hist Chile, vol. 3, 1849, p. 144.

Diagnosis.—Branchial regions nearly meeting on median line. First antero-lateral (orbital) tooth wider than any of the next 7 teeth. Basal article of antennae nearly as broad as long.

Description.—Similar to *C. plebejus.* Carapace narrower and more convex; inner branchial regions swollen and nearly meeting in the median line; cardiac and metagastric regions correspondingly depressed; surface densely granulate, granules visible to naked eye.

[24] For Prof. Carlos E. Porter, of Santiago, Chile.

Antero-lateral margin with a coarsely granulate or crenulate edge, cut into 9 teeth or lobes which are shallower than in *plebejus*, each tooth having a slightly projecting point; first tooth broadest, composed of the small, triangular outer tooth of the orbit joined to a truncate strip of the anterior margin; 2 postero-lateral teeth, the outer one better defined. Teeth of front broadly triangular, the blunt median tooth only slightly depressed and overreaching the adjacent pair but little; the teeth of this pair directed obliquely outward. Inner orbital tooth subacute, tooth of basal antennal article narrower and more produced, and followed by a small tooth on the suborbital margin. The outer maxillipeds fit into the buccal cavity, the extremity of the merus is obliquely placed. Merus of cheliped widening considerably to the distal end, 2 small sharp spines above; carpus with the customary short pyramidal tooth at inner angle; 4 outer granulated carinae on palm separated by a shallow depression from the pair of superior carinae which are near together and rough with acute granules; dactyl sharply granulate, non-carinate. Dark color of fingers extending the whole length of the prehensile edge and but a short distance from the tip along the outer edge. Chelae much smoother in the old, carinae faint. Legs long and narrow.

Color.—Above light red, indistinctly dotted with yellow; beneath yellowish. (Bell.)

Measurements.—Male (13870), length of carapace 74.4, width of same 121.8, fronto-orbital width 31.7, width of front between antennae 12.6, width between tips of inner orbital teeth 16.9 mm. Faxon notes a specimen 137 mm. wide.

Range.—Bay of Panama, 210 to 286 fathoms, to Valparaiso, Chile.

Material examined.—Bay of Panama; 1891; *Albatross:* Lat. 7° 32′ 36″ N., long. 79° 16′ 00″ W.; 286 fathoms; gn. M.; temperature 45.9° F.; March 8; station 3385; 3 males (20601), 1 male (M.C.Z.). Lat. 7° 32′ 00″ N., long. 78° 36′ 30″ W.; 259 fathoms; hrd. gy. M. S.; temperature 47.4° F.; March 11; station 3396; 2 males, 1 female, all small (20602). Lat. 7° 16′ 45″ N., long. 79° 56′ 30″ W.; 210 fathoms; gn. M.; temperature 48.8° F.; Mar. 9; station 3389; 1 male, 1 female (M.C.Z.).

Peru; specimen in Paris Mus.

Valparaiso, Chile; Nov. 1883; Dr. W. H. Jones, U. S. Navy; 1 male (13870).

Locality not given; C. Pickering, U. S. Expl. Exped.; 3 females (2388).

CANCER LUEDERWALDTI,[25] new species

Plates 86, 87, 88, and 89

Type-locality.—Santos, State of São Paulo, Brazil; 1 large specimen, sex unknown; found dead and dismembered, only the carapace and pair of chelipeds remaining; holotype in Museu Paulista, No. 948;

[25] For Dr. H. Luederwaldt, Museu Paulista, São Paulo, Brazil.

photographs of the same were sent to the U. S. National Museum through the kindness of Doctor Luederwaldt.

Measurements.—Length of carapace 15 cm., width of same 25 cm. (Luederwaldt.) Length of propodus of right cheliped 165.4 mm.

Diagnosis.—First antero-lateral (orbital) tooth as wide as any of the next five teeth. Basal antennal article more than twice as long as wide. Black color of fingers covering all but a small basal portion. Chelipeds narrow, merus not widening distally.

Description.—Carapace larger than any specimen of the genus yet obtained. Surface densely and coarsely granulate, not very uneven; a depression behind the front. Antero-lateral border strongly arched, cut into 9 broad subtruncate teeth which are defined by deep closed sinuses and show each a shallow thick marginal lobule which increases in prominence successively from the first to the ninth tooth. Postero-lateral border with two emarginations, the first well marked, the second slight. The frontal teeth between the antennae are in the same horizontal plane, thick, subequal, tips subacute. According to the dorsal view, shown in plate 86, the front is less advanced than the hepatic regions but this may be apparent rather than actual as the carapace is much foreshortened owing doubtless to the front half being upturned; the ventral view (pl. 87) may show more nearly the real relation of the front to the antero-lateral border. Inner orbital tooth triangular, broad; no supraorbital tooth but the two fissures strongly marked; no projecting tooth at outer angle of orbit. Basal article of antenna (pl. 87) elongate, having a strong terminal tooth; a small tooth close to it on the orbital margin. Epistome advanced at outer ends in a large rounded lobe. Chelipeds rather narrow; merus not enlarging toward distal end. Black color of fingers covering all but the basal end.

Relation.—This species is the first of the genus to be reported from the Atlantic coast of South America. It is allied to *C. porteri* and *C. plebejus* from the Pacific coast, has similar truncate lateral teeth, although without denticulate edges; it lacks a well formed outer orbital tooth present in those species; the antero-lateral margin is more strongly arched, the basal antennal article much longer, the fingers blacker. *C. luederwaldti* resembles *C. porteri* in its coarse granulation, in the shape of the front, and in the long first antero-lateral tooth, but differs most strikingly in the branchial regions not approximating the median line. Our species approaches *C. plebejus* in the moderate size of the chelipeds and in the flatness of the epistome, an indication that it was covered by the maxillipeds (which are lacking in this case), but differs in the partial separation of the lateral teeth.

CANCER POLYODON Poeppig

Plate 82, Figure 2; Plate 85, Figure 5; Plate 90

?Cancer setosus MOLINA, Saggio sulla Storia Naturale del Chili, 1782, p. 207, (type-locality, Chile; type not extant); French translation, 1789, p. 182.

Cancer dentatus BELL, Proc. Zool. Soc. London, vol. 3, 1835, p. 87, (type-locality, near Valparaiso; type not extant); Trans. Zool. Soc. London, vol. 1, 1835, p. 339, pl. 45, pl. 47, figs. 4 and 5.—DANA, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 155.—KINAHAN, Journ. Roy. Soc. Dublin, vol. 1, 1858, p. 335.—HELLER, Reise *Novara*, Zool., vol. 2, Crust., 1865, p. 6.—A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., vol. 1, 1866, p. 197.—ORTMANN, Zool. Jahrb., Syst., vol. 7, 1893, p. 427.—LENZ, Zool. Jahrb., suppl. 5, vol. 2, 1902, p. 759.—PORTER, Revista Chilena Hist. Nat., vol. 7, 1903, p. 149. Not *C. dentatus* Herbst, 1785.

Cancer polyodon POEPPIG, Arch. f. Naturg., vol. 2, pt. 1, 1836, p. 133 (type-locality, Chile; type in Mus. Leipzig).—RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 581.

Platycarcinus dentatus MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, Crust., 1844, p. 20.—NICOLET, in Gay, Hist. Chile, vol. 3, 1849, p. 143.

Diagnosis.—Hairy. Marginal teeth triangular, spinous. Three marginal spines on carpus. Two rows of spines above chelae.

Description.—Carapace convex, hairy and finely granulate, granules not crowded, regions fairly delimited; marginal teeth triangular, prominent, acute, edges coarsely spinous; antero-lateral teeth 9, the first of orbital tooth the smallest; postero-lateral teeth 2, well marked, the first much the larger. Frontal teeth thick those between the antennae small, the median one much slenderer and more produced than outer pair; a shallow lobe between inner and outer supra-orbital teeth; antennal teeth long, inclined toward each other; two very sharp infero-orbital spines, the inner one the larger but much smaller than the antennal spine. Outer maxillipeds overlapping epistome. Chelipeds rough above; two spines on merus; two large spines on carpus, one at articulation, one at inner angle, smaller scattered spines besides one below inner angle; two rows of spines above palm and proximal half of dactyl. Five carinae on outer surface of palm are granulate and hairy. Black of fingers occupies the distal two-thirds. Ventral surface of body and margins of legs coarsely hairy; legs broad and flat, dactyls with 4 or 5 rows of hair.

Color.—Color above rich reddish brown, somewhat mottled with yellowish, particularly in young specimens; beneath red mottled with yellow. (Bell.)

Measurements.—Male (40417) length of carapace 79.8, width of same 124.6, fronto-orbital width 33, width of front between antennae 10.8, width between tips of inner orbital teeth 18.2 mm.

Range.—From Bay of Ancon, Ecuador (Ortmann) to the Island of Chiloe, Chile.

Material examined.—

ECUADOR.—Guayaquil; specimen in Copenhagen Mus.

PERU.—Dr. W. H. Jones, U. S. Navy; 1 female (14843).

Peru; W. E. Curtis, Bureau of Ethnology; 1 specimen (14842).

Pacasmayo; J. Orton; 1 male (62360); received from Boston Society of Natural History.

Salavery; October 22, 1926; W. L. Schmitt; 1 male (60856).

Ancon; sand beach; February 13; R. E. Coker; 1 young (40413); received from Peruvian Government.

Callao; May 18, 1908; R. E. Coker; 1 male (40416) 1 female (40414); received from Peruvian Government.

NE. side of San Lorenzo Island; taken in fish net on rocky shore; Jan. 11, 1907; R. E. Coker; 1 male (40417); received from Peruvian Government.

Independencia Bay, at the Punta Callao of Isla Vieja; 1 fathom; July 20, 1907; R. E. Coker; 2 young males, 2 young females (40415); received from Peruvian Government.

CHILE.—J. D. Dana, U. S. Exploring Expedition; 1 male (2377).

Chile; F. Silvestri; 2 males; lent by Buenos Aires Museum.

Iquique; 1885; Dr. W. H. Jones, U. S. Navy; 5 females (11197).

Antofagasta; November 15, 1926; W. L. Schmitt; 2 young, postlarval stage (60857); identification probably correct. November, 1914; J. N. Rose, Carnegie Institution of Washington; 1 carapace and claw (49059).

Coquimbo; 1849–1852; J. M. Gilliss; 1 male (2408).

Valparaiso: J. D. Dana, U. S. Exploring Expedition; 1 male (2369). January 7, 1927; W. L. Schmitt; 1 young (61088).

Talcahuano; January 15, 1927; W. L. Schmitt: 1 female (61089); low tide, 2 males, 1 female (61087).

Lota; February 15, 1888; *Albatross;* 2 young (21977).

Lota; January 16, 1927; W. L. Schmitt; 1 young, postlarval stage (60858); identification probably correct.

Quetelmahué, Island of Chiloe; June, 1924; Carlos S. Reed; 1 female (61090); from Buenos Aires Museum.

CANCER PRODUCTUS (Randall)

Cancer productus Randall, Journ. Acad. Nat. Sci. Philadelphia, vol 8, 1839, p. 116 (type-locality, West America; type in Phila. Acad.).—Dana, U. S. Expl. Exped., vol. 13, Crust., p. 1, 1852, p. 156; atlas, 1855, pl. 7, fig. 3*a–h*.—Stimpson, Journ. Boston Soc. Nat. Hist., vol. 6, 1857, p. 461 [21]; Smithson. Misc. Coll., vol. 49, 1907, p. 36, pl. 4, figs. 5, 5*a*.—R. Rathbun, Fisheries & Fishery Industries of U. S., sec. 1, 1844, p. 771, pl. 262.—Schmitt, Univ. California Publ. Zool., vol. 23, 1921, p. 220, text-fig. 136, and synonymy.

Platycarcinus productus Gibbes, Proc. Amer. Assoc. Adv. Sci., vol. 3, 1850, p. 177.

Cancer perlatus Stimpson, Proc. California Acad. Nat. Sci., vol. 1, 1856, p. 88 (type-locality, San Francisco Bay; type not located); ed. 2, 1873, p. 96.

Diagnosis.—Front markedly produced beyond outer orbital angles, forming five subequal teeth. Merus of chelipeds unarmed, fingers dark-tipped.

Description.—The five interorbital teeth are flat, obtuse, closely placed, and markedly produced beyond the outer orbital angles;

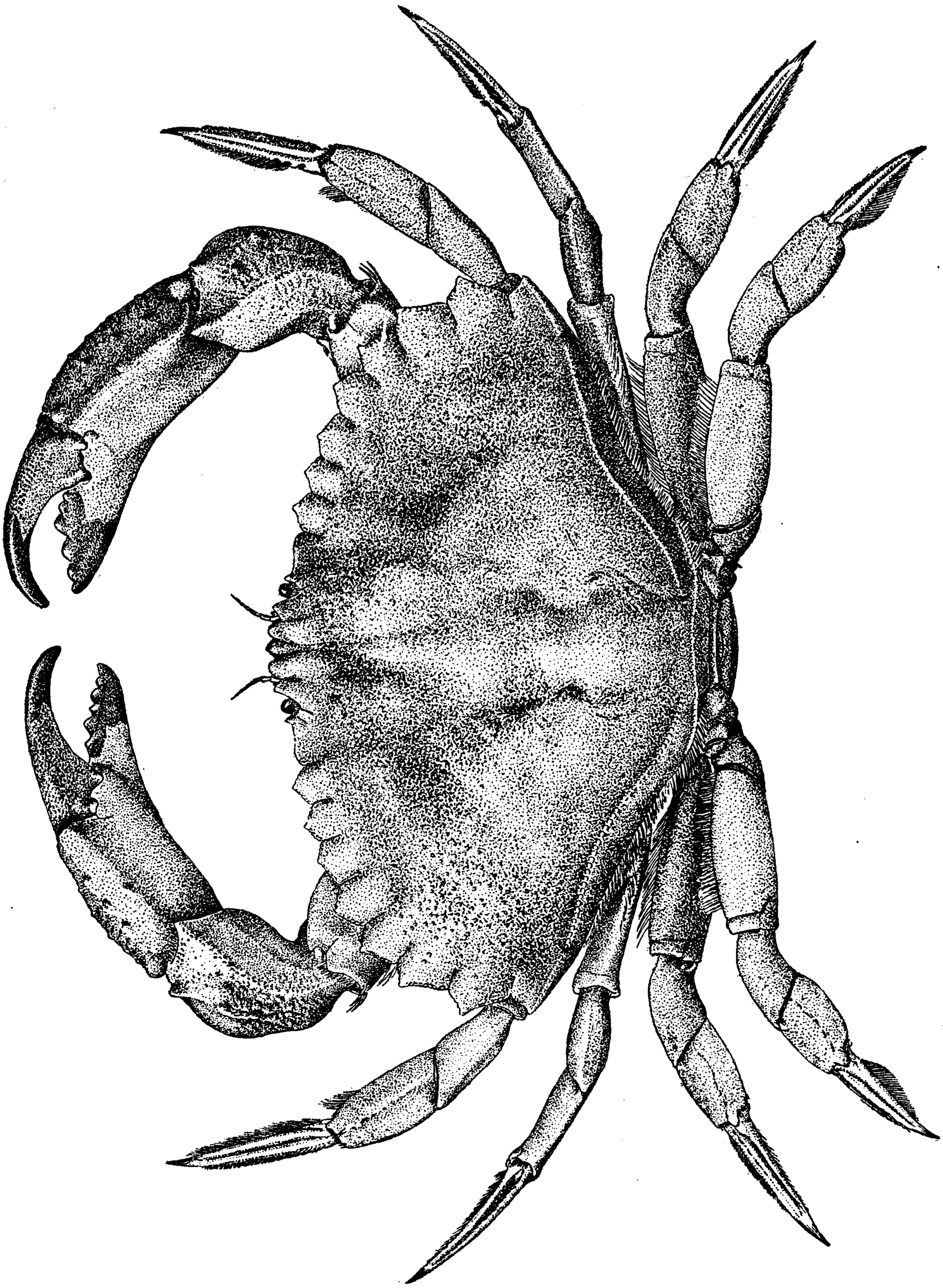

FIGURE 32.—CANCER PRODUCTUS, MALE (2529), DORSAL VIEW, REDUCED. AFTER R. RATHBUN

fronto-orbital width about one-fifth width of carapace. Antero-lateral teeth ten, shallow, outer orbital tooth small, next one rounded, succeeding teeth becoming larger and more acute posteriorly; between the teeth the margin of the carapace is marked with short closed fissures. A single obscure postero-lateral tooth. Carapace slightly

convex, very uneven. Inner lower orbital tooth flat, pressed close to the upper tooth; next it a small acute tooth. Merus of outer maxilliped about as broad as long, its anterior margin very oblique and forming a right angle with outer margin. Chelipeds rough above; merus unarmed; carpus rugose and lumpy, a single broad blunt tooth at inner angle, a large tubercle near articulation with manus; manus with four granulated carinae on outer surface; rugose above and with three rows of more or less obscure tubercles. Dactyli of legs thickly fringed above and below.

Color.—Adult dark red above, dirty white or yellowish white below; sometimes light red above due to minute red spots, not so numerous as in the case of the darker color, on a yellowish ground; or carapace with a complex pattern of narrow red lines on a yellowish ground.

Measurements.—Male (3111), length of carapace 97; width of same 157.5; fronto-orbital width 32; width of front between antennae 13, between tips of inner orbital teeth 18.6 mm. Male (Pacific Grove), width of carapace 173.5 mm. (Weymouth).

Range.—From Kodiak, Alaska, to Laguna Beach, California. Lockington [26] gave Magdalena Bay, L. Cal., as the southern limit. Many specimens formerly referred to the young of the common species, *C. magister*, *C. productus*, etc., were later found to belong to the more recently defined species, *anthonyi*, *branneri*, *jordani*, etc. For this reason only those stations from which material has been revised are included here.

Material examined.—See table, pages 206–207.

CANCER AMPHIOETUS Rathbun

Plate 91

Trichocarcinus dentatus Miers, Proc. Zool. Soc. London, 1879, p. 34 (type-localities, 4 stations off Korea and Japan, 5.5 to 37 fathoms; types in Brit. Mus.). Not *Cancer dentatus* Herbst, 1785, nor *C. dentatus* Bell, 1835.

Cancer pygmaeus Ortmann, Zool. Jahrb., Syst., vol. 7, 1893, p. 426, pl. 17, fig. 4 (type-locality, Tokio Bay; type in Strassburg Mus.).—Balss, Arch. f. Naturg., vol. 88, pt. 2, 1922, p. 94. Not *C. pygmeus* Fabricius, Mantissa Insectorum, vol. 1, 1787, pl. 320; nor *C. pygmaeus* Fabricius, Entom. Syst., 1793, p. 451.

Cancer amphioetus Rathbun, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 582; name substituted for *dentatus*, preoccupied in the genus *Cancer;* Harriman Alaska Exped., vol. 10, 1904, p. 175, pl. 6, fig. 3.—Schmitt, Univ. Calif. Publ. Zool., vol. 23, 1921, p. 223, pl. 36, figs. 1 and 2.

Cancer bullatus Balss, Zool. Anz., vol. 54, 1922, p. 1 (type-locality, Aomori; type in Berlin Mus.); Arch. f. Naturg., vol. 88, pt. 2, 1922, p. 95, pl. 1, figs. 2 and 3 (type designated).

Diagnosis.—Antero-lateral teeth broadly triangular, moderately produced, subequal. Carapace not pubescent, strongly areolated especially in the female.

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[26] Proc. Calif. Acad. Sci., vol. 7, 1876 (1877), p. 94 [1].

Material examined of Cancer productus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			°F.						
Northwest coast of America.								T. Nuttall	1 y ♂	Phila. Acad.	Holotype.
Alaska:											
Kodiak								W. G. W. Harford.	1♀	13878	
Kasaan Bay, Prince of Wales Island.								Dr. T. H. Streets, U. S. N.	2♂	14671	
Hunter Bay, Prince of Wales Island.						June 18, 1897		*Albatross*	1♂ 1 y	32217	
British Colombia:											
North Island						Aug. 8, 1883		James G. Swan	1♀	6605	
Beaver Harbor						July 12, 1888		*Albatross*	1♂	16040	
Union Bay, Bayne Island.			Shore.			May 14, 1906		do	1♂	50506	Softshell.
Comox								do	1	F. C. 7119	
North side Denman Island.						May 12, 1914		U. S. Bureau of Fisheries.	1	48838	
Nanaimo						July 10, 1888		*Albatross*	1♀	15466	
Barclay Sound						Sept. 27, 1888		do	2♂	15465	
Washington:											
Sucia Islands						May 6, 1894		do	1♂	18955	
Straits of Fuca						1880		D. S. Jordan	1♂ 1♀	3109	
Puget Sound								J. D. Dana, U. S. Expl. Exped.	1♀	2007	
Do								Young Naturalists' Society, Seattle.	1♀	18815	
Do		From cavities in concrete cylinders, Pier 4, Navy Yard.				Sept. 4, 1923		Marine Piling Investigations (Col. Wm. G. Atwood).	1	57682	
Port Orchard, Puget Sound.								O. B. Johnson	3♂ 1♀	14973	
Oregon:											
Yaquina Bay						1923		J. G. Malone	1♂ 1♀	57270	
Newport						1923		do	1♂ 1 carapace	57275	
California:											
Tomales Bay								E. Samuels	1♂ 1♀	2021	
San Francisco Bay								Wm. Stimpson, N. Pacific Expl. Exped.	3♂ 1♀	2132	
Do								H. Hemphill	3♂ 4♀	2529	

Middle San Francisco Bay.	Off Pt. San Quentin	10. 5–12. 75	S. M		Feb. 6, 1912	D5708	do	1	55342	
Do	Off Southampton Shoal	7 – 9	S. Sh		Dec. 18, 1912	D5826	do	1	55337	
Do	N. of Angel Island	13 –19	St		Oct. 29, 1912	D5795	do	2	55311	
Do	SW. of Angel Island	19 –17	S. crs. fne. G. brk. Sh.	53. 13	Jan. 30, 1912	D5700	do	1	55340	
Do	NW. of Alcatraz Island	13 –12. 75	Sh. St		do	D5702	do	1 1	55339 55343	
Do	Alcatraz Lt., 51°, 1.83 m	3 – 3	gy. S. R		May 8, 1912	D5779	do	1	55341	
Do	Off Lime Point	16. 5–17	G. S. St		Oct. 29, 1912	D5801	do	1	55346	
Do	Sausalito				Mar. 30, 1912		do	1	55335	
Do	Off Yellow Bluff	3. 5– 2. 75	R. St		Apr. 15, 1912	D5773	do	2 2	55349 55338	
Golden Gate	W. of Fort Point	43 –27	S. G. St		Nov. 4, 1912	D5808	do	3	52924	
Do	Off Fort Point	3. 5– 2. 25	gy. S. St		Apr. 17, 1912	D5778	do	1	55350	
Lower San Francisco Bay.	Goat Island Light, 23° 57′.	3 – 1. 25	m. S		Apr. 9, 1912	D5767	do	1	55348	
Do	Off Ferry Building	10 –10. 25	Sh. M		Oct. 30, 1912	D5802	do	1	55347	
Pillar Point Reef, Half Moon Bay.					May 11, 1913		do	1	55331	
Monterey Bay							Harold Heath	1 ♀ 1 ♂	22996 22997	
Do			(1)	Under rocks			do	1	22865	
Do			3⅓				do	1 y	22866	
Do					Mar. 13, 1890		*Albatross*	1 ♀	16041	
Monterey					1880		D. S. Jordan, U. S. Fish Commission.	2 y 2 ♂ lge	3061 3111	
Pacific Grove							John C. Brown	5	23917	
Do					July —, 1895		J. O. Snyder	1 y	19817	
Do					1918		Ida S. Oldroyd	7 ♂ 2 ♀ 9 y	54020	
Laguna Beach			12 –15				W. A. Hilton	1 y	50600	6.5 mm. wide, thin shell. White with pale narrow lines.
Southern California					1874		Wm. H. Dall	1 ♂	14672	
California							E. Samuels	2 ♀	56770	From Boston Soc. Nat. Hist.

[1] Mean tide mark.

Description.—Male.—Carapace smooth, bare, strongly areolated, the highest elevations occupying the protogastric and mid-branchial regions. Surface composed of fine close-set granules. Antero-lateral margin with 9 flat, broadly triangular, not strongly produced, subequal teeth with granulate margins; last 2 or 3 teeth acute or sharp-pointed. On postero-lateral margin a blunt tooth formed by a distinct emargination and followed by one and sometimes two less distinct. The frontal teeth between the antennae subtriangular, blunt or subtruncate, the middle one narrower and more produced than the next pair. Inner tooth of orbit very broad, shallow, separated from the outer tooth by a small, slightly projecting tooth or lobe. Tooth of basal antennal article broad, oblong; adjacent orbital tooth about half as long. Merus of cheliped armed above with two small, sharp spines, distal and subdistal; carpus with a triangular spine at inner angle and a granulated tubercle at articulation with manus; the latter has five carinae outside, and two above which are furnished with 2 or 3 tubercles each. Fingers granulated, dark color reaching nearly to base. Legs hairy, tips of dactyli bent downward.

Female.—Much more uneven than the male, the elevations forming large bosses, one occupying the whole of each protogastric region, two across the middle of each branchial region, of which the inner is the smaller, the outer one pear-shaped and obliquely transverse in position. Lesser but distinct bosses are on the hepatic region and the widest part of the mesogastric. The cardiac region has a tendency to split up into a 4 or 6 rayed fan. This sexual form is the *bullatus* of Balss, described from two females. Between it and the male described above there are intermediate forms of both sexes. See plate 91.

Young.—In the very young the antero-lateral teeth are longer, thicker, more curved and separated than in the adult and show greater alternation in size; the first of the postero-lateral teeth is more pronounced.

Measurements.—Largest American specimen, male (50637), length of carapace 21.4, width of same 29.5, fronto-orbital width 11.2, width of front between antennae 4 mm. Male (54498), length of carapace 29.5, width of same 41.4, fronto-orbital width 15.8, width of front between antennae 5.4, width between tips of inner orbital teeth 8.1 mm.

Range.—From La Jolla, Calif., to Gulf of California, Mexico. Japan; Korea.

Material examined.—See table, page 209.

Material examined of Cancer amphioetus

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.
California:	° ′ ″	° ′ ″	*Meters*		°*F.*					
Off La Jolla			15–7	S		June 29, 1906	1165	Scripps Institution	1♂	Returned.
Off San Diego Bay						Nov. 3, 1907	5	do	1 ovig. ♀	Do.
			Fathoms							
San Diego Bay			4.5	R. brk. Sh		Mar. 24, 1894	3591	*Albatross*	1♀	18967.
Mexico:										
West coast Lower California—										
Off Cerros Island	28 12 00	115 09 00	44	gn. M		May 5, 1888	2838	do	1 y	18183.
Cerros Island	Middle of E. side					Mar. 12, 1911		do	1 y	60022.
			Meters							
South of Cerros Island	27 57 30	115 15 12	33	brk. Sh		Sept. 1, 1908	1630	Scripps Institution	3♀	Returned.
Do	27 54 12	115 08 00	33	brk. Sh		do	1631	do	3♀	Do.
Santa Maria Bay						Mar. 18, 1911		*Albatross* (P. Bartsch)	12 y	53448.
			Fathoms							
Off Abreojos Point	26 42 30	113 34 15	5.5	gn. M		May 4, 1888	2835	*Albatross*	3 y	21980.
Magdalena Bay	24 38 00	112 17 30	51	gn. M		May 2, 1888	2833	do	1 y ♂	21978.
Do	24 32 00	111 59 00	12	fne. gy. S		do	2831	do	1♀ 1 y	21979.
Do						1917		C. R. Orcutt	2♂	50637.
Lower California						1911		*Albatross*	2 y	61076.
Gulf of California—										
Off Consag Rock, Lower California	31 05 30	114 29 00	12	gy. S		Mar. 27, 1889	3032	do	1 y ♂	17420.
Off Diggs Point, Lower California	30 50 45	114 29 45	18	gy. S	63.5	do	3033	do	1 y	17422.
Off Cape Tepoca	30 16 00	113 05 00	36	gy. S. brk. Sh	63.3	Mar. 24, 1889	3018	do	1 y. ♂	17421.
Northwest of Guaymas	28 16 00	111 54 00	22	fne. gy. S	63	Mar. 23, 1889	3012	do	1 y	18198.
Japan:										
Otaru, Hokkaido								Imper. Univ. Tokyo	4♂ 2♀	45827.
Oshoro, Hokkaido								Madoka Sasaki	2♂	54498.
Hakodate Bay			11.5	gn. M. S		Sept. 19, 1896	3656	*Albatross*	6♂ 7♀	20140.
Do			15.5	fne. gy. S		do	3659	do	2♂ 2♀	20141.
Hakodate								Imper. Univ. Tokyo	1♂	45797.
Do								Madoka Sasaki	1 y ♂	54523.
Off Uki Shima, Gulf of Tokyo			169	M. P	48	Oct. 13, 1896	3661	*Albatross*	1♀	20142.
Nagasaki								Imper. Univ. Tokyo	1♂ 2♀	45796.
Japan								Rev. H. Loomis	1♀	17563.
Do								Imper. Univ. Tokyo	1♀	45826.
Japan? (or Korea?)								Dale and Jouy, U. S. S. *Palos*	1♀	13721.
Korea: Fusan								P. L. Jouy	1♀	12401.

CANCER ANTENNARIUS Stimpson

ROCK CRAB

Plate 92; Plate 93, Figure 2

Cancer antennaria STIMPSON, Proc. Calif. Acad. Nat. Sci., vol. 1, 1856, p. 88 (type-locality, Bay of San Francisco; cotypes, Cat. No. 2033, U.S.N.M.; 1 male, Phila. Acad.); ed. 2, vol. 1, 1873, p. 96.

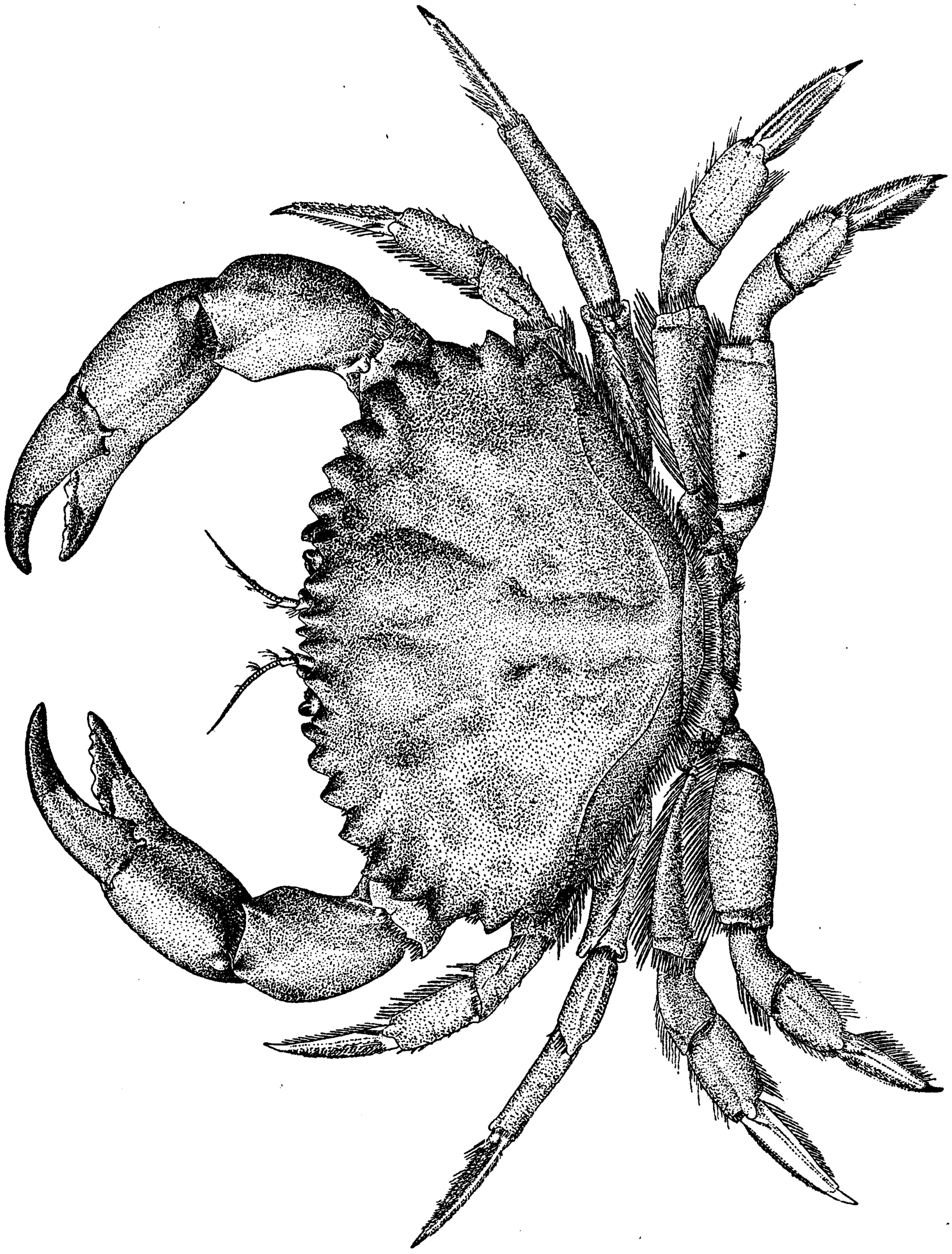

FIGURE 33.—CANCER ANTENNARIUS, MALE, COTYPE (2033), DORSAL VIEW, REDUCED. AFTER R. RATHBUN

Cancer antennarius STIMPSON, Journ. Boston Soc. Nat. Hist., vol. 6, 1857, p. 462, pl. 18.—R. RATHBUN, Fisheries and Fishery Industries of the U. S., sec. 1, 1884, p. 771, pl. 263.—WEYMOUTH, Stanford Univ. Publ., Univ. Ser. No. 4, 1910, p. 47, pl. 10, fig. 31; pl. 11, fig. 32.—SCHMITT, Univ. Calif. Publ. Zool., vol. 23, 1921, p. 224, text-fig. 137, pl. 35, fig. 3, pl. 36, fig. 8, and synonymy.

Diagnosis.—Carapace widest at eighth antero-lateral tooth; two postero-lateral teeth. Under parts spotted or blotched with reddish. A single tooth or spine on wrist.

Description.—Marginal teeth thick, high in the middle, deeply separated, edges finely spinulous. The three frontal teeth between the antennae are narrow, the median smallest and considerably lower than the next pair. Between the large inner and outer orbital teeth there is a smaller but prominent narrow tooth. Nine antero-lateral teeth more or less acute and curving forward. Postero-lateral teeth two, the first short but deeply marked, the second slightly indicated. Dorsal surface very uneven, lumpy, granulation fine, uniform; surface typically devoid of hair except in the very young. Antennae unusually stout and long. Lower orbital margin cut into two teeth between the outer and the antennal tooth. Chelipeds heavy, nearly smooth; merus with a short distal and subdistal spine-tipped tooth; inner tooth of carpus sharp, a conical tubercle near the distal articulation; outer-upper surface of palm obscurely costate. Legs rough and hairy; dactyli with five longitudinal rows of bristles.

Variable as to hairiness, roughness of the hand, size of granules, and thickness and sharpness of teeth.

Color.—Fairly uniform, dark red usually more or less mottled with a lighter, more yellowish tinge; under parts yellowish white spotted with red. Dark color of fingers extends more than half length of outer margins.

Measurements.—Male (15445), length of carapace 78, width of same 118, fronto-orbital width 30.3, width of front between antennae 12, width between tips of inner orbital teeth 20 mm.

Range.—From Tomales Bay, California, to west coast of Lower California, Mexico, as far south as San Geronimo Island, Magdalena Bay (Lockington).

Material examined.—See table, pages 212–213.

CANCER BRANNERI Rathbun

Plate 93, Figure 1

Cancer gibbosulus Rathbun, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 518 (part; not *Corystes* (*Trichocera*) *gibbosula* de Haan); Harriman Alaska Exped., vol. 10, 1904, p. 176 (part).—Weymouth, Stanford Univ. Publ., Univ. Ser. No. 4, 1910, p. 43, pl. 10, fig. 29 (not all synonymy).—Schmitt, Univ. Calif. Publ. Zool., vol. 23, 1921, p. 226, pl. 36, fig. 7 (not all synonymy or localities).

Cancer branneri Rathbun, Bull. 138, U. S. Nat. Mus., 1926, p. 63, pl. 16, fig. 4 (type-locality, San Francisco; type, Cat. No. 3092, U.S.N.M.).

Diagnosis.—First postero-lateral projection spiniform not projecting sideways beyond the carapace margin and followed by a minor tooth. Carapace strongly areolate. Dactyl of cheliped spiny.

Description.—Carapace markedly areolate, sparsely pubescent, hairs rather coarse and harsh, granules scabrous, somewhat scattered;

Material examined of Cancer antennarius

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
California:	° ′ ″	° ′ ″			°F.						
Tomales Bay (probably).								E. Samuels	1♂	56768	From Boston Soc. Nat. Hist.
Outside Golden Gate.	Point Bonita		(1)			Aug. 1, 1912		*Albatross*	1	55526	
Middle San Francisco Bay.	Off Southampton light		8	M	60.36	July 22, 1912	H5135	do	2 y	55353	
Do	Sausalito					Oct. 5, 1913		do	1	52679	
Do	Golden Gate		43–27	S. G. St		Nov. 4, 1912	D5808	do	1	55354	
Do	do		33–49	Sh. St		Apr. 7, 1912	D5845	do	1 y	55351	
Do	Off Fort Point Light		3. 5–2. 25	gy. S. St		Apr. 17, 1912	D5778B	do	1 y	55510	
San Francisco								Wm. Stimpson, N. Pacific Expl. Exped.	4♂ 1♀	2033	Cotypes.
Half Moon Bay	Pillar Point reef					May 11, 1913		W. L. Schmitt, Bur. Fisheries.	2♂ 1♀	52653	
Santa Cruz						Mar. 12, 1890		*Albatross*	2♂	15445	
Do								J. S. Kingsley	1♂	56767	From Boston Soc. Nat Hist.
Monterey Bay			(2)	Under rocks				Harold Heath	1♀	22864	
Do			(3)	do		Jan. 1, 1908		F. W. Weymouth	1	39117	
Do	Santa Cruz Lighthouse, N. 80° W., 2.1 m.		10	fne. gy. S. R		May 19, 1904		*Albatross*	3 y	50973	
Monterey						1880		D. S. Jordan	1♀	3113	
Pacific Grove								Leland Stanford Jr. Univ.	1♂ 1♀	19073	
Do								John C. Brown	6	23918	
Do						June —, 1905		J. E. Benedict	1♀	50492	
Do						1918		Ida S. Oldroyd	9♂ 10♀ (2 ovig.)	54018	
									3 y	54017	
Santa Barbara						June —, 1875		Yarrow, Henshaw, Shoemaker; Explor. W. of 100th meridian.	1♀ 1 y	2321	
Do						1880		D. S. Jordan, U. S. Fish Comm.	1♂	3128	
Venice, Santa Monica Bay.	½ m. N. of Long Wharf.							*Anton Dohrn*	1 y	50282	From Venice Marine Biol. Sta.
Do	Under aquarium					Mar. 9, 1913		J. Ross Beck	1 y	50283	Do.

Venice Breakwater.						Jan. 3, 1912		P. S. Barnhart	1 y ♀	50277	Do.
Do						Oct. 25, 1912		*Anton Dohrn*	3♂ 1 immature ♀	50279	Do.
Do						Feb. 19, 1913		J. Ross Beck	1 y♂	50278	Do.
Do						Oct. 29, 1913		*Anton Dohrn*	1 ♂	50280	Do.
									1 y	50284	Do.
Do						Mar. 13, 1913		J. Ross Beck	1♂	62465	Univ. Southern California.
San Pedro	Off breakwater		10			Nov. 30, 1912			1♀	Returned	Do.
Do						1880		D. S. Jordan, U. S. Fish Comm.	1 y	3086	
Do			(4)			July, 1896		H. N. Lowe	1♀	19865	
Do								do	1♀	32970	
									1♀	32977	
Do						1901		T. D. A. Cockerell.	1♀	31509	
Do								Mr. Baker	7 y	61077	From W. A. Hilton.
Point White, San Pedro.						May 18, 1919		E. P. Chace	1♀	53872	
				°C.							
Off Long Beach			5. 5		19. 5	May 16, 1925			1 y	62677	Univ. Southern California.
Long Beach, Los Angeles Harbor.						July 10, 1914		*Anton Dohrn*	1 y	50281	From Venice Marine Biol. Sta.
Do								H. N. Lowe	3 y	50496	
Laguna Beach								W. A. Hilton	1 y	48911	
Santa Catalina Island.	Catalina Harbor		(5)			1874		W. H. Dall	1♂ 1♀	14661	
La Jolla						Mar. 6, 1898		*Albatross*	1♂ 1 y ♀	21773	
Do			(5)	From kelp hold-fast.		Aug. 17, 1918		W. L. Schmitt	1 y	53982	
San Diego						Mar. 15, 1898		*Albatross*	1♂	21772	
Do								H. Hemphill	1♂ 1♀ 2 y	17529	
Do								San Diego Nat. Hist. Soc.	1♂	Returned	
San Diego Bay			5	fne. S. bk. Sh		Mar. 21, 1894	3576	*Albatross*	1♂	22245	
Do	32 41 30	117 13 30	(6)	S		July 9, 1906	1238	Scripps Institution	1♀	Returned	
California								Dr. J. G. Cooper	1♀	2138	
Mexico: Lower California, Todos Santos Island, off Ensenada.								A. W. Anthony	1♂	20692	

[1] Between tide marks. [2] Low tide mark to mean tide. [3] Low tide. [4] Deep water. [5] Beach. [6] Shore.

antero-lateral margin armed with 9 strongly produced, forward-curving, sharp teeth, all except the first two tipped with a spine; postero-lateral margin with a well marked tooth directed upward and not laterally, and behind it an indistinct tooth or notch. Fronto-orbital width one-third that of carapace; median tooth of front sub-oblong, depressed; next pair small, triangular, subacute, and widely separated from the broad orbital pair. Three superior orbital teeth, of which the middle one is similar in shape to the outer one but less advanced. Tooth of basal antennal article narrow, produced beyond the front; adjacent tooth of suborbital margin small. Merus of outer maxilliped truncate, anterior margin shorter than outer margin and forming a slightly obtuse angle; inner angle slightly produced inward in a blunt tooth. Chelipeds hairy; merus with two spines above, distal and subdistal; carpus spinulous above, a spine at articulation with manus, a larger spine at inner angle with a small one below it. Upper surface of hand with 2 rows of 3 to 5 spines each, outer surface with 5 rows marked with hair and spinules; a spine at articulation with carpus; upper margin of dactylus spinous, outer surface with 2 strong carinae the upper of which is spinous and between them a tuberculated carina on proximal half only. Legs hairy; dactyli longer than propodi, straight, tipped with nearly straight corneous spines. Abdomen of male very long and narrow, especially the terminal segment; sixth segment slightly wider than long.

Color.—Whitish marked with irregular but symmetrically disposed reddish blotches, tips of fingers of chelipeds black, ambulatory legs light banded with red. (Weymouth.)

Measurements.—Male holotype, length of carapace 32, width of same 46.6, fronto-orbital width 17, width of front between antennae 5, width between tips of inner orbital teeth 9.4 mm.

Range.—From Granite Cove, Port Althorp, Alaska, to Santa Catalina Island, California.

Material examined.—

Granite Cove, Port Althorp, Cross Sound, Alaska; June 18, 1880; Sylvanus Bailey; 1 male (12516), received through W. H. Dall.

Ucluelet, west coast Vancouver Island, British Columbia; low tide to deep water; Geological Survey of Canada; 1 male (40078).

Off Cape Orford, Oregon; lat. 43° 01′ 00″ N., long. 124° 30′ 30″ W.; 35 fathoms; crs. S. Sh.; temperature 46.7° F.; September 12, 1889; station 3094, *Albatross*; 1 young female (17419).

San Francisco, Calif.; 1880; D. S. Jordan; 1 male, holotype (3092).

SE. of the Farallones, California; Farallones Light, N. 80½° W., 5.4 miles; 35–33 fathoms; sand; October 22, 1912; station D5790, *Albatross*; 1 female, 2 young (52681).

Seal Beach, Calif.; 3 fathoms; February 24, 1923; Univ. Southern California; 1 young (62466).

Catalina Harbor, Santa Catalina Island, Calif.; 30–40 fathoms; sandy mud; W. H. Dall; 1 male, 1 young (14660).

CANCER JORDANI Rathbun

Plate 94, Figures 1 and 2

Cancer jordani Rathbun, Amer. Nat., vol. 34, 1900, p. 133 (type-locality, Monterey Bay; type, Cat. No. 22868, U.S.N.M.); Harriman Alaska Exped., vol. 10, 1904, p. 176, pl. 6, fig. 4.—Weymouth, Stanford Univ. Publ., Univ. Ser. No. 4, 1910, p. 45, pl. 10, fig. 30.—Schmitt, Univ. Calif. Publ. Zool., vol. 23, 1921, p. 228, pl. 36, figs. 5, 6.

Diagnosis.—Carapace hairy; antero-lateral teeth spiniform, curved, alternating in size; one postero-lateral tooth.

Description.—Carapace slightly areolated, hairy, and covered with small crowded scabrous granules; antero-lateral teeth separated to their bases, curved forward, tips spiniform, very slender; second, fourth, sixth, and eighth teeth smaller than the others; alternation in size of teeth varying with age, most noticeable in young specimens, less so in large ones; ninth tooth scarcely more prominent than eighth; one postero-lateral tooth is indicated in older specimens and less conspicuously so in younger ones by a slight gap in the spinules marking that margin. Fronto-orbital width nearly half width of carapace. Inner orbital tooth very slightly produced; margin of upper intermediate orbital lobe almost transverse, scarcely dentiform. Tooth of basal antennal article and the adjoining tooth of the orbital margin acute. Movable part of antennae half as long as carapace. Merus of outer maxilliped obliquely truncated, margin at a slightly obtuse angle to outer margin, corner rounded; the merus considerably overlaps the epistome and the basal article of the antenna. Seven carinae on upper-outer surface of palm are fringed with hair, the two superior carinae with several spines. Upper surface of basal half of movable finger rough with sharp granules. Tips of fingers light; the dark color runs along the prehensile margins to the base or nearly so, but about ⅗ or ⅔ of the outer margin. Legs hairy.

Color.—A male from Laguna Beach preserved in formalin showed a regular pattern on the carapace in brick-red blotches. The largest patch stretches from the anterior half of the postero-lateral margin obliquely toward the gastric region; two short patches stretch obliquely outward and forward from the posterior margin. A patch of the same color occupies nearly all of the lower surface of the arm, while a darker shade covers the dorsal aspect of the cheliped.

Measurements.—Male (50299), length of carapace 21, width of same 27.4, fronto-orbital width 11.9, width of front between antennae 4, width between tips of inner orbital teeth 6.6 mm.

Range.—From Humboldt Bay, Calif., to San Geronimo Island, Lower California, Mexico.

Material examined.—See table, pages 216–217.

Material examined of Cancer jordani

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
California:	° ′ ″	° ′ ″									
Humboldt Bay						July 18, 1916		Scripps Institution	1 y	Returned	
Pillar Point Reef, Half Moon Bay.						May 11, 1913		*Albatross*	2	55512	
Monterey								Dr. C. A. Canfield	1 y	3447	
Monterey Bay			(1)	Under rocks				Harold Heath	1	22867	
Do	From sub-umbrella space of large violet and white jellyfish.							do	1 ♀ holotype, 2 y.	22868	
Do								do	1 y	22869	
Do	36 56 20	122 03 20	13	fne. S. rky		Mar. 15, 1890	3142	*Albatross*	1 y	15446	
Do			(2)	Under rocks		June —, 1907		F. W. Weymouth	1	39116	From Stanford Univ.
Do	Off Del Monte		10–17			June 18, 1906		do	1	39119	Do.
Santa Monica								E. P. Chace	1 y	54001	
Santa Monica Bay	2 m. S. by E. from Del Rey.					Aug. 8, 1913		*Anton Dohrn*	2 ♂ 4 ♀ (1 ovig.)	50303	From Venice Marine Biol. Sta.
Do	2 m. out between Playa del Rey and El Segundo.					Aug. 2, 1913		do	1 ♂	50294	Do.
Do	Off Venice					July 29, 1913		do	1 ♂	50301	Do.
Do	do					Aug. 2, 1913		do	3 ♂ 1 ♀	50299	Do.
Do	S. of Venice Breakwater.		20					Univ. Southern California.	2 y	Returned	
									1 y	62690	
Do	3½ m. S. by W. of Venice.		24			July 29, 1913		*Anton Dohrn* (P. S. Barnhart).	1 y	50297	Do.
									1 ♂ 1 y	50302	
Point Vincente			8			July 5, 1924		Univ. Southern California.	7 y	62471	
Do			14			Nov. 15, 1924		do	1 y	Returned	
									1 y	62689	
Point Fermin						July 16, 1923		do	1 y	62470	
San Pedro								H. N. Lowe	1 y. ♂	23054	
Do								E. P. Chace	2 y	61084	
Vicinity of San Pedro						1917		do	2 ♂	54002	
Do						Nov. 30, 1912		*Anton Dohrn*	1 y	50298	Do.
Long Beach			10					Univ. Southern California.	3 y	62472	
Do								H. N. Lowe	1 y	50553	

					°C.					
Off Long Beach			5.5		19.5	May 16, 1925		Univ. Southern California.	1♂	62679
Seal Beach			3			Feb. 24, 1923		do	1 y	Returned
Newport Bay, Newport						Nov. 27, 1914		*Anton Dohrn*	1 y	50296
Laguna Beach								W. A. Hilton	4 y	50610
									1 y	50595
Do						Aug. 8, 1918		do	1	54024
Santa Catalina Island	Isthmus Harbor					Nov. 27, 1913		*Anton Dohrn*	1♀1♀	50300
Do	Catalina Harbor					1874		W. H. Dall	3 y	19976
Off San Nicolas Island	E. point San Nicolas Island, S. 77° W., 57 m.		33–32	fne. gy. S		Apr. 12, 1904	4420	*Albatross*	1 y	50969
La Jolla			Beach.	From kelp hold-fast.		Aug. 17, 1918		W. L. Schmitt	1 y	53983
Do						July —, 1917		Scripps Institution	1♂	Returned
			Meters							
Off La Jolla	32 52 00	117 15 54	13	S		June 27, 1906	1146	do	1♂ 1♀	do
Do	32 52 00	117 16 00	55	S. M.		do	1145	do	1♂ 8♀ (1 ovig.)	do
Do	32 51 30	117 16 24	146	rky		July 3, 1906	1202	do	1♂	do
Do	32 51 30	117 16 00	33	S		do	1200	do	1 y	do
Do	32 50 00	117 18 18	55–73	R		July 16, 1906	1287	do	1♂	do
Do			15–7	S		June 29, 1906	1165	do	22 y. 1 megalops	do
Do			12–11	S		do	1167	do	1♀ 10 y	do
Do			10	S		July 17, 1906	1299	do	7 y	do
San Diego								H. Hemphill	2 y	62363
			Fathoms							
Do			10					do	1 y	4282
San Diego Bay			6.5	M. S		Apr. 1, 1896	3621	*Albatross*	1♀	20139
Off San Diego Bay	32 38 00	117 14 00				Nov. 3, 1907	6	Scripps Institution	1♂ 1♀	Returned
Mexico: Lower California—			*Meters*							
Cerros Island	27 54 30	115 08 00	33	brk. Sh		Sept. 1, 1908	1631	do	1♂	do
Do	Middle of east side					Mar. 12, 1911		*Albatross*	1♀	60023
San Geronimo Island			7			July 19, 1896		A. W. Anthony	1 y	19524

[1] Low tide to mean tide.

[2] Low tide.

CANCER ANTHONYI Rathbun

Plate 94, Figure 3

Cancer anthonyi RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 111 (type-locality, Playa Maria Bay, Lower California; type, Cat. No. 19856); Harriman Alaska Exped., vol. 10, 1904, p. 176, pl. 6, fig. 2.—WEYMOUTH, Stanford Univ. Publ., Univ. Ser. No. 4, 1910, p. 49, pl. 11, fig. 33.—SCHMITT, Univ. Calif. Publ. Zool., vol. 23, 1921, p. 227, pl. 35, fig. 1.

Diagnosis.—Carapace widest at ninth antero-lateral tooth; postero-lateral teeth inconspicuous. Intermediate supra-orbital tooth shallow. Under parts of uniform light color.

Description.—Carapace very convex, uneven, furrows at middle well marked; surface smooth to the touch, formed by a pavement of flat, close-set granules. Marginal teeth thick, blunt or subacute. Antero-lateral margin very arcuate, nine-toothed, lateral tooth projecting little beyond the preceding. Postero-lateral margin with two rudimentary, non-projecting teeth or emarginations. Median tooth of front small and narrow. Upper margin of orbit between sutures dentiform or lobiform; tooth low. Basal antennal tooth large, advanced beyond front. Distal margin of merus of outer maxilliped slightly curved and at right angles to outer margin, outer angle rounded. Chelipeds and legs nearly smooth; merus with short distal and subdistal spines; carpus with a broad, inner tooth and a tubercle on upper surface just behind articulation with palm. The latter is obscurely carinated; immovable finger deflexed.

Allied to *C. antennarius* but antero-lateral teeth broader and less projecting, front narrower and legs less hairy.

Color.—Brownish red; under parts uniform light color. The black color on the fingers extends less than half the length of the outer margins.

Measurements.—Male (holotype), length of carapace 42.4; width of same 65; fronto-orbital width 18.2; width of front between antennae 6.3, width between tips of inner orbital teeth 10 mm. Largest specimen, male (23048), length 52.1, width 77.5 mm.

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

Material examined.—

CALIFORNIA.—Monterey Bay; lat. 36° 55′ 30″ N., long. 122° 02′ 00″ W.; 19 fathoms; fne. S. M. St.; temperature 55.4° F.; March 15, 1890; station 3138, *Albatross*; 1 young (19977).

Santa Monica Bay; received from Venice Marine Biological Station: Off Venice; August 2, 1913; *Anton Dohrn;* 1 young male (50178). Venice breakwater; 1 young male (45584). Two miles S. by E. from Playa Del Rey; August 8, 1913; *Anton Dohrn;* 1 young (50176).

Vicinity of San Pedro; 1917; E. P. Chace; 1 young (54006).

Point White, San Pedro; May 18, 1919; E. P. Chace; 1 young (53873).

Seal Beach; July 28, 1923; 1 young, returned to University of Southern California. Off Long Beach; 5½ fathoms; temp. 19.5° C.; May 16, 1925; 9 young (62498), from University of Southern California.

Long Beach; on wharf; H. N. Lowe; 2 males, 2 females (23048).

Anaheim Bay; November 18, 1918; E. P. Chace, 1 young female (54005).

Off Catalina Island; 50 fathoms; H. N. Lowe; 1 young female (29959).

La Jolla; 1915; 2 young; returned to Scripps Institution.

San Diego Bay; 6 fathoms; fne. S. brk. Sh.; March 21, 1894; station 3577, *Albatross*; 1 male (22246).

MEXICO.—West coast of Lower California:

Cape Colnett; gift of Ida S. Oldroyd; 1 young (62738).

Playa Maria Bay; A. W. Anthony; 1 male (holotype), 1 female paratype (19856).

Rosalia Bay; August 20 and 23, 1896; A. W. Anthony; 7 young (19822).

Magdalena Bay; 2 specimens (M.C.Z.).

CANCER GRACILIS Dana

Plate 95

Cancer gracilis DANA, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, 1852, p. 73 (type-locality, Bay of San Francisco; type not located); U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 153; atlas, 1855, pl. 7, fig. 2*a-d*.—WEYMOUTH, Stanford Univ. Publ., Univ. Ser. No. 4, 1910, p. 42, pl. 9, figs. 26–28.—SCHMITT, Univ. Calif. Publ. Zool., vol. 23, 1921, p. 232, pl. 35, fig. 2, and synonymy.

Diagnosis.—Nine low antero-lateral teeth, one postero-lateral. Fingers of cheliped without dark color. Merus of outer maxillipeds elongate, anteriorly rounded.

Description.—Carapace strongly convex, very slightly areolated, densely granulated, widest at ninth (sometimes eighth) tooth. Antero-lateral teeth low, 9 in number, of unequal width, projecting less than one-third width of base, not spiny-pointed. One small blunt postero-lateral tooth. Median tooth of front smaller than those of the next pair but well advanced beyond them. Outer and distal margins of merus of outer maxilliped forming a single curve without angulation. Arm with a small distal and subdistal spine or spinule; wrist with two inner spines or teeth, the smaller below the other. Propodus with nearly horizontal margin, outer-upper surface with seven longitudinal carinae some of which are incomplete, the upper one bispinulous, the next one similar; upper edge of dactylus finely roughened at its middle. Legs relatively narrow, merus finely rugose above, dactyls long and narrow.

Material examined of Cancer gracilis

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			°F.						
Alaska: Kasaan Bay, Prince of Wales Island.								Dr. T. H. Streets, U. S. Navy.	1 ovig. ♀	14662	
British Columbia:											
Comox								*Albatross*	7	F. C. 7118	
Victoria								Mr. Nichols	1♂	50508	
Washington:											
Port Angeles						Sept. 3, 1891		*Albatross*	3♂ 2♀	17094	
Puget Sound								Young Naturalists' Soc., Seattle.	2♂	18814	
Admiralty Inlet	Olele Pt., Oak Bay, S. 27° E., 1.5 m.		16–26	gn. M. S. brk. Sh.	51.8	July 1, 1903		*Albatross*	1 y	31601	
Port Orchard						July —, 1889		O. B. Johnson	3♂ 4♀	14972	
Do								*Albatross*	2♂ 1♀	15447	
Fort Steilacoom								Dr. Geo. Suckley, U. S. Army.	2♀	2049	
Olympia						1923		J. G. Malone	1♀	57277	
Oregon: Off Yaquina	Yaquina Light, S. 84° E., 5.1 m.		34	crs. gy. S		Sept. 2, 1914	H5716	*Albatross*	1	55236	
California:											
Drakes Bay	37 59 20	122 55 30	20	bk. S. M	51.8	Mar. 21, 1890	3154	do	2♂	15451	
Off Bolinas Point	37 49 50	122 37 10	11	fne. gy. S	52.2	Mar. 29, 1890	3182	do	18	17417	
West of Golden Gate	Bonita Pt. Light, N. 46° E.		9–8	fne. dk. S		Mar. 11, 1912	D5733	do	1	55233	
Do	Bonita Point		(1)			Aug. 1, 1912		do	2	55241	
Do	San Francisco Lightship, N. 37 E., 1 m.		26–19	S		Oct. 22, 1912		do	4	55238	
Do			30			July 21, 1912		do	1	55243	
Do			30					do	1	55237	
Sausalito						Mar. 30, 1912		do	1	55240	
Do						Apr. 1, 1912		do	1	55234	
Middle San Francisco Bay.	Off Pt. San Quentin		10.5–12.75	S. M		Feb. 6, 1912	D5708	do	1	55525	
Do	Off Southampton Shoal		7–9	S. Sh		Dec. 18, 1912	D5826	do	8	55231	
Do	do		8.5–12.5	S		do	D5825	do	1	55230	
Do	Off Angel Island		8.5–7.5	S		Oct. 29, 1912	D5797	do	3	55229	
Do	do		8.5–12.5	fne. gy. M. S		do	D5799	do	7	55232	
Do	do		16.5–10.25	M. S. Sh		Jan. 20, 1913	D5828	do	1	55235	
Do	do		8–7.25	M		Oct. 28, 1912	D5798	do	3	55239	
Lower San Francisco Bay.	Off Ferry Building		10–10.25	Sh. M		Oct. 30, 1912	D5802	do	5	52717	Figured

Do	San Francisco						Henry Hemphill	3 ♀	5133	
Do	Off San Mateo	10–9	M		Apr. 22, 1913	D5849	*Albatross*	1	55531	
Gulf of the Farallones	37 50 00 | 122 47 00	24	fne. gy. S	50.7	Mar. 29, 1890	3180	do	2 y	15449	
Do	37 43 20 | 122 43 00	29	crs. S	50.4	Mar. 10, 1890	3100	do	4 ♂ 4 ♀	15450	
Off Point Montara	Pt. Montara Light, N. 74½° E., 8.9 m.	39–40	dk. gn. S	49.66	Oct. 15, 1912	D5785	do	2	55242	
Off Pescadero Point	37 13 30 | 122 26 00	20	gy. S	52.8	Mar 11, 1890	3111	do	3 ♀	15454	
Off Point Ano Nuevo	37 08 00 | 122 28 10	47	br. M	51.3	Mar. 15, 1890	3148	do	1 y	15459	
Do	37 00 00 | 122 20 00	56	br. M	49.2	do	3147	do	2 y	15458	
Santa Cruz							Boston Soc. Nat. Hist.	1 ♀	56777	
Monterey Bay	Santa Cruz Lighthouse, N. 85° W., 1.6 m.	9–10	rky		June 11, 1904	4564	*Albatross*	1 y	50972	
Do	Santa Cruz Lighthouse, N. 71° W., 2.4 m.	10–12	fne. gy. S. R		do	4560	do	2 ♀	50523	
Do	Santa Cruz Lighthouse, N. 72° W., 8.1 m.	10	hrd. S. R		do	4562	do	1 ♂ 1 y	50524	
Do	36 56 20 | 122 03 20	13	fne. S. rky		Mar. 15, 1890	3142	do	1 y	15455	
Do	36 56 00 | 122 01 20	11	S. P		do	3137	do	1 ♀	15452	
Do	36 56 00 | 122 06 00	24	fne. gy. S. M	53	do	3141	do	3 y	15453	
Do	36 55 40 | 122 03 10	20	S G. R. M		do	3144	do	4 y	15460	
Do	36 54 10 | 121 55 00	15	fne. gy. S	54.7	Mar. 14, 1890	3135	do	4 ♂	15448	
Do	36 51 40 | 121 51 20	13	fne. S. M	54.5	do	3134	do	1 y	15457	
Do	36 44 00 | 121 51 00	33	br. M	52.1	do	3132	do	1 ♂ 1 ♀	15456	
Do	Pt. Pinos Lighthouse, S. 42° W., 7.6 m.	13–15	fne. gy. S		May 12, 1904	4459	do	1 ♂ 3 ♀	50487	
Do	Pt. Pinos Lighthouse, S. 21° W., 3.4 m.	49–50	gn. M. fne. S	48.5	May 11, 1904	4452	do	1 y	50971	
Pacific Grove					July —, 1895		J. O. Snyder	1 y	19818	
Do							John C. Brown	5	23919	From subumbrella of jellyfish.
Monterey					1880		D. S. Jordan, U. S. Fish Comm.	1 ovig. ♀	3063	
Santa Barbara					1880		do	1	3046	
Santa Monica Bay	Between Venice and Rocky Pt.				Aug. 11, 1914		*Anton Dohrn*	10 y	50270	From Venice Marine Biol. Station
Do	do				do		do	4 y	50275	Do.
Do	Off Venice				Aug. 2, 1913		do	1 y. ♂	50272	Soft shell.
Do	3 m. SW. by S. of Venice.	22			do		do	2 y	50273	
Do		14			July 29, 1913		*Anton Dohrn* (P. S. Barnhart).	3	50271	
Off Point Vincente		10			1924		*Anton Dohrn* (E. P. Chace)	1 y	58760	
Point Fermin					July 16, 1923		Univ. Southern California.	1 y	62468	
South side of San Pedro Bay.	600 feet W. of Pier near inlet.		crs. yl. S				do	1 ♂	62467	
Just east of Long Beach					Nov. 4, 1922		do	1 y ♂	62469	
Off Long Beach		12			Oct 21, 1922		do	1 y ♂ 1 y ♀	Returned	
Newport Bay					Nov. 26, 1914		do	1 y	62688	
Laguna Beach							W. A. Hilton	2 y	50606	

Material examined of Cancer gracilis.—Continued

Locality	Latitude N.	Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
California—Continued. Off La Jolla	° ′ ″ 32 51 30	° ′ ″ 117 16 00	*Meters* 33	S	°F.	July 3, 1906	1200	Scripps Institution.	1 y	Returned to sender.	
						Apr. 2, 1896		*Albatross*	1♂	20171	
North Island, San Diego Bay California								A. Samuels	1♂ 1 ovig. ♀	56779	From Boston Soc. Nat. Hist.
Lower California, Mexico: Playa Maria Bay.						{Aug. 24, 1896 to Aug. 26, 1896		A. W. Anthony	4♂ 4♀	19522	

[1] Between tide marks.

Color.—Olive overlaid with minute reddish spots, more numerous on the teeth of the antero-lateral margin and on the front, giving to the whole a brownish tinge; edges of teeth, under parts, and greater portion of legs yellowish. (Weymouth.)

Measurements.—Male (50508), length of carapace 59.3, width of same 91, fronto-orbital width 24, width of front between antennae 8.6 mm.

FIGURE 34.—CANCER GRACILIS, MALE (55355), OUTRR MAXILLIPED, ×3

Range.—From Prince of Wales Island, Alaska, to Playa Maria Bay, Lower California, Mexico. Low water to 56 fathoms.

Material examined.—See table, pages 220–221.

CANCER MAGISTER Dana

COMMON EDIBLE CRAB

Cancer irroratus RANDALL (not Say), Journ. Philadelphia Acad. Nat. Sci., vol. 8, 1839, p. 116.

Cancer magister DANA, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, 1852, p. 73 (type-locality, Bay of San Francisco; type not located); U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 151;

atlas, 1855, pl. 7, fig. 1*a-d*.—R. RATHBUN, Fisheries & Fishery Industries of the U. S., sec. 1, 1884, p. 770, pl. 261.—SCHMITT, Univ. Calif. Publ. Zool., vol. 23, 1921, p. 229, and synonymy.

Metacarcinus magister A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 1, 1866, p. 202, pl. 19.

Diagnosis.—Carapace widest at tenth or last antero-lateral tooth. Postero-lateral margin unbroken, entire. Antero-lateral teeth with more or less prominent serrations anteriorly. Fingers of chelipeds without dark color.

Description.—Carapace with 10 antero-lateral teeth, counting the orbital tooth, each acutely pointed at the anterior end, teeth 2 to 8, inclusive, increasing successively in width; edges denticulate; lateral tooth large, strongly projecting. Postero-lateral margin rimmed, entire. Middle tooth of front slightly larger than those of outer pair and more advanced. Inner orbital tooth considerably larger, less produced and separated from the front by a broad interval. Dorsal surface uneven, the elevated spots coarsely granulate. Basal article of antenna very broad and well advanced. Merus of outer maxilliped widened distally, its anterior margin forming a very obtuse angle with outer margin. Merus of cheliped with a distal and a subdistal spine above; wrist with a strong inner spine; hand with six carinae on upper outer surface, the uppermost spinous, as is also the upper margin of the dactyl for two-thirds of its length. Propodal finger much deflexed. Fingers without dark color. Legs rough above and very broad and flat, especially the propodus and dactylus of the last pair.

Color.—Light reddish-brown, darkest anteriorly, often light orange below; inner sides of the anterior feet and hands crimson. (Stimpson.)

Measurements.—Male (32235), length of carapace 126, width of same 198, fronto-orbital width 48.2, width of front between antennae 12.3 mm.

Range.—From Unalaska to Monterey Bay, Calif.[27] Low water to 50 fathoms.

Material examined.—

ALASKA.—Off village of Iliuliuk, Unalaska; 6 fathoms; mud; 1871; W. H. Dall; 3 specimens (14666).

East side Unga Island; 1872; Harrington and Hall; Dall collection; 1 male (14665).

Sanborn Harbor, Nagai Island; low water; 1872; W. G. Hall; Dall collection; 1 male (14663).

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[27] Lockington (Proc. Calif. Acad. Sci., vol. 7, 1876 (1877), p. 94 [1]), reported the young of *C. magister* from Magdalena Bay. The present author is convinced that this is a mistake, as Monterey appears to be the southern limit. Among large collections of *Cancer* examined from southern California, no *C. magister* has been found. Lockington's specimens may well have been *C. jordani*. See "Relations" under *Cancer jordani* in Harriman Alaska Exped., vol. 10, 1904, p. 177.

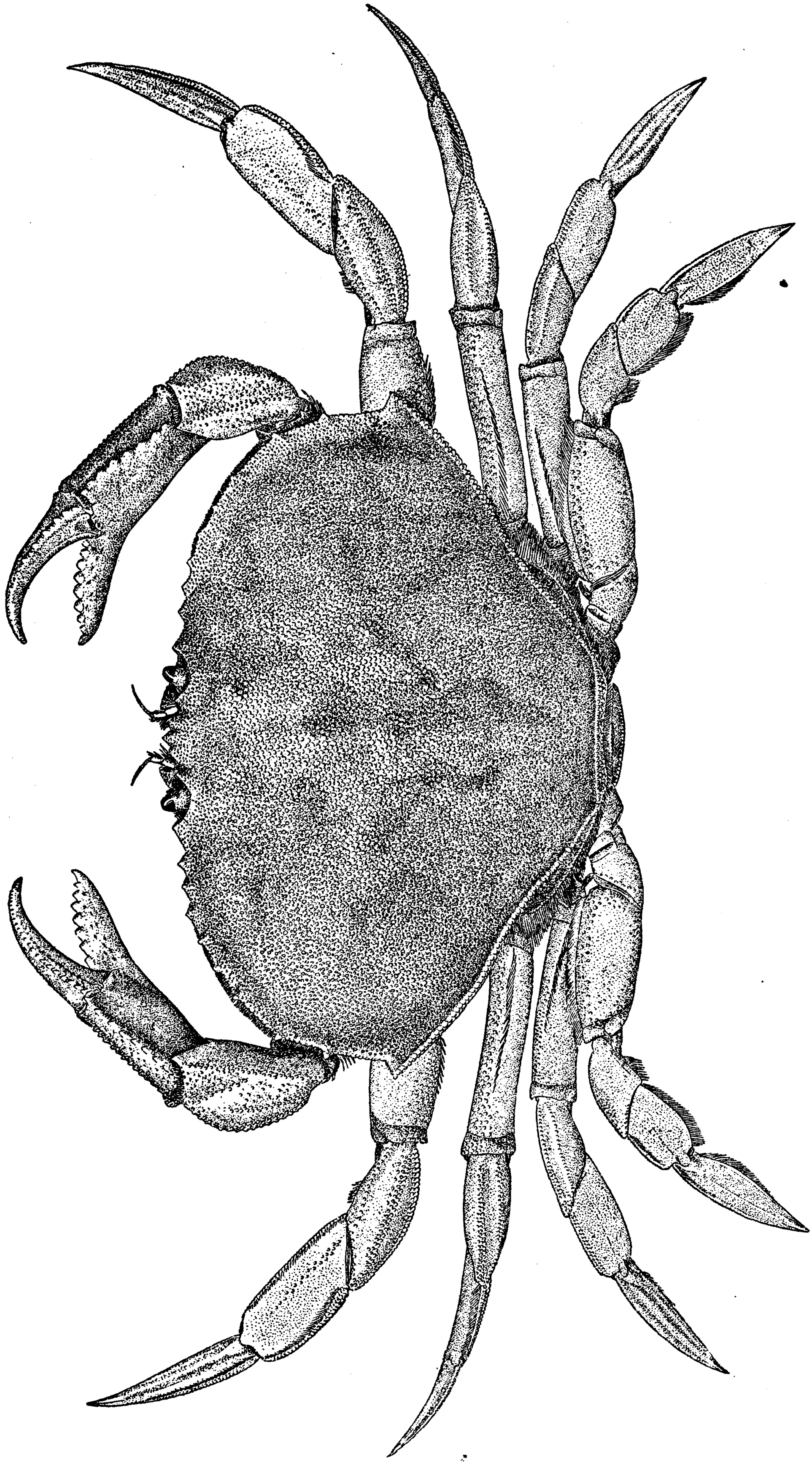

FIGURE 35,—CANCER MAGISTER, MALE (2553), CALIFORNIA, DORSAL VIEW, REDUCED. AFTER R. RATHBUN

Security Bay; low tide; Dr. W. H. Jones, U. S. Navy; 1 female (5794).

Yakutat Bay: Low water; 1874; W. H. Dall; 1 female (14664), in drag seine. August 28, 1897; *Albatross;* 1 specimen (21777).

Lituya Bay; 6–9 fathoms; 1874; W. H. Dall; 1 young (14667).

Sitka; Dr. Trowbridge; 1 male (17578).

Bay of Pillars; shore; August 30, 1900; *Albatross;* 1 female (33460).

Duncan Canal; *Albatross:* September 5, 1900; 1 male (26096). Shore; September 6, 1900; 1 male (33461).

Wrangell; Dr. W. H. Jones, U. S. Navy, U. S. S. *Wachusett:* Rocky beach, under stones; May 25, 1882; 2 young females (5131). Under stones; August 28, 1882; 2 males (6630). July, 1882; 2 males (5134).

Karta Bay, Prince of Wales Island; June 26, 1897; *Albatross;* 1 female (21776).

Kasaan Bay, Prince of Wales Island; Dr. T. H. Streets, U. S. N.; 3 females (14670).

Helm Bay; July 3, 1897; *Albatross;* 2 males, 1 female (21774).

Loring; June 16, 1904; Chamberlain and Aller, Bureau of Fisheries; 1 young female (50511).

Ward Cove, Revilla Gigedo Island; Dr. T. H. Streets, U. S. Navy; 1 female (14669).

Alaska; 1897; *Albatross;* 1 male; 3 females (32223).

BRITISH COLUMBIA.—Beaver Harbor; *Albatross;* 1 male, 1 female (15463).

FIGURE 36.—CANCER MAGISTER, MALE (15461), OUTER MAXILLIPED, ×2

Rock at Gordon Head, Victoria; May 1–3, 1905; J. E. Benedict; 1 specimen (52759).

WASHINGTON.—Puget Sound; J. D. Dana, U. S. Exploring Expedition; 1 female, paratype [28] (2370).

San Juan Island, Puget Sound; 20 meters; K. L. Hobbs; 3 young (62356).

Port Townsend; June 27, 1903; Bur. Fisheries; 3 young (50521).

Marrowstone Point, near Port Townsend; June 29, 1903; *Albatross;* 1 male, 1 female (31602).

Kilisut Harbor, near Port Townsend; July 1, 1903; *Albatross;* 2 young (31669).

Port Angeles; September 3, 1891; *Albatross;* 16 young (17095).

Neah Bay; in drag seine; May 18, 1897; *Albatross;* 8 specimens (21775).

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[28] Although Dana does not mention "Puget Sound," yet he had this specimen on hand when describing the species.

Off Grays Harbor; lat. 46° 47′ 00″ N., long. 124° 30′ 15″ W.; 50 fathoms; fne. gy. S.; temperature 45.9° F.; June 7, 1889; station 3047, *Albatross;* 1 female (15462).

Willapa Harbor; December 29, 1914; W. L. McAtee; 3 males (48774).

Shoalwater Bay; J. G. Cooper; 2 males (2027).

OREGON.—Off Tillamook Rock; *Albatross:* lat. 45° 56′ 00″ N., long. 124° 01′ 30″ W.; 29 fathoms; fne. gy. S.; temperature 50.1° F.; Oct. 18, 1888; station 2883; 1 young (17418). Lat. 45° 56′ 15″ N., long. 124° 01′ 30″ W.; 28 fathoms; br. M.; June 13, 1889; station 3060; 1 male (19480).

Off Yaquinna Head; lat. 44° 41′ 30″ N., long. 124° 01′ 15″W., 28 fathoms; fne. gy. S.; temperature 47.4° F.; *Albatross:* Station 3055; 1 female (19478). Station 3056; 1 female (19479).

CALIFORNIA.—Drakes Bay; March 23, 1890; *Albatross;* 1 male (15464).

Sacramento market; 1875; from E. G. Blackford; 2 large males (14470).

San Francisco market; R. E. C. Stearns; 1 specimen (5040).

San Francisco: Ferd. Bischoff, Western Union Telegraph Expedition; 1 male (12492). 1880; D. S. Jordan; 1 young (3123). April 3, 1883; R. E. C. Stearns; 6 specimens (5037). H. Hemphill; 1 large male (2216); 4 males, 1 female (2279).

San Francisco Bay: William Stimpson, North Pacific Exploring Expedition; 2 specimens, 1 figured (2553). W. H. Dall; 2 young (17241). For collections made by the *Albatross*, see table, page 227.

Santa Cruz; in seine; April 12, 1897; *Albatross;* 2 females (20133).

Monterey; in seine; April 15, 1897; *Albatross;* 1 female (20134).

California: T. Nuttall; 2 small (Phila. Acad.). Dr. LeConte; 2 small (Phila. Acad.).

WEST COAST OF NORTH AMERICA.—Exact locality unknown: 1 large male (25016). 1 large male (32235). 4 specimens, F. C. 3557 (46126).

CANCER OREGONENSIS (Dana)

Plate 96

Trichocera oregonensis Dana, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, 1852, p. 86 (type-locality, Puget Sound; type not extant); U. S. Expl. Exped., vol. 13, Crust., part 1, 1852, p. 299; atlas, 1855, pl. 18, fig. 5*a–g*.—Stimpson, Boston Journ. Nat. Hist., vol. 6, 1857, p. 464.

Platycarcinus recurvidens Bate, Proc. Zool. Soc. London, 1864, p. 663 (type-locality, Esquimalt Harbor, Vancouver Island; type not in Brit. Mus.).

Trichocarcinus oregonensis Miers, Proc. Zool. Soc. London, 1879, p. 34.—Holmes, Occas. Papers Calif. Acad. Sci., vol. 7, 1900, p. 54, and synonymy.—Lenz, Zool. Jahrb., Syst., vol. 14, 1901, p. 452.

Material examined of Cancer magister collected in San Francisco Bay by the Albatross

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
California	° ′ ″	° ′ ″			°F.						
Upper San Francisco Bay	Off Mare Island		6	M	64.86	July 31, 1912	H5168	*Albatross*	2	55304	
Do	do		9.5–10.5	M. Sh		Dec. 9, 1912	D5816	do	5 legs	55305	
Do	Off Pinole Point		5.5–4.75	S. M. Sh		Dec. 10, 1912	D 5818	do	5	55319	
Do	do		7–6	S. M. Sh		do	D 5819	do	6	55322	
Do	San Pablo Bay		5–1	gy. M. Sh		May 13, 1912	D5780A	do	3	55323	
Do	do		5–1	gy. M. Sh		do	D5780B	do	3	55325	
Do	do	122 25 45	12	bu. M		Mar. 5, 1890	3097	do	1♂ 2♀	15461	
Do	San Pablo Bay					Nov. 8, 1890		*Albatross* (C. H. Townsend)	1♀	20138	In Chinese shrimp net.
Do	do							do	1	23941	Do.
Middle San Francisco Bay	Off Point San Quentin		5–6	S. M. Sh		Dec. 17, 1912	D5822	*Albatross*	3	55312	
Do	do		10.5–12.75	S. M		Feb. 6, 1912	D5708	do	1	55299	
Do	Off Southampton Shoal.		7–9	S. Sh		Dec. 18, 1912	D5826	do	10	55318	
Do	do		8–7.25	M		Oct. 29, 1912	D5798	do	1	55297	
Do	do		8.5–12.5	S		Dec. 18, 1912	D5825	do	1	55310	
Do	Tiburon, Raccoon St		0–3	M		Apr. 29, 1913		do	1	55309	
Do	N. of Angel Island		13–19	St		Oct. 29, 1912	D5795	do	2	55311	
Do	do		19–13.5	S. Sh		do	D5796	do	3	55302	
Do	do		20.5–20	crs. gy. S. Sh. St. bk. M.		Mar. 18 1912	D5742	do	1	55300	
Do	E. of Angel Island		16.5–10.25	M. S. Sh		Jan. 20, 1913	D5858	do	1	55298	
Do	Angel Island					Nov. 7, 1890		*Albatross* (C. H. Townsend)	2♂	20135	
Do	Fort Baker Beach		0–3	S		Apr 18, 1913		*Albatross*	1	55313	
Do	do		0–3			May 13, 1913		do	6	55320	
Do	Alcatraz Lt., 51°, 1.83 m.		3–3	gy. S. R		May 8, 1912	D5779B	do	3 y	55324	
Do	Off Lime Pt		16.5–17	G. S. St		Oct. 29, 1912	D5801	do	13	55317	
Do	Piles N. of Key Route Pier.					Aug. 2, 1912		do	2	55303	
Golden Gate	W. of Fort Point		43–27	S. G. St		Nov. 4, 1912	D5808	do	13	55321	
Do	do		53–21.5	S. G. St		do	D5809	do	8	55315	
West of Golden Gate	Off San Francisco Lightship.		14.25–13	S	51.91	do	D5806	do	7	55307	
Do	do		28–30	S		July 8, 1912		do	25	55308	
Do	do		30	S		July 21, 1912		do	4	55301	
Do	do		8.5–9		53.36	Oct. 30, 1912	D5807	do	6	55314	
Lower San Francisco Bay	Off Ferry Building		10–10.25	Sh. M		do	D5802	do	5	55306	
Do	Off Hunters Point		7.5–6.75	sft. M		do	D5804	do	1	55316	
Do	Off Point San Mateo		1.5–1.75			May 28, 1912	D5784BD	do	2	55326	
Do	do		3			1896		do	1♂	20136	
Do	South Belmont oyster beds.					Oct. —, 1890		*Albatross* (C. H. Townsend)	1♂ 2♀	20137	In seine.

Trichocarcinus recurvidens WALKER, Trans. Liverpool Biol. Soc., vol. 12, 1898, p. 271, pl. 15, figs. 1–1*b*.[29]

Trichocarcinus walkeri HOLMES, Occas. Papers Calif. Acad. Sci., vol. 7, 1900, p. 53 (new name for *recurvidens* Walker).

Cancer oregonensis RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 581; Harriman Alaska Exped., vol. 10, 1904, p. 178, pl. 7, fig. 1.—SCHMITT, Univ. Calif. Publ. Zool., vol. 23, 1921, p. 234, pl. 36, figs. 3 and 4.

Diagnosis.—Antero-lateral and postero-lateral margins not meeting at a distinct angle. Carapace widest at seventh or eighth tooth. Merus of outer maxillipeds with antero-external angle produced.

Description.—Carapace elliptical, more or less evenly rounded at sides, antero-lateral and postero-lateral margins not meeting at a distinct angle, carapace widest at seventh or eighth tooth; 12 or 13 teeth; fronto-orbital width nearly one-half width of carapace. All teeth with granulated edges. Front between antennae truncate, advanced slightly beyond line of outer orbital angles and separated by a rounded sinus from inner orbital angles; median tooth very small. Middle tooth of orbit lobiform, reflexed. The first 10 lateral teeth of carapace similar, curved forward, spine-tipped except for the first 2; last 2 or 3 teeth small and blunt. Surface coarsely and densely granulate, and lumpy, the granulation coarser on the elevations. Carpus of chelipeds tuberculate above and with a short spine at inner angle and a tooth below it; hand thick and high, the short upper edge of palm with 2 rows of tubercles, outer surface with 5 finely granulate lines; dark color of fingers reaching nearly to their bases. Legs hairy.

Variations.—In the female the carapace is more uneven than in the male, the elevations higher and more pronounced. In many cases (form *a*, pl. 96, fig. 3) this is carried to an extreme and the sexes are very unlike; in the female the elevations are isolated, baccate and flattened, the intervening furrows quite smooth; the protogastric lobes are largest and highest, the narrow part of the mesogastric region is a short linear row of single berries, the hepatic region has a Y-shaped lobe, the arms of the Y extending to the lateral teeth; a fan-shaped pattern of 6 segments diverges from the posterior margin. In some individuals of this type the lateral teeth are shortened and their ends bluntly rounded (3076). The chelipeds are rougher in the female than in the male.

Form *b* (pl. 96, fig. 1) is represented by a male (17424) which is even further removed from typical *oregonensis*. The elevations of the carapace are small, hemispherical, the largest and most sharply defined on the summit of each protogastric region; the mesogastric boss is small. On the branchial region are three bosses, of which the 2 largest are placed longitudinally at the middle of the region and are

[29] Walker, p. 272, calls his specimen a male; I have found the same ornamentation only in the female, or form *a*.

Material examined of Cancer oregonensis

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Alaska:	° ′ ″	° ′ ″			° *F.*						
St. George Island, Pribilof Islands.			40			Feb. 19, 1914		G. D. Hanna, U. S. Bureau of Fisheries.	1 ovig. ♀	61085	Form *a*. From stomach of cod.
Constantine Harbor, Amchitka Island.			6–10	S. St		1873		W. H. Dall	1 ♀	14785	Form *a*.
Unalaska Island								do	1 ♂	14787	Typical.
Off Imagnee Pinnacle, Captains Bay, Unalaska.			8–20			1880		do	1 ♂	12539	Intermediate between typical and form *b*.
Iliuliuk Harbor, Captains Bay.			10	shingle		1871		do	1 ♀	14788	Typical.
Off S. entrance to Akutan Pass.	53 56 00	165 56 00	45	brk. Sh. P	43.5	July 28, 1888	2843	*Albatross*	5 ♂ 5 ♀	15582	Do.
Northwest of Unimak Island	54 49 30	165 02 00	43	bk. S. R	40.7	June 2, 1890	3262	do	4 ♂ 1 ♀	17426	1 ♂ is intermediate between typical and form *b*.
Unimak Pass	54 15 00	165 06 00	34	G. brk. Sh		May 22, 1890	3220	do	1 ♂ 3 ♀	17425	Typical.
Northeast of Amak Island	55 34 30	162 31 45	19	bk. S. Sh		June 27, 1890	3274	do	1 ♂	17424	Form *b*.
Belkofski Bay			15–25	Sh		1880		W. H. Dall	2 ♂ 6 ♀ 7 y	12529	♀ ♀ between typical and form *a*.
Coal Harbor, Unga Island, Shumagins.			3–9			1872		do	19 ♂ 17 ♀ 4 y	13112	♀ ♀ range from typical to form *a*.
New Harbor, Unga Island						do		Captain Hall for W. H. Dall.	2 ♂ 2 ♀	14777	♀ ♀ form *a*.
Popof Strait, Shumagins			6			do		W. H. Dall	15 ♂ 15 ♀ 5 y	13120	♀ ♀ range from typical to form *a*.
Sanborn Harbor, Nagai, Shumagins.			6–8	shelly S		do		do	1 ♀	13130	Typical.
Anchorage, Big Koniuji Island, Shumagins.			6–20	S. R		1874		do	1 ♀	14789	Form *a*.
Anchorage, Chirikof Island			9–14	S		do		do	1 ♂	13125	Typical.
Woody Id., Kodiak Island			(1)			Sept. 21, 1920		G. D. Hanna, Calif. Acad. Sci.	1 ♀	Returned	
Virgin Bay, Prince William Sound.						1899		W. R. Coe, Harriman Exped.	2 ♂	25852	Do.
Fox Island, Prince William Sound.						1899		T. Kincaid, Harriman Exped.	1 ♂ 1 ♀	23843	

[1] Low tide.

Material examined of Cancer oregonensis—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Alaska—Continued.	° ′ ″	° ′ ″			° *F.*						
Port Etches, Hinchinbrook Island, Prince William Sound.			(2)			1874		W. H. Dall	1♂	14782	Typical.
Do			12–18			do		do	1♂	14871	Do.
West side of Middleton Island.			10–12	G. St		do		do	2 sm. ♂ 1 ♀ 1 y.	14786	♀ covered with bryozoan.
Yakutat						June 19, 1899		W. E. Ritter, Harriman Exped.	1♂ 2♀	25837	Typical.
Lituya Bay			6–9			1874		W. H. Dall	2♂ 1♀ 1 y	14783	Between typical and form *b*.
Granite Cove, Port Althorp, Chichagof Island.						1880		S. Bailey for W. H. Dall.	2♂ 4♀	12522	♀ ♀ between typical and form *a*.
Sitka Harbor			15	G. M		1874		W. H. Dall	1♂	14784	Typical.
Horn Cliff, near Petersburg, Mitkof Island.								H. C. McMillin, U. S. Bureau of Fisheries.	3♂ 1♀	61734	♀ form *a*.
Wrangell						Mar. 10, 1914		E. P. Walker, U. S. Bureau of Fisheries.	1 y. ♀	48816	Soft shell.
Boca de Quadra	Center of Grouse Islet, Mink Bay, N. 20° W., 2.5 m.		48–57	sft. gn. M	44.6	July 6, 1903	4223	*Albatross*	1♂ 1♀	31597	Typical.
Cedar Id., Loring, Revillagigedo Island.						June 17, 1904		U. S. Bureau of Fisheries.	2♂	50478	Do.
Kasaan Bay, Prince of Wales Island.	Center of Round Island, S. 10° W., 0.4 m.		95–98	dk. gn. M. S. Sh. R.	48.9	July 11, 1903	4245	*Albatross*	1♀	31667	Do.
Chasina Bay, Prince of Wales Island.								Dr. T. H. Streets, U. S. Navy.	1♀	14790	Do.
Fort Tongass, Tongass Island.						July 4, 1882		Lieut. Comdr. H. E. Nichols, U. S. Navy.	1♀	5767	Do.
British Columbia:											
Fort Rupert, Vancouver Island.			(3)	R. seaweed, kelp.				Harlan I. Smith	1♀	22589	Do.
Queen Charlotte Sound	Center of Round Island, N. 22° W., 1.5 m.		25–30	vol. S. G. brk. Sh. sponge.	49.1	June 25, 1903	4203	*Albatross*	1 y	31662	Do.
Do	50 49 00	127 36 30	238	gy. S. P	44.7	Sept. 1, 1888	2862	do	1♂ 1♀	15579	Do.

Departure and Alert Bays								Feb. —, 1882		Dr. W. H. Jones, U. S. Navy.	1 ♀	13874	Do.
Comox								Sept. 22, 1893		*Albatross*	1 ♀	18299	Do.
Off Cape Beale	49	00	00	125	48	00	24	gy. S	52.3	Sept. 26, 1888	2881	do	5 ♂ 10 ♀ 1 y	15578	Small; tending toward form *a*.
Do	48	53	00	125	53	00	34	R	50.3	do	2879	do	1 ♂ 2 ♀	15580	Females form *a*.
Victoria										July 9, 1888		do	1 ♂ 1 ♀	17423	Typical.
Washington:							*Meters*								
Friday Harbor							100					K. L. Hobbs	1 ♂ 6 ♀	62355	Do.
Strait of Juan de Fuca													1 y	14791	Do.
Do										1880		D. S. Jordan, U. S. Fish Commission.	9 ♂ 4 ♀ 1 y	3076	Females form *a*.
Neah Bay										Apr. 27, 1914		*Albatross*	1 ♂ 1 ♀	48832	Typical.
Strait of Juan de Fuca	48	26	50	124	39	35	151	G	44	Aug. 28, 1891	3450	*Albatross*	1 ♀	17069	Form *a*.
Do	48	17	20	124	07	25	114	gy. S. G. R.	44.4	Sept. 2, 1891	3461	do	1 y	17070	Typical.
Do	48	18	30	123	22	00	56	gy. S. Sh. rky.	48.5	Sept. 4, 1891	3466	do	3	17072	
Do	48	21	00	123	14	00	48	rky	49.9	do	3465	do	17	17071	Do.
Do	48	13	30	123	11	20	97	gn. M. P	46	Aug. 27, 1891	3443	do	9 y	17068	
Do	48	15	00	123	00	00	67	crs. bk. S	45	Apr. 30, 1894	3597	do	1 ♀ 1 y	18966	Do.
Washington Sound	48	22	00	122	51	00	48	M. brk. Sh. S.	47.7	Sept. 6, 1888	2864	do	2 ♂ 9 ♀ (y.)	15577	
Puget Sound										1880		D. S. Jordan, U. S. Fish Commission.	1 ♀ and claw	4261	Form *a*.
Do	48	12	00	122	49	00	40	P	51.7	Sept. 6, 1888	2865	*Albatross*	4 ♂ 2 ♀	15581	Females approaching form *a*.
Do	48	11	30	122	48	00	37	rky	46	Apr. 30, 1894	3593	do	1 ♂ 1 y	18965	Between typical and form *b*.
Admiralty Inlet	Olele Point, Oak Bay, S. 61° W., 1.4 m.						39	gy. S. brk. Sh.	50.8	July 1, 1903	4222	do	8 y	31666	
Do	Olele Point, Oak Bay, S. 20° E., 0.8 m.						16–31	gn. M. S. brk. Sh.	50.8	do	4220	do	1 sm. ♂	31665	
Do	Bush Point Light, S. 28° E., 3.3 m.						79–101	rky	49	do	4216	do	1 ♀ 1 y	31664	Typical.
Do	Admiralty Head Light, N. 88° W., 1.4 m.						19–25	crs. gy. S. brk. Sh.	51	June 30, 1903	4212	do	1 y	31663	Do.
Do	Admiralty Head Light, N. 22° W., 3.5 m.						83–99	rky	50.5	June 29, 1903	4208	do	2 ♀	30542	1 female typical, 1 female form *a*.
Do	Admiralty Head Light, N. 38° W., 1.3 m.						26–15	R. Sh	50.8	do	4205	do	3 ♂ 1 ♀ 4 ♂ 4 ♀ 1 y	50477 31596	Typical. Females form *a*.
Kilisut Harbor, near Port Townsend.										July 1, 1903		do	2 ♂	31598	Typical.

[2] Low water.

[3] Between high and low tide lines.

Material examined of Cancer oregonensis—Continued.

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Latitude W.									
Washington—Continued.	° ′ ″	° ′ ″			°F.						
Port Ludlow								Sylvanus Bailey	1 ♀	5785	Typical.
Port Orchard						July —, 1889		O. B. Johnson	3 ♂ 12 ♀	14964	Males and females not very unlike.
Docton						May 10, 1906 May 11, 1906		*Albatross*	5 ♂ 11 ♀ (2 ovig.)	50479	Typical.
Off Grays Harbor	46 48 30	124 28 00	48	fne. gy. S	46.1	June 7, 1889	3046	do	2 y	18182	Do.
Oregon:											
Off Cape Kiwanda	Cape Kiwanda, N. 31° E., 12.2 m.		50	fne. gy. S		Sept. 3, 1914	H5732	do	1 y	49939	
Newport						1923		J. G. Malone	1 ♂ 1 ♀	57272	
Off Alseya River	44 28 00	124 25 30	46	C. R	46.6	Sept. 3, 1889	3088	*Albatross*	1 ♀	18618	Typical.
Off Heceta Head	Heceta Light, S.74° E., 29.2 m.		61	Sh. S. fne. G.		May 5, 1914	H5447	do	1 y	50466	Do.
California:											
Humboldt Bay						July 18, 1916		Scripps Institution.	1 y	Returned	
Farallone Islands	37 47 20	123 10 00	27	rky		Mar. 22, 1890	3159	*Albatross*	1 ♀	15583	Form *a*.
Santa Barbara						1880		D. S. Jordan, U. S. Fish Comsion.	1 ♂	3103	Typical.

partly confluent; the next in size is near the inner angle of the region; behind are 2 very small unequal elevations or tubercles. A well-marked 6-parted fan diverges from the posterior margin, the tips of the divisions tuberculiform. The antero-lateral area is a smooth concave basin (including the hepatic region). The lateral rim is strongly ascending, teeth anomalous, oblong, flat, widening from base to extremity, and therefore overlapping; only a slight vestige of a normal midrib is visible in a short ridge terminating in a small incurved spine or spinule; the margin from the first to the eighth tooth is finely and obscurely granulate, from the ninth tooth backward coarsely so. The edge of the inner tooth of the orbit is coarsely granulate, that of the middle tooth of the orbit and of the three teeth of the front have granules of intermediate size. Upper surface of chelipeds rough as in form *a*, outer surface of palms nearly smooth. Only males of this form or approaching this form have been observed.

The remarkable variation in form is paralleled in *C. amphioetus*.

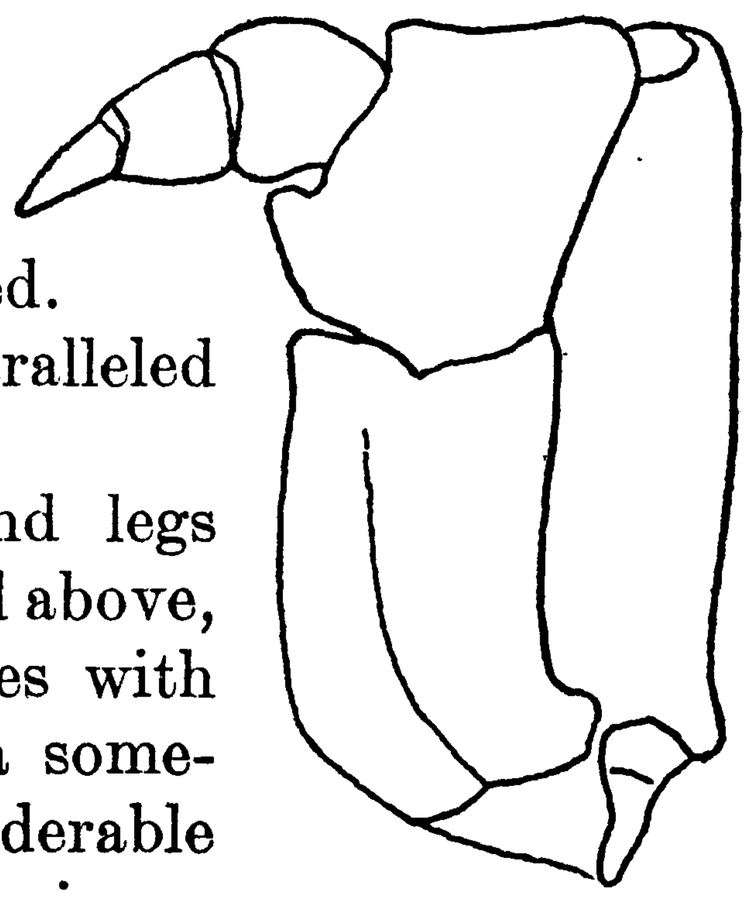

FIGURE 37.—CANCER OREGONENSIS, MALE (3076), OUTER MAXILLIPED, ×4

Color.—Areolae bright red, chelipeds and legs flesh color, fingers black (Walker). Dark red above, lighter beneath; walking legs in some cases with light spots which tend to give the legs a somewhat banded appearance. There is considerable variation in color; in some specimens a very irregular band of orange or yellow extends across the carapace anterior to the cardiac groove, with the whole carapace more gray and more or less spotted; in others the median line from the posterior end to beyond the cardiac groove shows very gray (Way).

Measurements.—Female (14964), length of carapace 36.5, width of same 47.1, fronto-orbital width 20.2, width of front between antennae 7, width between tips of inner orbital teeth 9.6 mm.

Range.—From Pribilof Islands and Rat Islands, Alaska, to Santa Barbara, California.

Material examined.—See table, pages 229–232.

Family XANTHIDAE

Canceridae, part (p. 85) +*Pilumnidae* (p. 86) LEACH, in Samouelle, The Entomologists' Useful Compendium, London, 1819.

Xanthidae ALCOCK, Journ. Asiat. Soc. Bengal, vol. 67, 1898, p. 69.

Carapace transversely oval or transversely hexagonal or subquadrate, rarely subcircular, and almost always broader than long. Front rather broad or very broad, never produced in the form of a rostrum. Antennules folded transversely or obliquely

transversely. Antennal flagella short, slender. Anterior margin of buccal cavity well defined, not overlapped by the outer maxillipeds. Legs ambulatory.

KEY TO THE AMERICAN GENERA OF THE FAMILY XANTHIDAE [30]

A¹. The ridges that define the efferent branchial channels, if present, are low and are confined to the posterior part of the endostome, never reaching to the anterior boundary of the buccal cavity.

B¹. Fronto-orbital border less than half the greatest width of carapace.

C¹. Antero-lateral border of carapace thin, cristiform; upper border at least of arms and of merus, carpus and propodus of legs sharp, cristiform.....**Platypodia**, p. 246.

C². Antero-lateral border of carapace and upper border of legs not cristiform.

D¹. Antero-lateral border entire up to a strong lateral epibranchial tooth. Carapace perfectly smooth without trace of regions. Chelipeds unequal, fingers pointed. Front three-lobed.
Carpilius, p. 239.

D². Antero-lateral border cut into teeth or lobes.

E¹. Anterior half of buccal frame nearly vertical. Fronto-orbital width about one-third width of carapace. Orbits largely dorsal in position. Male abdomen with segments 3–5 fused.....**Paraxanthus**, p. 286.

E². Buccal frame horizontal. Orbits forward looking.

F¹. Fronto-orbital border less than a third width of carapace. Regions indistinctly marked. Antero-lateral border obscurely lobed.....**Homalaspis**, p. 287.

F². Fronto-orbital border more than a third width of carapace.

G¹. Carapace narrow, lateral teeth about nine, front strongly produced. Male abdomen with segments 3–5 fused.....**Cycloxanthops**, p. 289.

G². Carapace wider, lateral teeth or lobes not more than five.

H¹. Carapace more or less octagonal, the first two antero-lateral teeth obsolete or nearly so, the last three laterally prominent.

J¹. Fronto-orbital distance nearly half width of carapace. Orbits long.
Lophopanopeus, p. 319.

J². Fronto-orbital distance less than two-fifths of width of carapace. Orbits subcircular. Front four-toothed.
Gaudichaudia, p. 278.

H². Carapace with antero-lateral margins forming a regular arch.

J¹. Carapace usually conspicuously lobulate, granulate, or eroded.

K¹. Carapace lobulate or granulate, chelipeds and legs also granulate, often hairy. Small species.
Actaea, p. 250.

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[30] Subfamilies are omitted as no satisfactory arrangement to include all genera has yet been made.

K². Carapace and legs deeply eroded.
Glyptoxanthus, p. 263.

J². Surface nearly smooth.

K¹. Front deeply separated from inner angles of orbit. Antero-lateral teeth and lobes more or less denticulate. Front quadridentate.
Platyxanthus, p. 279.

K². Front not deeply separated from inner angles of orbit. Antero-lateral teeth or lobes not denticulate. Outer angle of orbit not dentiform.

L¹. Superior inner tooth of orbit obsolete. Carapace convex in both directions, thick, broad oval, front not produced beyond general outline.
Carpilodes, p. 241.

L². Superior inner tooth of orbit distinct though small. Antero-lateral rim lobate or dentate and continued behind widest part of carapace, its chord longer than postero-lateral distance_____**Xanthodius**, p. 311.

B². Fronto-orbital border half or more than half the greatest width of carapace.

C¹. Antero-lateral margin continued forward and downward to anterior angle of buccal cavity instead of to orbit.

D¹. Attachment of movable part of antenna to basis concealed. *Front forming a projecting hood over antennules.* Surface covered with a reticulating pattern of granules.
Lipaesthesius, p. 270.

D². Attachment of movable part of antenna normal.

E¹. Superior inner orbital tooth separated from the front by a notch_____**Medaeus**, p. 273.

E². Superior inner orbital tooth absent_____**Carpoporus**, p. 269.

C². Antero-lateral margin continued to orbit.

D¹. Dorsal surface of carapace and exposed surface of chelipeds and legs covered with smooth, rounded, convex lobules_**Daira**, p. 268.

D². Dorsal surface not covered with smooth rounded convex lobules.

E¹. Carapace rough and hairy except on margin of front and orbits. A lunate crest above carpus of ambulatory legs. Antero-lateral margin spinous_____**Heteractaea**, p. 530.

E². Carapace smooth (non-granulate) and bare or nearly so.

F¹. Carapace transversely oval.

G¹. Antero-lateral teeth strong.

H¹. Five strong antero-lateral teeth including the orbital. Regions well delimited. Fingers often spooned_____**Leptodius**, p. 296.

H². Two antero-lateral teeth behind orbital angle. Regions not at all delimited. Antenna excluded from orbit__**Ectaesthesius**, p. 460.

G². Antero-lateral teeth not strong.
H¹. Superior inner orbital tooth not separated by an emargination from the outer angle of the front.
J¹. Surface of body and appendages covered with a short close pile (in the American species). Legs of moderate length. Antero-lateral divisions obscure. Front arcuate_____**Xanthias**, p. 464.
J². Five low antero-lateral teeth. Teeth and lower surface of chelipeds granulate. Front bilobed_____**Eucratodes**, p. 470.
H². Superior inner orbital tooth separated by an emargination from the outer angle of the front.
J¹. Regions well marked. Antero-lateral teeth projecting well outward even though small_**Paraxanthias** (part), p. 465.
J². Carapace more even, regions not well indicated.
K¹. Carapace depressed. Antero-lateral margin thin, teeth little projecting, second tooth fused with first.
Eurypanopeus, p. 403.
K². Carapace convex, smooth. Antero-lateral margin faintly lobed or toothed. Palms elongate, major palm at least twice as wide as minor; fingers short__**Paraliomera**, p. 243.
F². Carapace more or less hexagonal or subquadrate.
G¹. Margin of hepatic region thick, non-dentate. Carapace flat. Chelipeds heavy, unequal.
Lophoxanthus, p. 316.
G². Margin of hepatic region not thick nor dentate.
H¹. Frontal and antero-lateral regions rough with numerous tubercles, spinules or sharp granules. Ambulatory legs spinulous above.
J¹. Antero-lateral regions coarsely tuberculate.
K¹. Basal antennal article broad, prolonged into the orbital hiatus. Front prominent, four-toothed. Fingers spooned_____**Phymodius**, p. 294.
K². Basal antennal article narrow, not prolonged into the orbital hatius. Chelipeds coarsely tuberculate. Fingers pointed.
Paraxanthias (part), p. 465.

J². Antero-lateral regions, chelipeds and legs spinulous or sharply granulous. Size small. Antero-lateral margin shorter than postero-lateral, with either second or fifth tooth or both reduced or wanting. Basal antennal article not reaching or barely reaching the prolongation from the front_____**Micropanope**, p. 426.

H². Frontal and antero-lateral regions relatively smooth, never spinulous or sharply granulous.

J¹. Length and breadth of carapace subequal. Size small. Front broad, truncate.
Metopocarcinus, p. 318.

J². Breadth exceeding length of carapace. Third to fifth segments of male abdomen fused.

K¹. Only four antero-lateral teeth including orbital angle. Carapace very convex from front to back. Front truncate. Chelae elongate.
Tetraxanthus, p. 458.

K². Five antero-lateral teeth.

L¹. Antero-lateral teeth small, thick, widely separated. A few smooth transverse ridges on antero-lateral and epigastric regions. Legs thickly hairy.
Chlorodiella, p. 462.

L². Antero-lateral teeth broad, flat, the first and second more or less fused.

M¹. Third segment of male abdomen not reaching coxae of legs of last pair. Carapace subquadrate, broad behind, front truncate.
Rhithropanopeus, p. 455.

M². Third segment of male abdomen reaching coxae of legs of last pair. Carapace narrower behind.

N¹. Carapace crossed by broken, transverse, raised, granulated lines on anterior half. Front nearly transverse, not advanced. First and second antero-lateral teeth partially fused.
Panopeus, p. 333.

N². Carapace narrow, not crossed by transverse raised lines.

O¹. Front arcuate, forming a regular curve with antero-lateral margins. Second antero-lateral tooth lobiform, separated from the first by a shallow sinus. Male abdomen constricted between fifth and sixth segments; terminal segment subtriangular.
Neopanope, p. 366.

O². Hexagonal. Front narrow, prominent beyond curve of antero-lateral margins. Postero-lateral margins strongly converging. Antero-lateral teeth prominent. Supra-orbital lobe well marked.
Hexapanopeus, p. 383.

A². The ridges that define the efferent branchial channels extend to the anterior boundary of the buccal cavity and are often very strong.

B¹. Eyestalks subcylindrical, circular in cross-section.

C¹. Fronto-orbital border half or less than half the greatest width of carapace.

D¹. Basal antennal article does not nearly reach front.

E¹. Carapace broad, suboval. Surface of carapace and chelipeds smooth ..... **Menippe**, p. 472.

E². Carapace not much broader than long, subcircular. Chelipeds very rough ..... **Pilumnoides**, p. 534.

D². Basal antennal article touching front.

E¹. Anterior margin of merus of outer maxillipeds notched at orifice of efferent branchial channel. Orbits suborbicular ..... **Ozius**, p. 539.

E². Anterior margin of merus of outer maxilliped not notched at orifice of efferent branchial channel. Orbits oblong.
Eurytium, p. 422.

C². Fronto-orbital border much more than half the greatest width of carapace.

D¹. Fronto-orbital border about two-thirds the greatest width of carapace. Antero-lateral borders shorter than postero-lateral. Front with a narrow outer tooth, spine or lobe, separated by a notch from the superior inner angle of orbit.

E¹. More or less hairy and generally armed with spines or sharp granules ..... **Pilumnus**, p. 481.

E². More massive than the preceding, carapace deeply lobulate anteriorly, antero-lateral margin with three large teeth behind the orbit----------**Lobopilumnus**. p. 525.

D². Fronto-orbital border much more than two-thirds the greatest width of carapace.

E¹. Antennae not excluded from orbit. Chelipeds long, merus reaching far beyond carapace. Carapace resembling a Portunid----------**Melybia**, p. 561.

E². Antennae excluded from orbit.

F¹. Carapace rough above.

G¹. Merus of outer maxillipeds as long as or nearly as long as broad.

H¹. Width of front between antennae more than one-fourth width of carapace. Regions distinct. Fingers pointed-----**Eriphia**, p. 545.

H². Width of front between antennae less than one-fourth width of carapace. Antennae remote from orbit. Regions indistinct. Fingers of minor chela spooned-**Eriphides**, p. 552.

G². Merus of outer maxillipeds twice as broad as long. Carapace and chelipeds armed with black spines. **Domecia**, p. 553.

F². Carapace smooth above.

G¹. Chelipeds with short arms, projecting but little outside the carapace. Front lobed or dentate. **Trapezia**, p. 556.

G². Chelipeds with long arms, projecting far outside the carapace. Front acutely spinate. **Quadrella**, p. 560.

B². Eyestalks long and flat; when in orbits their acute anterior edge is continuous with margin of carapace. Merus of outer maxilliped transversely oblong, inner margin arcuate, without indentation. Carapace, chelipeds and legs fringed with long hair----------**Acidops**, p. 533.

Genus CARPILIUS Leach

Carpilius Leach, in Desmarest, Dict. Sci. Nat., vol. 28, 1823, p. 228; type, *C. maculatus* = *Cancer maculatus* Linnaeus, 1758.

Carapace broad, very convex in both directions, smooth (except for some coarse pitting inside frontal and antero-lateral borders), with no indication of regions; antero-lateral borders strongly arched, thick, entire, smoothly molded; postero-lateral borders strongly convergent, straight, with a prominent tubercle at angle of junction with antero-lateral. Front moderately broad (less than a third the greatest width of carapace), deflexed, three-lobed, the middle lobe prominent, the edges of all thickened. Orbital margins entire, the upper margin thickened and forming a well-marked blunt tooth at its junction with the antero-lateral margin. Eyes on short, thick stalks. Antennules folding obliquely; inter-antennular septum broad. Basal article of antenna long, flat, running up into an oblique cleft between margin of front and infra-orbital plate; flagellum very small, less than half diameter of orbit and lodged in said cleft. Merus of

external maxillipeds with anterior border very oblique. Chelipeds massive, smooth, unequal in both sexes; fingers bluntly pointed, those of larger cheliped with one or two molariform teeth, those of smaller cheliped with a blunt cutting edge. Legs smooth. Abdomen of male six-segmented, third and fourth somites fused with obliteration of sutures, fifth somite also immovably adherent to fourth.

Contains three large species, one inhabiting the Atlantic coast of middle America, the others widely distributed through the Indo-Pacific region.

CARPILIUS CORALLINUS (Herbst)

CORAL CRAB; QUEEN CRAB

Plates 97–99

Cancer corallinus HERBST, Natur. Krabben u. Krebse, vol. 1, 1783, p. 133, pl. 5, fig. 40; not synonymy except Plumier (type-locality, not given; type not found in Berlin Museum, 1896).

Carpilius corallinus LEACH in Desmarest, Consid. sur les Crust., 1825, p. 104; not Gundlach, An. Acad. Cien. Habana, vol. 36, 1899, p. 367, text-fig., which is a *Menippe*.

Description.—Front almost vertically deflexed, median lobe entire in large specimens, bilobate in small ones, and separated on either side from the forward pointing lateral lobes by a deep U-shaped sinus no larger than the lateral lobe. Movable finger of larger cheliped with two prehensile teeth; immovable finger with a single larger tooth. Legs compressed.

Color.—Ground pale red with scarlet spots among which are meandering designs in white and yellowish (Herbst). Carapace brick-red, somewhat wine-colored or coral-red, covered with yellow spots; legs veined with brown; claws spotted; fingers and nails brown (A. Milne Edwards).

Measurements.—Male (Bahamas), length of carapace 108.2, width 143.8, fronto-orbital width 53, width of front 37.2 mm. Male (von Martens), length 128, width 154 mm. This species is the largest of the West Indian crabs, and is often used for food.

Range.—Bahamas to State of Pernambuco, Brazil.

Material examined.—Spanish Wells, Bahamas; 1893; Biological Expedition, State University of Iowa; 1 large male (S.U.I.).

Santa Lucia, Cuba; May, 1914; Paul Bartsch and John B. Henderson, *Tomas Barrera* Expedition; 1 specimen (47918).

Jamaica: J. E. Duerden; specimen in Mus. Inst. Jamaica. C. R. Orcutt; 1928: Harboreale, 1 carapace (61341); without locality, 1 carapace (61343).

Porto Rico: George Latimer; 1 female (3575). Collector unknown; 2 specimens (2154).

St. Thomas, Virgin Islands; 1915; Clarence R. Shoemaker; received from Carnegie Institution: July 1; St. Thomas Harbor; 1 male (54046). July 19; Buck Island, off St. Thomas; 2 females (54045).

Simsons Bay lagoon, St. Martin, Virgin Islands; 1 fathom; sandy; September 21, 1905; J. Boeke; 1 adult male (Leiden Mus.).

La Sita, Guadeloupe; from Museum of L. Guesde; 1 female (4094).

Roseau, Dominica; 25 fathoms; A. Hyatt Verrill; 1 female (32509).

Slagtbaai, Bonaire, Curaçao Islands; 1 fathom; stony; August 2, 1905; J. Boeke; 1 very large female (Leiden Mus.).

Curaçao: Among coral reefs; June 26, 1905; J. Boeke; 1 adult female (42949).

Caracas Bay, Curaçao; 1920; C. J. van der Horst: In net; April 26; 1 male, 1 female (Amsterdam Mus.). April 27; 1 male (Amsterdam Mus.). April 24; 1 male (57006)

Old Providence Island, Caribbean Sea; 1884; *Albatross;* 1 male (7342).

Goyanna stone reef, Pernambuco, Brazil; June 18, 1899; Arthur W. Greeley, Branner-Agassiz Expedition; 1 male (25717).

Pernambuco, Brazil; 1876–1877; R. Rathbun, Hartt Explorations; 1 male, 1 female (40576).

Locality unknown; 1 specimen (14590).

Genus CARPILODES Dana

Carpilodes Dana, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 126; monotypic type, *C. tristis* Dana=specific name not given till 1852.—Odhner, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 8.

Liomera Dana (part), Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 124; type, *L. cinctimana=Carpilius cinctimanus* White.

Carpiloxanthus A. Milne Edwards, Faune Carcin. de l'ile de la Réunion, 1862, p. 3; type, *C. vaillantianus* A. Milne Edwards, 1862=*Carpilodes bellus* (Dana), 1852.

Carapace very broad, convex in both directions, regions usually well demarcated and, especially in anterior half, more or less subdivided into lobular areolae; antero-lateral borders usually cut into four broad, shallow, rounded lobes; postero-lateral borders straight, or a little concave, and strongly convergent. Front from a third to nearly a fifth of greatest breadth of carapace, obliquely deflexed, grooved and slightly notched in middle line. Orbits small, margins entire, but usually with the three suture lines near outer angle more or less distinct; eyestalks short and thick. Antennules folding obliquely, almost transversely. Basal antennal article running up between front and lower orbital plate. Chelipeds equal or subequal in both sexes; fingers more or less pointed, but usually grooved or hollowed near tips. Abdomen of male with third to fifth somites fused.

Contains numerous species distributed throughout the Indo-Pacific region, only one of which has been reported from America.

CARPILODES CINCTIMANUS (White)

Plate 100

Carpilius cinctimanus WHITE, in Jukes, Narrative Voy. H. M. S. *Fly*, vol. 2, Append. No. 8, 1847, p. 336, pl. 2, fig. 3 (type-localities, Indian Ocean and Eastern Seas; types not in Brit. Mus.); List Crust. Brit. Mus. 1847, p. 14, no description, Philippine Islands and Mauritius (specimens in Brit. Mus.).[31]

Liomera cinctimana DANA, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 124.—STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 103.

Liomera lata DANA, Proc. Acad. Nat. Sci. Philadelphia, 1852, p. 73 (type-locality, Feejee Islands, type not extant).—STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 104.

Carpilodes cinctimanus MIERS, Ann. Mag. Nat. Hist., ser. 5, vol. 5, 1880, p. 234.—ODHNER, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 14.

Liomera cocosana BOONE, Zoologica, vol. 8, 1927, p. 184, text-fig. 63 (type-locality, Cocos Island; type in Mus. New York Zool. Soc.).

Diagnosis.—Carapace nearly twice as long as broad, barrel form, without granulation; 2 M incompletely divided. (See diagram, p.6.)

Description.—Carapace extremely broad; two lobules on 2 M anteriorly and on 2+3 L, which are united; mesogastric region faintly delimited. Surface otherwise smooth and closely punctate. Antero-lateral border divided into three coarse lobes separated by deepish grooves; lobe next the orbit not projecting. Anterior margin of merus of outer maxilliped oblique.

Color.—Light red, sometimes white near the sides in the male; pterygostomian regions white; fingers of chelae black with white tips, the black color extending in adult male part way along the lower side of the palm, thence upward forming a broad black band around middle of palm, whence the specific name; base of ambulatory dactyli red, middle portion white, nail black.

Measurements.—Male (17795), length of carapace 15.4, width 28.2, width of front 6.1 mm.

Range.—From Gulf of Aden eastward to Australia, Japan and the islands of the Pacific Ocean. From Cape St. Lucas, Lower California, Mexico (Stimpson) to the Galapagos Islands (Boone).

Material examined.—Western Indian Ocean; 1905; H. M. S. *Sealark*, J. Stanley Gardiner: Salomon; 1 male, 2 females (Cambridge Mus.). Coetivy; 2 males, 3 females (41169).

Mauritius; purchased of Henry A. Ward; 3 females (17795).

Atami Province, Japan; F. Sakamoto; received from Garrett Droppers; 1 female (18858).

Mexico; from Secretaria de Agricultura y Fomento, through A. L. Herrera: Teacapan, Sinaloa, August, 1926; 1 female (60723). Maria Madre Island; March–May, 1927; 1 immature female (60722).

Mexico: Maria Madre Island; E. part of bay; 5–8 meters; May 17, 1925; F. Contreras; California Acad. Sci.; 1 female, returned; 1 young (62697).

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[31] Verified by Dr. Isabella Gordon.

PARALIOMERA, new genus

Type.—Liomera longimana A. Milne Edwards.

Carapace broad-oval, nearly smooth; antero-lateral margin obscurely lobed or toothed; front about a third as wide as carapace, having a small outer lobe which is separated by a notch from the inner upper angle of the orbit. Basal antennal article touching the downward prolongation of the front. Chelipeds very unequal, smooth; fingers short. Abdomen of male with third, fourth and fifth segments fused.

Contains only two species.

KEY TO THE SPECIES OF THE GENUS PARALIOMERA

A¹. Gastric region plainly but not deeply delimited. Transverse fringe of hair on front. Major palm thrice as wide as the long slender minor palm. ----------longimana, p. 243.

A². Carapace almost smooth, shining, very small. Major palm twice as wide as minor palm----------dispar, p. 244.

PARALIOMERA LONGIMANA (A. Milne Edwards), new combination

Plate 101, Figures 1–3

Liomera longimana A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 1, 1865, p. 221, pl. 12, figs. 7–7*b*; figs. 7 and 7*a* are incorrect, hands represented of equal size (type-locality, Guadeloupe; type in Paris Mus.); Crust. Rég. Mex., 1879, p. 240, pl. 46, figs. 1–1*c*.—Rathbun, Bull. U. S. Fish Comm. for 1900, vol. 20, part 2 (1901), p. 25.

Cancer nigerrimus Desbonne, in Desbonne and Schramm, Crust. Guadeloupe, 1867, p. 25 (type-locality, Guadeloupe; type perhaps not extant).

Diagnosis.—Gastric region plainly delimited; transverse fringe of hair on front; antero-lateral margins with four shallow lobes. Chelipeds strikingly unequal, minor hand about a third as wide as major.

Description.—Carapace about three-fifths as long as broad, thick, very convex, regions very faintly marked; antero-lateral margin showing four shallow lobes or teeth, the last two most distinct and angular. Front a little less than a third the breadth of carapace, distinctly bilobed, and with a separate tooth at outer end below orbital angle; a transverse fringe of hair behind the lobes. Antennal flagellum longer than greatest diameter of orbit. Chelipeds extremely unequal in both sexes, smooth, conspicuously punctate; arm projecting beyond carapace; larger cheliped heavy, hands with subparallel margins; the smaller hand very slender, about one-third the width of larger. Fingers moderately gaping. Larger wrist nearly as broad as long, inner angle blunt; smaller wrist much longer than broad, without an inner angle. Legs compressed, almost smooth, hairy.

Color.—Solid black on anterior and lateral portions of dorsal surface of carapace; toward the center, clove black with slightly greenish dots; but on a large, roughly oblong, posterior area, slate black, with slate black dots with mouse gray suffusions around them. Under parts slate gray; pterygostomian region, maxillipeds, and epistome

slate black. Chelipeds shiny black, smaller one with spots of the faintest straw yellow, larger one with cinerous spots. Extreme tips of fingers white, with a bit of brown before the black. Legs cream buff with Prouts brown spots. (Schmitt.)

Measurements.—(18679) length 8.2, width 13.7 mm.

Range.—Florida Keys; West Indies; Vera Cruz, Mexico (Ives); Curaçao.

Material examined.—Key West, Florida: H. E. Webster; received from Boston Society of Natural History; 2 males (56766). Union College collection; 1 female (42675), 2 males, 1 female (42676).

Tortugas, Florida; June 5 to 8, 1893; Biological Expedition, State University of Iowa; 2 males, 1 female (18679).

Tortugas, Florida; gift of Carnegie Institution: Fort Jefferson, Garden Key; shallow water; July 19, 1926; station 4; C. R. Shoemaker; 1 male (60924). West side Bush Key reef near Long Key; 4 feet; from holes in rocks; July 30, 1924; W. L. Schmitt; 1 male, 1 female (60810). Washed from weeds and rocks off mid-section of Bush Key reef inside, 3 feet before eel grass; August 1, 1924; W. L. Schmitt; 1 male, 2 females (60923).

Playa de Ponce, Porto Rico; February 1, 1899; *Fish Hawk;* 2 males, 2 females (24255).

St. Thomas, Virgin Islands: 1860; Krebs collector; Zoological Museum, Copenhagen; 2 males, 2 females (19698). 1915; Clarence R. Shoemaker; gift of Carnegie Institution: French Bay; ½ to 2½ fathoms; July 5; station 6; 1 male (60925). Drift Bay; July 15; station 11; 1 male, 1 female (53764).

Barbados; 1918; Barbados-Antigua Expedition, State University of Iowa: Needham Point; May 18; 3 males, 1 female (S.U.I.). One mile south of station 19, off Needham Point; 84 fathoms; rocky; station 20; 4 males, 2 females (S.U.I.). Okra Reef; May 13; 35 males, 44 females (35 ovigerous), 8 young (S.U.I.). May 15; 10 males, 9 ovigerous females (58009). On old coral; May 31; 8 males, 15 females (S.U.I.). On old coral heads; June 4; 12 males, 11 females (1 ovigerous) (S.U.I.).

Caracas Bay, Curaçao; April 19, 1920; C. J. van der Horst; 1 male (Amsterdam Mus.).

PARALIOMERA DISPAR (Stimpson), new combination

Plate 101, Figures 4–5

Chlorodius dispar STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 140 (type-locality, Cruz del Padre, Cuba; type in Museum of Comparative Zoölogy).
Leptodius dispar A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 27.
Liomera dispar RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 13; Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 25.

Diagnosis.—Carapace almost smooth, shining; antero-lateral margins almost entire. Chelipeds very unequal, minor hand half width of major.

Description.—Carapace about three-fourths as long as broad, thick, convex, covered with a short pubescence easily rubbed off; regions not defined; an anterior median furrow, also a furrow separating the front from orbital angle; antero-lateral margins almost entire, three lobes faintly discernible. Front about one-third width of carapace, bimarginate, margin convex, median notch small, external angle not projecting. Eyes very short and stout. Antennal flagellum shorter than greatest diameter of orbit. Chelipeds less unequal than in *P. longimana*, the smaller hand not so slender, about half the width of larger. Smaller wrist similar in shape to larger and with an inner tooth. The black color of thumb runs back a little on the hand, forming a convex outline. Otherwise resembling *P. longimana*.

Color.—Carapace dark brown, chelipeds dark reddish, fingers black greater hand with one or two white spots on outer side between bases of fingers. (Stimpson.)

Measurements.—Male (24862), length of carapace 5.2, width 8 mm. Female (58008), length of carapace 4.3, width 6.3 mm.

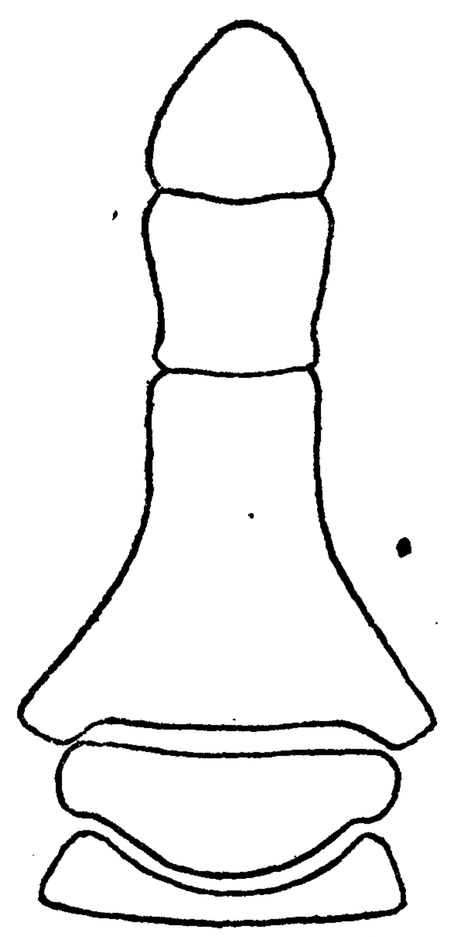

FIGURE 38.—PARALIOMERA DISPAR, MALE (24862), ABDOMEN, × 12

Range.—Florida Keys and West Indies to north coast of South America; Bermudas.

Material examined.—Key West, Florida; H. E. Webster; received from Boston Society of Natural History; 1 ovigerous female (56828).

Off Southeast lighthouse dock, Loggerhead Key, Tortugas, Florida; June 14, 1925; Valentine and Chester; 1 female (62550); gift of Carnegie Institution.

Cabañas, Cuba; sand, shell, grass to mud bottom; June 8–9, 1914; station 16; Henderson and Bartsch, *Tomas Barrera* Expedition; 1 ovigerous female (48925), poisoned with copper sulphate on reef.

Jamaica; P. W. Jarvis; 1 ovigerous female (20507).

Haiti; near the Caimites; April, 1865; P. R. Uhler; 1 female (2380, M.C.Z.).

On lighthouse reef, Arroyo, Porto Rico; February 3, 1899; *Fish Hawk;* 1 male, 1 young female (24254).

Pillars of Hercules, Antigua; 1918; Barbados-Antigua Expedition, State University of Iowa; 1 female (S.U.I.).

Barbados: 1918; Barbados-Antigua Expedition, State University of Iowa: One mile south of station 19, off Needham Point; 84 fathoms; rocky; station 20; 2 males, 4 females (2 ovigerous) (S.U.I.). Okra Reef; May 13; 3 males, 14 females (7 ovigerous) (58008). May 15; 6 males, 21 females (8 ovigerous) (S.U.I.). On old coral; May 31; 3 males, 13 females, 2 young (S.U.I.). On old coral heads; June 4; 4 males, 4 females (S.U.I.).

Caracas Bay, Curaçao; 1920; C. J. van der Horst: In coral; April 7; 1 male, 1 female (56884), 2 males, 1 female (Amsterdam Mus.); 1 male and 1 female have both branchial regions swollen by isopod parasites. May 1; 1 male, parasitized on both sides (Amsterdam Mus.).

Cartagena, Colombia; College of San Pedro Apostal; 1 female (53410).

Bermudas; J. Matthew Jones; received from A. E. Verrill; 1 male (24862).

Genus PLATYPODIA Bell

Platypodia Bell, Trans. Zool. Soc. London, vol. 1, 1835, p. 336; type, *P. granulosa* (Rüppell) = *Xantho granulosus* Rüppell, 1830, = *Cancer limbatus* Milne Edwards, 1834.—Rathbun, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 158.

Lophactaea A. Milne Edwards, Ann. Sci. Nat., ser. 4, vol. 18, 1862, p. 43; type, *L. granulosa* (Rüppell) = *Xantho granulosus* Rüppell.

Carapace moderately broad, convex in both directions; regions generally well delimited and subdivided into lobes; surface generally (not always) granular; antero-lateral borders with an independent crest-like edge, generally thin and sharp and distantly fissured; postero-lateral borders rather concave. Front a little deflexed, about a fourth the greatest breadth of carapace, grooved and emarginate in middle line. Orbits large, three suture lines near outer angle distinct. Eyes on short thick stalks. Antennules folding obliquely transversely; inter-antennular septum broad. Basal article of antennae short, touching front only; flagellum lodged in orbital hiatus. Merus of external maxillipeds with front edge a little oblique. Chelipeds equal in both sexes; fingers pointed, not hollowed at tip. Long joints of legs with sharp crest-like upper borders. Abdomen of male five-jointed, third to fifth somites being fused.

Inhabits the Indo-Pacific region besides both coasts of middle America and the Bermudas.

KEY TO THE AMERICAN SPECIES OF THE GENUS PLATYPODIA

A¹. Carapace not coarsely granulate near the margins. Lobules almost smooth and naked. Mesogastric region narrow, tapering to a slender point. **spectabilis, p. 247.**

A². Carapace coarsely granulate near the margins. Mesogastric region somewhat constricted at middle of its length; extremity not acuminate.

B¹. Lobules irregular in shape, not surrounded by a furry coat. Protogastric lobules two, a large outer, a small inner one_____**rotundata, p. 248.**

B². Lobules mostly round, finely and crisply granulate, standing out from a background of hair. Only one protogastric lobule on each side. **gemmata, p. 249.**

ANALOGOUS SPECIES OF PLATYPODIA ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
spectabilis	*rotundata*

PLATYPODIA SPECTABILIS (Herbst)

Plate 102, Figure 4

Cancer spectabilis HERBST, Natur. Krabben u. Krebse, vol. 2, 1794, p. 153, pl. 37, fig. 5 (type-locality unknown; type in Berlin Museum, examined by the writer, 1896).

Cancer lobata MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 375 (type-locality, Antilles; type in Paris Museum).

Lophactaea lobata A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat. Paris, vol. 1, 1866, p. 249, pl. 16, figs. 3, 3*a*.

Platypodia spectabilis RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 13.

Diagnosis.—Lobules of carapace appearing almost smooth. Mesogastric region narrowing regularly to a point in front. Antero-lateral rim of good width. Palm elongate.

Description.—Surface lobulated, granulate. Antero-lateral crest extending very far back and continued by a small transverse crest on carapace in line with cardiac region; marginal crest cut by three narrow fissures; postero-lateral borders concave. Front deflexed, presenting two oblique truncate lobes in dorsal view; in front view these lobes are concave. Hands short, compressed, surmounted by a sharp, entire crest; outer surface covered with granules, irregularly placed on upper portion, but forming three or four longitudinal lines on lower part. Fingers pointed, channeled, their prehensile borders denticulate, also a broad lobe at base of immovable finger. Ambulatory legs short, compressed; nails very sharp. Suture lines faintly visible between the third, fourth, and fifth abdominal segments in the male.

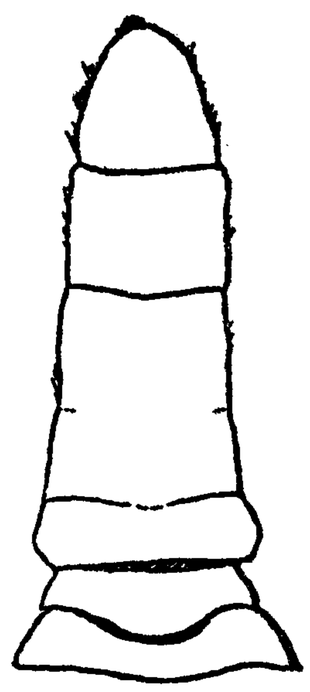

FIGURE 39.—PLATYPODIA SPECTABILIS (25440), MALE ABDOMEN, CARAPACE 13.2 MM. WIDE

Color.—Chocolate brown, with some yellow spots bordered with blue and black; similar spots on chelipeds. Legs red, with tricolored bands of yellow, blue, and black. Eggs reddish yellow. (A. Milne Edwards.)

Measurements.—Female (7688), length of carapace 13, width 19.3, fronto-orbital width 9, width of front 5 mm.

Range.—Gulf of Mexico, Bahamas and Florida Keys to Fernando Noronha, Brazil; Bermudas.

Material examined.—Bahamas; J. I. Northrop; specimen returned to sender.

Key West, Florida; on reefs; Mar., 1885; R. E. C. Stearns; 1 female (14460).

Vera Cruz, Mexico; specimens in Paris Museum.

Jamaica: March 1–11, 1884; *Albatross;* 1 male, 1 female (7688). Kingston Harbor; 1893; R. P. Bigelow; 1 female (17967).

Porto Rico; 1899; *Fish Hawk:* Porto Real; January 27; 1 male, 1 female (24256). Guanica Bay; January 29; 1 young female (Yale Mus.). Culebra; February 11; 1 female (24257).

St. Thomas, Virgin Islands; specimens in Paris Museum and in Copenhagen Museum.

St. John, Virgin Islands; 2.5 fathoms; in crevice between coral and encrusting alcyonarian; July 10, 1915; station 8; Clarence R. Shoemaker, for Carnegie Institution; 1 female (56381).

Guadeloupe; specimen in Paris Museum.

Marie Galante; specimen in Paris Museum.

Martinique; specimen in Paris Museum.

Needham's Point, Barbados; May 18, 1918; Barbados-Antigua Expedition, State University of Iowa; 1 male (58044), 1 ovigerous female (S.U.I.).

Curaçao; 1920; C. J. van der Horst: West Punt; May 14; 3 males, 1 female (Amsterdam Mus). Caracas Bay; May 5; 1 male (56906).

Bermudas: 1876–1877; G. Brown Goode; 1 female (43048). Hungry Bay; July-September; F. G. Gosling; 4 males, 4 females (25440).

Locality unknown; Herbst's type-specimen (Berlin Mus.).

PLATYPODIA ROTUNDATA (Stimpson)

Plate 102, Figures 1–3

Atergatis rotundatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 202 [74] (type-locality, Cape St. Lucas; cotypes in M.C.Z.).

Lophactaea rotundata A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 1, 1866, p. 250; Crust. Rég. Mex., 1879, p. 243; 1880, pl. 44, fig. 2.

Lophactaea rotunda [by error] SPENCE BATE, Zool. Rec. for 1866 (1867), p. 222.

Atergatis cristatissimo LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 41 [1] (type-locality, La Paz, Lower California; type not extant).

Platypodia rotundata RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 584.

Diagnosis.—Carapace coarsely granulate on and near the margins. Mesogastric region narrowing regularly to a point in front except for a slight constriction at middle. Antero-lateral rim narrow. Palm short and high.

Description.—Carapace narrower than in *spectabilis*, equally convex posteriorly and anteriorly, areolated and granulated, the granules extending entirely around the marginal areas and especially coarse on the branchial regions which they almost entirely cover. Crest of antero-lateral margin narrow, indistinctly quadrilobate, the lobes separated by slight notches and furrows; the crest granulate especially on its margin. Postero-lateral side very short. Hand of chelipeds short, with a high lamelliform superior crest; outer surface granulate above, ornamented with four or five granulate costae.

Color.—Of dried specimens, bright vermilion red throughout except on fingers which are brown (Lockington).

Measurements.—Male (46078), length of carapace 7.3, width 10.7 mm. Sex not given, length 12.7 mm. (0.5 inch), width 17.7 mm. (0.7 inch). (Lockington).

Range.—La Paz, Gulf of California, Mexico, to Ecuador.

Material examined.—Cape St. Lucas, Lower California, Mexico; John Xantus; 1 male, 1 female, cotypes (1251, M.C.Z.).

Manzanillo, State of Colima, Mexico; on drifted pile; July 17, 1913; C. R. Orcutt; 1 male (46078).

Panama: Capt. John M. Dow; 1 female (4079). Low tide, rocks; May–July, 1924; E. Deichmann; 1 female (60823).

South side of Point Santa Elena, Ecuador; among brown sea anemones; September 16, 1926; W. L. Schmitt; 2 males (60962).

PLATYPODIA GEMMATA Rathbun

Platypodia gemmata RATHBUN, Proc. Washington Acad. Sci., vol. 4, 1902, p. 279, pl. 12, figs. 5 and 6 (type-locality, Albemarle Island, Galapagos Islands; type, Cat. No. 24850, U.S.N.M.).

Diagnosis.—Internodular depressions filled with short hair. Elevations mostly subcircular, granulate. Antero-lateral rim extremely narrow. Palm short and high.

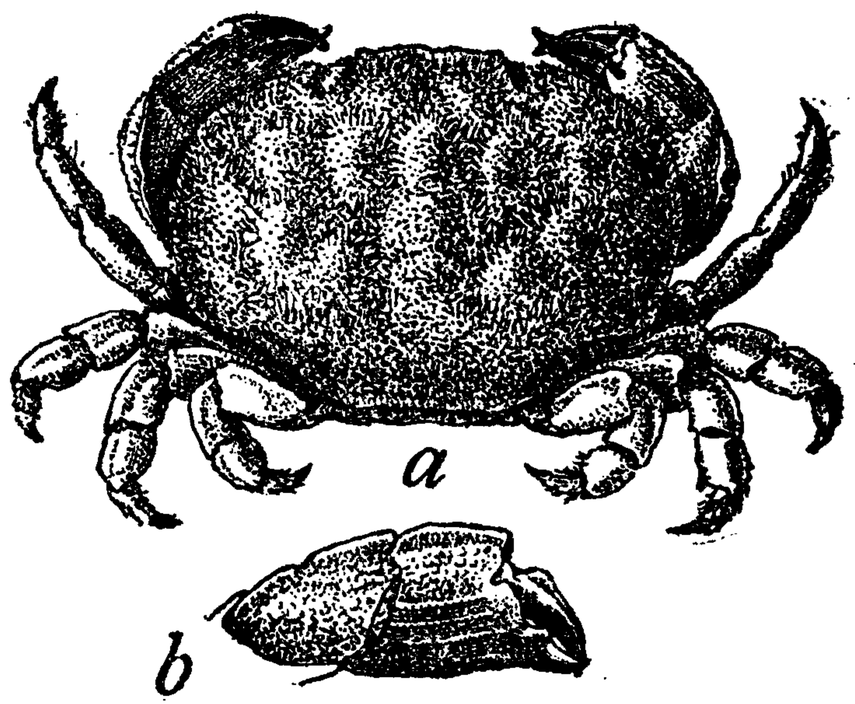

FIGURE 40.—PLATYPODIA GEMMATA, MALE, COTYPE, × 3. *a*. DORSAL VIEW. *b*. WRIST AND CHELA

Description.—Anterior two-thirds of carapace divided into about twenty lobules, for the most part circular, except the mesogastric lobule; covered with crowded depressed granules and separated from each other by depressions filled with a dense furry coating. Front with a thin bilobed edge, lobes slightly sinuous. Antero-lateral crest narrow, thin, covered above by a short fringe of fur, edge granulate; below are visible three fissures dividing the margin obscurely into four lobes. Postero-lateral borders short and deeply cut.

Related to *rotundata*, but the nodules are of different shape; the mesogastric is not linear and pointed anteriorly, the protogastric nodule is single, not subdivided by a longitudinal furrow. The granulation of the nodules of the anterior-median part of the carapace is very fine and sharp, not rough and uneven as in *rotundata*. The marginal rim is even narrower than in the allied species. Chelipeds similar in the two.

Measurements.—Ovigerous female, cotype, length of carapace 6.8, width 9.6, fronto-orbital width 4.9, width of front 2.8 mm.

Range.—Known only from the type-specimens from the reef north of Tagus Hill, Tagus Cove, Albemarle Island, Galapagos Islands; 1898-1899; Hopkins Stanford Expedition; 1 male, 1 ovigerous female (24830), 2 immature females (Stanford Univ.).

Genus ACTAEA de Haan

Actaea DE HAAN, Fauna Japon., Crust., 1833, pp. 4 and 18; type, *A. savignii* (Milne Edwards) = *Cancer savignii* Milne Edwards 1834 = *C. granulatus* Audouin, 1825, not *C. granulatus* Linnaeus, 1758.—RATHBUN, Bull. U. S. Fish Comm., vol. 20 for 1900, pt. 2 (1901), p. 33.—ODHNER, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 35 (part).

Anchilops GISTEL, Naturg. Thierreichs, 1848, p. VIII, substituted for *Actaea*, which was considered preoccupied in botany.

Actaeodes DANA, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 126; type, *A. tomentosus* Dana = *Zozymus tomentosus* Milne Edwards, 1834.

Iphimedia DUCHASSAING, MS., in A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 1, 1866, p. 271; type, *I. sulcata* Duchassaing, MS., 1865, = *A. setigera* A. Milne Edwards, 1865 = *Xantho setiger* Milne Edwards, 1834.

Banareia A. MILNE EDWARDS, Ann. Soc. Entom. France, ser. 4, vol. 9, 1869, p. 168; type, *B. armata* A. Milne Edwards.

Euxanthodes PAULSON, Investig. Crust. Red Sea, vol. 1, 1875, p. 33; type, *E. granulatus* Paulson = *Cancer granulatus* Audouin, 1825 (not *C. granulatus* Linnaeus, 1758) = *C. savignii* Milne Edwards, 1834.

Psaumis KOSSMANN, Zool. Ergeb. Reise Küstengeb. Rothen Meeres, Crust., 1877, p. 26; type, *P. fossulatus* (Girard) = *Cancer fossulatus* Girard, 1859. *Psaumis* used by Pascoe, Trans. London Ent. Soc., ser. 3, vol. 3, 1866, pp. 228 and 246, for a species of Coleoptera.

Cycloblepas ORTMANN, in Semon, Zool. Forsch. Austral. u. Malay. Arch., Crust., 1894, p. 53; type, *C. semoni* Ortmann.

Carapace convex fore and aft, slightly convex or flat from side to side, commonly broad, regions well demarcated by deep grooves and again subdivided into lobules, which are usually convex and granular. Antero-lateral borders as a rule four-lobed, lobes shallow and often indistinct. Postero-lateral borders usually concave, always short, not strongly convergent. Front between a third and a fourth the greatest width of carapace, deflexed, cleft in middle line into two lobes. Upper edge of orbit tumid, usually with two fissures or sutures; a third fissure below outer orbital angle; eye-stalks short and thick. Antennules folding obliquely or nearly transversely. Basal antennal segment usually stopping at angle of deflexed front, but often prolonged beyond this, toward or nearly into orbit; flagellum about as long as orbit and lodged in orbital hiatus. Merus of external maxillipeds with anterior border little oblique. Chelipeds equal in both sexes; fingers either acute or blunt-pointed, sometimes hollowed out at tip. Abdomen of male five-jointed, somites three, four, and five fused.

Contains many species. Bahamas and Florida Keys to Bahia, Brazil; Bermudas; Cape Verde Islands; Ascension Island; east coast of Africa from Natal northward; Indian Ocean; Australia; East Indian Islands to Japan; islands of the Pacific to Hawaiian Islands; Gulf of California, Mexico, to Ecuador and Galapagos Islands.

Usually found in shallow water but reported from a depth of 400 fathoms.

KEY TO THE AMERICAN SPECIES OF THE GENUS ACTAEA

A¹. Areoles covered with granules.
  B¹. Areoles low, separated by narrow furrows.
    C¹. Marginal divisions of carapace lobiform, not angular nor dentiform.
      D¹. Carapace uniformly granulate. Black color of immovable finger of adult male widely extended on palm. Fingers grooved, sharply granulate——**setigera**, p. 251.
      D². Granulation finer and denser than in *setigera*——**dovii**, p. 254.
    C². Marginal divisions of carapace angular or dentiform. Carapace narrower than in D¹. Front steeply inclined.
      D¹. Palm concealed by long thick hair. Fingers long, smooth, punctate, not channeled——**bifrons**, p. 255.
      D². Palm with longitudinal rows of granules not concealed by hair. Fingers deeply channeled, ridges granulate proximally, **angusta**, p. 256.
  B². Areoles high, convex, widely separated.
    C¹. Areoles separated by short pubescence. Anterior mesogastric nodule small.
      D¹. Nodules 1 F not fused with frontal margin. Marginal lobes D and E not remarkably small——**rufopunctata nodosa**, p. 257.
      D². Nodules 1 F fused with frontal margin. Marginal lobes D and E remarkably small——**sulcata**, p. 259.
    C². Areoles raspberry-like, set in a thick coat of long hair. Palms shaggy. Fingers broad, smooth, sharp-edged, acutely tipped. **palmeri**, p. 260.
A². Carapace covered dorsally with spines or sharp tubercles. Marginal lobes spinous——**acantha**, p. 261.

ANALOGOUS SPECIES OF ACTAEA ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
setigera.	*dovii.*
bifrons.	*angusta.*
rufopunctata nodosa.	*sulcata.*

ACTAEA SETIGERA (Milne Edwards)

Plate 103

Xantho setiger MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 390 (type-locality, Antilles; type in Paris Mus.).
Actaea setiger STIMPSON, Ann. Lyc. Nat. Hist. N. Y., vol. 7, 1859, p. 51.
Actaea setigera A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 1, 1866, p. 271, pl. 18, fig. 2.—RATHBUN, Bull. U. S. Fish Comm., vol. 20 for 1900, pt. 2 (1901), p. 34.

Diagnosis.—Carapace wide, uniformly granulate; lateral lobes not dentiform; black color of immovable finger of male widely extended on palm; fingers grooved, sharply granulate.

Description.—Carapace wide, ovoid, covered with short, stiff yellow hair and with granules; strongly lobulated anteriorly. Antero-lateral border divided into four lobes, which do not project beyond the general outline of the carapace. Postero-lateral borders concave. Median notch of front large; each lobe has an inconspicuous outer tooth. Basal antennal joint short, not prolonged into orbit. Ptery-

gostomian regions finely granulous. Chelipeds hairy and very granulous; fingers slightly deflexed, black, this color extending in full-grown males upon external and internal surfaces of palm almost to articulation with wrist; in females the fingers only are black. Fingers grooved, intervening ridges sharply granulate on the proximal half; tips acute. Legs covered with hairs; meral joints of first three pairs smooth outside and granulous on margins; of last pair, granulous on outside also; two following joints granulous; dactyls long, granulous, and terminating in a sharp nail. Abdomen of the male long and narrow.

Color.—In formalin, upper surface light orange red with whitish granules; fingers very dark purplish brown.

Measurements.—Male (14325), total length of carapace 16.9, width 25.6, fronto-orbital width 11.2, width of front 6 mm.

Range.—Bahamas and Florida Keys to north coast of South America; Bermudas. On reefs.

Material examined.—Abaco, Bahamas; 1886; *Albatross*; 1 male (17778).

Andros Island, Bahamas: In sponge; Frederick Stearns collection; destroyed by fire. Near lighthouse, south of South Bight, east side of island; May 14, 1912; Paul Bartsch; 1 male (45574).

Cape Florida, Florida; 1884; Edward Palmer; 2 females (9301).

Indian Key, Florida: 1884; Edward Palmer; 1 male, 1 female (15011). Between tides; Henry Hemphill; 3 males (14057).

Knights Key, Florida; among rocks, low tide; H. Hemphill; 2 males, 2 females (14074).

Key West, Florida; H. E. Webster; received from Boston Soc. Nat. Hist.; 1 male (56804). Among rocks, low tide; 1884; Henry Hemphill; 2 males, 2 young (9302). April 15–27, 1884; *Albatross*; 1 young (18521). February 3, 1901; B. A. Bean and W. H. King; 2 males (24844).

Tortugas, Florida; 1893; Biological Expedition, State University of Iowa; 1 female (S.U.I.).

Tortugas, Florida; 1924; W. L. Schmitt; gift of Carnegie Institution: Loggerhead Key, rocks, east side; July 28; 1 male (59413). From rocks below lighthouse pier, east side Loggerhead Key; August 24; 1 ovigerous female (59418). Bird Key: Southwest side, with boat dredge; August 8; 1 male (59411). Reef; July 16; 1 male, 2 females (59412). Reef; July 28; Bender collector; 1 male, 1 female (59415). North end of reef, "Channel reef"; August 12; 1 male (59416). Mid-section of reef; July 26; 2 males, 1 female (59417). South end of reef; August 13; 2 males (59414). Garden Key; about rocks, Fort Jefferson docks; July 30; Bender collector; 1 male, 1 female (59410). Bush Key reef: Mid-section; August 1; 4 males, 6 females (59409). South end; July 31; 1 male, 1 female (59419).

Tortugas, Florida; 1925; W. L. Schmitt; gift of Carnegie Institution: Bird Key reef: June 4, 1 young (60854); low tide, June 6, station 25–5, 1 female (60853); low tide, June 7, station 25–6, 4 males, 5 females (1 ovigerous), 1 young (60849). June 22; Dexter collector; 1 female (60852). Fort Jefferson, Garden Key; rocks at south coal dock; June 13; 1 female (60855). Bush Key reef near Long Key; June 3; 4 males, 1 female (60850).

Fort Jefferson, Garden Key, Tortugas; from beach at pier; July 25, 1926; station 6; C. R. Shoemaker; 1 male (60851); gift of Carnegie Institution.

Ensenada de Cajon, off Cape San Antonio, Cuba; May 22, 1914; Henderson and Bartsch, *Tomas Barrera* Exped., station 11; caught by copper sulphating on reef; 1 male (48558).

Kingston Harbor, Jamaica; 1893; R. P. Bigelow; 1 female (17965).

Montego Bay, Jamaica: Coral reef; July 12, 1910; C. B. Wilson; 1 ovigerous female (42929). Rocks in front of Sea View; August 30, 1910; E. A. Andrews (43049).

Umbrella Point, Jamaica; July 14, 1910; E. A. Andrews; 1 male (42922).

Porto Rico; 1899; *Fish Hawk:* Playa de Ponce Reef; February 1; 1 male, 1 female (24269). Caballo Blanco Reef; February 7; 1 young (24284). Ensenada Honda, Culebra; February 9 and 11; 1 male, 1 young (24282). Exact locality not given; 1 young (24283).

San Juan, Porto Rico; G. M. Gray; specimens in Marine Biological Laboratory, Woods Hole.

St. Thomas, Virgin Islands; 1884; *Albatross;* 6 males, 1 female, 2 young (17809).

Antigua; 1918; Barbados-Antigua Expedition, State University of Iowa: Pillars of Hercules; 2 males (Mus. S.U.I.). English Harbor; 1 male, 1 young (57958).

Barbados; 1918; Barbados-Antigua Expedition, State University of Iowa: Okra Reef; May 13; 1 male, 3 young (Mus. S.U.I.). Pelican Island; 1 young female (57987). Needham Point; 1 young male (57988); May 18, 1 young female (Mus. S.U.I.). Exact locality not given; 1 male (57989); 2 males, 2 females, 5 young, mostly from coral heads (Mus. S.U.I.).

Trinidad; Mr. Crosby collector; in exchange with Boston Society of Natural History; 1 young (56805).

Caracas Bay, Curaçao, Venezuela; under stones or in coral; 1920; C. J. van der Horst: 1 male, 1 young (56870); 2 males, 1 female, 9 young (Amsterdam Mus.).

Cartagena, Colombia; Colegio de San Pedro Apostal; 1 young female (53408).

Margarita Island, Atlantic side of Panama; coral rocks, low tide; June, 1924; E. Deichmann; 2 males (60717).

Hungry Bay, Bermudas; July-September; F. G. Gosling; 1 female (25441).

ACTAEA DOVII Stimpson

Plate 104, Figures 1–2

Actaea dovii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 104 (type-localities, San Salvador and Panama; type from Panama, 1021, Mus. Comp. Zoöl.).[32]—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 244, pl. 45, fig. 1.—FAXON, Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 16.—RATHBUN, Proc. Washington Acad. Sci., vol. 4, 1902, p. 281.

Diagnosis.—Granulation finer and denser than in *A. setigera*, especially on posterior portion of carapace.

Description.—The Pacific counterpart of *A. setigera.* The terminal segment of the male abdomen is more triangular than in *setigera;* the granulation of the carapace finer, specimens of similar size compared. There is considerable difference in the smaller specimens of *dovii.* A female from Panama is most sharply marked and has also the edge of front finely but distinctly beaded. A little larger female from Perico Island has lower and very inconspicuous granulation, almost hidden by fine hairs; granulation of front edge almost negligible. A male 7.1 mm. wide from Albemarle Island is narrower, granulation low and scabrous and, with the areolation almost disappearing in its posterior part; edge of front smooth. In none of the specimens is the granulation of the posterior regions more distinct than in *setigera*, as stated by Stimpson.

Color.—Eleven orange-red stripes extend backward from frontal and antero-lateral margins and converge posteriorly (25668).

Measurements.—Male, type, according to Stimpson, length 11.4 mm. (.45 inch), width 16 mm. (.63 inch). Female (20600), length 6.3, width 9.6 mm. Female (33264), length 7.2, width 10.3 mm.

Range.—San Salvador, Central America to Ecuador (Nobili) and Galapagos Islands.

Material examined.—Panama: Reef; March 12, 1891; *Albatross;* 1 young female (20600). March 15, 1860; A. Agassiz; 1 male (1021, M.C.Z.). Dr. Sternbergh, *Hassler* Exped.; 2 females (2210, M.C.Z.). Perico Island; Bay of Panama; October 26, 1904; *Albatross;* 1 young female (33264), 1 young female (M.C.Z.).

Taboga Island, Panama; July, 1924; E. Deichmann; 2 females (60718).

Reef N. of Tagus Cove, Albemarle Island, Galapagos Islands; March 16, 1899; Hopkins Stanford Expedition; 1 male (25668).

Other records.—S. Josá, Pearl Islands, Bay of Panama (Odhner); Ecuador.

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[32] The specimen collected in Panama by A. Agassiz is not marked "type".

ACTAEA BIFRONS Rathbun

Plate 104, Figures 3–6

Actaea bifrons RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 262, pl. 4, figs. 3 and 4 (type-locality, off Aspinwall [Colon], 34 fathoms; type, Cat. No. 7803, U.S.N.M.); Bull. U. S. Fish Comm., vol. 20 for 1900, pt. 2 (1901), p. 34.—ODHNER, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 50, pl. 3, figs. 12 and 12*a*.

Diagnosis.—Carapace flattish, granulation sparse anteriorly; front steeply inclined; palm concealed by long thick hair; fingers long, smooth and punctate, not channeled.

Description.—Compared to *A. setigera*, carapace narrower and flatter, areolations similar, but epigastric and postfrontal lobes sharply set off, sparsely granulate, marginal lobes more angular. Single hairs on carapace especially on side margins; like the remaining hairs, they are weak and colorless, not stiff and yellow as in *setigera*. Frontal

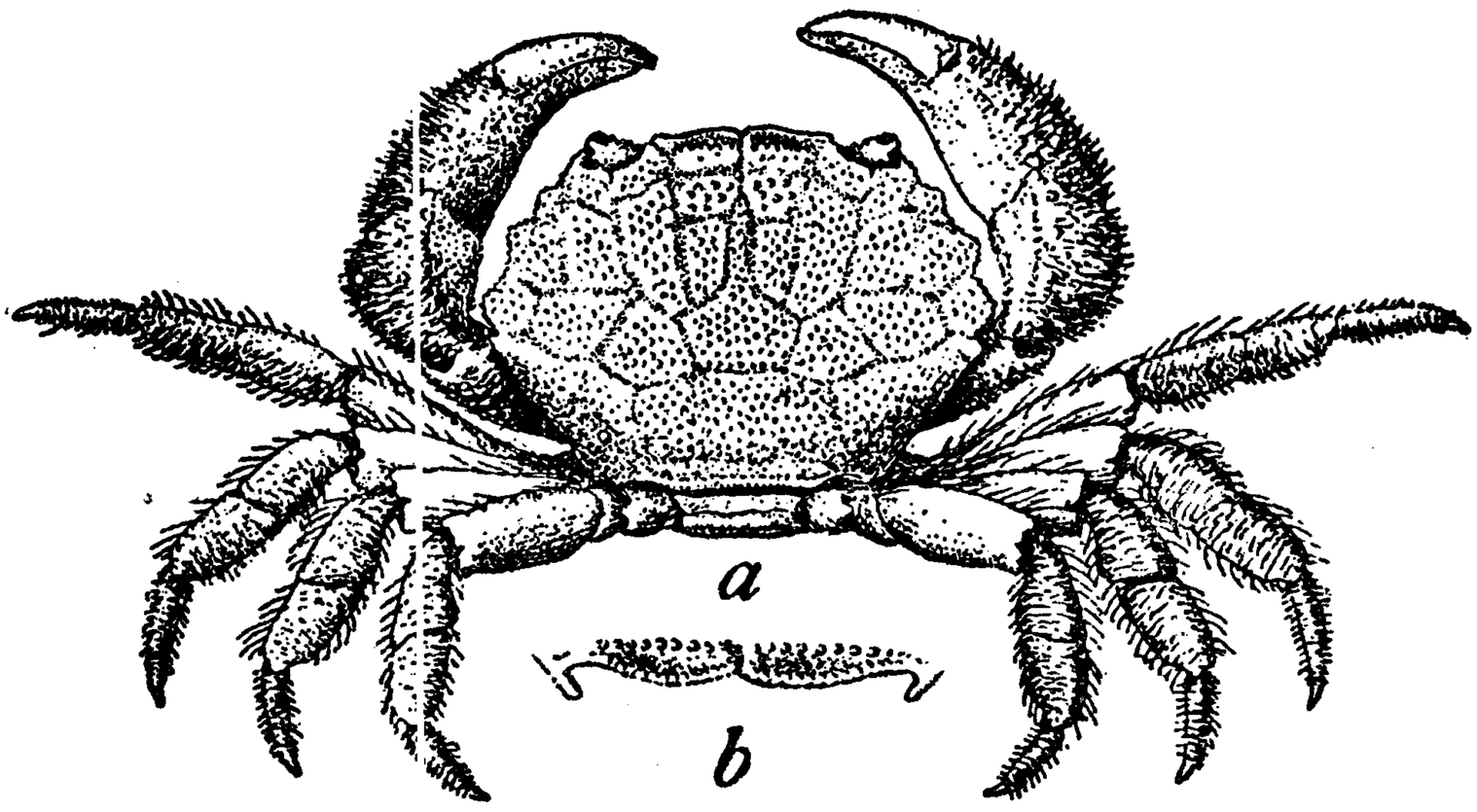

FIGURE 41.—ACTAEA BIFRONS, MALE. *a*. DORSAL VIEW, ×3.2. *b*. FRONT, ×6.4

lobes bent abruptly down, margins little advanced. Eyes larger; tooth at lower inner angle of orbit prominent. Chelipeds differ from those of *setigera* in the fingers longer in proportion to the palm, more strongly bent downward, and smooth, not channeled but with two rows of punctae on outer surface; in the immovable finger wider at base than the movable; in the granules of wrist and hand nearly concealed by thick hairy covering. Ambulatory legs tolerably hairy, especially the dactyls.

Color.—Carapace above reddish orange; fingers faded brownish black (Henderson).

Measurements.—Ovigerous female (53769), total length of carapace 7, width 10.5 mm. Female, Spanish Water, length of carapace 10.5, width 15.2 mm.

Range.—Florida Keys to north coast of South America. To a depth of 40 fathoms.

Material examined.—Western Dry Rocks, Key West, Florida; 25 fathoms; J. B. Henderson; 1 ovigerous female (53769).

Porto Rico; 1899; *Fish Hawk:* Off Vieques Island; North Cabras Island, NE. ⅜ E., 10½ miles; 12 fathoms; Co.; temp. 27° C.; station 6094 (166); 1 young (24298). Ensenada Honda, Culebra; February 11; 1 female (24299).

Barbados; 1918; Barbados-Antigua Expedition, State University of Iowa: 1 male (Mus. S.U.I.). Shoal Bank; 20–40 fathoms; sponge bottom; station 101; 1 male (57986). Shoal Bank, about 3 miles W. of Needham Point; 20–40 fathoms; bottom rough; June 12; station 96; 1 male (Mus. S.U.I.).

Spanish Water, Curaçao, Venezuela; in *Porites furcata;* 1920; C. J. van der Horst; 1 female (Amsterdam Mus.).

Off Aspinwall [Colon], Panama; lat. 9° 32′ 20″ N., long. 79° 54′ 45″ W.; 34 fathoms; Co.; temperature 78.5° F.; April 2, 1884; station 2147, *Albatross;* 1 male (7803), holotype.

Other records.—Salt Island, Virgin Islands, 40 fathoms (Odhner), and St. Bartholomew, 10–16 fathoms (Odhner).

ACTAEA ANGUSTA Rathbun

Plate 104, Figures 7 and 8

Actaea angusta RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 582, pl. 42, fig. 2 (type-locality, off Hood Island, Galapagos Islands, 20 fathoms; type, Cat. No. 21578, U.S.N.M.).

Diagnosis.—Carapace narrow, posteriorly areolated; lateral lobes dentiform; granulation on chelipeds coarser than on carapace; fingers rough.

Description.—Carapace narrow, slightly convex, areolate on posterior as well as anterior half; areoles granulate. Metagastric and cardiac regions very broad. Front slightly deflexed, margin visible in dorsal view, its lobes oblique, nearly straight; a broad median V. Lateral lobes four (besides the orbital), dentiform, first very short, second twice as long, third much the longest. Inner suborbital lobe rounded, prominent. Chelipeds covered with large sharp granules, carpus deeply grooved, granules of hands in longitudinal rows, fingers deeply channeled, intervening ridges granulate on proximal half.

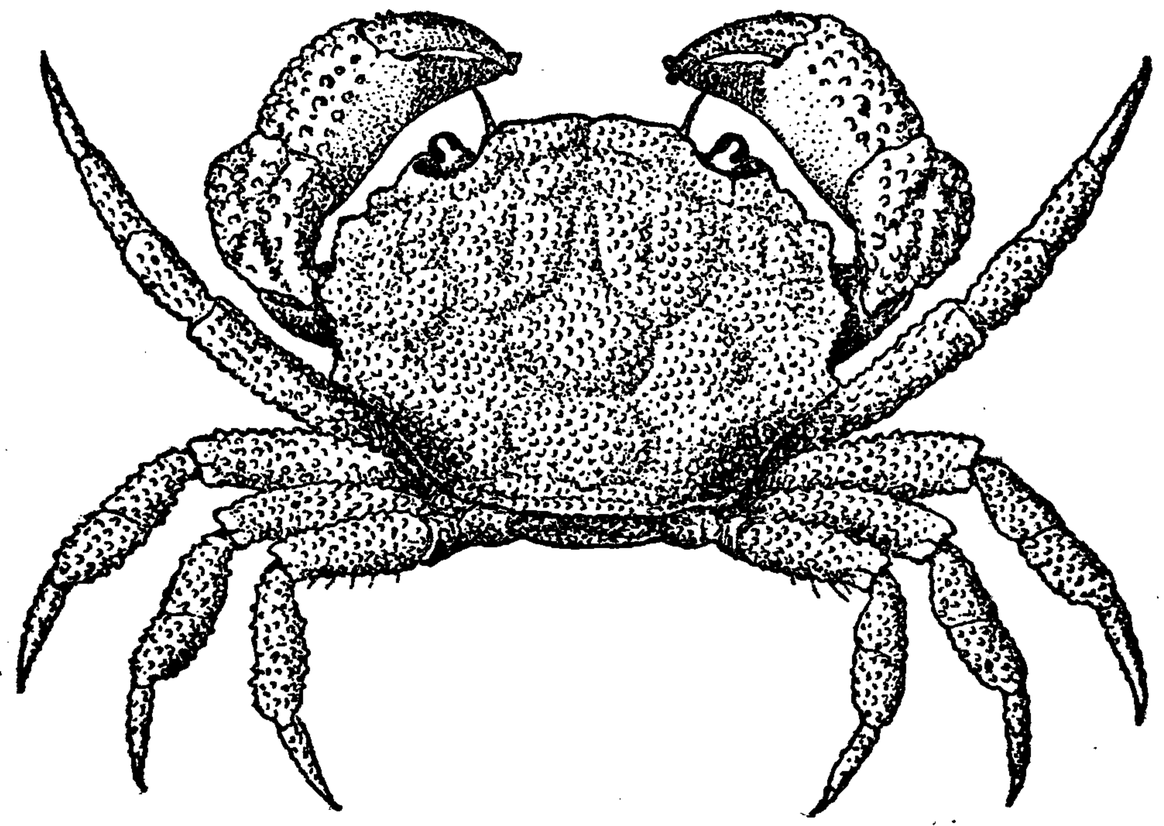

FIGURE 42.—ACTAEA ANGUSTA, FEMALE, HOLOTYPE, CARAPACE 6 MM. WIDE, DORSAL VIEW

Measurements.—Female holotype, length of carapace 4.3, width 5.8 mm.

Range.—Known only from the type-specimen (female) from off Hood Island, Galapagos Islands; lat. 1° 21′ 30″ S.; long. 89° 39′ 45″ W.; 20 fathoms; Co. S.; April 7, 1888; station 2812, *Albatross* (21578).

ACTAEA RUFOPUNCTATA NODOSA Stimpson

Plate 105, Figures 1–2

Actaea nodosa STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 203 [75] (type-locality, Tortugas, Florida; type not extant).—A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 1, 1866, p. 266, pl. 17, figs. 6–6c.

Actaea rufopunctata var. *nodosa* MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 122.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 316.

Actaea rufopunctata nodosa RATHBUN, Bull. U. S. Fish. Comm., vol. 20 for 1900, pt. 2 (1901), p. 33.

Actaea rufopunctata ODHNER, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 60 (part).

Diagnosis.—Carapace nodulous, nodules high and formed by distinct granules. Internodular depressions hairy. Anterior mesogastric nodule small. Nodules 1 F not fused with frontal margin.

Description.—Carapace broad, ovoid, its extreme length not quite three-fourths, but more than two-thirds its extreme breadth; its surface broken by deep and broad grooves into numerous (about twenty-seven, excluding those around the orbits and the front) very convex lobules, which are covered very closely with large vesiculous granules; grooves filled with a dense short felt, with longer hairs sometimes interspersed, against which the lobules stand out like islands. Exposed surface of carpal and propodal joints of chelipeds and legs lobulated in same style as carapace. Front strongly deflexed, but somewhat prominent and rather sharply bilobed. The tumid supra-orbital margin broken by two cross grooves and separated from lower margin of orbit by a fissure. Antero-lateral borders cut into four rounded lobules of nearly equal size by deepish fissures. Outer angle of basal antennal joint in contact with inner angle of lower edge of orbit. Edges of legs and of arm fringed with coarse hair. Lower outer surface of hand with granules arranged in lines. Fingers blunt-pointed, hollowed out at tip.

This subspecies or variety or form which inhabits the Atlantic is distinguished from the principal or typical form which inhabits the Pacific and Indian Oceans by the reduction of the small anterior median nodule of the mesogastric region. It may extend to the middle of the adjacent protogastric nodule, while in typical *rufopunctata* it extends as far as, or farther than, the end of that nodule. The frontal nodules (1 F) are not fused with the margin of the front.

Measurements.—Female (15010), length of carapace 16, width 22.7 mm. Female (Stimpson), length 16.25 mm. (0.64 inch), width 24.63 mm. (0.97 inch).

Range.—Florida Reefs, Bahamas, and West Indies to Bahia, Brazil; Ascension Island, South Atlantic. To a depth of 70 fathoms.

Material examined.—Off Biscayne Bay, Florida; 16 to 34 feet; May 29, 1912; Paul Bartsch; 1 male (53767).

Indian Key, Florida; 1884; Edward Palmer; 1 female (15010).

Key West, Florida; 1885; Henry Hemphill; 1 female (15009).

Tortugas, Florida: June 5–8, 1893; Biological Expedition, State University of Iowa; 1 female (S.U.I.). Bush Key; June, 1921; Paul Bartsch; 1 female (57130). About 8 miles S. of No. 2 buoy (sponge haul); 25 fathoms; June 11, 1925; station 217; W. L. Schmitt; 2 carapaces (60848); gift of Carnegie Institution.

Off Charlotte Harbor, Florida; lat. 26° 33′ N., long. 83° 10′ W.; 28 fathoms; sdy.; temperature 66° F. (19° C.); April 2, 1901; station 7123, *Fish Hawk;* 1 young female (25609).

Andros Islands, Bahamas; in sponge; Frederick Stearns collection; destroyed by fire.

Green Cay, Bahamas; June 30, 1903; B. A. Bean, Geographic Society of Baltimore; 1 female (31063).

Bahia Honda, Cuba; M. Co.; June 4–5, 1914; Henderson and Bartsch, *Tomas Barrera* Exped., station 15; 1 young female (48529).

Esperanza, Cuba; shallow water; May 11, 1914; Henderson and Bartsch, *Tomas Barrera* Exped.; station 21; 1 young male (48530).

Kingston Harbor, Jamaica; May–July, 1896; F. S. Conant; 1 young female (19597).

Between Jamaica and Haiti; lat. 17° 44′ 05″ N.; long. 75° 39′ W.; 23 fathoms; Co. brk. Sh.; February 29, 1884; station 2123, *Albatross;* 1 female (7762).

Between Jamaica and Haiti; lat. 17° 43′ 40″ N., long. 75° 38′ 25″ W.; 52 fathoms; Co. brk. Sh.; February 29, 1884; station 2136, *Albatross;* 1 female (17810).

Porto Rico, 1899; *Fish Hawk:* Off Vieques Island; Point Mula lighthouse, E. ½ N., 11¼ miles; 6 fathoms; Co.; temperature 27.3° C.; February 14; station 6096 (168); 1 young female (24264). Ensenada Honda, Culebra; February 9 and 11; 1 male (24263). Fajardo; February 17; 1 female (24262).

St. Thomas; specimens in Copenhagen Museum.

Off Santa Cruz; 115 fathoms; 1878–79; *Blake* station 132; 1 specimen (2718, M. C. Z.).

Flannegan Passage; 27 fathoms; 1878–79; *Blake* station 142; 2 females (2901, M.C.Z.).

Barbados: 1¼ miles due W. from white lighthouse at Needham Point; in line with red house; 67–70 fathoms; stony; May 17, 1918; station 11, Barbados-Antigua Expedition; 1 young male (S.U.I.). 94 fathoms; 1878–79; *Blake* station 276; 1 specimen (2664, M.C.Z.).

Curaçao, Venezuela; 1920; C. J. van der Horst: Caracas Bay; in coral; April 7; 1 male (Amsterdam Mus.). Spanish Port; May 20; 1 female (56869).

Off Cape Frio, Brazil; 35 fathoms; *Hassler* Exped.; 1 male (2532, M.C.Z.).

Ascension Island; 1889; William Harvey Brown, U. S. Eclipse Expedition to West Africa; 1 young (17805).

ACTAEA SULCATA Stimpson

Plate 105, Figures 3–4

Actaea sulcata STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 203 [75] (type-locality, Cape St. Lucas; type not extant).—A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 1, 1866, p. 267.—ODHNER, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 78, pl. 5, fig. 6.

Diagnosis.—Carapace nodulous, nodules deeply and widely separated, less prominent than in *rufopunctata nodosa*, their granules fused. Nodules D and E remarkably small. Nodules 1 F fused with frontal margin.

Description.—Upper surface of carapace divided into 30 flattened, granulate lobules (besides the small ones around orbits), separated by deep pubescent sulci. Owing to fusion of granules, the surface of lobules appears feebly granulate. Posterior lobules less prominent, more distinctly granulated and sometimes concealed by pubescence. According to Odhner the pattern corresponds to that of *A. rufopunctata* with few exceptions: 3 M is rudimentary [as in *r. nodosa*], 4 L and T are united, lobules 1 F are square and fused with the frontal margin; marginal teeth D and E are separate and very small. Furrows between lobules are very wide and covered with a short dark tomentum; three pairs of bunches of hair on carapace.

Chelipeds nodose above like carapace; granules similar, fused, especially on carpus; three such nodules on upper margin of palm; palms and base of fingers strongly granulate externally. Fingers partially excavate at tips. On the hairy ambulatories the granules are fused and form on merus and carpus raised bands which on carpus of first three pairs are U-form and make one continuous crest with those on merus.

Color.—Bright red somewhat maculated or mottled with white.

Measurements.—Female holotype, length of carapace 9.4 mm. (0.37 inch), width 14.2 mm. (0.57 inch) (Stimpson).

Range.—Cape St. Lucas, Lower California, Mexico (Stimpson), to San José, Pearl Islands, Bay of Panama, 15 fathoms (Odhner).

Material examined.—Maria Madre Island, Mexico; March–May, 1927; from Secretaria de Agricultura y Fomento, Mexico, through A. L. Herrera; 1 male (60721).

Maria Madre Island; E. part of bay; 5–8 meters; May 17, 1925; F. Contreras; California Acad. Sci.; 1 male (62696); 1 female, returned.

ACTAEA PALMERI Rathbun

Plate 106, Figures 3–6

Actaea lanigera HANSEN, MS., in Copenhagen Mus.

Actaea palmeri RATHBUN, Proc. U. S. Nat. Mus., vol. 17, advance sheet, March 30, 1894, p. 3; July, 1894, p. 85 (type-locality, Rodriguez Creek, Florida; type, Cat. No. 13927, U.S.N.M.).—ODHNER, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 76, pl. 4, figs. 20, 20*a*.

Diagnosis.—Clothed with a thick coat of long hair in which raspberrylike nodules stand out. Fingers sharp-edged, tips acute. A row of denticles on inner margin of ischium of maxillipeds.

Description.—Carapace as well as exposed surface of chelipeds and legs ornamented with raspberrylike nodules; intervening furrows filled with long silky hair which covers also the hinder part of the dorsal surface of carapace as well as the whole exposed under surface of the crab. Nodules of carapace, about 30 in number not counting orbits, vary in form and size and occupy approximately the following areas: 1 M; 2 M (two side by side); 3 M (two median, sometimes grown together in the old, and behind, two lateral, with sometimes another pair very small, still further back, more often concealed); 1–6 L; 1–2 R. The "raspberries" on 1 L, 3 L, 4 L and 1 R follow the antero-lateral margin; in the intervals between them are three sharp incisions well covered with thick hair and best seen from below. Edge of front with three strong U-shaped bays; median lobes and much smaller lobes at outer angles raspberrylike. A small, similar nodule on basal article of outer antenna. Three supra-orbital and two suborbital lobules surround the eyes. In front of the first lobule of the side margin (1 L) is another very small one. A still smaller lobule median, on intestinal region immediately behind cardiac region. A pair of low, elongate nodules covered with extremely small and well separated granules occupy the cardiac region, and are seldom exposed.

Inner margin of ischium of outer maxillipeds bears a row of rounded denticles.

Chelipeds with 6 "raspberries" on carpus (7 in large female, 25572), and 5 on hand (6 in 25572), of which 4 form a longitudinal row on upper edge. Lower edge of hand marked by a row of granules. Fingers bare, broad at base, meeting when closed, edges sharp, tips acute and crossing; 3 or 4 prehensile teeth on basal half of each; dactylus with acute granules on upper surface of proximal half, almost concealed by long hair.

The first three ambulatories bear small "raspberries" of which 2 are on the carpus and 2 on the propodus; the carpus of the third pair may have a third nodule. In the last leg the merus has proximally a single granule, distally a small "raspberry," the carpus bears three of which the 2 proximal are near together, and the propodus either two, one, or none.

Color.—Fur olive-buff, "raspberry" protuberances flesh color; eyes bay; fingers vinaceous, tips white (Bartsch).

Measurements.—Female (25572), total length of carapace 25, width 34.6 mm. Male holotype, total length of carapace 16, width 21 mm.

Range.—Florida Keys and the Bahamas to north coast of South America. Shallow water to 78 fathoms.

Material examined.—Off Biscayne Key, Florida; 16–34 feet; May 29, 1912; Paul Bartsch; 2 females (45623).

Elliott Key, Florida; 1901; J. E. Benedict; 2 females (25572).

Rodriguez Creek, Florida; Edward Palmer; 2 males, 2 females (13927).

Cotton Key Lake, Florida; from sponges; February 5, 1903; *Fish Hawk;* 2 females (53766).

Off Sand Key, Florida; 50 fathoms; 1913; J. B. Henderson; 1 young female (46065).

Bahama Banks; 1893; State University of Iowa Expedition to Bahamas; 1 male (S.U.I.).

Inside of Golding Key, Andros Islands, Bahamas; 1912; Paul Bartsch; 1 female (45575).

Golding Key, Andros Islands, Bahamas; May 15, 1912; Paul Bartsch; 1 female (45549).

Bahamas; June 15, 1859; Dr. Henry Bryant; received from Boston Society of Natural History; 1 male (56803).

Off Havana, Cuba; lat. 23° 10′ 28″ N., long. 82° 20′ 27″ W.; 78 fathoms; Co.; May 1, 1884; station 2169, *Albatross*; 1 female (7799).

Miragoane, Haiti; from coral; September 10, 1927; Walter J. Eyerdam; 1 immature female (60720).

St. Thomas, Virgin Islands; Riise collector; three specimens (Copenhagen Mus.).

Harbor of St. Thomas, Virgin Islands; from sponge; July 11, 1915; Clarence R. Shoemaker; received from Carnegie Institution; 1 male (53765).

Caracas Bay, Curacao, Venezuela; among branches of *Porites furcata;* April 29, 1920; C. J. van der Horst; 1 male (Amsterdam Mus.).

ACTAEA ACANTHA (Milne Edwards)

Plate 105, Figure 5; Plate 106, Figures 1 and 2

Cancer acanthus Milne Edwards, Hist. Nat. Crust., vol. 1, 1834, p. 379 (type-locality unknown; type in Paris Mus.).

Actaea acantha A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. Paris, vol. 1, 1865, p. 278, pl. 17, fig. 1 (Ile Maurice ?); Crust. Rég. Mex., 1879, p. 245, pl. 43, figs, 1–1*c* (Guadeloupe).—Rathbun, Bull. U. S. Fish Comm., vol. 20 for 1900, pt. 2 (1901), p. 34.—Odhner, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 53, pl. 5, figs. 10, 10*a*.

Actaea spinifera KINGSLEY, Proc. Acad. Nat. Sci. Philadelphia, vol. 31, 1879 (1880), p. 392 (type-locality, Plantation Key, Florida; type in Mus. Phila. Acad.).

Diagnosis.—Carapace, chelipeds and legs covered with conical spines or tubercles; lateral lobes bordered with spines; fingers short, channeled, rough except at tips.

Description.—Carapace and feet covered with long hairs; lobules of anterior portion of carapace very prominent, covered with pointed tubercles or spinules, between which are deep smooth grooves. Frontal lobes four, outer pair small, forming inner angle of orbit, those of inner pair large, separated by a relatively broad median U. Margin of front and orbits armed with spines. Antero-lateral margin cut into five lobes, each armed with three or four spines; outer orbital angle also spinulous. Postero-lateral borders concave. Posterior margin marked by rows of tubercles. Basal article of antenna spinulous. Merus of outer maxillipeds tuberculate, margins denticulate. Chelipeds subequal. Wrist and hand covered with spines; fingers short, spinulous, blunt, and somewhat hollowed out at tips; white at tips, remainder black, the black color extending in old males over nearly the whole hand. Ambulatory feet spinous.

Color.—Purplish, pincers brown (Desbonne and Schramm).

Measurements.—Male (56802), total length of carapace 22.3, width 31, fronto-orbital width 15.8, width of front 9, width across submedian lobes 5.8 mm. Female (48568) total length of carapace 22.3, width 32.4, fronto-orbital width 16.2, width of front 9.6, width across submedian lobes 6.6 mm.

Range.—Florida Keys to Fernando Noronha, Brazil. To a depth of 10 fathoms.

Material examined.—

Rodriguez Creek, Florida; 1884; Edward Palmer; 1 young (14428).

Bird Key reef, Tortugas, Florida; W. L. Schmitt; gift of Carnegie Institution: South end of reef; washed from seaweed from four rocks cracked up; July 31, 1924; 1 female (59407). Mid-section; August 1, 1924; 1 male (59408). Low tide; June 7, 1925; station 25–6; 1 male, 1 female (60844).

Florida; exact locality not given; possibly a topotype of *A. spinifera*; "Kingsley collection"; received from Boston Society of Natural History; 1 male (56802).

Nassau, Bahamas; April 15, 1902; Dr. George B. Shattuck; received from Geographic Society of Baltimore; 1 female (31047).

Cabañas, Cuba; 2 to 12 fathoms; sand, shell, grass to mud bottom; June 8–9, 1914; Henderson and Bartsch, *Tomas Barrera* Exped., station 16; caught by copper sulphating on reef; 1 female (48568).

Kingston Harbor, Jamaica; 1893; R. P. Bigelow; 1 female (17966).

Miragoane, Haiti; from coral; September 10, 1927; Walter J. Eyerdam; 1 female (60716).

Off Gallards Bank, Porto Rico; tangent of Murillo de Cabo Rojo, E. SE. ¾ E., 9⅓ miles; 10 fathoms; Co. S.; temperature 26.3° C.; January 26, 1899; station 6076 (148), *Fish Hawk;* 1 female (24272).

Fernando Noronha, Brazil; 1876–1877; R. Rathbun, Hartt Explorations; 2 males (40625).

Other records.—St. Bartholomew (Odhner); Guadeloupe (Desbonne and Schramm); Fernando Noronha (Pocock).

Genus GLYPTOXANTHUS A. Milne Edwards

Glyptoxanthus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 253; type, *G. erosus* A. Milne Edwards=*Actaea erosa* Stimpson, 1859.

Actaea Odhner, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 35 (part).

Near *Actaea.* Body thick, the lateral margin continued anteriorly downward and forward to the angle of the buccal cavity; suborbital region deep. Antero-lateral margin distinctly separated from the postero-lateral, having a strong tooth or lobe at the lateral angle. Surface, in American species, deeply eroded, above and below and on the appendages, except the dactyls of the ambulatories which are rough with granules and sharp spinules. The frontal lobes are rounded and deflexed to a line below the level of the orbits. Orbits deep and almost round. Basal antennal article wide and wedged between front and lower margin of orbit. Inner distal angle of merus of maxilliped deeply cut. Fingers pointed. Ambulatory legs strong; they with the chelipeds when retracted fit close together. Middle America; West Africa; Cape Verde Islands; Red Sea.

KEY TO THE AMERICAN SPECIES OF THE GENUS GLYPTOXANTHUS

A¹. Cardiac elevation without long transverse furrows. Both lateral and median mesogastric punctae.

B¹. Vermiculations very rough, intervening furrows narrow. 5 L convex. Outer areole of 2 M independent anteriorly_____**erosus, p. 263.**

B². Vermiculations smooth, intervening furrows wide. 5 L flat. Outer areole of 2 M entirely independent_____**labyrinthicus, p. 266.**

A². Cardiac elevation with two long transverse furrows. Mesogastric punctae median only. Outer areole of 2 M confluent with epigastric area_____ **vermiculatus, p. 266.**

ANALOGOUS SPECIES OF GLYPTOXANTHUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
erosus	*labyrinthicus*

GLYPTOXANTHUS EROSUS (Stimpson)

Plate 107

Actaea erosa Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 51 [5] (type-locality, Florida; type not extant).

Xantho vermiculatus Desbonne and Schramm, Crust. Guadeloupe, 1867, p. 27 (*teste* A. Milne Edwards).

Glyptoxanthus erosus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 254, pl. 43, figs. 3 and 3*a;* pl. 44, figs. 4–4*c.*

Diagnosis.—Surface vermiculated; vermiculations rough; furrows between them narrow; punctae numerous; mesogastric punctae median and lateral; 5 L convex.

Description.—Carapace flattened in its posterior three-fourths and transversely so in its middle two-thirds. Frontal and antero-lateral regions rolling convexly downward. The whole upper and lower surface of body and feet, exposed when the chelipeds and legs are flexed, has a deeply eroded or vermiculated appearance, being filled with small cavities which make a regular pattern. The elevated portions between the cavities are formed by masses of small granules crowded close together. This produces a very rough surface in the young and half grown; in the old the surface has worn off until it is more or less smooth and the granulation is evident only with a lens and is indicated largely by small punctae between granules. Margins of cavities fringed with short pubescence. Carapace areolated, but the divisions are to a large extent rendered indistinct by the character of the surface. Lateral boundaries of gastric region deep; also the median suture from the frontal margin to the mesogastric region. A transverse suture runs a little behind each orbit, between the marginal teeth E and N and forms the anterior boundary of the outer of the two protogastric areoles. Another transverse suture extends from near the median line in front of the cardiac region outward to the base of marginal tooth S. A suture across the carapace behind cardiac region is partly interrupted at middle by a small, transverse nodule. From the gastric region a curved suture concave forward, separates 2 L, 3 L, N from 5 L, 4 L, T. Front steeply inclined; median lobes evenly rounded, separated by a V notch from each other and by a broad oblique rounded sinus from the small, conical, blunt outer lobes. Outer angle of orbit neither dentiform nor projecting. The first of the four antero-lateral teeth (E of Dana) is prominent, a little below the orbital level, the inner and inferior slope of its acute edge is directed toward the angle of the buccal cavity. Lobes N and T are successively longer than E; above T is a shallow blunt point on the lobe 4 L. S is dentiform, subacute and set off from the rest of the margin.

On the ischium of the outer maxilliped is an obliquely longitudinal erosion pointed at both ends and extending nearly the whole length of the article; a second, parallel suture on the outer distal half forms part of an erosion which involves the adjacent carapace. A notch on anterior margin of merus.

Hands short and broad, upper surface divided by furrows into transverse tuberculate ridges, outer surface divided into longitudinal ridges the tubercles of which are smaller and better defined. Fingers short, deeply grooved, 4-5-toothed within, dactyls tuberculate at base on the upper side. Ambulatory legs with hairy edges, dactyli pubescent.

On the first five segments of the abdomen the eroded cavity is transverse and in the male occupies the entire width of segment.

Color.—A specimen in formalin was cream white with blotches and small spots of bright red, especially persistent on the ambulatory legs, the dactyls of which are red at base and yellowish distally.

Measurements.—Male (25573), entire length of carapace 33, width 47.3 mm.

Range.—Bahamas; east Florida; Gulf of Mexico. Guadeloupe (Desbonne and Schramm, as *vermiculatus*). On coral reefs, to a depth of 36 fathoms. (A. Milne Edwards.)

Material examined.—

BAHAMAS.—Frederick Stearns collection; specimens destroyed by fire.

FLORIDA.—Biscayne Bay; 1901; J. E. Benedict; 1 male (25573).

Cape Florida; G. Wurdemann; Gray Fund, June, 1859; 1 male, 1 female (2217, M. C. Z.).

Tortugas; June–August, 1926; W. H. Longley; 1 female (60719).

Tortugas; W. L. Schmitt; gift of Carnegie Institution: West of Loggerhead Key; six dredge hauls off dock and north of lighthouse pier; 8–5 feet; August 3, 1924; 1 male (60846). Near Fort Jefferson landing, Garden Key; from rocks and *Halimeda* scraped from rocks; August 17, 1924; 1 male (60845). White Shoals; July 20, 1924; stations 35, 36; 1 young (61104). About 10 miles south of No. 2 buoy; 35–37 fathoms; coarse sand; June 10, 1925; haul 206; 2 carapaces (60847).

Southwest of Cedar Keys; lat. 28° 46′ 00″ N.; long. 84° 49′ 00″ W.; 26 fathoms; crs. S. Co.; March 15, 1885; station 2406, *Albatross;* 1 male (17814).

Southwest of Cape San Blas; lat. 29° 17′ 00″ N.; long. 85° 30′ 45″ W.; 26 fathoms; gy. S. brk. Sh.; February 7, 1885; station 2371, *Albatross;* 1 female (9608).

Pensacola; in stomach of fish; D. S. Jordan; 1 male, much defaced (4665).

LOUISIANA.—Grand Isle; June 25, 1928; E. H. Behre; 1 young (63038).

MEXICO.—Campeche Snapper Banks, NE. coast of Mexico; Joseph Lee; one specimen returned to sender.

Off Cape Catoche, Yucatan; lat. 22° 18′ 00″ N.; long. 87° 04′ 00″ W.; 24 fathoms; wh. R. Co.; January 30, 1885; station 2365, *Albatross;* 2 males, 2 females (9585).

Off Cape Catoche, Yucatan; lat. 22° 07′ 30″ N.; long. 87° 06′ 00″ W.; 21 fathoms; wh. R. Co.; January 30, 1885; station 2363, *Albatross;* 3 males, 1 female (15001).

GLYPTOXANTHUS LABYRINTHICUS (Stimpson)

Plate 108, Figures 1–3

Actaea labyrinthica STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 204 [76] (type-locality, Panama; type not extant).

Actaea meandrica LOCKINGTON, Proc. California Acad. Sci., vol 7, 1876 (1877), p. 97 [3] (type-locality, Mulege Bay, Gulf of California; types not extant).

Glyptoxanthus labyrinthicus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 255, pl. 43, figs. 4–4*b*.

Diagnosis.—Surface vermiculated; vermiculations smooth; furrows between them wide; punctae relatively few; mesogastric punctae median and lateral; 5 L flattened.

Description.—Carapace flatter than in *erosus*, less minutely eroded or vermiculated; furrows wider, the prominent parts between principal furrows of erosion being smaller, flatter, and smoother; they are covered with a very fine flat granulation not at all rough. The difference in elevation is especially notable in the area 5 L. The tubercles on outer surface of hands are pointed or mammilliform.

Lockington says: "This little crab has a peculiarly compact appearance. The rugosities of its limbs are so arranged that when they are folded up close to the carapax not a portion of smooth surface can be seen either above or below, the only smooth portions being lateral and hidden."

Color.—Variegated with yellow and carmine (Stimpson).

Measurements.—Female (3272), total length of carapace 23.2, width 32.8 mm.

Range.—West coast of Mexico; Panama; Galapagos Islands.

Material examined.—Panama: Rev. J. Rowell; 1 male, type (1295, M.C.Z.). Capt. John M. Dow; 1 male, 1 female (3272). Darien Exped., Dr. Maack; 2 males (2218, M.C.Z.). On reef: March 12, 1891; *Albatross;* 1 male (20604).

Pearl Islands, Panama Bay; April, 1875; S. Garman; 1 female (2306, M.C.Z.).

Galapagos Islands; June, 1872; *Hassler* Exped.; 1 female (2219, M.C.Z.), slight variation.

GLYPTOXANTHUS VERMICULATUS (Lamarck)

Plate 108, Figure 4; Plate 109

Cancer vermiculatus LAMARCK, Hist. Nat. Anim. sans Vert., vol. 5, 1818, p. 271 (type-locality unknown; type in Paris Mus.).

Xantho vermiculatus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 391.—A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 4, 1868, p. 49.

Actaea angolensis BRITO CAPELLO, Desc. alg. esp. nov. Crust. e Arach. Portugale poss. Port. do ultramar, 1866, p. 4, pl. 1, fig. 3–3*b*; reprinted in Mem. Acad. R. Sci. Lisboa, Cl. de Sci. Nat., new ser., vol. 4, 1867, pt. 1 (type-locality, Angola; type in Lisbon Mus.).

Glyptoxanthus vermiculatus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 255, pl. 43, figs. 2–2*b*.—RATHBUN, Proc. U. S. Nat. Mus., vol. 22, 1900, p. 288.

Actaea (*Psaumis*) *maeandrina* KLUNZINGER, Nova Acta, Abh. K. Leop.-Carol. Deutschen Akad. Naturforscher, vol. 1c, No. 2, 1912, p. 89 [185], pl. 1 [5], fig. 5*a*–5*b*, pl. 6 [10], fig. 4 (type in Stuttgart Mus.).

Actaea vermiculata ODHNER, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 57, pl. 4, fig. 1.

Diagnosis.—Surface vermiculated; vermiculations smooth, showing boundaries between granules; elongate furrows replacing most punctae; cardiac elevation crossed by two long transverse furrows; all mesogastric punctae median.

Description.—In some respects intermediate between *erosus* and *labyrinthicus;* as for example, in convexity of carapace and of vermiculations, and in distinctness of granulation. The raised surface is composed entirely of granules crowded close together and smoothed off so that the elevations present a glossy surface ornamented with darker lines indicating boundaries of granules. Sutures between larger divisions, as well as smaller ones, wide as in *labyrinthicus.*

The number of depressions in the vermiculations is fewer than in either of the other species, partly due (1) to the confluence of two or more depressions to form elongate ones as on 5 L and 2 M and most noticeably on 1 P where there are two long transverse furrows, and (2) to the opening of many of the small depressions into the furrows bordering the islets instead of being entirely enclosed. 3 M has only three depressions, all median, against six (four in a transverse line, two median) in *labyrinthicus* and *erosus.*

The connections of certain areoles are different in the three allied species. The outer protogastric areole (2 M) is independent in *labyrinthicus*, continuous with the epigastric area in *vermiculatus*, while in *erosus* it is free anteriorly but confluent posteriorly with the mesogastric areole. 2 L and 3 L are united in *vermiculatus* and *erosus*, separate in *labyrinthicus.*

Tubercles on outer surface of palm acutely pointed as in *labyrinthicus* but much more complex in their basal outlines.

Color.—White, including the fingers in their whole length; ambulatory claws horn color (Klunzinger).

Measurements.—Female (7589), entire length of carapace 21.8, width 32.6 mm.

Range.—Curaçao, South America; Angola, West Africa (Brito Capello, Osorio).

Material examined.—Curaçao; February 10–18, 1884; *Albatross;* 1 female (7589).

Remarks.—Brito Capello's figure shows the two elongate cardiac furrows; on the other hand the areoles are represented much more subdivided and the outer furrow on the ischium of the external maxilliped much longer and more complete than in the Curaçao specimen here described. The American and African forms are

united on the authority of A. Milne Edwards (1868) who says, "Le *Xantho vermiculatus* des Antilles a été signalé à Angola par M. Capello."

Genus DAIRA de Haan

Daira DE HAAN, Fauna Japon., Crust., 1833, pp. 4 and 18; type, *D. perlata* (Herbst) = *Cancer perlatus* Herbst, 1790 = *Cancer daira* Herbst, 1801 = *Cancer* (*Daira*) *perlatus* de Haan, 1833.

Lagostoma MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 386; type, *L. perlata* (Herbst) = *Cancer perlatus* Herbst, 1790.

Carapace broad, oval, strongly convex in both directions, regions well delimited and subdivided into very numerous rounded, convex lobules; antero-lateral borders strongly arched, crenate; postero-lateral borders concave, very short. Front deflexed, bilobed, lobes conspicuous and prominent. Orbital margin thickened and smoothly crenulate, a strong suture line in lower margin. Eyes on short thick subglobular stalks. Antennules folding obliquely owing to large size of basal article; interantennular septum broad. Basal article of antenna not touching front, the next article and the very short flagellum wedged in gap between orbit and front. Merus of outer maxillipeds with a wide and deep notch in anterior margin.

Chelipeds unequal in both sexes; finger tips either spoon-shaped or acute. Upper edge of merus of chelipeds and legs crestlike, serrated; upper edge of succeeding joints of legs with a crest of stout sharp spines; all this ornamentation concealed by a thick fringe of long coarse hair. Abdomen of male with all seven segments distinct, but the 3rd–5th not movable on one another. (After Alcock.)

Contains two species, *D. perlata*, widely distributed through the Indo-Pacific region, and *D. americana* from the west coast of middle America.

DAIRA AMERICANA Stimpson

Plate 110, Figures 1 and 2

Daira americana STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 212 [84] (type-locality, Cape St. Lucas; type in M.C.Z.).—A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 1, 1866, p. 299, pl. 16, figs. 4–4*c*.

Diagnosis.—Thick tufts of hair among tubercles of carapace. Finger tips pointed, not spooned.

Description.—The furrows separating the different areoles or groups of tubercles on the carapace are filled with thick tufts of coarse hair; these tufts are scarce on the posterior third of the carapace, and are almost absent from a young female 10.8 mm. wide. Tubercles crowded with fine flattened granules, and marked in many cases with impressed lines or patterns of punctae; punctate lines also separate individual tubercles. The five large crenations of the antero-lateral margin are separated by units of one or two smaller crenations, best seen from below, hairy above.

Upper and outer surface of wrist lobulated like the carapace but without hairy tufts. The same surface of hand and dactylus covered with more or less conical tubercles. Upper part of inner surface of wrist and hand covered with a mosaic of flat markings; a similar mosaic occurs on outer surface of arm and merus of legs, but on the dactyli and propodites of the legs the tubercles are either spiny or acute. Fingers pointed, cutting edges dentate in both chelae. Lower edge and surface of merus of legs somewhat excavate to receive the bulging of carpus and propodus in flexion. Upper edge of legs down to the propodus fringed with hair which partially conceals their sculpture. A few brushes of hair on under side of propodus and dactylus.

Color.—Specimens in alcohol are shaded brown, darker anteriorly.

Measurements.—Female (5768), total length of carapace 26, width 37 mm.

Range.—Lower California ["California," A. Milne Edwards] to Ecuador (Nobili).

Material examined.—Cape St. Lucas, Lower California, Mexico; John Xantus; 1 male, type (1275, M. C. Z.). Socorro Island, Mexico; Hanna and Jordan, California Acad. Sci.; 1 young female, returned. Panama; Capt. John M. Dow; 2 females, 1 young (5768).

Genus CARPOPORUS Stimpson

Carpoporus Stimpson, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 138; type, *C. papulosus* Stimpson.

Carapace subhexagonal, nearly as long as broad; antero-lateral margin in a line which conducts beneath the orbit anteriorly, armed with about three small teeth and drawn in posteriorly, the greatest breadth of the carapace being at the penultimate tooth; postero-lateral about as long as posterior margin; facial region very broad; front prominent. Orbit circular. Basal article of antennae narrowing forwards, reaching the front, and the hiatus of the orbit; movable part of peduncle very small; flagellum about as long as eye. Chelipeds when retracted having a large hole above between the carpus and manus for the passage of water to the afferent branchial apertures. Third, fourth, and fifth segments of the male abdomen fused; terminal segment as broad as long.

Contains only one species.

CARPOPORUS PAPULOSUS Stimpson

Plate 110, Figures 3–6; Plate 111

Carpoporus papulosus Stimpson, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 139 (type-localities, SW. of Tortugas, 25 fathoms, and off Carysfort Reef, 52 fathoms; types not extant).—A. Milne Edwards, Crust. Rég. Mex., 1879, p. 247, pl. 44, figs. 1–1*d*.

Diagnosis.—Chelipeds with a large hole above between carpus and manus. Lobes of front very oblique, edge concave. Color of fixed finger encroaching very slightly on palm.

Description.—Carapace naked above, areolated; areolets protuberant, somewhat wartlike and granulated; gastric and epibranchial regions very prominent. Lateral teeth small, spiniform, their interspaces armed with denticles, two or three in number. Front strongly projecting at middle and bilobed, margin of lobe concave, inner end rectangular, outer end spiniform. Peduncle of eye granulated, a few spinules at summit. Orbit with the margin sharply granulated above, two closed fissures faintly indicated, no tooth at upper inner angle; two or three spinules below near outer side and a spine at lower inner angle. Exposed portion of outer maxillipeds, except dactyls, ornamented with bead granules.

Chelipeds when retracted having a large hole above between the carpus and manus for the passage of water to the afferent branchial apertures. Near the middle of the inner surface of the manus are two unequal peglike spines, which form in retraction a sort of filter before the branchial opening.

Carpus and hand sculptured externally with granulated protuberances which on the hand are arranged in four or five longitudinal rows; hand serrated above with four teeth, partially joined by a thin web; fingers stout, short, less than half as long as palm. Legs thickly hairy below; carpus and propodus armed posteriorly with acorn-shaped spines.

Measurements.—Male (15006), length of carapace 13.2, width of same 16, fronto-orbital width 9.5, width of front 5.6 mm.

Range.—Off North Carolina to Mexico.

Material examined.—See table, page 271.

Genus LIPAESTHESIUS Rathbun

Lipaesthesius RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 584; type, *L. leeanus* Rathbun.

Anterior portion of carapace very broad, posterior fourth very narrow; anterior half very convex longitudinally, posterior half flattened. Antero-lateral margin arcuate, running obliquely downward to angle of buccal cavity. Front deflexed, forming a projecting hood over the antennules. Orbits small, subcircular, without sutures. The anterior margin of the basal antennal article is joined to the downward prolongation of the front, only the flat lower surface of the article being exposed to view. The epistome has a deep transverse invagination through its entire width. Abdomen of male with third to fifth segments fused. Chelipeds concave on inner side to fit closely against carapace. Last pair of legs fitting into postero-lateral sinus of carapace.

One species only.

Material examined of Carpoporus papulosus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
North Carolina:	° ′ ″	° ′ ″			° F.						
Between Capes Hatteras and Lookout.	34 38 00	76 12 00	18	fne. gy. S	------	Oct. 19, 1885	2607	*Albatross*	1♀	11220	
Do	34 37 30	75 39 45	34	yl. S. brk. Sh	------	Oct. 18, 1885	2604	do	1♂	11225	
Off Cape Lookout	34 26 00	76 12 00	22	fne. gy. S	------	Oct. 19, 1885	2609	do	1♂	18809	
Florida:											
Off Key West	24 25 45	81 46 00	45	Co	75	Jan. 15, 1885	2318	do	2	15110	
Do	Sand Key Light, WNW., Key West Light, N.		60		------	June 19, 1893	24	Biological Expedition, State University of Iowa.	4♂ 1♀ 2 y	Mus. S. U. I.	
Tortugas	About 10 miles S. of No. 2 buoy.		35–37	crs. S	------	June 10, 1925	206	W. L. Schmitt	1♀ 1 y	60859	Gift of Carnegie Institution.
Do	8 miles S. of red buoy No. 2.		25		------	June 11, 1925	217	do	1♂	61105	Do.
West of Marco	26 13 00	83 44 00	51	wh. S	69	Mar. 18, 1889	5104	*Grampus*	2	15221	
West of Charlotte Harbor.	26 30 00	83 19 00	27.5	gy. S. brk. Sh	67.5	Mar. 23, 1889	5115	do	1	15222	
Do	26 39 00	83 56 30	45	wh. S. Algae	65	do	5119	do	1	15223	
Do	26 33 00	83 10 00	28	sdy	66	Apr. 2, 1901	7123	*Fish Hawk*	1 y	25610	
South of Cape St. George.	28 45 00	85 02 00	30	gy. S. brk. Co	------	Mar. 15, 1885	2405	*Albatross*	3♂ 2♀ 7 y	15006	
South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co	------	do	2406	do	3♂ 3♀ 1 y	15007	
Southeast of St. George Island.	28 47 30	84 37 00	24	Co. brk. Sh	------	do	2407	do	3 y	15008	
Southwest of Cape San Blas.	29 14 00	85 29 15	25	Co	------	Feb. 7, 1885	2373	do	1♀ 2 y	15004	
Do	29 15 30	85 29 30	27	G	------	do	2372	do	1♀ 2 y	15003	
Do	29 18 15	85 32 00	25	crs. gy. S. brk. Sh.	------	do	2370	do	5 y	15002	
West coast of Florida.	----------	----------	25–27	----------	------	do	2369–2374	do	4 y	20326	
Alabama:											
South of Mobile Bay.	29 27 30	87 48 30	30	crs. S. bk. Sp. Sh.	------	Mar. 4, 1885	2390	do	1	18010	
Do	29 24 30	88 01 00	35	yl. S. brk. Sp	------	do	2388	do	2♂	15005	
Mexico: Off Cape Catoche, Yucatan.	22 18 00	87 04 00	24	wh. R. Co	------	Jan. 30, 1885	2365	do	4	15102	

LIPAESTHESIUS LEEANUS Rathbun

Plate 112

Lipaesthesius leeanus RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 585, pl. 42, figs. 4 and 5 (type-locality, southern part of Gulf of California, 10 fathoms; type, Cat. No. 21581, U.S.N.M.).

Medaeus rugosus BOONE, Zoologica, vol. 8, 1927, p. 201, text-fig. 70 (type-locality, off Gardner Bay, Hood Island, Galapagos Islands; type in Mus. N. Y. Zool. Soc.).

Diagnosis.—Basal antennal article terminating at prolongation of front. Surface of carapace and appendages covered with pearly granules which form a more or less reticulating pattern.

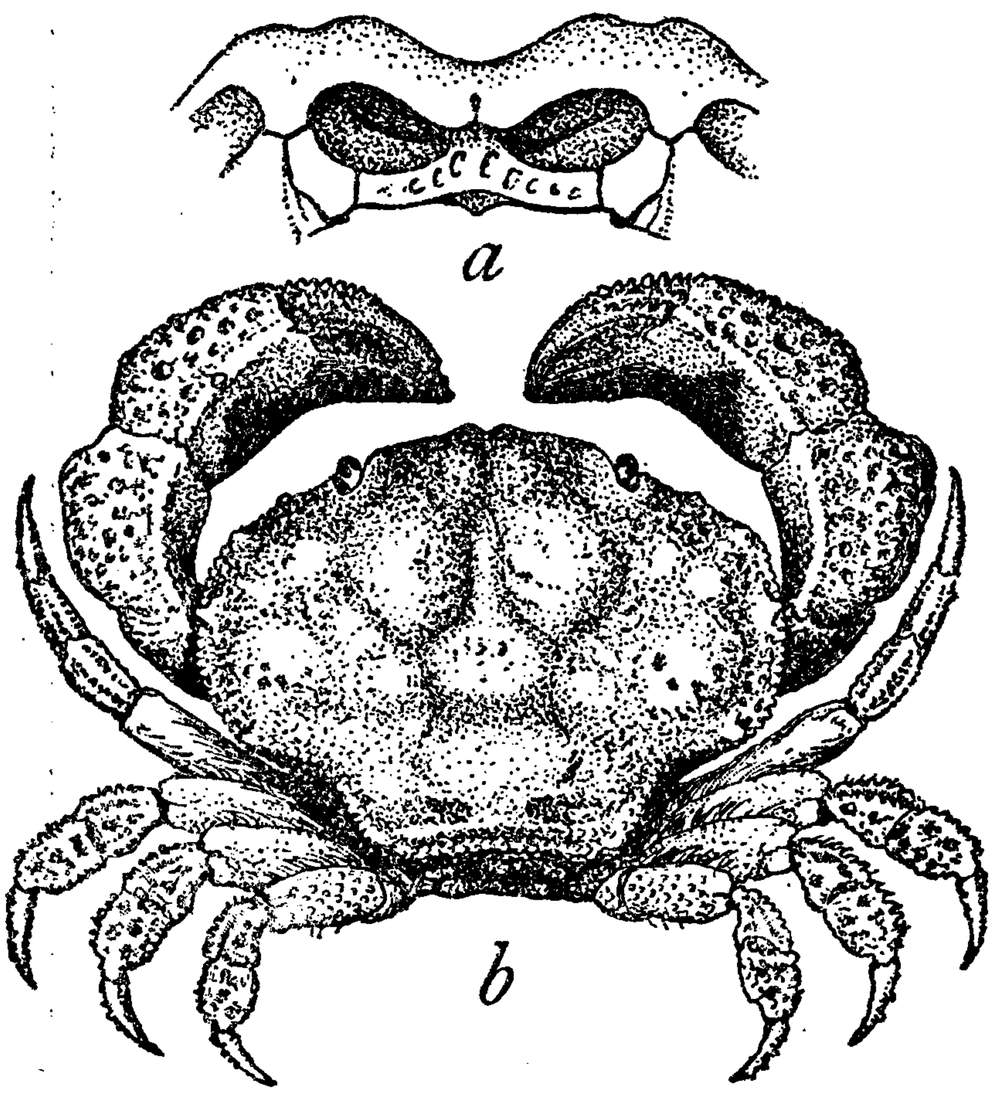

FIGURE 43.—LIPAESTHESIUS LEEANUS, MALE, HOLOTYPE, CARAPACE 11.4 MM. WIDE. *a*. FRONT VIEW. *b*. DORSAL VIEW

Description.—Mesogastric and cardiac regions depressed; protogastric region forming an elevated protuberance; a similar but smaller protuberance at middle of branchial region, and in front of it, two tubercles. Hepatic region inclined strongly toward the vertical. Antero-lateral margin subacute, with about four distant tubercles above the edge. Surface covered with coarse, bead granules arranged to form a network or an eroded surface; gastric sutures smooth. Front strongly deflexed, thin, emarginate, a short closed median fissure; lobes oblique, sinuous, bent down at outer angles to meet basal antennal article. Upper inner angle of orbit fused with the front and without tooth.

The basal antennal article is broad behind, obliquely placed, its distal surface (where the next article is commonly attached) is fixed against the downward prolongation of the front. In the type-specimen, the inner lower angle of the orbit also joins the front, closing the orbit. The antenna, however, is not without a flagellum, as at first supposed. By rotating the eyestalk a short flagellum of a few articles (tip broken off) was disclosed; its attachment is entirely concealed as it proceeds from the upper surface of the basal article, bordering the lining of the orbit.[33] In a smaller male from the type-locality, the union of the front with the orbital angle is very slight, whereas in a small male from Maria Madre, there is no union of front with orbit and the outer angle of the basal article of the antenna lies in the orbital hiatus. The attachment of the movable part of the antenna to the basis is concealed but is not so remote from the orbital

[33] This discovery was not made until the validity of "*Medaeus rugosus*" was investigated.

opening as in the type-specimen, with the result that the flagellum, which is as long as the eyestalk, is not concealed; three articles of the peduncle are visible and at least seven of the flagellum.

Ventral surface of crab granulous and eroded, except abdomen and portions against which legs are applied. Abdomen almost smooth. Palpus of endognath folded above merus and only slightly visible in ventral view.

Chelipeds subequal, thick, outer surface granulate and eroded. Fingers gradually curved downward, very rough with granulation except at the tip; prehensile edges toothed, not gaping; color brown, that of fixed finger running back on palm, further on inner surface than on outer; dactylus longer than superior margin of palm. Legs short, ornamented with granulations similar to those on carapace.

Measurements.—Male holotype, length of carapace 8.4, width of same 11.4, fronto-orbital width 5.7, width of front 3.6 mm.

Range.—From Gulf of California, Mexico, to the Galapagos Islands.

Material examined.—Gulf of California: East of La Paz; lat. 24° 11′ 30″ N., long. 109° 55′ 00″ W.; 10 fathoms; Sh.; April 30, 1888; station 2828, *Albatross;* 2 males, holotype and paratype (21581).

Maria Madre Island, Mexico; 4–10 fathoms; California Academy of Sciences; 1 male (62713); 1 young female, returned.

Gardner Bay, off Hood Island, Galapagos; 15 feet; William Beebe by diving at station 54, *Arcturus;* one ovigerous female, holotype of *Medaeus rugosus* (Mus. N. Y. Zool. Soc.).

Genus MEDAEUS Dana

Medaeus Dana, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 125; type, *M. ornatus* Dana, 1852.—Alcock, Journ. Asiat. Soc. Bengal, vol. 67, 1898, p. 123.—Odhner, Göteborg's K. Vet. Hand., Fjärde Följden, vol. 29, No. 1, 1925, p. 81.

Carapace not very broad, hexagonal, regions well defined and well areolated. Antero-lateral border ascending, cut into about four large teeth with thick tuberculiform tips, and continued beneath the orbits to the angles of the buccal cavern. Fronto-orbital border half, or a little more than half, the greatest breadth of the carapace. Front about a fourth, or a little more than a fourth, the greatest breadth of the carapace, horizontal, rather prominent, notched in the middle line, separated from the supra-orbital margin by a notch. Chelipeds either unequal or subequal, wrists and hands typically covered with large nodules, fingers pointed. Abdomen of male with third to fifth somites fused.

Indo-Pacific region; tropical America.

KEY TO THE AMERICAN SPECIES OF THE GENUS MEDAEUS

A[1]. Palm with a superior lobate crest.
  B[1]. Carpus of ambulatory legs with a multidenticulate crest. **spinimanus**, p. 274.
  B[2]. Carpus of ambulatory legs with a trilobed crest_____**lobipes**, p. 275.
A[2]. Palm without lobate crest, and armed with spinules only__**spinulifer**, p. 276.

ANALOGOUS SPECIES OF MEDAEUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
spinimanus	*lobipes*

MEDAEUS SPINIMANUS (Milne Edwards)

Plate 113

Cancer spinimanus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 378 (type-locality unknown; type in Paris Mus.).
Cancer miniatus DESBONNE and SCHRAMM, Crust. Guadeloupe, 1867, p. 23, pl. 4, fig. 3 (type-locality, Guadeloupe; type not extant).
Medaeus spinimanus A. MILNE EDWARDS, Ann. Soc. Entom. France, vol. 7, 1867, p. 270; Crust. Rég. Mex., 1879, p. 250; 1880, pl. 44, figs. 3–3*b*.

Diagnosis.—Carpus of ambulatory legs with a multidenticulate crest. Distal end of abdominal segments of male without a band of pubescence. Tuberculation of carapace coarse and conspicuous.

Description.—Carapace bare, strongly lobulated especially anteriorly; all the prominent parts granulate, all the furrows smooth. Front most advanced in the middle, lobes oblique, a narrow median fissure, best seen from below where it is continued to the point of the epistome. Orbits subcircular; infero-internal angle more produced than basal article of antenna. Antero-lateral border cut into four triangular teeth which are united by a denticulate crest; the first tooth which is the smallest is placed below the level of the outer orbital angle. Pterygostomian regions, outer maxillipeds and sternum granulate.

Chelipeds short and stout; arm not projecting beyond carapace, granulated below; wrist rugose and granulate outside and above, two somewhat conical teeth at inner angle; hand surmounted by a crest cut into five large teeth, and ornamented outside with raspberrylike tubercles arranged more or less in longitudinal rows and separated by irregular, crowded granules; fingers broad, deeply channeled, prehensile edges meeting when closed; above the dactylus a crest the edge of which is feebly granulate in its proximal half. Color of immovable finger not continued on palm. Ambulatory legs rather long, covered with granules or spinules, margins hairy except the dactyls which are hairy all over.

Abdomen of male narrow, basal half granulate.

Color.—Carapace yellowish gray spotted with vermilion; chelipeds vermilion, legs spotted with the same; fingers brown (Desbonne). Orange red (A. Hyatt Verrill).

Measurements.—Male (31085), entire length of carapace 20.4, greatest width of same 34.7, fronto-orbital width 16.6, front 9.9 mm.

Range.—Bahamas; West Indies. Rare.

Material examined.—Off Green Cay, Bahamas; in oyster dredge; June 30, 1903; B. A. Bean, Geographic Society of Baltimore; 1 male (31085).

Guadeloupe; M. Beaupertius; received from Paris Museum; 1 female (20265).

Dominica; 15 fathoms; A. Hyatt Verrill; identified from pencil sketch.

Martinique; specimen in Paris Museum.

MEDAEUS LOBIPES Rathbun

Plate 114

Medaeus lobipes RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 583, pl. 44, fig. 1 (type-locality, Panama Bay, 33 fathoms; type, Cat. No. 21580, U.S.N.M.).

Diagnosis.—Carpus of ambulatory legs with a trilobed crest. Distal end of abdominal segments of male with a band of pubescence. Tuberculation of carapace fine, inconspicuous.

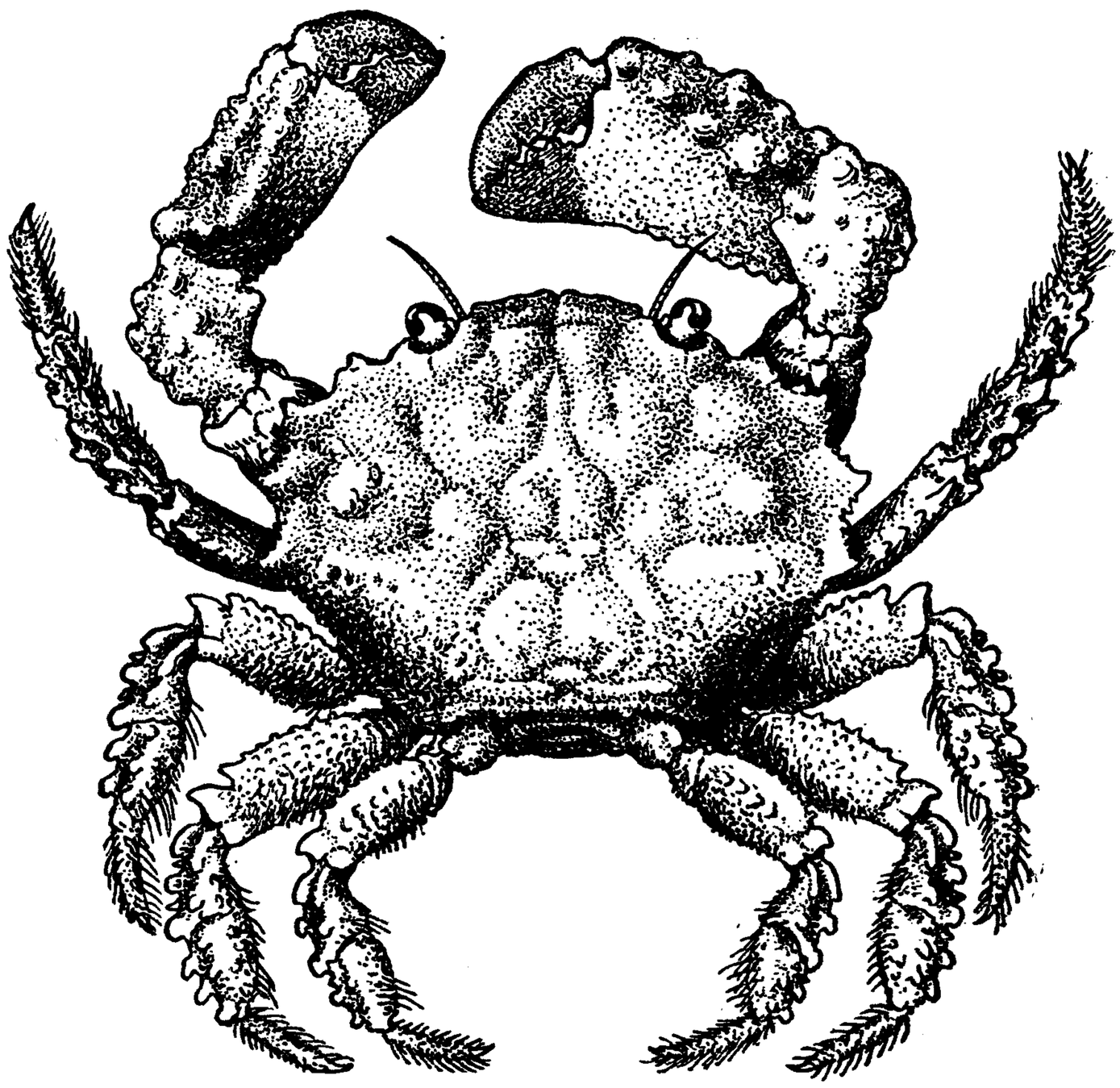

FIGURE 44.—MEDAEUS LOBIPES, MALE, HOLOTYPE, CARAPACE 25.6 MM. WIDE, DORSAL VIEW

Description.—Compared to *M. spinimanus*, the carapace is shorter and broader, lobules similar in shape and position, their area of tuberculation diminishing with age; front less advanced, its lobes less oblique. Cardiac and metagastric region each divided by a median sulcus into two lobules. Chelipeds more feebly roughened than in *spinimanus;* teeth on upper border of hand very unequal, the second, counting from the wrist, largest, the distal one a low tubercle. Ambulatory legs shorter than in the allied species; merus denticulate or spinulous on upper margin, carpus with a trilobed crest above, propodus with a row of three smaller lobes or teeth on each side of the upper surface; a similar row on each side of the carpus of the first three legs, and on the outside of the last leg. Legs hairy, especially the

last. First three segments of male abdomen tuberculate; distal end of each segment save the last marked by a narrow transverse band of pubescence. Posterior half of sternum tuberculate, anterior half punctate.

Measurements.—Male holotype, length of carapace 17, width 25.6 mm. Female (21986), length 8.5, width 12.3 mm.

Range.—Cape St. Lucas, Mexico; Bay of Panama; Galapagos Islands, 5½ to 33 fathoms.

Material examined.—Off Cape St. Lucas, Lower California, Mexico; lat. 22° 52′ 00″ N.; long. 109° 55′ 00″ W.; 31 fathoms; rky.; temp. 74.1° F.; May 1, 1888; station 2829, *Albatross;* 1 male (21987).

Bay of Panama; 1888; *Albatross:* Lat. 8° 05′ 00″ N.; long. 78° 51′ 00″ W.; 33 fathoms; gy. S. brk. Sh.; Mar. 5; station 2796; 1 male, holotype (21580). Lat. 7° 56′ 00″ N.; long. 79° 41′ 30″ W.; 51½ fathoms; gn. M.; Mar. 30; station 2805; 2 small males (21985).

Off Hood Island, Galapagos Islands; lat. 1° 21′ 30″ S.; long. 89° 39′ 45″ W.; 20 fathoms; co. S.; April 7, 1888; station 2812, *Albatross;* 1 female (21986).

MEDAEUS SPINULIFER (Rathbun), new combination

Pilumnus spinulifer RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 585, pl. 42, figs. 6–8 (type-locality, off Cape St. Lucas, 31 fathoms; type, Cat. No. 21582, U. S. N. M.); Proc. Washington Acad. Sci., vol. 4, 1902, p. 281.—BOONE, Zoologica, vol. 8, 1927, p. 217, text-fig. 79.

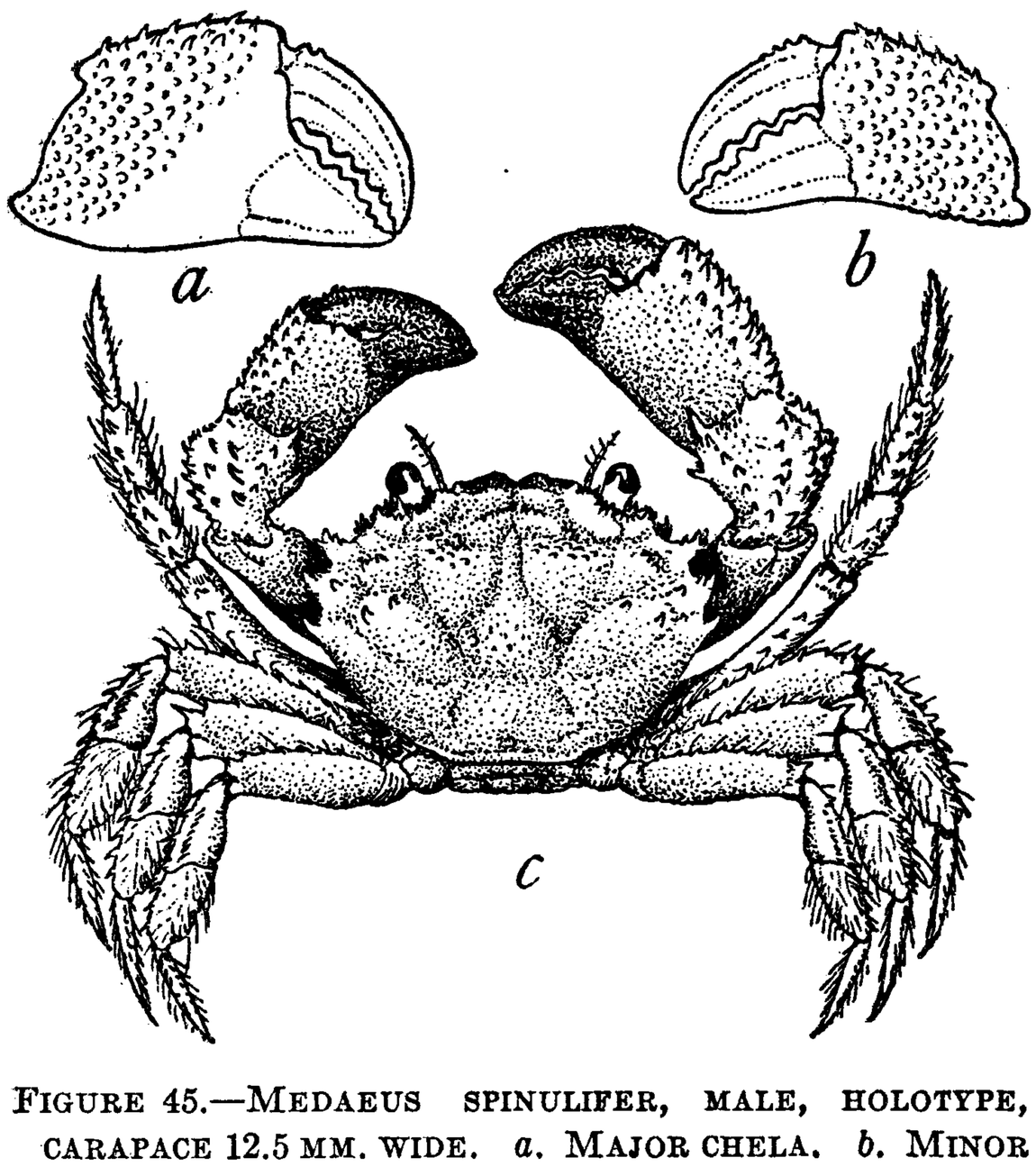

FIGURE 45.—MEDAEUS SPINULIFER, MALE, HOLOTYPE, CARAPACE 12.5 MM. WIDE. *a.* MAJOR CHELA. *b.* MINOR CHELA. *c.* DORSAL VIEW

Diagnosis.—Rough and hairy. Four lateral spines, a subhepatic spine. Frontal lobes triangular. Half or nearly half of outer surface of major palm smooth and bare.

Description.—Carapace covered with a short coating of downy hair, thicker on anterior portion, where there are tufts of longer and stouter setae; or it may be nearly naked in large specimens. Carapace wide, convex in both directions, deeply areolated, covered with spiniform granules which are very small posteriorly, but larger anteriorly, many becoming spinules on the antero-lateral regions. Median sinus of front very large and V-shaped, forming inner margins of two large angular lobes whose outer margins are longer and very oblique;

outer angles of front rectangular, inconspicuous; edge thin and granulate. Superior margin of orbit spinulous, inferior margin armed with slender spines; inner suborbital tooth prominent, subtriangular, edge spinulous, sharp. Antero-lateral margin with four spines, bordered by smaller spines or spinules; between the second and first or orbital tooth is the greatest interval, below which is a subhepatic spine similar to, but less produced than those of the margin. Lower surface of carapace rough, similar to upper.

Chelipeds hairy except on smooth portions. Arms granulate on outer surface; margins armed with spines and spinules, those of upper surface increasing in size distally. Wrist rough with sharp granules or spinules. Upper and proximal half of outer surface of major palm covered with stout spinules, which have a tendency to form longitudinal rows and toward the lower and distal margins become smaller and granuliform. Smaller palm roughened on entire outer surface with spinules or spiniform granules; upper surface with two rows of spines; inner face granulous except near fingers; dactyli of both chelipeds a little roughened near the base. Fingers of minor chela deeply grooved, of major chela less so. Merus of legs armed on anterior margin with a row of slender spines; posterior margin spinulous; carpus and propodus armed above, below, and anteriorly with a row of spines. Legs sparingly hairy.

Variation.—In the largest (type) specimens the carapace is nearly naked and rougher than in the smaller specimens; the bare portion of the outer surface of the major palm is more distal than inferior. In the Galapagan specimens the carapace is clothed with hair, and the bare portion on the major palm is almost wholly inferior and is set off by a longitudinal row of acute granules.

Measurements.—Male, holotype, entire length of carapace 8.8, width of same including spines 12.5, fronto-orbital width 8.2, width of front 4 mm.

Range.—From Cape St. Lucas, Lower California, Mexico, to Galapagos Islands.

Material examined.—Off Cape St. Lucas; lat. 22° 52′ 00″ N.; long. 109° 55′ 00″ W.; 31 fathoms; rky.; temperature 74.1° F.; station 2829, *Albatross;* 2 males, 1 is holotype (21582).

Tagus Cove, Albemarle Island, Galapagos Islands; 1899; Hopkins Stanford Galapagos Expedition: 12 fathoms; 1 male (25670), 1 male, 1 young female (Stanford Univ.). Reef, north of Tagus Hill: March 16; 1 male (25669).

Remarks.—In this species the antero-lateral border is not prolonged so distinctly to the buccal angle as in typical *Medaeus*. In this respect it is akin to *M. reynaudii* (Milne Edwards), formerly in *Xantho*, but recently placed in *Medaeus* by Odhner.[34] In *spinulifer* the areolation, shape of front and arrangement of lateral teeth conform to *Medaeus*.

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[34] Göteborg's K. Vet. Hand., Fjärde Följden, vol. 29, No. 1, 1925, p. 81.

GAUDICHAUDIA, new genus

Type.—*Xantho gaudichaudii* Milne Edwards.

Diagnosis.—Near *Xantho*. Front one-fifth of carapace-width; margin thick, appearing double-edged, bilobed, lower or true edge quadrilobulate. Orbits subcircular, edge subentire, three sutures faintly indicated. Basal article of antenna broad, touching front; first movable article broad, situated in the orbital hiatus. Epistome slightly produced at middle. Antero-external margin of merus of outer maxilliped nearly transverse; antero-internal margin not deeply notched, but sinuous or somewhat trilobed. Legs broad, thick, and rough. Otherwise as in *Xantho*.

Contains only one species.

GAUDICHAUDIA GAUDICHAUDII (Milne Edwards), new combination

Plates 126 and 127

Xantho gaudichaudii Milne Edwards, Hist. Nat. Crust., vol. 1, 1834, p. 396 (type-locality, Chile; type in Paris Mus.).—Milne Edwards and Lucas, d'Orbigny's Voy. Amér. Mér., vol. 6, pt. 1, 1844, p. 15; vol. 9, atlas, 1847, pl. 5, fig. 4.—Rathbun, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 540, pl. 39, fig. 1 (after Milne Edwards and Lucas).

Xantho bifrons Ortmann, Zool. Jahrb., vol. 7, 1893, p. 450, pl. 17, fig. 7 (type-locality, Ancon [35] Gulf; type in Strassburg Mus.).

Xantho gaudichaudi Ortmann, Zool. Jahrb., vol. 10, 1897, p. 296.—Lenz, Zool. Jahrb., Suppl. 5, vol. 2, 1902, p. 760.—Porter, Revista Chilena Hist. Nat., vol. 9, 1905, p. 32, text-fig. 1.

Diagnosis.—Margin of carapace thick. Edge of front with four small lobules. Margin of orbit subentire. Four antero-lateral lobes, the first one almost obsolete. Upper margin of merus of ambulatory legs spinulous.

Description.—Surface punctate and under the lens finely and closely granulate. Areolation fairly well marked; a deep longitudinal groove runs back from the fronto-orbital notch. Antero-lateral margin very thick, without tooth at orbit; first lobe low, obscure; next three lobes slightly prominent or dentiform with very blunt tips. Sinuses of front U-shaped, the lateral ones broadly so; both edges of front coarsely granulate. Inner supra-orbital tooth well marked and well separated from the front.

Chelipeds unequal in both sexes, heavy; upper margin of merus denticulate, a shallow subdistal sinus; carpus with a short blunt inner tooth and a more obscure one below; manus widening distally; the black of the fingers covers all but the tips and the extreme proximal end of the dactylus, and extends from the immovable finger back a little on the palm. Ambulatory legs rough and hairy; merus spinulous on upper margin; carpus and propodus more or less sharply

[35] Ecuador.

roughened on upper half; last three articles covered with short, bristly hairs.

Color.—Reddish brown (Nicolet).

Measurements.—Male (21993), total length of carapace 33, width of same 50, fronto-orbital width 18, width of front 10 mm.

Range.—Ecuador to Chile. Island of Juan Fernandez (Porter).

Material examined.—

PERU.—R. E. Coker, for the Peruvian Government: Bay of Sechura, west of Matacaballa, in trawl at about 5 fathoms, April 8, 1907, 1 very young (40421). La Punta, tide pool on shingle beach, December, 1906, 1 young male (40422), 1 male (Peruvian Government).

CHILE.—Antofogasta; November 15, 1926; W. L. Schmitt; 1 male (60739). Santiago (?); 1 male (17537). Port Otway; February 10, 1888; *Albatross;* 8 males, 5 females (21993). Exact locality not given; 1 immature female (Mus. Paulista, 1306).

Variation.—The young have a more deeply areolated carapace, the three dentiform lateral lobes more prominent and more acute, the margin of the frontal lobes concave but not lobulated.

Genus PLATYXANTHUS A. Milne Edwards

Platyxanthus A. Milne Edwards, Ann. Sci. Nat., ser. 4, vol. 20, 1863, p. 280; type, *P. orbignyi* (Milne Edwards and Lucas).

Antero-lateral margins strongly arched; front very little advanced beyond the arch, and deeply separated from the dentiform superior angles of the orbits. Surface convex, uneven. Antero-lateral margin cut into five teeth or lobes (including the orbital angle), some or all of which are subdivided. Front typically quadridentate. Inner lower tooth of orbit well developed. Basal article of antenna falls far short of front. Anterior margin of merus of outer maxillipeds oblique. Chelipeds unequal, strong. No subterminal tooth on merus of ambulatory legs. Abdomen of male with its seven segments distinct.

South American coasts.

KEY TO THE SPECIES OF THE GENUS PLATYXANTHUS

A¹. Merus of outer maxilliped longer than broad.

B¹. Second, third and fourth antero-lateral lobes deeply subdivided into large teeth. Outer tooth of front directed forward. Fingers shorter than middle length of palm ..... **orbignyi**, p. 280.

B². Antero-lateral lobes not deeply subdivided. Outer tooth of front directed obliquely outward. Fingers as long as middle length of palm. **cokeri**, p. 283.

A². Merus of outer maxilliped as broad as long.

B¹. Regions slightly indicated. Frontal lobes each subdivided by a deep sinus into two tuberculiform teeth. Dark color almost covering dactylus of chelipeds ..... **crenulatus**, p. 281.

B². Regions fairly well indicated, especially the hepatic and anterior gastric regions. Frontal lobes each subdivided by a broad shallow sinus. Dark color covering about two-thirds of dactylus of chelipeds. **patagonicus**, p. 284.

ANALOGOUS SPECIES OF PLATYXANTHUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
crenulatus	*cokeri*

PLATYXANTHUS ORBIGNYI (Milne Edwards and Lucas)

Plate 115; Plate 116, Figure 2

Xantho orbignyi MILNE EDWARDS and LUCAS, d'Orbigny's Voy. Amér. Mer., vol. 6, pt. 1, 1844, p. 14; atlas, vol. 9, 1857, pl. 7, fig. 1–1*e* (type-locality, Chili; type in Paris Mus.).

Platyxanthus orbignyi A. MILNE EDWARDS, Ann. Sci. Nat., ser. 4, vol. 20, 1863, p. 280.

Diagnosis.—Antero-lateral margin cut into nine large teeth. Merus of outer maxillipeds longer than broad; two punctate lines on ischium. Ambulatory legs very broad.

Description.—Carapace moderately convex, uneven; regions outlined by shallow furrows; a broad median furrow extends backward from the front margin. Surface paved with crowded flattened granules; a raised line runs obliquely backward from the last lateral tooth. Antero-lateral borders broadly arcuate, occupying three-fifths of the length of the carapace; they are cut into nine strong teeth trending forward and a few secondary teeth, not counting the first or orbital tooth; the last tooth is simple; the eight intermediate ones are resolvable by the depth of the emarginations into three groups of two, four and two teeth respectively. The numerous marginal teeth therefore correspond to the five teeth or lobes in other species of the genus and in most species of Xanthidae. Postlateral margin slightly sinuous. Front divided into four subequal triangular blunt teeth; median sinus deeper than the lateral. Inner upper tooth of orbit short but well marked; the three fissures of orbit deeply cut; outer suborbital tooth more advanced than the one above it; inner suborbital tooth as advanced as or more advanced than the front.

Ischium of outer maxillipeds with a longitudinal row of linear punctae near inner margin; another row of round and more distant punctae at inner third; merus subtriangular, elongate, outer angle opposite inner tooth. Chelipeds massive, very unequal; a low protuberance on upper border of arm and an acute tooth at inner angle of wrist; palms swollen; fingers shorter than middle length of palm, gaping; the dark color of the dactylus does not cover the basal fourth, that of the immovable finger is not continued on the palm; prehensile teeth white. Under part of carapace, upper border of arm and margins of legs hairy.

Color.—Red spotted with yellowish above, yellow below, fingers and nails black (A. Milne Edwards and Lucas).

Measurements.—Male (14847), total length of carapace 63.4, width of same 93, fronto-orbital width 27.3, width of front 13.8 mm.

Range.—Peru; Chile.

Material examined.—

PERU.—Salavery; October 22, 1926; W. L. Schmitt; 3 males, 3 females (2 ovigerous) (60967).

Callao; May 18, 1908; R. E. Coker collector; received from Peruvian Government; 1 male (40412).

Callao; specimens in Paris Mus.

San Lorenzo Island; January, 1884; Dr. W. H. Jones, U. S. Navy; 1 ovigerous female (13864).

Pisco Bay; specimens in Paris Mus.

Peru: Dr. W. H. Jones, U. S. Navy; 3 males, 1 female (14847, 46331). W. E. Curtis; 8 specimens (12552).

PLATYXANTHUS CRENULATUS A. Milne Edwards

Plate 116, fig. 1; Plates 117–119

Platyxanthus crenulatus A. MILNE EDWARDS, Bull. Soc. Philom., ser. 7, vol. 3, 1879, p. 106, pl. 2, fig. 1 (type-locality, Patagonia; type in Paris Mus.). Not *P. crenulatus* Rathbun, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 540, except figure copied from A. Milne Edwards.

Diagnosis.—Carapace nearly smooth; four antero-lateral lobes or teeth. Merus of outer maxillipeds as broad as long, anterior margin oblique. Dark color almost covering dactylus of chelipeds.

Description.—Regions feebly indicated. Surface covered with small separated granules. An oblique raised granulated line on the hepatic and on the epibranchial region, parallel to each other. Two similar transverse parallel lines on each protogastric region, the posterior shorter and further from the median line than the anterior; while these granulated lines are distinct in small and medium specimens they disappear in the old. Antero-lateral borders occupy half the length of carapace and are cut by three V-notches into two lobes and two teeth; the first two lobes are subequal in extent, edges crenulate, the crenules deeply divided in the young, obscure in the old; the first lobe is transverse for half its length and confluent with the orbital angle which is dentiform in the young, not so in the old; third and fourth prominences dentiform, subacute, the third projecting sideways beyond the line of the preceding lobe and bearing a denticle or two at the posterior end of its outer margin. A line of coarse granules runs obliquely inward from tip of last tooth. Post-lateral margin nearly straight. Four frontal teeth subequal, tuberculiform, separated by U-shaped sinuses, median sinus narrow, outer sinuses very wide. Inner supra-orbital tooth triangular; orbital fissures deep; of the two inferior, rounded teeth the outer is the smaller and more advanced than outer angle of orbit, the inner tooth is

more advanced than the inner supra-orbital tooth but less advanced than frontal teeth.

Ischium of outer maxillipeds with a deeply impressed longitudinal line at its inner two-fifths; merus as broad as long. Chelipeds very unequal in both sexes; a deep subdistal indentation on upper margin of merus and a corresponding low tooth; a short subacute tooth at inner angle of wrist; palms inflated, fingers considerably shorter than middle length of palm, gaping; the dark color of fingers covers the dactyl except at its base and barely covers the fixed finger; prehensile teeth white. Dactyls of ambulatory legs clothed, except in the longitudinal furrows and the horny tips, with a short felt; also a fringe of longer hair on the lower margin.

Young.—Two young, the largest only 11.3 mm. wide from La Paloma, have the front double-edged, the edges granulate and separated by a deep groove; the lobes are subtruncate and slightly concave but scarcely bilobed, although the inner part of the lower lobe projects slightly beyond the upper edge. In all other characters these specimens resemble adult *crenulatus*. The probability is, therefore, that the lower edge of the front in the young becomes the true thick edge in the adult, and that the upper edge in the young is represented in the adult by the row of coarse granules just behind the front which is set off by an inconspicuous groove corresponding to the deep marginal groove in the young. A series of sizes intermediate between 12 and 40 mm. in carapace width is needed to confirm this surmise.

Color.—Dried male (57124), dark carmine above, light buff below, ambulatory legs and hind part of carapace dotted with light buff; fingers nearly black.

Measurements.—Male (57124), total length of carapace 50.8, width of same 74.2, fronto-orbital width 23.2, front 12.3 mm. Young male (60972), total length of carapace 8.7, width of same 11.3, fronto-orbital width 6.1, width of front 3.1 mm.

Range.—Uruguay to Patagonia.

Material examined.—

URUGUAY.—Coronilla Island; beach; 1922; Hugh M. Smith; 1 major chela (57692).

Cabo Polonia, Rocha; F. Felippone; 3 males, 2 females and 3 major chelae of larger specimens (55569, 56689, 57124).

Cabo Santa Maria, Rocha; F. Felippone; 1 male (57574), 1 female (54635), 1 female (61379).

Puerto La Paloma; December 6 and 7, 1925; W. L. Schmitt; 19 specimens (60964, 60965). March, 1925; *Atair;* 1 young, lent by Buenos Aires Mus. (15412), 1 young (60972). F. Felippone; 1 male, 1 ovigerous female (61378).

Punta del Este, Maldonado; 1922; F. Felippone; 1 male (57123).

Montevideo; F. Felippone; 1 male (55174).

ARGENTINA.—Market of Buenos Aires; from stomach of *Acanthistius patachonicus;* U. S. Bureau of Fisheries; 1 male (32566).

La Plata; February, 1902; Bisego collector; 1 male (Mus. Paulista, 383).

Puerto San Antonio West; April, 1920; A. Carcelles, collector; 3 females (60963); gift of Buenos Aires Museum.

Mar del Plata; 1 young male (60966); gift of Buenos Aires Museum.

Argentina; exact locality not given; 1910; A. Hrdlicka; 1 female (50528).

PATAGONIA.—Exact locality not given; d'Orbigny collector; 2 cotypes (Paris Mus.).

PLATYXANTHUS COKERI, new species

Plates 120–122

Platyxanthus crenulatus RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 540, not pl. 39, fig. 2; not *P. crenulatus* A. Milne Edwards 1879.

Type-locality.—Near mouth of Rimac River, Peru; R. E. Coker; one male holotype (Cat. No. 40410, U.S.N.M.).

Diagnosis.—Carapace very convex. Outer frontal teeth directed obliquely outward. Merus of maxillipeds longer than broad. Fingers in the old as long as middle length of palm. Major dactylus without large basal tooth.

Description.—Closely allied to *P. crenulatus*, to which I formerly assigned these Peruvian specimens. The carapace is more convex than in *crenulatus;* the granulation is similar, but the granules are thickly interspersed with punctae plainly visible to the naked eye; the hepatic and the epibranchial ridge are thick and blunt and persist in the old; there is also a single but less evident protogastric ridge; in the young only is there a trace of the second or short ridge. The first of the antero-lateral lobes is longer than the second and is separated from the orbital angle by a distinct sinus; the anterior margin of the two lateral teeth slopes inward and forward instead of inward and backward as in *crenulatus;* postlateral margin more sinuous. Outer teeth of front wider than inner and directed obliquely outward; median sinus subtriangular, wider than in *crenulatus*, lateral sinuses broad, asymmetrical. Inner supra-orbital tooth forming an obtuse angle; orbital fissures short and shallow; suborbital teeth lobiform, outer one low, inner one large, inclined inward and nearly as advanced as the outer frontal tooth; outer angle of orbit less advanced than the tooth below it. The first and second truncate lobes of the antero-lateral margin are bordered by shallow crenulations; the last three sinuses are broadly V-shaped.

Merus of outer maxilliped longer than wide, the anterior (or antero-external) margin being more oblique than in *crenulatus;* the merus is intermediate in shape between those of *orbignyi* and *crenulatus*. The merus of the chelipeds has a strong, acute, upstanding,

subdistal tooth; the distal extremity also is acutely pointed. Tooth at inner angle of carpus strong. Fingers more elongate than in *crenulatus;* in the old the dactylus of both chelae exceeds in length the middle length of the palm; the major dactylus has no large basal tooth as is present in both sexes in *crenulatus;* the dark color of the fingers in the female of medium size covers little more than the distal half except alongside the white prehensile teeth; in the old male the color has almost disappeared, but it seems to have been much less extensive than in the smaller specimen. The felt-like covering of the dactylus of the ambulatory legs is interrupted by five longitudinal lines of short hairs.

Young.—A young male, 31.9 mm. wide, shows the following differences from the adult: The first and second lobes of antero-lateral margin are cut into irregular, tuberculiform denticles; the second lobe, especially on the right is in its entirety more dentiform than in, the adult.

Measurements.—Male holotype, total length of carapace 59.8, width of same 88.3, fronto-orbital width 26.7, frontal width 13.6 mm.

Range.—Peru.

Material examined.—

PERU.—R. E. Coker collector; received from Peruvian Government: Southeast of Caleta Colon, Bay of Paita; 7 to 8 fathoms; soft mud; taken in boat beam trawl; April 13; 1 young male (40411). Near mouth of Rimac River; thrown on beach by strong sea; February 4, 1907; 1 male holotype, 1 female returned to Peruvian Government. Callao; identified by a photograph received from R. E. Coker. · Pisco, on beach; July 7, 1908; 1 female (40409).

Paita; October 8, 1926; W. L. Schmitt; 1 young (62714).

PLATYXANTHUS PATAGONICUS A. Milne Edwards

Plates 123–125

Platyxanthus patagonicus A. Milne Edwards, Bull. Soc. Philom., ser. 7, vol. 3, 1879, p. 107, pl. 1 (type-locality, Patagonia; type in Paris Mus.).

Diagnosis.—Surface very uneven, antero-lateral margin with numerous indentations. Frontal lobes not deeply subdivided. Merus of maxilliped broader than long. Dark color covering about two-thirds of dactylus of chelipeds. Ambulatory legs narrow.

Description.—Carapace uneven; hepatic region defined by broad deep furrows; anterior mesogastric region distinct; surface covered with a flat pavement of dense granules and innumerable punctae; toward the margins and on the ridges coarsely granulate; an hepatic and an epibranchial ridge, subparallel; a short high epigastric ridge, a protogastric ridge directed inward and a little backward; a ridge proceeding obliquely backward from the last lateral tooth and finally turn-

ing transversely inward on the carapace; this portion is accented by furrows behind and before. The antero-lateral margin is considerably divided and subdivided into teeth and denticles or crenules whose true relations are indicated by the three broad furrows which divide the margin into four parts. The first lobe, which is confluent and in line with the orbital angle, is transversely oblique and is divided into four or five denticles followed by a small bidentate lobe; the second lobe is divided into a large subacute triangular tooth with a denticle on each slope followed by a small bidentate lobe; the third projection is the largest, dentiform, and has 2 or 3 denticles on its outer margin; last tooth narrow, simple. Front bilobed, lobes with concave margins, median sinus a narrow slit. Inner orbital angle blunt, inner margin of orbit raised and separated by a furrow from the frontal region; the two suborbital teeth small, the outer one lobiform, the inner one narrow, acute, much less advanced than the tooth above it.

Merus of outer maxilliped broader than long, distal margin slightly oblique, arcuate; outer lobe more advanced than inner. Chelipeds coarsely granulate; merus roughly denticulate above and with a strong rectangular subdistal tooth; carpal tooth stout; palms elongate, much exceeding fingers; a groove on outer surface just below upper margin. The dark color extends the whole length of the fingers along the prehensile edges, but only two-thirds the distance on outer edges; a strong tooth at base of major dactyl. A furry covering on the dactyls of ambulatory legs except in the lateral furrows.

Measurements.—Male (32842), total length of carapace 45, width of same 62.3, fronto-orbital width 22, width of front 13.4 mm. Male holotype, length of carapace 75, width of same 100 mm. (A. Milne Edwards). Male, Puerto Priamides, length of carapace 75, width 109 mm.; length of right palm through middle 73, width 35, thickness 23 mm.; length of left palm through middle 64, width 29, thickness 18 mm.; length of right movable finger from top at articulation to tip, 65, of left ditto, 53; right fixed finger broken, length of left from base of sinus to tip, 40 mm.

Range.—Uruguay to Patagonia.

Material examined.—

URUGUAY.—Cabo Santa Maria; F. Felippone; 1 male (32842).

East of Cabo Santa Maria; lat. 34° 50′ S., long. 52° 20′ W.; 58–65 fathoms; *Undine;* 1 male (Buenos Aires Mus., 16658); carapace 94 mm. wide; photographs sent by M. Doello-Jurado.

Off Mar Chiquita; lat. 37° 50′ S., long. 56° 00′ W., 1 male (Buenos Aires Mus., 17635); carapace 97 mm. wide; photographs sent by M. Doello-Jurado.

ARGENTINA.—Mar del Plata: August 7, 1918; 1 female (60824); received from Buenos Aires Museum. Twenty-five fathoms; March,

1918; Martin Doello-Jurado collector; 1 young female; lent by Buenos Aires Museum (9359). Dr. Pedro Rojas collector; 1 ovigerous female (Buenos Aires Mus., 12908); carapace 91 mm. wide; photographs sent by M. Doello-Jurado.

Argentina; 1897; Bicego collector; 1 young; lent by Mus. Paulista (923).

PATAGONIA.—D'Orbigny collector; 1 male holotype (Paris Mus.).

Playa Puerto Piramides; March, 1915; Martin Doello-Jurado collector; 1 large male (Buenos Aires Mus. 9185*a*); examined by Dr. W. L. Schmitt; photographs sent by the collector.

Genus PARAXANTHUS Milne Edwards and Lucas

Paraxanthus MILNE EDWARDS and LUCAS, d'Orbigny's Voy. Amér. Mer., vol. 6, pt. 1, 1844, p. 18; type, *P. hirtipes* Milne Edwards and Lucas.—NICOLET, in Gay, Hist. Chile, vol. 3, 1849, p. 140.

Carapace narrow, nearly flat except toward the edges; regions well marked; antero-lateral borders long, quadrilobate. Front very prominent, bilobed. Orbits small, oval, directed obliquely upward and forward; margin as in *Xantho*. Antennules folding very obliquely. Antennae in the inner hiatus of orbit, basal article small, scarcely reaching front, next article short, flagellum of medium length. Epistome small and deeply sunken. Buccal cavity much longer than wide, anterior border almost semicircular, arched upward not forward. Outer maxillipeds elongate; merus longer than wide, its anterior border so oblique that its inner angle forms a sort of terminal tubercle, and is prolonged noticeably beyond the insertion of the following article which is disposed as in *Cancer*, that is, situated in a cut of that angle. First maxillipeds almost like those of *Xantho*, as are also the chelipeds and legs except that the meropodites of the latter are so short that they do not reach the line of the lateral border of the carapace. The sternal plastron is rather wide anteriorly, strongly narrowed behind; the abdomen is very narrow in both sexes, all segments are distinct in the female, the third, fourth and fifth fused in the male. (Milne Edwards and Lucas.)

Contains only one species.

PARAXANTHUS BARBIGER (Poeppig)

Plates 131 and 132; Plate 133, Figures 1 and 2

Gecarcinus barbiger POEPPIG, Arch. f. Naturg., vol. 2, pt. 1, 1836, p. 138 (type-locality, shallow brackish bays at the mouths of the Andalien river near Concepcion, Chile; type in Leipzig Mus.).—NICOLET, in Gay, Hist. Chile, vol. 3, 1849, p. 153.

Paraxanthus hirtipes MILNE EDWARDS and LUCAS, d'Orbigny's Voy. Amér. Mér., vol. 6, pt. 1, 1844, p. 19; vol. 9, atlas, 1847, pl. 7*bis* (type-locality, Valparaiso; type in Paris Mus.).—NICOLET, in Gay, Hist. Chile, vol. 3, 1849, p. 141.—PHILIPPI, Zool. Anz., vol. 17, 1894, p. 265 [2].

Paraxanthus barbiger RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 583.

Diagnosis.—Anterior border of buccal cavity almost semicircular, arched upward not forward. Sternum narrow. Merus of outer maxilliped elongate, anterior margin oblique, forming a tooth at inner angle.

Description.—Carapace finely punctate and obscurely granulate, rather deeply furrowed, most of the furrows indicating regions and subregions; three furrows run obliquely inward from the lateral margin and are bordered behind by granulated ridges; the two anterior of these end in a small tooth not projecting outwardly beyond the general margin. Still further forward on the margin is a similar tooth without the accompanying ridge and furrow. Antero-lateral margins thick, finely granulate, postero-lateral margins concave, smooth and rough with long hair. Front and orbits finely granulate; each lobe of front is subdivided forming two tuberculiform lobules at the angles, median fissure closed. Inner supra-orbital tooth a little less than a right angle; orbital denticles between fissures not projecting into orbit, the outer one much narrower than the upper one; two inferior teeth similar in shape and size, the inner one the more advanced, but less so than the angle above it.

Outer maxillipeds smooth, ischium slightly ciliated on inner border, merus with a bouquet of long hairs at summit of tubercle. First three articles of cheliped bristling with long hairs; remainder smooth; fingers long, robust, strongly channeled. Legs much ciliated, merus and carpus covered with a short thick tomentose velvet. Abdomen ciliated in both sexes; the sternum has here and there some bouquets of hair.

Color.—Dirty gold color; dried animal, pale red (Poeppig). Red tinged with yellowish, fingers blackish brown (Milne Edwards and Lucas).

Measurements.—Holotype of *P. hirtipes*, length of carapace 57 (not 27), width of same 82 mm. (Milne Edwards and Lucas).

Range.—From Tumbes, Peru (Lenz) to Concepcion, Chile; Juan Fernandez Islands (Lenz, Balss).

Material examined.—

CHILE.—A part of two carapaces (17539).

Valparaiso; Edwyn Reed collector; 1 ovigerous female (Buenos Aires Mus., 10807).

Genus HOMALASPIS A. Milne Edwards

Homalaspis A. MILNE EDWARDS, Ann. Sci. Nat., ser. 4, vol. 20, 1863, p. 279; type, *H. plana* (Milne Edwards).

Carapace broad, longitudinally convex; regions indistinct, not lobulated. Antero-lateral borders obscurely lobed, postero-lateral margins strongly convergent. Front advanced, deflexed, very narrow, not more than a sixth the greatest width of carapace, not separated from the supra-orbital margin by a notch or groove. Orbits

circular, with two suture lines above and one below; inner-lower tooth not prominent. Antennae as in *Xantho*. Anterior edge of merus of external maxillipeds very oblique. Chelipeds unequal in both sexes, strong. Legs thick. Abdomen of male with its seven segments distinct.

Contains only one species.

HOMALASPIS PLANA (Milne Edwards)

Plates 128–130

Xantho planus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 397 (type-locality, Chile; type in Paris Mus.).—MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 14; atlas, vol. 9, 1847, pl. 6.—NICOLET, in Gay, Hist. Chile, vol. 3, 1849, p. 136.—PORTER, Revista Chilena Hist. Nat., vol. 9, 1905, p. 31, pl. 3.

Gecarcinus regius POEPPIG, Arch. f. Naturg., vol. 2, pt. 1, 1836, p. 136 (type-locality, Chile; type in Leipzig Mus.).—NICOLET, in Gay, Hist. Chile, vol. 3, 1849, p. 153.

Homalaspis planus A. MILNE EDWARDS, Ann. Sci. Nat., ser. 4, vol. 20, 1863, p. 280.

Xantho plana PHILIPPI, Zool. Anz., vol. 17, 1894, p. 265[2].

Diagnosis.—Margin of carapace obscurely lobed. Front extremely narrow, fused with orbital margin. Of large size.

Description.—Surface covered with coarse depressed crowded granules most evident around the antero-lateral arch. Mesogastric region faintly outlined. Antero-lateral margin thick, divided by three closed fissures or thumb-nail impressions into four lobes; the first two lobes follow the general outline of the carapace, with but a slight shallow emargination between, second lobe longer than first; the third lobe projects a little, the fourth still more; from the fourth a ridge, concave forward, curves obliquely inward and backward. Anterior margin of front bilobed, lobes oblique, their margins concave, separated by a small V-shaped median emargination which is continued back for a short distance by a closed fissure. Sides of front forming with inner margin of orbit a very oblique line. Superior orbital fissures obscure, not interrupting the curve of the margin; no tooth at outer angle; two well-developed teeth below, the one at inner angle larger than the other. The inclined front is produced considerably beyond the peduncle of the antennae. Outer maxillipeds coarsely granulate, especially so on the merus and distal end of the ischium; merus widest at its middle, bearing two deep depressions, hairy in the old.

Chelipeds massive; the merus is almost entirely covered by the carapace and has a subterminal tooth above, formed by a deep triangular indentation. Inner angle of carpus dentiform, very blunt. Fingers strongly toothed, teeth mostly white, a large backward-pointing tooth at base of major dactylus. The dactyli of the am-

bulatory legs have a feltlike brush of hair above and below, covering the greater part of the article.

Color (after plate of Milne Edwards and Lucas).—General color ox-blood red with spots on carapace of mikado orange and pinard yellow and extensive mottlings of the latter on chelipeds; ambulatory legs reticulated with cadmium yellow.

Measurements.—Female (14364), length of carapace 98, width 151.5, fronto-orbital width 38.2, width of front 24.7 mm.

Remarks.—Common on sandy shores; edible (Poeppig).

Range.—From Ecuador to Chile.

Material examined.—

ECUADOR.—Guayaquil; specimens in Copenhagen Museum.

CHILE.—Antofagasta; November 15, 1926; W. L. Schmitt; 2 young, about 3.5 mm. wide (60743).

Valparaiso: U. S. Exploring Expedition; 1 male (14848). November, 1883; Dr. W. H. Jones, U. S. Navy; 2 females (14364, 46340). April, 1920; Edwyn Reed; 6 young (Buenos Aires Mus., 10805).

Lota: January 16, 1927; W. L. Schmitt; 25 young (60882).

Quetelmahué, Chiloe; June, 1924; Carlos Reed; 1 male (60883); received from Buenos Aires Museum.

Chile: C. E. Porter; 1 young (46030). Origin unknown; 1 major chela (59376). 1 male, 5 young (Mus. Paulista, 1306). F. Silvestri; 1 young male, lent by Buenos Aires Mus. (4673).

Port Otway; February 10, 1888; *Albatross;* 3 males, 1 female (21994).

Genus CYCLOXANTHOPS Rathbun

Cycloxanthus A. Milne Edwards, Ann. Sci. Nat., ser. 4, vol. 20, 1863, p. 278; type, *C. sexdecimdentatus* (Milne Edwards and Lucas); Crust. Rég. Mex., 1879, p. 258. *Cycloxanthus* used by H. Milne Edwards, 1850, in d'Archiac's Hist. Prog. Géol., vol. 3, p. 304*k*, for a different genus of crabs found fossil.

Cycloxanthops Rathbun, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 164; substituted for *Cycloxanthus*, preoccupied.

Carapace rather narrow; front horizontal, prominent, and divided by a closed median fissure into two lamellar truncate lobes, and separated from internal orbital angles by a deepish notch. Orbits small; two fissures in supra-orbital margin; external orbital angles inconspicuous, continuous with antero-lateral borders. Antero-lateral borders very long, strongly curved, extending far backwards. In the American species nine lateral teeth, besides the orbital tooth, the last two small and post-lateral. Basal antennal article short, but touching the front at its inner angle; flagellum inserted in orbital hiatus. Merus of external maxillipeds subquadrilateral. Chelipeds moderately unequal. Fingers sharp-pointed, not hollowed. Abdomen of male consists of five movable pieces.

West coast of America; Indo-Pacific.

KEY TO THE AMERICAN SPECIES OF THE GENUS CYCLOXANTHOPS

A¹. Carapace nearly smooth, with a flattened marginal rim. Superior orbital margin between fissures arcuate, not dentiform, surface flat. **sexdecimdentatus**, p. 290.

A². Carapace rugose, not rimmed. Superior orbital margin between fissures narrow, thick, raised.

B¹. Tooth at superior inner angle of orbit with a denticle on outer slope. Carapace narrow, a fringe of hair under lateral margin **vittatus**, p. 291.

B². Tooth at superior inner angle of orbit without a denticle on outer slope. Carapace wider, margin naked **novemdentatus**, p. 292.

CYCLOXANTHOPS SEXDECIMDENTATUS (Milne Edwards and Lucas)

Plate 133, Figures 5 and 6; Plate 134, Figure 2; Plate 135, Figure 1

Xantho sexdecimdentatus Milne Edwards and Lucas, d'Orbigny's Voy. Amér. Mér., vol. 6, pt. 1, 1844, p. 15; vol. 9, atlas, 1847, pl. 7, fig. 2 (type-locality, Chile; type in Paris Mus.).

Paraxanthus sexdecimdentatus Dana, U. S. Expl. Exped., vol. 13, Crust., part 1, 1852, p. 172.

Cycloxanthus sexdecemlineatus (by error) A. Milne Edwards, Crust. Rég. Mex., 1879, p. 258.

Cycloxanthus sexdecemdentatus A. Milne Edwards, Crust. Rég. Mex., 1879, p. 259.

Cycloxanthops sexdecimdentatus Rathbun, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 541.

Diagnosis.—Carapace nearly smooth and with a flattened marginal rim. Superior orbital margin between fissures arcuate, surface flat. A lobe below spine at inner angle of wrist.

Description.—Carapace intermediate in width between the two following species; convex except for a flat lateral rim which bears the slightly upturned lateral teeth; surface nearly smooth. Regions separated for the most part by broad shallow grooves; a large dimple near middle of branchial region; a short oblique ridge subparallel to postlateral margin, and stopping abruptly inside the lateral rim. First two lateral teeth subtruncate, remainder subacute, unequal; last two teeth small and sometimes obscure. Front strongly advanced at middle, each lobe oblique, bilobed in smaller, nearly straight in larger specimens. Major chela very heavy, the palm increasing in width distally; fingers dark brown; a lobe below spine at inner angle of wrist.

Color.—Red tinged with yellowish above, bright fawn yellow below; fingers and dactylus of ambulatory legs a bright brown (Milne Edwards and Lucas). Carapace generally a dark prune purple to claret brown, so dark that on higher parts of carapace it is almost black; the same on antero-lateral spines. Chelae lavender, lilac on upper margin, on prominent superior spine of carpus and on smooth portions above. Teeth of fingers white, also tip of inner carpal spine. The short curved groove on outer face of palm leading down from articulation with dactylus is almost cadmium orange.

Pits of reticulations rufous to ochraceous rufous, darker and redder than ambulatory legs. Legs almost orange, ochraceous orange buff. (Schmitt.) Small specimen dull white around free edge of carapace, anterior median part drab gray with touches of russet, hinder part more lilac gray. Fingers of chelae dark mummy brown. Propodi and dactyli of first and second legs drab to raw umber, distal third of dactyls white; dactyl of third leg with band of same color as the preceding legs; fourth legs all white. (Schmitt.)

Measurements.—Male (40431), length of carapace 30.6, width of same 45.8, fronto-orbital width 15.2, width of front 7.1 mm.

Range.—Mexico to Chile.

Material examined.—

MEXICO.—Maria Madre Island; 4–10 fathoms; California Acad. Sci.; 1 small male, soft shell, without chelipeds or legs; returned.

PERU.—Paita; 1926; W. L. Schmitt; 2 males (61373).

Bay of Sechura; west of Matacaballa; about 5 fathoms; taken in trawl; April 8, 1907; R. E. Coker, collector; received from Peruvian Government; 1 young female (40428).

Bay of Sechura; about half way between Bayovar and Matacaballa; 5 to 6 fathoms; April 10, 1907; R. E. Coker, collector; specimens returned to the Peruvian Government.

Lobos de Afuera; March 25; R. E. Coker, collector; received from Peruvian Government; 1 female (40434).

La Punta; tide pool on shingle beach; December, 1906; R. E. Coker, collector; received from Peruvian Government; 1 male (40433), 5 males (40431).

Callao; photograph received from C. E. Porter.

Near northeast side of San Lorenzo Island, Callao Bay; 2.5 fathoms; dredged; February 5; R. E. Coker, collector; received from Peruvian Government; 1 young female (40429).

Dredged off San Lorenzo Island; 1926; W. L. Schmitt: November 3; 2 males (1 soft shell) (60725). November 7; 2 males (60726), 1 male (60727).

Bay of Chilca; September 2, 1907; R. E. Coker, collector; received from Peruvian Government; 1 male, 1 female (40430).

Independencia Bay; at the Punta Callao of Isla Vieja; 1 fathom; July 20, 1907; R. E. Coker, collector; received from Peruvian Government; 1 male (40432).

Chincha Islands; Saussure, collector; specimens in Geneva Mus.

CHILE.—Without definite locality; 1 chela (17538).

CYCLOXANTHOPS VITTATUS (Stimpson)

Plate 133, Figures 3 and 4; Plate 134, Figure 3

Xantho vittata STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 206 [78] (type-localities, Panama and Cape St. Lucas; cotypes from Cape St. Lucas in Mus. Comp. Zoöl.).

Cycloxanthus vittatus A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 259, pl. 46, fig. 5–5*d*.
Cycloxanthops vittatus RATHBUN, Mem. Mus. Comp. Zoöl., vol. 35, 1907, p. 70.

Diagnosis.—Carapace narrow, rugose; some transverse lines. A denticle on slope of inner-upper angle of orbit. Superior orbital margin between fissures advanced, dentiform.

Description.—Carapace very narrow, anteriorly more lobulated than in *C. sexdecimdentatus*, lobules rugose and crossed by some transverse lines. Front separated from the superior inner angles of orbit by a deep furrow; these angles are tuberculiform and directed a little outward at tip and bear a denticle on their outer border; a few hairs on edge of front; orbital border interrupted by two fissures, either side of a projecting tooth. Lateral teeth well separated, very unequal, fourth, sixth, eighth, and ninth much reduced. Lateral border hairy below the teeth. Upper surface of carpus and manus feebly eroded; a short blunt tooth behind distal angle of carpus; secondary inner tooth reduced. Palms short and broad, both margins arcuate; color of immovable finger continued a little on palm.

Color.—Yellowish grey; carapace with 11 longitudinal stripes of red (Stimpson). Fingers dark brown.

Measurements.—Male (3208), length of carapace 17.6, width of same 23.5, fronto-orbital width 10.6, width of front 5.3 mm.

Range.—From Cape St. Lucas, Lower California, Mexico, to Panama.

Material examined.—Cape St. Lucas, Mexico; John Xantus, collector; 9 small specimens, cotypes (1260, M.C.Z.).

Puerto Angel, State of Oaxaca, Mexico; 1910; C. R. Orcutt, collector; 1 male (50924).

Panama: Specimens named by Stimpson, not including the measured type (M.C.Z.). John M. Dow, collector; 2 males, 2 females (3208).

Perico Island, Panama; October 26, 1904; *Albatross;* 1 male (33276).

CYCLOXANTHOPS NOVEMDENTATUS (Lockington)

Plate 134, Figure 1; Plate 135, Figures 2 and 3

Xanthodes ? novemdentatus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 32 [5] (type-locality, San Diego; type not extant).
Xantho novem-dentatus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 99 [5].
Cycloxanthus californiensis RATHBUN, Proc. U. S. Nat. Mus., vol. 16, 1893, p. 237 (type-locality, Guadalupe Island, L. Cal.; type, Cat. No. 17395, U.S.N.M.).
Cycloxanthops novem-dentatus HOLMES, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 56.
Cycloxanthops rugosa HOLMES, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 59 (type-locality, San Diego; type in Mus. Univ. Cal.).
Cycloxanthops novemdentatus RATHBUN, Harriman Alaska Exped., vol. 10, 1904, p. 180, pl. 7, fig. 10.

Diagnosis.—Carapace wide, for the genus; rugose; edge thick. Secondary tooth on wrist well developed; palms oblong.

Description.—Carapace slightly convex, flattened behind, punctate and anteriorly rugose, wider than the two preceding species; regions separated and subdivided by shallow grooves, less distinct than in *C. vittatus*. First lateral tooth depressed, last two small, postlateral, last one absent in small specimens; margin thick, teeth short, subacute. Front produced, more advanced at middle than at orbits; lobes each with a shallow sinus, or almost straight, a well developed outer tooth in small specimens. Abdomen broader than in *C. vittatus*, second and penult segments shorter. Wrist and upper part of hand very rugose; wrist with two blunt teeth at inner angle; hands oblong, upper and lower margins subparallel; fingers irregularly toothed, not gaping, grooved. Legs hirsute on margins.

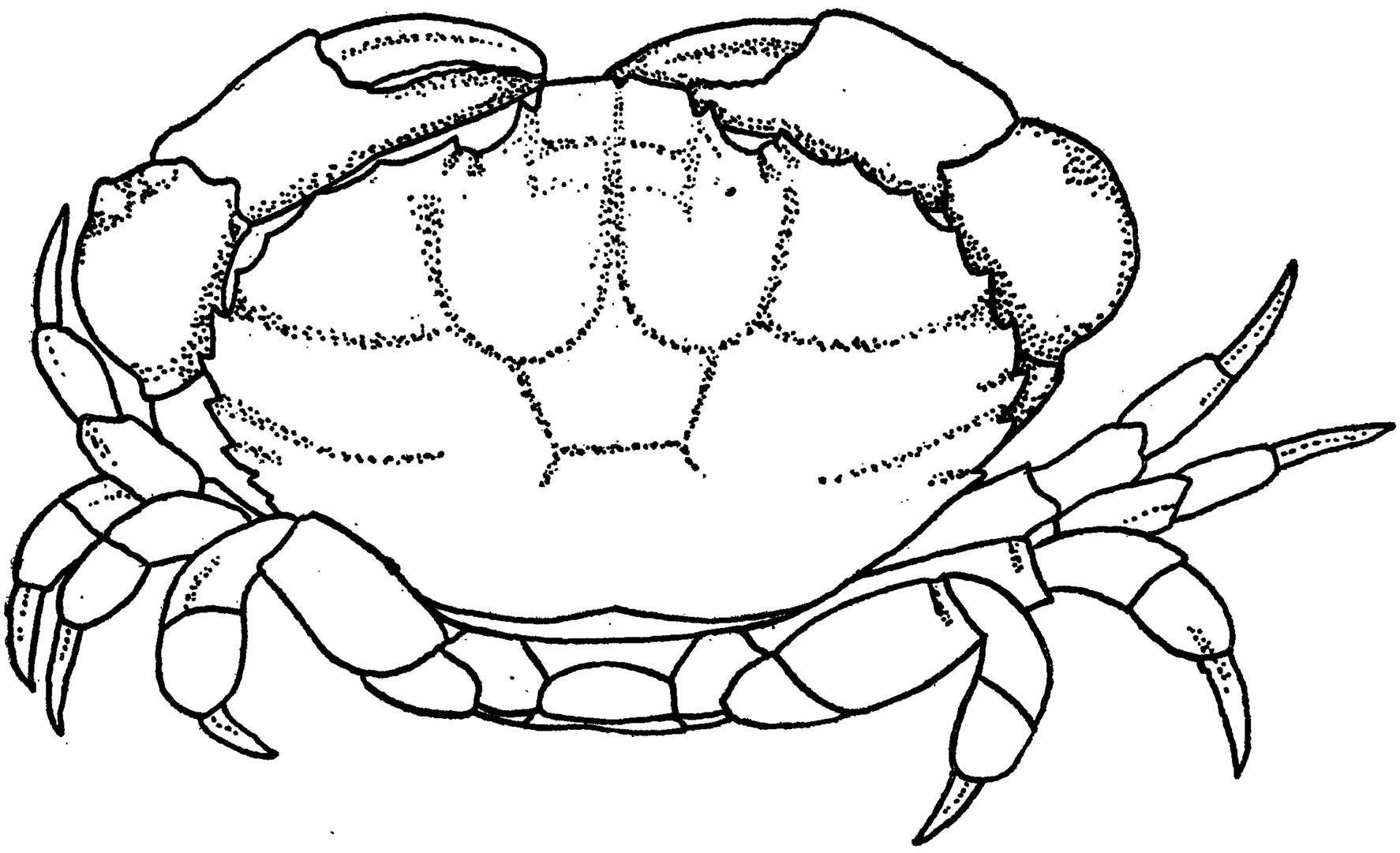

FIGURE 46.—CYCLOXANTHOPS NOVEMDENTATUS, MALE, DORSAL VIEW. AFTER HOLMES

Color.—General color dull reddish brown, showing traces of purple at posterior part of carapace and still more strongly on ambulatory legs and below. Fingers black with teeth along prehensile margins white. (Schmitt.) See under "*Material examined.*"

Measurements.—Male (17536), length of carapace 28, width of same 43.2, fronto-orbital width 13.3, width of front 7.2 mm. Male (19505), length of carapace 53.4, width of same 94.1, fronto-orbital width 23.2, width of front 12.2 mm.

Habitat.—Frequent under stones between tides (Baker).

Remarks.—The form called *rugosa* by Holmes is probably a variation of *novemdentatus*, this species having great variation in roughness.

Range.—From Monterey Bay, California, to Guadalupe Island, Lower California, Mexico.

Material examined.—

CALIFORNIA.—Venice Breakwater: *Anton Dohrn;* Venice Marine Biological Station; 3 males (50252). March 13, 1913; J. R. Beck; 1 male (62512); from Univ. Southern California.

Redondo; E. P. Chace; 1 male (53905).

Point Fermin; March 25, 1918; E. P. Chace; 1 male (53990).

San Pedro; H. N. Lowe; 3 males, 2 females (23052).

Point White, San Pedro; May 18, 1919; E. P. Chace; 2 young (53901, 53902).

Long Beach; H. N. Lowe: 1 female (50514). December, 1924; 1 female (60863).

Laguna Beach; W. A. Hilton; 1 male (48994); 9 young (54025–54030); 1 specimen (50602); 1 young male, medium low tide (50603), carapace very light, almost white, fingers and second, third and fourth pairs of legs brown; 1 male, 1 female (50601), carapace white with purplish pink longitudinal marks.

Catalina Harbor, Santa Catalina Island; W. H. Dall: Beach; 7 males, 1 young (17507), 2 males (17509). 30–40 fathoms, sandy mud; 2 females, 2 young (17508).

Catalina Harbor; west shore; December 28, 1912; *Anton Dohrn;* Venice Marine Biological Station; 2 males (50249).

Isthmus Harbor, Santa Catalina Island; *Anton Dohrn;* Venice Marine Biological Station; 10 males, 6 females, 8 young (50250).

Avalon, Santa Catalina Island; C. F. Baker; 2 males (29305).

Sugar Loaf Rock, Avalon Bay, Santa Catalina Island; June 18, 1913; *Anton Dohrn;* Venice Marine Biological Station; 3 males (50251, 50266).

San Nicholas Island; H. N. Lowe; 1 male, 1 female (32968).

San Clemente Island; January, 1899; H. N. Lowe; 2 males (23061).

La Jolla; September 22, 1918; W. L. Schmitt; 6 males, 5 females, 2 young (53972).

San Diego: 1861; J. G. Cooper; 2 males (17536). H. Hemphill; 1 male, 6 females (17531). C. R. Orcutt; 2 males (17499). San Diego Society of Natural History; 2 specimens (53360).

California; from Boston Society of Natural History; 1 female (56807).

LOWER CALIFORNIA.—San Martin Island; July 16, 1896; A. W. Anthony; 1 male (19505). An unusually large specimen of extraordinary width. See under "*Measurements.*"

Guadalupe Island; 1889; *Albatross;* 1 male (17395), holotype of *C. californiensis* Rathbun.

Genus PHYMODIUS A. Milne Edwards

Phymodius A. Milne Edwards, Ann. Sci. Nat., ser. 4, vol. 20, 1863, p. 283; type, *P. ungulatus* (H. Milne Edwards).

Carapace moderately convex, hexagonal, regions well delimited and broken up into numerous convex areolae. Front bilobed, the

outer angle of each lobe forming a distinct little lobule. Orbital margin with two grooves above and one below outer angle. Eyes on short thick stalks. Basal antennal article large, extending outwards and upwards into the gap between front and orbit. Chelipeds unequal, fingers large, deeply hollowed at tip. Merus, carpus and propodus of legs spinulous above. Male abdomen five-segmented.

Inhabits the Indo-Pacific region and the east coast of middle America.

PHYMODIUS MACULATUS (Stimpson)

Plate 136

Chlorodius maculatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 210 [82] (type-locality, Tortugas, Fla.; type not extant).

Phymodius maculatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 267.

Diagnosis.—Carapace areolated; lateral teeth sharp, separated by concave spaces; front advanced, four-toothed. Fingers gaping, spooned. Legs spinulous and hairy.

Description.—Carapace evenly convex, areolated; lobules rather prominent anteriorly and antero-laterally, with nearly smooth surfaces. No transverse ridges. Surface posteriorly glabrous. Antero-lateral teeth four (excluding angle of orbit), subequal, small but sharply prominent; interspaces broad, concave. Front advanced, sublaminiform, median notch small, lobes oblique, outer lobules produced. A blunt subhepatic tooth or tubercle just in front of the first of the four antero-lateral teeth.

Anterior margin of merus of maxillipeds oblique. Chelipeds stout, not very unequal; merus spinulous above. Upper surface of carpus and manus slightly rugose. Two teeth at inner angle of carpus, the upper one much the longer. Chelae dissimilar; immovable finger with color ending in an oblique line on palm, and with a tooth at middle of prehensile margin, which may be absent in the minor chela of old specimens. Major dactyl with a small tooth near its base. Fingers spooned, gaping, the gape wider in the minor chela. Legs spinulous and hairy.

Color.—Carapace yellowish with numerous brown spots. Chelipeds spotted with red.

Measurements.—Male (13833), length of carapace 17, width of same 23.5, fronto-orbital width 13.6, frontal width 6.1 mm.

Range.—Florida Keys; Bahamas; West Indies.

Material examined.—

FLORIDA.—Cape Florida; Dr. Edward Palmer; 1 young female (17899).

Indian Key; along shore, low tide; H. Hemphill; 1 female (17826).

Key West: Among rocks, low tide; H. Hemphill; 10 males, 7 females (13833). 1884; *Albatross;* 2 males, 4 females (17825).

Dry Tortugas: Dr. Edward Palmer; 1 female (17827). Shallow water; June, 1893; Biological Expedition, State University of Iowa;

1 male, 3 females; returned to sender. North end Bird Key reef; "Channel reef"; Aug. 12, 1924; W. L. Schmitt; 1 female (59467); gift of Carnegie Institution. Bird Key Reef; June 2, 1925; W. L. Schmitt; 1 female (60926). J. E. Mills; 1 ovigerous female (M.C.Z.).

Florida Keys; May, 1913; J. B. Henderson; 1 female, with left orbit and maxilliped malformed (46064).

BAHAMAS.—Spanish Wells; July 13, 1893; Biological Expedition, State University of Iowa; 1 male; returned to sender.

CUBA.—1914; Henderson and Bartsch, *Tomas Barrera* Expedition: Ensenada de Cajon off San Antonio; station 11; May 22; 1 young male (48536); caught by copper sulphating on reef. On reef flat between Cayo Hutia and Little Cayo, NE. of Light; 1 male (48517).

ST. THOMAS, VIRGIN ISLANDS.—Specimens in Copenhagen Museum.

Genus LEPTODIUS A. Milne Edwards

Leptodius A. Milne Edwards, Ann. Sci. Nat., ser. 4, vol. 20, 1863, p. 284; type, *L. exaratus* (Milne Edwards) = *Chlorodius exaratus* Milne Edwards, 1834.

Carapace broad, suboval, moderately convex anteriorly, flat in posterior half; regions generally well delimited and fairly well lobulated in anterior two-thirds, but not posteriorly. Antero-lateral borders arched, usually cut into four strong teeth; postero-lateral borders as long as chord of antero-lateral, moderately convergent, not concave. Fronto-orbital distance about half or more that half of extreme width of carapace. Front not produced, about a fourth the greatest width of carapace; notched in middle line, separated from supra-orbital margin by a notch or groove. Orbits suboval, margin with two suture lines above and one just below outer angle; usually a prominent tooth at inner angle of lower edge of orbit. Eyes on short thick stalks. Basal antennal article short, meeting front at inner angle; flagellum lodged in orbital hiatus. Anterior edge of merus of external maxillipeds nearly transverse, with commonly a small tooth near antero-internal angle. Chelipeds unequal in both sexes. Legs thick, upper edges often sharp. Abdomen of male with third to fifth segements fused.

East and west coasts of America; Europe; eastern Atlantic; Indo-Pacific region.

KEY TO THE AMERICAN SPECIES OF THE GENUS LEPTODIUS

A¹. Antero-lateral margins dentate.
  B¹. Palms of chelipeds without strong longitudinal ridges outside.
    C¹. Only five lateral teeth including orbital angle.
      D¹. Last (or most posterior) of antero-lateral teeth directed obliquely forward.
        E¹. Granulation of carapace and chelipeds inconspicuous. Lateral teeth of carapace rather broad and flat.

F¹. Front plainly double-edged in middle. Dorsal lobe 1 L conical, its ridge continued along margin of first lateral tooth. Dark color of both immovable fingers of male continued on palm_____**floridanus**, p. 297.

F². Front faintly double-edged in middle. Dorsal lobe 1 L low, oblong, inconspicuous. Dark color of immovable fingers of male not continued on palm_____**occidentalis**, p. 301.

E². Granulation coarse; dorsal aspect of chelipeds covered with tubercles. Lateral teeth of carapace subconical, hooked, the last three with pointed tips.

F¹. Carapace lobulate; tubercles of chelipeds composed of granules; ambulatory legs rough with acute granules_____**agassizii**, p. 307.

F². Carapace not lobulate; tubercles of chelipeds small, not composed of granules; ambulatory legs spinulous_____**tridentatus**, p. 308.

D². Last (or most posterior) of antero-lateral teeth directed straight outward.

E¹. Areolations of carapace crossed by one or more granulated ridges. Transverse branchial ridge behind apex of last marginal tooth reaching to carapace margin. Antero-lateral edge thin_____**taboganus**, p. 304.

E². Areolations of carapace not crossed by a granulated ridge. Antero-lateral edge thick_____**parvulus**, p. 305.

C². Six lateral teeth including orbital angle_____**sanguineus**, p. 302.

B². Palms of chelipeds with strong longitudinal ridges. Antero-lateral margin strongly dentate_____**snodgrassi**, p. 303.

A². Antero-lateral margins thick and lobed, the lobes more or less angular. Upper inner margin of palm cristate. Color of immovable fingers not con-continued on palm_____**cooksoni**, p. 310.

ANALOGOUS SPECIES OF LEPTODIUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
floridanus	*occidentalis*
agassizii	*tridentatus*
parvulus	*cooksoni*

LEPTODIUS FLORIDANUS (Gibbes)

Plate 137, Figures 1 and 2; Plate 138, Figure 1

Chlorodius floridanus GIBBES, Proc. Amer. Assoc. Adv. Sci., vol. 3, 1850, p. 175 [11] (type-locality, Key West; cotypes in Charleston Mus.).[36]

Chlorodius limosus DESBONNE and SCHRAMM, Crust. Guadeloupe, 1867, p. 30 (type-locality, Guadeloupe; type not extant).

Chlorodius exaratus DANA, U. S. Expl. Exped., vol. 14, Crust., part 2, 1853, p. 1554; not *C. exaratus* Milne Edwards, 1834.

Leptodius floridanus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 268, pl. 49, figs. 2 and 2*a*.

Diagnosis.—Front plainly double-edged in middle. Dorsal lobe 1 L conical, its ridge continued along margin of first lateral tooth to orbit.

[36] According to E. B. Chamberlain the label reads, "Charleston Cabinet. Brought from Key West in numbers, by Doctor Wurdemann in 1845, and lately by Prof. W. H. Harvey." These words precede Gibbes's description.

Dark color of both immovable fingers of male continued on palm. Suture between third and fourth and fourth and fifth abdominal somites very slightly indicated.

Description.—Lateral lobules of dorsal surface, 1 L, 3 L, and 4 L, tuberculiform and conical; remaining lobules flattened, crossed by short transverse lines, finely granulate or punctate and defined anteriorly by shallow grooves. Frontal lobes subtruncate, separated by a narrow emargination, each lobe subdivided by a shallow sinus; the inner angle of the lobe made double by a deep groove, the upper edge less produced than the under. Antero-lateral teeth large, subacute; the second tooth is a little below the line between the third and the first or orbital tooth. Just behind the tip of the last tooth a transverse raised granulate line runs inward nearly across branchial region.

Merus of chelipeds short not reaching beyond carapace; wrist and upper portion of hand rugose; fingers stout, grooved and punctate, dentate within, touching only at the broadly spoon-shaped extremities; a tuft of hair in the spoon. Dark color of immovable finger continued back a short distance on palm. Legs hairy on margin.

Color.—Ground of back (46039) ivory white, growing darker forward; irregular spots almost black; legs same color as hinder part of back and spotted with brown; upper portion of claws very dark green growing lighter to white underneath; pincers chestnut, white tipped; entire under part of body and claws white. Some specimens grayish green, uniform on legs and claws; pincers rich chestnut, tips and teeth white; under portion lighter, grayish or whitish. (Henderson.) Grayish green, fingers black (Desbonne). Sometimes yellow with red spots (A. Milne Edwards).

Measurements.—Male (57126), extreme length of carapace 22, width of same 33, fronto-orbital width 18, front 8 mm.

Range.—Bermudas; Bahamas and Florida Keys to the State of São Paulo, Brazil. In shallow water and on reefs.

Material examined.—

BERMUDAS.—F. V. Hamlin; received from Wesleyan University; 3 females (4023).

BAHAMAS.—Abaco; 1886; *Albatross;* 2 males, 2 females (17779).

Powell's Point, Eleuthera Island; July 8, 1903; B. A. Bean; received from Geographic Society of Baltimore; 1 male (31042).

New Providence; specimens in Copenhagen Museum.

Bahamas; Frederick Stearns collection; specimens destroyed: Andros Island in sponges; Andros Banks, west side, in live sponges.

Bahamas; Dr. Henry Bryant; from Boston Society of Natural History: 2 males, 3 females (56761), 1 young (56822).

FLORIDA.—Ragged Key; April 27, 1912; Paul Bartsch; 3 females (2 ovigerous).

Indian Key; along shore, low tide; 1885; Henry Hemphill; 3 males (15026).

Key Vaccas; H. Hemphill; 1 male, 1 female (15027).

Big Pine Key; H. Hemphill; 1 male, 1 female (15025).

Key West; A. S. Packard; received from Boston Society of Natural History; 5 females (56765). December, 1883; D. S. Jordan; 2 males, 1 female (5826). April 15–27, 1884; *Albatross;* 6 males, 2 females (17780). H. Hemphill; 39 males, 26 females (9274). C. N. E. Eliot; 1 male (22990). May 27, 1926; U. S. Bureau of Fisheries; 3 males, 3 females (60748). Off North Fort Murtane; July 14, 1924; W. L. Schmitt; 1 male (60895); gift of Carnegie Institution.

Tortugas; Biological Expedition of State University of Iowa, 1893: June 5–8; 6 males, 10 females (S. U. I.). In gulf weed; June 13; 2 males (S. U. I.).

Tortugas; W. L. Schmitt collector; gift of Carnegie Institution: About 7 miles S. of No. 2 buoy; 18 fathoms; coarse sand; July 22, 1924; station 44; 1 young (60894). From stomach of fish No. 430, yellowtail, *Ocyurus chrysurus* (Bloch), taken by dynamiting on reef patch south of channel at Fort Jefferson; June 18, 1925; 1 specimen (60896).

Tortugas Reef; J. B. Henderson; 1 male (53744).

Loggerhead Key, Tortugas; 1924; W. L. Schmitt: Off northern end; August 10; 1 male (59430). Rocks on east side; July 27 and 28, 1924; 4 males, 2 females (59432). East side, below lighthouse pier; from weeds and rocks; August 18; 1 female (59428). West of lighthouse, on rocks; July 21; 1 male (59441).

Bird Key, Tortugas; 1924; W. L. Schmitt: On reef; 1 male (59439). On reef; July 26 and 28; Bender collector; 7 males, 8 females (1 ovigerous, 1 immature) (59437). North end of reef, "Channel reef"; August 12; 4 males, 1 female (59434). Mid-section of reef; August 15; 4 males, 2 females (59435). South end of reef; August 13; 6 males, 6 females (2 ovigerous) (59438). East side of harbor; 10 feet; with boat dredge; August 8; 1 male (59433).

Bird Key; 1889; Grampus; 2 males (15220).

Bird Key Reef, Tortugas; 1925; W. L. Schmitt: June 2; 3 females (1 ovigerous) (60892). Low tide; stations 25–26; June 7; 22 males, 22 females (8 ovigerous) (60888). June 20; 1 female (61109). June 22; Dexter, collector; 7 males, 5 females (60889).

Long Key, Tortugas; 1924; W. L. Schmitt: From bunches of *Hypnea,* in water too deep for seining; July 30; 1 male (59431). Long Key Shoal, from rocks and seaweed; 2½–3 feet; August 14; 1 male (59440).

Bush Key, Tortugas; 1924; W. L. Schmitt: Northern section of reef; August 2; 2 males (59427). Mid-section of reef; August 1; 27 males, 12 females (3 ovigerous) (59436). Off reef; August 20; 1 male (59429).

Bush Key, Tortugas; June, 1921; Paul Bartsch; 23 males, 20 females (2 ovigerous) (57126). Bush Key reef: Near Long Key; June 3, 1925; W. L. Schmitt; 2 males, 2 females (60891). Shallow water; July 29, 1926; C. R. Shoemaker; station 7; 1 female (60893); gift of Carnegie Institution.

Florida Keys: Received from Boston Society of Natural History; 4 males, 3 females (56762). 1884; Edward Palmer; 2 males (9275). May, 1913; J. B. Henderson; 5 males (46039).

CUBA.—Cuba; 1914; Henderson and Bartsch, *Tomas Barrera* Expedition: Ensenada de Cajon, off Cape San Antonio; May 22; station 11; 1 male (48550). On reef at Cape San Antonio; caught by copper sulphating; 4 females (48539). Cabãnas; 2–12 fathoms; sand, shell, grass to mud bottom; caught by copper sulphating on reef; June 8–9; station 16; 2 males, 2 females (48569).

Mariel; under stones between tides; May 10, 1900; William Palmer and J. H. Riley; 2 specimens (23831).

Cojimar; C. F. Baker; 1 male, 1 female (31894).

Cardenas; 1923; Francisco R. Sosa; 2 males, 1 female (58390).

SANTO DOMINGO.—1878; W. M. Gabb; 5 males, 4 females (3195).

JAMAICA.—Montego Bay; on coral reef; July 12, 1910; Charles B. Wilson; 1 male, 1 ovigerous female (42931); 1 male (42932).

Montego Bay; 1910; E. A. Andrews: June 28; 1 ovigerous female (42926). June 21; coral reef near Bogue Islands; 2 males (42928). June 25; at Montego Bay Point; 1 male (43053).

Umbrella Point; July 14, 1910; E. A. Andrews; 1 male (42927).

Port Royal Cayes; P. W. Jarvis; specimens in Jarvis collection.

PORTO RICO.—Porto Rico; 1899; *Fish Hawk:* Guanica, reefs; January 29; 1 male (24247). Ponce; January 31; 1 female (24347). Playa de Ponce Reef; February 1; 1 male, 1 female (24274). Arroyo; February 4; 4 males, 5 females (24265).

San Juan; G. M. Gray; specimens returned to sender.

Ensenada Honda, Culebra Island; February 9 and 10, 1899; *Fish Hawk;* 2 males, 2 females (24348).

Caballo Blanco Reef, Vieques Island; February 7, 1899; *Fish Hawk;* 1 male (24271).

ST. THOMAS.—St. Thomas, Virgin Islands: January 17–24, 1884; *Albatross;* 2 males, 1 female (18514). Lagoon; July 9, 1915; Clarence R. Shoemaker; received from Carnegie Institution; 1 male, 1 female (53745).

ST. CROIX.—St. Croix; specimens in Copenhagen Museum.

ANTIGUA.—Pillars of Hercules; 1918; Barbados-Antigua Expedition of State University of Iowa; 1 female (S. U. I.).

BARBADOS.—Barbados; May 8, 1890; W. H. Brown; U. S. Eclipse Expedition to Africa; 3 females (14887).

Barbados; 1918; Barbados-Antigua Expedition of State University of Iowa: 8 males, 3 ovigerous females (S. U. I.). Pelican Island, tide pools: 2 males (S. U. I.); May 11, 3 males (58007); May 13, 4 females (3 ovigerous) (58006). Pelican Island, shallow water, 1 male, 1 young female (S. U. I.).

CURAÇAO.—Curaçao: 1884; *Albatross;* 5 males, 5 females (17813). Spanish Port; April 10, 1920; C. J. van der Horst; 1 female (Amsterdam Mus.).

COLOMBIA.—Sabanilla [Puerto Colombia]; March 16–22, 1884; *Albatross;* 7 males, 7 females (17823).

PANAMA.—Colon [Aspinwall]; J. A. McNiel; received from Boston Society of Natural History; 1 male, 1 female (56760). Coral reef; May 2, 1911; Meek and Hildebrand; Smithsonian Biological Survey; 1 male (44189).

BRAZIL.—Abrolhos Islands; 1887; *Albatross;* 1 female (22010).

Pirangi, Ceara, Brazil; 1911; Fred Baker, Stanford Expedition; 1 female (53746).

Brazil; 1899; A. W. Greeley, Branner-Agassiz Expedition: June 22 and 23; Mamanguape stone reef, Parahyba; 2 males, 1 female (25730). June 18; Rio Goyanna stone reef, Pernambuco; 3 males, 1 female (25731). Coral reef, Maceio; 1 male, 3 females (Stanford Univ.).

Brazil; 1876–1877; R. Rathbun, Hartt Explorations; Bom Fim, Bahia; 1 male (19964). Plataforma, Bahia; 2 males, 2 females (40605).

Rio de Janeiro; H. Krøyer; specimens in Copenhagen Museum.

Villa Bella, Ilha São Sebastião, São Paulo, Brazil; Sept. 29, 1925; W. L. Schmitt; 2 males (60890).

LEPTODIUS OCCIDENTALIS (Stimpson)

Plate 137, Figures 3 and 4; Plate 138, Figure 2

Chlorodius occidentalis Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 108 (type-localities, Panama and Manzanillo, Mexico; types not extant).
Chlorodius fisheri Lockington, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 104 [10] (type-locality, Magdalena Bay, Mexico; type not extant).
Chlorodius fischeri [by error] A. Milne Edwards, Crust. Rég. Mex., 1880, p. 269.
Leptodius occidentalis A. Milne Edwards, Crust. Rég. Mex., 1880, p. 269.

Diagnosis.—Front faintly double-edged in middle. Dorsal lobe 1 L low, oblong, inconspicuous. Dark color of immovable fingers of male not continued on palm. Sutures between third and fourth and fourth and fifth abdominal somites well marked.

Description.—Carapace broader than in *floridanus;* front less projecting, teeth of median pair less produced beyond those of lateral pair than in *floridanus;* margin of front very slightly double along median lobes, the two parts, upper and lower, equally advanced. Carapace smoother, less rugose; antero-lateral teeth broader, especially the second which is more obtuse. Dorsal lobe 1 L low, oblong.

Color of immovable finger running from the proximal end of the prehensile edge obliquely downward and backward in a wavy line to lower margin.

Color.—Carapace greenish red; chelipeds marbled with purplish red, white beneath; fingers black (Lockington).

Measurements.—Male (50626), extreme length of carapace 24.7, width of same 39.6, fronto-orbital width 19.2, front 9.3 mm.

Range.—Magdalena Bay, Lower California, and also the Gulf of California, Mexico, to Panama; Galapagos Islands.

Material examined.—Magdalena Bay, west coast of Lower California; 1917; C. R. Orcutt; 1 male (50626).

La Paz, Gulf of California: L. Belding; 4 males (4626). *Albatross;* 1 male, 1 female (17398). Harbor; *Albatross;* 2 males, 1 female (17399).

Pichilinque Bay, Gulf of California; *Albatross:* April 29, 1888; 4 males, 8 females (22011). March 27, 1911; 1 male, 1 female (50482), 4 males, 2 females (Amer. Mus.).

San Josef Island, Gulf of California; March 16, 1889; *Albatross;* 5 females (17400).

Agua Verde Bay, Gulf of California; April 1, 1911; *Albatross;* 3 males (50483).

Concepcion Bay, Gulf of California; March 19, 1889; *Albatross;* 9 males, 12 females (17406).

San Luis Gonzales Bay, Gulf of California; March 27, 1889; *Albatross;* 1 male, 1 female (17410).

Guaymas, Sonora, Mexico: March 21, 1889; *Albatross;* 5 males, 6 females (17408). Inner harbor; February 23, 1891; P. L. Jouy; 1 male, 1 female (17305). Bay shore, among rocks; February 22, 1904; William Palmer; 2 females (31514).

Manzanillo, Colima, Mexico; on drifted pile; July 17, 1913; C. R. Orcutt; 1 female (54464).

Clarion Island, west of Mexico: A. W. Anthony; 1 male (20699). Shore; Hanna and Jordan, California Acad. Sci.; 3 males, 3 females returned; 2 males, 2 females (62703).

Galapagos Islands; 1888; *Albatross;* 1 male, 1 female (22012).

LEPTODIUS SANGUINEUS (Milne Edwards)

Plate 137, Figure 5 and 6; Plate 138, Figure 3

Chlorodius sanguineus Milne Edwards, Hist. Nat. Crust., vol. 1, 1834, p. 402 (type-locality, Mauritius; type in Paris Mus.).

Lagostoma nodosa Randall, Journ. Acad. Nat. Sci. Philadelphia, vol. 8, 1839 (1840), p. 111 (type-locality, Sandwich Islands; type not located).

Chlorodius nodosus Dana, Proc. Acad. Nat. Sci. Philadelphia, 1852, p. 79.

Leptodius sanguineus A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat., Paris, vol. 4, 1868, p. 71.—DeMan, Abh. Senck. naturf. Ges., Frankfurt, vol. 25, 1902, p. 602.

Leptodius exaratus var. *sanguineus* CANO, Boll. Soc. Nat. Napoli, ser. 1, vol. 3, 1889, p. 203.
Xantho exaratus var. *sanguinea* ORTMANN, Zool. Jahrb., Syst., vol. 7, 1893, p. 447.
Xantho (*Leptodius*) *sanguineus* ALCOCK, Journ. Asiat. Soc. Bengal, vol. 67, 1898, p. 119; not *Chlorodius edwardsi* Heller.

Diagnosis.—A small tooth on the postero-lateral margin. Dark color of immovable fingers of male continued well back on palm. No fine transverse granulate lines on lobules of dorsal surface of carapace.

Description.—Related to *floridanus* and *occidentalis* but distinguishable at once by an additional though small tooth on the lateral margin, behind the lateral angle and therefore postero-lateral. Lobules of dorsal surface smooth, lacking the fine transverse striae of the above-named species. 2 L, 3 L, and 4 L subtruncate on the steep side toward the carapace margin. 1 L oblong, independent, 2 M longitudinally divided for fully half its length. Frontal margin thick sinuous, median emargination shallow, a short closed fissure behind it. Lateral teeth subacute; D tuberculiform, E and N shallow, obtuse-angled, T pointing forward or a little inward, S and the postero-lateral tooth directed obliquely outward and forward. Wrist and palm rough above; a very short conical tooth at inner angle of wrist. Fingers broadly spooned; dark color of immovable fingers of male continued well back on palm. Abdomen of male narrow.

Color.—With orange, reddish and white spots.

Measurements.—Male (Paita), length 21.5, width 34 mm. (Cano).

Range.—Indo-Pacific region from the Red Sea and Mauritius to Australia, Loo Choo Islands, Marcus Island, and the islands of the eastern Pacific, the Hawaiian, Marquesas and Paumotu Islands. Paita, Peru (Cano), the only American record.

LEPTODIUS SNODGRASSI Rathbun

Plate 139

Leptodius snodgrassi RATHBUN, Proc. Washington Acad. Sci., vol. 4, 1902, p. 279, pl. 12, figs. 7 and 8 (type-locality, Black Bight, Albemarle Island, Galapagos; type, Cat. No. 24831, U.S.N.M.).

Diagnosis.—Antero-lateral margins strongly toothed. Protogastric regions longitudinally divided for less than half their length. Wrist and hand deeply dimpled; hand with five longitudinal ridges, three outside, two above. Color of immovable finger extending on palm.

Description.—Carapace deeply areolated in anterior two-thirds; the areoles generally marked anteriorly by a transverse or nearly transverse line of granules from which the surface falls steeply down; epigastric lobes prominent; protogastric lobes partially longitudinally divided, the outer half itself divided in two crosswise; 2 L and 3 L fused, a short groove paralleling the anterior border; 5 L short and broad; D and 1 L united by a blunt ridge; 4 L roundish. E blunt and obtuse, N larger, dentiform, T and S acute, slightly curved at

tip, S much smaller than T. Front thick, double-edged by a shallow groove; median emargination shallow, margin of lobes little oblique and cut by shallow sinuses.

Chelipeds very unequal in male; upper and outer surface of wrist deeply dimpled or wrinkled; a strong tooth at inner angle of wrist. Hand with blunt longitudinal carinae, two on upper margin and three on outer surface; upper carina of outer surface broad, having a row of deep pits or dimples; lowest carina at inferior third of outer surface and continued along upper margin of thumb; upper part of inner surface of palm pitted. Entire surface of chelipeds and carapace finely and closely granulate and irregularly punctate. Fingers carinated, lower carina of outer surface of immovable finger is continued one-third length of palm; fingers black, color extended on palm ending in a zigzag line. Fingers of large hand gape widely, of small hand slightly; major dactylus with two large prehensile teeth and a small intermediate one; two large teeth on immovable finger; tips

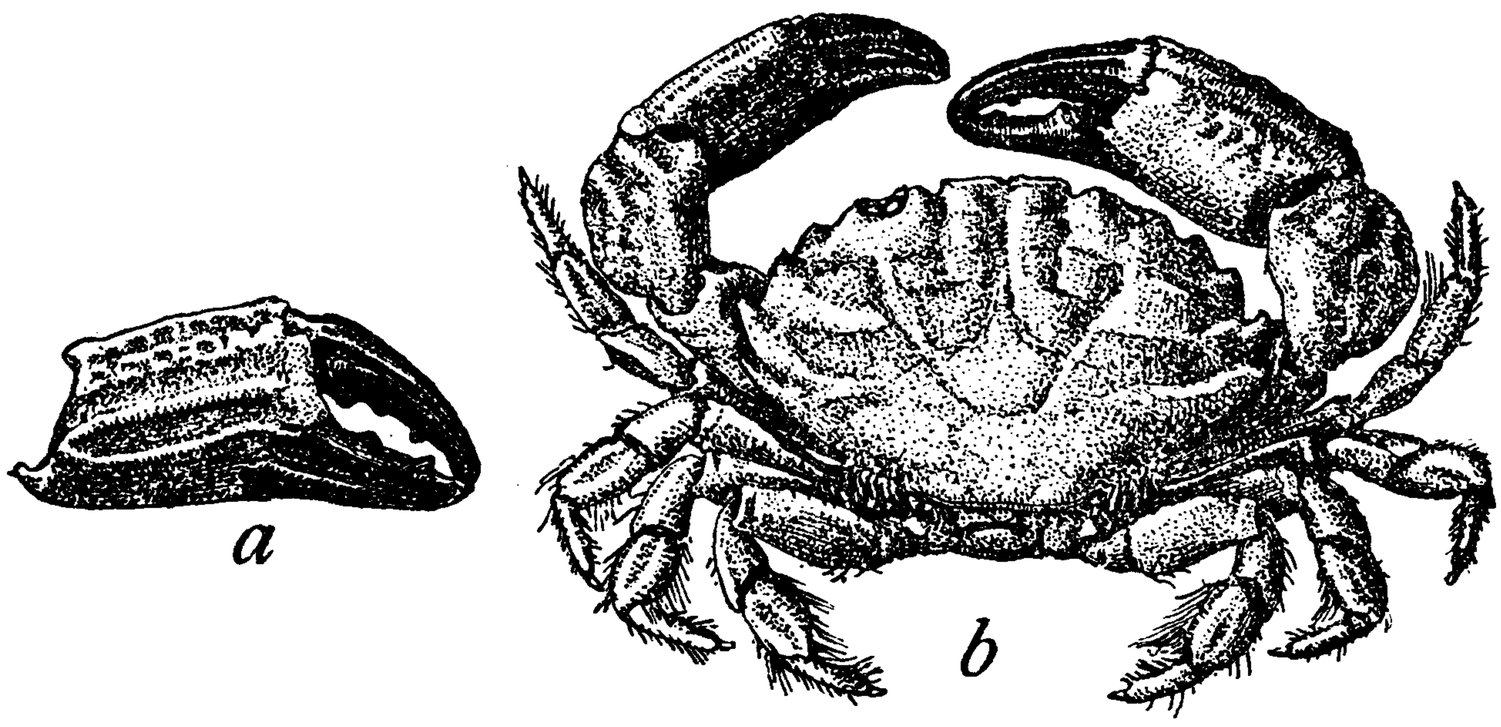

FIGURE 47.—LEPTODIUS SNODGRASSI, MALE, TYPE, ALBEMARLE ISLAND, ×1.5.
a. CHELA. *b*. DORSAL VIEW OF CRAB

broadly hollowed out; fingers of minor chela with prehensile margins wavy.

Measurements.—Male holotype, length of carapace 13.1, width 20.4, fronto-orbital width 11.8, width of front 5.5 mm.

Range.—Found only at the Galapagos Islands.

Material examined.—Albemarle Island, Galapagos Islands; 1899; Hopkins Stanford Expedition: Black Bight; January 9; 2 males (1 holotype) (24831). Reef north of Tagus Cove; March 16; one minor cheliped (Stanford Univ. Mus.).

LEPTODIUS TABOGANUS Rathbun

Plate 140

Leptodius taboganus RATHBUN, Smithson. Misc. Coll., vol. 59, 1912, p. 3 (type-locality, Taboga Island; type, Cat. No. 43658, U. S. National Museum).

Diagnosis.—Last antero-lateral tooth pointing directly outward; remaining teeth shallow, little projecting. Transverse branchial ridge continued to margin of carapace. Color of immovable finger extending on palm.

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

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

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

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

Range.—Panama to Ecuador.

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

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

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

LEPTODIUS PARVULUS (Fabricius), new combination

Plate 141, Figures 1–3

Cancer parvulus FABRICIUS, Ent. Sys. Auct. et emend., vol. 2, 1793, p. 451 (type-locality, in Americae meridionalis Insulis; type probably in Kiel Mus.).
Chlorodius americanus SAUSSURE, Mém. Soc. Phys. Hist. Nat. Genève, vol. 14, 1858, p. 430, pl. 1, fig. 5 (type-locality, Haiti; type in Geneva Mus.).
Chlorodius floridanus STIMPSON (not Gibbes), Amer. Journ. Sci., ser. 2, vol. 27, 1859, p. 446.
Xanthodius americanus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 209 [81].
Leptodius americanus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 269.
Xanthodius parvulus RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 15.

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

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

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

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

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

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

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

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

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

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

Haiti; 1 male type (Geneva Mus.).

St. Domingo; specimen in Copenhagen Mus.

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

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

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

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

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

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

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

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

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

LEPTODIUS AGASSIZII A. Milne Edwards

Plate 141, Figures 4 and 5

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

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

Leptodius agassizi A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 313, pl. 2, fig. 8; pl. 5, fig. 2.

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

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

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

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

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

Material examined.—See table, page 309.

LEPTODIUS TRIDENTATUS Lenz

Plate 143, Figures 1–4

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

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

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

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

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

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

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

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

Material examined.—

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

Material examined of Leptodius agassizii

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
North Carolina:	° ′ ″	° ′ ″			° C.						
Off Cape Hatteras	35 21 00	75 21 30	16	gy. S. brk. Sh.	-------	Oct. 19, 1884	2280	*Albatross*	6♂ 17♀ (3 ovig.) 28 y	37858	
									3♂ 3♀ 4y	8851	
Fishing grounds off Beaufort.	34 22 00	76 57 00	12.5	Co	-------	Sept. 7, 1913	7958	*Fish Hawk*	1♂ 2♀	51081	
Florida:											
Gulf Stream off Cape Florida.	2⅛ m. SSE. of Fowey Rocks Light.		45	rky	21.1	Mar. 25, 1903	7511	do	1 ovig. ♀	53750	
					° F.						
Off Sand Key	Sand Key W,. 8½ miles		31		74.5	Dec. 18, 1912	7787	do	1♂	61376	
Tortugas	About 7¼ m. S. of No. 2 buoy.		18	crs. S	-------	July 22, 1924	44	W. L. Schmitt	1♀	60886	Gift of Carnegie Institution.
Do	About 8 m. S. of No. 2 buoy (sponge haul).		25	picked from coral rock.	-------	June 11, 1925	217	do	4♂ 1♀	60885	Do.
Do	About 11 m. S. of No. 2 buoy.		37	shy. S. Sponges.	-------	June 10, 1925	207	do	3♀	60884	Do.
					° C.						
Off Cape Romano	25 50 15	82 41 45	21	sdy	20	Apr. 2, 1901	7124	*Fish Hawk*	1 y	25611	
Highland section	27 55 30	83 11 30	13	Co. R	15.2	Jan. 28, 1902	7253	do	1 y. ♀	60744	
					° F.						
Off Cedar Keys	Cedar Keys Light, N. ¾ E., 21¾ m.		5.75	Co	63.45	Jan. 11, 1913	7807	do	1♀	60745	
					° C.						
Pepperfish Key section	29 18 00	83 37 00	8	rky	18	Nov. 21, 1901	7161	do	2♂ 3♀ (1 ovig.) 2 y.	53749	
Do	29 21 00	83 32 00	6.75	rky	16.7	do	7160	do	2♂	53748	
Deadmans Bay section	29 39 00	83 53 10	7.5	S. Co	21.5	Nov. 7, 1901	7152	do	1 immature ♀	60747	
Do	29 43 40	83 49 45	5.25	Co	20.5	do	7151	do	1♀	60746	
Do	29 35 20	83 56 00	9.5	S. Co	23	do	7153	do	1 ovig. ♀	53747	
					° F.						
Off Carrabelle	Carrabelle Light, N. by W., 14⅔ miles.		10		60.2	Jan. 16, 1913	7810	do	1♀	60887	
South of Apalachicola	Between 29 11 30 and 29 18 15	Between 85 29 00 and 85 32 00	25–27			Feb. 7, 1885	Between 2369 and 2374	*Albatross*	1 y. ♀	19722	
Snapper banks off Pensacola.			13½					Benjamin Harrison	4♂ 2♀	18008	

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

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

LEPTODIUS COOKSONI Miers

Plate 142

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Genus XANTHODIUS Stimpson

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

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

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

KEY TO THE AMERICAN SPECIES OF THE GENUS XANTHODIUS

A¹. Antero-lateral margins cut into four lobes or lobiform teeth exclusive of the orbital angle.
  B¹. Antero-lateral margin thin. Edge of front visible in dorsal view. **sternberghii, p. 311.**
  B². Antero-lateral margin thick. Edge of front invisible in dorsal view. **hebes, p. 313.**

A². Antero-lateral margins cut into nine or more narrow teeth.
  B¹. Carapace not deeply subdivided into numerous lobules bordered with hair. Median notch of front small and shallow. Wrist and hand rugose and dimpled above----------**denticulatus, p. 314.**
  B². Carapace deeply subdivided into numerous lobules bordered with hair anteriorly. Median notch of front deep. Wrist and hand covered above with large tubercles----------**stimpsoni, p. 315**

ANALOGOUS SPECIES OF XANTHODIUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
denticulatus	*stimpsoni*

XANTHODIUS STERNBERGHII Stimpson

Plate 144; Plate 145, Figure 2

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

XANTHODIUS HEBES Stimpson

Plate 147

Xanthodius hebes STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 208 [80] (type-locality, Cape St. Lucas; cotypes in M.C.Z.).
Acteodes mexicanus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 42 [2] (type-locality, Mazatlan; type not extant).
Actoeodes mexicanus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 103 [9].
Leptodius hebes A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 273.

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

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

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

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

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

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

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

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

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

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

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

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

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

XANTHODIUS DENTICULATUS (White), new combination

Plate 145, Figure 1; Plate 146

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

XANTHODIUS STIMPSONI (A. Milne Edwards), new combination

Plate 143, Figures 5–7

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

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

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

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

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

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

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

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

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

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

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

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

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

Genus LOPHOXANTHUS A. Milne Edwards

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

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

Contains only one species.

LOPHOXANTHUS LAMELLIPES (Stimpson)

Plate 148, Figures 3 and 4

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

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

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

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

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

Range.—West coast of Mexico to Ecuador.

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

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

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

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

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

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

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

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

Genus METOPOCARCINUS Stimpson

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

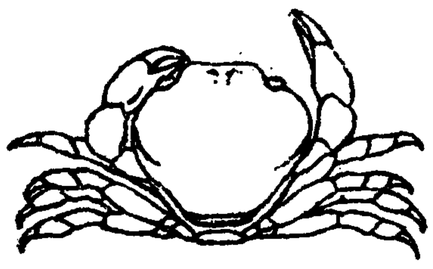

FIGURE 48.—METOPOCARCINUS TRUNCATUS, MALE, CAPE SAN LUCAS, CARAPACE 0.18 INCH WIDE, DORSAL VIEW. AFTER STIMPSON

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

Known only from a single species.

METOPOCARCINUS TRUNCATUS Stimpson

Plate 148, Figures 1 and 2

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

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

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

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

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

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

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

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

Genus LOPHOPANOPEUS Rathbun

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

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

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

KEY TO THE AMERICAN SPECIES OF THE GENUS LOPHOPANOPEUS

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

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

LOPHOPANOPEUS BELLUS (Stimpson)

Plates 150 and 151

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

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

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

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

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

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

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

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

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

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

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

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

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

Habitat.—Low tide, among rocks.

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

Material examined.—

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

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

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

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

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

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

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

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

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

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

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

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

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[39] May represent a different species.

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

LOPHOPANOPEUS HEATHII Rathbun

Plate 149

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

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

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

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

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

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

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

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

Material examined.—

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

Monterey; specimens returned to California Academy of Sciences.

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

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

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

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

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

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

LOPHOPANOPEUS FRONTALIS (Rathbun)

Plate 152

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

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

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

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

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

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

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

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

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

Material examined.—

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

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

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

LOPHOPANOPEUS LEUCOMANUS (Lockington)

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

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

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

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

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

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

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

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

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

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

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

Material examined.—

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

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

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

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

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

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

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

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

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

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

LOPHOPANOPEUS LOCKINGTONI Rathbun

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

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

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

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

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

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

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

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

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

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

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

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

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

Material examined.—

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

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

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

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

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

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

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

LOPHOPANOPEUS DIEGENSIS Rathbun

Plate 153, Figures 6, 7, and 10

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

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

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

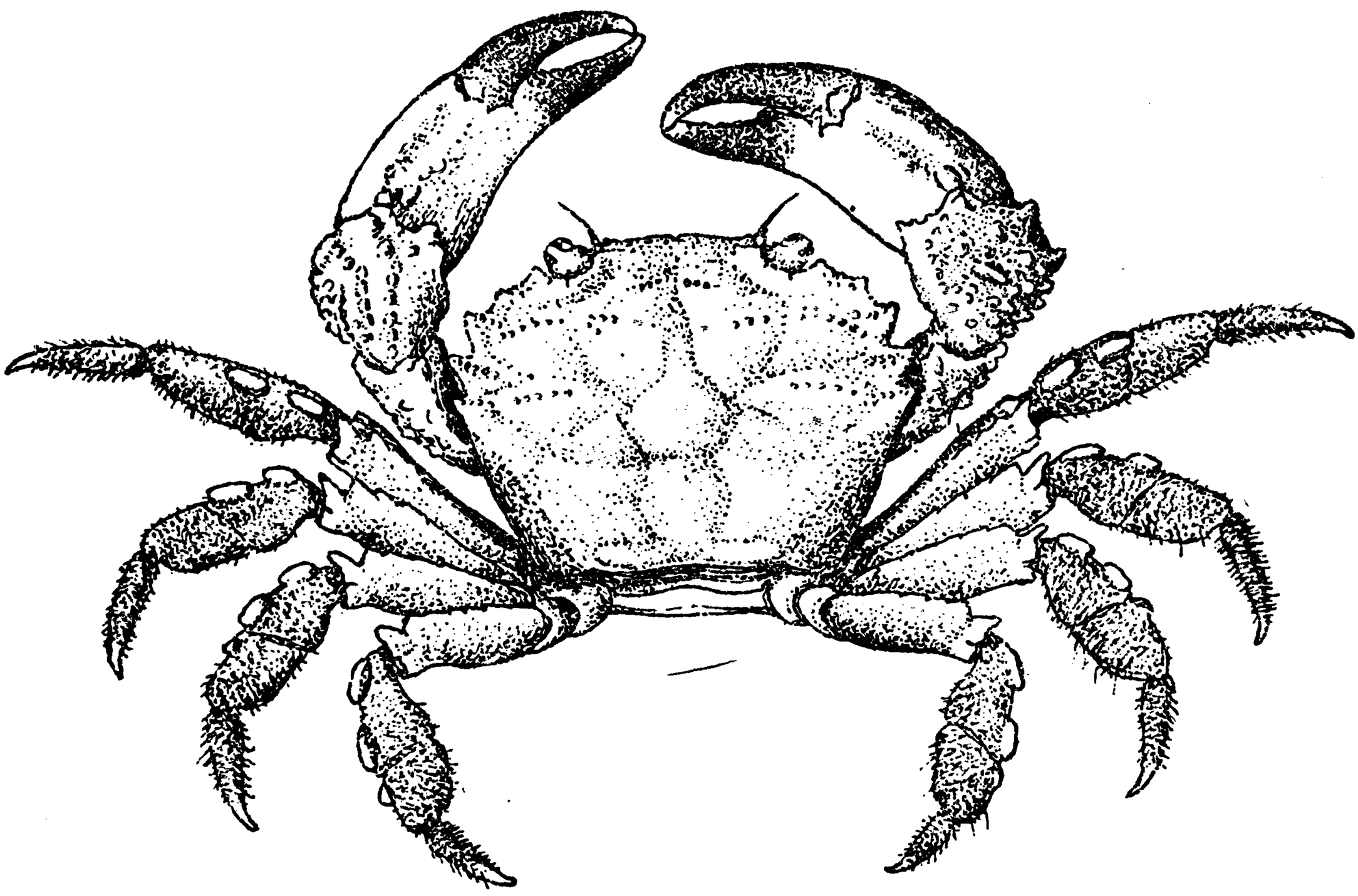

FIGURE 49.—LOPHOPANOPEUS DIEGENSIS, MALE, HOLOTYPE, CARAPACE 11.4 MM. WIDE

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

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

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

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

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

Material examined.—

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

LOPHOPANOPEUS LOBIPES (A. Milne Edwards)

Plate 155, Figures 3–5

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

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

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

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

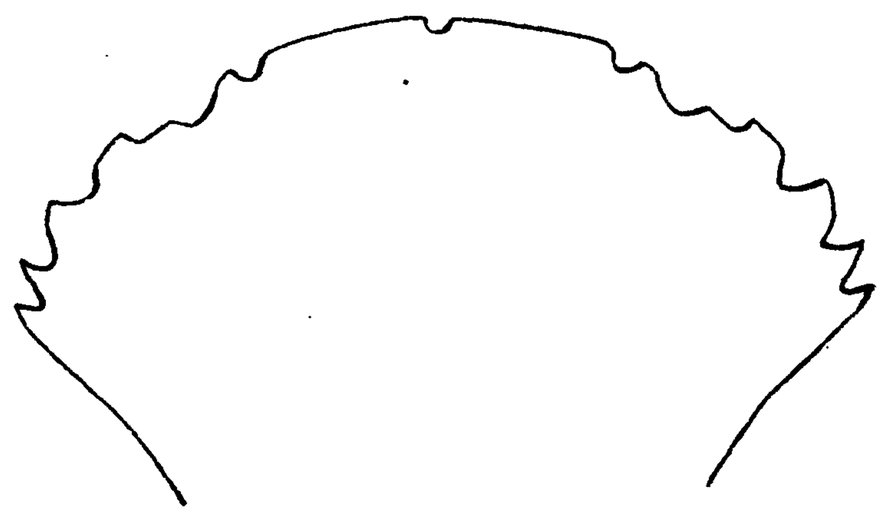

FIGURE 50.—LOPHOPANOPEUS LOBIPES, FEMALE, KEY WEST (MUS. S. U. I.), CARAPACE 5.6 MM. WIDE

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

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

Range.—Bahama Banks; Straits of Florida.

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

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

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

LOPHOPANOPEUS MACULATUS Rathbun

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

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

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

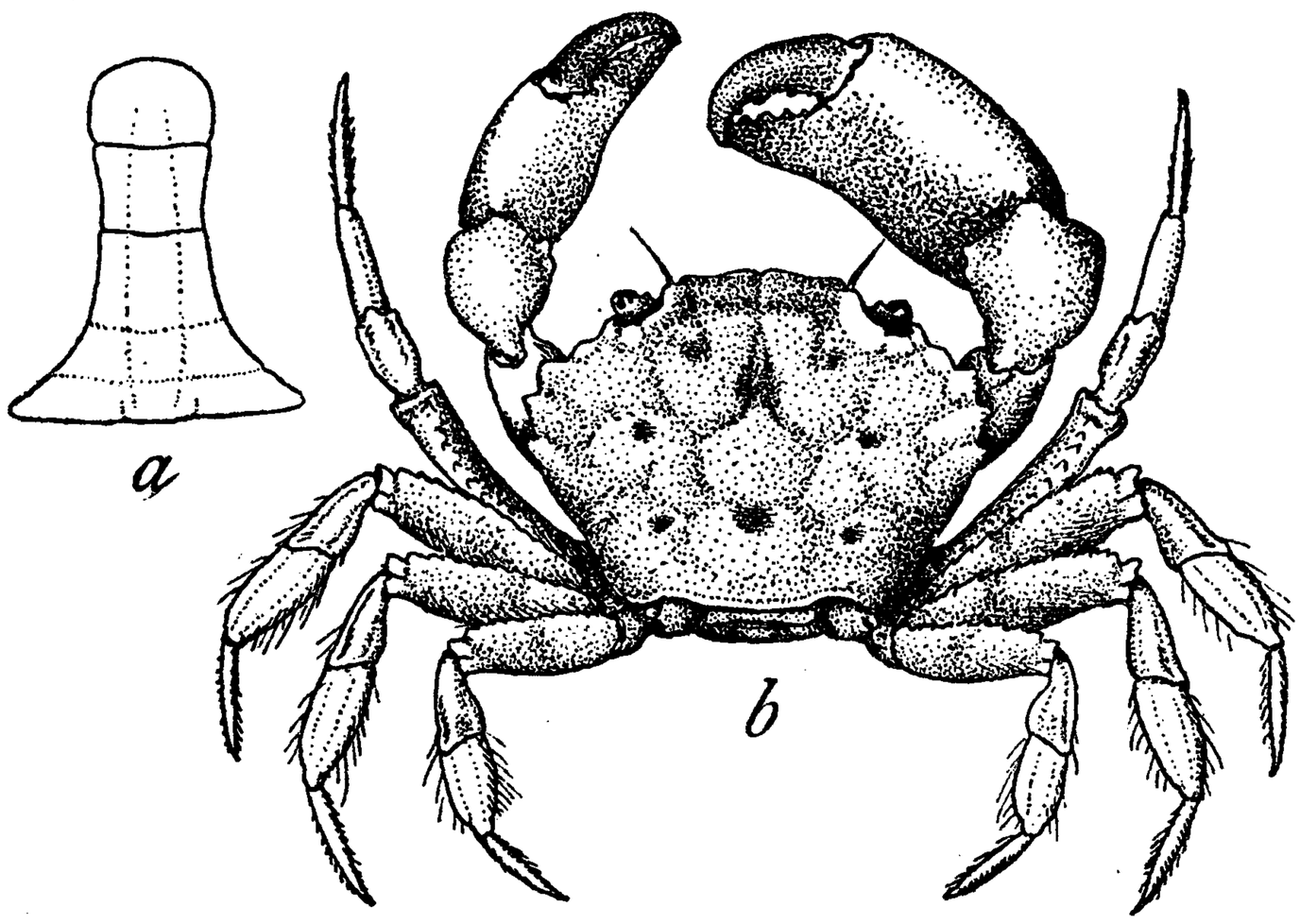

FIGURE 51.—LOPHOPANOPEUS MACULATUS, MALE, HOLOTYPE, CARAPACE 9.9 MM. WIDE. *a*. ABDOMEN. *b*. DORSAL VIEW

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

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

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

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

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

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

LOPHOPANOPEUS DISTINCTUS Rathbun

Plate 155, Figures 1 and 2

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

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

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

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

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

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

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

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

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

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

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

LOPHOPANOPEUS SOMATERIANUS, new species

Plate 153, Figures 3 and 4

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

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

Genus PANOPEUS Milne Edwards

MUD CRABS

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

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

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

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

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

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

KEY TO THE AMERICAN SPECIES OF THE GENUS PANOPEUS

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

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

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

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

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

C². Carapace wider, fourth lateral tooth equal to or narrower than third.
D¹. Edge of front thick, beveled, and with a transverse groove. Third segment of male abodmen with lateral extremities broadly rounded---------- **bermudensis**, p. 360.
D². Edge of front if thick not transversely grooved. Third segment of male abdomen with lateral extremities angled.
E¹. Front much produced, narrow, .24 of carapace width. First and second lateral teeth deeply separated; remaining teeth strongly hooked, spiniform---------- **chilensis**, p. 346.
E². Front little produced, wider, .28 to .33 of carapace width. First and second lateral teeth not deeply separated; remaining teeth not strongly hooked.
F¹. Sixth segment of male abdomen much broader than long. First and second lateral teeth of carapace very unequal, separated by a shallow sinus. Color of immovable fingers running slightly back on palm. **turgidus**, p. 364.
F². Sixth segment of male abdomen very little broader than long. First and second lateral teeth of carapace separated by a deeper sinus. Color of immovable fingers running well back on palm in male.
G¹. Outer margins of lateral teeth form a regular curve from lateral angle of carapace to orbital angle. **herbstii**, typical, p. 335.
G². Lateral teeth more outstanding, their outer margins not forming a regular curve from lateral angle to orbital angle.
H¹. Teeth shallow, third tooth suboblong. **herbstii forma obesa**, p. 336.
H². Teeth deeper, measured from tip to base, compared to distance between sinuses. **herbstii forma crassa**, p. 336.

B². Dark color of immovable finger not continued on palm.
C¹. Carapace and chelipeds rough and hairy. Outer surface of palm with three longitudinal ridges---------- **rugosus**, p. 353.
C². Carapace and chelipeds not noticeably hairy. Outer surface of palm without longitudinal ridges.
D¹. Coalesced (first plus second) lateral tooth narrow, width equal to that of fourth tooth---------- **purpureus**, p. 344.
D². Coalesced-tooth broad, width greater than that of fourth tooth.
E¹. Carapace rough with upstanding bead granules. First and second lateral teeth similar, acute and widely separated. **harttii**, p. 355.

E². Granules of carapace depressed.
F¹. Carapace rugose. Third to fifth lateral teeth more prominent and widely separated. **occidentalis forma serrata**, p. 349.
F². Carapace nearly smooth. Third to fifth lateral teeth less prominent and nearer together.
G¹. Third lateral tooth narrower at base than fourth. **convexus**, p. 352.
G². Third lateral tooth wider at base than fourth. **occidentalis**, typical, p. 348.

A². Four lateral teeth, the first two of the normally five teeth completely and indistinguishably fused---------- **boekei**, p. 365.

ANALOGOUS SPECIES OF PANOPEUS ON OPPOSITE SIDES OF THE CONTINENT

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

PANOPEUS HERBSTII Milne Edwards

Plates 156 and 157

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

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

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

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

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

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

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

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

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

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

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

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

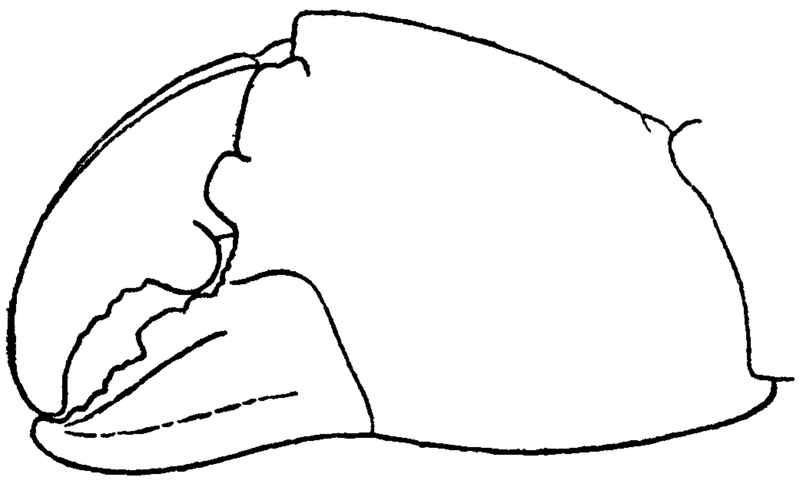

FIGURE 52.—PANOPEUS HERBSTII, MALE, MAJOR CHELA, ENLARGED. AFTER BENEDICT AND RATHBUN

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

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

FORMA OBESA Smith

Plate 156, Figure 3

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

FORMA CRASSA A. Milne Edwards

Plate 157, Figure 3

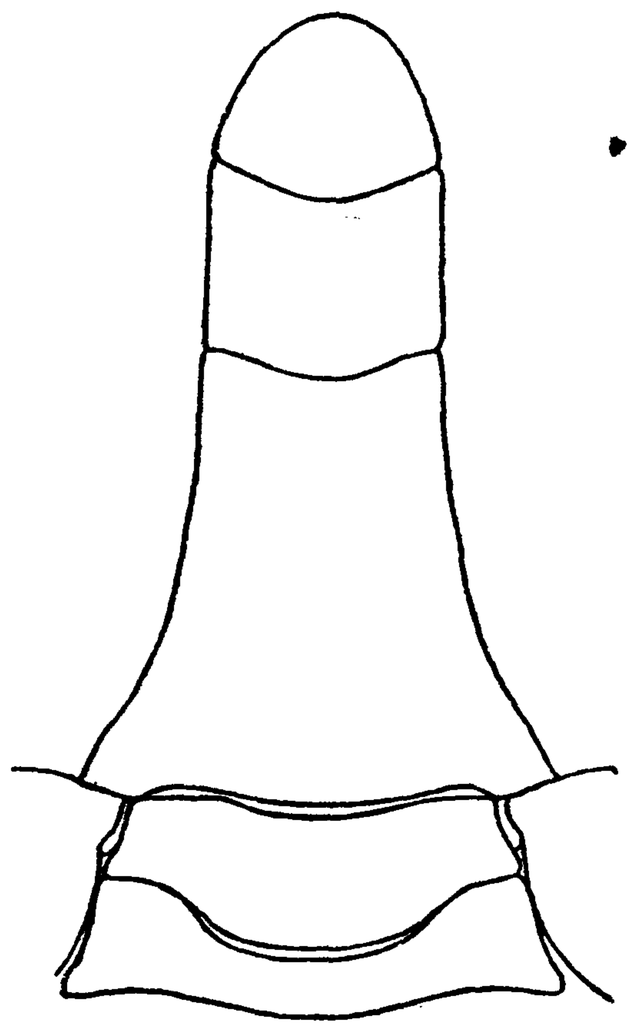

FIGURE 53.—PANOPEUS HERBSTII, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

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

FORMA SIMPSONI[40] new

Plate 157, Figures 1 and 2

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

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

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

Measurements

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

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

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

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

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

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

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

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

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

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

Material examined.—

MASSACHUSETTS.—Boston (M.C.Z.).

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

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

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

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

Drownville (M.C.Z.).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

FLORIDA.—St. Augustine (P.M.Y.U.).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

HAITI.—Jeremie (M.C.Z.).

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

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

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

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

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

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

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

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

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

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

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

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

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

VENEZUELA.—Cumana (M.C.Z.).

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

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

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

BRAZIL.—Para (M.C.Z.).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PANOPEUS PURPUREUS Lockington

Plate 158, fig. 1; Plate 159

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PANOPEUS CHILENSIS Milne Edwards and Lucas

Plate 158, fig. 3; Plate 160

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

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

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

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

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

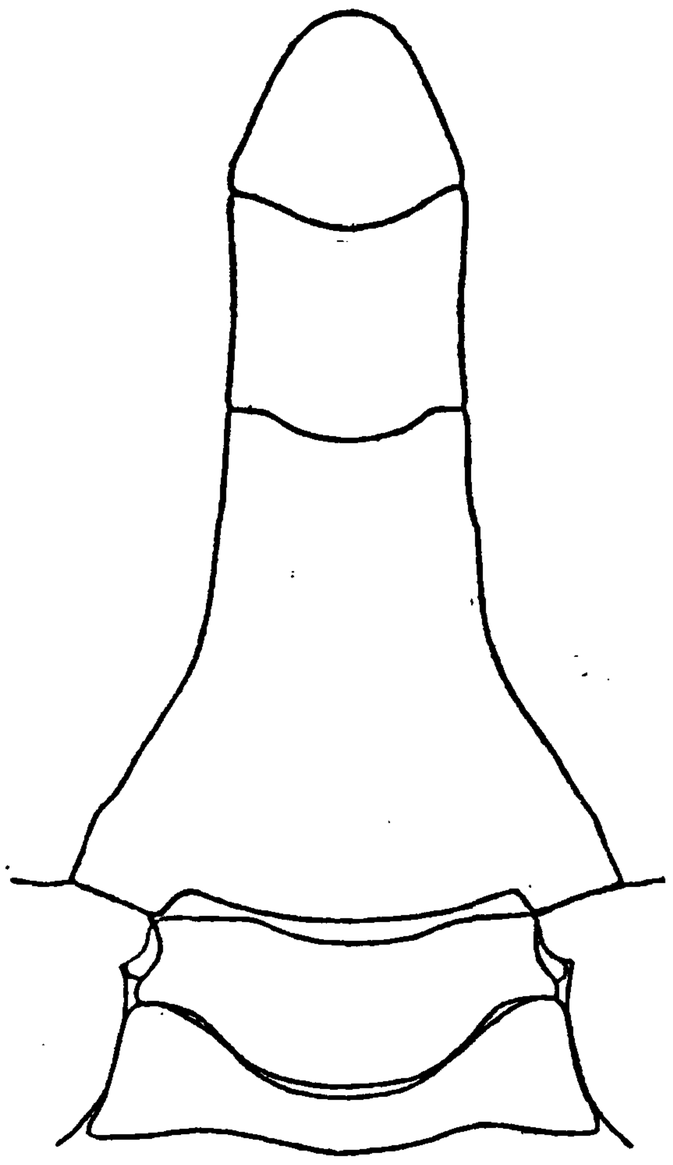

FIGURE 54.—PANOPEUS CHILENSIS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

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

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

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

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

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

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

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

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

Range.—From Sinaloa, Mexico, to Chile.

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

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

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

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

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

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

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

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

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

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

PANOPEUS OCCIDENTALIS Saussure

Plate 161

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

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

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

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

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

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

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

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

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

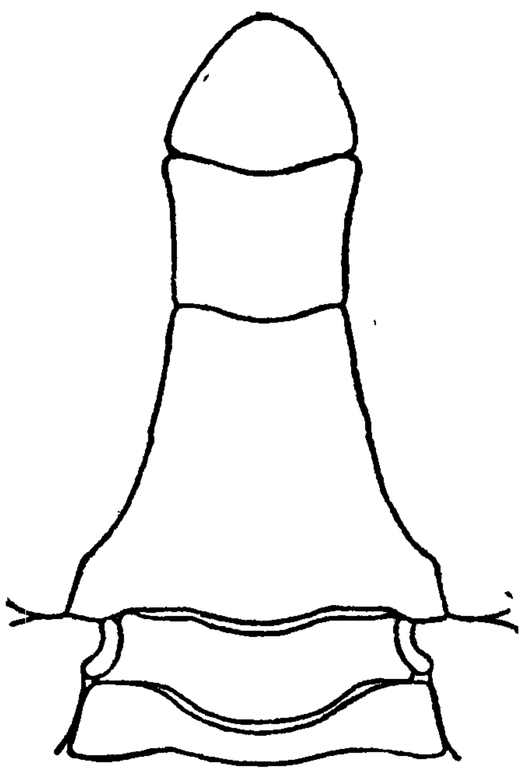

FIGURE 55.—PANOPEUS OCCIDENTALIS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

FORMA SERRATA Saussure

Plate 161, Figures 1 and 3

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

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

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

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

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

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

Material examined of Panopeus occidentalis from Fish Hawk dredgings in Florida

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

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

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

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

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

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

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

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

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

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

[45] See also table on this page.

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

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

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

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

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

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

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

CUBA.—Guadiana Bay (M.C.Z.).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Cayenne, French Guiana (Brit. Mus.).

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

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

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

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

PANOPEUS CONVEXUS A. Milne Edwards

Plate 158, Figure 2

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

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

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

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

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

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

Range.—Chile.

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

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

PANOPEUS RUGOSUS A. Milne Edwards

Plates 162 and 163

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

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

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

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

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

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

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

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

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

Material examined.—

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

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

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

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

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

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

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

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

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

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

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

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

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

PANOPEUS HARTTII Smith

Plate 164, Figures 1, 2, and 5

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

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

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

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

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

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

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

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

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

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

Material examined.—

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PANOPEUS AMERICANUS Saussure

Plate 164, Figures 3, 4, and 6

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

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

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

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

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

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

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

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

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

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

Material examined.—

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PANOPEUS BERMUDENSIS Benedict and Rathbun

Plate 165

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

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

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

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

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

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

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

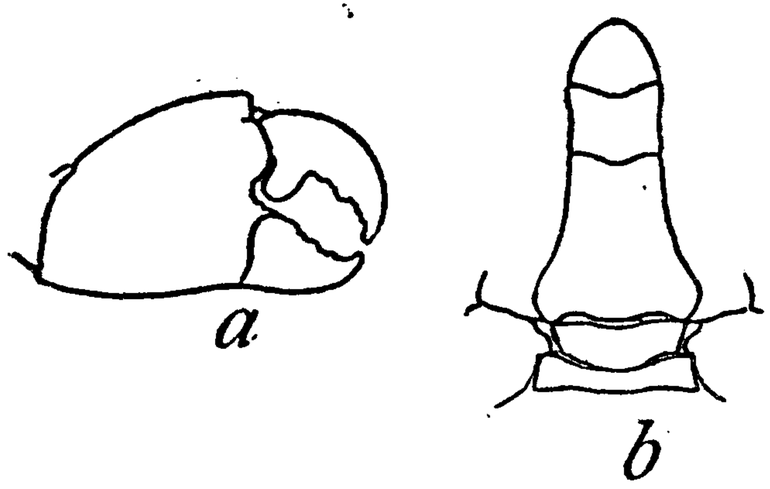

FIGURE 56.—PANOPEUS BERMUDENSIS, MALE, ENLARGED. *a*. MAJOR CHELA. *b*. ABDOMEN. AFTER BENEDICT AND RATHBUN.

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

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

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

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

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

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

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

Material examined.—

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

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

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

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

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

Garden Key, Tortugas; 1 male (3217).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PANOPEUS TURGIDUS, new species

Plate 166

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

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

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

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

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

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

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

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

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

Material examined.—

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

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

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

PANOPEUS BOEKEI Rathbun

Plate 167

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

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

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

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

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

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

Range.—Lesser Antilles; Caribbean Sea.

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

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

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

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

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

Genus NEOPANOPE A. Milne Edwards

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

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

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

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

KEY TO THE SPECIES OF THE GENUS NEOPANOPE

A¹. Dactylus of major chela without a large basal tooth.
  B¹. Fingers white or light horn-color. Antero-lateral teeth sharp and much produced----------*texana texana*, p. 367.
  B². Fingers black or dark-colored in males. Antero-lateral teeth blunter and less produced----------*texana sayi*, p. 369.
A². Dactylus of major chela with a large basal tooth----------*packardii*, p. 380.

NEOPANOPE TEXANA TEXANA (Stimpson)

Plate 168, Figures 1 and 2

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

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

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

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

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

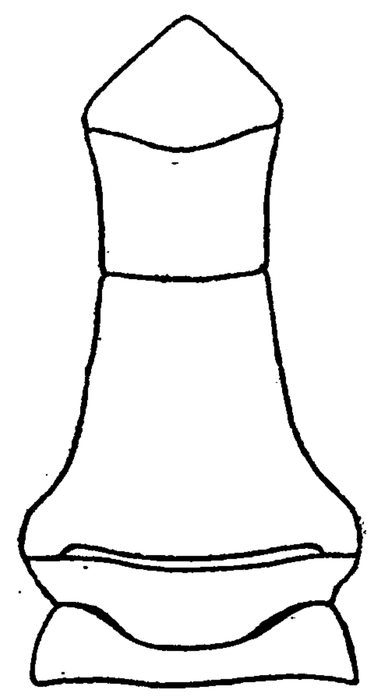

FIGURE 57.—NEOPANOPE TEXANA, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

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

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

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

Material examined.—

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

TEXAS.—Texas; specimens in M.C.Z.

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

NEOPANOPE TEXANA SAYI (Smith)

Plate 168, Figures 3 and 4

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Material examined of Neopanope texana sayi [1]

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			°F.						
New Brunswick: Geddes Point (near Buctouche).			Low tide.	Under stones		Sept. 1, 1926		F. Johansen	1♂	61619	
Massachusetts:											
Provincetown						Sept. 28, 1879		U. S. Fish Commission.	1 y	3005	Off dyke.
Do						Sept. 29, 1879		do	5♂ 2♀	3827	Do.
Wellfleet			(2)			1879		H. E. Webster	1♀	3001	In tubes of *Amphitrite ornata*.
Off Chatham	Chatham Lights, WNW., 16 miles.		43	S. G	49	Aug. 30, 1881	981	*Fish Hawk*	1♀ ovig	36581	
Nantucket Sound	Bishop and Clerks Lightship, E. by S. ¼ S.; Collins Beacon, N. by W. ¾ W.; Hyannis Light, NE. ¼ N.		4. 5	S. Sh	69. 5	Sept. 5, 1887	1245	do	5 y	12688	
Off East Chop, Marthas Vineyard.			10–11. 5			Aug. 11, 1887	1205–1208	do	1 y	16336	
Woods Hole								U. S. Fish Commission.	25♂ 18♀	3214	
Do								do	1♂ 1♀	40776	
Do			(2)					do	1♂ and exuvia	18771	Molt Aug. 27.
Do						July —, 1875		do	5 y	40786	
Do						Sept. 20, 1881		do	7♂ 3♀	40780	
U. S. Fisheries wharf, Woods Hole.						July 5, 1905		J. A. Cushman	4 y	32464	
Do			On piles.			July 27, 1905		M. J. and S. H. Rathbun.	1♂ several y	32446	
Vicinity of Woods Hole.						1905		M. J. Rathbun	50+	32444	
Woods Hole						1911		Bureau of Fisheries.	12	43184	
North of Penzance Point.			4– 4. 75	fne. S. St		July 29, 1905	124	*Phalarope*	1♂	32467	
Woods Hole Passage			4– 4. 75	S. St		July 27, 1905	121	do	2♂	32466	
Ram Island						Sept. —, 1875		U. S. Fish Commission.	2♂	36895	
Vineyard Sound								do	50♂ 25♀ 19 y	8487	
Do						1875		do	2♂	18770	
Do						1875		do	2 claws	34066	

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

[2] Low water.

Material examined of Neopanope texana sayi—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Massachusetts—Contd.	° ′ ″	° ′ ″			° F.						
Vineyard Sound			6–13	hrd. Sh. G	69–70	Aug. 31, 1875	710–715	*Bluelight*	2♂ 3♀	40777	
Do						1875		U. S. Fish Commission.	19	40116	
Do			9–14		64–67	July 20, 1881	932–934	*Fish Hawk*	6♂ 6♀	39958	
Do	Nobska Point Light, WSW. ¼ W., 1⅝ miles.		6	S. G	71. 5	Aug. 18, 1882	1099	do	1♂	5764	
Do			(2)			1883		U. S. Fish Commission.	2♂	6518	Molt Aug. 1.
Do			(2)			1883		do	2♂	6508	Molt Aug. 22
Do						1883		do	2♂	6503	Molt Aug. 20.
Do						1911		Bureau of Fisheries.	1	43185	
East of Uncatena Island.			7–5	S. Sh		July 27, 1905	118	*Phalarope*	7	32465	
Northwest Gutter, Naushon.						July 5, 1905		M. J. Rathbun	6♂ 1♀	32445	
Off Falmouth						1884		*Fish Hawk*	2♂	13843	
Do			3–5			1884		U. S. Fish Commission.	1 y	34166	
Do						1883		do	1♂	40778	
Buzzards Bay	Near Hog Island Harbor.		3. 25–5			Aug. 5, 1905	134–137	*Phalarope*	7+	32469	
Do	Nyes Neck, NE. ¾ E., 2¾ miles.		8	bk. M	68	Aug. 26, 1881	961	*Fish Hawk*	2♀	15661	
Do	Nyes Neck, E. by S., ¼ mile.		7	S	68	do	955	do	10♂ 6♀	4576	
Cataumet						July 22, ——		U. S. Fish Commission.	2♂	40787	
Do						do		do	3♂ 1♀	40779	
Buzzards Bay	S. of Wild Harbor and Cataumet Harbor.		3–6. 5			Aug. 7, 1905	138, 141, 142	*Phalarope*	10+	32470	
Do	East shore		4. 5–5	S. G		Aug. 5, 1905	132	do	13	32468	
Mattapoisett Harbor						Nov., 1882		Willard Nye, jr	7♀	5782	
Rhode Island:											
Sakonnet River	McCurrys Point, N. ¼ E., 1¼ miles.		3. 5	sft. M. brk. Sh	71	Aug. 27, 1880	835	*Fish Hawk*	1♂ 2♀ 7 y	40773	
									1♂ 1♀	41029	
Newport			Shore.			1880		U. S. Fish Commission.	1♀	34021	
Do			Shore.			July 31, 1880		do	2♀ with zoeae	34022	
Do			Shore.			1880		do	2♂ 1♀	40113	

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

[1] Low water.

Material examined of Neopanope texana sayi—Continued

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

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

	From Boston Soc. Nat. Hist.
	Beam trawl.

[3] Returned.

[4] On sand bar.

Material examined of Neopanope texana sayi—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			° *F.*						
Virginia—Continued. Chesapeake Bay	37 33 07	76 02 34	10.25	sft. bk. M., marine growth.	77.3	July 27, 1916	8606	*Fish Hawk*	1 ♀	56342	
	San Marcos wreck, N. ¾ W., Maps Creek Point, E. by S.										
Do	37 22 12	76 10 25	9.5	sft. gn. M. S	66	Oct. 22, 1915	8341	do	2 ♂ 6 ♀	56323	
	1¼ mile SSE. of Wolf Trap Light.								1 ♂	56324	
Do	37 17 12	76 14 12	4.25	hrd. fne. gy. S	48.5	Dec. 4, 1915	8374	do	1 y	56329	
	2¼ miles SE. by E. ¼ E. of New Point Comfort Lighthouse.										
			Meters		°*C.*						
Do	Buoy C 9, NW. by N. ¼ N., New Point Comfort Light, NW. ¾ W., York Spit Light, S. by W. ½ W.		10.07	gy. M. S	4.8	Jan. 23, 1921	8936	do	1 y	58337	
Do	New Point Comfort Light 296°, York Spit Light 8°.		8		11.1	Apr. 2, 1921	8982	do	1 y	58340	
			Fathoms		°*F.*						
Do	37 16 50	76 14 27	5.5	hrd. fne. S., marine growth.	50.3	Apr. 22, 1916	8506	do	3 y	58329	
	Buoy C9, NW. by N. ¼ N., New Point Comfort Light, NW. ¾ W., York Spit Light, SW. ½ W.								1 ♀ 1 y	56338	
Do	37 15 58	76 10 54	6	do	49.8	do	8505	do	2 ♂ 2 ♀ 2 y	56337	
	New Point Comfort Light, NW. by W. ⅜ W., York Spit Lighthouse, SW. ½ W., Buoy C7, W.										
			Meters		°*C.*						
Do	York Spit 252°, Old Plantation Light 308°.		42.5	bk. M	11.5	Apr. 2, 1921	8985	do	2 y	58341	
Do	York River; wooden buoy No. 8.					July 5, 1883		Commander R. D. Evans, U. S. N.	1 ♂	13847	

Do	37 15 54 | 76 07 42 Plantation Light, SE. by E., Buoy No. 10, E. by N. ⅝ N., Buoy No. 15, S. by E. ⅛ E.	7 *Fathoms*	sft. fne. gy. S. M.	49.4 °*F.*	Apr. 22, 1916	8504	*Fish Hawk*	1♀ 1 y	56336
Do	Plantation Light, SE. by E., Buoy No. 10, E. by N. ⅝ N., Buoy No. 15, S. by E. ⅛ E.	12.81 *Meters*	gy. M. S	5 °*C.*	Jan. 23, 1921	8934	do	1♂	58336
Do	37 15 21 | 76 04 40 Plantation Light, SE. ⅜ S., Buoy No. 10, N. ¼ E., Cherrystone Light, E. ⅜ N.	25 *Fathoms*	hrd. brk. Sh	51.6 °*F.*	Apr. 22, 1916	8503	do	2♂ 2♀	56335
Do	Plantation Light, SE. ⅜ S., Buoy No. 10, N. ¼ E., Cherrystone Light, E. by N.	45.75 *Meters*		21.9 °*C.*	July 8, 1920	8826	do	1♂	55731
Do	Plantation Light, SE. ⅜ S., Buoy No. 10, N. ¼ E., Cherrystone Light, E. by N.	45.75 *Fathoms*	gy. S. Sh	4.9 °*F.*	Jan. 23, 1921	8933	do	1 y	58335
Do	37 12 00 | 76 10 05 Back River Light, NW., Thimble Light, W., buoy, SSW. ¼ W.	4	fne. gy. S	68	Oct. 22, 1915	8336	do	23♂ 27♀ (1 ovig.).	56321
Do	37 06 35 | 76 07 30 ¾ mile W. by S. ½ S. of 35-foot Channel Lightship.	8.25	gy. M. fne. gy. S.	68	do	8337	do	2♂ 1♀	56322
Do	37 04 42 | 76 09 18 3 miles SW. of 35-foot Channel Lightship.	5.5–6.5	hrd. S		Jan. 16, 1914	8009	do	3♂ 3♀	56320
Do	37 00 35 | 76 15 15 8 miles WSW. of Thimble Shoal.	15	sft. bk. M. Seaweed.	41.5 °*F.*	Jan. 16, 1916	8403	do	1♀	56333
Do	Bell Buoy No. 1, E. ⅜ S., 3½ miles, Buoy No. 10C, N. by E. ¼ E., off Sandy Point.	14.64 *Meters*		4.2 °*C.*	Jan. 23, 1921	8938	do	1 y	58338
Do	Bell Buoy No. 1, SE. ½ E., 1 mile, Buoy No. 10C, NW. by W. ⅛ W., off Sandy Point.	7.77		24.8	July 8, 1920	8821	do	21♂ 11♀ (4 ovig.).	55732

Material examined of Neopanope texana sayi—Continued

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Virginia—Continued.	° ′ ″	° ′ ″			°C.						
Chesapeake Bay	Bell Buoy No. 1, E. ⅜ S., 3½ miles, Buoy No. 10C, N. by E. ¼ E., off Sandy Point.		14.64		22.5	July 8, 1920	8820	*Fish Hawk*	1♀	55724	
Do	37 00 33	76 15 25 Thimble Light, ENE. ¾ E., Bell Buoy No. 15, SE. ⅛ E.	15.25	hrd	47.8	Apr. 21, 1916	8497	do	5♂ 2♀	56334	
			Meters		°C.						
Do	Thimble Light, ENE. ¾ E., Bell Buoy No. 15, SE. ⅛ E.		28.08	M. S. C. Sh	10.1	Dec. 4, 1920	8898	do	1♂ y	58332	
Do	Thimble Light, ENE. ¾ E., Bell Buoy No. 15, SE. ⅛ E.		27.91	bl. M	4.4	Jan. 22, 1921	8929	do	2♂ 2♀	58334	
			Fathoms		°F.						
Do	36 57 02	76 00 26 Cape Henry Light, S. ⅝ W., Lightship, N. ⅜ E., Can Buoy C1, W ¼ S.	12	hrd	69.8	July 25, 1916	8595	do	4♂ 6♀ (3 ovig.).	56341	
			Meters		°C.						
Do	Lightship, S. ⅜ E., Cape Henry Light, S. ¼ W., Whistling Buoy, SW. by W. ¼ W.		16.1	gy. S. bl. M	11	Dec. 4, 1920	8901	do	1 y	58333	
Do	Cape Henry Light, SW. by S. ¾ S., Lightship, N. ¾ W.		22.87	S. M	19.7	Oct. 21, 1920	8896	do	1 y	58331	
Do						Jan. 3, 1894	5	do	1 y	56349	
Do						do	18	do	1 y	56351	
			Fathoms								
Do	Lower Bay		3.75					U. S. Fish Commission.	1♂	58327	
Do	Mouth of Bay					May 10, 1888		*Grampus*	1♂ y	59851	
Do	Hampton Roads		12			Apr. 8, 1887	2737	*Albatross*	3♂ 2♀ 3 y	12453	
									3 y	15632	
North Carolina:											
Off Cape Hatteras	35 21 00	75 21 30	16	gy. S. brk. Sh		Oct. 19, 1884	2280	do	1 y	56363	
Bogue Sound, off Beaufort.						July —, 1912		*Fish Hawk* (W. P. Hay).	1 y	51389	

Off Morehead City						July 18, 1912		do	6	51011	
Off Harker's Island, near Beaufort.								do	2	51091	
Pivers Island						Jan. 31, 1927		J. S. Gutsell	1 y ♀	62204	
Do				From *Pinna* beds.		Sept. 14, 1928		Schmitt and Shoemaker.	1♂	62535	
Shackleford Bank, inside.				Washed from seaweed.		Sept. 12, 1928		do	3♂ 6♀ (3 ovig.) 5 y.	62534	
Do				do		do		do	1♂ 15 y	62568	Between *texana* and *t. sayi*.
Do						do		do	3♂ 1♀ 2 y	62533	
Gallant Point, Beaufort Harbor.				Mud flats		Sept. 13, 1928		do	3♂ 1♀	62532	
Do				Tide flats, oyster reef.		do		do	1♂ 1♀	62531	
South Carolina:											
Winyah Bay						Dec. —, 1890		*Fish Hawk*	1 y	15689	
Clambank Creek						Dec. 30, 1890		do	1♂ 1♀	15703	From oysters.
Bulls Bay Lighted Beacon.						Mar. 23, 1891		do	1♀	15777	Among oyster shells.
					°F.						
Cooper River	Half a mile above mouth, 300 miles from marsh, south side.		2.6	sft	51	Jan. 16, 1891	1645	do	10+	15720	
Do	300 yards above Lighthouse wharf, lower entrance.		5	hrd	50	do	1646	do	5 y	26365	
Mouth of Bull Creek	Near Cooper River							do	1♂ y	56345	
Do						Jan. 15, 1891		do	25+	17521	
Bull Creek								do	3♂ 1♀	15734	
Charleston Harbor			7.8	stky	58	Mar. 13, 1891	1659	do	1♂ 1♀	15767	
Do						May 14, 1891	2	do	1♂	15778	
Do						1891		do	1♂	31475	
Klawah River						Mar. 8, 1891	4	do	2♂ 2♀ 1 y	56346	
Coosaw River						Feb. 28, 1891		do	1♂ 1♀	15771	
Myrtle Bush Creek						Feb. 7, 1891		do	6	15769	
Jericho Creek						Jan. 23, 1891		do	2 y	15783	
									1 y	26175	
									1♀ y	56348	
Port Royal, naval station.			(5)			Feb. 12, 1891		do	1♂	31474	
Near Port Royal						1891		do	2♂ 1♀	15729	
West end Skull Creek								do	13	15738	Mostly small.
Skull Creek						1891		do	3	26174	
May River	One mile inside of					Jan. 27, 1891		do	2	26176	
									27	15731	Small.
Calibogue Sound	Southern beacon abeam.		7	sft	50	Jan. 16, 1891	1649	do	1♂ 1♀ 2 y	56319	
Do	Off south end May River.		10	hrd	51	do	1651	do	1♀ 2 y	31473	
									40+	15712	
									20+ y	15716	

[5] Piles of wharf.

NEOPANOPE PACKARDII (Kingsley)

Plate 168, Figures 5 and 6

Panopeus packardii KINGSLEY, Proc. Boston Soc. Nat. Hist., vol. 20, 1879, p. 152 (type-locality, Key West, Florida; type in M. C. Z.).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 365, pl. 22, fig. 1; pl. 23, fig. 6.

Neopanope pourtalesii A. MILNE EDWARDS, Crust. Rég. Méx., 1880, p. 330, pl. 61, figs. 2–2*e* (type-localities, Woman Key and Florida Strait (lat. 24° 44′ N., long. 83° 26′ W.), 37 fathoms; cotypes in M. C. Z. and Paris Mus.).

Neopanope packardii RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; Amer. Nat., vol. 34, 1900, p. 138.

Neopanope pourtalesi A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 329, pl. 5, fig. 6.

Diagnosis.—Dactylus of larger hand with a large basal tooth. Last three antero-lateral teeth spiniform, widely separated; tip of fifth tooth at right angles to tip of third.

Description.—Carapace high in middle whence it slopes down rather rapidly in all directions excepting at the mesobranchial region which is high and bears an obscure transverse ridge leading to the ridge on the posterior tooth of the lateral margin. Front prominent in middle, median emargination minute, lobes slightly sinuous. Antero-lateral teeth sharp pointed, very divergent; interspaces, save the first, broadly open. Third and fifth (reckoning five teeth on a side) pointing at right angles to each other, the fourth in an intermediate direction.

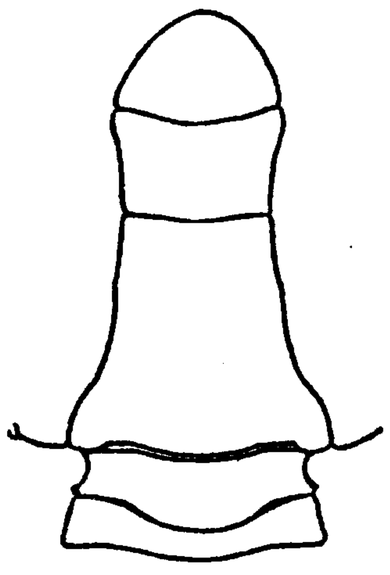

FIGURE 59.—NEOPANOPE PACKARDII, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Fingers black varying to light brown, tips white, color continued on palm along lower margin; dactylus of major cheliped with a large tooth at base of prehensile edge. Tooth of wrist sharp, spiniform. Chelipeds more nearly equal in female than in male.

Measurements.—Male (13042), length of carapace 13.4, width of same 19 mm.

Range.—Southern and western Florida; Bahamas; Cuba.

Material examined.—

FLORIDA.[46]—Miami; G. M. Gray; 1 male (42139), 1 female (42147).

Bonefish Banks SW. end of Biscayne Bay; November 26, 1906; Pine and Bean; 1 male (33145).

Cards Sound: 1889; *Grampus;* 3 males, 2 females (15225). 1.5 miles N. of Pumpkin Key; 10 feet; barry; temperature 24° C.; March 10, 1903; station 7493, *Fish Hawk;* 1 immature female (60786).

Key Largo; 1 fathom; Gis.; H. Hemphill; 1 female (15392).

Lower Metacumbe Key; December 4, 1906; Pine, Vandegrift and Bean, Yacht *Orian*; 1 ovigerous female (33143).

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[46] See also table on page 382.

No Name Key; low tide and below; amid grass and algae; H. Hemphill; 24 males, 29 females (13546).

Summerland Keys; December 6, 1906; B. A. Bean; 1 male (33148).

Key West: A. S. Packard, Jr.; 1 male, type (4800, M.C.Z.). H. E. Webster; 1 male, 1 female (56833), received from Boston Society of Natural History. D. S. Jordan; 5 males, 1 female (15390). H. Hemphill; 6 males, 2 females (15395). C. N. E. Eliot; 1 young female (22991). April 15–27, 1884; *Albatross;* 4 males, 6 females (18519).

Woman Key; William Stimpson; 1 specimen, cotype of *N. pourtalesii* (2985, M.C.Z.).

Harbor Key; H. E. Webster; 2 males (56834), received from Boston Society of Natural History.

Florida Bay; Union College collection; 1 specimen (42799).

Off Cape Romano; lat. 25° 50′ 15″ N.; long. 82° 41′ 45″ W.; 21 fathoms; sdy.; temp. 20° C.; April 2, 1901; station 7124, *Fish Hawk;* 1 male (25615).

Marco; H. Hemphill; 3 young (15633), 1 young (15634).

Punta Rassa; H. Hemphill; 15 males, 10 females (15394).

Charlotte Harbor: Low tide, amid grass; Henry Hemphill; 1 male (15393). Mar., 1887; W. H. Dall; 1 female (15389).

Off Charlotte Harbor; 1901; *Fish Hawk*: Lat. 26° 33′ N.; long. 83° 10′ W.; 28 fathoms; sdy.; temperature 66° F.; April 2; station 7123; 1 male (25613). Lat. 26° 35′ N.; long. 83° 11′ W.; 27.5 fathoms; sdy.; temperature 66° F.; April 2; station 7122; 2 males (25614).

Sarasota Bay; February, 1884; H. Hemphill; 15 males, 14 females (6430).

Boca Ceiga Bay, inner shore of Pine Key; January, 1884; H. Hemphill; 25 males, 19 females, 4 young (15396).

Orange Bluff, Clearwater Harbor; 1 and 2 fathoms; H. Hemphill; 2 males (15391).

Off NW. end St. Martin's Reef, Florida Banks, near lat. 28° 50′ N.; long. 83° W.; 1887; Lieut. J. F. Moser, U. S. N., U. S. Coast Survey Str. *Bache;* 3 males, 4 females (13042).

Cedar Keys: December, 1883; H. Hemphill; 36 males, 13 females, 19 young (15397). February 1887; Lieut. J. F. Moser, U. S. N., U. S. C. S. Str. *Bache;* 1 male (59916).

Sea Horse Key; beach, low water; sft. M. Grs.; March 21, 1887; Lieut. J. F. Moser, U. S. Navy, U. S. Coast Survey Str. *Bache*; 1 male (13051). Flats at low tide; March 27, 1926; Miller and Aschemeier; 4 males, 1 ovigerous female (60913).

West coast of Florida: F. W. Crosby; 1 male (56832), received from Boston Society of Natural History. 1891; Henderson and Simpson; 9 specimens (16339).

Material examined of Neopanope packardii from Fish Hawk dredgings in Florida

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.
	Latitude N.	Longitude W.								
	° ′ ″	° ′ ″	*Feet*		°*C.*					
Biscayne Bay	4 miles ENE of Turkey Point.		8.5	hrd. S	25	Mar. 6, 1903	7476	*Fish Hawk*	1 ♀ ovig. 1 y	59917
Do	3.5 miles SW. by W. ½ W. of Soldier Key.		10.5	barry	23.5	Mar. 7, 1903	7482	do	2 ♂ 1 ♀	59918
Cards Sound	1.5 miles SW. ½ W. of Pumpkin Key.		11.5	sft. S. G	24	Mar. 10, 1903	7492	do	4 ♂ 1 ♀	59919
Do	1.5 miles N. of Pumpkin Key.		10	barry	24	do	7493	do	3 ♂ 3 ♀ (1 ovig.)	59920
North of Knights Key Channel	3.5 miles E. by N. of East Bahia Honda Key.		10	rky	20	Jan. 22, 1903	7411	do	1 ♂ 1 ♀	59921
Do	3 miles NE. by N. of East Bahia Honda Key.		11	rky	20	do	7412	do	1 ♂ 1 y	59922
Do	4.75 miles NNE. of West Bahia Honda Key.		11.5	S. G. barry	20	do	7413	do	1 ♂	59923
Do	6 miles NNE. ½ E. of East Bahia Honda Key.		11	barry	20.5	do	7414	do	2 ♂ 2 ♀ 1 y	59924
			Fathoms							
Pigeon Key Lake	Nearly 1 mile NNE. ½ E. of Money Key.		9	S. G	17.5	Jan. 7, 1903	7402	do	1 ♀ 2 y	59925
Off Key West, inside the reef	Key West Light to E. Channel Bar Buoy 71° 53′ to Beacon A 74° 46′.		5.25	Co. S. G	20	Feb. 13, 1902	7278	do	1 ♀	59926
Florida Bay and vicinity						Jan. 29, 1903	7432–7442	do	6 ♂ 1 ♀ 1 y	59927
Off Cape Sable	25 09 52	81 21 53	3.75	gy. S. Sh	23.5	Dec. 17, 1902	7352	do	1 y	59928
			Feet							
Do	WSW. ½ W. from signal, 7.25 miles.		11	gy. S. G	22	Dec. 19, 1902	7368	do	1 ♂	59929
			Fathoms							
Do	E. end Sawyer Key, S. ¼ W., 2.25 miles.		4.75	rky	22.5	Dec. 22, 1902	7390	do	1 ♂	59930
Tampa Bay			6.5	M	20.5	Mar. 29, 1901	7109	do	1 ♀	25616
Pepperfish Key section	29 32 10	83 29 50	3	sdy	21.8	Nov. 5, 1901	7144	do	1 ♂	59931

BAHAMAS.—Bahamas; from living sponges; 1888; Frederick Stearns: 5 specimens (42801). West side Andros Island; 10 specimens (42802). Andros Banks; 2 specimens (42800).

Off Governor's Harbor, Eleuthera Island; 5 fathoms, in oyster dredge; July 7, 1903; B. A. Bean; 3 males, 2 females (31056), received from Geographic Society of Baltimore.

CUBA.—Esperanza; shallow water; May 11, 1924; Henderson and Bartsch, *Tomas Barrera* Exped.; 1 male (48519).

Genus HEXAPANOPEUS Rathbun

Hexapanopeus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; type, *H. angustifrons* (Benedict and Rathbun); Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 30.

Carapace narrow (the length three-fourths or more of width), hexagonal, regions well delimited. Antero-lateral margin arcuate, about as long as postero-lateral, five-toothed, teeth prominent, orbital or first tooth partly fused with second, fourth tooth very prominent, fifth sometimes much smaller and almost postlateral in position. Postero-lateral margins strongly converging. Fronto-orbital border from half to three-fourths the greatest width of the carapace. Front from a fourth to about a third the greatest width of the carapace. Front advanced, with a median notch and oblique, sinuous or straight lobes separated from inner orbital angle by a notch. Orbital margin with a well-marked lobe between sinuses above; otherwise the orbits are similar to those of *Panopeus*. Basal article of antenna narrow, as in *Eurypanopeus*.

Distinguished from *Eurypanopeus* chiefly by the hexagonal, narrow carapace with produced front and very convergent postero-lateral margins.

From southern Massachusetts to Uruguay; west coast of Mexico.

KEY TO THE SPECIES OF THE GENUS HEXAPANOPEUS [47]

A[1]. Fingers either black or horn color.
  B[1]. Fifth lateral tooth well developed.
    C[1]. Color of immovale finger continued slightly backward on palm, ending in an oblique line.
      D[1]. Margin of front with a small tooth or lobule at outer ends.
        E[1]. Carpus of cheliped not covered with tubercles although it may be lumpy.
          F[1]. Tips of lateral teeth not tuberculiform. Supraorbital lobe wide, more than half as wide as the distance to tip of inner orbital tooth_____**angustifrons**, p. 384.
          F[2]. Tips of lateral teeth tuberculiform. Supra-orbital lobe narrow, less than half as wide as the distance to tip of inner orbital tooth_____**orcutti**, p. 397.

[47] *H. hirsutus* Boone, Bull. Bingham Ocean. Coll., vol. 1, art. 2, 1927, p. 27, fig. 7, Isle of Pines, is *Panopeus harttii;* figure unrecognizable.

E². Carpus of cheliped covered with tubercles, about 15 in number. Fingers deeply grooved_____**paulensis**, p. 395.

D². Margin of front without a small tooth at outer ends. Carapace deeply furrowed. Supra-orbital tooth defined by open fissures_____**sinaloensis**, p. 398.

C². Color of immovable finger continued well backward and also upward on palm. Edge of front thick, beveled_____**schmitti**, p. 393.

B². Fifth lateral tooth almost obsolete_____**caribbaeus**, p. 399.

A². Fingers white or nearly so.

B¹. Fingers not deeply grooved. Short granulated ridges on carapace.

C¹. Carpus and manus granulate, without tubercles___**hemphillii**, p. 400.

C². Carpus and upper surface of manus covered with tubercles. **nicaraguensis**, p. 395.

B². Fingers deeply grooved. First two lateral teeth similar to, but smaller than, remaining teeth_____**quinquedentatus**, p. 402.

ANALOGOUS SPECIES OF HEXAPANOPEUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
schmitti	*sinaloensis*
paulensis	*nicaraguensis*

HEXAPANOPEUS ANGUSTIFRONS (Benedict and Rathbun)

Plate 169, Figures 1 and 2

Panopeus angustifrons BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 373, pl. 22, fig. 3; pl. 24, fig. 18 (type-locality, Long Island Sound, 6–7 fathoms; type, Cat. No. 15669, U.S.N.M.).

Hexapanopeus angustifrons RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.—SUMNER, Bull. Bur. Fisheries, vol. 31, 1911, part 2, 1913, p. 674.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 436, pl. 34, fig. 7.

Diagnosis.—Anterior margin of third lateral tooth transverse. Hepatic tubercle obsolete. Deep groove on carpus. Color of immovable finger not extended on palm. Outer ends of third abdominal segment of male rounded.

Description.—Carapace convex, lateral teeth ascending; areolations fairly well marked; front narrow, much produced, four-lobed, lateral lobes small, their outer margin oblique; median notch V-shaped, continued in a narrow or closed fissure; margin between the two supra-orbital fissures produced, arcuate; antero-lateral edge thin, shorter than postero-lateral; sinus of coalesced tooth shallower in adult than in young; orbital angle acute, next tooth arcuate or lobiform; third and fourth teeth short and broad, anterior edge of third tooth nearly at right angles to median line, posterior edge much longer than anterior and directed obliquely backward and outward from tip; fourth tooth with posterior margin a little longer than anterior and subparallel to median line; fifth tooth shorter and sharper. Inner

lower angle of orbit conical, produced much beyond upper angle; outer hiatus deep, closed at bottom, wide spreading at opening. No subhepatic tubercle.

One and sometimes two small teeth on upper margin of arm; carpal groove deep, tooth at inner angle subcylindrical, stout, obtuse, a shallow lobe below it; major palm smooth, deep, swollen, fingers widely gaping, a cylindrical tooth near the base of the strongly arched dactyl; fingers hooked at tips; the color of immovable finger ends in the old, in an oblique line not extending further on palm; in smaller specimens the color line is vertical and does not quite reach base of finger. Legs slender; dactyls long and hairy.

Third, fourth, and fifth segments of male abdomen partially anchylosed; third segment not as wide as first, its outer ends rounded; terminal segment rounded at tip.

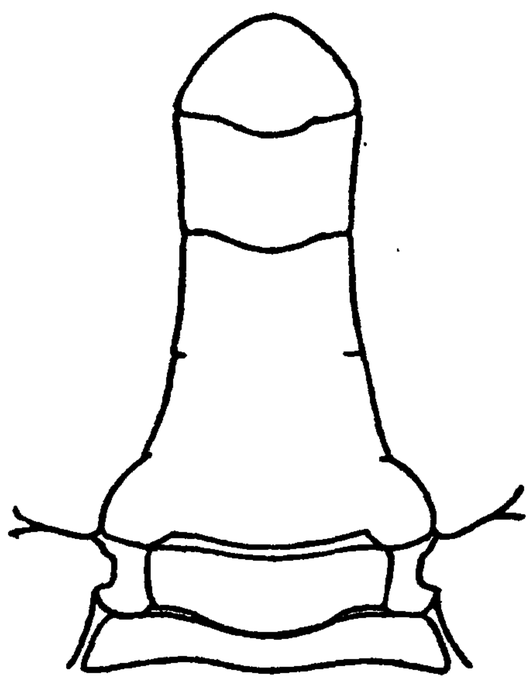

FIGURE 60.—HEXAPANOPEUS ANGUSTIFRONS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Color.—Variable, sometimes a uniform brownish yellow or even light buff, but usually a dark reddish brown or dark gray, the females usually darker than the males and often more or less spotted. In both sexes the fingers are black or dark brown at the base, lighter at the tips. (Hay and Shore.)

Measurements.—Male holotype, length of carapace 17.8, width of same 26.5, fronto-orbital width 13, width of front 7.2 mm. Most of the specimens from Chesapeake Bay and from South Carolina southward are small.

Variation.—A single male (21236) from Jamaica is atypical. It has the not uncommon abnormality of two minor chelipeds instead of a major and a minor; but these are not only similar in form but of nearly equal size and are much longer and stronger than its small carapace (11.6 mm. wide) would normally carry, the merus projecting well beyond the carapace. In addition, the sinus of the coalesced lateral tooth of the carapace is deeper and wider than usual and the ambulatory legs are very narrow, the merus of the last pair being 4.6 by 1.1 mm.; the size of the corresponding member of a male of 13.5 mm. carapace-width (15643) is 4.5 by 1.4 mm.

Range.—From Massachusetts (Vineyard Sound) to Gulf of Mexico (Louisiana), Bahamas and Jamaica.

Material examined.—See table, pages 386 to 392.

Material examined of Hexapanopeus angustifrons

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Massachusetts:	° ′ ″	° ′ ″			°F.						
Off East Chop, Martha's Vineyard.			10 –11.5	S. Sh. G	72	Aug. 11, 1887	1205–1208	*Fish Hawk*	7♂ 7♀	12686	
Vineyard Sound								U. S. Fish Commission.	2♂ 1♀	15639	
Vicinity of Woods Hole.						1905		M. J. Rathbun	1♂ 1♀	32472	
Buzzards Bay	Nye's Neck, NE. ¾ E. 2¾ miles.		8	bk. M	68	Aug. 26, 1881	961	*Fish Hawk*	1♂	15638	
Do	Scraggy Neck and Wings Neck Light.		3.5 – 4.75	S. Sh. fne. G		Aug. 9, 1905	144,145,147	*Phalarope*	3♂	32471	
Nantucket Sound	Bishop and Clerks Lightship, E. by S. ¼ S.; Collins Beacon, N. by W. ¾ W; Hyannis Light, NE. ¼ N.		4.5	S. Sh	69.5	Sept. 5, 1887	1245	*Fish Hawk*	1♂	16337	
Rhode Island:											
Sakonnet River	McCurrys Point, N. ¼ E., 1¼ miles.		3.5	sft. M. brk. Sh.	71	Aug. 27, 1880	835	do	2♂ 5♂ 8♀	36745 40789	1 female is host of an Entoniscid and has a deformed abdomen.
Narragansett Bay	Halfway Rock, NNE. ½ E., 2⅜ miles.		12.5	M	67	Sept. 17, 1880	882	do	1♂	5769	
Connecticut:											
Long Island Sound	Branford Beacon, N. by W. ⅝ W., 1¼ miles.		10	sft	70	Sept. 21, 1892	1733	do	1♀	26148	
Do	Off New Haven and Branford.		3.83– 8.83	M. S		July 28, 1890	1504–1511	do	1♂	17165	
Do	Stratford Point Lighthouse, W. ⅞ S., 2⅜ miles.		7	sft	64	Oct. 13, 1890	1627	do	2♂ 3♀	15711	
Do	Stratford Point Lighthouse, NE. by N., 3½ miles.		8	sft	68.5	Sept. 25, 1890	1562	do	1♂ 5♀	15673	
Do	Bridgeport Light, N. ¾ W., 2 miles.		5.16	sft	70	Sept. 19, 1890	1536	do	1♂ 2♀	15756	
Do	Off Bridgeport		4.5 – 4.66		71	Sept. 17, 1890	1523, 1524	do	1♂	15754	

Do	Bridgeport Light, N. by E. ¾ E., 3¼ miles; Penfield Reef Light, NW., 1⅝ miles.	9	sft	65	Oct. 11, 1890	1622	do	1♂	15759	
Do	Penfield Reef Light, NW. by W. ¼ W., 2¼ miles.	8.5	sft	70	Sept. 18, 1890	1529	do	2♂ 2♀	15710	
Do	Penfield Reef Light, W. by N., 2½ miles.	6.33	sft	70	Sept. 19, 1890	1537	do	1♀	17166	
Do	Penfield Reef Light, W. by N. ¼ N., 3 miles.	7	sft	70.5	do	1546	do	3♀	17164	
Do	Penfield Reef Light, W. by N. ¼ W., 3½ miles.	6	sft	70	do	1547	do	1♀	17163	
Do	Off Penfield Reef Light.	6 – 7	sft		do	1546–1547	do	2♂ 7♀ 2 y	15669	1 male is holotype.
Do	Middle Ground Lighthouse, S. ⅛ E., 2½ miles.	7	hrd	67	Oct. 1, 1890	1580	do	3♂ 5♀ 2 y	15677	
Do	Middle Ground Lighthouse, S. by E., 2¾ miles.	6.66	hrd	68	Sept. 26, 1890	1572	do	2♂ 3♀	15757	
Do	Off Norwalk				1890		do	3♂ 4♀	15768	
New York	The Gut, Long Island.				July 23, 1898		Biological Laboratory, Cold Spring Harbor.	6	21660	
Maryland:										
Chesapeake Bay	38 47 30 | 76 25 06 Bloody Point Light, NNE. ¾ E.; N. end Poplar Island, SE. by E. ¾ E.	20	sft. bk. M		Apr. 25, 1916	8528	*Fish Hawk*	1 y ♀	56292	
Do	38 33 24 | 76 26 06 ¾ mile W. of Bell Buoy No. 18 A.	13	sft. gn. Marl	65.7	Oct. 26, 1915	8355	do	1♂	56306	
Do	38 20 24 | 76 18 14 Barren Island Buoy No. 16 D, NE. by N., about 200 yards.	26	sft. bk. M., marine growth.	45	Apr. 25, 1916	8523	do	2♂ 1♀	56318	
Do	38 14 42 | 76 15 36 Hooper Island Light, NE.; Buoy N. ½ E.	26	sft. bk. M	46	do	8522	do	1♂ 1 y ♀	56291	
Do	38 07 12 | 76 13 30 3⅛ miles E. by S. of Point No Point Lighthouse.	21	hrd.; seaweed, brk. Sh.	52.2	Dec. 6, 1915	8388	do	2♂ 1 y ♀	56309	

Material examined of Hexapanopeus angustifrons—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Virginia:	° ′ ″	° ′ ″			°F.						
Chincoteague						July —, 1913		Henderson and Bartsch.	1♂	46288	
Eastern shore of Virginia.									1♂ 1♀	42797	From Union College. No large tooth at base of dactyl of major cheliped.
Chesapeake Bay	37 54 03	76 06 20	6.75	fne. gy. S	64	Oct. 24, 1915	8347	*Fish Hawk*	4♂ 2♀ 14 y 3♂ 3♀ 1 y	56304 56305 58356	
Do	37 53 00	76 05 30	6	sft. fne. gy. S	48.5	Dec. 5, 1915	8383	do	6♂ 4♀ 2♂	56289 56288	From red sponge.
Do	37 51 38	76 09 44	24	hrd. fne. gy. S. M.	48	Apr. 23, 1916	8512	do	1 y ♀	56317	
Do	37 48 50	75 58 05	11	sft. fne. gy. S. gy. marl.		Oct. 23, 1915	8345	do	1 y ♂ 1 y ♀	56303	
Do	37 41 12	76 00 40	9	hrd. gn. marl, S.	66.5	do	8344	do	7♂ 5♀ 1 y	56302	
Do	37 39 18	76 02 12	9	sft. gn. bu. M.	50.2	Dec. 4, 1915	8379	do	2 y ♂	56307	
Do	37 38 50	76 05 20	7	hrd. gn. marl, S.	65.3	Oct. 23, 1915	8343	do	1♂	56301	
Do	37 35 48	76 10 24	23	hrd. thin layer bk. M.	48	Apr. 23, 1916	8511	do	1 y ♂	56316	
Do	37 34 00	75 59 07	4.25	hrd. Sh. marine growth.	51.5	do	8508	do	1♀	56315	

Windmill Point Light, W. ½ N.; Bell Buoy, SW. by W. ½ W.
Can Buoy No. 1, SE. ½ E., 1 mile.

Do	37 33 19 | 75 58 21 500 yards NW. by W. ½ W. from Can Buoy No. 1.	3	hrd	79	July 27, 1916	8607	do	1 ovig. ♀	60876	
Do	Plantation Light, SE. ⅜ S.; Buoy No. 10, N. ¼ E.; Cherrystone Light, E. by N.	*Meters* 45.75		° *C.* 21.9	July 8, 1920	8826	do	1 ♀	55727	
Do	37 23 24 | 76 05 08 Wolf Trap Light, W. ½ N.; Plantation Light, S. ¼ E.	*Fathoms* 13	hrd. Sh. marine growth.	° *F.* 50.2	Apr. 22, 1916	8507	do	1 ♂	56314	
Do	Cherrystone Light, S. ⅞ E.; New Point Light, SW. by W., ⅞ W.; Wolf Trap Light, W. ½ N.	*Meters* 23.79	bu. M	*C.* 24.8	July 8, 1920	8822	do	1 ♂ 1 cheliped	55725 55723	
Do	37 22 12 | 76 10 25 1¼ miles SSE. of Wolf Trap Light.	*Fathoms* 9.5	sft. gn. M. S	° *F.* 66	Oct. 22, 1915	8341	do	3 ♂ 1 ♀ 1 y 1 ♂ 1 ♀	56296 56293	
Do	37 16 50 | 76 14 27 Buoy C 9, NW. by N. ¼ N.; New Point Comfort Light, NW. ¾ W.; York Spit Light, SW. ½ W.	5.5	hrd. fne. S. M. marine growth.	50.3	Apr. 22, 1916	8506	do	2 y 2 ♀ 1 y	58357 56313	
Do	37 15 58 | 76 10 54 New Point Comfort Light, NW. by W. ⅜ W.; York Spit Lighthouse, SW. ½ W.; Buoy No. C 7, W.	6	hrd. fne. S. M. marine growth.	49.8	do	8505	do	1 y ♂	56312	
Do	37 15 21 | 76 04 40 Plantation Light, SE. ⅜ S.; Buoy No. 10, N. ¼ E.; Cherrystone Light, E. ⅜ N.	25	hrd. brk. Sh	51.6	do	8503	do	9 ♂ 11 ♀	56290	
Do	Thimble Light, E NE. ¾ E.; Bell Buoy No. 15, SE. ⅛ E.	*Meters* 28.08	M. S. Co. Sh	° *C.* 10.1	Dec. 4, 1920	8898	do	3 y	58358	
Do	Thimble Light, E NE. ¾ E.; Bell Buoy No. 15, SE. ⅛ E.	27.91	bu. M	4.4	Jan. 22, 1921	8929	do	1 ♂ 1 ♀	58359	
Do	37 12 00 | 76 10 05 Back River Light, NW.; Thimble Light W.; Buoy, SSW. ¼ W.	*Fathoms* 4	fne. gy. S	° *F.* 68	Oct. 22, 1915	8336	do	2 ♂ 1 ♀	56299	Female is soft shell.

Material examined of Hexapanopeus angustifrons—Continued

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Virginia—Continued.	° ′ ″	° ′ ″			°F.						
Chesapeake Bay	Off Back River Light							*Grampus*	1 ♀	56361	
Do	37 06 35	76 07 30	8.25	gy. M. fne. gy. S.	68	Oct. 22, 1915	8337	*Fish Hawk*	1 ♀	56300	
	¾ mile W. by S. of 35-foot channel Lightship.										
Do	37 05 55	76 10 00	25	sft. gy. bu. M.	50.9	Dec. 5, 1915	8381	do	1 ♀	56294	
	1¼ miles SSE. of Smith Point Lighthouse.										
Do	37 03 18	75 58 12	7.5	sft. fne. S. brk. Sh.	48.9	Dec. 3, 1915	8371	do	2 ♂ 1 ♀	56286	
	3/10 mile W. by S. ¾ S. of No. 4 Buoy, Nautilus Shoal.										
Do	37 00 40	76 14 55	16	sft. gn. bk. M.	50	Dec. 2, 1915	8366	do	1 ♂ 2 ♀	56287	
	½ mile W. by S. of Thimble Shoal Lighthouse.										
Do	37 00 35	76 15 15	15	sft. bk. M. seaweed.	41.5	Jan. 16, 1916	8403	do	1 ♂	56285	
	8 miles WSW. of Thimble Shoal Light.										
Do	37 00 33	76 15 25	15.25	hrd	47.8	Apr. 21, 1916	8497	do	2 ♂ 2 ♀	56310	
	Thimble Light, ENE. ¾ E.; Bell Buoy No. 15, SE. ⅛ E.										
Do	56 58 38	76 07 14	5.25	hrd. brk. Sh.	46.2	do	8498	do	1 ♂	56311	
	Buoy No 4, N. by W. ⅜ W.; Buoy No. 5, W. by N.										
			Meters		°C.						
Do	Cape Charles Light, NE.; Buoy No. 4, E. ⅛ S.; Lightship, SW. by S. ¾ S.		18.3		18.2	July 9, 1920	8827	do	1 ovig. ♀	55726	
			Fathoms		°F.						
Do	36 57 02	76 00 26	12	hrd	69.8	June 25, 1916	8595	do	1 ♀	56295	
	Cape Henry Light, S. ⅝ W.; Lightship N. ⅜ E.; Can Buoy C 1 W. ¼ S.										

		Meters		°*C.*						
Do	Cape Henry Light, SW. by S. ¾ S.; Lightship, N. ¾ W.	23.79		24.2	July 9, 1920	8829	do	1♀	55728	
Do	Lower Chesapeake Bay.				Jan. —, 1921		do	1♂ 1♀	58355	
		Fathoms								
Do	Hampton Roads	12			Apr. 8, 1887	2737	*Albatross*	1♀	12457	
Do	Mouth of Bay				May 10, 1888		*Grampus*	2 y	31478	
North Carolina:										
Off Cape Hatteras	35 21 00 | 75 21 30	16	gy. S. brk. Sh.		Oct. 19, 1884	2280	*Albatross*	1 y	60877	
Off Harker's Island, near Beaufort.					July 24, 1913		*Fish Hawk* (W. P. Hay).	1♂ 4 ovig. ♀	51089	
South Carolina:				°*F.*						
Winyah Bay	33 49 45 | 78 04 00	7	hrd.	80.5	July 12, 1915	8275	*Fish Hawk*	1♂	51061	
Cooper River	300 yards above Lighthouse wharf, lower entrance.	5	hrd. Co.	50	Jan. 16, 1891	1646	do	25 7 y	15724 26366	Small.
Do	½ mile above mouth of Cooper River, 300 yards from marsh, south side.	2.6	sft.	51	do	1645	do	10	15719	Do.
Charleston Harbor		7.8	stky.	58	Mar. 13, 1891	1659	do	1♂	15766	
Near Port Royal					1891		do	1♂ 1♀	15728	
May River	1 mile inside of river				do		do	6	15732	
Skull Creek	West end of creek				do		do	4	15739	
Calibogue Sound	Southern Beacon abeam.	7	sft.	50	Jan. 16, 1891	1649	do	3 y 1 y	15740 56297	
Do					1891		do	3♂ 1♀	15736	
				°*C.*						
Florida:										
Off Northwest Channel.	24 44 50 | 81 53 38	10	hrd. S.	19.5	Feb. 24, 1902	7289	do	1♀	59914	
Off Cape Romano	25 50 15 | 82 41 45	21	sdy.	20	Apr. 2, 1901	7124	do	1♂	25621	
Marco							H. Hemphill	5♂ 5♀ 10 y	15642	
Punta Rassa							do	6♂ 7♀ 8 y	15643	Do.
Charlotte Harbor					Mar. —, 1887		W. H. Dall	2♀	15644	
				°*F.*						
Off Charlotte Harbor.	26 33 00 | 83 10 00	28	sdy.	66	Apr. 2, 1901	7123	*Fish Hawk*	2♀	25620	
Do	26 35 00 | 83 11 00	27.5	sdy.	66	do	7122	do	2♀ ovig.	25619	Atypical: Carapace and chelipeds rough, lateral teeth prominent.
Sarasota Bay		1–2			Feb. —, 1884		H. Hemphill	1♂	15645	
Do								1♂	42796	From Union College.
Do								1♀	42795	From Union College. Rough variety, densely granulate.

Material examined of Hexapanopeus angustifrons—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued.	° ′ ″	° ′ ″			°C.						
Tampa Bay			6. 25–6. 5	M	20. 5–21. 6	Mar. 29, 1901 Apr. 1, 1901	7109, 7121	*Fish Hawk*	1♂ 3♀ 2 y	25622	
Goodland Point								H. Hemphill	3♂ 1♀	18260	
Pensacola						July —, 1893		J. E. Benedict	25 y	18259	
West Florida						1891		Henderson and Simpson.	10	16338	
					°F.						
Louisiana: Mouth of Mississippi River.	S. Pass Light, N. by E.; SW. Light, NE.		76	sft. M	71	June 24, 1913	7909	*Fish Hawk*	1♀	56298	In mud bag.
Bahamas: Andros Islands.	Banks, west side of islands.					1888		F. Stearns	1♀	59509	In live sponges.
Jamaica:											
Montego Bay	Off Montego Bay Point					June 28, 1910		E. A. Andrews	1♂	42944	
Do	Off Bathing Beach					Aug. 5, 1910		do	2♂	42945	
Do	do					July 19, 1910		do	1♀	42943	Dredged.
Port Antonio								J. E. Duerden	1♂	21236	Atypical. From Institute of Jamaica.

HEXAPANOPEUS SCHMITTI,[48] new species

Plate 169, Figures 3–5

Type-locality.—Bay of Rio de Janeiro, Brazil; 1925; W. L. Schmitt collector; male holotype (Cat. No. 59831, U.S.N.M.).

Diagnosis.—Front edge thick, beveled. Anterior margin of third lateral tooth directed outward and slightly forward. A raised bunch of granules on subhepatic region. Color of immovable finger extended backward and upward on palm. Outer ends of third abdominal segment of male rounded; terminal segment an acute, equilateral triangle.

Description.—A small species, representing *H. angustifrons* in the Southern Hemisphere. Carapace convex, with an ascending antero-lateral rim, as in *angustifrons*, but less hexagonal, the front being less advanced and the antero-lateral margin more arcuate. Mesogastric region narrower and more regularly tapering. Protogastric regions covered with numerous irregular and unequal rugae, oblique or transverse in direction. On the other areas, the principal single lines of granules are, one transverse and interrupted at middle, on widest part of metagastric region, and one oblique and directed outward and slightly backward on the epibranchial region. An oblique hepatic elevation bears several striae. Front narrow, edge sinuous, median notch minute, outer angles a little more pronounced than in *angustifrons;* edge thick, obliquely beveled and with a shallow furrow. Supra-orbital notches small, but V-shaped, intervening lobe short, ascending. Sinus between coalesced teeth deepish and rather large in relation to the teeth; remaining sinuses deeper than in *angustifrons*. Third tooth rectangular at tip, anterior margin oblique; fourth tooth triangular, its posterior margin nearly straight, not convex, and directed backward and inward; last tooth pointing outward. Outer suborbital notch V-shaped, adjacent margin slightly concave and less advanced than in *angustifrons*, not separated by an emargination from the inner tooth, which is longer than in the related species. A broad, low, subhepatic tubercle.

Subdistal tooth of merus of cheliped lower and transverse groove deeper than in *angustifrons*. Groove of carpus also deep and continued backward at the outer end in a right angle; inner tooth shorter and broader at base than in *angustifrons*. Minor palm shorter than in full grown *angustifrons;* propodal finger of both chelae more deflexed than in that species. Legs similar to those of the northern species.

In comparison with *angustifrons* the third segment of male abdomen is narrower and its ends more rounded, sixth segment longer, terminal segment longer and more acutely pointed, forming almost an equilateral triangle.

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[48] For Dr. W. L. Schmitt who, as a fellow under the Walter Rathbone Bacon fund of the Smithsonian Institution, has made extensive collections of crustaceans in South America.

Color.—Carapace of freshly preserved specimens olive gray sometimes finely speckled on posterior half. Dorsal half of chelipeds covered with reddish speckles more or less confluent; a larger red spot at articulations. Legs with duller speckles like carapace. The dark color of immovable finger may extend in male along half, or even more than half, of entire lower margin of propodus.

Measurements.—Male holotype, length of carapace 9.4, width of same 12.8, fronto-orbital width 7.8, width of front 4.2 mm.

Remarks.—Small specimens are easily mistaken for *Panopeus bermudensis* on account of the similarity of the granulate lines on the carapace, but they can be identified by the character of the lateral teeth, the thick front, the texture of the palms, and the extension of the color of the finger in the male.

Range.—Brazil; Uruguay.

Material examined.—

BRAZIL.—Maceio, Alagôas; coral reef; August 3, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 female (25736); formerly recorded as *bermudensis*.

Bom Fim, Bahia; 1876–77; R. Rathbun, Hartt Explorations; 1 male (21398); chelipeds not regenerated.

Bay of Rio de Janeiro: 1876–77; R. Rathbun, Hartt Explorations: Dredged, shallow water, 1 male, 3 females (1 ovigerous) (19792); Rio de Janeiro, dredged, 1 female (19791). 1925; W. L. Schmitt: 7 males, 5 females (1 ovigerous) (59831), 1 male is holotype; Pedra de Itapuca, Nictheroy, August 24, 1 ovigerous female (59832); Paqueta, August 19, 4 males, 1 female, 2 young (59833); River in Ilha Governador, August 27, 1 male, 1 female (59847). January, 1922; Carlos Moreira; Copacabana; in *Sargassum*, carried to shore by waves; 19 males, 21 females (8 ovigerous) (59834); received through W. L. Schmitt.

Villa Bella, Ilha São Sebastião, São Paulo; 1925; from W. L. Schmitt: September 28, 4 males, 1 ovigerous female (59835); H. Luederwaldt collector: August, 5 males, 1 ovigerous female, 1 young (59836); October, 14 males, 9 females (3 ovigerous) (59837).

São Francisco, Santa Catharina; along flat in front of sea wall by Mercado; October 5, 1925; W. L. Schmitt; 1 male, 1 female (59838).

URUGUAY.—Cape Polonia; December 6, 1922; H. M. Smith; 1 male (56719).

Punta del Este; under rocks in seaweed mostly in water; November 15, 1925; W. L. Schmitt; 1 male, much worn (59839).

Puerto La Paloma, Rocha: February, 1925; 1 male; lent by Buenos Aires Mus. (15175). March, 1925; *Atair;* 1 male; lent by Buenos Aires Mus. (15412, part).

HEXAPANOPEUS PAULENSIS, new species

Plate 170, Figures 5 and 6

Type-locality.—Santos, São Paulo, Brazil; received from Museu Paulista; male holotype (Cat. No. 61136, U.S.N.M.).

Diagnosis.—Carapace with short transverse lines of single granules. Wrists tuberculate. Fingers deeply grooved, the color of the immovable finger continued moderately back on palm. Sixth abdominal segment of male abdomen broader than long.

Description.—About 12 transverse granulated lines on gastric, cardiac and branchial regions; epigastric and frontal lobes prominent. Edge of front thin, arcuate, with a small median V-notch and a small slightly projecting lobule at outer end. Supra-orbital border arcuate between the two emarginations. Outer tooth small, next or second tooth of antero-lateral margin larger, broad and shallow, with arcuate outer margin; third tooth with nearly straight margin directed inward and forward; fourth and fifth teeth acute and prominent; there may be a small denticle in the first, second, or third sinus. Inner suborbital tooth large, further advanced than the supra-orbital angle but less than the outer angle of the front. On the subhepatic region a raised line of granules.

The chelipeds are distinguished from others of the genus by the roughness of wrist and upper part of palm. The wrist has about 15 tubercles irregular in size and distribution; besides the customary tooth at the inner angle, there is below it a very small but plainly marked tooth or denticle; distal groove deep. Manus with a superior groove, also one on the outer surface just below the upper edge; the two ridges thus formed each have 4 or 5 low ill-defined tubercles. Fingers deeply grooved, tips light, remainder horn color, the color of the immovable finger continued a little on the palm and ending in an oblique line. Of the abdominal segments of the male the last two are broader than long, the terminal segment subtriangular, its proximal margin arching toward the sixth segment.

Measurements.—Male, holotype, length of carapace 7, width of same 9.6, fronto-orbital width 5.6, width of front 2.9 mm.

Range.—State of São Paulo, Brazil.

Material examined.—

Villa Bella, Ilha São Sebastião, São Paulo; September 19, 1925; W. L. Schmitt; 1 male, 2 ovigerous females (61137).

Santos, São Paulo; 3 males, 2 females (61136) from Museu Paulista; 3 males, 3 females (Mus. Paulista, 1011).

HEXAPANOPEUS NICARAGUENSIS Rathbun, new combination

Lophopanopeus nicaraguensis RATHBUN, Proc. Biol. Soc. Washington, vol. 17, 1904, p. 162 (type-locality, Realejo, west coast of Nicaragua; type in Copenhagen Mus.).

Diagnosis.—Five well marked, triangular, antero-lateral teeth. Transverse granulated lines on carapace. Upper surface of wrist and palm tuberculate.

Description.—Regions of carapace plainly marked, finely granulate, crossed by transverse lines of coarser granules—on front and epigastric lobes, two on each protogastric region, one at widest part of mesogastric region, one hepatic, two on anterior part of branchial region, while on posterior part of same region there is a nearly longitudinal row of very short granulated rugae which extend to posterior margin; the last of these is the strongest. Front narrow, little more than one-fourth width of carapace; margin thick, granulate, bilobed, median notch V-shaped, lobes most advanced near the notch, outer angles distinct, blunt teeth. Margin of orbit granulate, outline convex between the two superior fissures; outer sinus a large V, inner lower

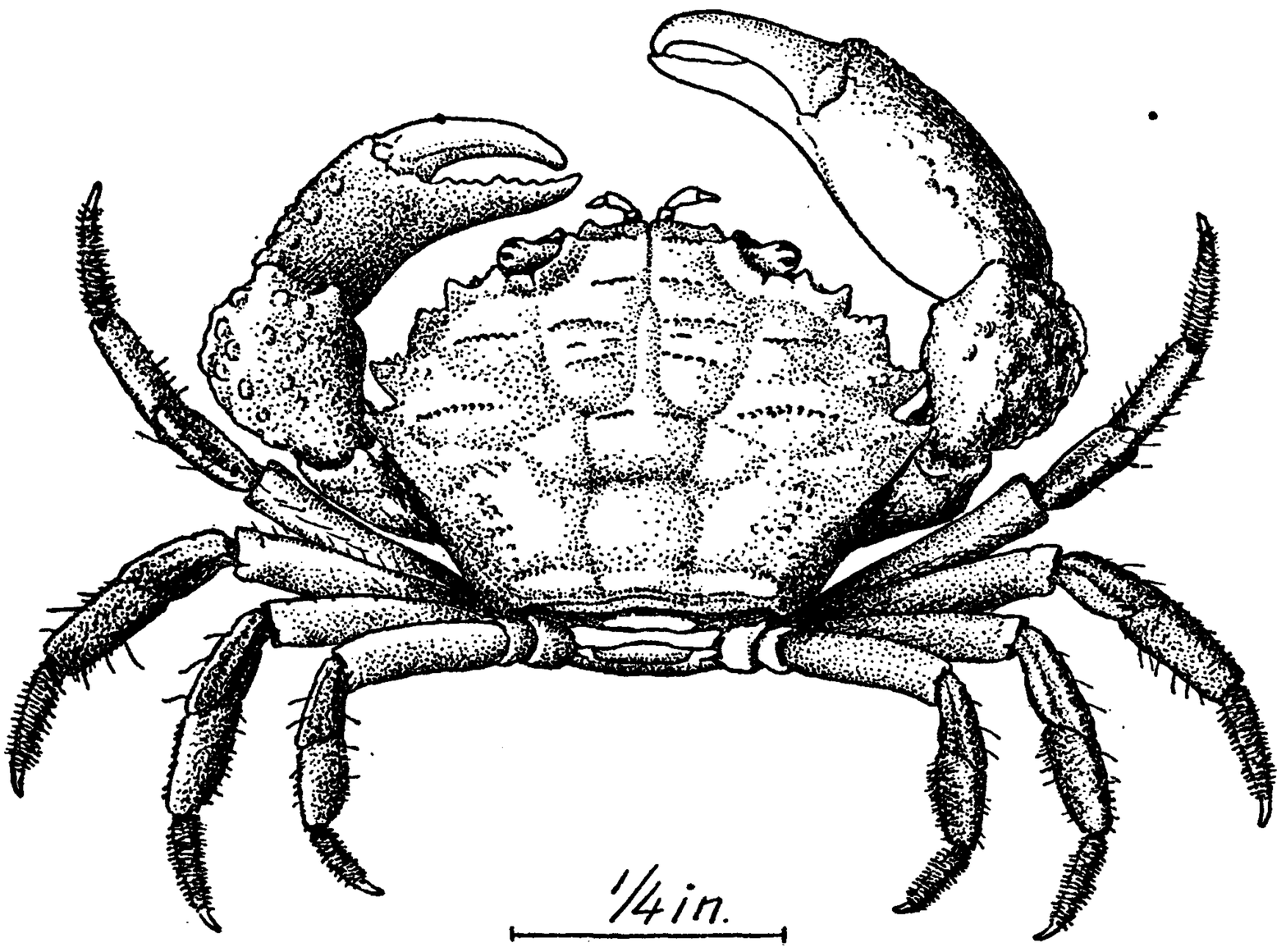

FIGURE 61.—HEXAPANOPEUS NICARAGUENSIS, MALE, HOLOTYPE (COPENHAGEN MUS.), CARAPACE 13 MM. WIDE, DORSAL VIEW

angle prominent, triangular, intervening outline convex. Antero-lateral teeth five (orbital included), increasing rapidly in size from first to fourth, fifth nearly as large as fourth, thick, upturned, margins denticulate. From the second a granulate bilobed crest extends along subhepatic region to antero-lateral angle of buccal cavity. The fourth and fifth teeth have a superior crest prolonged on to the carapace.

Chelipeds very unequal, granulate, granules coarser on elevations and margins. Merus as high as long, a strong subterminal tooth above, behind it a denticle. Carpus covered outside with granulated tubercles, anterior and outer margins thickened; inner tooth small. The fine granules of the palm form transverse reticulating lines; upper and posterior end rough with granulated tubercles which form two rows above and have a tendency to form longitudinal lines on

outer surface. Fingers of large claw gaping, dactylus with a large basal tooth, thumb a little deflexed, that of smaller claw more strongly so. Fingers almost white in alcohol, color line oblique but not extended noticeably on palm. Upper margins of ambulatory legs granulate, carpal crests unevenly so; last two articles densely hairy.

First segment of male abdomen with a transverse granulated crest; penult segment much broader than long, and broader at anterior than posterior margin; terminal segment broadly subtriangular.

Measurements.—Male holotype, length of carapace 8.7, width of same 13, width of front 3.5 mm.

Range.—West coast of Nicaragua.

Material examined.—Known only from the type-specimen from Realejo; Oersted collector; one male (Copenhagen Mus.).

HEXAPANOPEUS ORCUTTI, new species

Plate 170, Figures 3 and 4

Type-locality.—Near Modesto, Sinaloa, Mexico; September 29, 1922; 1 male holotype (Cat. No. 56688, U.S.N.M.).

Diagnosis.—Lateral teeth with tuberculiform tips. Carpal furrow turning backward at a right angle. Major manus with a furrow on upper part of outer surface. Color of immovable finger prolonged obliquely backward from interdigital sinus.

Description.—Striae of dorsal surface ill defined, regional furrows shallow. Margin of front slightly arched, as far as the well marked outer teeth; median emargination minute. Upper orbital border between fissures lobiform. Antero-lateral teeth similar, triangular, shallow, and with thick tuberculiform tips; first tooth equilaterally triangular and so deeply and widely separated from the second that they do not appear coalesced; third tooth with a short anterior margin directed a little forward and the posterior margin directed well outward and backward; fourth tooth widest, its anterior margin running slightly back to the tip, posterior margin longer, a little convex and directed backward and inward to the small and narrow fifth tooth, which points obliquely forward.

Carpus of cheliped very lumpy, its distal furrow continued backward at the outer end in a right angle. Upper part of major manus compressed so that a longitudinal furrow is formed on the outer surface. Color of both propodal fingers continued moderately on palm, the terminal line beginning in the sinus at base of finger and continued obliquely down and back in a sinuous line. The major dactyl lacks a large basal tooth; this may be an accidental rather than a specific character.

Sixth segment of male abdomen broader than long, sides mostly parallel but curve inward a little at distal end. Terminal segment very short and rounded at tip.

Measurements.—Male holotype, length of carapace 4.9, width 6.6, fronto-orbital width 4.5, width of front 2.6 mm.

Range.—West coast of Mexico. Known only from the type specimen.

HEXAPANOPEUS SINALOENSIS, new species

Plate 170, Figures 1 and 2

Type-locality.—Teacapán, Sinaloa, Mexico; on oyster beds especially among bunches of Hydrozoa; Secretaria de Agricultura y Fomento; 1 male holotype (Cat. No. 60229, U.S.N.M.).

Diagnosis.—Carapace deeply furrowed. Front arcuate, without tooth at outer ends. Supra-orbital lobe set off on either side by an open fissure. Second antero-lateral tooth much larger than first; third wider than fourth.

Description.—Regions and subregions of the dorsal surface of the carapace marked off by deep furrows; transverse granulated lines inconspicuous. Front thin, not crossed by the median epigastric groove; edge arcuate, scarcely interrupted by the minute notch at the middle, and without a tooth at the outer ends. Inner supra-orbital tooth large, outer edge longitudinal, inner oblique; space between fissures broad, transverse, fissures open, terminating in a V-notch; inner suborbital tooth low, reaching only as far as the line of the base of the supra-orbital tooth. Outer tooth small, only a third as wide as the second tooth of lateral margin and separated from it by a narrow sinus; second tooth shallow, inner margin nearly transverse, outer margin sinuous, directed backward and outward; third tooth broadest, a lobule on its inner margin, outer margin nearly longitudinal; fourth tooth narrow-triangular, a minute lobule at base of inner margin, outer margin oblique and slightly convex; fifth tooth very small but well formed, directed obliquely forward.

The chelipeds, which are detached and very unequal, are rough, the carpus lumpy toward the distal end, the manus very rough above and with a deep superior furrow. Both chelipeds have the fingers strongly deflexed and the dactyl without a large basal tooth. They have the appearance of minor chelipeds and may not both belong to the type-specimen. The color of the fixed finger runs back a little on the palm in a horizontal line, then turns obliquely downward, forming a line parallel to the proximal margin of the palm.

Abdomen (male) rather narrow, the third segment not reaching the coxae of the last pair of legs; sixth segment broader than long, its sides sinuous; terminal segment slightly broader than long, sub-triangular.

Measurements.—Male holotype, length of carapace 6.2, width 8.5, fronto-orbital width 5.7, width of front 3.2 mm.

Range.—West coast of Mexico. Known only from the type specimen.

HEXAPANOPEUS CARIBBAEUS (Stimpson)

Plate 171, Figures 3–5

Micropanope caribbaea STIMPSON, Ann. Lyc. Nat. Hist. N. Y., vol. 10, 1871, p. 108 (type-locality, St. Thomas; type not extant).
Eurypanopeus caribbaeus RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 20.
Hexapanopeus caribbaeus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; Bull. U. S. Fish Comm. for 1900, vol. 20, part 2, 1901, p. 31.

Diagnosis.—Fifth lateral tooth minute. A supra-orbital lobe present, advanced to level of outer orbital tooth. Dark color of fingers running backward and upward on palm. No large tooth at base of major dactyl.

Description.—Carapace moderately convex, pubescent. Transverse ridges with longer hairs, as follows: Two subparallel, on protogastric region; one epibranchial, strong, in line with last lateral tooth; slightly further back, one metagastric, interrupted at middle; one cardiac, with a shorter median break; one short, above base of last leg. An oblique and more feeble granulate hepatic ridge paralleling the lateral margin; this ridge is lacking in small specimens. Front very narrow, produced, edge thin, lateral margins oblique, a median V, lobes oblique, or in the young transverse or nearly so. Antennal flagellum as long as front is broad. Inner supra-orbital border elevated, emarginations V-shaped, intervening space lobate or obtusangled, as advanced as the small triangular, outer tooth. Exorbital notch V-shaped, lower margin advanced, becoming gradually more so up to the broad inner tooth, which is less produced than the corresponding tooth above. Second antero-lateral tooth small, similar to first and separated from it by a shallow sinus; their combined width equal to that of third tooth, which has a transverse or in the old strongly concave, anterior, and an arcuate posterior margin, tip acute. Fourth tooth spiniform, a little narrower at base than third, and much more outstanding, directed obliquely forward, anterior margin concave, posterior straight or nearly so. Fifth tooth minute, separated from fourth by a closed fissure and appearing much like a section from the posterior slope of the fourth.

Chelipeds very unequal; carpus with a number of small tubercules, arranged roughly in three rows, and at the inner angle a small slender tooth. Palm very finely granulate but smooth to the naked eye; two parallel ridges above and a smooth interspace. Fingers dark with light tips, the dark of the propodal finger prolonged in the male well back and up on the palm, in the female and young a short way back. Major fingers stout, not gaping, minor fingers slenderer and longer; major dactylus without large basal tooth; major fixed finger nearly horizontal, minor deflexed. Ambulatory legs very slender, merus not inflated.

Male abdomen: Third segment narrow, ends rounded; remaining segments relatively broad, a slight constriction between fifth and sixth, sixth and seventh much broader than long; seventh subtriangular, with blunt tip.

Measurements.—Male (24278), length of carapace 8, width 11.5, fronto-orbital width 7.5, width of front 3.7 mm.

Range.—West Indies; coast of South America from Colombia to State of Santa Catharina, Brazil.

Material examined.—

WEST INDIES.—Jamaica: P. W. Jarvis; 4 males (19356, 19402). Montego Bay; from sponges and algae in brackish pond; July 2, 1910; C. B. Wilson; 1 female (42938). Bogue Islands; 1910; C. B. Wilson: On mangrove roots with sponges, ascidians, etc., June 20, 12 males, 6 females (42937); from sponge on mangrove roots, July 10, 1 male (42936). Kingston Harbor: 1893, R. P. Bigelow, 1 male (19795); P. W. Jarvis, 2 males, 1 female (19359).

Porto Rico; 1899; *Fish Hawk:* 1 male (24279). Boqueron Bay; January 27; 1 male, 1 female (24280). Hucares; February 14; 1 male (24278).

St. Thomas; 1884; *Albatross;* 1 male (19414).

SOUTH AMERICAN COAST.—Colombia: Sabanilla; March 16–22, 1884; *Albatross;* 2 ovigerous females, 1 young (19416).

Curaçao; Caracas Bay; 1920; C. J. van der Horst: Under stones near shore; May 3; 1 female (Amsterdam Mus.). In coral; April 28; 1 young (56883).

Trinidad; January 30–February 2, 1884; *Albatross:* 12 specimens (19794). Monos Island; 3 females (2 ovigerous, 1 of which is only 4.5 mm. wide) (19415).

Brazil: Bay of Rio de Janeiro, across from the city; from sponges; C. Moreira; 2 males (31502) from Museu Nacional, Rio de Janeiro. River on Ilha Governador, Bay of Rio de Janeiro; August 27, 1925; W. L. Schmitt; 1 male (59829). State of Santa Catharina; 1919; H. Luederwaldt; 2 males, lent by Museu Paulista.

HEXAPANOPEUS HEMPHILLII (Benedict and Rathbun)

Plate 171, Figures 1, 2, and 6

Panopeus hemphillii BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 374, pl. 24, figs. 12 and 13 (type-locality, Indian Key, Florida; holotype, Cat. No. 15649, U.S.N.M.).

Hexapanopeus hemphillii RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; Bull. U. S. Fish Comm. for 1900, vol. 20, part 2, 1901, p. 31.

Diagnosis.—Third lateral tooth broader at base than the other teeth. Carapace widest at fourth tooth. Fifth tooth well developed. Fingers not deeply grooved; color white, not extended on palm.

Description.—Carapace well areolated, mesogastric region constricted behind the point where it narrows to the tip. Transverse granulated ridges on epigastric, protogastric, hepatic, and epibranchial regions; except in the last-mentioned, the ridges are two or more granules in width, and in the protogastric and hepatic ridges are very irregular and wider at outer than inner end. Anterior and lateral margins granulate; third, fourth, and fifth teeth surmounted by a line of granules, that on fourth and fifth teeth widening inwardly in a bunch of granules. Front with a row of granules paralleling the margin; a narrow median V; edge of either half oblique and sinuous, forming a low outer lobule strongly rounded off. Inner upper tooth of orbit acutangled; superior fissures V-shaped, intermediate space short; outer emargination a broad V from which the lower margin of the orbit is transverse up to the conical inner tooth. Outer tooth of orbit small, obtusangled, separated by a shallow rounded, or sometimes slightly pointed sinus from the next or second antero-lateral tooth; this is larger than the first, larger in full-sized than in small specimens, and sometimes rounded or lobiform as in the type-lot, or subtriangular as in smaller specimens. Last three teeth unequal and dissimilar; third widest, suboblong, anterior margin straight, oblique; posterior margin rounded or a little angled. Fourth tooth prominent laterally (carapace widest here), not much more than half as wide at base as third, anterior margin concave and obliquely transverse, posterior margin convex; fifth tooth triangular, directed outward.

Chelipeds very unequal in male. Upper margin of merus rough with granules, two or three denticles preceding the subdistal tooth or tubercle. Carpus rough with granulated ridges and tubercles, the distal furrow widens at outer end, and a broad, nearly smooth, depression runs along the inner border from the tooth to articulation with manus. The latter is rough above and inside with fine granulate reticulations, superior groove well marked; on the outer surface the granules become very fine below or disappear. Fingers not gaping, white, color not extended on palm. Fingers of major chela very short and broad, propodal finger horizontal; fingers of minor chela long, narrow, deflexed, grooves deeper than in major chela.

Fifth segment of male abdomen narrowing distally, sides sinuous. Sixth segment broader than long, narrowing slightly toward fifth segment. Terminal segment an equilateral triangle, or in the full grown, more elongate; tip subacute.

Measurements.—Male holotype, length of carapace 6.9, width of same 9.8, fronto-orbital width 6.3, width of front 3.4 mm.

Range.—Western and southern Florida; West Indies.

Material examined.—

FLORIDA.—Sarasota Bay; 1 male (42807); from Union College.

Tortugas: 1884; Edward Palmer; 2 ovigerous females (15653). East side Loggerhead Key; from two buckets of turtle grass, roots, etc.; June 17, 1925; W. L. Schmitt; 1 male (59830). Fort Jefferson from beach at pier; July 25, 1926; C. R. Shoemaker, station 6; 1 ovigerous female (60880); gift of Carnegie Institution.

Key West: 1884; *Albatross;* 3 males, 5 females (18262). H. Hemphill; 50 specimens (15652). February 3, 1901; B. A. Bean and W. H. King; 1 male, 1 female (24843). Key West Harbor; Edward Palmer; 8 specimens (15651).

Off Key West; inside the reef; Key West Light to East Channel Bar Buoy, 71° 53′, to Beacon A, 74° 46′; 5¼ fathoms; Co. S. G.; temperature 20° C.; February 13, 1902; station 7278, *Fish Hawk;* 3 young (59911).

No Name Key; H. Hemphill; 13 specimens (15650).

3¾ miles NW. ½ N. of E. end of Grassy Key; 8 feet; rky.; temperature 24° C.; January 28, 1903; station 7431, *Fish Hawk;* 1 male (59912).

Duck Key N., 1.25 miles; 2¾ fathoms; Co. S. grass; temperature 69.5° F.; December 20, 1912; station 7790, haul 2, *Fish Hawk;* 1 male, 1 female with Bopyrid parasite, 1 young (60881).

4¼ miles W. by N. of Elbow Reef Beacon, Hawk Channel; 2¾ fathoms; barry, S.; temperature 20.5° C.; February 19, 1903; station 7467, *Fish Hawk;* 1 ovigerous female, 1 young (59913).

Indian Key; H. Hemphill; 1 male holotype, 1 female (15649).

Key Largo; among corallines, low tide; H. Hemphill; 1 female (15648).

WEST INDIES.—Cuba; on reef flat between Cayo Hutia and Little Cayo, northeast of Light; May 12, 1914; Henderson and Bartsch, *Tomas Barrera* Expedition; 1 male (48515).

Porto Rico; 1899; *Fish Hawk:* 2 females (24259). Mayaguez Harbor; January 20; 1 male (24260). Porto Real; January 27; 1 male (24261).

St. Thomas; January 17–24, 1884; *Albatross;* 2 females (1 ovigerous) (18518).

HEXAPANOPEUS QUINQUEDENTATUS Rathbun

Hexapanopeus quinquedentatus RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 2, 1901, p. 31, text-fig. 6 (type-locality, Mayaguez, Porto Rico; type Cat. No. 23769, U.S.N.M.).

Diagnosis.—Lateral teeth prominent, thick; sinus deep between first and second. Outer tooth of front obsolete. Fingers white, deeply grooved.

Description.—Carapace deeply areolated, regions separately convex, granulate; granules coarser on elevations, noticeably in a transverse line on epibranchial, mesobranchial, metabranchial, hepatic, epigastric, metagastric (line interrupted at middle), protogastric

(two, one behind the other), and on the midribs of the lateral teeth. Edge of front thin, with a median V; lobes slightly oblique, nearly straight, outer angles deflexed and but very little, almost imperceptibly, advanced; side margins oblique, outer corners rounded. Upper orbital margin between fissures wide, slightly arched. Five well-marked lateral teeth, sinus deep between first and second; the first four teeth increase successively in size; second tooth with convex outer margin and blunt tip; third, fourth, and fifth most prominent, thick, subacute; fifth directed outward.

Chelipeds not very heavy nor very unequal, coarsely and closely granulate; merus margined above, ending in a minute subdistal point. Carpus uneven with a few tubercles and a very wide and deep distal groove. Manus deeply grooved along upper surface; a broader shallower groove on upper part of outer surface. Fingers deeply grooved, intervening ridges partly granulate; tips acute, fingers not gaping; color white, apparently not continued on palm. Legs granulate along anterior margin.

Measurements.—Female holotype, length of carapace 5.5, width of same 7.4, fronto-orbital width 5, width of front 2.4 mm.

FIGURE 62.—HEXAPANOPEUS QUINQUEDENTATUS. *a*. MALE, RIGHT CHELA, × 10. *b*. FEMALE, CARAPACE, × 4

Range.—Porto Rico.

Material examined.—Porto Rico; 1899; *Fish Hawk:*

Mayaguez; January 19; 1 female, holotype (23769); chelae equal and both of the minor sort without basal tooth on the dactyl.

Mayaguez Harbor; customhouse, E. by S. ¼ S., 2¼ miles; 12 fathoms; stky. M.; January 19; station 6060; 1 ovigerous female (24245).

Off Porto Real; Punta Guaniquilla, S. ¼ E., 2 miles; 8.5 fathoms; Co. S.; January 25; station 6074; 1 immature female (24244).

Off Boca Prieta; Punta Guaniquilla, S. SE., 3¼ miles; 8.5 fathoms; Co. S.; January 25; station 6075; 1 immature female (24243).

Relation.—*H. quinquedentatus* resembles *sinaloensis* in the deep sinus between the first and second lateral teeth, but is a much rougher species with more outstanding third, fourth, and fifth teeth and straighter, more transverse front.

Genus EURYPANOPEUS A. Milne Edwards

Eurypanopeus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 318; type, *E. crenatus* (Milne Edwards and Lucas).

Carapace rather broad, length about two-thirds width, oval, depressed or convex, regions not strongly marked or areolated, often

crossed by fine transverse broken granulated lines, but on the whole the carapace is smoother than in *Panopeus*. Antero-lateral borders horizontal or slightly upturned, as long as or slightly shorter than postero-lateral, arcuate, cut into five (including orbital) shallow teeth or lobes, usually projecting little if at all beyond general line of carapace. Second tooth low and rounded and rather closely fused with orbital tooth. Fronto-orbital border half or more than half and front a third or little less than a third the greatest width of carapace. Front less advanced than in *Panopeus;* otherwise front and orbits much as in that genus. Orbital hiatus and basal article of antenna narrower than in *Panopeus*. Chelipeds unequal in both sexes; the fingers may be acute or spoon-shaped or different on the two chelipeds in the same species. Abdomen of male with usually the third, fourth, and fifth segments fused (only fourth and fifth fused in *dissimilis*).

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

KEY TO THE SPECIES OF THE GENUS EURYPANOPEUS

A¹. Carapace distinctly convex, especially in the antero-posterior direction.
  B¹. Fingers of minor cheliped spooned. Chelipeds very unequal.
    C¹. Minor manus two-thirds as high as major. Transverse lines on dorsum not strikingly prominent---------- **depressus**, p. 410.
    C². Minor manus half as high as major. A few very prominent raised granulated lines on dorsum---------- **dissimilis**, p. 411.
  B². Fingers of both chelipeds with acute tips, not spooned.
    C¹. Dark color of immovable finger continued on palm.
      D¹. Front double-edged, upper edge with a line of granules.
        E¹. Hepatic region faintly indicated and not crossed by oblique granulated lines---------- **transversus**, p. 407.
        E². Hepatic region deeply indicated and crossed by oblique granulated lines---------- **abbreviatus ater**, p. 407.
      D². Front not double-edged. Hepatic region deeply delimited----- **ovatus**, p. 409.
    C². Dark color of immovable finger not continued on palm.
      D¹. Carapace moderately convex, well areolated; three lateral sinuses of good size---------- **abbreviatus**, p. 404.
      D². Carapace very convex, regions faintly marked; lateral sinuses slight. ---------- **crenatus**, p. 418.
A². Carapace flat, especially toward the sides.
  B¹. Carpus of cheliped smooth (without grooves). Anterior and antero-lateral regions rough with granules and granulated rugae-- **planus**, p. 420.
  B². Carpus of cheliped with two grooves at right angles to each other. Antero-rior and antero-lateral regions nearly smooth, finely granulate-------- **planissimus**, p. 421.

ANALOGOUS SPECIES OF EURYPANOPEUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
abbreviatus	*ovatus*

EURYPANOPEUS ABBREVIATUS (Stimpson)

Plate 172, Figures 1 and 2

Xantho parvulus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 395, Antilles and Brazil (not *Cancer parvulus* J. C. Fabricius, 1793).

Panopeus abbreviatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 211 (type-locality, Barbados; type in M. C. Z.).

Panopeus politus SMITH, Trans. Connecticut Acad. Sci., vol. 2, 1869, pp. 3 and 34, pl. 1, fig. 4 (type-locality, Abrolhos Reefs, Brazil; type in P. M. Y. U.).

Eurypanopeus parvulus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 322, pl. 59, figs. 5–5*d*.

Eurypanopeus abbreviatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 320, pl. 59, figs. 3, 3*a*.—RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 19; Bull. U. S. Fish Comm. for 1900, vol. 20, part 2, 1901, p. 30.

Panopeus parvulus BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 369, pl. 21, fig. 1; pl. 23, figs. 2 and 3.

Diagnosis.—Antero-lateral margin cut into shallow lobes. Carpus of cheliped with a broad low blunt tooth at inner angle. Color of immovable finger not prolonged on palm. Fingers of minor chela acute.

Description.—Carapace naked above, broad, moderately convex in two directions, granulate and uneven on the front and along the antero-lateral border, smooth and polished on median regions and posteriorly. Regions slightly but distinctly indicated. Several well marked rugae among the granules: One on the raised epigastric lobes; one, straight or broken, on hepatic region, subparallel to antero-lateral margin; one or two on anterior part of protogastric region; one epibranchial. Front strongly deflexed, edge somewhat beveled from above and four-lobed; median lobes prominent, oblique, separated by an acute V-notch, lateral lobes project as small narrow teeth. Upper margin of orbit with two slight notches followed by deeply impressed closed fissures, intervening margin a little convex. Suborbital notch broad and shallow, adjacent margin sloping somewhat backward to base of the stout inner tooth. On the subhepatic region a low, granulated swelling below the interval between first two lateral teeth. Antero-lateral margin thin, divided by small notches into four lobes, the first of which is composed of the inconspicuous angle of the orbit coalesced by a slightly concave line with the low, rounded lobule or normal second tooth; third tooth (second lobe) truncate, oblique, with either end an obtuse angle; fourth tooth with outer margin longitudinal or nearly so, anterior angle a right angle and slightly carinate; fifth tooth subtriangular, directed straight outward.

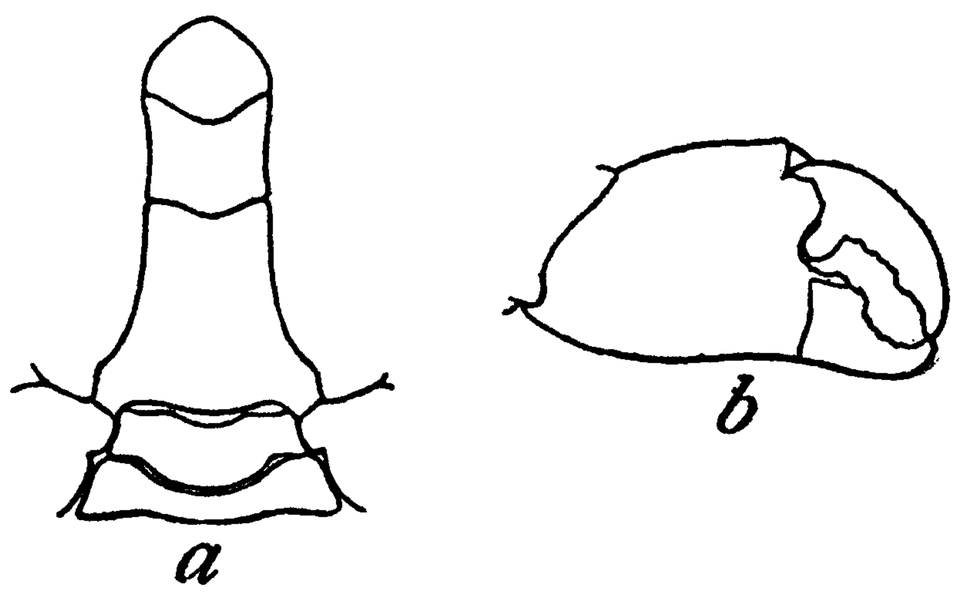

FIGURE 63.—EURYPANOPEUS ABBREVIATUS, MALE, ENLARGED. *a*. ABDOMEN. *b*. MAJOR CHELA. AFTER BENEDICT AND RATHBUN

Chelipeds of male very unequal. Inner angle of carpus marked by a low blunt lobe. Major palm stout and high. Fingers slender, pointed, widely gaping in the major chela, fitting closely in the minor chela, tips crossing in both; a very large tooth at base of larger dactyl, base of immovable finger rectangular, then rapidly diminishing;

fingers of smaller chela more deflexed. Dark color restricted, just, or not quite, covering base of immovable fingers. In female, major cheliped not much heavier than minor, gape of fingers narrow.

Abdomen of male with sixth segment broader than long, side margins a little sinuous; terminal segment triangular with angles blunt.

Color.—Yellowish or brownish; chelipeds and front margin of carapace roseate; fingers black with paler tips (Stimpson). Light brown above, tinged with bluish purple on anterior part of carapace and upper side of chelipeds (Smith). A number of large dark spots on upper half of chelipeds in Brazilian specimens.

Measurements.—Male (59845), length of carapace 14.1, width of same 22, fronto-orbital width 11, width of front 6 mm.

Range.—From Bahamas and Florida Keys to State of Santa Catharina, Brazil.

Material examined.—

Florida: Key West; 1885; H. Hemphill; 1 male, 1 female (15787). Dr. H. Allen; specimens in P. M. Y. U.

Bahamas: Abaco; 1886; *Albatross;* 2 males, 1 female (16333). Andros Islands; under rocks at Smith's; May 5, 1912; Paul Bartsch; 1 female (45726).

Jamaica: Montego Bay and Port Henderson; specimens returned to sender. Kingston Harbor; May–July, 1896; F. S. Conant; 1 male (19592).

Haiti: Santo Domingo; 1878; W. M. Gabb; 5 males, 2 females (3202).

Porto Rico; 1899; *Fish Hawk:* Ponce; January 31; 1 female (24331). Arroyo; February 4; 1 male, 1 female (24332). Hucares; February 13 and 14; 5 males (24334), 1 female (24335). Ensenada Honda, Culebra; February 9 and 10; 2 males, 1 female, 1 young (24333).

St. Thomas harbor; shore near town; July 10, 1915; C. R. Shoemaker; 1 male (59902).

St. Croix; specimens in Copenhagen Mus.

Antigua: Pillars of Hercules; 1918; Barbados-Antigua Expedition, State University of Iowa; 1 male, 1 young (Mus. S. U. I.), 1 female (58001).

Barbados: Theodore N. Gill; 1 male cotype (M. C. Z.). Rock pool at Bathsheba; February 22, 1924; Gerrit S. Miller; 3 males, 4 females, 1 young (62516).

Colombia: Sabanilla; March 16–22, 1884; *Albatross;* 6 males, 15 females (15788).

Curaçao: Caracas Bay; under stones near shore; May 3, 1920; C. J. van der Horst; 1 ovigerous female (56877), 2 females (1 ovigerous) (Amsterdam Mus.).

Venezuela: Puerto Cabello; specimens in Berlin Mus.

Trinidad: February, 1878; Crosby collector; 3 males (56815), received from Boston Society of Natural History. 1884; *Albatross;* 9 males, 5 females (15658).

Brazil: 1899, A. W. Greeley, Branner-Agassiz Expedition: Mamanguape stone reef, Parahyba, June 22 and 23, 5 males, 7 females (25738); Rio Goyanna stone reef, Pernambuco, June 18, 2 males (25739); Boa Viagem stone reef, Pernambuco, July 6, 1 male, 1 female (25740); Maceio coral reef, Alagoas, 3 males, 1 female (Stanford Univ.). Bahia, 1876–1877, R. Rathbun, Hartt Explorations, 1 specimen (16264). 1925, W. L. Schmitt: Ilha Governador, Bay of Rio de Janeiro, outside mouth of river, under rocks, sponges and bunches of bryozoa, September 1, 1 female (59842); Paqueta, Bay of Rio de Janeiro, August 19, 1 ovigerous female (59843); Villa Bella, Ilha São Sebastião, São Paulo, September 20 and 21, 28 males, 18 females (5 ovigerous), 1 young (59844); same locality, October, H. Luederwaldt collector, 4 males, 4 females (1 ovigerous) (59846); São Francisco, Santa Catharina, October 28–30, November 1, 5 males, 7 females (3 ovigerous) (59845).

EURYPANOPEUS ABBREVIATUS ATER, new subspecies

Plate 172, Figures 3 and 4

Type-locality.—Vera Cruz, Mexico; 1925; C. R. Orcutt; 1 male (Cat. No. 59994, U.S.N.M.).

Diagnosis.—Distinguished from the typical form (1) by the dark color of the immovable finger of both chelae continued on the palm backward to a point a little beyond the middle of the lower margin of the propodus (measured from tip of finger) and upward more than half its greatest height; and (2) by the numerous and well separated red dots on the outer surface of the palm.

Measurements.—Male holotype, length of carapace 13.3, width of same 19.8, fronto-orbital width 9.6, width of front 5.4 mm.

EURYPANOPEUS TRANSVERSUS (Stimpson)

Plate 172, Figures 5–7

Panopeus transversus Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 210 [82] (type-locality, Panama; type not extant).—Benedict and Rathbun, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 367, pl. 22, fig. 2; pl. 24, fig. 9.

Eurypanopeus transversus A. Milne Edwards, Crust. Rég. Mex., 1880, p. 319, pl. 59, fig. 1-1*f*.

Diagnosis.—Front double-edged, upper edge marked with a line of granules. Hepatic region faintly indicated. Lateral margin cut into shallow lobes. Color of propodal fingers continued on palm.

Description.—Carapace moderately convex, the front bent noticeably downward; sparingly short-pubescent, anteriorly finely granulate and rugose, regions indicated; mesogastric region narrow, very slightly constricted at middle, acuminate, a median groove leading from it to

edge of front. This edge is divided into two sinuous granulate lobes, the outer angle of which forms a distinct but inconspicuous lobule; the front appears thick because it has a row of single granules a little above and behind the true edge. Supraorbital notches minute and not far apart. Outer orbital angle obtuse forming a low tooth scarcely distinguishable from the truncate second tooth of the lateral margin, which has a long, straight or slightly convex margin. Succeeding notches short and narrow, more or less V-shaped, the V often ending in a short linear fissure. Third and fourth teeth truncate, slightly convex, the third a trifle shorter than or sometimes subequal to, the fourth. Suborbital emargination of good size, lower margin of orbit a little convex or nearly straight, separated by a shallow V from the broad, low, triangular, inner tooth. Subhepatic tubercle as a rule very little developed.

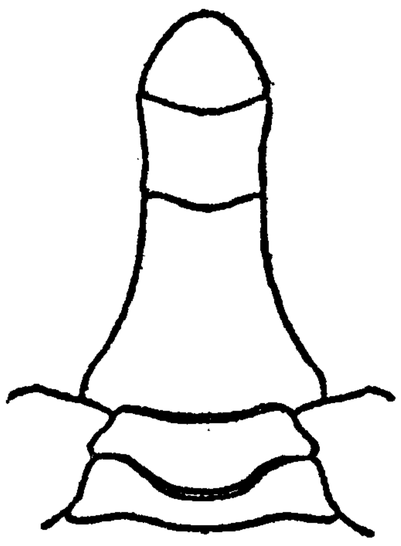

FIGURE 64.—EURYPANOPEUS TRANSVERSUS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Chelipeds minutely granulate; no subdistal tooth on merus; surface of carpus covered with fine granulate rugae irregularly transverse, inner angle a very short blunt tooth. Palms crossed by transverse rugae emphasized by intermediate rows of punctae larger than the granules. A strong tooth at base of major dactyl, which forms a narrow gape with its opposing finger. Both propodal fingers are nearly horizontal, their color runs back a little on the palm, less in female than in male.

Abdomen of male with third segment very little wider than second, somewhat rounded or a little angled at outer ends; sixth segment broader than long, terminal segment subtriangular, the tip broadly arcuate.

Measurements.—Male (16214), length of carapace 11.4, width of same 17, fronto-orbital width 10, width of front 5.5 mm.

Variations.—Stimpson says of this species, "Surface not uneven near the antero-lateral teeth." Of the specimens before me this is true of some but others have a deep groove leading inward from the last two lateral notches. There is variability also in size of lateral notches, in development of subhepatic tubercle, even on different sides of one individual; and in prominence of granules on manus.

In two specimens the major chela is underdeveloped, as not infrequently happens in Panopeids; in male No. 16214, which corresponds most nearly to Stimpson's description, the major chela retains its characteristic shape but is somewhat lower, and the basal tooth of the dactylus is much reduced; in female No. 40425 not only is the major chela considerably reduced but it has the shape of a minor chela including the form and ornamentation of the fingers.

Range.—West coast of Mexico (A. Milne Edwards); Salvador to Peru.

Material examined.—

SALVADOR.—Acajutla; F. H. Bradley; specimens in P. M. Y. U.; 1 male (16214), from Peabody Museum, Yale University.

Gulf of Fonseca; J. A. McNiel; 1 female (4801, M. C. Z.).

NICARAGUA.—Corinto; 1 female (4802, M. C. Z.).

COSTA RICA.—Puntarenas: January 1907; J. Fid. Tristan; 1 male, 1 female (39104). 1907; P. Biolley; 1 male, 1 female (50497). Pacific or Estero side; February 1905; J. Fid. Tristan; 4 males, 4 females (1 ovigerous) (32282); "inhabit mangroves." August 8, 1927; M. Valerio; 1 male, 1 ovigerous female (61144). Salinas, at sea level; July 17, 1928; M. Valerio; 1 male, 1 ovigerous female (62519).

PANAMA.—Doctor LeConte; 4 specimens (424, M. C. Z.), labeled by Stimpson. C. F. Davis; 1 male (2238, M. C. Z.). Reefs; Melbourne Ward; 1 male, returned. Panama, Pacific side; 1924; E. Deichmann: Low tide, rocks; May-July; 1 male (60738). June; 2 males, 2 ovigerous females (60737).

PERU.—Paita; 1873; Doctor W. H. Jones, U. S. N., 1 male (2239, M. C. Z.). Las Vacas, near Capon; on beach; January 23, 1908; R. E. Coker; 1 female (40425), 1 female returned to Peruvian Government. Chincha Islands; R. C. Murphy; 1 male returned to Brooklyn Museum.

EURYPANOPEUS OVATUS (Benedict and Rathbun), new combination

Plate 173, Figures 5 and 6; Plate 174, Figure 4.

Panopeus ovatus BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 368, pl. 24, fig. 8 (type-locality, Concepcion Bay, Gulf of California; type, Cat. No. 15786, U.S.N.M.).

Diagnosis.—Front not double-edged. Hepatic region deeply delimited. Anterior and antero-lateral regions coarsely granulate and rugose. Lateral margin cut into shallow lobes. Color of propodal fingers continued on palm.

Description.—Close to *E. transversus.* Carapace flatter, anterior and antero-lateral regions coarsely granulate and rugose, gastric region narrower, surface more uneven, hepatic region more distinctly outlined, median groove and groove leading back from antennal notch deep. A groove extends inward from each of the three lateral notches, the intermediate of these, that is, the one between third and fourth teeth, longer than the other two. The front is not bimarginate; although bent down and appearing thick, it lacks the regular line of granules above which distinguishes *transversus.* A subhepatic tubercle present. In the chelipeds, the outer surface of the manus is punctate and nearly smooth, but the upper surface is finely wrinkled. In old well developed males the major manus is twice as high as the minor.

In abdomen of male, the terminal segment is shorter and more arcuate than in *transversus.*

Measurements.—Male (16078), length of carapace 13.4, width of same 20.4, fronto-orbital width 11, width of front 6 mm.

Habitat.—"On beach at low water under stones. In order to avoid capture when disturbed they splash around and attempt to bury themselves in the sand before the water clears." (Jouy.)

Range.—West coast of Mexico, in Gulf of California.

Material examined.—

Guaymas, inner harbor; February 23, 1891; P. L. Jouy; 6 males, 5 females (16078).

Concepcion Bay, Lower California; March 19, 1889; *Albatross;* 5 males, 3 females (15786).

EURYPANOPEUS DEPRESSUS (Smith)

Plate 173, Figures 3 and 4

Panopeus depressus SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 283 (type-localities, New Haven, Connecticut, and Egmont Key, Florida; types in Peabody Museum, Yale University); Rept. U. S. Commr. of Fish and Fisheries, pt. 1, for 1871–72 (1873), p. 547 [253], pl. 1, fig. 3.—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 366, pl. 20, fig. 5; pl. 23, figs. 4 and 5.

Eurypanopeus depressus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 320, pl. 59, fig. 2.

Diagnosis.—Antero-lateral margin deeply cut, forming three (third to fifth) sharp teeth. Carpus of cheliped with a conical spine-tipped tooth at inner angle. Color of immovable finger prolonged on palm. Fingers of minor chela spooned.

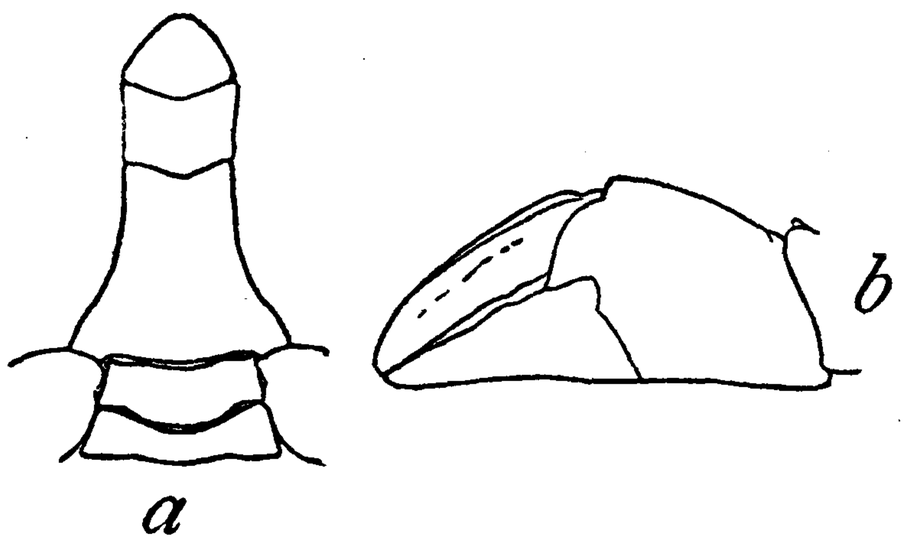

FIGURE 65.—EURYPANOPEUS DEPRESSUS, MALE, ENLARGED. *a*. ABDOMEN. *b*. MINOR CHELA. AFTER BENEDICT AND RATHBUN

Description.—Carapace gently convex, roughened with very fine granules and innumerable short, unequal, transverse lines of coarser granules; hepatic and posterior cardiac grooves shallow, otherwise the regions are plainly marked; mesogastric region narrowing gradually forward until near the tip where it suddenly contracts to a deeply impressed line; epigastric lobes low; surface short pubescent. Front slightly arcuate, with a minute median nick, not followed by a closed fissure. Inner border of orbit broad and high, ending in a blunt, acute angle; upper border with two small V-shaped nicks prolonged in a closed fissure, the inner one twice as long as the other; outer angle of orbit small, triangular; beneath it a large V emargination from which the border extends in a concave line to the broad, triangular tooth at the lower inner angle. Second tooth of lateral margin of carapace broad, lobiform, united with the first tooth by a shallow concavity; remaining teeth acute, more or less spiniform, curved, so that the outer line follows the general contour of the body; third tooth points obliquely inward, fourth forward, fifth obliquely outward and forward.

Chelipeds very unequal and dissimilar. The acute, granulate upper margin of the merus ends distally at the transverse groove with a small slender spinule. Inner tooth of carpus tipped with a similar spinule. Height of palm as great as superior length. Major chela heavy, propodal finger nearly horizontal, both fingers stout, gaping, an enlarged tooth at base of dactyl. In the minor chela, the fingers are almost as bulky as the palm, distal half spooned and fitting close together, proximal half finely denticulate and with a small gape. Ambulatory legs with a ragged hairiness.

Third segment of male abdomen pointed at ends, sixth segment narrowing a little toward the fifth, terminal segment triangular with end rounded.

Color.—Dark olive brown; fingers black or dark brown, the color of the propodal finger prolonged well back and up on the palm.

Measurements.—Male (18739), length of carapace 15.7, width of same 22.8, fronto-orbital width 14, width of front 7.3 mm. Male type, length of carapace 18.6, width 26.8 mm. (Smith.)

Habitat.—On muddy and stony shores, oyster beds, wharves and submerged timber, and in eel-grass; sometimes in brackish water.

Range.—From Massachusetts Bay to Florida (east and west coasts), to Texas; St. Martin, West Indies; Bermuda.

Material examined.—See table, pages 412 to 416.

EURYPANOPEUS DISSIMILIS (Benedict and Rathbun)

Plate 173, Figures 1 and 2

Panopeus dissimilis BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 366, pl. 20, fig. 4, pl. 23, fig. 1 (type-locality, Trinidad; type, Cat. No. 15640, U.S.N.M.).

Eurypanopeus dissimilis RATHBUN, Ann. Inst. Jamiaca, vol. 1, 1897, p. 19.

Diagnosis.—Lateral teeth prominent, well separated. Minor cheliped strikingly small and rough, its fingers spooned. Color of immovable fingers not spreading upward on palm. Third abdominal segment of male not fused with fourth.

Description.—Resembling *E. depressus;* antero-lateral notches larger (both deeper and wider), second to fifth teeth, inclusive, more prominent, second tooth more dentiform, its outer margin nearly longitudinal, third, fourth, and fifth teeth strongly hooked. Regional grooves deeper than in *depressus*. Surface less rugose, lacking a background of fine granulation. Two transverse granulate lines on each protogastric region, diverging outwardly; one metagastric line, narrowly interrupted at middle, forming a curve with a short broken line on epibranchial region; further forward a long epibranchial line which ends just in front of inner end of ridge leading

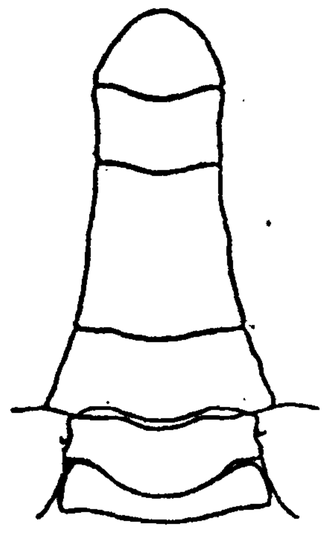

FIGURE 66.—EURYPANOPEUS DISSIMILIS, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Material examined of Eurypanopeus depressus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
New England:	° ′ ″	° ′ ″			° *F.*						
Vineyard Sound, Massachusetts.						1875		U. S. Fish Commission	9	P.M.Y.U	
Do						1882		do	2♂ 1♀	14799	
Woods Hole, Massachusetts.						1886		do	6	11727	At Woods Hole Station.
New Bedford, Massachusetts.								R. E. C. Stearns	1♀	58746	In *Modiolus modiolus* (L.).
Do						Sept 24, 1882		Willard Nye, jr	10	P.M.Y.U	
Sakonnet River, Rhode Island.	Black Point, W. ¼ N., ½ mile.		5		71	Aug. 27, 1880	836	*Fish Hawk*	Several	do	
Newport, Rhode Island.			Shore.					U. S. Fish Commission.	20	19025	
Fishers Island Sound, Connecticut.			10–12			1874		do	5	P.M.Y.U	
New Jersey: Maurice River Cove, Delaware Bay.			Dredged.			Nov. 16, 1928		H. G. Richards	1♂ 1♀	Univ. Penna.	
Marvland:											
Magothy Bay, Chesapeake Bay.						July 22, 1916		*Fish Hawk*	9♂ 8♀ (4 ovig.) 1♂ 5♀ (1 ovig.)	56271 56272	On wild oysters.
Creek halfway between Plum Point and Chesapeake Beach, Chesapeake Bay.						May 30, 1912		Palmer and Ward.	6♂ 3♀ 15 y	56367	
Chesapeake Beach.						Aug. 6, 1927		W. L. Schmitt	2♂ 2♀ ovig	60732	
Plum Point, Chesapeake Bay.						Aug. 15, 1912, to Aug. 24, 1912.		William Palmer	2♂	56385	Around piles.
Do						Aug.; 1913		do	1♀	46104	
Do						July 14, 1914		C. R. Shoemaker	1♀	56378	

Chesapeake Bay	38 20 24 | 76 18 14 Barren Island Buoy No. 16D, NE. by N., about 200 yards.	26	sft. bk. M., marine growth.	45	Apr. 25, 1916	8523	*Fish Hawk*	1 y	56284	
	38 06 06 | 76 17 20 Point No Point Light, N. ⅜ E.; Holland Island Bar Light, E. by S. ⅝ S.	6.5	sft	79	July 28, 1916	8614	do	2 ♀	58367	
Brick House Bar, Chesapeake Bay.					Sept. 10, 1928		R. V. Truitt	1 ♂ 2 ♀ ovig	61828	
Smith's Creek, Potomac River.					July 10, 1883		Commander R. D. Evans, U. S. Navy.	14 ♂ 15 ♀	13845	On wooden buoy.
Cedar Point, Potomac River.					July 29, 1916		*Fish Hawk*	2 ♂ 2 ♀	56273	In washings from oysters. One male has an encrusting bryozoan.
Herring Creek, St. Marys County.					June 14, 1926		James E. Benedict, jr.	1 ♂	59848	
Do					Sept. 11, 1926		do	1 ♂	60280	
Tangier Sound, Chesapeake Bay					1897		U. S. Fish Commission.	1 ♂ 2 y	20123	
Virginia:										
Eastern shore							H. E. Webster	5 ♂	56817	From Boston Society of Natural History.
Fishermans Island.	Motor-boat landing				July 21, 1916		*Fish Hawk*	1 ♂	56357	Washed from dead oysters.
Chesapeake Bay	From Crisfield, Md., to Cape Charles Va.				Nov. 22, 1921	26–27	W. C. Schroeder, Bureau of Fisheries.	7 ♂ 10 ♀ 6 y	57140	Beam trawl.
Do	S. point Tangier Island, N NW., 1 mile.	9.5–20	br. M. Sh	42	Mar. 2, 1882	1064	*Fish Hawk*	5 ♂ 4 ♀	13793	
Do	37 53 00 | 76 05 30 4.5 miles E. ¼ S. of Smiths Point Lighthouse.	6	sft. fne. gy. S	48.5	Dec. 5, 1915	8383	do	5 ♂ 2 ♀ 70 y 8 ♀ 5 ♂ 32 y	56275 56276	On red sponge.
Do	37 54 03 | 76 06 20 4.5 miles E. by N. ¼ N. of Smiths Point Lighthouse.	6.75	fne. gy. S	64	Oct. 24, 1915	8347	do	3 ♂ 2 ♀ 7 y	56274	
Do	Smiths Point Lighthouse W. ½ N.; Great Wicomico Light, SW. by W. ½ W.	7	sft. bk. M	47.8	Apr. 23, 1916	8513	do	4 ♀ (3 ovig.)	56281	
Do	Northumberland County.				Dec. 23, 1914		P. L. Boone	25 ♂ 22 ♀ 4 y	48849	

Material examined of Eurypanopeus depressus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Virginia—Contd.	° ′ ″	° ′ ″			° *F.*						
Piankatank River	Iron buoy No. 1					July 6, 1883		Commander R. D. Evans, U. S. Navy.	2♂	13848	
Mouth of Indian Creek	On iron buoy					do		do	9♂ 16♀	13929	Left side abnormal, first three teeth completely fused, edge undivided.
									1♀	15402	
York River	Wooden buoy No. 8							do	2♀	15403	
North Carolina:											
Shackleford jetty, Beaufort						July 22, 1912		W. P. Hay, *Fish Hawk*.	8	51099	
Shackleford Bank, inside				Washed from seaweed.		Sept. 12, 1928		Schmitt and Shoemaker.	1♂ 1♀	62517	
South Carolina:											
Winyah Bay						Dec., 1890		*Fish Hawk*	1♂ 1 y	15688	
Do								do	1	15683	Above brackish water.
Do	Half mile N. of wharf on South Island.		4	hrd. Sh	48. 5	Jan. 3, 1891	1639	do	5	15692	
Do	About half a mile N. of wharf.		4. 5–5	Sh	47–49. 5	Jan. 3, 1891	1641, 1642	do	1 ♂ 3 ♀ 25 y	56282	
									3	15697	
Jones Creek, near inlet						Dec. 31, 1890		do	1♂	15685	
Clambank Creek, upper mouth						Dec. 30, 1890		do	2♀	15702	On oysters.
Bulls Bay Lighted Beacon						Mar. 23, 1891		do	1♂ 3 y	15776	
Charleston Harbor						Mar. 11, 1880		Col. M. McDonald.	1♂	4065	
Morgan River						Feb. 24, 1891		*Fish Hawk*	2♂	15781	
Do				M		do		do	2	26149	On coon oysters.
Jericho Creek						Jan. 23, 1891		do	1♂	15785	
Near Port Royal								do	3♂ 1♀	15727	
Georgia: Near mouth of Savannah River								J. S. Raymond	1♀	59910	From wood bored by *Teredo*.

Florida:											
East peninsula opposite Micco.								O. Bangs	400	18739	
Cocoanut Grove, edge of bay.			Shallow.			Nov. —, 1913		James Silver, U.S. Biological Survey.	12♂ 4♀ (2 ovig.).	58427	
Cape Florida						1884		Edward Palmer	1♂ 3♀	13899	
Oyster Bay						May —, 1884		H. Hemphill	11♂ 19♀ 17 y	6990	
Punta Rassa						Feb. —, 1884		do	18♂ 6♀ 11 y	6665	
Sanibel Island						Feb. 21, 1928 Feb. 22, 1928		O. C. Van Hyning.	5♂ 2♀ ovig	Fla. State Mus.	
Palma Sola, mouth of Manatee River.								H. Hemphill	46♂ 26♀ 13 y	15401	Mostly small.
Tampa Bay, near Piney Point.								do	15♂ 3♀	15399	
Goodland Point								do	3♂	15398	
Cedar Keys								do	2 y	6466	
Apalachicola; St. Georges Sound.						Jan. —, 1915		E. Danglade, Bureau of Fisheries.	1♂ 1♀	56358	
Apalachicola Bay, vicinity of New Inlet.				In algae on oysters.		1915		do	2♀	61375	
Apalachicola						Summer, 1928.		J. V. and Frank F. Gander.	2♀	62518	
St. Georges Sound						Jan. 16, 1915		*Fish Hawk*	1♂ 1♀	56283	
Pensacola						July —, 1893		J. E. Benedict	1♂ 1♀	18258	
Alabama: Mobile Bay						1894		U. S. Fish Commission.	4	19354	
Mississippi: Henderson Point.						Sept. 2, 1928		Tulane University.	1♂ 2♀ (1 ovig.)	Returned to sender.	
Louisiana:											
Oyster Bay, St. Bernard Parish.						Feb. 3, 1898		*Fish Hawk*	1♂	59903	On oyster bed.
Bay NW. of Shell Island.						Feb. 7, 1898		do	1♂	59904	From oysters.
S. of Crooked Island Bay, Bodreau, St Bernard Parish.						Feb. 10, 1898		do	1 y	59905	On oyster bed.
Dutchmans Gap, St. Bernard Parish.						Feb. 16, 1898		do	1♂	59906	On oysters.
Near Mussel Bayou, St Bernard Parish.						do		do	1♀	31469	
Near Half Moon Island.						Feb. 21, 1898		do	1♀	59907	Do.
Around Half Moon Island.						Feb. 23, 1898		do	1 y	59908	Do.

Material examined of Eurypanopeus depressus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Louisiana—Contd.	° ′ ″	° ′ ″			° *F.*						
Mussel Bayou						Feb. 23, 1898		*Fish Hawk*	3 ♀	59909	On old stump. Var. with major fingers spooned.
Texas:											
Galveston Bay						Nov. 5, 1891, to Nov. 15, 1891.		B.W.Evermann, U.S.Fish Commission.	3 ♂ 2 ♀	17103	
Matagorda Bay								J. D. Mitchell	20	20638	
Do	Reef off Point at flag station.	Dresings				Mar. 20, 1905		T. E. B. Pope, Bureau of Fisheries.	2 ♀	33033	
Oyster Reef, Lavaca Bay.								J. D. Mitchell	10	19628	
Dutch West Indies: St. Martin, Leeward Islands.	Simsons Bay lagoon		Shallow.			Sept. 7, 1905		J. Boeke	1 ♂ 1 ♀ ovig	42960	Despite their remoteness these specimens are undoubted *depressus*.
Bermuda						1903			1 ♂	56816	From Boston Society of Natural History.

from fifth lateral tooth; a broken mesobranchial line on the same level with anterior cardiac border; just behind this border, a short transverse cardiac line on either side; in front of base of last leg a short granulate ridge. Outer end of front not advanced, neither lobiform nor dentiform. Supraorbital and suborbital notches larger than in *depressus;* inner inferior tooth lower, acute.

Chelipeds more unequal than in *depressus*, the minor palm only half as high as the major, while in *depressus* it is two-thirds as high as the major. Palms coarsely granulate, the minor much more so than the major, and with two or three longitudinal lines at middle of outer surface; upper surface of both palms more deeply guttered than in *depressus*. Color of propodal finger continued on palm but not spreading upward. Fingers of minor chela together smaller than the palm, their distal half spooned, extremities narrower than in *depressus*, ridges rough with granulation.

Third segment of male abdomen not fused with the fourth, its lateral extremities less pointed than in *depressus;* sixth segment shorter and broader than in that species.

Measurements.—Of smaller size than *depressus*. Male paratype (15640), length of carapace 9.6, width of same 14.3, fronto-orbital width 9.5, width of front 4.6 mm.

Variation.—Occasionally a major cheliped is reduced so that the manus is only half again as high as in the minor cheliped, but in such cases the chela partakes of the character of the minor one in shape and roughness and the spooning of the fingers.

Range.—From the Gulf of Mexico (west coast of Florida) to Santa Catharina, Brazil.

Material examined.—

FLORIDA.—Off Charlotte Harbor; lat. 26° 35′ N.; long. 83° 11′ W.; temperature 66° F.; April 2, 1901; station 7122; *Fish Hawk;* 2 males (25623).

CUBA.—Manimani River, Bahia Honda, Pinar del Rio; 1924; Mario Sanchez Roig; 1 female (58666). Mariel, Pinar del Rio; May 10, 1900; William Palmer and J. H. Riley; 1 male (23830).

JAMAICA.—Montego Bay and Port Henderson; P. W. Jarvis; "numerous"; specimens returned to sender. Kingston Harbor: 1893, R. P. Bigelow, 25 specimens (17971); May–July, 1896, F. S. Conant, 2 young (19595).

NICARAGUA.—Salt water lagoon near Greytown; in crevices in logs; Charles W. Richmond; 2 males, 2 females (18011).

TRINIDAD.—January 30–February 2, 1884; *Albatross;* 13 males (including holotype), 18 females, 17 young (15640). Mono Island; *Albatross;* 2 males, 7 females, 6 young (18522).

BRAZIL.—Vigia, Grão Para; 1870; Derby and Powers, Hartt Explorations; specimens in P. M. Y. U. São Francisco, Santa Catharina; November 1, 1925; W. L. Schmitt; 1 female (61107).

EURYPANOPEUS CRENATUS (Milne Edwards and Lucas)

Plate 174, Figures 1–3

? Xantho crenatus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 396 (type-locality, Peru; type in Paris Mus.).

Panopeus crenatus MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, Crust., 1844, p. 16; atlas, vol. 9, 1847, pl. 8, fig. 1 (type-locality, environs de Callao (Chili); type in Paris Mus.).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 377, pl. 21, fig. 4; pl. 24, fig. 17.

Eurypanopeus crenatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 318, figs. 4–4*b*.

Eurypanopeus peruvianus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 318, pl. 60, figs. 3–3*b* (type-locality, Peru; type in Paris Mus.).

Diagnosis.—Carapace very convex, smooth, no rugose lines. Urogastric region of good length throughout. Front prominent. Lateral margin cut into shallow lobes. Fingers not gaping; dark color scarcely continued on palm.

Description.—Carapace very convex, especially antero-posteriorly. Surface nearly smooth, punctate, microscopically very closely granulate; no rugosities. Regions indicated by shallow sutures; a large pit between hepatic and branchial regions; urogastric region longer than usual, about half as long as wide; a small triangular area delimited at inner angle of branchial region. Front advanced, upper surface concave, edge thick, slightly convex to the shallow outer lobules, which are rounded off and not at all prominent; median notch minute ending in a short closed fissure. Supra-orbital notches slight; exorbital notch large; from the latter the suborbital margin is transverse to the broad arcuate tooth at inner angle. First antero-lateral (orbital) tooth very small, united with the broad second tooth or lobe, forming a sinuous margin. Remaining lateral sinuses narrow, shallow; third and fourth teeth subequal, truncate, the long margin slightly convex; anterior margin longer and more outstanding in fourth than in third tooth; a short carina running from apex of fourth tooth; fifth tooth short, triangular, obtuse, its carina extended on the carapace further than in fourth tooth.

Inequality of chelipeds not great. Subdistal tooth of merus rectangular, tip tuberculiform. Carpal groove shallow, inner tooth broadly pyramidal. Lower margin of propodus slightly sinuous, finger nearly horizontal, its color scarcely extending on palm, only so far as is limited by an oblique line from the prehensile edge to lower margin. Fingers not gaping. Basal tooth of major dactyl broader than long.

In abdomen of male the third segment is nearly as wide as first and rounded at ends; sixth broader than long and converging a little toward fifth; last segment short, subtriangular, tip rounded.

Color.—Carapace above deep rose and yellowish white. Chelipeds deep rose above, whitish yellow below, fingers light brown. Legs slightly tinged with rose above, yellowish white below; dactyls a light ashen gray. (Milne Edwards and Lucas.)

Male (60731) almost seal brown, fingers burnt umber fading out to whitish tips, chelae more hazel. Female (60731) more bay color on carapace, single chela tawny, fingers a bit lighter, tips still lighter. In male and female the part of the abdomen visible from above has a row of white spots down the median line, the first one on the hind edge of the carapace, abdomen mottled whitish bistre. (Schmitt.)

Comparison with E. transversus.—Carapace less oval, more hexagonal, and devoid of the fine transverse rugae present on the anterior half in *transversus*. Front more advanced beyond inner orbital angles, submedian lobes straight instead of convex, outer lobe narrower. Outer orbital angle small, pointed, and distinguishable from the second antero-lateral lobe, not completely fused with it. Transverse ridge on fifth lateral tooth high. Postero-lateral margins a little more concave. In the full grown male the fingers of the major cheliped gape very little, less than in *transversus*, and are more elongate, the dactylus less arched and the propodal finger more deflexed.

Measurements.—Ovigerous female (16213), length of carapace 15, width of same 22, fronto-orbital width 11, width of front 6 mm. Male (2245, M. C. Z.), length of carapace 24.3, width of same 35.6, fronto-orbital width 15.8 mm., width of front 9.3 mm.

Range.[49]—Puna, Ecuador (Cano), to Magellan Strait.

Material examined.—

PERU.—2 males, 1 female (Paris Mus.), labeled "*peruvianus*," probably cotypes. Callao; F. H. Bradley; 1 male, 2 females (1 ovigerous) (16213), from P. M. Y. U. Callao; 1 male, 2 females (4803, M. C. Z.). Callao; specimen in Brit. Mus. "Chili"; 1 male (Paris Mus.), probably type of *Panopeus crenatus*. Off San Lorenzo Island, Callao Bay; dredged; November 7, 1926; W. L. Schmitt; 1 male, 1 female, both small (60731); also 2 young, representing a postlarval stage (62715); identification probably correct. Paracas Bay; *Hassler* Exped.; 3 males, 4 females (2245, M. C. Z.).

CHILE.—Valparaiso; J. D. Dana, U. S. Expl. Exped.; 1 male, 1 female (1924, M. C. Z.). 1872; *Hassler* Exped.: Caldera, May 16, 5 males, 3 females (2 ovigerous) (2246, M. C. Z.); Talcahuano, Apr., 4 males, 6 females, 2 young (2244, M. C. Z.): Juan Fernandez Ids., May 1, 1 male (2247, M. C. Z.); Port Gallant, Magellan Strait, Mar., 1 male (2313, M. C. Z.).

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[49] The locality, Esquimalt Harbour, B. C., assigned to this species by Spence Bate is erroneous (Lord's A Naturalist in Vancouver Island and British Columbia, vol. 2, 1866, p. 270).

EURYPANOPEUS PLANUS (Smith)

Plate 175, Figures 3–5

Panopeus planus SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 283 (type-locality, Bay of Panama; cotypes in P. M. Y. U.).—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 369, pl. 24, figs. 10 and 11.

Eurypanopeus planus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 321, pl. 59, fig. 4–4c.

Diagnosis.—Carapace depressed, rugose. Lateral teeth truncate (save the last), well separated. Front prominent. Chelipeds heavy, carpus nearly smooth, fingers gaping, color of immovable finger continued on palm.

Description.—Carapace slightly convex in an antero-posterior direction, in general depressed; anterior and antero-lateral portion roughly granulate and rugose; posterior and middle portion nearly smooth, punctate; gastric and hepatic regions well delimited. Front produced, a narrow median V cut, lobes deeply sinuous forming a pronounced outer lobule. Two closed supraorbital fissures deeply impressed; outer sinus broad and shallow. Lateral emarginations V-shaped, continued by a groove on carapace. Coalesced tooth (first and second) also third and fourth subtruncate; orbital angle a little more than a right angle; other angles obtuse, rounded; fifth tooth triangular, tip blunt.

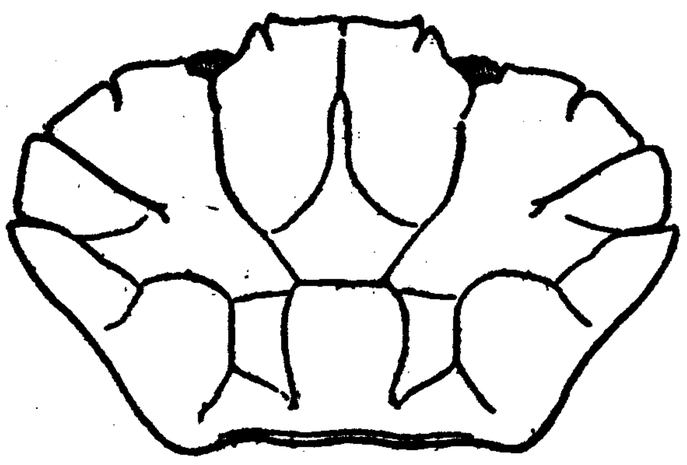

FIGURE 67.—EURYPANOPEUS PLANUS, BAY OF PANAMA, CARAPACE, ENLARGED. AFTER BENEDICT AND RATHBUN

Chelipeds heavy; carpus lacking groove, or with a faint one, inner tooth slightly marked, scarcely dentiform; palms higher than superior length in the full grown; lower margin of manus convex, upper margin also convex, but highest at base of dactylus; propodal finger high at base, lower margin sinuous, tip curved upward, color continued well back on palm; dactylus slender, arched, a large backward-pointing basal tooth in major chela.

Color.—Ranges from indigo blue and slate, really more slate color, to sepia and seal brown; all are variously mottled with lighter speckles of pearl blu · or olive buff as crabs are bluish or brownish. In blue backed crabs the lower half of outer face of chela is purplish or between a hyacinth blue and royal purple tinge; in brown or drab crabs this part of the chela is porcelain white with a china-blue tinge. A small specimen, 10.3 mm. wide, is mottled porcelain white, ochraceous and mummy brown, legs speckled with wood brown; major hand porcelain white, fingers black or clove brown except extreme tips; minor hand black or clove brown speckled giving it a grayish color, speckles most numerous toward upper margin. (Schmitt.)

Measurements.—Male (44188), length of carapace 17.3, width of same 27.3, fronto-orbital width 12.8, width of front 7.1 mm.

Range.—Gulf of California, Mexico, to Ecuador.

Material examined.—San Carlos Bay, Sonora, Mexico; March 9, 1921; Fred Baker; 1 male (Cal. Acad. Sci.).

Bay of Panama; F. H. Bradley; cotypes in Peabody Museum; 1 male, 1 female, cotypes, Cat. No. 16215, U. S. N. M.

Panama; 1924; E. Deichmann: Panama Harbor; low tide, lava; May 30; 1 male (60734). Pacific shore of Panama; low tide, rocks; May–July; 2 males (60735).

Taboga Island, Bay of Panama; May 11–15, 1911; Meek and Hildebrand, Smithsonian Biological Survey; 1 male, 1 female (Cat. No. 44188, U. S. N. M.); 1 female (Field Mus.).

South side Point Santa Elena, Ecuador; September 17, 1926; W. L. Schmitt; 1 female, 1 young (60736).

Salinas, Ecuador; under rocks; September 12–15, 1926; W. L. Schmitt; 60 males, 74 females (33 ovigerous) (60873–60875, 60920).

EURYPANOPEUS PLANISSIMUS (Stimpson)

Plate 175, Figures 1, 2, and 6

Xantho planissima STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 205 [77] (type-locality, Cape St. Lucas; cotypes in M. C. Z.).

Panopeus planissimus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 108.—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 370, pl. 21, text-fig. 5, pl. 24, figs. 1 and 2.

Eurypanopeus planissimus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 322.

Diagnosis.—Carapace flat, nearly smooth. Chelipeds heavy; carpus with two grooves at right angles; color of immovable finger squared off at proximal end where it encroaches on palm.

Description.—Carapace perfectly flat above, posterior two-thirds smooth, anterior third finely granulate, slightly rugose. Regions moderately well defined but not themselves areolated excepting the gastric in its anterior part. Front arcuate up to the small distinct outer lobules, median notch small; edge thick. Outer orbital tooth small, triangular, separated by a shallow sinus from the second lateral tooth; remaining emarginations V-shaped; third tooth obtusely angled, fourth and fifth subacute. Subhepatic tubercle large, sublaminar.

Chelipeds massive; carpus with a tuberculiform inner tooth and a groove subparallel to the distal margin; the groove widens outwardly; on its proximal margin near the inner end there are two tubercles separated from each other by a short groove at right angles with the first. Manus high, height exceeding length of upper margin, surface punctate and finely granulate; a row of dimples on outer surface below upper edge. Immovable finger broad at base where there are two large prehensile teeth in a line parallel with lower margin; color continued backward in a rectangular patch on palm where it ends in a vertical line and is not continued upward to the

interdigital sinus. On major dactyl a strong basal tooth and a large tooth at distal third, projecting into the gape. Fingers hooked at tips, not gaping in minor chela.

Color.—Very dark bluish gray, marbled posteriorly; fingers black with light tips. (Stimpson).

Measurements.—Male (50966), length of carapace 8.4, width of same 13.4, fronto-orbital with 7.8, width of front 4 mm.

Range.—West coast of Mexico.

Material examined.—

WEST COAST OF GULF OF CALIFORNIA.—Agua Verde Bay; April 1, 1911; *Albatross;* 1 male (50966).

San Francisquito Bay; beach; April 9, 1911; *Albatross;* 4 males (Amer. Mus.).

La Paz: L. Belding; 2 males, 2 females (4629). La Paz Harbor; March 12, 1889; *Albatross;* 1 female (16025).

Cape San Lucas; John Xantus; 2 males, 4 females (1 ovigerous), cotypes (1253, M. C. Z.).

BELOW GULF OF CALIFORNIA.—Maria Madre Island; March-May, 1927; from Secretaria de Agricultura y Fomento, through A. L. Herrera; 1 ovigerous female (60733).

Genus EURYTIUM Stimpson

Eurytium Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 56 [10]; type, *E. limosum* (Say).

Carapace very broad, convex, regions slightly marked, without transverse raised lines. Antero-lateral borders regularly arcuate, shorter than postero-lateral, cut into five shallow teeth, the second tooth rounded and intimately fused with first. Fronto-orbital border half or a little more than half the width of carapace. Front from a fourth to almost a third the width of carapace. Front deflexed, two rounded lobes separated by a V-shaped notch. Superior margin of orbit with two short and inconspicuous fissures; lower margin with a deep rounded sinus outside, and two unequal lobes. Basal antennal segment broad and in contact with front; the flagellum stands in the orbital hiatus. The ridge on the endostome which defines the efferent branchial channel is well marked, and continues to margin of epistome. Chelipeds massive and rounded, unequal in both sexes. Abdomen in male with third to fifth segments fused.

Related to *Panopeus* and its allies, but distinguished by its oval and almost smooth carapace, without ridges, and by its strong palatal ridge.

Along the Atlantic coast of America from New York to the State of São Paulo, Brazil; on the Pacific coast from Mexico to Peru. Bermudas.

KEY TO THE SPECIES OF THE GENUS EURYTIUM

A¹. Carapace very convex.
  B¹. Carapace widest behind tips of teeth of last pair_____**limosum**, p. 423.
  B². Carapace widest at tips of teeth of last pair_____**tristani**, p. 425.
A². Carapace nearly flat. Carapace widest at tips of teeth of last pair
_____**affine**, p. 425.

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
limosum	*tristani*

EURYTIUM LIMOSUM (Say)

Plate 176, Figures 1 and 2

Cancer limosa SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1818, p. 446 (type-locality, "Inhabits shores of the northern states;" type not extant).
Panopeus limosus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 404.
Eurytium limosum STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 56 [10].—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 332, pl. 60, fig. 2, 2*a*.

Diagnosis.—Carapace very convex, widest behind tips of teeth of last pair. Frontal lobes undivided. Sinus between coalesced teeth shallow.

Description.—Carapace very convex in an antero-posterior direction; surface smooth to eye, but under the lens densely granulate, the granules coarser near frontal and antero-lateral margins; two feeble epigastric lobes; mesogastric and cardiac regions outlined. Front one-fourth the width of carapace. Antero-lateral margin about two-thirds the length of postero-lateral, bordered by a raised line of granules; first tooth small, triangular; second lobiform, separated from first by a shallow sinus; third obtuse, fourth subacute, both with arcuate outer margin; fifth more prominent, acute, pointing forward.

Granulation of chelipeds fine and reticulate; upper margin of merus coarsely tuberculate, a strong subdistal tooth; no groove on carpus, a narrow inner spine; fingers pointed, deflexed, a large basal tooth on major dactyl; color of immovable fingers stopping short of palm.

Color.—Carapace a brilliant purplish blue; wrist and hand bluish; fingers white except proximal upper half of movable finger pink; lower portion of chelipeds and also carpal tooth orange-yellow.

Measurements.—Male (44184), length of carapace 26.6, width of same 42.8, fronto-orbital width 21.5, width of front 10 mm.

Habitat.—In muddy or marshy banks, a little below high-tide mark, in burrows partially filled with water.

Range.—New York (De Kay) to State of São Paulo, Brazil; Bahamas; Bermudas.

Material examined.—

NEW JERSEY.—Thomas Say collector; 2 males (Phila. Acad.). The larger one is 45 mm. wide, while Say's measured type was 33.8 mm. wide.

SOUTH CAROLINA.—West end of Port Royal Island; January 27, 1891; *Fish Hawk;* 25 specimens (16028).

BAHAMAS.—Watling Island; 1886; *Albatross;* 1 male (16332).

FLORIDA.—Key West: High tide among stones or burrowing in sand; 1885; H. Hemphill; 1 male, 2 females (13824). 1885; *Albatross;* 1 male (9899).

Tortugas: Greater heads up Reef; in stomach of gray snapper, *Neomaenis griseus* (Linnaeus); June 13, 1925; W. L. Schmitt; 1 cheliped (61108), received from Carnegie Institution.

Sarasota Bay; Union College collection ; 5 specimens (42793).

LOUISIANA.—Grand Isle; July 7, 1928; E. H. Behre; 1 female (63040).

CUBA.—Los Arroyas; May 20, 1914; Henderson and Bartsch, *Tomas Barrera* Exped.; 1 male (48552).

Cardenas; 1923; Francisco R. Sosa; 1 male, 1 female (58389).

Bay at Matanzas; under stones between tides; April, 1927; Melbourne Ward; 1 male; returned.

JAMAICA.—Montego Bay; P. W. Jarvis; 1 male, 1 female (19067).

Kingston Harbor; May to July, 1896; F. S. Conant; 1 young female (19594).

PORTO RICO.—Ensenada Honda, Culebra; February 9, 1899; *Fish Hawk;* 1 male, 1 female (24336).

BRITISH HONDURAS.—Belize; H. J. Huwe, S. J.; 1 male (50951).

PANAMA.—Toro Point, Canal Zone; January 24, 1912; Meek and Hildebrand, Smithsonian Biological Survey; 1 young female (59301).

Colon; on coral reef; May 2, 1911; Meek and Hildebrand; 1 male (44184).

CURAÇAO.—February 10–18, 1884; *Albatross;* 2 males, 1 female (7579).

BRAZIL.—Maranhão; Lieut. F. E. Sawyer, U. S. Navy; 1 male (16276).

Plataforma, Bahia; 1876–1877; R. Rathbun, Hartt Explorations; 1 male, 1 female (16263).

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

Bay of Rio de Janeiro; 1925; W. L. Schmitt: Paqueta; station 1; August 19; 1 male (59882). River on Ilha Governador; August 27· 1 female (59881).

Santos: Piassaguera; November, 1913; H. Luederwaldt; 2 males (47838). Between Canals 4 and 5, Estuario; September 13, 1925; W. L. Schmitt; 5 males, 6 females (59880).

EURYTIUM TRISTANI Rathbun

Plate 176, Figure 3; Plate 177, Figure 3

Eurytium tristani RATHBUN, Proc. Biol. Soc. Washington, vol. 19, 1906, p. 100 (type-locality, Boca del Jesús Maria, Costa Rica; type, Cat. No. 32366, U. S. N. M.): Proc. U. S. Nat. Mus., vol. 38, 1910, p. 543, pl. 47, fig. 1.

Diagnosis.—Carapace very convex, widest at tips of teeth of last pair. Frontal lobes each with a slightly marked truncate outer lobule. Sinus between coalesced teeth pronounced.

Description.—Carapace widest between tips of lateral teeth of last pair; slightly convex from side to side, strongly convex from front to back, but less so than in *E. limosum*. Cardiac region and gastric region and its subdivisions well delimited. Surface finely granulate. Front one-fourth or, in the old, less than one-fourth as wide as carapace, bilobed, each lobe convex except for a slightly marked transverse outer tooth. Two distinct notches in upper border of orbit. Lateral teeth more prominent, less shallow than in *E. limosum;* first tooth blunt, partly fused with the second tooth, which is lobiform, nearly as advanced as the first and usually larger; anterior margin of fourth and fifth teeth concave; posterior margin of third, fourth and fifth teeth convex; that of fifth tooth sloping backward and inward. Lower teeth of orbit strongly projecting, the outer one a rounded lobe.

Chelipeds and legs as in *E. limosum*.

Color.—Upper surface of chelipeds violet, of movable finger red.

Measurements.—Holotype male, length of carapace 18, width of same 28.2, fronto-orbital width 15.5, width of front 7 mm. Male (40418), length of carapace 34, width of same 51.6.

Habitat.—All the specimens [in Costa Rica] were found in rotten mangroves, hidden in fine mud. (Tristan.)

Range.—From Costa Rica to Peru.

Material examined.—

COSTA RICA.—Punta Arenas; February, 1907; P. Biolley collector; 1 female (39093), from J. Fid. Tristan.

Boca del Jesús Maria; P. Biolley and J. Fid. Tristan collectors: 1 male, holotype (32366), from J. Fid. Tristan. January, 1906; 1 male (32492), from Costa Rica National Museum.

PANAMA.—Canal Zone; 1911; Smithsonian Biological Survey: Corozal; April 20–21; 1 male (Field Mus.). Balboa; tide water; May 5; 1 male (44183).

PERU.—Salto (near Capon); January 31; R. E. Coker; 1 male (40418), received from Peruvian Government; 1 female (Peru Govt.).

EURYTIUM AFFINE (Streets and Kingsley)

Plate 177, Figures 1 and 2

Panopeus transversus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 102; not *P. transversus* Stimpson, 1860 (San Bartolomé, Magdalena and Santa Maria Bays, and La Paz, all in Lower California).

Panopeus affinis STREETS and KINGSLEY, Bull. Essex Inst., vol. 9, 1877, p. 106 (type-locality not designated, but is one of Lockington's localities).

Eurytium affine A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 334, pl. 60, fig. 1–1c.

Diagnosis.—Carapace slightly convex, widest at tips of teeth of last pair. Frontal lobes each with a slightly marked truncate outer lobule. Sinus between coalesced teeth very shallow.

Description.—Carapace slightly convex, granulate along front and antero-lateral margins, especially on hepatic regions. Front with lobes subtruncate, outer angles forming an obscure truncate lobule. Lateral teeth shallow; outer angle of orbit subacute, separated from next lateral tooth by a scarcely perceptible sinus, third tooth oblong, truncate, fourth tooth broadly triangular, fifth most prominent laterally, acute. Teeth of lower margin of orbit narrow, subequal, triangular, the inner one most advanced. A large tooth at base of dactyl of larger chela. Legs sparsely long-hairy.

Measurements.—Male (50484), length of carapace 14.7, width of same 22, fronto-orbital width 12.6, width of front 6.4 mm.

Range.—Mexico: West coast of Lower California and Gulf of California. Ecuador (?).

Material examined.—Magdalena Bay; C. R. Orcutt: September, 1913; 1 ovigerous female (54465). 1917; 1 male, 1 female (50638).

Turtle Bay; August 1, 1896; A. W. Anthony; 12 males, 2 females (19516).

Pichilinque Bay; *Albatross:* April 29, 1888; 1 male, 1 female (22013). 3 males, 1 female (50484).

Puerto Refugio, Angel Island; March 29, 1889; *Albatross;* 1 male (16026).

San Luis Gonzales Bay; March 27, 1889; *Albatross;* 3 males, 1 female (16027).

Guaymas, gulf side; under stones, scarce; February 27, 1891; P. L. Jouy; 3 males, 1 female (16079).

Genus MICROPANOPE Stimpson

Micropanope STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 139; type, *M. sculptipes* Stimpson.

Carapace of moderate width, slightly convex, regions usually lightly indicated, commonly granulous or spinulous toward frontal and antero-lateral borders. Antero-lateral borders arcuate, shorter than postero-lateral, armed usually with five teeth or spines, of which the last is much reduced and the second also reduced or altogether wanting. Postero-lateral borders moderately converging. Fronto-orbital width great, usually three-fourths or more than three-fourths width of carapace and front more than one-third width of carapace. Front bilobed, outer angle rectangular, blunt, and situated below and in advance of upper inner angle of orbit. Upper orbital margin with

two small open notches and an intermediate lobe; inferior margin with a large outer notch; inner tooth prominent. Inner orbital hiatus wide; basal article of antennae not reaching, or barely reaching, prolongation from front. Endostome usually marked by a slight ridge on either side which does not extend to the anterior margin. Chelipeds unequal in both sexes, and usually roughened by sharp granules or spinules. Fingers pointed. Legs slender, usually spinulous above. Abdomen of male with third to fifth segments fused.

Small species, ranging from Cape Hatteras, North Carolina, to Cape Frio, Brazil; Bermudas; from Santa Monica, California, to the Galapagos Islands; Hawaiian Islands. To a depth of 250 fathoms.

KEY TO THE AMERICAN SPECIES OF THE GENUS MICROPANOPE

A¹. Last lateral tooth of carapace obsolescent.
  B¹. General appearance of carapace smooth.
    C¹. Color of immovable finger continued on palm. Wrists rough **areolata**, p. 450.
    C². Color of immovable finger not continued on palm. Wrists nearly smooth **nitida**, p. 448.
  B². Carapace uneven or rough or both.
    C¹. Carapace deeply areolated all over. Legs unarmed. Chelae high and heavy, *Glyptoplax*-like **pusilla**, p. 431.
    C². Carapace areolated and rough anteriorly. Legs spinulous.
      D¹. Second lateral tooth small but distinct. Anterior carapace and wrists finely granulate **lobifrons**, p. 429.
      D². Second lateral tooth fused with the first and scarcely distinguishable. Anterior carapace and wrists deeply eroded. **sculptipes**, p. 428.

A². Last lateral tooth of carapace small but easily discernible.
  B¹. Color of immovable finger continued on palm.
    C¹. Submedian lobes of front triangular, prominent. Chelae heavy. Palms with a blunt crest above **cristimanus**, p. 454.
    C². Frontal lobes straight **latimanus**, p. 433.
  B². Color of immovable finger not continued on palm.
    C¹. Palms mostly smooth.
      D¹. Lateral projections dentiform.
        E¹. No tooth at outer angles of front. . Cardiac region granulate. Chelae similar [50] **lata**, p. 441.
        E². A small tooth at outer angles of front. Cardiac region smooth. Chelae dissimilar **polita**, p. 440.
      D². Lateral projections spiniform **spinipes**, p. 443.
    C². Palms entirely or mostly rough.
      D¹. Granulation of carapace mostly in lines. Chelipeds coarsely granulate.
        E¹. No notches in upper margin of orbit. Palms without longitudinal grooves **granulimanus**, p. 439.
        E². Two notches in upper margin of orbit. Palms with three longitudinal grooves on upper-outer surface.
          F¹. Granulation of carapace fine, squamose; transverse lines slightly marked **xantusii**, p. 438.

[50] As this species was founded on a single specimen, the similarity in chelae may be abnormal.

F². Granulation of carapace coarse, pearl-like; transverse lines strong_____**xantusii taboguillensis**, p. 439.

D². Granulation of carapace not in lines to any great extent.

E¹. Second lateral tooth absent, or fused with the first or orbital tooth. Palms rough with large bead granules.
nuttingi, p. 450.

E². Second lateral tooth or spine present.

F¹. Lateral projections spinous.

G¹. Outer surface of major palm rough all over. Chelipeds and legs long-haired_ _**urinator**, p. 451.

G². Outer surface of major palm partly rough. Chelipeds and legs inconspicuously hairy.
barbadensis, p. 446.

F². Lateral projections dentiform.

G¹. Frontal lobes arcuate. Granulation of carapace and chelipeds rough, not beadlike.
xanthiformis, p. 442.

G². Frontal lobes truncate. The entire carapace, chelipeds and legs covered with bead granules.
truncatifrons, p. 433.

ANALOGOUS SPECIES OF MICROPANOPE ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
granulimanus	*polita*
truncatifrons	*xantusii*
xanthiformis	*lata*

MICROPANOPE SCULPTIPES Stimpson

Plate 178, Figures 1–3

Micropanope sculptipes STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p.140 (type-localities, at seven hauls in the Florida Keys, 15–68 fathoms; types not extant).

Micropanope pugilator A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 326, pl. 54, fig. 1–1e (type-locality, northwest of Tortugas, lat. 25° 33′ N., long. 84° 21′ W., 101 fathoms; type in M. C. Z.); Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14, (not station 132 which is *M. lobifrons*).—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 326.

Diagnosis.—Chelipeds and anterior half of carapace rough. Margins of legs spinulous. Second lateral tooth almost indistinguishable. A subhepatic tubercle present. A thin laminate crest above dactyls of chelipeds.

Description.—Carapace naked, distinctly areolated; anterior and antero-lateral areolets somewhat roughened in front with small, sharp, tooth-like tubercles which are partly disposed in lines. Antero-lateral teeth sharp and denticulate, the posterior one nearly obsolete, the first and second almost entirely fused, the second represented by a denticle. Frontal lobes abruptly deflexed, little projecting, but with a convex outline; margin thin, minutely crenulate and defined by a slight furrow following it above. A small tubercle on the subhepatic region beneath the second antero-lateral tooth.

Chelipeds granulate above carpus with the granules arranged more or less in raised reticulating rugae, and with a sharp tooth and denticulate margin within; hand with a double denticulate crest above and with the minute granules of the outer surface showing a tendency to arrangement in rows; these granules become obsolete on the distal lower half of the major chela; upper part of inner surface granulate; fingers grooved, more deeply so in the minor chela; a thin superior crest on the dactyls. Ambulatory legs armed with minute spines above, which form two rows on the carpus. Merus of hind leg when appressed, reaching to the fifth or posterior tooth of the lateral margin of the carapace.

Measurements.—Male (20719), length of carapace 4.2, width 6, fronto-orbital width 4.6, width of front 2.4 mm.

Range.—From South Carolina to the Gulf coast of Florida; 15 to 101 fathoms. St. Croix, Grenada and Barbados, 69 to 170 fathoms (A. Milne Edwards).

Material examined.—See table, page 430.

MICROPANOPE LOBIFRONS A. Milne Edwards

Plate 178, Figures 4–6

Micropanope lobifrons A. Milne Edwards, Crust. Rég. Mex., 1880, p. 327, pl. 53, fig. 3 and 3*a* (type-locality, off Montserrat, 88 fathoms; type in Paris Mus.); Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14 (Grenada, 170 fathoms; Barbados, 94 fathoms).—Rathbun, Bull. U. S. Fish Comm. for 1900, vol. 20, part 2, 1901, p. 32.—A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 325, pl. 5, figs. 3 and 4.

Diagnosis.—Carapace and chelipeds partly rough. Five lateral teeth, two small, two large, one very small. A transverse ridge behind front. No subhepatic tubercle.

Description.—Carapace in large part smooth; fine granulation on gastric, hepatic, and epibranchial lobes. Regions fairly well indicated. Lobes of front arcuate, most produced at the inner two-fifths; a transverse granulated ridge marks the upper border. Five anterolateral teeth; the orbital tooth little produced; second tooth equally small, obtuse; third and fourth subequal, sharp-pointed; fifth minute. Subhepatic tubercle obsolete or obsolescent.

Chelipeds covered with small, pointed granules; those of carpus not forming reticulating rugae. Two inner carpal spines, one below the other. Upper surface of palm bicristate; in the major chela the granules of the outer surface become smaller distally and disappear. Fingers deeply grooved. Minor palm elongate. Legs spinulous on margins; hind pair when appressed, reaching fourth tooth of lateral margin of carapace.

Terminal half of male abdomen narrow.

Material examined of Micropanope sculptipes

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			°F.						
South Carolina	32 55 00	77 54 00	79	crs. S. bk. Sp	59.1	Jan. 5, 1885	2311	*Albatross*	1♂	19797	Compared with type-specimen of *M. pugilator*.
Florida:											
Northwest of Tortugas	25 33 00	84 21 00	101		61.75	1878	45	U. S. C. S. Str. *Blake*	1♂ 1♀	2785, M. C. Z.	Types of *M. pugilator*.
Tortugas						July 22, 1924	44	W. L. Schmitt	1y	60775	Gift of Carnegie Institution.
Tortugas	Due S. of buoy E. side channel.		35–37	crs. S		June 10, 1925	206	*Dohrn;* W. L. Schmitt	1♀	60778	
Do	do		37	shelly S		do	207	do	1♂	60776	
Do	S. of red buoy No. 2		25			June 11, 1925	217	do	2♂	60777	
West of Tortugas	24 43 00	83 25 00	37			1877–78	11	*Blake*	1♂	3048, M. C. Z.	
South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co		Mar. 15, 1885	2406	*Albatross*	1♀	20719	
Southwest of Cape San Blas	29 11 30	85 29 00	26	S. G. brk. Sh		Feb. 7, 1885	2374	do	1♀ ovig	19798	
West Florida								*Bache;* W. Stimpson	1♂ 2♀	2982, M. C. Z.	

Measurements.—Male (58014), length of carapace 4.4, width of same 6.3, fronto-orbital width 4.7, width of front 2.6 mm. Width of ovigerous female, Barbados, 61 mm. (Bouvier).

Range.—Florida; West Indies; Panama. 20–170 fathoms.

Material examined.—See table, page 432.

MICROPANOPE PUSILLA A. Milne Edwards

Plate 179, Figures 7 and 8

Micropanope pusilla A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 327, pl. 54, figs. 4–4*b* (type-locality, near the west coast of Florida, 17 fathoms; type in M. C. Z.); Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14 (Florida Strait, 36 fathoms).

Glyptoplax pusilla RATHBUN, Journ. Inst. Jamaica, vol. 2, 1899, p. 628; Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2, 1901, p. 33.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 328.

Diagnosis.—Chelipeds and carapace nearly smooth to naked eye. Legs unarmed. Four lateral teeth distinguishable. No subhepatic tubercle.

Description.—Carapace narrow, covered on the prominent parts with numerous fine, regular granulations. Lobules indicated by deeper furrows, and lobules of branchial and cardiac regions more apparent, than in *sculptipes*. Behind the outer angle of the orbit there are two triangular and slightly projecting teeth and a small tubercle which replaces the last tooth; the second normal tooth is merged with the first. Front wide, appearing almost straight as seen from above but really bent down, in the old almost vertically, the two lobes deep toward the median sinus but becoming shallow toward the orbits; surface of front more coarsely granulate than rest of carapace.

Chelipeds finely granulate; carpus uneven, distal furrow deep; chelae unlike, not very unequal; both palms high, upper surface broad, its outer border slight, inner border cristate, but not lobate, at proximal end. Fingers meeting, tips crossing, those of major chela irregularly dentate throughout, dactyl with large basal tooth; fingers of minor chela longer and narrower, more deflexed, very finely denticulate especially the dactylus, which is of rather even width down to its middle, whence it diminishes to the tip. A finely granulate ridge just above lower margin of each propodal finger is continued a ways on palm; a similar ridge on upper margin of dactyls. Fingers usually light brown in alcohol, sometimes nearly white. Ambulatory legs slender and smooth.

Abdomen of male short and wide; third segment at its base covering the sternum; sixth segment nearly twice as wide as long, seventh segment equally short, margin broadly arcuate.

Measurements.—Male (19802), length of carapace 4.2, width of same 5.6, fronto-orbital width 4.4, width of front 2.4 mm.

Material examined of Micropanope lobifrons

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Florida: South of St. George Island.	° ′ ″ 28 46 00	° ′ ″ 84 49 00	26	crs. S. Co.	° C.	Mar. 15, 1885	2406	*Albatross*	1 y	60906	
Tortugas	S. of SW. channel buoy					Aug. 16, 1924	7	*Dohrn*; W. L. Schmitt.	1 y	62565	Gift of Carnegie Institution.
Gulf Stream off Cape Florida.	2⅛ miles SSE. of Fowey Rocks Light.		*Feet* 45	rky.	21.1	Mar. 25, 1903	7511	*Fish Hawk*	1 y	60905	
Cuba: Off Havana						1893		Biol. Exped. State Univ. Iowa.	1 ♀	Mus. S.U.I.	
Virgin Islands: Off St. Thomas.	Sail Rock, W. by N. ½ N., 6 miles.		*Fathoms* 20–23	Co.	25.8	Feb. 6, 1899	6079	*Fish Hawk*	1 ♂	24350	
Santa Cruz			115	R. brk. Sh.	° F. 65	1878–79	132	*Blake*	1 ♂	2685, M.C.Z.	
Barbados	SW. of Pelican Island, 1 mile.		38	fne. Co. fragments.		May 13, 1918	1	Barbados-Antigua Exped. State Univ. Iowa.	2 ♂	58025	
									2 ♀	Mus. S.U.I.	
	Half mile W. of station 17..		40	crs. S.		May 18, 1918	18	do	1 ♀	do	
	WNW. of Lazaretto; NNW. of Pelican Island.		33	rky.		May 27, 1918	51	do	9 ♀ (1 ovig.)	do	3 with Rhizocephalid parasites.
	Cable Station, E. by S.; Lazaretto, ESE. ½ S.		35–60	mostly rky.		June 3, 1918	75	do	1 ♂	do	
	Cable Station, SE. by E.; Paynes Bay Church, NE., off shore ¾ mile.		35–75	alternate S. and R.		do	78	do	1 ♀	do	With small Rhizocephalid.
	W. by N. of Telegraph Station, little more than a half mile off.		30–65	R. S.		June 5, 1918	79	do	3 ♀	58014	2 with a Rhizocephalid larger than the abdomen.
Grenada			170	fne. gy. Oz.	53.5	1878–79	247	*Blake*	1 ♂	2650	
Panama: Near Colon (Aspinwall).	9 32 00	79 54 30	34	brk. Sh.		Apr. 2, 1884	2146	*Albatross*	1 ♀	7778	

Range.—From Alabama in the Gulf of Mexico to St. Thomas, Virgin Islands.

Material examined.—See table, pages 434–435

MICROPANOPE LATIMANUS Stimpson

Micropanope latimana STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 107 [17] (type-locality, Cape St. Lucas; type not extant).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 329.[51]

Xanthodes latimanus LOCKINGTON, Proc. Calif. Acad. Sci., vol. 7, 1876 (1877), p. 31 [4] (type-locality, San Diego; type not extant).

Xantho latimanus LOCKINGTON, Proc. Calif. Acad. Sci., vol. 7, 1876 (1877), p. 101 [7].

? *Xanthodes ? angustus* LOCKINGTON, Proc. Calif. Acad. Sci., vol. 7, 1876 (1877), p. 100 [6] (type-localities, Magdalena Bay, L. Cal.; Mulege Bay, Port Escondido and San Jose Island, Gulf of Cal.; types not extant).

Diagnosis.—Margin of frontal lobes straight. Palms broader than long. Black of propodal finger continued one-third the way along palm.

Description (after Stimpson).—Carapace moderately convex, naked, smooth and polished, except toward the anterior and antero-lateral margins, where it is somewhat granulated. Front rather broad and little projecting, lobes with straight margins. Subhepatic region minutely granulated. Chelipeds large and angular; palms broader than long, smooth and polished, strongly protuberant at the postero-inferior angle; fingers nearly as long as palm, deflexed and black, the black of the propodal finger extending on the palm for one-third its length. Chelae unequal, the fingers of the smaller one longer and more deflexed than those of the greater one, which gives the hand a more angular form and a deeply concave inferior outline. Ambulatory feet slender, smooth and sparsely hairy.

Measurements.—Male type, length of carapace 7.1 mm. (0.28 inch), width of same 9.7 mm. (0.38 inch).

Range.—San Diego, California, to Cape St. Lucas, Lower California, Mexico.

MICROPANOPE TRUNCATIFRONS Rathbun

Plate 178, Figures 7 and 8

Micropanope truncatifrons RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 274, pl. 4, fig. 2 (type-locality, off Havana, 194 fathoms, station 2326, *Albatross;* type, Cat. No. 9497, U.S.N.M.).

Diagnosis.—Carapace and chelipeds coarsely granulate. Frontal lobes truncate, transverse. Five lateral teeth. No subhepatic tubercle. Legs slender.

Description.—Carapace moderately convex, antero-lateral teeth horizontal. Surface granulate, granules large and conspicuous anteriorly, diminishing toward posterior margin. Regions well defined;

[51] A. Milne Edwards suggests the possibility of this species being equivalent to *Glyptoplax pugnax* Smith.

Material examined of Micropanope pusilla

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Alabama:	° ′ ″	° ′ ″			° C.						
South of Mobile Bay	29 24 30	88 01 00	35	yl. S. bk. Sp.	------	Mar. 4, 1885	2388	*Albatross*	1♀ ovig	19804	
Do	29 27 30	87 48 30	30	crs. S. bk. Sp. Sh.	------	do	2390	do	1♂ 1♀	19805	
Florida:											
Southwest of Cape San Blas.	29 18 15	85 32 00	25	crs. gy. S. brk. Sh.	------	Feb. 7, 1885	2370	do	1♀	19799	
Do	29 15 30	85 29 30	27	G	------	do	2372	do	4♂	19800	
Do	29 14 00	85 29 15	25	Co	------	do	2373	do	1♂	19801	
Do	29 11 30	85 29 00	26	S. G. brk. Sh	------	do	2374	do	1♂	19802	Compared with type.
Do			25–27		------	do	2369–2374	do	4♂ 4♀ (1 ovig.) 15 y.	19803	
South of Cape St. George.	28 45 00	85 02 00	30	gy. S. brk. Co	------	Mar. 15, 1885	2405	do	1♀	19806	
South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co	------	do	2406	do	1♂ 4♀ (3 ovig., 1 soft shell.)	19807	
South of Dog Island	28 47 30	84 37 00	24	Co. brk. Sh	------	do	2407	do	1♀	19808	
Oyster Bay								H. Hemphill	1♂	19809	
West coast of Florida.			17					W. Stimpson	2♂ 1♀	2984, M. C. Z.	Cotypes.
White Shoals, Tortugas.						July 19, 1924	21	W. L. Schmitt	1♂	60770	Gift of Carnegie Institution.
Do						do	25	do	1 ovig. ♀	60771	Do.
Do						do	26	do	1♀ shedding	62567	Do.
Do						do	28	do	1♂ 1 ovig. ♀	60773	Do.
Do						July 20, 1924	35, 36	do	1♂ 1 ovig. ♀	61120	Do.
Tortugas	4–5 miles S. of Channel buoy.		40			July 22, 1924	38	do	1♂	61116	Do.
Do	S. of SW. Channel buoy.					Aug. 16, 1924	7	do	1♂ 3♀	62566	Do.
Do	6 miles S. of No. 2 buoy.		18	crs. S		July 22, 1924	44	do	1♀ [1] 1♂ 1♀	61118 60772	Do.
Do	Due S. of buoy E. side of channel.		35–37			June 10, 1925	206	*Dohrn;* W. L. Schmitt.	2♂ 3♀ (1 ovig.)	60769	Do.
Do	13 miles S. of No. 2 buoy.		87–45	Rough		do	210	do	1♂	60909	Do.
Do	7 miles S. of red buoy No. 2.		20			June 11, 1925	216	do	1♂ 3♀ [2]	61119	Do.
Do	S. of red buoy No. 2		25			do	217	do	1♂ 1 y	60774	Do.

Gulf of Mexico, off Northwest Channel, Key West.	24 40 45	81 53 40	6	hrd. S.	19	Feb. 24, 1902	7287	*Fish Hawk*	1♂	61117	
Cuba:											
Between Cape San Antonio and Cape Cajon.				Pure sand to weedy.		May 24, 1914	12	*Tomas Barrera;* Henderson and Bartsch.	1♂	49171	
Bahia Honda						June 7, 1914		do	1♀	49172	
Jamaica: Port Antonio								J. E. Duerden			Specimens in Institute of Jamaica.
Porto Rico:					° *F.*						
Mayaguez Harbor	Custom House, NE. ¾ E., 4½ miles.		4–6	Co.	68	Jan. 20, 1899	6065	*Fish Hawk*	1♂ 1♀	24337	
					° *C.*						
Off Humacao	Hucares, NW. ¾ W., 2¼ miles.		9.5	Co.	26	Feb. 14, 1899	6099	do	5♂	24346	
Do	Humacao, N. ½ W., 3 miles.		12.5	Co.	26.4	do	6098	do	1♂ 1♀	24345	
Vieques Island:											
Off Vieques	Port Mula Lighthouse, SSW. ⅜ W., 5¾ miles.		14	Co. S.	25.6	Feb. 8, 1899	6085	do	1♀	24339	
Do	Culebrita Light House, NE. x N., 10 miles.		15	Co.	26	Feb. 10, 1899	6091	do	1♂	24341	
Do	Culebrita Light House, NE. ⅜ E., 7¼ miles.		16	Co.	25.2	do	6092	do	1♂ 1♀	24342	
Do	Port Mula Light House, E. ½ N., 11¼ miles.		6	Co.	27.3	Feb. 14, 1899	6096	do	2♂ 2♀	24344	
Culebra Island:											
Off Culebra	Port Mula Light House, SW. ½ S., 8½ miles.		14.75	Co. S.	25.5	Feb. 8, 1899	6086	do	5♀	24340	
Do	Culebrita, NE., 5¼ miles.		15	Co.	25.2	Feb. 10, 1899	6093	do	1♀	24343	
St. Thomas, Virgin Islands.	Sail Rock, NW. ½ W., 4 miles.		20	Co.	25	Feb. 6, 1899	6080	do	2♂ 1♀	24338	Female with Rhizocephalid parasite.

[1] 1 female with parasite in right branchial cavity.

[2] 1 female with Rhizocephalid.

interregional furrows smooth. On each epigastric region a short oblique ridge, a longer ridge on the hepatic region, a transversely arcuate elevation on epibranchial region. Outer orbital tooth very small, well separated from second lateral tooth which is small and tuberculiform; third to fifth teeth dentiform, third directed forward, fourth and fifth outward, fifth smaller than the two preceding; margin of teeth denticulate. Front truncate; lobes slightly sinuous, margin thin, finely crenulate; a transverse row of coarse granules behind and above margin giving the front the appearance of having a double edge. Orbital margin granulate; two superior fissures little marked, terminating in small emarginations; lower margin with two subequal teeth and a broad outer V-shaped fissure. Lower surface of carapace granulate.

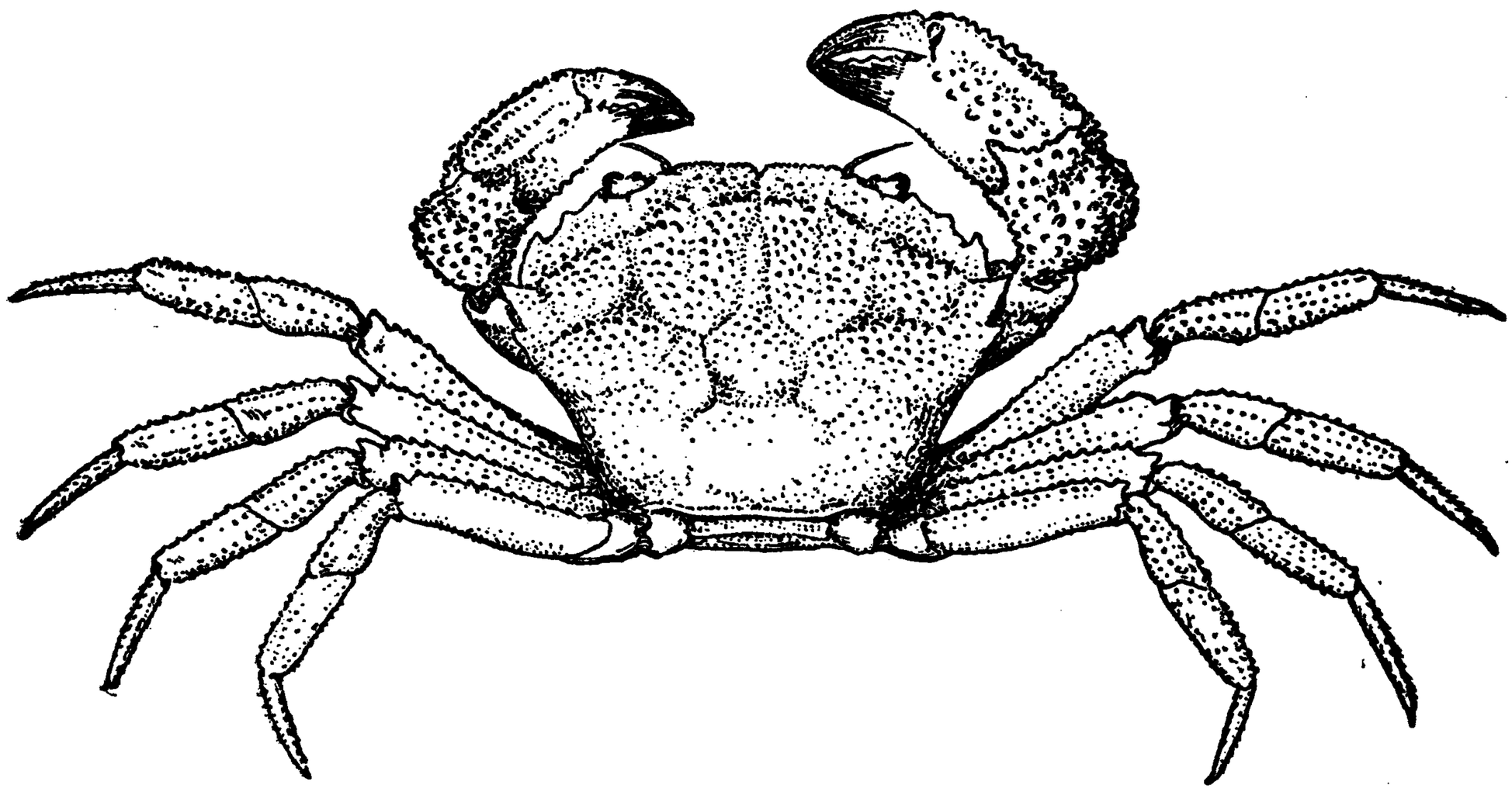

FIGURE 68.—MICROPANOPE TRUNCATIFRONS, FEMALE, HOLOTYPE, DORSAL VIEW, × 3.2

Chelipeds unequal in female, coarsely granulate. Arm short and broad, triangulate, armed with rather sharp granules, larger on margins. Granules of wrist in irregular masses and ridges; two inner spines, the infero-posterior the smaller. Hand with superior groove and double crest; outer granules diminish in size below, inner granules very large near upper margin, diminishing toward lower and distal margins. Fingers brown, deeply grooved, finely granulate, not gaping when closed; dactylus of larger hand with large basal tooth. Legs very slender, granulate; merus armed with small spines above, carpus and propodus with spinules.

Measurements.—Female holotype, length of carapace 7, width of same 10.4, fronto-orbital width 6.5, width of front 3.5 mm.

Range.—Off Havana and Yucatan; 130 to 194 fathoms.

Material examined.—See table, p. 437.

Material examined of Micropanope truncatifrons

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Cuba:	° ′ ″	° ′ ″			°F.						
Off Havana	23 11 45	82 18 54	194	br. Co	62	Jan. 17, 1885	2326	*Albatross*	1♀	9497	Holotype.
Do	23 10 40	82 20 15	182	Co		Jan. 20, 1885	2349	do	1♂ y	9530	
Mexico: Off Arrowsmith Bank, Yucatan	20 59 30	86 23 45	130	Co		Jan. 22, 1885	2354	do	1♀	20718	

Material examined of Micropanope polita

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Mexico:	° ′ ″	° ′ ″			°F.						
Off Magdalena Bay, Lower California.	24 58 15	115 53 00	36	Coralline	64.3	Mar. 2, 1889	2989	*Albatross*	2♂ 3♀ 2 y 1♂	17397 4252, M.C.Z.	Cotypes.
Off Cape St. Lucas, Lower California.	22 52 00	109 55 00	31	rky	74.1	May 1, 1888	2829	do	7♂ 9♀	19972	
Panama: Near Cocos Island	5 32 45	86 54 30	66	rky	58.4	Feb. 28, 1891	3368	do	1♂	20606	Cotype of *Panopeus tanneri.*
Galapagos Islands:	*Lat. S.*										
East of Indefatigable Island	0 57 00	89 38 00	53	P. Co. Sh	60	Mar. 28, 1891	3405	do	5♂ (2 y.)	4485, M.C.Z.	Cotypes of *Panopeus tanneri.*
Off Hood Island	1 21 30	89 39 45	20	Co. S	20	Apr. 7, 1888	2812	do	1♀	21995	

MICROPANOPE XANTUSII (Stimpson), new combination

Plate 179, Figures 1–4.

Xanthodes xantusii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 105 [15] (type-locality, Cape St. Lucas; type not extant).

Pilumnus beebei BOONE, Zoologica, vol. 8, 1927, p. 219, text-fig. 80 (type-locality, off Hood Island, Galapagos, station 54; cotypes in Mus. New York Zool. Soc.).

Diagnosis.—Granulation of carapace mostly in lines. Frontal lobes oblique. Five lateral teeth. Chelipeds coarsely granulate. Three grooves on outer-upper surface of palm.

Description.—Carapace smooth on its middle and posterior portions but in front areolated and roughened with somewhat squamiform granules and slight transverse crenulated ridges. Antero-lateral margin armed with four teeth not including the angle of the orbit between which and the next tooth there is a nearly straight, granulate interspace. Front little projecting, bordered by a thin lamella; median emargination a large V; outline of lobes concave, forming a lobule on either side, the outer one smaller than the inner; margin finely crenulate, an irregular line of fine granules close to the edge, and further back a transverse line of coarse granules. Orbital fissures little marked, ending in small emarginations separated by a slightly convex edge; outer incision broad, V-shaped, followed by a large tooth similar to that at the inner angle. Subhepatic region irregularly granulate, with one granule or cluster more prominent. Basal article of antennae short, scarcely reaching front.

Wrist and hand strongly granulate, with large and small granules, on the whole outer surface. Carpus with a deep sulcus near and parallel to the outer-distal margin; a rectangular inner angle and a stout spinule below it. Hand with three longitudinal sulci, one on the upper, and two on the outer surface. Smaller cheliped sparsely short-setose. Legs setose and roughened above with stout spinules on the merus and minute spinules and granules on the succeeding articles.

Measurements.—Male type, length of carapace 6.35 mm. (.25 inch), width of same 8.9 mm. (0.35 inch). Male, length of carapace 6.6 mm., width of same 9, fronto-orbital width 5.4, width of front 2.8 mm.

Range.—Cape St. Lucas, Lower California, to Maria Madre Island, Mexico; Galapagos Islands.

Material examined.—Maria Madre Island, Mexico: March–May, 1927; Secretaria de Agricultura y Fomento, through A. L. Herrera; 1 male (60785). E. part of bay; 5–8 meters; May 17, 1925; F. Contreras; 3 females (62704), 1 male, 4 females (1 ovigerous), returned to California Acad. Sci.

Clarion Island, Mexico; Hanna and Jordan; 1 female; returned to California Acad. Sci.

Off Hood Island, Galapagos Islands, 15 feet, William Beebe by diving at station 54, *Arcturus;* 3 males, 1 female, cotypes (Mus. New York Zool. Soc.).

MICROPANOPE XANTUSII TABOGUILLENSIS Rathbun

Plate 179, Figures 5 and 6

Micropanope taboguillensis RATHBUN, Mem. Mus. Comp. Zoöl., vol. 35, 1907, p. 69, pl. 1, fig. 8; pl. 7, figs. 3, 3*a* (type-locality, Taboguilla Island, Panama; type, Cat. No. 32859, U.S.N.M.).

Diagnosis.—Differs from typical *xantusii* in the granules of carapace and chelipeds which are pearl-like rather than squamiform, and larger and fewer in each row, making a rougher and more ornate surface. Interspace behind outer orbital tooth less well defined.

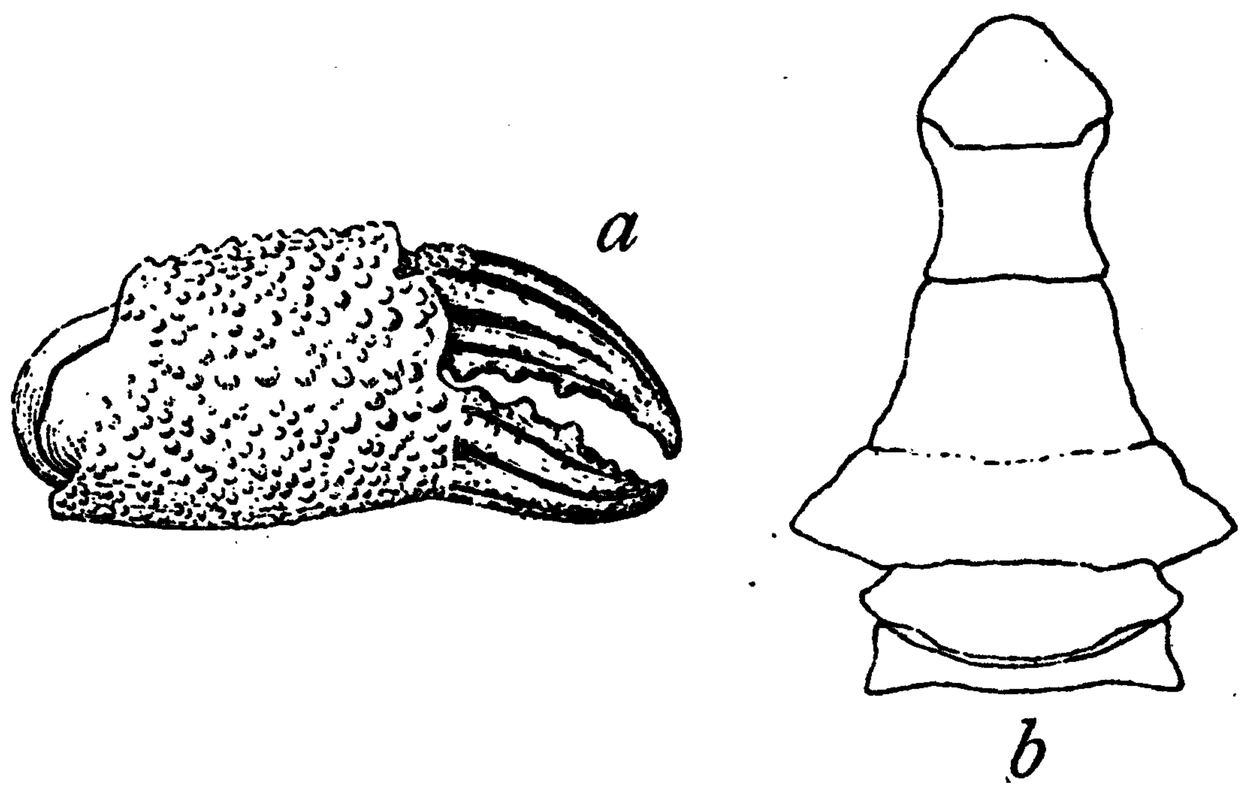

FIGURE 69.—MICROPANOPE XANTUSII TABOGUILLENSIS, MALE, HOLOTYPE, CARAPACE 10 MM. WIDE. *a*. CHELA. *b*. ABDOMEN

Measurements.—Male holotype, length of carapace 7, width of same 10, fronto-orbital width 5.7, width of front 3 mm.

Material examined.—Taboguilla Island, Panama, one fathom, low tide, from coral, October 31, 1904, *Albatross;* 1 male, holotype of *M. taboguillensis* (32859). A smaller male, paratype (M.C.Z.) was taken between tide marks, October 31, 1899, by the *Albatross*.

MICROPANOPE GRANULIMANUS (Stimpson), new combination

Plate 180, Figures 1 and 2

Pilumnus granulimanus STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 143 (type-locality, Cruz del Padre, Cuba; type not extant).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 294.

Xanthias granulimanus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 271.

Diagnosis.—Chelipeds densely granulate. No notches in upper margin of orbit. Basal article of antennae not reaching front.

Description.—Carapace rather short and broad, naked, areolated and granulated in front, smooth posteriorly; granules having a tendency to form lines. Antero-lateral margin minutely denticulate and armed, exclusive of the orbital angle, with four small, acute triangular teeth, the two end ones a little smaller than the two intermediates. At the penult tooth a short granulate ridge, arched obliquely forward, extends inward on the surface of the carapace. Subhepatic region

granulate. Margin of orbit granulate; a distinct notch below outer angle; a short acute tooth at inner lower angle; upper margin slightly sinuous but without open notches. Front somewhat deflexed, very little projecting; margin unarmed, deeply notched at middle; lobes oblique, sinuous. The basal article of the outer antennae falls considerably short of reaching the front. A short ridge on endostome.

Chelipeds and legs setose, the major cheliped less so than the rest. Chelipeds stout; carpus and hand covered externally and above with small, subequal granules, regularly crowded and diminishing in size below; carpus with two sharp, minute teeth at inner angle. Legs with one row of short spines along upper edge of merus and a few rows of spinules or sharp granules on next two articles. Third, fourth and fifth articles of male abdomen fused.

Color.—Yellowish marbled with red (Stimpson).

Measurements.—Female (20052), length of carapace 6.3, width of same 9, fronto-orbital width 5.6, width of front 2.7 mm.

Range.—Bahamas and Cuba to Curaçao.

Material examined.—

BAHAMAS.—Green Turtle Cay; E. A. Andrews; 1 female (20052).

CURAÇAO.—Caracas Bay; 1920; C. J. van der Horst: In *Maeandrina;* April 7; 1 male (57001), 1 male, 1 young female (Amsterdam Mus.). In coral: May 5, 1 female (57000); May 13, 1 young male (60765). Under stones near shore; May 3; 1 ovigerous female (Amsterdam Mus.).

MICROPANOPE POLITA Rathbun

Plate 180, Figures 3 and 4

Micropanope polita Rathbun, Proc. U. S. Nat. Mus., vol. 16, 1893, p. 238 (type-locality, off Magdalena Bay, 36 fathoms; cotypes, Cat. No. 17397, U.S.N.M., Cat. No. 4252, M.C.Z.).

Panopeus tanneri Faxon, Bull. Mus. Comp. Zoöl., vol. 24, 1893, p. 154 (type-localities, off Galapagos Islands, 53 fathoms, cotypes including measured and figured specimens, in M.C.Z.; and off Cocos Island, 66 fathoms, cotype, Cat. No. 20606, U.S.N.M.); Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 19, pl. 3, figs. 4, 4*a*.

Xanthias politus Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 271.

Diagnosis.—Palms not more than half rough. A notch in upper margin of orbit. Basal article of antennae reaching front. Front double-edged.

Description.—Carapace moderately convex longitudinally, smooth and punctate posteriorly, rough-granulate anteriorly, especially on hepatic region; areolations distinct. A nearly transverse, slightly arched line of granules on the branchial region opposite the last lateral sinus. Front nearly straight, median notch narrow, a blunt tooth at each lateral angle. A double edge is formed by a groove which runs along the front, the lower edge projecting a little further

forward than the upper; both edges granulate, the lower more finely than the upper. Orbit with a pronounced inner tooth above and outside the front, a small emargination near middle of upper border, a larger triangular outer notch, and a blunt tooth at inner angle of lower margin. Antero-lateral teeth five including orbital angle; a concave sinus between first and second tooth; first and last tooth smallest. Ventral surface of carapace granulate; no subhepatic tubercle. Basal antennal article short, but touching the prolongation of the front.

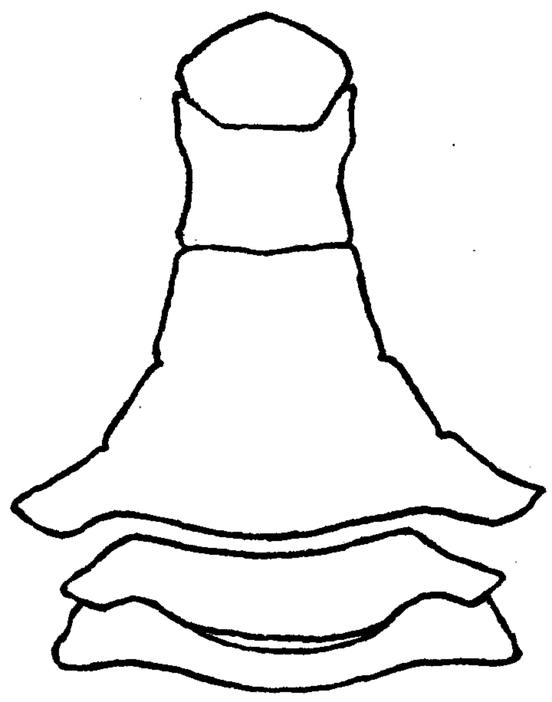

FIGURE 70.—MICROPANOPE POLITA, MALE (19972), ABDOMEN, × 10

Merus of chelipeds finely granulate, upper margin dentate; carpus squamoso-rugose, a distal groove and a stout tooth at inner angle; palms squamoso-tuberculate above and near wrist, elsewhere smooth and punctate; major palm robust, lower margin convex, fingers gaping, a large tooth at base of dactylus; minor palm much narrower, lower margin almost straight, fingers meeting, teeth not prominent. Fingers black, tips lighter, crossing when flexed. Legs slender, punctate, spinulous above, last three segments hairy.

In the male abdomen the slender distal angles of the sixth segment are prolonged on either side of the terminal segment which is broader than long.

Measurements.—Male (20606), length of carapace 6.1, width of same 9.4, fronto-orbital width 6.4, width of front 3.4 mm.

Range.—From Magdalena Bay, Lower California, Mexico, to Galapagos Islands; 20 to 66 fathoms.

Material examined.—See table, page 437.

MICROPANOPE LATA (Faxon), new combination

Plate 180, Figures 5 and 6

Panopeus latus FAXON, Bull. Mus. Comp. Zoöl., vol. 24, 1893, p. 153 (type-locality, Bay of Panama, 85 fathoms; type in M.C.Z.); Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 18, pl. 3, fig. 3, 3*a*.

Diagnosis.—Carapace very broad and very convex antero-posteriorly. No tooth at outer angles at front. Hands mostly smooth.

Description (after Faxon).—Carapace broad, convex antero-posteriorly, granulate, especially on the hepatic, branchial and cardiac regions; areolations well marked and protuberant. Front with a small median incision, lobes slightly convex, not produced into teeth at lateral angles. Five antero-lateral teeth; postocular tooth small, separated from the second tooth by a shallow, granulate sinus, third tooth broadest, rounded off at apex, fourth most salient, acute, fifth very small, acute; all have crenate or spinulous margins. Orbital

margin minutely crenulate, upper part with two closed fissures; outer hiatus a triangular notch; lower margin produced to form an obtuse tooth at inner angle. Subhepatic region granulate, without tubercle.

Chelae unequal but similar. Carpus rough with small tubercles and having a distal groove and a small blunt tooth at inner angle. Hands robust, inflated, smooth except near articulation with carpus where there are scattering granules; upper and lower margins rounded. Fingers long, down-curved, smooth, canaliculate, their cutting edges irregularly armed with small and rather sharp teeth, without any prominent basal tooth; when closed the fingers gape slightly and tips cross. Legs setose, merus with small teeth on upper edge. Penult segment of male abdomen with concave sides, terminal segment broad and rounded.

Measurements.—Male holotype, length of carapace 6.5, width of same 10.25 mm.

Range.—Known only from the single type specimen, male (4484, M.C.Z.) from the Bay of Panama; lat. 7° 33′ 00″ N.; 85 fathoms; sft. gn. M. brk. Sh.; temperature 57.3° F.; March 11, 1891; station 3397, *Albatross*.

Remarks.—Allied to *M. xanthiformis*, but carapace much broader and more convex from front to back, front less prominent and destitute of lobules at lateral angles, and carpal tooth of cheliped blunt.

MICROPANOPE XANTHIFORMIS (A. Milne Edwards)

Plate 180, Figures 7 and 8

Panopeus xanthiformis A. Milne Edwards, Crust. Rég. Mex., 1880, p. 353, pl. 53, figs. 4–4*b* (type-locality, off Grenada, 92 fathoms; type in Paris Mus.); Bull. Mus. Comp. Zoöl., vol. 8, Dec., 1880, p. 13.

Micropanope xanthiformis Rathbun, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 274; Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 32.—A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 324.

Diagnosis.—Shape xanthoid. Front shallow. Carapace and chelipeds very rough in adults. Subhepatic tubercle ill defined.

Description.—Carapace depressed, coarsely granulate on anterior arch, granules depressed; regions well marked; an oblique ridge on hepatic region. Front slightly deflexed, shallow; lobes separated by a narrow fissure; margins sinuous, on the whole convex but with a distinct rectangular outer corner. Orbits wide, margin finely crenulate. Five antero-lateral teeth; second small, blunt, in adults considerably larger than postorbital angle, in the young obsolescent; third and fourth teeth large, acute; last very small and pointed; teeth with granulate margins. A slight subhepatic elevation formed by a number of granules.

Chelipeds rugose with coarser granules (or tubercles) than on carapace. Arm with a row of spines above; wrist with a deep anterior

groove and two inner spines, one smaller and below the other; major hand roughened on its upper and proximal portions, the roughness of the outer surface more extensive in the minor than the major chela. Fingers deeply grooved; dactylus of larger claw with a large basal tooth. Legs very long and slender; merus with a row of spines above, other articles spinulous.

Color.—Anterior portion of carapace light yellowish orange. Fingers of major chela brownish black, of minor chela black. Spines and tubercles of both chelipeds light salmon.

Measurements.—Male (19810), length of carapace 7, width of same 10, fronto-orbital width 7.2, width of front 3.7 mm.

Range.—From Cape Hatteras, North Carolina, and Gulf of Mexico to Cape Frio, Brazil; depth 8½ to 182 fathoms.

Material examined.—See table, page 444.

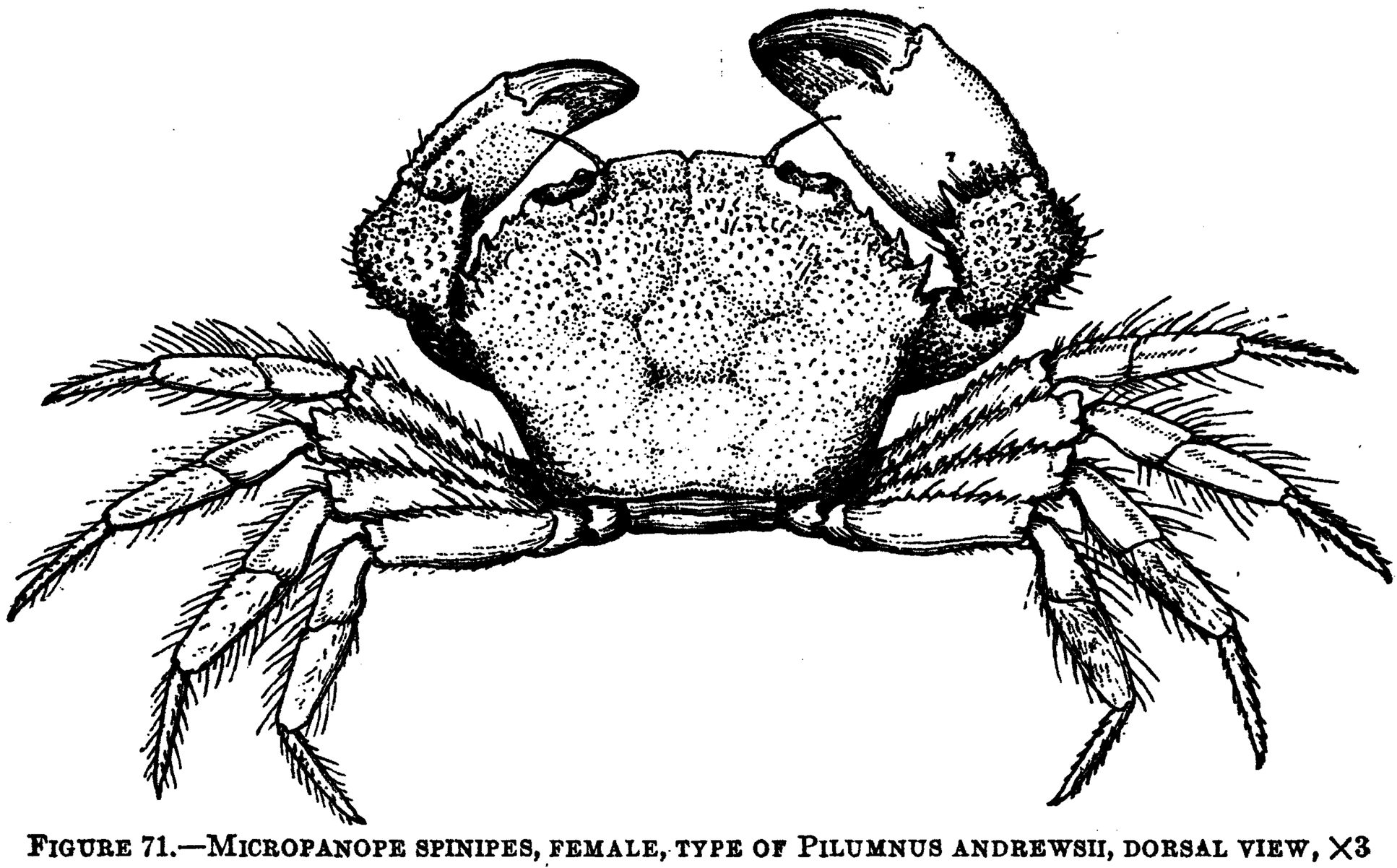

FIGURE 71.—MICROPANOPE SPINIPES, FEMALE, TYPE OF PILUMNUS ANDREWSII, DORSAL VIEW, ×3

MICROPANOPE SPINIPES A. Milne Edwards

Plate 181, Figures 1 and 2

Micropanope spinipes A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 326, pl. 54, figs. 3–3c (type-locality, Abrolhos Islands, Brazil, 30 fathoms; type in Museum of Comparative Zoölogy).—MIERS, *Challenger* Rept., Zool., vol. 17, 1886, pp. xx and 130; Bahia, 7 to 20 fathoms.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 323.

Pilumnus spinipes RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 264.—VERRILL, Trans. Conn. Acad. Arts and Sci., vol. 10, 1900, p. 577 ("Cuba" is an error); vol. 13, 1908, p. 361, text-fig. 20, pl. 27 [not 26], fig. 1.

Pilumnus andrewsii RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 267, pl. 5, fig. 2 (type-locality, Green Turtle Cay, Bahamas; type, Cat. No. 20508, U.S.N.M.).

Diagnosis.—Palms smooth and bare over nearly the whole outer surface. Third and fourth antero-lateral teeth larger, first, second, and fifth smaller. Margin of front and orbits granulate.

Material examined of Micropanope xanthiformis

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
North Carolina:	° ′ ″	° ′ ″			°F.						
Off Cape Hatteras	35 12 30	75 05 00	48	crs. gy. bk. S.	77	Oct. 19, 1884	2269	*Albatross*	1 ♀ ovig	8749	
Do	35 10 40	75 06 10	68	gy. M.	71.3	do	2268	do	2 ♀	8745	
Florida:			Feet		°C.						
Gulf Stream off Cape Florida.	2⅛ miles SSE. of Fowey Rocks Light.		45	rky	21.1	Mar. 25, 1903	7511	*Fish Hawk*	2 ♀	60912	
			Fathoms								
Off Sand Key	Sand Key Light bearing W. about 8 miles.		15			June 24, 1893	41	Biological Expedition State Univ. Iowa.	1 ♂	S. U. I.	
					°F.						
Off Key West	24 25 30	81 47 45	50		74	Jan. 15, 1885	2316	*Albatross*	1 ♂ 1 ♀	9463	
White Shoals, Tortugas						July 19, 1924	25	W. L. Schmitt	1 ♀ 1y	60781	Gift of Carnegie Institution.
Tortugas						July 22, 1924	41	do	1 ♂	60780	Do.
Do	About 10 miles S. of No. 2 buoy.		35–37	crs. S.		June 10, 1925	206	do	1 ♀ 1 ♂ 1y. smooth var.	60911 60784	Do.
Do	About 13 miles S. of No. 2 buoy.		87–45	rough		do	210	do	1 ovig. ♀	60910	Do.
Do	S. of red buoy No. 2		25	co. R.		June 11, 1925	217	do	1 ♀ y	60782	Smoother variety. Gift of Carnegie Institution.
Western Dry Rocks			80			1916		*Eolis;* J. B. Henderson.	2 ♂	60783	
Cuba:											
Off Havana	23 10 25	82 20 24	33	Co.	79.1	Jan. 17, 1885	2324	*Albatross*	1 ♂	19810	Compared with type-specimen.
Do	23 11 45	82 17 54	182	fne. br. S.		do	2327	do	1 ♂	19811	
Mexico: Off Arrowsmith Bank, Yucatan.	20 59 30	86 23 45	130	Co.		Jan. 22, 1885	2354	do	1 ♂	19812	
					°C.						
Porto Rico: Off Porto Real	Punta de Guaniquilla, S. ¼ E., 2 miles.		8.5	Co. S.	26	Jan. 25, 1899	6074	*Fish Hawk*	1 ♂ y	24349	
					°F						
Dominica			118	fne. S. brk. Sh.	65	1878–79	177	U.S.C.S. Str. *Blake*	1 ♂	2592, M.C.Z.	
Off Barbados			73	crs. co. S. brk. Sh.	70.75	1878–79	290	do	1 ♂	2658, M.C.Z.	
Off Grenada			92	Co. brk. Sh.	58.5		253	do	1 ♂	Paris Mus.	Type.
Off Curaçao	11 34 30	69 02 10	122	fne. Sh. gn. M.	59.5	Feb. 18, 1884	2124	*Albatross*	1 sterile ♀	7829	
	Lat. S.										
Brazil: Off Cape Frio	23 08 00	41 34 00	59	bu. M.	57.1	Dec. 30, 1887	2762	do	1 ♂	21996	

Description.—Upper surface of carapace rough with scalelike granules, which are sharper and higher on the anterior lateral arch. The granules of carapace and chelae bear hairs while many much finer hairs arise between them. Front bent obliquely down, a narrow transverse ridge at the bend, nearly parallel with the edge; margin of frontal lobes nearly straight, sloping backward a little from the median V-shaped notch; a small rectangular tooth at outer end. Upper orbital margin minutely granulate or denticulate, lower margin also denticulate, a large triangular tooth at inner angle, a large outer sinus. Outer orbital tooth and next antero-lateral tooth at some distance, very small but plainly marked and acute; below and between them a sharp subhepatic tubercle; the last three antero-lateral projections are triangular spine-pointed teeth, the last one more or less smaller than the others. Endostomial ridge not nearly reaching epistome.

The outer-upper surface of the wrist is entirely covered with spinules or sharp granules and has a transverse distal groove, and two sharp spines on the inner edge, the one at the inner angle longer than any other. Upper surface of hand spinulous in part, more so in minor than major chela and in the young than full grown; outer surface in both sexes entirely smooth and bare in the old, but with a narrow strip on upper and proximal portior which is spinulous. Minor manus with a dorsal groove, fingers each with two deep grooves both inside and outside. Grooves less evident on the major chela, which is much the stouter. Ambulatory legs very slender, spinulous. Male abdomen with third, fourth, and fifth segments fused.

Color.—Male (in formalin), pale buff on upper side of carapace and legs; chelae yellowish or salmon on the palm, with a white patch preceded by a yellow one at base of claws, which were umber-brown. (Verrill.)

Measurements.—Female (20508), length of carapace 8.9, width of same 12.8, fronto-orbital width 8, width of front 4.1 mm.

Range.—From Bahamas and Florida Keys to the Abrolhos Islands, Brazil; Bermuda.

Material examined.—Bermuda; 1898; A. E. Verrill and party; 1 male, 1 female (P.M.Y.U.).

Hawk Channel, Florida; 4¼ miles W. by N. of Elbow Reef beacon; 2¾ fathoms; barry S.; 20.5° C.; February 19, 1903; station 7467, *Fish Hawk;* 1 female (60779).

Green Turtle Cay, Bahamas; 1897; E. A. Andrews; 2 females (20508), types of *Pilumnus andrewsii.*

No Name Key, Florida; banks, low tide; 1885; H. Hemphill; 1 female (19891).

Caracas Bay, Curaçao; 1920; C. J. van der Horst; in coral, May 5, 1 male (56896); in sponge, May 10, 1 young female (Amsterdam Mus.).

Maceio, Alagoas, Brazil; coral reef; July 26, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 male (25726).

Off Abrolhos Islands, Brazil; 30 fathoms; U. S. Coast Survey Str. *Hassler;* 1 female, holotype (2981, M. C. Z.).

MICROPANOPE BARBADENSIS (Rathbun), new combination

Pilumnus barbadensis RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 9, 1921, p. 73, pl. 1 (type-locality, Barbados; type in Mus. S. U. I.).

Diagnosis.—Carapace broad-oval, frontal lobes oblique. Outer orbital fissures absent or minute. Color of immovable fingers covering distal two-thirds only. Minor palm rough outside, major palm rough only on its upper, proximal portion.

Description.—Carapace suboval, antero-lateral margin arched but shorter than postero-lateral. Surface covered with a short, soft, sparse pubescence which does not conceal the carapace. Furrows between regions and gastric subregions well marked. Surface minutely roughened, especially along front and antero-lateral regions where the granules are acutely pointed. Lobes of front oblique, edge slightly convex save at outer end which is right angled in smaller specimens but has a small, more or less pointed tooth in the old (female, 12.3 mm. wide); edge crenulate. Inner angle of orbit acute; upper margin sloping obliquely outward and backward to a slight outer tooth; edge finely denticulate; notches very small, or in the old disappearing altogether. Antero-lateral margin armed with three slender, acuminate spines, each set in a stout, triangular, denticulate base. Carapace widest at the posterior pair of these spines; the two interspaces are subequal; between the anterior spine and the orbital angle there is a spinule, little larger than the sharp denticles of the neighboring surface, and confused in dorsal view with several subhepatic spinules. Suborbital region covered with coarse, acute granules Lower orbital margin more advanced than upper, its spinules more elongate; spinule at inner angle a little larger and more pronounced.

Chelipeds very unequal, thinly clothed with longer hairs than the carapace; carpus covered with acute granules, and having two spinules, one above the other at inner angle. Only the proximal third or less of the major palm is rough with granules, the roughness forming an oblique band bordering the carpus but stopping short of the lower margin; the proximal two-thirds of the upper edge is separately roughened; remainder of palm smooth and naked; the Florida female is an exception, the granules covering all but the distal end of the palm; fingers of male dark brown with light tips, color not reaching base of immovable finger, color line vertical; a narrow interdigital gape. In the minor cheliped the entire outer surface of palm is very rough, the granules arranged for the most part longitudinally; fingers less gaping, deeply grooved, ridges very rough. In the female, the

fingers are a lighter brown; in the largest female the roughness on the major palm is less extensive.

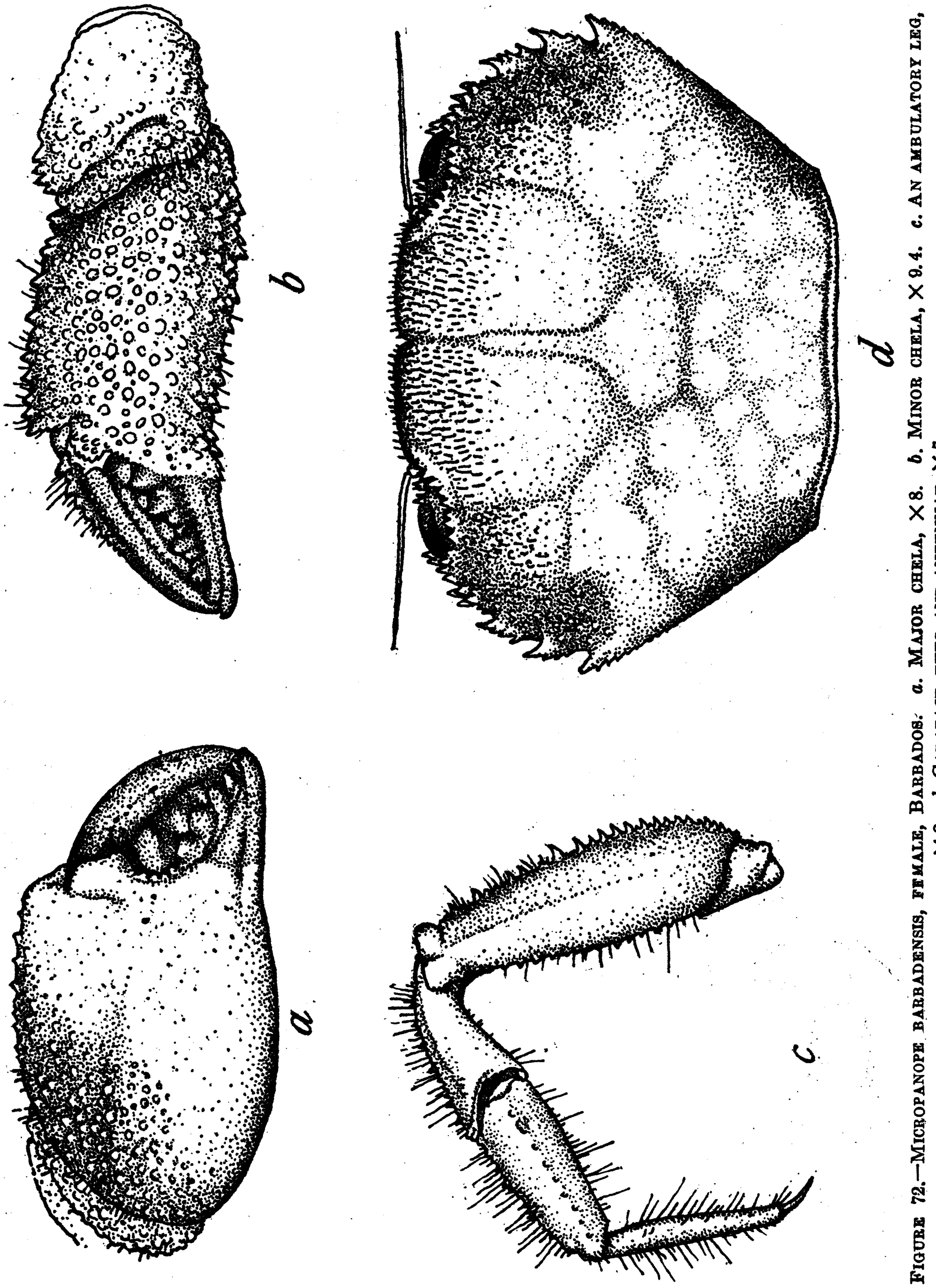

FIGURE 72.—MICROPANOPE BARBADENSIS, FEMALE, BARBADOS. *a*. MAJOR CHELA, ×8. *b*. MINOR CHELA, ×8. *c*. AN AMBULATORY LEG, ×8. *d*. CARAPACE, EYES, AND ANTENNAE, ×7

Ambulatory legs slender, bordered with long hair; merus slightly enlarged, upper margin edged with slender spines; dactyli noticeably slender.

Measurements.—Male holotype, length of carapace 6.7, width 9.4 mm.; figured female, length 7.6, width 10.7 mm.; largest female, width 12.3 mm.

Range.—Tortugas, Florida; Barbados.

Material examined.—Middle section of Bird Key reef, Tortugas, Florida; July 26, 1924; W. L. Schmitt; 1 female (60934); gift of Carnegie Institution.

Barbados; Barbados-Antigua Expedition, State University of Iowa: Okra Reef; May 13, 1918; 2 young (Mus. S.U.I.). Barbados; May 31, 1918; 1 male holotype, 1 female (Mus. S.U.I.), 2 males, 1 female (58042); from old coral heads. Barbados; June 4, 1918; 5 small (Mus. S.U.I.), from coral heads.

MICROPANOPE NITIDA Rathbun

Plate 181, Figures 3 and 4

Micropanope nitida RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 587, pl. 42, fig. 9 (type-locality, southern part of Gulf of California, 8 fathoms, station 2824, *Albatross;* type, Cat. No. 21583, U.S.N.M.); Bull. Amer. Mus. Nat. Hist., vol. 48, 1923, p. 623.

Diagnosis.—General appearance smooth. Frontal lobes rounded; second and fifth lateral teeth reduced; color of immovable finger not continued on palm.

Description.—Carapace broad, convex in both directions; regions faint; surface minutely granulate or almost smooth, covered with very minute punctae and occasionally a larger one. Front flat, inclined, granulate; edge thin; median sinus V-shaped; lobes sinuous, convex for their inner two-thirds. Orbits with two V-shaped sinuses on superior margin. Lateral teeth five; first or orbital tooth small, little advanced; second low, rounded and connected with the first by a shallow sinus; third and fourth large, arcuate outer and concave inner margins and acute curved tips; fifth very small. No subhepatic tubercle. Outer suborbital fissure deep, narrow at base, with convex sides; inner tooth low and blunt. Second segment of male abdomen wide, leaving exposed at its outer distal corners a very small piece of sternum; third segment with broad base and angular corners, reaching coxae of last pair of legs; penult segment short, sides convex; terminal segment triangular, end blunt.

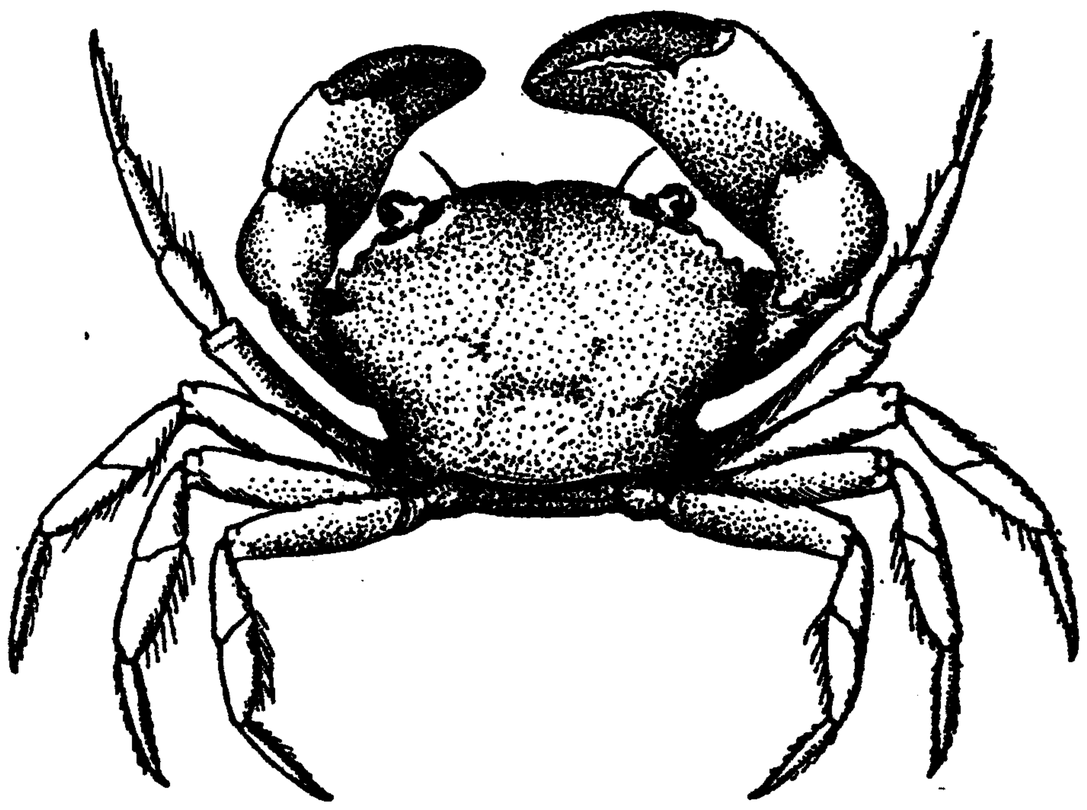

FIGURE 73.—MICROPANOPE NITIDA, MALE, HOLOTYPE, CARAPACE 11.5 MM. WIDE, DORSAL VIEW

Chelipeds strong, finely granulate. Upper margin of arm granulate or denticulate. Carpus slightly rugose, a short sharp inner tooth or

Material examined of Micropanope nitida

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Mexico:	° ′ ″	° ′ ″								
Gulf of California	24 22 30	110 19 30	8	brk. Sh.	Apr. 30, 1888	2824	*Albatross*	2♂ 9♀	21583	Type lot.
Do	24 22 15	110 19 15	7	brk. Co.	do	2825	do	3♂ 6♀	21997	
Do	24 12 00	109 55 00	9.5	Sh.	do	2826	do	2♂	21998	
Do	24 11 45	109 55 00	10	Sh.	do	2827	do	1♀	21999	
Do	24 11 30	109 55 00	10	Sh.	do	2828	do	2♀	22000	
Do	Agua Verde Bay				Apr. 1, 1911		do	1♂ 3♀	60030	
Locality not given					1911		do	{11♂ 8♀ (1 ovig.) {12♂ 8♀ 1 y	60031 Amer. Mus.	

Material examined of Micropanope areolata

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″			°F.						
California: 6 miles north of Santa Monica, Los Angeles County.								E. P. Chace	7 y	53986	
Mexico:											
Off Adair Bay	31 21 00	113 49 00	11	S. brk. Sh. G.	67	Mar. 25, 1889	3024	*Albatross*	4♂ 1♀	21584	
Patos Island						Apr. 23, 1921		Fred Baker	1♂	58113	Gift of California Academy Sciences.
Southern part Gulf of California.	24 12 00	109 55 00	9.5	Sh.		Apr. 30, 1888	2826	*Albatross*	1♂ 1♀	22001	
Do	24 11 45	109 55 00	10	Sh.		do	2827	do	1♂	22002	
Do	24 11 30	109 55 00	10	Sh.		do	2828	do	1♂ 4♀	22003	

spine, a blunt tooth beneath it, an anterior groove. Large hand strong, margins convex; upper surface broad and flattened, in smaller specimens with two blunt crests; fingers bent downward, slightly gaping, marked with punctate impressed lines, prehensile teeth low. Basal tooth of major dactyl little enlarged if at all. Smaller hand resembling larger, two-thirds as wide. Fingers dark brown, the color line on the fixed finger running obliquely down from proximal end of prehensile margin and parallel to proximal end of palm. Legs long and narrow, anterior margins of merus finely spinulous; last two articles with pubescent margins.

Measurements.—Male holotype, length of carapace 8.1, width of same 11.5, fronto-orbital width 8.8, width of front 4.5 mm.

Range.—Gulf of California, 7 to 10 fathoms.

Material examined.—See table, page 449.

MICROPANOPE AREOLATA Rathbun

Plate 182, Figures 1 and 2

Micropanope areolata RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 588 (type-locality, off Adair Bay, Gulf of California, 11 fathoms, station 3024, *Albatross;* type, Cat. No. 21584, U.S.N.M.).

Diagnosis.—Carpus of chelipeds and antero-lateral portions of carapace rough. Color of immovable finger continued on palm. Otherwise near *nitida.*

Description.—Closely allied to *M. nitida,* with which it may be compared. Carapace somewhat narrower, front relatively narrower, first and second lateral teeth more completely united. Surface slightly pubescent, regions more distinctly marked, granulation fine but plain on protogastric, hepatic and epibranchial lobes, epigastric ridge well developed. A subhepatic tubercle. Wrists much roughened, palms finely rugose, color of immovable fingers extending well back on palms, basal tooth of major dactyl not heavy, though larger than in *nitida.* Male abdomen similar to that of *M. nitida* but last two segments shorter.

Measurements.—Male holotype, length of carapace 6.4, width of same 8.9, fronto-orbital width 6.7, width of front 3.4 mm.

Range.—Southern California and Gulf of California, to a depth of 11 fathoms.

Material examined.—See table, page 449.

MICROPANOPE NUTTINGI (Rathbun), new combination

Xanthias nuttingi RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 271, pl. 4, fig. 1 (type-locality, Bahama Banks; cotypes in Mus. State Univ. Iowa and Cat. No. 19975, U.S.N.M.); Bull. U. S. Fish Comm. for 1900, vol. 20, part 2 (1901), p. 35.

Diagnosis.—Second lateral tooth absent. Palms rough with bead tubercles, covering both palms of female and minor palm and greater part of major palm of male.

Description.—Carapace suboval, convex in an antero-posterior direction, nearly flat in a transverse direction; anterior half rough with squamose granules; regions distinct. Front convex, having two lobes with granulate margins separated by a V-shaped sinus; outer angle of each lobe subrectangular. Second normal antero-lateral tooth of this genus suppressed, being completely united with the orbital tooth which is not prominent; three remaining teeth sharp-pointed, posterior one smallest. Outer fissure of orbit broad, V-shaped.

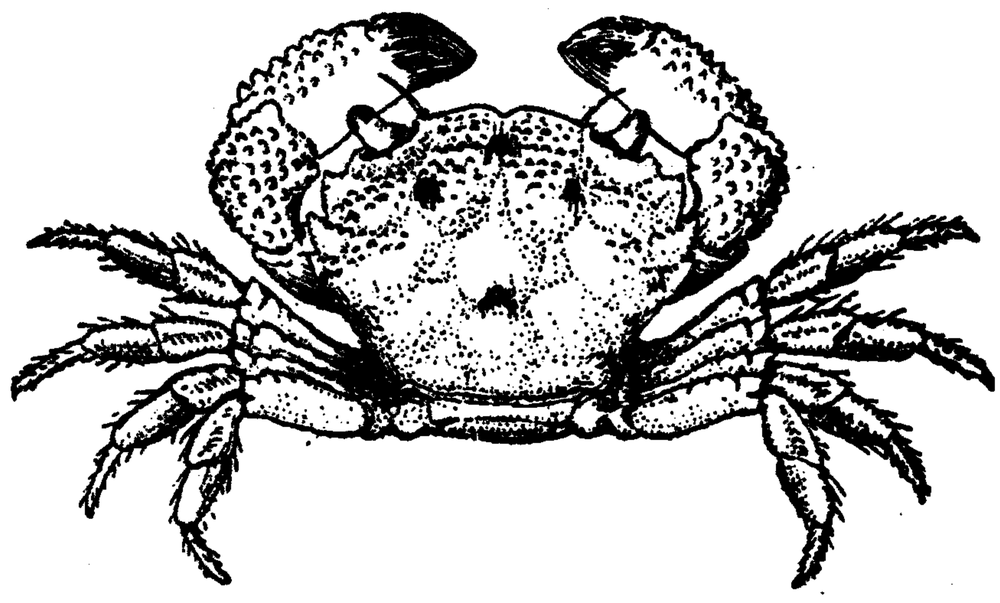

FIGURE 74.—MICROPANOPE NUTTINGI, MALE, DORSAL VIEW, ×4.8

Chelipeds heavy, very unequal, arm spinulous on upper edge; wrist covered with beadlike tubercles and with a deep anterior groove and an inner right angle tipped with a spinule; a second spinule below. Major hand in male with upper and about two-thirds of outer surface ornamented with bead tubercles; lower third and distal extremity smooth and shining; fingers broad, not gaping, brown with light tips; dactylus with large basal tooth; color of immovable finger not running back on manus, but forming a line with articulation of dactylus. Minor hand almost entirely covered with tubercles, which grow smaller toward distal and lower margins; upper margin with a longitudinal groove; fingers deeply grooved. Upper margin of ambulatory legs tuberculate or granulate. The females differ in having the whole outer surface of the major as well as the minor palm tuberculate.

Measurements.—Male (24289), length of carapace 3.8, width of same 5.7, fronto-orbital width 4, width of front 2 mm.

Color.—In alcohol, speckled with blue; larger patches of blue on anterior gastric and cardiac region.

Range.—From Cape Hatteras, North Carolina, and Gulf of Mexico to Cape St. Roque, Brazil. Shallow water to 37 fathoms.

Material examined.—See table, pages 452–453.

MICROPANOPE URINATOR (A. Milne Edwards), new combination

Plate 182, Figures 3 and 4; Plate 183, Figures 1–3

Pilumnus urinator A. MILNE EDWARDS, Crust. Rég. Mex., 1881, p. 289, pl. 53, fig. 2–2*b* (type-locality, near Santa Cruz [St. Croix], West Indies, 245 fathoms; type in Paris Mus.).—RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 265.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 326.

Diagnosis.—Rough; carapace short-haired, chelipeds and legs long-haired; spines white. Five antero-lateral spines. Outer surface of both palms rough all over; fingers deeply grooved.

Material examined of Micropanope nuttingi

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
North Carolina: Off Cape Hatteras.	35 21 00	75 21 30	16	gy. S. brk. Sh.	°C.	Oct. 19, 1884	2280	*Albatross*	1♀ 2 y	60908	
Bahamas: Bahama Banks						May 17, 1893		State Univ. Iowa Exped.	5♂3♀ Numerous	19975 Mus. S.U.I.	From millepores.
Florida:			*Feet*								
Off Biscayne Bay			16-34			May 29, 1912		P. Bartsch	1♀	60907	
			Fathoms								
Off Key West			(1)			June 26, 1893	46	State Univ. Iowa Exped.	1♂	Mus. S.U.I.	
Northwest of Tortugas	25 04 30	82 59 15	26	fne. wh. S. brk. Sh.		Mar. 19, 1885	26	*Albatross*	1♂	19894	
Tortugas	Due S. of buoy E. side of channel.		37	Sh. S		June 10, 1925	207	*Dohrn*, W. L. Schmitt.	1♂	60767	Gift of Carnegie Institution.
Do	8 miles S. of red buoy No. 2.		25			June 11, 1925	217	do	1 y	61115	Do.
West of Marco	26 00 00	82 57 30	24	fne. S. bk. Sp. brk. Sh.		Mar. 19, 1885	2413	*Albatross*	1♀	19885	
Southwest of Cape San Blas.			25-27			Feb. 7, 1885	2369-2374	do	1♀	60766	
Mexico:											
Off Cape Catoche	22 18 00	87 04 00	24	wh. R. Co		Jan. 30, 1885	2365	do	2♂ 1♀	19884	
Do	22 08 30	86 53 30	25	Co. S		do	2362	do	1♂ 1♀	19882	
Do	22 07 30	87 06 00	21	wh. R. Co		do	2363	do	1♀	19883	
Cuba: Reef Lavesos Italienos, opposite Cayo Lavesos.			2-3	Co. S. R		June 2, 1914	14	*Tomas Barrera*, Henderson and Bartsch.	1♂	48527	
Jamaica: Montego Bay	Off point					June 28, 1910		E. A. Andrews	3♂	42946	
Porto Rico:											
Mayaguez Harbor						Jan. 20, 1899		*Fish Hawk*	1♂ 2♀	24285	
Do	Red buoy entrance, ESE., ½ mile.		25-30	S. M. Sh	25	do	6062	do	1♂	24289	
					°F.						
Do	Customhouse, NE. ¾ E, 4½ miles.		4-6	Co	68	do	6065	do	1♂ 2♀	24292	
					°C.						
Off Boca Prieta	Fanduco Cay, E., 1¾ mile.		8.5	Co. S	25	Jan. 25, 1899	6075	do	1♂	24291	
Playa de Ponce Reef						Feb. 1, 1899		do	1♂	24293	

Off Humacao	Hucares, NW ¼ W., 2¼ miles.		9.5	Co	26	Feb. 8, 1899	6099	do	1 ♀	24286	
Do	Humacao, N. ½ W., 3 miles.		12.5	Co	26.4	do	6098	do	1 ♂ 1 ♀	24287	
Off Vieques Island	Pt. Mula lighthouse, SSW. ⅜ W., 5¾ miles.		14	Co. S	25.6	do	6085	do	1 ♂	24288	
Virgin Islands:											
Off St. Thomas	Sail Rock, NW. ½ W., 4 miles		20	Co	25	Feb. 6, 1899	6080	do	1 ♂	24290	
Virgin Islands				From piles		1915		C. R. Shoemaker	1 ♂ 1 ♀	60768	Gift of Carnegie Institution.
Caribbean Sea: Old Providence Island.						Apr. 4–9, 1884		*Albatross*	1 ♀	19886	
	Lat. S.				°*F.*						
Brazil: Off Cape St. Roque	6 59 30	34 47 00	20	brk. Sh	79	Dec. 16, 1887	2758	do	2 ♀	22020	

[1] Shallow.

Material examined of Tetraxanthus bidentatus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			°*F.*						
Off Cape Lookout, N. C	34 38 30	75 33 30	124	S. R		Oct. 18, 1885	2602	*Albatross*	1 ♀	18248	
Off Fowey, Fla			75–100					J. B. Henderson	1 y ♀	60827	
Off Key West, Fla			75					do	1 ♂	53770	
Off Sand Key, Fla	Sand Key Light bearing W. about 18 miles.		15			June 24, 1893	42	Biol. Exped. State Univ. Iowa.	1 ♀	Mus. S.U.I.	
S. of Cape San Blas, Fla	28 36 00	85 33 30	111	gy. M		Mar. 14, 1885	2402	*Albatross*	10 ♂ 8 ♀	9759	
Off Grenada			92	Co. brk. Sh	58.5	1878–79	253	U. S. C. S. Str. *Blake*	1 ♂	2904, M.C.Z.	Type.
	Lat. S.										
Off Cape Frio, Brazil	23 08 00	41 34 00	59	bu. M	57.1	Dec. 30, 1887	2762	*Albatross*	2 ♂	22015	

Description.—A rough species. Carapace broad; regions plainly marked, granulate except in the depressions, and covered with a short, thin pile. All the spines, spiny tips and spinules, however small, are conspicuously white in preserved specimens, in contrast with the darker color of the body. Hepatic region spinulous. Antero-lateral spines five, including a very small one at the orbit; second to fifth spines set in stouter, denticulate bases; third and fourth largest, subequal, curved, the second and fifth subequal, second curved, first and fifth straight. Orbital margin spinulous; on the upper margin the spinules diminish on the inner half to granules; they are somewhat larger on the lower margin, interrupted on the outer half by a broad, pointed sinus, and extending inward to a large, triangular, granulated tooth. An oblique row of a few white spinules on the eyestalk at inner base of eye. Frontal lobes slightly arcuate; edge finely denticulate, separated by a very small median notch but not sharply divided from the outer angle which is subrectangular, not advanced and edged with two minute white granules. Endostomial ridge obscure.

Chelipeds rough and bristling; two long spines above merus; carpus heavily spined, the longest spine at inner angle; one equally long below it in minor cheliped; minor palm spinous on the entire outer surface; on the major palm the spines change to coarse granules below and distad. Fingers deeply grooved, especially the minor pair, where the ridges are armed with sharp granules. Legs rough except on those flat surfaces of the dilated merus which are subject to friction; long-hairy on the lower surface, and also on the upper surface of the last three articles; propodus dilated; dactylus long, slender, curved, with a light brown, horny tip of needle-like sharpness.

Third, fourth, and fifth segments of male abdomen fused.

Measurements.—Male (7806), length of carapace 7, width of same 10, fronto-orbital width 7, width of front 3.6 mm.

Range.—From Florida Keys to St. Croix, West Indies; 80 to 250 fathoms.

Material examined.—Off Key West, Florida; about 80 fathoms, Biol. Exped. State Univ. of Iowa, 1893; 1 male (Mus. S.U.I.).

Off Santiago, Cuba; February 27, 1884; *Albatross:* Lat. 19° 56′ 44″ N.; long. 75° 50′ 49″ W.; 202 fathoms; hrd. crs. S.; station 2131; 2 males (7806). Lat. 19° 55′ 58″ N.; long. 75° 47′ 07″ W.; 250 fathoms; hrd. Co.; station 2135; 2 males (7812).

MICROPANOPE CRISTIMANUS Stimpson

Plate 183, Figures 4–6

Micropanope cristimana STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 107 [17] (type-locality, Cape St. Lucas; type not extant).

Diagnosis.—Carapace with transverse ridges. First and second lateral teeth completely fused, posterior tooth well marked. Frontal lobes triangular.

Description.—Carapace convex, smooth posteriorly, and with a transverse ridge, interrupted at the middle, on the protogastric, epigastric, and frontal regions, and one on each hepatic and epibranchial region. Front convex, strongly projecting, the two lobes triangular, separated by a large V-shaped sinus from which arises a deep furrow extending backward to the gastric region; each lobe with tip rounded, outer margin very oblique, concave, outer tooth small, separated from orbital tooth by a very obtuse angle. Superior orbital sinuses not far apart. The normal second tooth of the lateral margin is completely absorbed in the first or orbital tooth. This and the other three teeth are strong, the last two with a median ridge, the last (or true fifth) tooth larger than common in *Micropanope*. Outer hiatus of orbit almost obsolete; inferior inner tooth of orbit prominent, subconical, tip narrow, subacute.

Chelipeds large, smooth, polished; carpus with a broad depressed tooth at inner angle, and a short crest, bordering a depressed area, at outer angle; hands short, broad and compressed above, where a smooth crest is formed; posterior outer extremity of hand protuberant and more or less bituberculate. Fingers black with white tips; those of the smaller chela much deflexed and longer than the palm; color of immovable fingers extended on palm. Ambulatory legs rather compressed and faintly crested above; dactyli pubescent.

Measurements.—Male type, length of carapace 5.6 mm. (.22 inch), width of same 6.9 mm. (.27 inch). Male (46080), total length of carapace 5.3 mm., width of same 7, fronto-orbital width 4.6, width of front 2.4 mm.

Range.—West coast of Mexico.

Material examined.—Manzanillo, State of Colima; on drifted pile; July 17, 1913; C. R. Orcutt; 1 male, 2 females (1 ovigerous) (46080).

Genus RHITHROPANOPEUS Rathbun

Rhithropanopeus RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273; type, *R. harrisii* (Gould).

Allied to *Panopeus*. Carapace subquadrilateral, approaching the Goneplacidae in form, dorsal ridges prominent, postero-lateral margins not markedly convergent. Front less than a third as wide as carapace, horizontal, margin thick, double-edged. Upper emarginations of orbit obsolescent. Eyes filling orbits. Chelipeds very unequal, heavy; major dactylus without large basal tooth. Third or coalesced segment of male abdomen not reaching coxae of last pair of legs.

Contains only one species.

RHITHROPANOPEUS HARRISII (Gould)

Plate 183, Figures 7 and 8

Pilumnus harrisii GOULD, Rept. Invert. Massachusetts, 1841, p. 326 (type-localities, Cambridge marshes and clinging to floating seaweed in Charles River; types not extant).

Panopeus wurdemannii GIBBES, Proc. Amer. Assoc. Adv. Sci., vol. 3, 1850, p. 176 [12] (type-locality, Enterprize, Fla. (cotypes, Cat. No. 16157, U.S.N.M., and in Charleston Mus.).—LEIDY, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 3, 1855, p. 17. Not *P. wurdemannii* Benedict and Rathbun, 1891.

Panopeus harrisii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 55 [9].—BENEDICT and RATHBUN, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 378, pl. 21, fig. 2; pl. 24, fig. 16.

Rhithropanopeus harrisii RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 273.

Diagnosis.—Front truncate; dorsal ridges prominent. First two antero-lateral teeth fused, last three dentiform. Legs slender.

Description.—Two transverse lines of granules on each protogastric region, one on mesogastric region interrupted at middle, two branchial, one of which is opposite the tip of the posterior lateral tooth. Front little produced, edge nearly straight, channeled, upper and lower margins granulate; median notch triangular. Lateral teeth not prominent; a sinus in coalesced tooth; third and fourth teeth pointing obliquely forward; last tooth smaller. Outer orbital hiatus a nearly closed fissure opening on a broad shallow notch. No subhepatic tubercle.

In the old the chelipeds are nearly smooth. In small specimens the wrist is rough with lines and bunches of granules, distal groove deep; two granulate ridges on upper margin of palm; upper edge of fingers granulate. Fingers slender, prehensile edges evenly dentate. Legs long, slender, compressed.

The third segment of the male abdomen does not touch the coxae of the last pair of legs; terminal segment subquadrate.

Color.—Brownish, paler below; fingers white. Yellow with red spots (18501).

Measurements.—Male (3149), length of carapace 14.3, width of same 19.4 mm.

Habitat.—In brackish or fresh water. Local.

Range.—From Miramichi estuary, New Brunswick (Connolly), to Mexico.

Material examined.—

MAINE.—Sheepscot; from among oysters growing in Sheepscot River; November 5, 1902; W. C. Kendall; 8 specimens (28783).

CONNECTICUT.—East side New Haven Harbor; September, 1892; James E. Benedict; 20 specimens (18194).

NEW YORK.—Creek near West Point, Hudson River; Dr. E. A. Mearns, U. S. Army; 6 females, 1 young (19632).

MARYLAND.—Chester River, Kent County; September 3, 1910; W. W. Wallis; 13 males, 14 females (4 ovigerous), 20 young (56365).

Bloody Point Light, NNE. ¾ E.; North and Poplar Island, SE. by E. ¾ E.; lat. 38° 47′ 30″ N.; long. 76° 25′ 06″ W.; 20 fathoms; sft. bk. M.; April 25, 1916; station 8528, *Fish Hawk;* 1 male (56270).

Island Creek, Talbot County; July 26, 1911; C. R. Shoemaker and W. D. Appel; 3 males, 3 females, 14 young (56366).

Chesapeake Beach; August 26, 1927; W. L. Schmitt; 2 males, 4 females (2 ovigerous), 14 young (60825).

South of Chesapeake Beach; William Palmer; 6 specimens (54802). September 13, 1919; 1 male (53593).

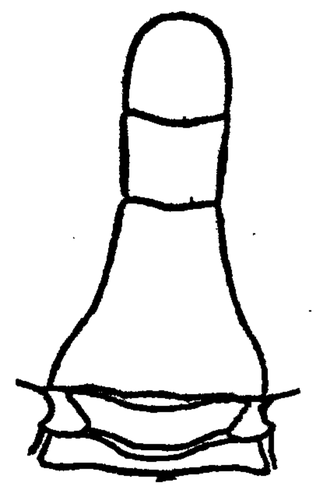

FIGURE 75.—RHITHROPANOPEUS HARRISII, MALE ABDOMEN, ENLARGED. AFTER BENEDICT AND RATHBUN

Plum Point; Around piles; August 15–24, 1912; William Palmer; 1 female (56372). July 14, 1914; C. R. Shoemaker; 5 young (56377). Plum Point Creek; July 4, 1912; Palmer and Weed; 1 male (44496).

St. George Island; July 6, 1896; H. M. Smith, U. S. Fish Commission; 1 specimen (20252).

Herring Creek near Piney Point; September 11, 1926; James E. Benedict, jr.; 10 males, 8 females (60279).

Potomac River; 5 males, 3 females (3176).

VIRGINIA.—Lower Machodoc Creek; James E. Benedict, jr.; June 25, 1917; 3 males, 7 females (1 ovigerous) (56368). August 3, 1917; 11 males, 11 females, 29 young (56384).

West coast of Chesapeake Bay, Northumberland County; December 23, 1914; P. L. Boone; 3 males, 2 females (48851).

Rappahannock River; in stomach of *Lophodytes;* December 31, 1916; Biological Survey, U. S. Department of Agriculture; fragments of 2 specimens; returned to sender.

SOUTH CAROLINA.—Winyah Bay; *Fish Hawk:* Above brackish water; 1 male, 1 female (15682). December, 1890; 3 males, 3 females (15684), 1 young (15761). Half a mile N. of wharf on South Island; 4 fathoms; hrd. S.; temperature 48.5° F.; January 3, 1891; station 1639; 6 males, 1 female, 2 young (15691). From ½ mile N. to 400 yards E. of wharf on South Island; 4–5 fathoms; hrd. S. Sh.; temperature 49.5°–50° F.; Jan. 3, 1891; stations 1641–1642; 186 specimens (15695, 20250, 56264). Four hundred yards SSW. of wreck buoy; 5 fathoms; hrd. S.; temperature 50.5° F.; January 3, 1891; station 1643; 1 male (15693).

Clambank Creek; *Fish Hawk;* 1 male (26363).

Santee Club; in stomach of *Lophodytes;* December 31, 1909; Biological Survey, U. S. Department of Agriculture; 1 small; returned to sender.

FLORIDA.—Tributary of St. Johns River; fresh water; Benjamin Harrison; 2 males, 2 females (18501).

St. Johns River, opposite Palatka; January 25, 1897; W. C. Kendall; 1 male (21842).

St. Johns River, at Palatka; January 20, 1897; W. C. Kendall; 1 male, 4 females (22277).

St. Johns River, near Beecher Point; March 17, 1897; W. C. Kendall; 8 males, 9 females (22159).

Border of Lake Monroe; in holes in the rocks; Lewis R. Gibbes; 1 male, 1 female (16158), cotypes of *Panopeus wurdemannii* Gibbes.

Lake Monroe; in stomach of *Bufo;* Biological Survey, U. S. Department of Agriculture; fragments, returned to sender.

Enterprise; Lewis R. Gibbes; 2 males (16157), cotypes of *Panopeus wurdemannii* Gibbes.

Sanford; April 12, 1897; W. C. Kendall; 1 male (21843).

Indian River; February 18, 1880; R. E. Earll, U. S. Fish Commission; 11 males, 8 females (3149).

Shark Harbor Bay, Charlotte County; J. L. Madden; 1 female (60826).

MISSISSIPPI.—Grand Plains Bayou; April 19, 1897; B. W. Evermann, U. S. Fish Commission; 1 male (22262).

LOUISIANA.—Grand Isle; June 30, 1929; E. H. Behre; 2 males (1 covered with bryozoan) (63039).

MEXICO.—Vicinity of Pueblo Viejo, Vera Cruz, 2 kilometers S. of Tampico; May 23–31, 1910; Edward Palmer; 1 female (59915)

Genus TETRAXANTHUS Rathbun

Tetraxanthus RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898 p. 275; type, *T. bidentatus* (A. Milne Edwards).

Carapace subquadrate, convex, not areolate; orbit as wide as half the front; lateral teeth four including orbital angle; first and second small, third and fourth more or less dentiform, blunt. Palate with a ridge. Fingers long, compressed. Legs long and slender.

Known only from the Atlantic coast of middle America.

KEY TO THE SPECIES OF THE GENUS TETRAXANTHUS

A¹. Lateral projections of carapace shallow, not prominent., A broad lobe on inner margin of wrist ..... bidentatus, p. 458.

A². Third and fourth lateral teeth prominent. A blunt tooth at inner angle of wrist ..... rugosus, p. 459.

TETRAXANTHUS BIDENTATUS (A. Milne Edwards)

Plate 184

Xanthodes bidentatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 353, pl. 53, figs. 5–5*b* (type-locality, Grenada, 92 fathoms; type in M. C. Z.).

Tetraxanthus bidentatus RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 275.

Diagnosis.—Very convex. Lateral projections shallow. One lobe on inner margin of carpus of cheliped. Legs smooth.

Description.—Body covered with a short, thin down. Carapace smooth to the naked eye, microscopically granulate; very convex from front to back, much less so transversely. Gastric and hepatic regions feebly indicated. Margin of front slightly arcuate, nearly straight, divided by a small median emargination. Inner angles of orbit small, and though more elevated than the front, project scarcely at all laterally, superior fissures obsolescent, outer sinus broad and shallow; outer angle a small triangular tooth not prominent. Behind it on the antero-lateral margin are three other lobes or teeth, the second a small shallow lobe, the third an obtuse-angled tooth or lobe with short anterior and long, somewhat convex posterior margin which is nearly longitudinal; last tooth dentiform, short, elevated. Basal antennal article short and broad.

Chelipeds of male long, strong, unequal; a broad lobe on upper margin of merus and at inner angle of carpus. Manus elongate, increasing in width distally, margins a little convex. Fingers long, deflexed, with little or no gape, prehensile teeth uneven, a larger one at base of major dactyl, dark color not covering tips of fingers or base of immovable finger. Ambulatory legs slender, unarmed, pubescent toward extremities.

Color.—Fingers except extreme tips fresh-blood red, tips white. (Henderson.)

Measurements.—Male (9759), length of carapace 17.6, width of same 23.8, fronto-orbital width 14.6, width of front 7 mm.

Range.—North Carolina and Gulf of Mexico to Cape Frio, Brazil; 15 to 124 fathoms.

Material examined.—See table, page 453.

TETRAXANTHUS RUGOSUS, new species

Plate 185

Type-locality.—Off Sand Key, Florida, 120 fathoms; holotype, male, Cat. No. 60828, U.S.N.M.

Diagnosis.—Moderately convex. Third and fourth lateral teeth prominent. Two blunt teeth on inner margin of carpus of cheliped. Legs spinulous.

Description.—Narrower, more hexagonal and less convex than the preceding. Front bilobed, lobes little oblique. The rectangular tooth at inner upper angle of orbit projects sideways beyond the front. Of the four antero-lateral teeth (including the orbital) the second is placed close to the first, both together occupying much less of the margin than the third tooth. Third and fourth teeth large, triangular, prominent, tips tuberculiform, the posterior margin of the third tooth sinuous instead of convex. Posterior margin of carapace more concave than in *bidentatus*.

Chelipeds rough; merus short, upper edge tuberculate, outer surface broad, granulate, especially near the margins. Carpus coarsely and irregularly ridged, interspaces rough, inner angle with a thick blunt tooth and below it a smaller tooth. Propodus granulate and rugose, a double ridge and intervening sulcus on the upper surface, two faint longitudinal carinae on the outer surface of the minor manus. Fingers of major chela slightly gaping, teeth few and large, a strong tooth at base of dactyl; fingers of minor chela not gaping, teeth more numerous, small and low. Merus of ambulatory legs rough above; last two articles pubescent.

Color.—Fingers black, tips lighter, yellowish-brownish black.

Measurements.—Female holotype, length of carapace 8.7, width of same 11.4, fronto-orbital width 7.3, width of front 3.8 mm.

Range.—Florida Keys; West Indies.

Material examined.—Off Sand Key, Florida; 120 fathoms; *Eolis*, John B. Henderson; 1 male holotype (60828).

Off Sambo Key, Florida; 120 fathoms; *Eolis*, John B. Henderson; 1 male, 1 ovigerous female (60829).

South of Cuba; lat. 19° 56′ 06″ N., long. 75° 47′ 32″ W.; 254 fathoms; February 27, 1884; station 2134, *Albatross;* 1 immature female (7815).

Genus ECTAESTHESIUS Rathbun

Ectaesthesius RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 591; type, *E. bifrons* Rathbun.

Carapace smooth, wider than in *Trapezia* and sides more arcuate, bidentate, one tooth at lateral angle, the other further forward; postero-lateral margins converging. Regions not indicated. Front broad, slightly bilobed. Orbits shallow, entire; inner hiatus closed by union of lower orbital margin with front. Peduncular articles of antennae short; the penult article just reaches lower corner of front; the last article attains frontal margin. Palatal ridge partially developed, anteriorly obsolete. Antero-external angle of merus of outer maxillipeds laterally produced, antero-internal angle emarginate. Chelipeds of female unequal, smooth, not enlarged; arm short, margins entire; wrist unispinous; fingers elongate, acute. Legs short, last three articles setose; dactyli rather stout.

Contains only one species.

ECTAESTHESIUS BIFRONS Rathbun

Ectaesthesius bifrons RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 591, pl. 42, figs. 12–14 (type-locality, off Chatham Island, Galapagos Islands, 45 fathoms; type, Cat. No. 21586, U.S.N.M.).

Diagnosis.—Orbital hiatus closed. Sides of carapace bidentate. Fingers very long.

Description.—Carapace slightly convex in both directions, about three-fourths as long as wide, antero-lateral margins arcuate, postero-lateral sinuous, rapidly converging. Surface smooth, microscopic granulation near front and lateral teeth. Front nearly half width of carapace, slightly arcuate, almost imperceptibly bilobed, edge thin, retreating at outer angles; just behind and parallel to the margin is a sharp ridge slightly interrupted at middle. Orbit less than half as wide as front; upper margin oblique, outer angle not advanced. Margin between orbit and first lateral tooth crenulate. Tooth at lateral angle subacute, a little in front of middle of carapace; anterior tooth obtuse, about one-third distance from orbital angle to lateral tooth. Abdomen of mature female narrow; third, fourth, and fifth segments subequal in length as well as in width; sixth of same width but longer; seventh narrower, length and breadth subequal, extremity rounded.

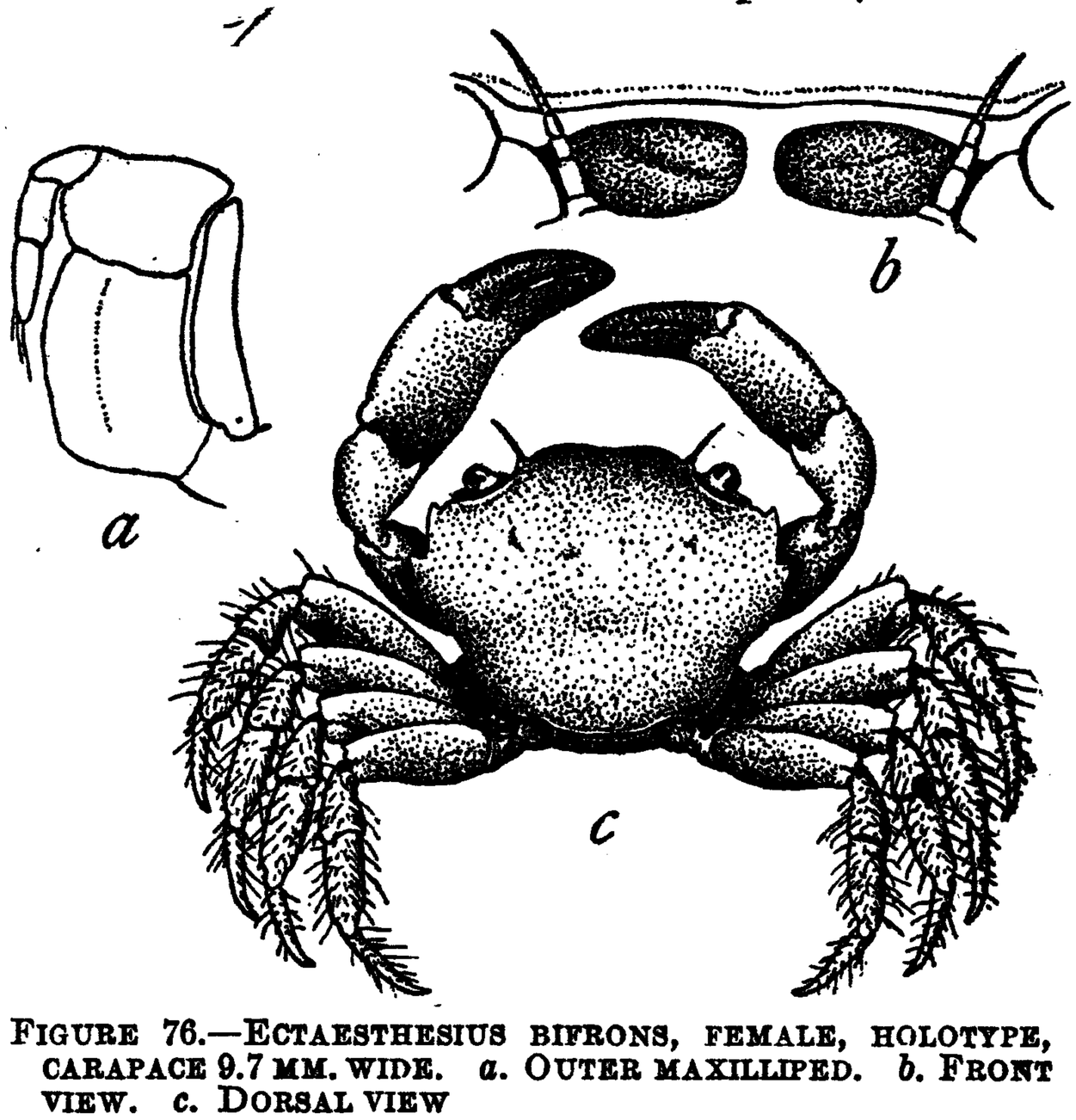

FIGURE 76.—ECTAESTHESIUS BIFRONS, FEMALE, HOLOTYPE, CARAPACE 9.7 MM. WIDE. *a*. OUTER MAXILLIPED. *b*. FRONT VIEW. *c*. DORSAL VIEW

Arm extending but little outside carapace, trigonal, widest near middle; carpal tooth large, spiniform. Hand with inner surface swollen toward proximal end; margins smooth, rounded; superior margin slightly convex, inferior sinuous, that of fixed finger concave. Dactylus longer than superior margin of palm. Fingers not gaping, a few lines of punctae; dactylus without teeth; larger fixed finger with one low tooth on basal half and two teeth and a few denticles on terminal half; in smaller chela, the teeth are all on terminal half. Legs as in *Trapezia;* dactyli nearly as long as propodi.

Measurements.—Ovigerous female, length of carapace 7, width of same 9.7, fronto-orbital width 7.2, width of front 4.4 mm.

Range.—Off Chatham Island, Galapagos Islands; lat. 0° 50′ 00″ S., long. 89° 36′ 00″ W.; 45 fathoms; gy. S.; temperature 74.1° F.; April 4, 1888; station 2809, *Albatross;* 1 ovigerous female, holotype (21586).

Genus CHLORODIELLA Rathbun

Chlorodius MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 399; type, *C. niger* (Forskål). Not *Clorodius* Leach in Desmarest, 1823.

Fucicola GISTEL, Naturg. Thierreichs, 1848, p. VIII (part); not *Fucicola* Menke, 1844, nudibranch.

Chlorodiella RATHBUN, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 157; substituted for *Chlorodius* Milne Edwards.

Carapace depressed, hexagonal; regions partially or not at all demarcated; surface smooth and almost unbroken except sometimes anteriorly and on branchio-hepatic region near antero-lateral border, where there may be some broad transverse wrinkles. Frōnto-orbital border varying from about two-thirds to more than three-fourths the width of carapace. Front broad, almost straight, emarginate in middle, its outer angles separated from the supra-orbital margin by a groove. Antero-lateral borders cut into four lobes or teeth, exclusive of orbital angle. Orbit with two suture lines above and one below outer angle; eyes on short thick stalks. Basal antennal article large, extending upwards and outwards into the orbital gap. Merus of external maxillipeds with anterior margin almost transverse. Chelipeds unequal, more than twice as long as carapace; fingers stout, deeply hollowed at tip. Legs spinulous. The third to fifth somites of the male abdomen are fused.

Inhabits the Indo-Pacific region, the Atlantic coast of middle America; also west Africa.

Contains only one American species.[52]

CHLORODIELLA LONGIMANA (Milne Edwards)

Plate 186

Chlorodius longimanus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 401 (type-locality, Porto Rico; type in Paris Mus.).

Chlorodiella longimanus RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 14.

Chlorodiella longimana RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 20, part 2 (1901), p. 36.

Diagnosis.—Transverse folds on carapace. Front double-edged. Chelipeds extremely long and heavy. A sinus on front edge of merus of outer maxilliped.

Description.—Surface punctate and microscopically granulate. Gastric region faintly indicated. A smooth transverse ridge and a deep furrow on epigastric, protogastric, hepatic and anterior branchial regions. The first three lateral teeth blunt, the last two longer and acute or subacute; a tubercle above the fourth tooth. Front with a double edge, the upper one truncate, feebly notched at middle, the

[52] The identity of "*Chlorodius caribaeus*" Desbonne (Desbonne and Schramm, Crust. Guadeloupe, 1867, p. 31) has not been determined.

Chlorodius imbricatus Spence Bate (Proc. Zool. Soc. London, 1864, p. 664; in Lord's Naturalist in Vancouver Island and British Columbia, vol. 2, 1866, p. 270), "Esquimalt Harbor, 8 fathoms," does not belong to the fauna of British Columbia and was introduced along with others into Bate's report through an error in locality. See S. I. Smith, Rept. Geol. Sur. Canada, 1878–1879 (1880), p. 209 B, footnote.

lower edge with a deeper notch and somewhat sinuous lobes; outer corners tuberculiform, turned down to meet the basal antennal segment. The anterior margin of the outer maxillipeds has a well marked sinus at its middle.

Chelipeds very long. Two-thirds of the arm projects beyond the carapace, its anterior margin armed with four or five teeth or spines. Wrist smooth, bearing a spine or tubercle at inner angle. Palm long and smooth, fingers stout and black, the color of the fixed finger continued on palm; prehensile edges with two or three low, rounded, inconspicuous teeth. Legs spinulous above and hairy.

Color.—Rather uniform pinkish red. Some very inconspicuous tiny white dots on carapace and small irregular brownish spots on top of chelae.

Measurements.—Male (57992), length of carapace 12.8, width of same 20, fronto-orbital width 12.9, frontal width 6 mm.

Range.—Florida Reefs; Bahamas; West Indies; Curaçao; St. Thomas Island, west Africa (Osorio).

Material examined.—

FLORIDA.—Miami; G. M. Gray; 1 male (42138).

Cape Florida; 1884; Dr. Edward Palmer; 1 male (9304), 10 specimens (9306).

Biscayne Bay; 1901; James E. Benedict; 1 male (25650).

Rodriguez Creek; 1884; Dr. Edward Palmer; 1 male, 1 female (9305).

Hawk Channel, 4¼ miles W. by N. of Elbow Reef beacon; 2¾ fathoms; barry, S.; temperature 20.5° C.; February 19, 1903; station 7467, *Fish Hawk;* 1 ovigerous female (53771).

Key West; 1885; Henry Hemphill; 4 males, 2 females (9303).

Bird Key reef, Tortugas; 1924; W. L. Schmitt; gift of Carnegie Institution: July 16; 2 males (60860). Middle section; July 26; 1 male (60724). July 28; Bender collector; 1 female (60861). North end of Bird Key reef, "Channel reef;" August 12; 3 males (60862).

BAHAMAS.—Andros Bank; in sponge; Frederick Stearns; specimen returned to sender.

WEST INDIES.—Jamaica; P. W. Jarvis; specimens returned to sender.

Porto Rico: Type specimens (Paris Mus.). 1899; *Fish Hawk:* Mayaguez, January 20, 1 young female (24300); Ponce, February 1, 1 specimen (24301); Arroyo, on lighthouse reef, February 3, 1 male (24302). San Juan; G. M. Gray; specimen returned to sender.

Culebra: Ensenada Honda; February 9–11, 1899; *Fish Hawk;* 9 males, 5 females (24303).

St. Thomas; January 17–24, 1884; *Albatross;* 1 male, 1 female (8935).

St. Croix; specimens in Copenhagen Museum.

Martinique; specimens in Paris Museum.

Barbados: Barbados-Antigua Expedition, State University of Iowa, 1918: Okra Reef; May 13; 2 males, 2 females (Mus. S. U. I.). One male S. of station 19, off Needham Point; 84 fathoms; rky.; station 20; 1 male (Mus. S. U. I.). Barbados: May 15, 3 males, 7 females (1 ovigerous), 2 young (Mus. S. U. I.); in coral heads, 1 male (Mus. S. U. I.), 2 males, 3 females (57992).

CURACAO.—1884; *Albatross;* 1 female (17815).

Genus XANTHIAS Rathbun

Xanthodes Dana, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, May, 1852, p. 73; type, *X. granosomanus* Dana, 1852=*Xantho lamarckii* Milne Edwards, 1834. Name preoccupied by Guénee, Jan., 1852, for a genus of Lepidoptera.

Xanthias Rathbun (part), Proc. Biol. Soc. Washington, vol. 11, 1897, p. 165; substituted for *Xanthodes*.—Odhner, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 84.

Carapace thick, somewhat depressed posteriorly, inclined downward anteriorly, moderately broad, suboval, regions delimited and to a certain extent areolated in anterior two-thirds. Fronto-orbital border half or more than half greatest width of carapace; front strongly produced, convex, bilobed, outer angles not set off from orbital border by an emargination. Antero-lateral margin cut into four lobes or teeth besides the orbital angle. The three grooves of the orbital margin either fairly distinct or quite indistinct. Basal antennal article broad and very short; the flagellum, about as long as the greatest width of the orbit, is lodged in the orbital hiatus.

Chelipeds equal or nearly so in both sexes; hands stout; fingers slender, little curved, tips acute. Legs stoutish, usually more or less hairy and granulate or rough along upper border. Abdomen of male with third to fifth segments entirely or partially fused.

As restricted by Odhner this genus inhabits chiefly the Indo-Pacific region. Only one American species belongs here.

XANTHIAS INORNATUS (Rathbun), new combination

Plate 187

Actaea inornata Rathbun, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 583, pl. 42, fig. 3 (type-locality, off Cape St. Roque, Brazil, 20 fathoms, station 2758 [*Albatross*]; type, Cat. No. 21579, U. S. N. M.).

Xanthias vestitus Rathbun, Proc. Biol. Soc. Washington, vol. 35, 1922, p. 103 (type-locality, Spanish Harbor, Curaçao; type in Amsterdam Museum); Bijdragen tot de Dierkunde, Amsterdam, vol. 23, 1924, p. 15, pl. 3, figs. 4–6.

Diagnosis.—Size small. Covered with short felt. Carapace granulate near margins. Wrist and hand granulate. Fingers light colored.

Description.—Entire animal except extremities of fingers covered with a very short feltlike pubescence which conceals granules and other inequalities and obscures the antero-lateral teeth. Carapace

very flat posteriorly, anterior third deflexed. When the felt is removed the regions are fairly well indicated, the urogastric region is depressed, the grooves forming an H in middle of carapace are especially deep. Fine granules are scattered sparsely on the antero-lateral, postero-lateral and posterior portions. Antero-lateral teeth shallow, blunt; first, or E of Dana, long and low, second and third subequal, fourth smallest. Carapace very nearly as wide at last tooth as at penultimate. Fronto-orbital distance a little over half as great as width of carapace; front, between antennae, less than one third the carapace width, separated from orbital border by a deep groove but without emargination; anterior margin of front bilobed, median notch V shaped.

Carpus and manus of subequal chelipeds covered with granules; fingers light colored; propodal finger horizontal except at tip where it crosses the dactylus, gape narrow. Ambulatory legs smooth.

Measurements.—Female holotype, length of carapace 4.3, width 5.6, fronto-orbital width 3.1, width of front 1.6 mm. Male holotype of *vestitus*, length of carapace 4.6, width 6.4 mm.; female paratype, length 5.2, width 7.6 mm.

Range.—Curaçao; Cape St. Roque, Brazil.

Material examined.—Spanish Port, Curaçao; 1920; C. J. van der Horst collector: April 16; 2 males, 2 females (57002), 4 females (Amsterdam Mus.). May 6; 3 males (1 is holotype of *X. vestitus*), 4 females (Amsterdam Mus.).

Off Cape St. Roque, Brazil, lat. 6° 59′ 30″ S., long. 34° 47′ 00″ W., 20 fathoms, brk. Sh., temperature 79° F., December 16, 1887, *Albatross;* 1 female, holotype (21579).

Genus PARAXANTHIAS Odhner (part)

Liomera (part) Dana, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 124.
Xanthodes (part) Dana, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, 1852, p. 73.
Xanthias (part) Rathbun, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 165.
Paraxanthias Odhner (part), Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 85; type, *P. notatus* (Dana).

Carapace broad, suboval or subhexagonal, convex in both directions, regions well delimited. Antero-lateral margins thick, dentate, with four divisions not counting the orbital angle which may be confluent with the first lobe. Frontal lobes obliquely cut, with outer angles produced and separated by an emargination from the upper orbital margin. Basal antennal article short and broad, merely touching front; flagellum lodged in orbital hiatus. Anterior border of merus of outer maxilliped a little oblique. Chelae distinctly unequal, both stout; fingers rather short, the movable one strongly curved. Male abdomen with third to fifth segments fused.

Odhner divides the genus *Xanthias* according to the characters of front and chelae. He groups under *Paraxanthias* the species *notatus* (Dana), *pachydactylus* (A. Milne Edwards), *elegans* (Stimpson), *taylori* (Stimpson), all of which have areolated, subhexagonal carapaces, strong lateral teeth and stout minor chelae, together with *dispar* (Stimpson), *longimana* (A. Milne Edwards) and *alcocki* (Calman), which have almost smooth, barrel-like carapaces, only slight traces of lateral marginal divisions and very narrow, slender minor chelae; and also *parvus* (Borradaile), which is intermediate between these two subgroups.

I do not believe that any useful purpose is subserved by placing the species of the two groups together, and because the type species of the genus *Liomera* has been transferred to the genus *Carpilodes*, I am obliged to make a new genus for the species *dispar* and *longimana*. (See below.) Perhaps *parvus* should be placed there also. The species *alcocki* should remain in the genus *Lioxanthodes*, the lateral lobes of its front not being separated from the inner supra-orbital angles.

KEY TO THE AMERICAN SPECIES OF THE GENUS PARAXANTHIAS

A¹. Manus nodulous.
  B¹. Each half of frontal margin bituberculate. Legs densely hairy. **taylori**, p. 466.
  B². Each half of frontal margin slightly arcuate except for a small tooth at outer angle. Legs sparsely hairy---------- **insculptus**, p. 468.
A². Manus not nodulous. Roughness inconspicuous---------- **sulcatus**, p. 469.

PARAXANTHIAS TAYLORI (Stimpson)

Plate 188; Plate 189, Figure 1

Xanthodes taylori STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1861, p. 208 [80], pl. 3, fig. 3 (type-locality, Monterey, California; type not extant).
Xanthias taylori HOLMES, Occas. Papers California Acad. Sci., vol. 7, 1900, p. 65.—SCHMITT, Univ. California Publ. Zool., vol. 23, 1921, p. 246, text-fig. 147, pl. 37, fig. 8, and synonymy.
Paraxanthias taylori ODHNER, Göteborg's K. Vet. Handl., Fjärde Följden, vol. 29, No. 1, 1925, p. 85.

Diagnosis.—Carapace subhexagonal, deeply areolated; antero-lateral teeth strong. Carpus and manus with prominent smooth tubercles.

Description.—Carapace flat behind, in front strongly convex longitudinally but nearly plane transversely. Areolets anteriorly embossed. Lobes of front separated by a wide rounded median notch and furnished with a rounded tooth at inner and outer angles, between which are several tubercles; above the front a transverse crenulated ridge; inner orbital angle prominent, separated by a deep notch from outer angle of front; upper orbital margin with a rounded tooth which is bounded on either side by a deep sulcus; postorbital tooth small and continuous posteriorly with a rounded protuberance;

the latter separated by a smooth sulcus from a subconical tubercle; three posterior teeth on antero-lateral margin prominent, the last two curved forward, the first obtuse and generally more or less bifid; from it a row of two or three tubercles extends forward below the margin; usually there is a small tooth behind the one at antero-lateral angle.

Chelipeds stout, more or less unequal; carpus covered with prominent, rounded, smooth, glossy, rose-colored tubercles. Hand oblong, longer than wide, upper and outer surface covered with tubercles like those on carpus, arranged in seven or eight longitudinal rows; fingers stout, gaping in major chela, almost meeting in smaller.

Color.—Uniform dark red, lighter below; fingers black, the black not extending back upon hand.

Measurements.—Ovigerous female (23920), total length of carapace 25.2, width 42 mm.

Range.—Monterey Bay, California, to Magdalena Bay, Lower California. Beach to 55 fathoms. Abundant under stones between tides and also in kelp holdfasts from deeper water.

Material examined.—

CALIFORNIA.—Monterey Bay; under rocks, low tide mark to mean tide; Harold Heath; 1 male (22871).

Monterey; Henry Hemphill; 1 female (3290).

Pacific Grove: John C. Brown; 5 specimens (23920). Ida S. Oldroyd; 1918; 1 male, 5 females (54011).

Venice breakwater; Venice Marine Biological Station: 1 female (45580). October 29, 1913; P. S. Barnhart, *Anton Dohrn;* 2 males (50191); 1 male (50292).

Point Vincent; from rocks; 1918; H. N. Lowe; 10 specimens (51125).

San Pedro; E. P. Chace: December 15, 1918; 1 male, 1 female (54000). May 4, 1919; 1 female, 1 young (53904).

San Pedro; *Anton Dohrn*, Venice Marine Biological Station: Foot of breakwater, February 21, 1913; 1 male (50192). Portuguese Bend; littoral; June 26, 1914; 1 male, 1 female (50196).

San Pedro; H. N. Lowe; 1 female (19733).

Long Beach; H. N. Lowe; 3 males, 2 females (50546).

Seal Beach, south of Long Beach; March 2, 1919; E. P. and E. M. Chace; 2 young (53999).

Laguna Beach; W. A. Hilton; 1 young (50594); 1 male (48992).

Catalina Harbor, Santa Catalina Island; W. H. Dall: 40 to 60 fathoms; 1 young (4279). 1874; 30 to 40 fathoms; sandy mud; 2 females (14749). 1874; beach; 6 males, 2 females (14750).

Santa Catalina Island; *Anton Dohrn*, Venice Marine Biological Station: Catalina Harbor; April 1, 1915; 1 male (50293). West shore, Catalina Harbor; December 28, 1912; 1 male, 3 females (50193).

Avalon Bay; October 22, 1910; P. S. Barnhart; 2 young (50198). Isthmus; December 27, 1912; 1 young (50195). Isthmus Harbor; November 27, 1913; 27 males, 16 females (50199).

San Nicholas Island; H. N. Lowe; 5 males, 1 female (32973).

San Clemente Island; January, 1899; H. N. Lowe; 1 female (23060).

La Jolla: March 6, 1898; *Albatross;* 1 female (21780). From kelp holdfast on beach; August 18, 1918; W. L. Schmitt; 3 young (53981). Tide pools; September 22, 1918; W. L. Schmitt; 1 young (53980).

San Diego: Henry Hemphill; 8 males, 12 females (17535). C. R. Orcutt; 1 male, 1 female (17303).

Southern California; 1874; W. H. Dall; 20 males, 12 females, 11 young (14751).

Southern California; *Anton Dohrn,* Venice Marine Biological Station: 1 male (50194), 1 female (50197). February 19, 1913; 4 males, 5 females (50189). March 13, 1913; 10 males, 8 females (50190).

Off southern California; *Albatross;* 1 male (18178).

LOWER CALIFORNIA.—Cortez Bank; lat. 32° 23′ 30″ N.; long. 119° 02′ 15″ W.; 55 fathoms; gray sand; temperature 53.1° F.; January 16, 1889; 1 young male (17396).

PARAXANTHIAS INSCULPTUS (Stimpson), new combination

Plate 189, Figure 4

Xanthodes insculpta STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 105 [15] (type-locality, Cape St. Lucas; type not extant).

Xanthias insculptus RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 271.

Pilumnoides pusillus RATHBUN, Proc. Washington Acad. Sci., vol. 4, 1902. p. 281, pl. 12, figs. 9 and 10 (type-locality, Tagus Cove, Albemarle Island; cotype, Cat. No. 24832, U.S.N.M.).—BOONE, Zoologica, vol. 8, 1927, p. 215, text-fig. 78.

Xanthias insculpta RATHBUN, Zoologica, vol. 5, 1924, p. 157, text-fig. 38.—BOONE, Zoologica, vol. 8, 1927, p. 207, figs. 74 A and 74 B (megalops).

Diagnosis.—Carapace areolate, chelipeds nodulous. Palm with two longitudinal ridges.

Description.—Carapace naked, slightly convex, somewhat lobulate, the protogastric region divided in two by a longitudinal furrow, median furrow also deep, the area adjacent to the antero-lateral margin broken up into four or five lobules; entire surface very finely granulate. Margin of frontal lobes slightly convex except for a squarish tooth at outer angle. Orbital margin with two shallow V-shaped fissures above and one below outer angle.

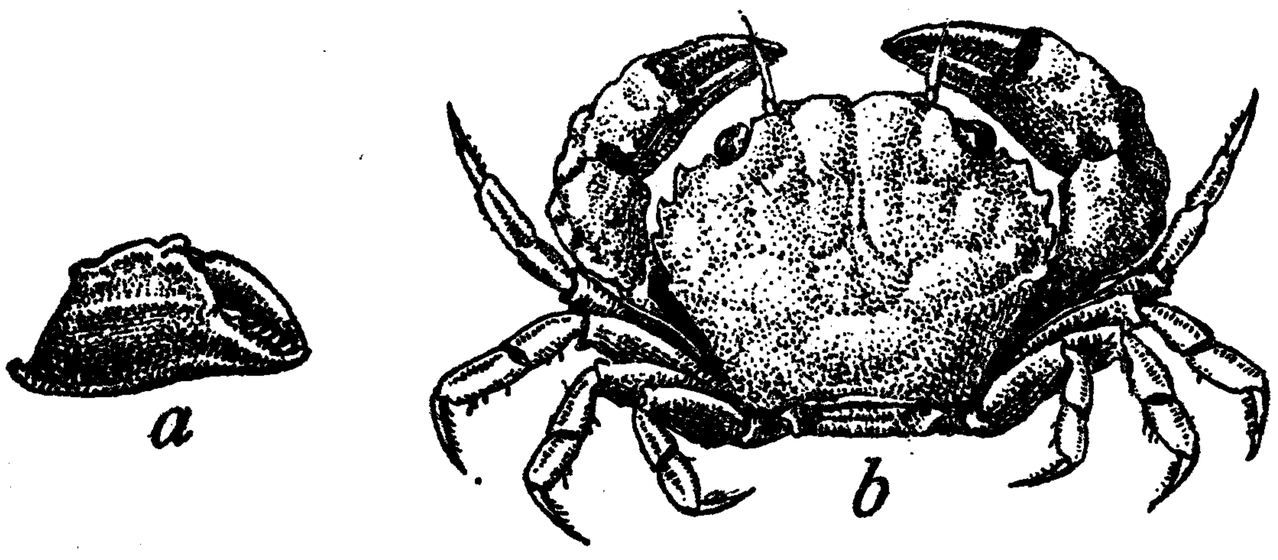

FIGURE 77.—PARAXANTHIAS INSCULPTUS, MALE (24832), CARAPACE 3 MM. WIDE. *a*. CHELA. *b*. DORSAL VIEW OF CRAB

Antero-lateral border distinctly marked, almost limbed, and furnished with five teeth, including the orbital tooth which is small and little prominent; second, third, and fourth teeth subequal, fifth much smaller. From it a crest extends obliquely inward and backward on carapace.

Chelipeds not very unequal, covered with large tubercles or nodules, five or six on the carpus, nine or ten on the manus. A granulated longitudinal ridge on outer surface of manus; immovable finger with two carinae, the lower of which extends back on the palm. Dactylus with a deep superior furrow. The fingers of the larger cheliped when closed leave a small hiatus at base, those of the smaller cheliped either have a smaller hiatus or fit tight together. Legs sparsely hairy.

Measurements.—Male, type of *insculpta*, length 0.12 inches (3 mm.), width 0.17 inches (4.3 mm.). Male (57145), length 3, width 4 mm. Male, type of *pusillus*, a postlarval stage, length 2.4, width 3 mm. Miss Boone gives for *insculpta*, length 12, width 14 mm.; this proportion is impossible and is not borne out by her Figure 74 A.

Range.—From Cape St. Lucas, Lower California, Mexico, to the Galapagos Islands.

Material examined.—Galapagos Islands:

Reef north of Tagus Hill, Tagus Cove, Albemarle Island; March 16, 1899; Hopkins Stanford Galapagos Expedition; 2 males, cotypes (Stanford Univ. and 24832, U.S.N.M.).

Off Eden Island, northwest of Indefatigable Island; April 1, 1923; Williams Galapagos Expedition; 1 male (N. Y. Zool. Soc.), 1 young (57745).

PARAXANTHIAS SULCATUS (Faxon), new combination

Plate 189, Figures 2 and 3

Xanthodes sulcatus FAXON, Bull. Mus. Comp. Zoöl., vol. 24, 1893, p. 152 (type-locality, off Panama, 153 fathoms, station 3391; type, the measured male, M. C. Z.); Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 17, pl. 3, fig. 2, 2*a*.

Xanthias sulcatus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 271.

Diagnosis.—Carapace suboval. Lateral teeth very small. Granulation and tuberculation inconspicuous. Legs slender.

Description.—Carapace very convex from before backward, granulated, granulation coarsest on lower surface and near borders of upper surface. Deeply impressed grooves separate the gastric from the branchial regions, and the mesogastric from the lateral gastric lobes. The median groove which extends from the mesogastric region to the front is crossed a short distance behind the frontal margin by a transverse groove, which meets on each side another groove running parallel to the upper margin of the orbit; in this way there are marked off a pair of frontal and a pair of orbital areolets. Frontal

margin in general horizontal, its two lobes slightly convex, finely denticulate, a small triangular tooth at outer angle, separated from the upper orbital angle by a notch. Antero-lateral border of carapace armed with four small spines or teeth; no tooth at external orbital angle. Of the teeth the first is smallest, third largest, second and fourth of about equal size; margins of teeth denticulate.

Chelipeds short, unsymmetrical; merus granulated on outer face, spinulous on upper edge and grooved near articulation with carpus. Carpus granulated on outer side, and having a tooth at inner angle. Major propodus inflated, granular along upper margin and at proximal end of outer face where some of the granules are enlarged and tubercular. Minor propodus with subparallel margin, rough all over the outer face. Meri of ambulatory legs finely roughened.

Measurements.—Male type, length of carapace 8, width 11, length of large chela 10, width of same 5 mm. (Faxon). Female (20053), length of carapace 7.6, width 11.2, fronto-orbital width 6.6, frontal width 3.6 mm.

Range.—Off Panama, 153 to 182 fathoms.

Material examined.—Off Panama; 1891; *Albatross:*

Lat. 7° 33′ 40″ N., long. 79° 43′ 20″ W.; 153 fathoms; gn. M.; temperature 55.8° F.; March 9; station 3391; 1 male (type), 3 females (4483, M. C. Z.).

Lat. 7° 12′ 20″ N., long. 80° 55′ 00″ W.; 182 fathoms; bk. G. Sh.; temperature 54.1° F.; February 23; station 3355; 1 male, 2 females (20053).

Genus EUCRATODES A. Milne Edwards

Eucratodes A. Milne Edwards, Crust. Rég. Mex., 1880, p. 346; type, *E. agassizii* A. Milne Edwards; Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14.—Rathbun, Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 35.

Carapace oval, of moderate width, antero-lateral margins arcuate, feebly dentate, postero-lateral converging. Fronto-orbital width about two-thirds the greatest width of carapace. Frontal lobes entire. No upper fissures on orbital margin, a shallow emargination below. Basal article of antennae short, just touching a prolongation of front; the flagellum lies in the orbital hiatus. Antennules folded transversely. Buccal cavity broad; margin of epistome with two notches on each side; endostome without ridge. Merus of outer maxillipeds subquadrilateral, notched at inner angle for articulation of palpus. Chelipeds of moderate size and nearly equal; fingers pointed. Ambulatory legs slender, smooth; dactyli elongate. Third, fourth, and fifth segments of abdomen fused; third segment angular at sides, reaching coxae of fifth pair of feet.

Akin to *Metopocarcinus*. Contains only one species.

EUCRATODES AGASSIZII A. Milne Edwards

Plate 190

Eucratodes agassizii A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 347, pl. 61, fig. 1–1*e* (type-locality, 100 fathoms, west of Florida; type not located); Bull. Mus. Comp. Zoöl., vol. 8, 1880, p. 14, (type-locality corrected to 100 fathoms at lat. 21° 14′ N. [Yucatan Channel], collected by Stimpson).—RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 35.

Diagnosis.—Antero-lateral margins dentate. Front one-third as wide as carapace. Basal antennal segment touching prolongation of front. Dactyli of legs long and straight.

Description.—Carapace thick, very convex in an antero-posterior direction, slightly convex transversely; regions scarcely indicated except for the H-shaped depression at middle of carapace; surface smooth to naked eye, but under the lens it is punctate and obscurely granulate, except along antero-lateral margin, where the granules are plainly seen. Antero-lateral margin obscurely five-toothed, first or orbital tooth small; second rounded and separated from the first by a shallow sinus, as in species of *Eurypanopeus;* third larger, but little prominent; fourth not so wide but most prominent; fifth small. Front slightly bilobed, lobes separately convex; a short closed median fissure; margin thin. Lower surface of carapace coarsely granulate. The arm has a superior subterminal tooth, the wrist a blunt inner tooth. Surface of chelipeds similar to that of carapace; lower surface of palms coarsely granulate. Dactylus of larger hand with a large basal tooth. The brown color of the fixed finger covers only its distal half. The chela figured by Milne Edwards is the smaller of the two; the larger is more swollen. Ambulatory legs pubescent, margins hairy.

Color.—Pale yellow; fingers brown (A. Milne Edwards).

Measurements.—Male (24318), length of carapace 6.2, width of same 8.5, fronto-orbital width 5.5, width of front 2.8 mm. Young male (24319), length of carapace 3.3, width of same 4.2 mm.

Variations.—The type male is intermediate in size between the two above measured; it shows only three lateral teeth on the carapace, on account of the suppression of the second and fifth teeth shown in the largest specimen. The teeth of the young male (see above) are also undeveloped.

Range.—Porto Rico; Yucatan, Mexico.

Material examined.—Porto Rico; 1899; *Fish Hawk:* Off Aguadilla; Point de Borinquen lighthouse, NE. by N. ¾ N., 3¼ miles; 137 fathoms; S. M. Sh.; temperature 24° C.; January 18; station 6055; 1 male (24318). Mayaguez Harbor; Point del Algarrobo, E., 4⅝ miles; 161–172 fathoms; M. S.; temperature 23° C.; January 20; station 6066; 1 young male (24319).

Genus MENIPPE de Haan

Menippe DE HAAN, Fauna Japon., Crust., 1833, pp. 4 and 21; type, *M. rumphii* (Fabricius).

Carapace broad, transversely oval, moderately convex fore and aft, very slightly so from side to side; regions, except gastric, little defined. Several pits form a semicircle on either side opposite the last two lateral teeth. Antero-lateral borders long, strongly arched, cut into four teeth besides orbital; postero-lateral borders slightly shorter than antero-lateral, convergent; posterior border short. Front narrow, about a fifth or less than a fifth the greatest breadth of carapace, rather prominent, almost horizontal, cut into two lobes, the outer angle of each of which forms a distinct tooth or lobule. Orbit with three grooves near the outer angle well marked; inner orbital angles, both upper and lower, pronounced. Eyes on short, thick stalks. Side edges of front not turned down; the short basal antennal article does not nearly reach the front, so that the cavities of orbits and antennules are not properly separated; next antennal article just reaches front, and the long antennary flagellum stands in the orbital hiatus. Antennules fold nearly transversely. Anterior edge of merus of external maxillipeds oblique and a little sinuous but not excised. Ridges of endostome complete, but low and faint. Chelipeds massive, a little unequal in both sexes; fingers stout, pointed, not hollowed. Abdomen of male singularly broad, all seven segments distinct.

Indo-Pacific region; both coasts of middle America.

KEY TO THE AMERICAN SPECIES OF THE GENUS MENIPPE

A¹. Surface of carapace not nodose, almost smooth. Antero-lateral teeth or lobes shallow or little projecting. A stridulating apparatus present.
  B¹. Margin of front with two lobules on outer side of each submedian lobe.
    C¹. Second antero-lateral lobe not bilobate. Two lobes or teeth on lower orbital margin ---- **mercenaria**, p. 472.
    C². Second antero-lateral lobe bilobate. Three lobes on lower orbital margin ---- **frontalis**, p. 477.
  B². Margin of front with one lobule on outer side of each submedian lobe. Second antero-lateral lobe bilobate ---- **obtusa**, p. 478.
A². Surface of carapace anteriorly nodose. Antero-lateral teeth strong, projecting well out from carapace. No stridulating apparatus ---- **nodifrons**, p. 479.

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
mercenaria	*frontalis*

MENIPPE MERCENARIA (Say)

STONE CRAB

Plates 191–193

Cancer mercenaria SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1818, p. 448 (type-locality, "the southern states"; type, 114.3 mm. wide, not extant).
Xantho mercenaria MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 399.

Pseudocarcinus ocellatus MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 409 (type-locality unknown; type in Paris Mus.).

Pseudocarcinus mercenarius GIBBES, Proc. Amer. Assoc. Adv. Sci., vol. 3, 1850, p. 176 [12].

Menippe ocellata VON MARTENS, Arch. f. Naturg., vol. 22, pt. 1, 1856, p. 87.

Menippe mercenaria STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 53 [7].—A. MILNE EDWARDS, Crust. Rég. Mex., 1879, p. 262, pl. 47 (colored) and 48, fig. 3.—R. RATHBUN, Fisheries and Fishery Industries of the U. S., sec. 1, 1893, p. 772, pl. 264.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 439, pl. 35, fig. 8.

Menipe ocellata GUNDLACH and TORRALBAS, Anales Acad. Cien. Habana, vol. 36, 1900, p. 369, not text-fig. 5G.

Diagnosis.—Carapace smooth, not lumpy. Antero-lateral teeth low, not prominent. A stridulating organ on inner side of palm. Black not wholly covering fingers but ending obliquely.

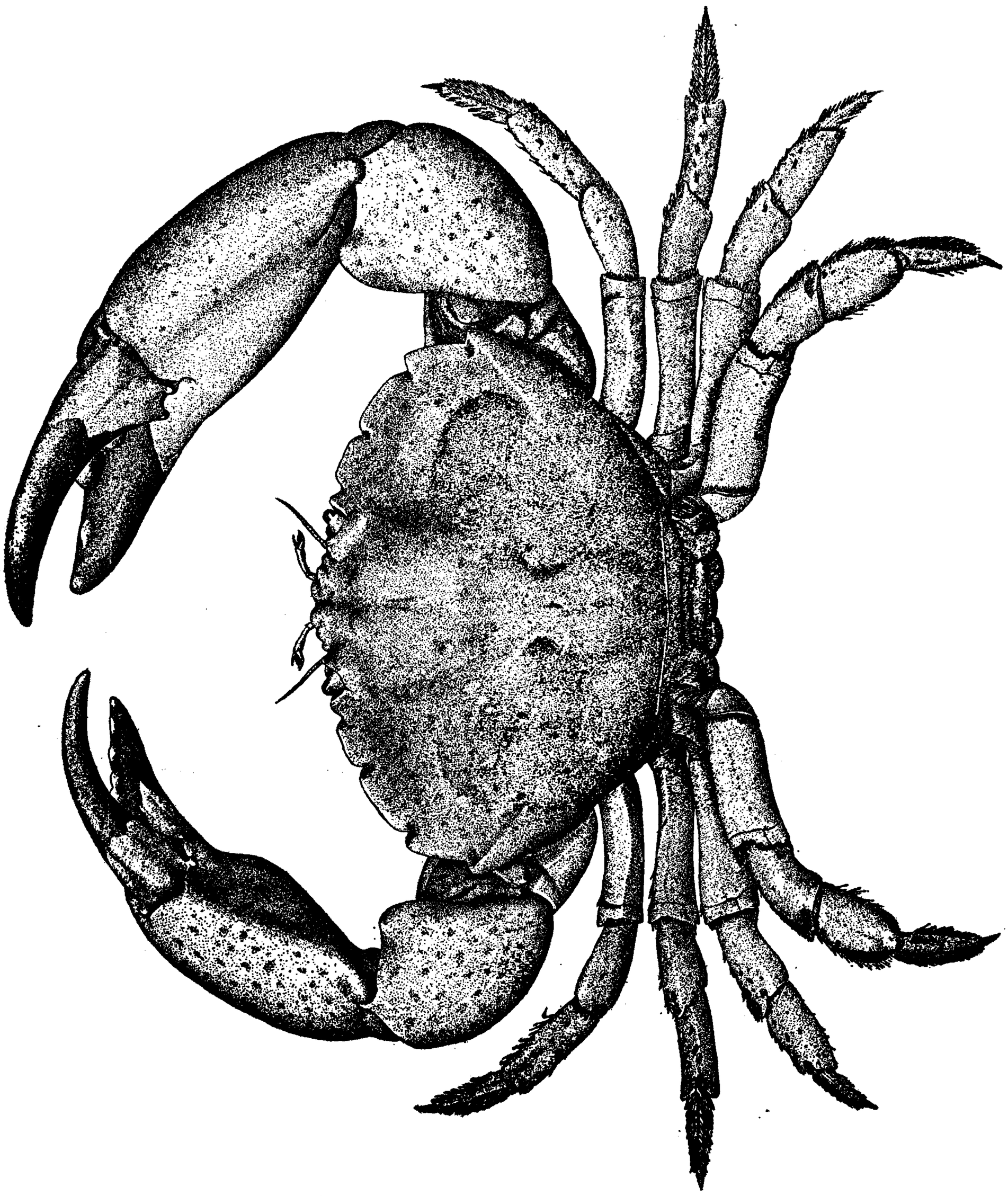

FIGURE 78.—MENIPPE MERCENARIA, MALE, CHARLESTON, DORSAL VIEW. AFTER R. RATHBUN

Description.—Carapace minutely granulate, punctate, not nodulose; epigastric areas slightly elevated. Two large pits mark the

widest part of the mesogastric region. Anterior part of this region outlined; crescentic grooves at middle of carapace well marked. Each lobe of front is oblique and subdivided into three, one large submedian and two small. Inner supraorbital tooth with transverse anterior margin; outer angle obtuse, not advanced; lower margin bidentate, inner tooth prominent, outer one lower than the inner, but similar to and almost merged with the tooth above it, but more advanced. Second to fourth lateral teeth shallow, more or less truncate or lobiform, having short anterior and long posterior margins, which meet at an obtuse angle. Fourth tooth subdentiform, last tooth dentiform, blunt, projecting outward; from it a low, blunt ridge runs obliquely backward.

Dactylus of major chela with a large basal tooth, fixed finger with a large subbasal tooth; other teeth few and large. The fingers of the minor chela have numerous small teeth. The dark color of the fingers ends in an uneven or broken, oblique line, the color extending the length of the prehensile edge but little more than half the length of the outer edge. On the distal upper half of the inner surface of both palms in both male and female there is a broad oblong patch of striae obliquely placed, which serves as a stridulating organ. It is adapted for playing against the thick edge of the second and third antero-lateral teeth and the outer suborbital tooth. There is a series of granules on the suborbital and subhepatic regions which may provide the element of friction, although the articulation of the arm seems not to permit this. There is a row of these round or oblong granules or small tubercles behind and parallel to the lower orbital border, and on the second and third antero-lateral lobes, besides a few granules toward the buccal cavity.

Color.—Young specimens, a dark purplish blue, the very young always with a white spot on the wrist; with age the color becomes a dark brownish red more or less mottled and spotted with dusky gray. (Hay.) Fingers black; legs ornamented with red and yellow bands.

Measurements.—Male (32250), total length of carapace 85.6, width of same 127, fronto-orbital width 47, width of front 24.6 mm.

Habitat.—The young are hatched at intervals throughout the spring and summer and, after having assumed the crab form, appear to resort to the deeper channels of the harbor where they live under the shell fragments with which such bottoms are covered. On attaining a width of half an inch or thereabouts they move into shallower water and may be found among the oyster shells and the rocks about the harbor jetties. Here they live until they have attained full size, when, if circumstances seem to demand it, they move to some shoal and just below low-tide mark make burrows. These

Material examined of Menippe mercenaria

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
North Carolina:	° ′ ″	° ′ ″			° F.						
Shackleford Bank				From rocks		Sept. 12, 1928		Schmitt & Shoemaker.	2♂ 3♀ 1 y	62527	
Beaufort								William Stimpson	1♀	17527	
South Carolina								Brevoort	1	2089	
Bull's Bay Lighted Beacon.						Mar. 23, 1891		*Fish Hawk*	1 y	17170	Among oyster shells.
Cooper River			5	hrd. C	50	Jan. 16, 1891		do	1♂	32250	
Charleston Harbor			7. 8	stk	58	Mar. 13, 1891	1659	do	1♀	17171	
Charleston market						Mar. —, 1880		R. E. Earll	1♀	4906	
Cat Island Creek, Port Royal.						Feb. 2, 1891		*Fish Hawk*	1 y	26144	On gorgonian.
Calibogue Sound			6. 6-8. 3		50-52	Jan. 16, 1891	1648-1651	do	2 y	18195	
Georgia: St. Mary's						Mar. 24, 1896		O. Bangs	1 large female	19474	
Bahamas: West side Andros Island.								Frederick Stearns	Specimens returned to sender.		
Florida								H. E. Webster	3 y	56829	From Boston Society of Natural History.
Indian River, at Titusville.						Jan. 14, 1896		U. S. Fish Commission.	3 small ♀	20097	
Indian River								G. Wurdemann	7	2094	
Fort Pierce						Jan. 23, 1896		U. S. Fish Commission.	1♀	20095	Obtained from fisherman.
Miami								G. M. Gray	2 y	42129	
			Feet		° C.						
Biscayne Bay	4 miles ENE. of Turkey Point.		8. 5	hrd. S	25	Mar. 6, 1903	7476	*Fish Hawk*	1 y	53754	
Key West						Dec. —, 1883		D. S. Jordan	4 y	6370	
Do								H. Hemphill	18♂ 9♀ 12 y	8964	
Do						Apr. 15, 1884 to Apr. 27, 1884		*Albatross*	1 y 29	18520 7509	
Do						Apr. 11, 1889		do	1♂	20096	
Do						Feb. 11, 1903		*Fish Hawk*	1♂	33463	
Do									1♂	57007	From Boston Society of Natural History.
Key West Harbor						1884		Edward Palmer	4 y	15101	From piles of wharf and among rocks.

Material examined of Menippe mercenaria—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued.	° ′ ″	° ′ ″	*Feet*		° *C.*						
North of Knights Key Channel.	6 miles NNE. ½E. of East Bahia Honda Key.		11	barry	20.5	Jan. 22, 1903	7414	*Fish Hawk*	1 y	53756	
Marco						May —, 1884		H. Hemphill	6♂ 3♀ 15 y	6948	
Oyster Bay								do	1 y	14988	
Puntarasa						Feb. —, 1884		do	4♂ 8♀ 13 y	6439	
Sanibel Island						Feb. 22, 1928		O. C. Van Hyning	1 ♂ 2♀	Fla. State Mus.	
Off Sanibel Island	Bell buoy off Sanibel Island Light, NE., 10–2½ miles.		4.75	Sh. wh. M		Jan. 1, 1913	7795(9)	*Fish Hawk*	1 y	50465	
Boca Grande						Apr. 27, 1915		do	1 y. ♀	56359	
Off Charlotte Harbor.	26 35 00	83 11 00	27.5	sdy	20	Apr. 2, 1901	7122	do	7 y	25607	
Do	26 33 00	83 10 00	28	sdy	19	do	7123	do	3 y	25608	
Charlotte Harbor						Mar. —, 1887		W. H. Dall	1♂	14995	
Do								E. B. Baker	2	2017	
Little Sarasota Bay								H. Hemphill	2♀	14991	
Sarasota Bay						Feb. —, 1884		do	3 y	6432	
Do								H. E. Webster	1♂ 1 y	56830	
Goodland Point								H. Hemphill	24 y	14989	
Palma Sola, mouth of Manatee River.								do	3♀	14997	
Mullet Key									1 y	53757	
Off Port Tampa			4	sdy		Jan. 25, 1898		*Fish Hawk*	3 y	26145	
Do			4	muddy		Jan. 29, 1898		do	1 y	26146	
Tampa Bay								H Hemphill	2 y	14992	
Dunedin						Feb. —, 1916		J. B Clark	1♀	57843	From Florida State Mus.
Off northwest end St. Martins Reef, near Florida Banks.	28 50 00	83 00 00				1887		Lieut. J. F. Moser, U. S. N.	1 y	14994	
Cedar Keys						Dec. —, 1883		H. Hemphill	14♂ 6♀ 10 y	6409	
Do				Flats, low tide		Mar. 27, 1926		Miller and Aschemeier.	1 y	60973	
Pepperfish Key	29 32 10	83 29 50	3	sdy	21.8	Nov. 5, 1901	7144	*Fish Hawk*	1 y	53755	
St. Vincent Sound, Apalachicola.						Mar. 26, 1915		do	1♂ 1♀	56383	

1935						
Copenhagen Mus. 26147						
M. C. Z. 20637						
33032						
Phila. Acad.						Male 95 mm. wide; female 111.3 mm. wide.
M. C. Z. 61114	1	10 y	J. D. Mitchell			
62528	1♂ 2♀		T. E. B. Pope, Bureau of Fisheries.			
57067	1♂ 1♀					
	1					
	2 ♂	1894	U. S. Fish Commission.			
	1 chela	Apr. —, 1927	C. R. Orcutt			
	Claws	1922	A. H. Blackiston			

higher and rounded. The second to fifth antero-lateral teeth or lobes are similar to those of *mercenaria* except that the second is more advanced, more transverse, and is subdivided by a shallow sinus into two lobules.

On the upper distal quarter of the inner face of the palm there is an oblong patch, vertically placed, of parallel oblique striae. There are certain fixed points on the carapace against which the striae may be scraped; they are small tubercles, mostly oblong and whitish, situated as follows: One oblong on the lower surface of the median and outer suborbital lobes, two further back near the angle of the buccal cavity; and just below the antero-lateral margin one small tubercle on each lobule of the second lobe and two or three on the third lobe or tooth. This stridulating apparatus is present on a specimen only 18 mm. wide. Black of fingers not covering their base but ending in an irregular, mostly scalloped line.

Color.—General color of preserved specimens red. Outer face of manus reticulated with yellow.

Measurements.—Male (60758) total length of carapace 86, width of same 128, fronto-orbital width 45.6, width of front 20.8 mm.

Range.—West coast of Nicaragua to Peru.

Material examined.—Nicaragua; Dr. Carl Flint; 1 female (3812).

Panama: J. H. Sternbergh collector; 2 males, 1 female (17300). Chame Point; June–July, 1912; Robert Tweedlie, Smithsonian Biological Survey; 1 young (59310). Canal Zone; August, 1915; J. Zetek; 1 male, paper shell (48807).

Paita, Peru; under rocks, low tide; October 8, 1926; W. L. Schmitt; 3 males, 19 females (60758); a fine series of large specimens, the first recorded from Peru.

Locality unknown; 1 male (13885).

MENIPPE OBTUSA Stimpson

Plates 197; 198, Figures 1 and 2

Menippe obtusa STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 53 [7] (type-locality, Panama; type, Cat. No. 2050, U.S.N.M.).

Diagnosis.—A single lobule on frontal margin next to each submedian lobe. Front channeled just above the lobes. Second antero-lateral lobe bilobate. Stridulating organ of palm unlike in the sexes.

Description.—Carapace nearly smooth and even, flattened posteriorly; a tubercle on each side of front and of epigastric region. Gastric region defined. Frontal region channeled along the margin above the lobes. A single lobule behind each frontal lobe, forming an oblique row with the obtuse, tuberculiform inner angle of orbit. Outer angle of orbit low and blunt; the tooth below it blunt and a little more advanced; tooth at inner lower angle large and rounded. Between these last two, on ventral surface and not projecting to orbital margin there is a tubercle. Antero-lateral teeth similar to those of *frontalis*, but the second lobe is bilobate.

The palms are furnished with a large lobe within, at the proximal end of the upper surface. On the distal upper quarter of the inner surface of each palm there is a suboval stridulating area formed of parallel oblique striae; these are entire in the male and in the major chela of the female, but are broken into short lengths and utriculiform granules in the minor chela of the female. This area as in *frontalis* is played upon by a series of small, elongate, whitish tubercles; two are on the outer and middle tubercles below the orbit, two are on the lobules of the second antero-lateral lobe, two others on the adjacent end of the third lobe, and one is near the angle of the buccal cavity; besides there are several granules on the suborbital and subhepatic region. A young female only 10.2 wide shows the stridulating apparatus.

The dark color of the fingers very nearly covers them to the base in the male and major chela of the female; in the minor chela of the female it is more extensive on the immovable finger, reaching from the interdigital sinus obliquely backward some distance on the palm.

Color.—Of preserved specimen reddish, mottled or banded. (Stimpson.)

Measurements.—Female holotype, total length of carapace 30.4, width of same 43, fronto-orbital width 20, width of front 9.5 mm. Male (17301), length 35.5, width 52 mm. Female (17301), length 38.8, width 56.3 mm.

Range.—Pacific side of Costa Rica and Panama.

Material examined.—Punta Arenas, Costa Rica; specimen in Copenhagen Museum.

Panama: J. H. Sternbergh; 1 female holotype, 1 young female (2050). Henry A. Ward; 1 male, 1 female (17301).

Remarks.—In the female, 17301, the major chela is abnormal; although of large size, the fingers partake of the nature of the minor fingers, being more elongate than in the type female, the fixed finger having five teeth in place of three and the black color running along the base of the palm as in the minor chela.

MENIPPE NODIFRONS Stimpson

Plate 198, Figure 3; Plate 199

Pseudocarcinus rumphii Milne Edwards, vol. 1, 1834, p. 408. Not *Cancer rumphii* Fabricius, Ent. Sys., Suppl., 1798, p. 336.

Menippe rumphii Dana, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 179.—Smith, Trans. Connecticut Acad. Sci., vol. 2, 1869, p. 34.—Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 106 [16].—A. Milne Edwards, Crust. Rég. Mex., 1880, p. 263, pl 48, figs. 4–4*b*.

Menippe nodifrons Stimpson, Ann. Lyc Nat. Hist. New York, vol. 7, 1859, p. 53 [7] (type-locality, Indian River, Florida; type not extant).

Carpilius corallinus Gundlach and Torralbas, Anales Acad. Cien. Habana, vol. 36, 1900, p. 367, text-fig. 4 G.

Menippe rumphi? A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 316.

Diagnosis.—Antero-lateral regions lumpy; lateral teeth prominent. No stridulating organ on inner side of palm. Black of fingers not continued quite to palm and ending irregularly though not obliquely.

Description.—Surface covered with crowded depressed granules and coarse punctae. Gastric region distinct and divided into five subregions; on the epigastric regions there is a pair of lobules which with a similar pair on the front form a quadrilateral, those of the anterior pair further apart than those of the posterior. A low elevation nearly parallel with the curve of the antero-lateral border crosses either branchial region; other shorter elevations cross the hepatic and protogastric regions. The frontal margin consists of two prominent, submedian, well-separated, arcuate lobes outside of each of which are two smaller lobes forming an oblique line; the inner of these small lobes is sometimes obliterated in the old. Inner angle of orbit thick, obtusangled; outer angle thick, blunt; lower margin forming two subequal lobes separated by a rounded sinus, the outer lobe directly below the smaller outer supraorbital angle. Antero-lateral border rather sharp and divided into four prominent lobes of which the first two are broadly rounded, the last two dentiform, obtuse, strongly projecting sideways; from the last one a ridge extends obliquely inward on the carapace.

Inner angle of wrist bluntly prominent. Legs with upper border of carpus and both borders of propodus hairy; dactylus more thickly hairy.

Color.—Reddish; feet banded with red and yellowish; fingers black.

Measurements.—Male (59309), total length of carapace 49, width of same 72, fronto-orbital width 25.8, width of front 14.7 mm.

Range.—From Indian River, Florida and Gulf of Mexico to State of Santa Catharina, Brazil. West Africa.

Material examined.—

UNITED STATES.—Indian River, Florida; U. S. Fish Commission; specimen returned to sender.

Cameron, Louisiana; R. P. Cowles; 1 male (30566).

WEST INDIES.—Cuba; *Tomas Barrera* Expedition, Henderson and Bartsch: June 8–9, 1914; station 16; 1 young female (48524). Guantanamo Bay; station 24; 1 male (50537).

Cuba: Cojimar Playa, near Havana; Melbourne Ward; 1 male; returned.

Jamaica: March 1–11, 1884; *Albatross;* 4 males, 6 females, 2 young (17781). T. H. Morgan; 1 ovigerous female (17213). J. E. Duerden; specimens returned to sender. Kingston Harbor: 1893; R. P. Bigelow, 2 males (17968); P. W. Jarvis, specimens returned to sender. C. R. Orcutt: 3 males, 1 pair chelipeds (62530); Kingston, 1 cheliped (62529); Harbor Head, Kingston, 1 female (61130).

St. Thomas Harbor, St. Thomas, Virgin Islands; July 13, 1915; C. R. Shoemaker; 1 female (53758), gift of Carnegie Institution.

TRINIDAD.—February, 1878; Crosby; 11 young (56831), received from Boston Society of Natural History.

PANAMA.—Meek and Hildebrand, Smithsonian Biological Survey: Toro Point, Canal Zone; January 25, 1912; 2 females (59309, 59311). Fox Bay, Colon; January 20, 1912; 1 ovigerous female (59308). Porto Bello; April 24–28, 1911; 1 male (44178). Colon (Aspinwall); 4 fathoms; 1884; *Albatross;* 1 female (7646). Colon Harbor; on dock piles; 1923; Williams Galapagos Expedition; 1 young (57734), from New York Zoological Society.

COLOMBIA.—Sabanilla; March 16–22, 1884; *Albatross;* 1 female (7568).

BRAZIL.—Branner-Agassiz Expedition; A. W. Greeley, collector; 1899: Mamanguape stone reef; June 20 and 23; 2 young (25721). Rio Goyanna stone reef; June 18; 1 female (25722). Pernambuco stone reef at Ilha de Nogueira; July 10; 1 young (25723). Coral reef, Maceio, Alagôas; July 22; 1 male, 2 females (25724).

Ilha Governador; outside mouth of river; from under rocks, sponges, and bunches of bryozoa; September 1, 1925; W. L. Schmitt; 1 male (60759).

Paqueta; August 19, 1925; W. L. Schmitt; 1 female (60762).

Conto do Rio, Nictheroy; tide pool, on sides and in water; August 22, 1925; W. L. Schmitt; 1 male, 2 young (60764).

Ilha dos Buzios, São Paulo; 1906; Fr. Gunther, collector; received from H. von Ihering; 1 female (47832).

Villa Bella, Ilha de São Sebastião, São Paulo; Beach; September 24, 1925; W. L. Schmitt; 1 male (60761). October, 1925; H. Luederwaldt, collector; 4 young (60763); received from W. L. Schmitt.

Bahia de Guanavara; 1923; C. Fernetz; 1 female; returned to Buenos Aires Museum.

Saco São Francisco, Bahia de Guanavara; 1923; C. Fernetz; 1 ovigerous female; returned to Buenos Aires Museum.

São Francisco do Sul; October 5, 1925; W. L. Schmitt; 1 male (60760).

Brazil; 1 specimen (16422); received from W. H. Dall.

WEST AFRICA.—Gabon, French Congo; specimen in Paris Mus.,

Genus PILUMNUS Leach

Pilumnus LEACH, Trans. Linn. Soc. London, vol. 11, 1815, pp. 309 and 321; type *P. hirtellus* (Linnaeus).

Acanthus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 32; type, *A. spino-hirsutus* Lockington.

Eupilumnus KOSSMANN (not Kingsley), Zool. Ergeb. Reise Küstengeb. Rothen Meeres, Crust., 1877, p. 38; type, *E. actumnoides* (A. Milne Edwards).

Parapilumnus KOSSMANN, Zool. Ergeb. Reise Küstengeb. Rothen Meeres, Crust., 1877, p. 38; type, *P. cristimanus* (A. Milne Edwards).

Carapace and legs generally covered with hair. Carapace transversely oval or subquadrilateral, declivous anteriorly, flat posteriorly, not greatly broader than long; the regions, as a rule, but moderately plainly demarcated and areolated. Antero-lateral borders not longer, but commonly shorter than postero-lateral, and cut into teeth which are often spiniform. Front usually about a third the greatest breadth of carapace, but sometimes broader; cut into two lobes, the outer angle of each of which commonly forms an independent dentiform or spiniform lobule separated from the supra-orbital angle by a groove or notch. The orbits generally have a gap or fissure just below the outer angle, and one or two gaps or notches in the upper border; inner lower orbital angle commonly sharp and prominent. Eyes moderately long and slender. The antennules fold transversely. Basal antennal article short, either not quite touching the front or just touching it by its inner angle; the flagellum, which is planted in the orbital hiatus, is long, usually very much longer than the major diameter of orbit. Ridges of endostome, defining expiratory channels, plain, but not very high; anterior border of merus of external maxillipeds almost transverse and not notched. Chelipeds stout, the fingers coarse, short, and pointed. Legs usually stout and of moderate length. The abdomen of male consists of seven separate segments.

Found on the American coasts from North Carolina to Argentina and from San Pedro, California, to Peru. Also inhabits other tropical and warm temperate seas.

KEY TO THE AMERICAN SPECIES OF THE GENUS PILUMNUS

A¹. Margin of frontal lobes more or less convex.
  B¹. Antero-lateral spines or teeth four, or occasionally three, including the outer orbital one.
    C¹. Ambulatory legs of moderate length, less than twice as long as carapace.
      D¹. Palms hairy or partly hairy.
        E¹. Major palm partly smooth and bare on outer surface.
          F¹. Hair on carapace not covering the whole carapace or not forming so thick a coat as to conceal the surface beneath.
            G¹. Two or more superhepatic spines. All long spines black or dark colored----------**sayi, p. 484.**
            G². No superhepatic spines.
              H¹. Major palm smooth on larger part of outer surface----------**dasypodus, p. 493.**
              H². Major palm rough on larger part of outer surface.
                J¹. Frontal lobes deep, margins arcuate. Orbit unarmed above----**quoyi, p. 510.**
                J². Frontal lobes shallow.

K¹. Margins of carapace long spined.
L¹. Frontal lobes edged with 5 or more denticles or spinules. Lateral spines more or less compound---**caribaeus**, p. 491.
L². Frontal lobes edged with 3 spines. Lateral spines simple.
townsendi, p. 504.
K². Lateral and orbital margins armed with spiniform teeth. Frontal margin spinulous----**depressus**, p. 506.
F². Hair covering the whole carapace and forming a thick coat concealing the surface beneath.
G¹. Chelipeds spinous above. A transverse row of long hairs across front-------**floridanus**, p. 507.
G². Chelipeds not spinous above. Carapace tuberculate.
H¹. Felt-like covering of carapace forming well defined areoles, deeply separated from one another. Half or less than half of outer surface of major palm bare and smooth.
holosericus, p. 519.
H². Felt-like covering of carapace not forming well defined, deeply separated areolets.
J¹. Anterior half of carapace and upper surface of chelipeds dotted with bead-like tubercles. Upper margin of orbit furnished with truncate spines--**pannosus**, p. 514.
J². Tubercles of carapace not numerous nor prominent. Upper margin of orbit not spinous----------**lacteus**, p. 511.
E². Major palm with outer surface rough all over or nearly so.
F¹. Carapace covered with a dense pubescence in which are set small tubercles regularly placed.
G¹. Hairy covering short and trim. A small bare, smooth spot on major palm at base of immovable finger----------**limosus**, p. 518.
G². Hairy covering short; long tubular hairs interspersed, numerous on legs and chelipeds giving them a ragged appearance. Red bead tubercles showing on carapace, chelipeds and legs.
gemmatus, p. 513.
F². Carapace pubescent and hairy but not so densely as to conceal the surface beneath.
G¹. Carapace and chelipeds spinous. Carapace narrow, about one-fourth wider than long; antero-lateral margin short. Spines of carpus of ambulatory legs normal to the article.
diomedeae, p. 501.
G². Carapace and chelipeds granulate, without spines.
pygmaeus, p. 515.
D². Palms naked----------**nudimanus**, p. 523.
C². Ambulatory legs very long and slender, the longest ones twice as long as carapace.

D¹. Frontal lobes arcuate, finely denticulate_____**marshi**, p. 499.
D². Frontal lobes spinulous or spinous_____**gracilipes**, p. 499.
B². Antero-lateral spines or teeth five including the outer orbital one.
C¹. Outer surface of major palm partly smooth.
D¹. First two antero-lateral spines nearer together than the others, sometimes united at base. Margins of front and orbit long-spined_____**spinohirsutus**, p. 503.
D². First two antero-lateral spines small. Margin of front granulate, of orbit spinulous at most_____**miersii**, p. 510.
C². Outer surface of major palm everywhere rough with spines or granules.
D¹. Upper margin of orbit and margins of ambulatory legs unarmed_____**xantusii**, p. 486.
D². Upper margin of orbit spined, ambulatory legs spinulous. **gonzalensis**, p. 505.
E¹. Carapace largely flat. Front spined.
E². Carapace convex. Front granulate_____**longleyi**, p. 502.
A². Margin of frontal lobes distinctly oblique and concave, sometimes nearly straight.
B¹. Carapace one-half wider than long. A subhepatic tubercle present. Greater part of outer surface of major palm bare___**reticulatus**, p. 521.
C¹. Lateral teeth lobiform, flattened in a plane perpendicular to the dorsum_____**reticulatus**, typical, p. 522.
C². Lateral teeth with acute edge corresponding to marginal line of carapace_____**reticulatus forma tessellata**, p. 522.
C³. Some of the tubercles of carapace and chelipeds stalked and flattened above, mushroom-like_____**reticulatus forma fragosa**. p. 522.
B². Carapace narrower. Both palms rough outside.
C¹. Antero-lateral marginal spines small. No subhepatic tubercle or tooth_____**stimpsonii**, p. 524.
C². Marginal spines long; three at inner end of orbit curving over eye-stalk. Subhepatic region covered with sharp granules. **spinosissimus**, p. 494.

ANALOGOUS SPECIES OF PILUMNUS ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
sayi	*xantusii*
longleyi	*spinohirsutus*
holosericus	*limosus*

PILUMNUS SAYI Rathbun

Plate 200, Figures 1 and 2; Plate 201, Figures 4–7

Cancer aculeatus SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 1, 1818, p. 449 (type-localities, Georgia and E. Florida; type not extant); not *C. aculeatus* O. Fabricius, 1780, nor Herbst, 1790.

Pilumnus aculeatus GUÉRIN-MÉNÉVILLE, Icon. Règne Anim. Cuvier, 1829 (?), pl. 3, figs. 2–2*c*.—MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 420.—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 282, pl. 50, fig. 1–1*c*.

Pilumnus sayi RATHBUN, Ann. Inst. Jamaica, vol. 1, 1897, p. 15 (name *sayi* substituted for *aculeatus* preoccupied in *Cancer*).—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 320.

Diagnosis.—Four lateral marginal spines, two superhepatic spines. Long spines of body and appendages black or dark brown, color

persisting. Outer surface of major palm of adult partly smooth and bare. Three spines or spinules on edge of each frontal lobe.

Description.—Carapace about three-fourths as long as wide, anterior half semicircular, strongly deflexed, posterior half with sides constricted. Dorsal surface with a thin coat of short downy hair interspersed with many long stout hairs with pointed tips; hair scanty on posterior third. When the hair is removed the fine granular hair sockets are revealed, forming a rough surface. On the hepatic region are two long curved dorsal spines with sometimes 1, 2, or 3 supplementary spines, and one long spine just below the lateral margin between the first and second marginal spines. The marginal spines are four in number, including the outer orbital spine. Orbit armed with 3 long spines above and 4 long and 2 or 3 short spines below, the short ones between the 2 outermost long ones. Front advanced; median sinus large, its sides converging, apex rounded; lobes bordered with three principal spines shorter than those described above; at outer angles of front a single long spine.

Chelipeds and legs clothed with long hairs similar to those on the carapace and also some short hairs. Chelipeds very unequal, the major palm of the adult male half again as high as the minor palm. Upper margin of merus armed with a few small blunt spines and at the end with two large curved spines, distal and subdistal. Carpus and dorsal aspect of manus of major palm armed with dark spines, those of the manus arranged more or less in longitudinal rows and becom ng pointed tubercles lower down on the surface; the smooth area of the outer palm may exceed the spined area, from which it is separated by an oblique line, or it may be very much reduced as in smaller specimens and in females. In the minor palm the spines very nearly cover the outer face (entirely cover it in small specimens) and the conical tubercles outnumber the spines. Lower edge of palms obscurely tuberculate, convex in major palm, only slightly so in minor palm, lower edge of the whole propodus sinuous, fingers deflexed, tips curved upward; major finger a little longer than basal height. Movable fingers with a few conical spines and tubercles in 3 rows above near base. On the ambulatory legs the spines on the upper margin of the merus are small, slender, and approximate; those of the carpus and propodus are long and dark and disposed in two rows; horny tip of dactyl slender and dark.

Color.—Grayish brown irregularly suffused with red; spines mostly black, hairs yellow. (Hay and Shore.)

Measurements.—Male (12472), length of carapace including spine 21.8, width including spines 29, width excluding spines 25.5, fronto-orbital width 19, width of front including outer or antennal spines 8.8 mm.

Habitat.—Fairly common on shelly bottoms and not infrequently crawling over wharf piles. (Hay and Shore.)

Range.—North and South Carolina, west and southwest coast of Florida, Bahamas, Jamaica, Guadeloupe (A. Milne Edwards), Curaçao.

Material examined.—See table, pages 487–490.

PILUMNUS XANTUSII Stimpson

Plate 201, Figures 1–3

Pilumnus xantusii STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 213 [85] (type-locality, Cape St. Lucas; cotypes in Paris Mus. and M.C.Z., Cat. No. 1259).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 284, pl. 51, figs. 1–1*b*.

Diagnosis.—Five lateral marginal spines. Superior margin of orbit unarmed. Ambulatory legs without spines. Carapace less than a fifth wider than long.

Description.—Carapace narrow, moderately convex, anteriorly hairy but posteriorly short-pubescent like the abdomen. Gastric region and its principal lobules well circumscribed. Several very short spines on the hepatic and branchial regions toward the antero-lateral margin. Surface elsewhere either smooth or sparsely roughened with sharp grains. Front rather broad, arcuate, deeply incised at middle but without lateral incisions; margin armed with six or more small spines. Superior margin of orbit straight, ciliated, but not armed with spines; inferior margin spinulous and with two or three spines toward inner angle. Antero-lateral margin armed with five spines, regularly placed and nearly equidistant, but diminishing in size forward; the anterior one at external angle of orbit.

Merus of outer maxillipeds longer than usual in the genus, being nearly square, and less incised at the internal angle. Chelipeds short and thick; greater hand hairy above and externally and armed with spines; surface between the spines smooth and glabrous except toward the fingers where it becomes granulated, the spines disappearing or becoming tubercles; lower surface and inner side near fingers granulated. Fingers tuberculate at base. Ambulatory legs not spinous but clothed above with very stiff hairs.

Color.—Reddish; spines black; fingers black.

Measurements.—Male type, length of carapace 15.2 mm. (0.6 inch), width of same, spines excluded, 17.3 mm. (.68 inch). (Stimpson.) Length of largest male examined 11.7, width without spines 14, width of front 4.6 mm.

Range.—Cape St. Lucas, Lower California, Mexico. Known only from the type-locality.

Material examined.—Cape St. Lucas; John Xantus; 1 male, 1 female, cotypes (62737); cotypes (1259, M.C.Z.).

Material examined of Pilumnus sayi

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
North Carolina:	° ′ ″	° ′ ″			°F.						
Off Cape Hatteras	35 22 30	75 26 00	7	crs. gy. S		Oct. 20, 1884	2287	*Albatross*	1♂	7245	
Do	35 21 00	75 21 30	16	gy. S. brk. Sh		Oct. 19, 1884	2280	do	1 y ♀	60954	
Do	35 08 30	75 10 00	49	gy. S		Oct. 17, 1885	2596	do	1♀	18036	
Off Cape Lookout	Off Harker's Island, near Beaufort.							*Fish Hawk*	1 y ♀	51090	
Do	Bogue Sound					July —, 1912		W. P. Hay	2♂ 1 y	51383	Dredged.
Do	25 miles ESE. of Lookout Lightship.					July 28, 1915		*Fish Hawk*	1♂ 1♀	60183	
Do	Fishing grounds off Beaufort Harbor. 34 20 00	76 49 00	13.5	Co. S. Sh	80	Sept. 6, 1913	7943	do	4	51047	
Do	Fishing grounds off Beaufort Harbor. 34 17 00	76 56 00	16	Sh	79	Sept. 7, 1913	7951	do	1♂	51387	
Off Cape Fear	33 38 00	77 36 00	15	gy. S. brk. Co		Oct. 20, 1885	2622	*Albatross*	1♀	14393	
Do	33 38 00	77 36 00	15	gy. S. brk. Co		do	2623	do	1♂	18039	
Do	33 37 30	77 36 30	14	crs. yl. S. brk. Sh.		do	2617	do	1♂	18037	
Do	33 37 15	77 35 30	17	crs. yl. S. brk. Sh.		do	2618	do	1♂ 2♀	18038	
South Carolina: Near Port Royal.								*Fish Hawk*	1♀	18219	
Florida:											
West Florida								Henderson and Simpson.	1♂ 2♀	18035	
Do								J. W. Velie	1♀	23013	
Pensacola						1882		Silas Stearns	1	9269	
Do								do	2	9270	From fish stomach.
Off Carrabelle	Carrabelle Light, N. by W., 14⅔ miles.		10		60.2	Jan. 16, 1913	7810(24)	*Fish Hawk*	1♀	60182	In beam trawl.
Do	Carrabelle Light, NW. ½ N., 16 miles.		10.25		60.2	do	7809(23)	do	1♂ 1 y	60181	
					°C.						
Aucilla section	29 54 00	84 06 00	4.5	R. Co. Sh	14	Dec. 5, 1901	7191	do	1♀	60155	Soft shell.
Do	29 49 00	84 06 15	6	R. Co	15	do	7192	do	1♂	60156	
Do	29 48 10	83 55 15	5	S. Co	21	Nov. 6, 1901	7148	do	2♀	53737	
Do	29 44 09	84 06 30	7	R. Co	16.5	Dec. 5, 1901	7193	do	1♂ 1 y	53738	
Do	29 34 00	84 07 20	10.5	R. Co	17.6	do	7195	do	1♀	53739	
Pepperfish Key section.	29 33 05	83 28 03	2.25	S. Co	21.5	Nov. 5, 1901	7143	do	1♂	53726	
Do	29 32 10	83 29 50	3	sdy	21.8	do	7144	do	1♀	60147	
Do	29 19 30	83 46 00	10		18.3	Nov. 20, 1901	7158	do	1♂ 1 y	53727	

Material examined of Pilumnus sayi—Continued

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Florida—Continued.	° ′ ″	° ′ ″			°F.						
Cedar Keys						Dec. —, 1883		H. Hemphill	1 ♀	18034	
Do						Mar. 27, 1926		Miller and Aschemeier.	1 ♂ 1 y ♀	60953	On flats at low tide.
Do						Feb. —, 1887		Lieut. J. F. Moser, U. S. N.	4 ♂ 1 ♀	12472	
Off Cedar Keys	Cedar Keys Light, N. ¾ E. 2 1¾ miles.		5.75	Co	63.45 °C.	Jan. 11, 1913	7807(21)	*Fish Hawk*	2 ♂ 2 ♀	60180	1 with Rhizocephalid.
Deadman's Bay section.	29 48 05	83 46 40	4	Co	19.5	Nov. 7, 1901	7150	do	1 y	60149	
Do	29 43 40	83 49 45	5.25	Co	20.5	do	7151	do	1 ♂	53712	
Do	29 39 30	83 53 10	7.5	S. Co	21.5	do	7152	do	1 ♂	53717	
Do	29 32 30	83 50 00	9	R. Co	16.6	Dec. 6, 1901	7201	do	1 y	60157	
Do	29 32 00	83 58 30	10.5	Co	22.5	Nov. 7, 1901	7154	do	1 ♂	53718	
Do	29 24 30	83 49 30	10	R. Co	17	Dec. 6, 1901	7202	do	1 ♂	60158	
Do	28 58 50	83 54 20	10	S. Co	22	Nov. 7, 1901	7155	do	1 ♂	60150	
			Feet								
Florida Banks	28 56 00	82 55 00	19			Apr. 3, 1887		Lieut. J. F. Moser, U. S. N.	1 ♀	13065	
Do	Off NW. end St. Martin's Reef. Near 28 50 00	83 00 00				1887		do	2 ♂ 3 ♀	13041	
			Fathoms								
North Key section	Sea Horse Key Light, E. ¼ N., 5. miles.		3.25	sdy. rky	14.5	Nov. 27, 1901	7180	*Fish Hawk*	1 ♂	60152	
Do	29 08 45	83 14 45	3	sdy	14.2	do	7179	do	1 ♀ immat.	60151	
Do	29 05 00	83 22 30	5.5	sdy. rky. Co	15.5	do	7177	do	1 ♂ 1 ♀ 2 y	53719	
Do	29 00 00	83 18 45	5.75	rky. Co	15.3	Nov. 28, 1901	7182	do	1 ♂	53720	
Do	28 57 30	82 58 00	3	rky	15.5	Dec. 9, 1901	7207	do	2 ♂ 2 ♀	53721	
Do	28 55 00	83 28 10	10.5	R. Co	17	Nov. 28, 1901	7184	do	2 ♂	60153	
Do	28 52 45	83 07 00	5.75	rky	16.1	Dec. 9, 1901	7209	do	1 ♂	53722	
Do	28 47 45	83 28 00	11.5	R. Sh	17	Nov. 28, 1901	7186	do	1 y	60154	Soft shell.
St. Martin's section	28 41 00	83 15 15	8.5	rky	13.5	Jan. 17, 1902	7226	do	1 ♂	53725	
Do	28 35 30	83 02 30	3	sdy. grsy	12	Jan. 15, 1902	7222	do	1 y ♂ 2 ♀ immat.	60161	
Do	28 34 45	83 08 00	5.75	Co. R. G	12.5	do	7221	do	1 ♂	53724	
Do	28 33 30	83 19 00	9	sdy. grsy	13.6	do	7219	do	1 y	60160	
Do	28 27 15	83 19 00	10.5	rky. sdy	14	do	7218	do	2 ♂	53723	
Do	28 25 15	82 57 00	2.75	S. G	12	do	7213	do	1 ♀ immat.	60159	

Anclote section	28	19	45	83	06	30	8.5	rky. G	13	Jan. 24, 1902	7240	do	1♂	53736	
Do	28	19	30	83	01	00	6.25	rky. G	12.5	do	7239	do	1♂ 1♀	53735	
Do	28	19	00	82	55	15	3	S. G	12	do	7238	do	1♂	53734	
Do	28	08	30	83	12	00	11	hrd. & G	14	Jan. 23, 1902	7232	do	1♂	60162	
Do	28	01	30	83	08	00	11	rky	13.5	do	7234	do	2♀ 1 y	53733	
Anclote Keys										Apr. 23, 1917		W. Topliff	1♂	57851	From Florida State Museum.
									°F.						
Off Anclote Keys	Anclote Light, E. ⅛ S., 14 miles.						8.5	Cc	63.95	Jan. 11, 1913	7806(20)	*Fish Hawk*	1 y ♀	60179	
Off Port Tampa							4	M		Jan. 29, 1898		do	1♀	26180	
Do										Jan. 25, 1898		do	2♂	26112	
Tampa Bay							5–6.5			Mar. 29, 1901 Apr. 1, 1901	7109 7117 7121	do	3♂ 6♀ 3 y	25629	
Pass a Grille										Feb. 12, 1922		Joseph Lee	1♀	55570	
Keys of Sarasota												Mrs. E. A. Reed	1♂	60184	
Off Sarasota Bay	Longboat Inlet, ENE., 4½ miles.							S. brk. Sh		Jan. 5, 1913	7802(16)	*Fish Hawk*	2♂ 1♀	60178	
Do	Sarasota Pt., NE. by E., 9¼ miles.							rf. Co	65	do	7801(15)	do	2 y	60177	One in sponge.
Off Charlotte Harbor	Gasparilla Light, E. by S., 6¼ miles.						7	hrd. S. brk. Sh.		Jan. 4, 1913	7799(13)	do	2 y ♀	60175	
Do	Gasparilla Light, SE. by E., 6½ miles.							hrd. S. brk. Sh.		do	7800(14)	do	1♂	60176	
Do	26	35	00	83	11	00	27.5	sdy	66	Apr. 2, 1901	7122	do	2♂ 2♀	25628	
Do	26	33	00	83	10	00	28	sdy	66	do	7123	do	1♂ 6♀	25627	
									°C.						
Off Sanibel Islands	Bell buoy off Sanibel Island Light, NE., 10-2½ miles.						4.75	Sh. wh. M		Jan. 1, 1913	7795(9)	do	2♂	60172 60173	
Do	do									do	7795(9) Haul 2.	do	1♀	60171	
Marco							(1)			May —, 1884		H. Hemphill	3♂ 4♀	6952	
Caxambas										1919		George Mott	1♀	53403	
							Feet								
Cape Romano, 2 miles W. of							15–18					Lieut. J. F. Moser, U. S. Navy.	1♂	13053	
							Fathoms								
Off Cape Sable	25	10	10	81	28	30	4.75	gy. S. Sh	23.5	Dec. 17, 1902	7354	*Fish Hawk*	1♀	60164	
Do	25	09	45	81	18	35	3.25	rky. Co	23.5	do	7351	do	3♂ 1♀	53729	
Do	25	09	37	81	15	15	2.5	rky. Co	23.5	do	7350	do	1♂ 2♀	53731	
Do	25	07	10	81	29	00	5	rky. Co	23	Dec. 18, 1902	7361	do	2♂	53728	
Do	25	06	52	81	22	25	4.25	S. brk. Sh	23	do	7359	do	1♀	60166	
							Feet								
Do	25	06	30	81	12	25	11.5	rky	22	do	7356	do	1♀	60165	

[1] Outside beach to 3 fathoms.

Material examined of Pilumnus sayi—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued.	° ′ ″	° ′ ″			°C.						
Off Cape Sable	25 01 00	81 25 30	4.5	Sp. S. Sh	23	Dec. 19, 1902	7373	*Fish Hawk*	2♀	60168	
Do	25 00 40	81 15 37	2.5	rky	22.5	do	7370	do	1♀	53732	
Do	24 58 05	81 28 30	5	rky	22	do	7375	do	3♂ 1♀	53730	
Do	E. end Sawyer Key, S. ¼ W., 2¼ miles.		4.75	rky	22.5	Dec. 22, 1902	7390	do	3♂ 1 juv	60169	
Off Northwest Channel.	24 42 30	81 55 52	7.25	Co	20	Feb. 24, 1902	7293	do	2 y	60163	
Do	24 38 40	81 56 28	5.25	Co	19.5	do	7295	do	1 y ♀	53753	
Do	5 miles off breakwater		6					J. B. Henderson	1♂ 1♀	53751	
			Feet								
Hawk Channel	3½ miles N. ¾ E. of Sombrero Light.		11.5	rky	24.5	Jan. 27, 1903	7427	*Fish Hawk*	1♀	60170	Shedding. Identification uncertain.
Tortugas			[1]			1893		Biol. Exped. to Florida Keys and Bahamas.	1♂	Mus. S.U.I.	
Tortugas, outer lighthouse reef.	Stomach of fish No. 167, yellow grunt, *Haemulon sciurus* (Shaw).					June 7, 1925		W. L. Schmitt	1 cheliped	60957	Gift of Carnegie Institution. Fish taken by dynamiting.
Tortugas, off north end of Loggerhead Key.	Stomach of fish No. 31, schoolmaster, *Neomaenis apodus* (Walbaum).					do		do	1♀	60956	Gift of Carnegie Institution. Fish taken by dynamiting. With Rhizocephalid parasite.
Tortugas, outer lighthouse reef.	Stomach of fish No. 137, yellow grunt, *Haemulon sciurus* (Shaw).					do		do	1 cheliped	61129	Gift of Carnegie Institution.
Bahamas: Egg Island						May 13, 1893		Biol. Exped. to Florida Keys and Bahamas.	1♂	Mus. S.U.I.	

[1] Dredged.

PILUMNUS CARIBAEUS Desbonne and Schramm

Plate 200, Figures 3 and 4

Pilumnus caribaeus DESBONNE and SCHRAMM, Crust. Guadeloupe, 1867, p. 32 (type-locality, Guadeloupe; type not extant).—STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 141.—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 284.

Pilumnus ? aculeatus VON MARTENS [not Say], Arch. f. Naturg., vol. 22, pt. 1, 1856, p. 91.

Pilumnus brasiliensis MIERS, *Challenger* Rept., vol. 17, 1886, p. 151, pl. 13, figs. 2–2*d* (type-locality, near Bahia, 7 to 20 fathoms; type in Brit. Mus.).—RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 20, part 2 (1901), p. 40.

Diagnosis.—Secondary spines or spinules on lateral margin. Spines light horn color. Superhepatic spines wanting. Five or more denticles or spinules on edge of each frontal lobe.

Description.—Closely related to *P. sayi;* differs as follows: Fronto-orbital distance greater. The hairy coating is softer and evenly distributed on the dorsum, the long hairs slenderer than in *sayi.* The larger spines of body and appendages are light horn color. No superhepatic spines, subhepatic spine not large, marginal spines, one or more, have a small secondary spine on the posterior slope. Orbital spines numerous (7 or 8 above, 9 or 10 below), unequal but none large. Median sinus of front U-shaped or somewhat button-holed, lobes edged with five or more small spines or acute denticles.

The outer surface of the manus in both chelipeds is rough but the hair on the major manus is confined to the dorsal aspect or upper proximal half while the lower distal half is naked. The spines on the carpus and in the upper 3 or 4 rows of the manus are long, narrow and curved, the spines of the manus become, from the upper rows downward, gradually shorter, stouter and more conical until the lower ones are pointed tubercles. The lower part of the outer surface of the major manus may be smooth. The tuberculation of the lower margin is more pronounced than in *sayi.* On the whole the spination of the chelipeds is coarser than in *sayi.* The lower margin of the major propodus is convex below instead of sinuous. Ambulatory legs and horny tips of their dactyls shorter than in *sayi.*

Measurements.—Female (31082), length of carapace including spine 17.3, width including spines 23, width excluding spines 21.6 fronto-orbital width 16.6, width of front including outer or antennal spine 7.5 mm.

Color.—Reddish with some spots of a dirty white, fingers black (Desbonne and Schramm).

Range.—From Bahamas and Florida Keys to Brazil.

Material examined.—

BAHAMAS.—1903; B. A. Bean; received from Geographic Society of Baltimore: Off Governor's Harbor; in oyster dredge; July 7; 1 male, 7 females (31046). Off Green Cay; in oyster dredge; June 30; 1 male, 3 females, 3 young (31082).

1893; Biological Expedition, State University of Iowa: Egg Island; 1 female (Mus. S.U.I.). Bahama Banks, from millepores; May 12; 1 male (Mus. S.U.I.). Bahama Banks; May 15; 1 female (20022), 1 female (Mus. S.U.I.).

CUBA.—1914; Henderson and Bartsch, *Tomas Barrera* Expedition: Punta Colorado; 2–3 fathoms; Sh. Grs.; station 10; 1 female (48554). Bahia Honda; 2–12 fathoms; M. Co.; June 4; station 15; 1 male (48542).

JAMAICA.—T. H. Morgan; 1 small female (17214); identification uncertain. March 1–11, 1884; *Albatross;* 2 males (19887). P. W. Jarvis; 1 male (19403). C. R. Orcutt; 1 female (62553). Kingston Harbor: 1893, R. P. Bigelow, 1 female (19890); May–July, 1896, F. S. Conant, 2 males, 1 female (19596). Kingston; C. R. Orcutt; 1 male (62552).

VIEQUES.—Off Vieques Island; February 8, 1899; *Fish Hawk:* Point Mula Lighthouse, S. SW. ⅜ W., 5¾ miles; 14 fathoms; Co. S.; temperature 25.6° C.; station 6085; 2 small males (24355). Culebritas Lighthouse, NE. ½ N., 10 miles; 15 fathoms; Co.; temperature 26° C.; station 6091; 1 small male, 2 young (24357). Culebritas Lighthouse, NE. ⅜ E., 7¼ miles; 16 fathoms; Co.; temperature 25.2° C.; station 6092; 1 young (24358). Point Mula Lighthouse, E. ½ N., 11¼ miles; 6 fathoms; Co.; temperature 27.3° C.; station 6096; 1 small male (24359).

CULEBRA.—Off Culebra Island; Point Mula Lighthouse, SW. ½ S., 8½ miles; 14¾ fathoms; Co. S.; temperature 25.5° C.; February 8, 1899; station 6086, *Fish Hawk;* 2 small females, 1 young (24356).

VIRGIN ISLANDS.—St. Thomas; January 17–24, 1884; *Albatross;* 1 male, 2 females (19888).

1915; C. R. Shoemaker collector; gift of Carnegie Institution: Between Water Island and St. Thomas; 2–5 fathoms; June 28; 1 young female (60206). South side of Buck Island, 3 miles from St. Thomas; from fish pot; July 6; 1 male, soft shell (60207). South of Buck Island, about 3 miles from St. Thomas; from fish pot; July 8; 1 female (53752).

CURAÇAO.—February 10–18; 1884; *Albatross;* 1 ovigerous female (18040), carapace 6.7 mm. wide; identification uncertain.

BRAZIL.—Bay of Bahia; specimens in Copenhagen Mus.

Copacabana, Rio de Janeiro; in *Sargassum bacciferum,* carried to shore by waves; January, 1922; Carlos Moreira; 1 young (60935).

Ilha São Sebastião, State of São Paulo: 1900; E. Garbe collector; 1 female (returned to Mus. Paulista).

Villa Bella; October, 1925; H. Luederwaldt collector; 1 male, 1 ovigerous female (60933); received from W. L. Schmitt.

PILUMNUS DASYPODUS Kingsley

Plate 200, Figures 5 and 6

Pilumnus dasypodus KINGSLEY, Proc. Boston Soc. Nat. Hist., vol. 20, 1879, p. 155 (type-locality, Key West, Florida; type not located.—RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2, 1901, p. 40.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 320.

Pilumn us vinaceus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 283, pl. 50 figs. 2–2*b* (type-locality, Florida Reefs; type, Cat. No. 3049, M.C.Z.).

Diagnosis.—Margins spinous. No superhepatic spines. Outer surface of major palm of both sexes largely smooth and bare; spines and tubercles of upper part not arranged in rows.

Description.—Carapace thinly covered on its anterior two-thirds with long fine hair and occasional stouter setae interspersed; upper part of chelipeds and surface of legs similarly clothed. Under the hair the carapace is roughened by granular hair sockets and on the antero-lateral region by sharp granules. Frontal lobes with slightly arched and oblique margins furnished with very short spines or sharp granules and separated from each other by a median V notch and from the small, inconspicuous, single-spined, outer tooth by a wider U-shaped sinus. Orbital border strongly spined, about seven spines below and three or four above with sharp granules toward inner supraorbital tooth; the strongest spine is at the outer angle where it forms the smallest of the four spines arming the antero-lateral margin. They have conical bases and long, slender, incurved, horny extremities. A short subhepatic spine.

Chelipeds very unequal, spinous and granulate except lower-distal two-thirds (about) of outer surface of major palm which is smooth and naked in both sexes. The movable fingers have at base rows of sharp granules and slender hairs. Fingers of minor chela grooved on the outside, of major chela evenly rounded without grooves. Legs spinous above.

Color.—Body and claws brownish wine color, legs much lighter; fingers and extremities of spines brown. (A. Milne Edwards.)

Measurements.—Male (50535), entire length of carapace 10.7, entire width 15, fronto-orbital width 10.4, width of front 4.4 mm.

Affinity.—Small specimens of *dasypodus* are sometimes not easily distinguished from *sayi*. *P. dasypodus* is less heavily clothed with hair than *sayi* and less ragged looking. The front is more deflexed and less advanced, therefore appears wider. The spines and tubercles of the major palm in *sayi* are arranged more or less in rows and these rows have a tendency to encroach on the lower distal half; in *dasypodus* there are seldom any definite rows and the lower distal two-thirds or one-half in both sexes is smooth and bare. The immovable finger of the major chela in *dasypodus* is a little longer than in *sayi*.

Range.—North and South Carolina. From Gulf of Mexico to Florianopolis [Desterro], Brazil. Shallow water to 11 fathoms. A. Milne Edwards records *vinaceus* from 37 fathoms in the Gulf of Mexico.

Material examined.—See table, pages 495–498.

PILUMNUS SPINOSISSIMUS Rathbun

Plate 200, Figures 7 and 8

Pilumnus spinosissimus RATHBUN, Bull. Labor. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 265, pl. 5, fig. 3 (type-locality, off Key West, 5¼ fathoms; type in Mus. State Univ. Iowa).

Diagnosis.—Long-hairy. Frontal lobes oblique. Three innermost orbital spines curving over eyestalk. Four long antero-lateral spines. Palms short and high.

Description.—Carapace anteriorly strongly deflexed, front half covered with spiniform granules and rather sparse long hairs; posterior

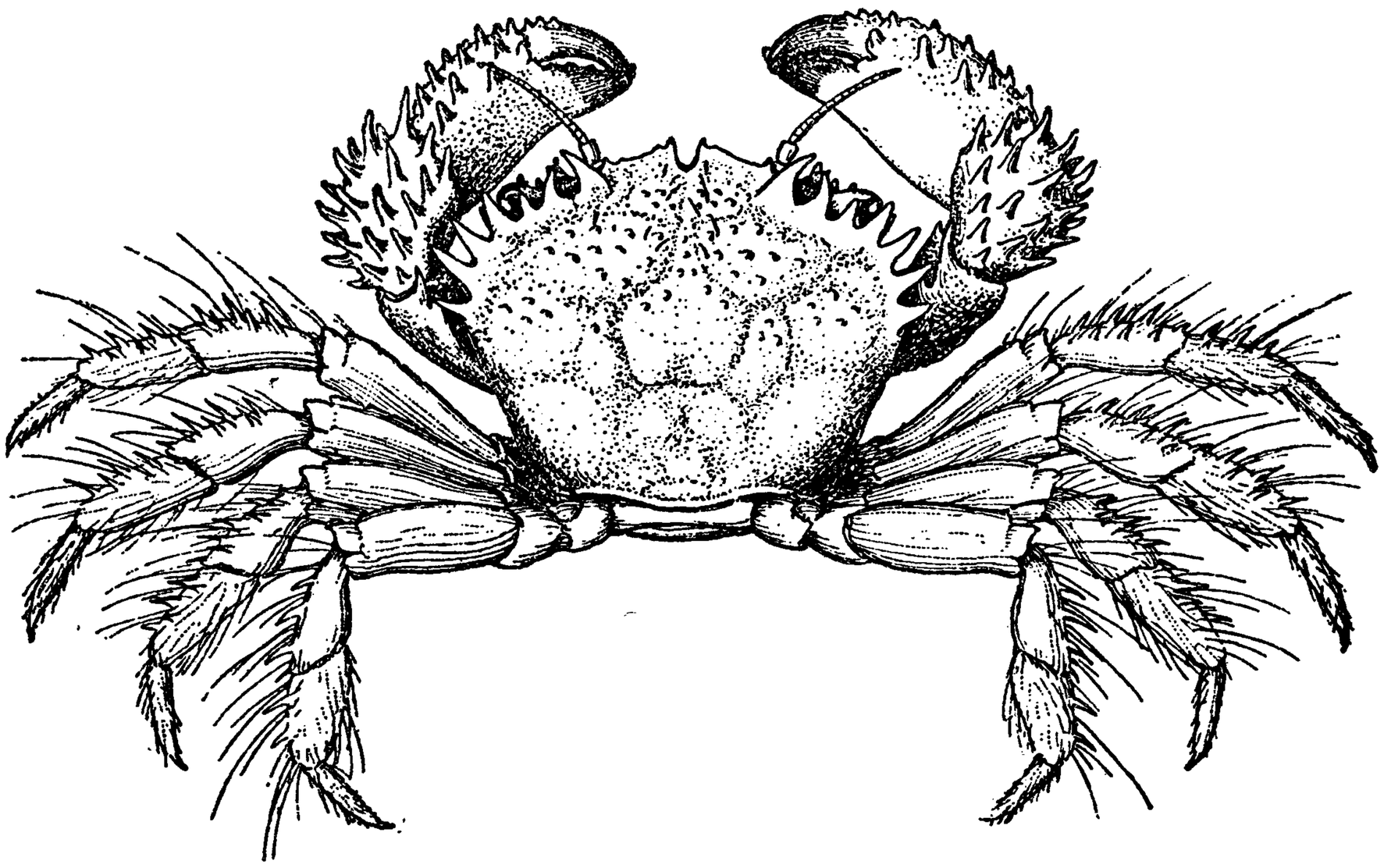

FIGURE 79.—PILUMNUS SPINOSISSIMUS, MALE, TYPE, DORSAL VIEW, × 3

half almost smooth; regions deeply limited. Front bilobed; lobes separated by a broad U-shaped sinus; each lobe has an oblique margin armed at inner end with a short spine and a few minute spinules; at outer end of front a small isolated or antennal spine. Superior orbital margin armed with four long spines, two innermost curving over the orbit but in planes at right angles to each other; inferior margin armed with a large inner process with bispinose tip and two shorter spines between which there is a row of stout spinules. Lateral margin of carapace with three long spines beside orbital spine; posterior spine a little shorter.

Chelipeds: Two long curved spines at distal end of upper margin of arm; wrist armed with about 20 sharp spines directed distad. Approximately two-thirds of outer surface of larger hand of male covered with about seven irregular rows of spines, larger above,

Material examined of Pilumnus dasypodus

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
North Carolina:	° ′ ″	° ′ ″			°C.						
Off Cape Hatteras	35 21 00	75 21 30	16	gy. S. brk. Sh	-------	Oct. 19, 1884	2280	*Albatross*	1 y. ♀ 2 y	20054	
Beaufort Harbor, off laboratory.	----------	----------	-------	----------	24	May 6, 1915	8261	*Fish Hawk*	2 y. ♀	60937	
Off Beaufort Harbor.	Fishing grounds NE. from can buoy, 1 mile.		15.5	Smooth	-------	Aug. 12, 1914	8217	----do	1♂	51076	
South Carolina: 15 miles southeast of Charleston.	----------	----------	-------	Taken from piece of coral.	-------	Mar. 23, 1880	-------	R. E. Earll	1♀	5063	
Florida:					°F.						
Off Carrabelle	Carrabelle Light, NW. ½ N., 16 miles.		10.25	----------	60.2	Jan. 16, 1913	7809 (23)	*Fish Hawk*	1♂	60195	
					°C.						
Aucilla Section	29 54 00	84 06 00	4.5	R. Co. Sh	14	Dec. 5, 1901	7191	----do	1♂	60188	
Do	29 48 10	83 55 15	5	S. Co	21	Nov. 6, 1901	7148	----do	1♂	60148	In sponge.
Do	29 52 10	83 51 47	3	S. Co	20	----do	7147	----do	1♀	60185	
Pepperfish Key Section.	29 18 00	83 37 00	8	rky	18	Nov. 21, 1901	7161	----do	1♂	60187	
Do	29 21 00	83 32 00	6.75	rky	16.7	---- do	7160	----do	1♂	60186	
Anclote section	28 01 30	83 08 00	11	rky	13.5	Jan. 23, 1902	7234	----do	1♂	60189	
					°F						
Do	Anclote Light, E. ⅛ S., 14 miles.		8.5	Co	63.95	Jan. 11, 1913	7806 (20)	----do	1♂	60194	
Tampa Bay	----------	----------	-------	----------	-------	----------	-------	J. S. Raymond	2♂	60198	From palmetto borings by *Teredo.*
Mullett Key	----------	----------	-------	----------	-------	----------	-------		1♂ 1♀	60197	
Goodland Point	----------	----------	-------	----------	-------	----------	-------	H. Hemphill	1♀	18030	
Off Boca Grande	Boca Grande Light, NNE ⅜ E., 24½ miles, to NE. ¼ N., 20 miles.		12.5	----------	68.5	Jan. 2, 1913	7796 (10)	----------	1♂ 2♀	60174	
Sarasota Bay	----------	----------	-------	----------	-------	----------	-------	H. E. Webster	1♀	56846	From Boston Society of Natural History.
Off Sanibel Island	Bell buoy off Sanibel Id. Light, NE. 10-2½ miles.		4.75	Sh. wh. M	-------	Jan. 1, 1913	7795 (9)	*Fish Hawk*	1♂ 1♀	60193	
Marco	----------	----------	1-3	----------	-------	May —, 1884	-------	H. Hemphill	50+	6976	

Material examined of Pilumnus dasypodus—Continued

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida—Continued.	° ′ ″	° ′ ″	*Feet*		°C						
Off Cape Romano	2 miles W. of Cape Romano.		15–18					Lieut. J. F. Moser, U. S. Navy.	1♀	18029	
Do	4 miles E. of Cape Romano.		18			Apr. 18, 1887		do	1 y	13060	
			Fathoms								
Off Cape Sable	25 00 55	81 22 15	4	rky	22	Dec. 19, 1902	7372	*Fish Hawk*	1♂ 1♀	60191	
Do	24 58 05	81 28 30	5	rky	22	do	7375	do	1♂	60192	
Do	25 00 40	81 15 37	2.5	rky	22.5	do	7370	do	1♂ 1♀	60190	
			Feet								
Do	25 00 30	81 12 20	11.5	rky	22	do	7369		1♂ 1♀	60167	
Key West						1885		H. Hemphill	2♂ 1♀	14443	
West of Tortugas	24 44 00	83 26 00	37			1877–78	10	U.S.C.S.S. *Blake*	2♂	3049, M.C.Z.	Cotypes of *P. vinaceus*.
Eastern Dry Rocks								Edward Palmer	2♀ 2 y	18027	
Cape Florida								do	2♂ 1♀	18028	
Cuba:			*Fathoms*								
Cabañas			2–12	S. Sh. grass to M.		June 8, 1914 June 9, 1914	16	Henderson and Bartsch.	1♂ 2♀ ovig	48543	
Havana									2	Copenhagen Mus.	
Guantanamo Bay								Henderson and Bartsch.	27	50535	1 with Rhizocephalid.
Jamaica:											
Kingston Harbor								P. W. Jarvis	1♂	19676	
Jamaica						1884		*Albatross*	2♂ 2♀ 1 y	18026	
Do						1910		E. A. Andrews	2 y	43058	
Bogue Islands						June 15, 1910		C. B. Wilson	1♀	43057	
Montego Bay						July 15, 1910		do	1♀	43059	
Porto Rico:											
Mayaguez						Jan. 20, 1899		*Fish Hawk*	1♀	24360	
Do						Jan. 21, 1899		do	1♂ 2♀ 1 y	24361	On corals.
Boqueron Bay						Jan. 25, 1899		do	1 y	24362	
Boqueron						do		do	2♀	24363	
Porto Real						Jan. 27, 1899		do	1♂ 2♀ 1 y	24364	

Reefs at Ponce						Jan. 30, 1899		do	3 y	24365	
Playa de Ponce Reef.						Feb. 1, 1899		do	4♂ 5♀	24366	
Porto Rico						1899		do	2♂ 5♀ 1 y.	24369	
Culebra:											
Ensenada Honda						Feb. 9, 1899 Feb. 11, 1899		do	1♂ 1♀	24367	
Culebra						Feb. 8, 1899		do	1♀	24368	
St. Thomas:											
St. Thomas						Jan. 17, 1884 to Jan. 24, 1884		*Albatross*	4♂ 3♀	18516	1 with Rhizocephalid.
Do						do		do	2 y	18041	
Do				From piles near town.		July 7, 1915		C. R. Shoemaker	1♂ 4♀ (2 ovig.) 1 y.	60199	From Carnegie Institution.
St. Thomas Harbor				From bottom of small boat.		July 10, 1915		do	6♂ 7♀ (3 ovig.) 4 y.	60201	Do.
Gregerie Bay			0. 5–2. 75	Co. R. S. seaweed		July 7, 1915	7	do	12♂ 16♀ (1 ovig.)	60200	Do. 1 with Rhizocephalid.
Mosquito Bay			2	wh. S. Co		July 21, 1915	12	do	1♀	60202	With 2 Rhizocephalids. From Carnegie Institution.
Virgin Islands				From piles		1915		do	9 ♂ 11 ♀ (2 ovig.) 6 y.	60203	Do.
St. John									3	Copenhagen Mus.	
Martinique									1	Paris Mus.	
Curaçao						Feb. 10, 1884 to Feb. 18, 1884		*Albatross*	1♂ 2♀	18523	
Caracas Bay						Apr. 19, 1920		C. J. van der Horst.	1♀	56899	With Rhizocephalid parasite.
Spanish Water				Mangrove roots		Apr. 8, 1920		do	1♀ ovig	56897	
Do						May 18, 1920		do	1♂	56898	
Brazil:											
Pernambuco (probably).						1876–77		R. Rathbun	1♀	19892	Hartt Explorations.
Pernambuco stone reef at Ilha de Nogueira.						July 10, 1899		A. W. Greeley	3♀	25727	Branner-Agassiz Expedition.
Stone reef at Boa Viagem, Pernambuco.						July 6, 1899		do	3♂ 1♀	25728	Do.
Coral reef, Maceio, Alagoas.						1899		do	1♂ 1♀	Stanford Univ.	Do.
Brazil						1899		do	1♂	25729	Do.

Material examined of Pilumnus dasypodus—Continued

Locality	Date	Station	Collector	Specimens	Catalogue No.	Remarks
Brazil—Continued. Bom Fim, Bahia, stone reef.	1876–77		R. Rathbun	1♂ 1♀ ovig.	40824	Hartt Explorations. Atypical. Spines unusually developed, especially those bordering the orbit.
Rio de Janeiro	Aug. 24, 1925		U.S.C.S.S. *Hassler*. W. L. Schmitt	1 sm 2 y	M. C. Z. 60936	
Pedras da Itapuca, Bay of Rio de Janeiro.				1	Paris Mus.	
Desterro [Florianopolis.]						

Bearings		Fathoms	Bottom	Temperature
Latitude N.	Longitude W.			
° ′ ″	° ′ ″			

diminishing lower down on the article; outer surface of smaller hand covered with spines. In the female the major as well as the minor palm also is covered outside with spines and tubercles. Dactyli spinulous on proximal half or two-thirds. Fingers deeply grooved outside. Legs long-hairy; merus spinulous above; carpus and propodus armed with long spines; dactyli thick and with a long horny tip.

Measurements.—Male holotype, length of carapace 8.3, width of same including spines 11.6, excluding spines 10.5 mm. Female (22268), length of carapace including spine 10.8, width of same including spines 15, excluding spines 14, fronto-orbital width 11.8, width of front including antennal spine 5.2 mm.

Range.—Florida Keys.

Material examined.—

Off Biscayne Key; 16–34 feet; May 29, 1912; Paul Bartsch; 1 male (60222).

Duck Key, N., 1.25 miles; 2.75 fathoms; Co. Sh.; December 20, 1912; station 7790 (4), *Fish Hawk;* 1 male (60221).

Key West; 1896; B. W. Evermann, U. S. Fish Commission; 1 female (22268).

Off Key West; about one mile from Light; 5¼ fathoms; June 26, 1893; station 44, Biological Expedition, State University of Iowa; 1 male holotype (Mus. S. U. I.).

Tortugas; from stomachs of fish obtained by dynamiting; 1925; W. L. Schmitt; gift of Carnegie Institution: Fish No. 137, yellow grunt, *Haemulon sciurus* (Shaw), on outer Lighthouse reef; June 7;

1 immovable finger (60959). Fish No. 179, schoolmaster, *Neomaenis apodus* (Walbaum), off N. end of Loggerhead Key; June 9; 2 chelipeds (60961). Fish No. 246, common grunt, *Haemulon plumieri* (Lacépède), off N. end of Loggerhead Key; June 9; 1 cheliped (60960). Fish No. 622, sailors choice, *Haemulon parra* (Desmarest); June 23; 1 chela (60958).

Tortugas: S. end of Loggerhead Key; from large rock 2 feet by 18 inches by 18 inches; August 10, 1924; W. H. Longley; 1 young male (62557); gift of Carnegie Institution.

PILUMNUS GRACILIPES A. Milne Edwards

Plate 201, Figures 8 and 9

Pilumnus gracilipes A. Milne Edwards, Crust. Rég. Mex., 1880, p. 288, pl. 50, figs. 3, 3*a* (type-locality, off Barbados, 100 fathoms; type in Museum of Comparative Zoölogy).

Diagnosis.—Carapace narrow, subquadrilateral, short-hairy. A spine at middle of upper margin of orbit. Legs very long and slender.

Description.—Carapace thicker and more quadrilateral than usual in *Pilumnus*, covered with pubescence and short, stiff bristles which are yellow with dark reddish-brown tips (in spirit) and are so scattered as not to conceal details of carapace. Regions not deeply outlined, surface without granulations and spines, but a little rugose from the punctæ in which the hairs are inserted. Front wide, lobes spinulous, little arched forward. Inner superior angle of orbit with two spines. Upper border of orbit with a curved spine at middle and 3 or 4 spiniform granules between it and the postorbital spine; lower border armed with about four spines and terminated by a bispinose inner angle. Some spiniform tubercles and numerous granules on subhepatic and pterygostomian regions. Antero-lateral margin short, armed with four spines including that at the orbital angle.

Chelipeds unknown. Ambulatory legs extraordinarily long and slender, margins sparsely hairy; merus, carpus and propodus armed above with a row of rather long, slender spines; dactyl remarkably long.

Measurements.—Female holotype, ovigerous, length of carapace 16, width of same 20 mm.

Range.—Barbados, 100 fathoms. Known only from the unique type-specimen.

Material examined.—Off Sandy Bay, Barbados; 100 fathoms; 1871; U. S. Coast Survey Steamer *Hassler;* 1 female holotype (2974, M. C. Z.).

PILUMNUS MARSHI Rathbun

Pilumnus marshi Rathbun, Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2, 1901, p. 41, text-fig. 8 (type-locality, off St. Thomas, 20–23 fathoms; type, Cat. No. 23771, U.S.N.M.).

Diagnosis.—Subquadrate; antero-lateral margin short, three-spined. Outer surface of both palms rough and hairy all over. Legs long and narrow.

Description.—Carapace narrow, relatively broad behind, postero-lateral margins slightly convergent and twice as long as the antero-lateral. Surface pubescent, with longer, very fine hairs interspersed; a few short spinules scattered on antero-lateral region. Front with a median V-notch, two subtruncate or slightly arcuate lobes with finely denticulate edge, separated by a U-shaped sinus from the isolated outer spine. Orbital margin finely denticulate and with a few separated spinules above and several at the inner end below. Eyes large, reniform. Antero-lateral margin with three spines, none at orbital angle, first two spines long, slender, attached to broad bases, third spine slender but much smaller and rather closely appressed to side of carapace.

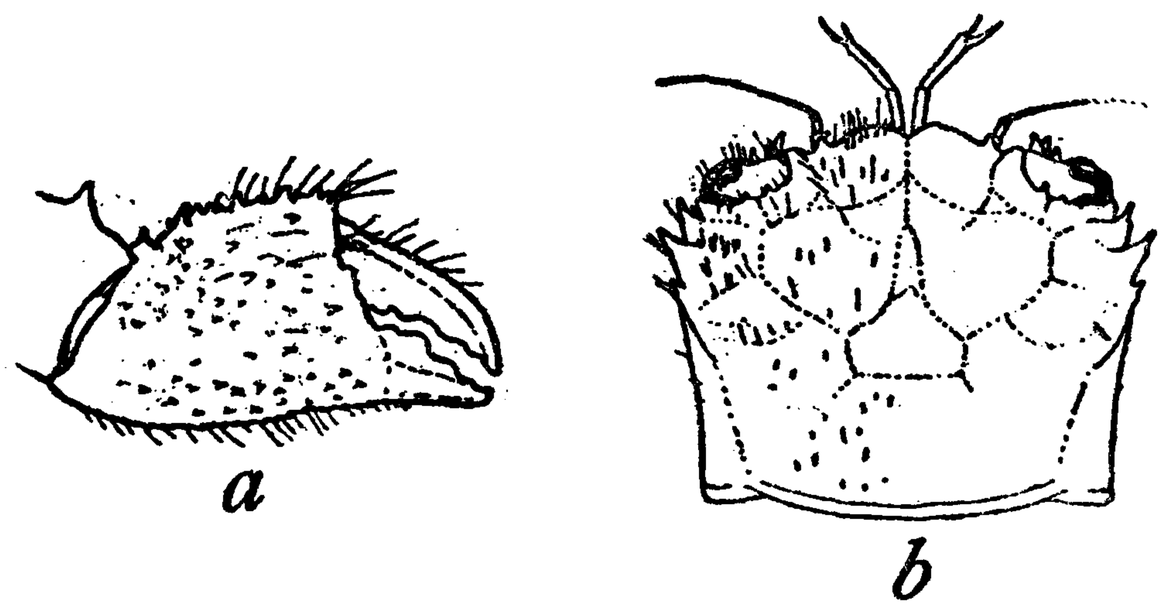

FIGURE 80.—PILUMNUS MARSHI, MALE, ×4. *a*. MAJOR CHELA. *b*. CARAPACE

Chelipeds and legs thinly clothed with long hair. Margins of merus and dorsal aspect of carpus and propodus of cheliped spinous. Chelae similar and not very unequal; their spines become progressively smaller on outer surface of palms until below they are sharp granules. Merus of ambulatory legs dilated, armed above, also carpus and propodus with a row of slender curved spines, below minutely spinulous; three terminal articles long and narrow, the dactylus nearly straight down to the curved horny tip.

Color.—In alcohol the spines are white, fingers light horn color, tips white.

Measurements.—Male holotype, length of carapace 5.5, width of same 7, fronto-orbital width 6.2, width of front 2.8 mm. Female (24242), length of carapace 5.7, width of same 7.1 mm.

Range.—Tortugas, Florida, and off St. Thomas, Virgin Islands.

Material examined.—White Shoals, Tortugas, Florida; July 19, 1924; station 25; W. L. Schmitt; 1 male (60822); gift of Carnegie Institution.

Off St. Thomas; February 6, 1899; *Fish Hawk:* Sail Rock, NW. ½ W., 4 miles; 20 fathoms; Co.; temperature 25° C., station 6080; 1 female (24242). Sail Rock, W. by N. ½ N., 6 miles; 20–23 fathoms; Co.; temperature 25.8° C.; station 6079; 1 immature male (23771).

PILUMNUS DIOMEDEAE Rathbun

Plate 202, Figures 2 and 3

Pilumnus diomedeae RATHBUN, Proc. U. S. Nat. Mus., vol. 17, p. 3, advance sheet, March 20, 1894; p. 85, July, 1894 (type-locality, off Havana, 184 fathoms; type, Cat. No. 9526, U.S.N.M.).

Diagnosis.—Four long spines on each lobe of front. Carapace very rough. Hairs extremely long. Spines of carpus and propodus of ambulatory legs normal to the article.

Description.—Carapace of moderate width. Surface very rough with acute granules or hair sockets; some and perhaps all of the hairs long, yellow. Front with two produced oblique lobes each bearing four slender spines; a longer incurved spine near antenna. Orbital spines 9: 2 on the upper margin, one at the outer angle and 6 below; of the 2 upper, one is next the antennal spine, the other at middle of orbit; of the suborbital spines the two outermost are separated by a deep narrow sinus, the two innermost are more advanced. There are four strong antero-lateral spines including the orbital; between the first and second there is a small supernumerary spine; the second spine has an accessory spinule. Subhepatic and pterygostomian regions spinulous; two small spines form a longitudinal line on the process which bears the two spines at inner angle of orbit.

Chelipeds unequal, spinous, long-hairy like the carapace. Merus with surface minutely spinulous, margins spinous, upper margin with two huge spines at distal end. Carpus with outer surface spinous and spinulous, an unusually long and strong spine at inner angle. Manus with two rows of four slender spines on upper surface, lower margin spinulous, spines of outer surface arranged in four or five longitudinal rows, inner surface minutely granulous. Fingers spinulous and hairy proximally, horn-colored, teeth and tips almost white. Ambulatory legs very long, slender, long-hairy like carapace and chelipeds; margins of merus and upper margin of carpus and propodus armed with slender spines, those on carpus and propodus nearly normal to the article.

Measurements.—Female holotype, width of carapace including spines 16, excluding spines 15, width of front including antennal spine 6, length of longest hairs about 6, length of inner spine of carpus of cheliped 2.5 mm.

Range.—Entrance to Gulf of Mexico, 130 to 184 fathoms.

Material examined.—

Off Havana, Cuba; lat. 23° 10′ 40″ N.; long. 82° 20′ 15″ W.; 184 fathoms; fne. gy. wh. Co.; January 20, 1885; station 2345, *Albatross;* 1 female, holotype (9526); hinder portion missing.

Yucatan Channel, Mexico; lat. 20° 59′ 30″ N.; long. 86° 23′ 45″ W.; 130 fathoms; Co.; January 22, 1885; station 2354, *Albatross;* 1 female, soft shell (18158).

PILUMNUS LONGLEYI, new species

Plate 202, Figures 4 and 5

Type-locality.—South end of Loggerhead Key, Tortugas, Florida; Aug. 10, 1924; W. H. Longley; one female (Cat. No. 62569); gift of Carnegie Institution.

Diagnosis.—Five antero-lateral spines of which the third is double. Hepatic region spinous. Manus of both chelipeds rough and hairy outside.

Description.—Carapace covered with uneven hairs which are shorter on the posterior half; underneath the hairs the surface is rough with pointed granules, which also border the front. Hepatic region armed above with several spines two of which are longer and with dark tips. Regions deeply marked. Anterior and antero-lateral margins together arcuate. Frontal lobes convex, bordered with 8 or more granules some of which may be acute, but no spines; lobes separated from each other and from the outer spine by a broad V. Orbital margin spinous, spines unequal. Antero-lateral margin 5-spined; first two spines shorter, slenderer and nearer together than the others; third spine bispinose; fourth and fifth longest; terminal half of spines light brown. Subhepatic region granulate and with one spine.

Chelipeds and legs long-hairy. Chelipeds massive, very unequal; two spines on upper margin of merus; carpus and upper part of manus armed with stout spines; outer surface of manus covered with acute or subacute tubercles. Major fixed finger short and broad, prehensile edge with two large teeth above the point, followed by two smaller ones; teeth of dactylus low, 5 or 6 in all, the 2 proximal ones united and enlarged, the fourth may be equally large. Three longitudinal rows of granules on upper surface of dactylus in basal third. Fingers of minor cheliped slenderer, the fixed finger longer. Merus of ambulatory legs 1 to 3 armed with a row of spines above, carpus with three rows, propodus with two rows. Last leg with a spine at distal end of merus; carpus and propodus with a row of spines above and an incomplete row on outer surface.

Measurements.—Female (62569), total length of carapace 11.4, width including spines 16, width excluding spines 15, fronto-orbital width 10.4, width of front between antennae 4.8 mm. The male (60955) measures 17.4 mm. in extreme width.

Young.—Small specimens are rougher and more spinous, spines white; there may be 3 superhepatic spines, one protogastric spine near by, and 4 or 5 smaller epibranchial spines.

Relation.—This species is easily confounded with *sayi* and *caribaeus*, which it resembles in general appearance, but can be told (1) by the antero-lateral spines 5 in number, or 6, counting as 2 the spines of the constantly bispinose third spine, whereas in *sayi* the spines are

only 4, and in *caribaeus* 5 with the second insignificant and the third, fourth, and fifth equal and with stout spinulous bases; (2) by the edge of the front finely and numerously granulate; and (3) by the greater number of spines on the dorsal surface of the antero-lateral region.

Range.—Bahamas and Florida Keys.

Material examined.—

BAHAMAS.—Golding Key, Andros Island; May 13, 1912; Paul Bartsch; 1 young female (60205).

FLORIDA.—Hawk Channel; half a mile SE. by S. of SE. end of Duck Key; 2.25 fathoms; rky.; temperature 24.5° C.; January 27, 1903; station 7429, *Fish Hawk;* 1 female (60204).

Key West; Union College collection; 2 males (42815), 1 male (42816).

Tortugas; through W. L. Schmitt; gift of Carnegie Institution: S. end of Loggerhead Key; from large rock 2 feet by 18 inches by 18 inches; August 10, 1924; W. H. Longley, collector; 1 female, holotype (62569). Off N. end of Loggerhead Key; by dynamite; from stomach of fish No. 19, schoolmaster, *Neomaenis apodus* (Walbaum); June 5, 1925; W. L. Schmitt collector; 1 male (60955).

PILUMNUS SPINOHIRSUTUS (Lockington)

Plate 203

Acanthus spino-hirsutus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 33 [6] (type-locality, San Diego; type not extant), and p. 102 [8] (part).

Pilumnus spino-hirsutus STREETS and KINGSLEY, Bull. Essex Inst., vol. 9, 1877, p. 107 (part).

Pilumnus spinohirsutus RATHBUN, Harriman Alaska Exped., vol. 10, 1904, p. 185 (part), not pl. 7, fig. 2; Proc. U. S. Nat. Mus., vol. 38, 1910, p. 585 (part); Bull. Amer. Mus. Nat. Hist., vol. 48, 1923, p. 623, pl. 27.

Diagnosis.—Width of carapace (exclusive of spines) nearly 1½ times length. Antero-lateral spines 5, the first interspace shorter than the others. No subhepatic spine, sometimes small spinules. In male, half of outer surface of major palm is smooth and naked, this area bounded by an oblique line.

Description.—Dorsal surface of carapace and appendages covered with long hairs except the hinder part of the carapace; carapace and ambulatory legs have also a short coat of pubescence. Carapace very convex antero-posteriorly, slightly convex from side to side. Frontal lobes truncate, slightly oblique, 3-spined. Antero-lateral margins armed with long spines, orbit and front with shorter spines; lateral spines 5, the first or orbital spine a little shorter than the others, the space between first and second less than the other spaces, the bases of these two spines being often contiguous, so that they appear like one deeply bifid spine. The third spine has a tendency to produce a posterior branch. Subhepatic spine wanting, in its place there may be some small spinules.

The lower half of the major palm of the male is usually smooth and naked, the smooth area separated from the rough area by a line running from the lower proximal corner to the distal end opposite the middle of the base of the dactylus or sometimes further down. In the female the smooth space is similar to, but smaller than, that of the male.

Measurements.—Female (32964), length of carapace including spine 23.4, median length 22.4, width including spines 34.6, excluding spines 32, fronto-orbital width 20.3, width of front including antennal spine 8.5 m.

Range.—From San Pedro, California, to Magdalena Bay, Lower California.

Material examined.—

CALIFORNIA.—Vicinity of San Pedro; 1917; E. P. Chace; 1 male (53988).

Long Beach; H. N. Lowe; 1 female, soft shell (50550).

Santa Catalina Island; dredged; H. N. Lowe; 3 females (32964).

La Jolla, on rocks north of Institute; January 28, 1915; Scripps Institution; 3 males, 4 females (54763), 2 males, 6 females (2 ovigerous) (Scripps Inst.). Third lateral spine bifid in 1 male (54763).

San Diego: C. R. Orcutt; 1 male, 1 female (54734). False Bay; San Diego Society of Natural History; 1 female (returned to sender).

Southern California; *Anton Dohrn;* Venice Marine Biological Station; 1 female (50258).

LOWER CALIFORNIA.—Point Abreojos; March 6, 1911; *Albatross;* 1 male (60035).

Magdalena Bay: 1917; C. R. Orcutt; 1 male, soft shell, 1 female (50631). Shore; Hanna and Jordan, California Acad. Sci.; 1 male; returned.

Magdalena Bay; Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35′ 20″ N.; long. 111° 59′ 35″ W.; 13.5 fathoms; S. brk. Sh.; March 21, 1911; station 5678, *Albatross;* 1 male, 1 female, 2 young (60034).

PILUMNUS TOWNSENDI Rathbun

Plate 202, Figure 1; Plate 204, Figures 1 and 2

Acanthus spino-hirsutus Lockington, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 102 [8] (part), not p. 33 [6].

Pilumnus spino-hirsutus Streets and Kingsley, Bull. Essex Inst., vol. 9, 1877, p. 107 (part).—Kingsley, Proc. Boston Soc. Nat. Hist., vol. 20, 1879, p. 154.—Rathbun, Harriman Alaska Exped., vol. 10, 1904, p. 185 (part), pl. 7, fig. 2; Proc. U. S. Nat. Mus., vol. 38, 1910, p. 585 (part).

Pilumnus townsendi Rathbun, Bull. Amer. Mus. Nat. Hist., vol. 48, 1923, p. 624, pl. 28 (type-locality, off Adair Bay, Gulf of California; type, Cat. No. 17413, U.S.N.M.).

? *Eriphides hispida* Boone, Zoologica, vol. 8, 1927, p. 236 (part: text-fig. 87 B).

Diagnosis.—Width of carapace (exclusive of spines) 1⅓ or less than 1⅓ times length. Antero-lateral spines 4, equally separated. A slender, well-marked, subhepatic spine, below the interval between first and second lateral spines. In both sexes less than half of outer surface of major palm is smooth. A continuous low of short, conical spines runs lengthwise in line with the base of cutting edge of propodal finger.

Description.—General appearance same as that of *P. spinohirsutus.* The frontal spines are longer than in *spinohirsutus;* the other differences are indicated in the diagnosis.

Measurements.—Female holotype, length of carapace including spine 14.2, median length 13.8, width including spines 21.4, excluding spines 18.3, fronto-orbital width 14.7, width of front including antennal spine 6.6 mm.

Range.—West coast of Mexico, from Magdalena Bay to Manzanillo, via Gulf of California. ? Galapagos Islands.

Material examined.—

WEST COAST OF LOWER CALIFORNIA.—Off Magdalena Bay; lat. 24° 38′ 00″ N.; long. 112° 17′ 30″ W.; 51 fathoms; gn. M.; temperature 56.4° F.; May 2, 1888; station 2832, *Albatross;* 1 young, soft shell (21988); width 4.3 mm., identification uncertain.

Magdalena Bay; Sail Rock, Entrada Point, S. 53° W.; Redondo Point, S. 15° W.; lat. 24° 35′ 20″ N.; long. 111° 59′ 35″ W.; 13.5 fathoms; S. brk. Sh.; March 21, 1911; station 5678, *Albatross;* 1 male, 1 female (60038).

GULF OF CALIFORNIA.—Head of Concepcion Bay; April 6, 1911; *Albatross;* 1 male, 3 young (60036).

San Luis Gonzales Bay; March 27, 1889; *Albatross;* 1 male (17414).

Off Shoal Point; lat. 31° 31′ 45″ N.; long. 114° 19′ 00″ W.; 10 fathoms; gy. s.; March 26, 1889; station 3027, *Albatross;* 1 young (18621).

Off Adair Bay; March 25, 1889; *Albatross:* Lat. 31° 22′ 00″ N.; long. 114° 07′ 45″ W.; 17 fathoms; G. brk. Sh.; temperature 65.2° F.; station 3026; 2 females (1 is holotype) (17413). Lat. 31° 21′ 00″ N.; long. 113° 49′ 00″ W.; 11 fathoms; S. brk. Sh. G.; temperature 67° F.; station 3024; 4 males, 2 females (17412).

NW. of Guaymas; lat. 28° 16′ 00″ N.; long. 111° 54′ 00″ W.; 22 fathoms; fne. gy. S.; temperature 63° F.; March 23, 1889; station 3012; *Albatross;* 1 male (18199).

STATE OF COLIMA.—Manzanillo; on drifted pile; July 17, 1913; C. R. Orcutt; 5 females (46081).

PILUMNUS GONZALENSIS Rathbun

Plate 204, Figures 3 and 4

Pilumnus gonzalensis RATHBUN, Proc. U. S. Nat. Mus., vol. 16, 1893, p. 240 (type-locality, San Luis Gonzales Bay; type, Cat. No. 17415, U.S.N.M.).

Diagnosis.—Short-hairy over all its dorsal surface. Carapace largely flat; five lateral spines, first two small. Infero-distal half of outer surface of major palm naked, but mostly rough with tubercles and granules.

Description.—A much flattened species, carapace deflexed in anterior third, covered with a short, dense, tough pubescence, each hair straight, regularly tapering. When the hairs are removed, the outlines of the mesogastric region are distinct, and three or four spinules near antero-lateral margin. Front with margin hairy and spinulous with 10 or 12 spinules, median sinus V-shaped, lateral lobes scarcely separated from median and less advanced. Margin of orbit armed with about 11 conical spines. Five antero-lateral spines, the first two very small, equal, close together at base, and shorter than the remaining spines; third spine with a small one on its posterior slope; all have one or more accessory spinules. Pubescence of ventral surface shorter than that of dorsal; subhepatic region spinulous and subbranchial region granulous. Ridge on endostome distinct.

Chelipeds very unequal, upper surface covered with hair and short conical spines which become acute tubercles and then granules lower down on the outer surface of the palms, there forming irregular longitudinal lines; major palm naked toward fingers and lower edge, punctate and finely granulous; fingers short, stout, gaping; dactyls tuberculate above near base. Legs broad, hairy, spinulous above.

Color.—In alcohol, hairs yellow, carapace red mottled with pale yellowish, spines and fingers brown.

Measurements.—Male (17415), length including spine 13, width including spines 18, excluding spines 16.4, fronto-orbital width 11.4, width of front 5.5 mm.

Range.—Gulf of California, Mexico.

Material examined.—La Paz; L. Belding; 5 males, 2 females (4628).

San Francisquito Bay; April 9, 1911; *Albatross;* 1 female (60033), 1 female (Amer. Mus.).

San Luis Gonzales Bay; March 27, 1889; *Albatross;* 8 males, 13 females (17415); 1 male is holotype.

Tepoca Bay; April 25, 1921; Fred Baker, Exped. California Academy of Sciences; 2 young females (Cal. Acad. Sci.).

Gulf of California; 1921; Exped. California Academy of Sciences; 1 male (Cal. Acad. Sci.).

PILUMNUS DEPRESSUS Stimpson

Pilumnus depressus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 109 [19] (type-locality, Cape St. Lucas; type not extant).

Diagnosis.—Carapace and outer surface of major cheliped mostly naked. Lateral and orbital margins dentate.

Description.—"Body depressed; carapax for the most part flattened and naked, but slightly curved, pilose and roughened toward the

anterior and antero-lateral margins. Frontal margin spinulose. Margins of the orbits above and below armed with spiniform teeth. Antero-lateral margin with three spiniform teeth besides the angle of the orbit, which, like the next lateral tooth, is bifid. Subhepatic tooth minute. Subhepatic and suborbital regions covered with sharp granules concealed beneath pubescence. Feet pilose and spinulose; spinules shorter than in *P. xantusii*. Greater cheliped naked and obsoletely granulated on the larger part of its distal surface." (Stimpson.)

Measurement.—Male type, length of carapace 8.9 mm. (0.35 inch), width of same 11.9 mm. (0.47 inch). (Stimpson.)

Range.—Cape St. Lucas, Lower California, Mexico. Known from the original description only.

PILUMNUS FLORIDANUS Stimpson

Plate 205, Figures 3 and 4

Pilumnus floridanus STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 141 (type-locality, Tortugas; type in M. C. Z.).—RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 40.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 322.

Pilumnus lacteus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 292, pl. 51, fig. 5–5*b*. Not *P. lacteus* Stimpson, 1871.

Diagnosis.—A transverse row of long hairs across front. Front bare, unarmed. Orbit entire above, spinulous below. Four lateral spines. Chelipeds spinous.

Description.—A small species: Carapace covered with a dense, short pubescence, thinning behind, and a few longer clavate hairs, a transverse series of which across the frontal region is a conspicuous feature. Lobes of front almost bare, edge slightly oblique, entire, median notch triangular, lateral notches rounded, outer teeth minute, deflexed. Hepatic region finely roughened above but without spines. Antero-lateral marginal spines four, slender, set in conical bases; below the interval between the orbital and the next spine may be seen a small subhepatic spine. Orbital margin unarmed above, having a small V-shaped notch opposite the end of the gastro-hepatic furrow; armed below with from eight to ten spinules, those on the inner half a little larger.

Chelipeds spinous above, two spines near distal end of merus, carpus armed all over its exposed surface; on the manus the spines become pointed tubercles on the outer surface; the major manus has a limited, smooth bare space on its distal lower portion, sometimes amounting to half its outer surface in the male, usually much more restricted and often lacking in the female. Ambulatory legs spined above.

Measurements.—Male (11306), length of carapace 6.5, width of same 9.6, fronto-orbital width 6.9, width of front 3.4 mm.

Range.—North Carolina and Gulf of Mexico to the Virgin Islands.

Material examined.—See table, pages 508–509.

Material examined of Pilumnus floridanus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			°C.						
North Carolina: South of Cape Lookout, off fishing buoy.	34 20 15	76 49 00	16	hrd		July 14, 1915	8283	*Fish Hawk*	1 ♀	61124	
West coast of Florida:											
Off Cape San Blas	29 18 15	85 32 00	25	crs. gy. S. brk. Sh.		Feb. 7, 1885	2370	*Albatross*	1 y	18018	
Do			25–27			do	2369–2374	do	2 y	19859	
South of Cape St. George.	28 45 00	85 02 00	30	gy. S. brk. Co		Mar. 15, 1885	2405	do	1 ♀	18019	
South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co		do	2406	do	1 ♂ 5 y	18020	
Do	28 47 30	84 37 00	24	Co. brk. Sh		do	2407	do	1 ♂	18021	
Cedar Keys			Low tide.	Flats		Mar. 27, 1926		Miller and Aschemeier.	1 ♀	60944	
Anclote Section	28 01 30	83 08 00	11	rky	13.5	Jan. 23, 1902	7234	*Fish Hawk*	1 ♂	60208	
West of Charlotte Harbor.	26 47 30	83 25 15	28	fne. wh. S. bk. Sp. brk. Sh.		Mar. 18, 1885	2410	*Albatross*	3 ♂ 1 ♀ 1 y	9821	
Do	27 04 00	83 21 15	26	crs. gy. S. brk. Sh.		do	2409	do	3 y	18022	
Do	26 33 30	83 15 30	27	fne. wh. S. bk. Sp.		do	2411	do	2 ♂ 2 ♀ 3 y	18023	
Do	26 35 00	83 11 00	27.5	sdy	20	Apr. 2, 1901	7122	*Fish Hawk*	4 ♂	25630	
Do	26 33 00	83 10 00	28	sdy	19.1	do	7123	do	10+	25631	
					°F.						
West of Sanibel Islands.	26 19 00	83 11 00	27	S. algae	68	Mar. 21, 1889	5108	*Grampus*	1 y	23393	
West of Marco	26 00 00	82 57 30	24	fne. S. bk. Sp. brk. Sh.		Mar. 19, 1885	2413	*Albatross*	17 ♂ 10 ♀ 5 y	11306	
					°C.						
West of Cape Romano.	25 50 15	82 41 45	21	sdy	20	Apr. 2, 1901	7124	*Fish Hawk*	6 ♂ 4 ♀	25632	
Gulf of Mexico						Mar. 7, 1885		*Albatross*	1 ♀	10034	On fish line.
Bay of Florida								Union College collection.	4 y	60212	
North of Tortugas	25 04 30	82 59 15	26	fne. wh. S. brk. Sh.		Mar. 19, 1885	2414	*Albatross*	7 ♂ 9 ♀	18025	
White Shoals, Tortugas.						July 19, 1924	22	W. L. Schmitt	1 ♀	60820	Gift of Carnegie Institution.
Do	5 miles S. of Loggerhead Key.		7–10			July 20, 1924	29–32	do	1 ♂	60942	Do.
Do						July 20, 1924	35, 36	do	1 ♀	61125	Do.

Tortugas	6 miles S. of No. 2 buoy.	18	crs. S		July 22, 1924	44	do	5♂ 7♀ 3 y	60941	Do.
Do	Between 10 and 11 miles S. of No. 2 buoy.	35–37	S		June 10, 1925	206–207	do	10♂ 7♀ (1 ovig.).	60938	Gift of Carnegie Institution; 2 with parasites.
Do	About 13 miles S. of No. 2 buoy.	87–45	Rough		do	210	do	1 y	60943	Gift of Carnegie Institution.
Do	About 8 miles S. of No. 2 buoy (sponge haul).	25	Picked from coral rock.		June 11, 1925	217	do	4♂ 7♀ (1 ovig.) 6 y.	60939	Do.
Do	E. side Loggerhead Key.		From 2 buckets of turtle grass, roots, etc.		June 17, 1925		do	2 y	60940	Do.
Do	Greater heads up reef. Stomach of fish No. 391, yellow grunt, *Haemulon sciurus* (Shaw).				June 13, 1925		do	1 pair chelipeds.	61126	Do.
Do	S. of SW. channel buoy				Aug. 16, 1924	7	*Dohrn* (W. L. Schmitt).	1♀	62554	Do.
Off Key West, inside the reef.	Key West Light to East Channel Bar buoy, 71° 53′; to Beacon "A," 74° 46′.	5. 25	Co. S. G	20	Feb. 13, 1902	7278	*Fish Hawk*	1 y	60209	
Key West							H. Hemphill	6 y	18272	
		Feet								
North of Knight's Key Channel.	2 m. NE. by E. of Basin Bank.	8. 5	rky	21. 5	Jan. 22, 1903	7417	*Fish Hawk*	1 y	60210	
Yucatan Channel:										
North of Cape Catoche.	22 18 00 | 87 04 00	24	wh. R. Co		Jan. 30, 1885	2365	*Albatross*	3♂ 1 y	18017	
Do	22 07 30 | 87 06 00	21	do		do	2363	do	1♂	18016	
Bahamas:										
Green Cay		4			June 30, 1903		B. A. Bean	1♂	31065	From Geographic Society of Baltimore.
Bahama Banks					May 18, 1893		Biological Expedition, State University of Iowa.	1♂ 1♀	Mus. S.U.I.	
West Indies:										
Jamaica								1 y	Returned to sender.	Identification uncertain.
Mayaguez Harbor, Porto Rico.	Red buoy entrance, ESE. ½ mile.	25–30	S. M. Sh	25	Jan. 20, 1899	6062	*Fish Hawk*	1♀ 1 y	24297	
Off Culebra Island	Culebrita Lighthouse, NE., 5¼ miles.	15	Co	25. 2	Feb. 10, 1899	6093	do	2 y	24295	
Off Vieques Island	Culebrita Lighthouse, NE. ⅜ E., 7¼ miles.	16	Co	25. 2	do	6092	do	2 y. ♀	24296	
Off St. Thomas	Sail Rock, W. by N. ½ N., 6 miles.	20–23	Co	25. 8	Feb. 6, 1899	6079	do	1♂ 2♀ 3 y	24294	
St. Thomas					Jan. 17, 1884 to Jan. 24, 1884		*Albatross*	1♀	18517	Dredged.
Virgin Islands		Piles.					C. R. Shoemaker	1♀	60211	

PILUMNUS QUOYI Milne Edwards

Plate 206, Figures 1–4

Pilumnus quoii MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 418 (type-locality, Rio de Janeiro; type in Paris Mus.).

Pilumnus quoyi A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 289, pl. 50, fig. 5–5c.

Diagnosis.—Wrists and hands covered with large shining spines. Orbit entire above, spined below. Frontal lobes very arcuate.

Description.—Dorsum covered with very stiff and spaced, short, russet hairs, regularly placed and not concealing the surface. Carapace very convex longitudinally, uneven, smooth, one and a fifth wider than long (narrower than in A. Milne Edwards's figure); antero-lateral border upturned, armed with three spines besides the orbital; spines sharper than represented in figure; also a subhepatic spine. Front consisting of two deep deflexed lobes with very arcuate and granulate margin, and a small triangular outer tooth. Orbit practically entire above though traces of two or three spinules remain; below five or six irregular short spines. Pterygostomian region granulate.

Merus of outer maxillipeds with the anterό-internal angle truncate, not emarginate. Chelipeds and legs very hairy, hairs longer than on the carapace. Chelipeds very strong, unequal. Terminal and subterminal spine on merus large. Spines or subacute tubercles of carpus and manus very striking, stout and shining; they extend all over the outer face of the minor palm and over the greater part of the major palm. Ambulatory legs short, strong, wider than figured, and unarmed.

Measurements.—Male holotype, entire length of carapace 20.6, width of same including spines 26, excluding spines 23.4 mm.

Range.—Guiana (A. Milne Edwards) and Rio de Janeiro, Brazil.

Material examined.—Rio de Janeiro, Brazil; Quoy and Gaimard collectors; one male, unique type (Paris Mus.).

PILUMNUS MIERSII A. Milne Edwards

Plate 206, Figure 5

Pilumnus miersii A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 292, pl. 51, fig. 3 (type-locality, Antilles; type in Paris Mus.).

Diagnosis.—Five antero-lateral spines. Outer face of larger palm smooth.

Description.—Resembles in general form *P. floridanus*. It is clothed with a very short down in which some longer hairs are inserted on the feet. Carapace wide, smooth, regions scarcely indicated. Front little advanced, edge granulate. Orbits with a few small spinules above, below roughened with pointed granules or spinules. Antero-lateral border armed with five spines, counting the orbital spine; the first two are very small and pointed, the others well developed. Some subhepatic tubercles between the second and third marginal spines.

Chelipeds very unequal; wrists tuberculate or granulate; major palm very swollen and with numerous pearl-shaped tubercles above, which disappear on the outer face; minor palm rather deep, spinous above and outside. Ambulatory legs without spines.

Measurements.—Female cotype, length of carapace 9.3, width of same including spines 13.2, excluding spines 12.2 mm.

Range.—Antilles.

Material examined.—Antilles; Freminville collector; 2 dried specimens, the larger a female (Paris Museum).

PILUMNUS LACTEUS Stimpson

Plate 205, Figures 1 and 2

Pilumnus lacteus STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 142 (type-localities, reef at Cruz del Padre, Cuba, and at Key West in from 2 to 5 fathoms; types not extant).—Not MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 292, pl. 51, fig. 5–5*b*.

Diagnosis.—Covered with an uneven velvet, concealing tubercles. Tubercles few and small. Four lateral teeth. More than half of outer surface of major and minor manus bare and smooth.

Description.—Covered with a very short velvet like pubescence easily rubbed off. Tubercles of carapace and chelipeds not numerous, invisible through the hairy coating. Carapace widest at last tooth; nearly smooth, a row of five low tubercles parallels the antero-lateral and orbital margins; a few tubercles on epigastric region, a few very obscure on hinder part of protogastric lobe, not more than one on mesogastric region. Lobes of front triangular, edge granulate. Inferior margin of orbit granulate, two granules on superior margin. Antero-lateral teeth four, subconical, with sharp horny tips, the first or orbital tooth very short, tips of second and third curved forward.

Two similar curved spines at distal end of upper margin of merus of cheliped. Scattered tubercles on carpus, a short blunt tooth at inner angle. Outer surface of hands largely smooth and glabrous; the tubercles and hairy coating of the major palm cover only the extreme proximal end of the outer surface together with the upper surface, or it may be only the proximal end of the same, and form an oblique line with the smooth area. The rough hairy part of the minor palm is more extensive than on the major palm. In both palms the tubercles have a tendency to spread further than the hair, encroaching on the glabrous space. On the ambulatories the pubescence is supplemented by long slender hairs on the margin.

Color.—Pubescence whitish or cream-color. Outer surface of hands light red. (Stimpson.)

Measurements.—Male (17902) entire length of carapace 8, entire width of same 11.5, fronto-orbital width 7.7, width of front 3.7 mm.

Range.—North Carolina; west coast of Florida; Cuba.

Material examined.—See table, page 512.

Material examined of Pilumnus lacteus

Locality	Bearings: Latitude N.	Bearings: Longitude W.	Fath oms	Bottom	Temp.	Date	Station	Collector	Specimens	Cat. No.	Remarks
North Carolina:	° ′ ″	° ′ ″									
Shackleford Bank (inside), Beaufort.	----------	----------	-------	Washed from seaweed.	°F. ------	Sept. 12, 1928	------	Schmitt and Shoemaker.	1 y----------	62556-------	
South of Cape Fear River	33 49 45	78 04 00	8	hrd----------	80.5	July 12, 1915	8275	*Fish Hawk*-------	1♂----------	60949-------	
Florida:					°C.						
Aucilla section----------	29 44 09	84 06 30	7	R. Co----------	16.5	Dec. 5, 1901	7193	*Fish Hawk*-------	1♂----------	60216-------	
Pepperfish Key section----	29 29 30	83 33 25	4.75	sdy----------	21.5	Nov. 5, 1901	7146	-----do----------	1 y----------	60215-------	
Off Northwest end St. Martin's Reef.	Near 28° 50′ 00″ north latitude, 83° 00′ 00″ west longitude.		-------	----------	------	1887	------	Lieut. J. F. Moser, U. S. N.	1♂ 1♀------	17901-------	
Marco----------	----------	----------	1–3	----------	------	----------	------	H. Hemphill------	12♂ 9♀ 3y--	17902-------	
Off Cape Sable----------	25 09 45	81 18 35	3.25	rky. Co----------	23.5	Dec. 17, 1902	7351	*Fish Hawk*-------	4♂ 6♀ (1 ovig.)	60217-------	
Tortugas----------	----------	----------	-------	----------	------	June —, 1893	------	Biol. Exped., State Univ. Iowa.	1♂----------	Mus. S. U. I.	
Do----------	Stomach of fish No. 550, gray snapper, *Neomaenis griseus* (L.).		-------	----------	------	June 21, 1925	------	W. L. Schmitt----	1♂----------	61127-------	Gift of Carnegie Institution.
Key West----------	----------	----------	(1)	----------	------	----------	------	U. S. C. S. Str. *Bache*, Wm. Stimpson.	Many small.	2461, M.C.Z.	
Cuba:											
Ensenada de Cajon, off Cape San Antonio.	----------	----------	-------	----------	------	May 22, 1914	------	Henderson and Bartsch, *Tomas Barrera* Exped.	1♀ ovig-----	48534-------	
Los Arroyos----------	----------	----------	-------	----------	------	May 20, 1914	8	-----do----------	2♂ 4y------	48535-------	
Cabañas----------	----------	----------	-------	----------	------	1914	16	-----do----------	1 y----------	48531-------	
Ensenada de Santa Rosa--	----------	----------	1–3	S. Sh. M. sponge-	------	1914	------	-----do----------	1♀ ----------	48532-------	
Keys at Esperanza-------	----------	----------	(2)	----------	------	May 11, 1914	1–2	-----do----------	1♀ ----------	48533-------	
Varadero playa, Bay of Cardenas.	----------	----------	(3)	Under stones----	------	Apr —, 1927	------	Melbourne Ward -	1♂----------	Returned----	

(1) Dredged. (2) Shallow. (3) Near shore.

PILUMNUS GEMMATUS Stimpson

Plate 207, Figures 1–3

Pilumnus gemmatus Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 214 [86] (type-localities, St. Thomas and Tortugas; types not extant).—Rathbun, Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 38.—Not A. Milne Edwards, Crust. Rég. Mex., 1880, p. 290, pl. 51, fig. 4–4*b*.

Diagnosis.—Dorsal aspect showing small red tubercles set in close-cut velvet. Outer surface of both hands entirely covered with tubercles and hair. Fingers deeply grooved.

Description.—Carapace rather narrow, covered as are also the chelipeds and legs with a short, close pubescence (with occasional stout and long cylindrical setae), which does not conceal boundaries of regions and the small red beads or tubercles scattered on anterior two-thirds of carapace (3 to 6 on each areolet), upper and outer surfaces of chelipeds and upper surface of legs. On the latter the tubercles or granules are much smaller than elsewhere. Frontal lobes subtriangular, granulate on margin, more advanced near median line; interspace large, V-shaped; a transverse row of stout setae behind each lobe. Upper orbital margin with two or three red tubercles, lower margin finely denticulate, a shallow outer notch. Antero-lateral projections four, short, stout; tips varying from blunt in first and second tooth to acute in the last.

Entire outer surface of both hands tuberculate, the tubercles growing smaller and more numerous toward lower margin. Propodal finger horizontal, lower edge slightly arcuate, tip slightly upcurved. Both fingers deeply grooved; tubercles on upper portion of basal half of dactylus, a few on outer surface of immovable finger, where in small specimens they form in two rows on the ridges. Outer lower margin of arm with a broad band of tubercles and granules.

Color.—Pubescence cream-colored or whitish; granules, tubercles and spines all bright ruby red. (Stimpson.) Fingers light brown.

Measurements.—Female (56900), entire length 10.6, entire width 13.5, fronto-orbital width 9, width of front 4 mm.

Range.—Tortugas, Florida; Culebra Island to Curaçao.

Material examined.—Tortugas, Florida; June 5–8, 1893; Biological Expedition, State University of Iowa; 1 male (Mus. S.U.I.).

Tortugas, Florida; W. L. Schmitt; gift of Carnegie Institution: Six dredge hauls W. of Loggerhead Key, off dock and N. of lighthouse pier; 8–5 feet; August 3, 1924; 1 young female (60946). Stomach of fish No. 121, gray snapper, *Neomaenis griseus* (Linnaeus), outer Lighthouse Reef; June 7, 1925; 1 female (60945). Mid-section of Bush Key reef inside, 3 feet before eelgrass; washed from weed and rocks; August 1, 1924; 4 specimens (62555).

Ensenada Honda, Culebra Island; February 10, 1899; *Fish Hawk;* 1 female (24370).

St. Thomas; 1915; C. R. Shoemaker collector; Carnegie Institution donor: Shore near town; June 30; 1 male (60213). Lagoons; July 7; 1 male (60214).

Off St. Thomas; Sail Rock, W. by N. ½ N., 6 miles; 20–23 fathoms; Co.; temperature, 25.8° C.; February 6, 1899; station 6079, *Fish Hawk;* 1 male (24371).

Curaçao: 1884; *Albatross;* 1 female (17913). 1920; C. J. van der Horst: Caracas Bay; in coral; May 5, 1 female (Amsterdam Mus.); April 23, 1 female (56900). Spanish Water; in *Siderastrea,* April 29, 1 female (Amsterdam Mus.); in *Porites furcata,* May 5, 1 male, 1 female, 1 young (Amsterdam Mus.).

PILUMNUS PANNOSUS Rathbun

Plate 207, Figures 4 and 5

Pilumnus gemmatus A. Milne Edwards, Crust. Rég. Mex., 1880, p. 290, pl. 51, figs. 4–4*b;* not *P. gemmatus* Stimpson 1860.

Pilumnus pannosus Rathbun, Proc. U. S. Nat. Mus., vol. 19, 1896, p. 142 (type-locality, Key West, Florida; type, Cat. No. 13814, U.S.N.M.); Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 39.—A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 321.

Diagnosis.—Tubercles of carapace concealed by dense hairy coat. Three lateral teeth have spinuliform tips, orbital teeth end in truncate spines. A large part of outer surface of palm smooth and bare except in minor palm of female.

Description.—Resembles *P. gemmatus.* Carapace wider and less quadrate, entirely covered with a soft, thick, plushlike pubescence which is not evenly distributed; here and there are longer, irregular, club-shaped setae which give a very ragged appearance. This hairy coat conceals the details of ornamentation but shows the lobulation of the anterior part and the tubercles of the chelipeds. Anterior half of carapace and upper surface of chelipeds and legs dotted with beadlike tubercles. Frontal lobes subtriangular, granulate on the margin, more advanced near median line; interspace V-shaped; outer tooth triangular, acute. Upper margin of orbit with three truncate spines, one at inner angle and two near the middle; a similar one at outer angle; lower margin with a row of short, stout, truncate spines or tubercles of unequal size and a V-shaped notch near outer angle. The antero-lateral projections look like shallow lobes tipped with a spinule until the pubescence is removed when they are seen to be (with the exception of the exorbital spine) triangular, well-separated spines with slender pointed tips directed forward and easily broken off. A well developed subhepatic spine.

Upper portion of hands tuberculate but usually a large part of outer surface smooth and naked; extent of smooth bare space varying, in adult males from half to nearly all of the outer surface in the major palm and from one-third to one-half in the minor palm; in females

and young males it is more restricted, from a little less than half to a little more than half in the major palm, and a small spot at base of propodal finger in the minor palm. A few tubercles on dactylus near articulation. Fingers of male with shallow grooves indicated by lines of punctae, of female with deep grooves in minor chela and in propodal finger of major chela. Ambulatory legs pubescent and bordered with fringes of club-shaped setae mixed with long fine hair.

Color.—Carapace under pubescence bright red as is also the bare part of the palms. (A. Milne Edwards.)

Measurements.—Male (11192), entire length of carapace 8.8, entire width of same 12, fronto-orbital width 7.8, width of front 3.8 mm.

Range.—North Carolina; Bahama Banks and coasts of Florida to Virgin Islands.

Material examined.—See table, pages 516–518.

PILUMNUS PYGMAEUS Boone

Plate 207, Figures 4 and 5

Pilumnus pygmaeus Boone, Zoologica, vol. 8, 1927, p. 221, text-fig. 81 (type-locality, off Hood Island, Galapagos, 15 feet; holotype female in Mus. New York Zool. Soc.).

Diagnosis.—Carapace and chelipeds granulate, not spinous. Lateral teeth obscure, edge denticulate. Size small.

Description.—Carapace transversely suboval, posteriorly narrowing rapidly; convex, especially antero-posteriorly; regions feebly indicated except the anterior part of the gastric region which is plainly marked; surface irregularly hairy, anterior two-thirds granulate. Anterior margins also granulate. Front cut by a large median V-shaped emargination into two oblique, subentire, and slightly convex lobes; median notch not visible in dorsal view. Lateral margin having three (not counting orbital angle) long, shallow, scarcely projecting and equally spaced teeth, the edges of which are unequally and bluntly denticulate.

Chelipeds very unequal, stout, hairy, granulate; palms swollen; fingers rather short, tips light colored. In the major chela the prehensile teeth are unequal, the largest one near base of fixed finger. Ambulatory legs with margins granulate and hairy.

Measurements.—Ovigerous female, paratype, total length of carapace 2.6, width of same 3.5, fronto-orbital width 2.5, width of front 1.4 mm.

Range.—Galapagos Islands.

Material examined.—Off Hood Island, 15 feet; station 54, *Arcturus* Oceanographic Expedition; 1 ovigerous female, paratype (Mus. New York Zool. Soc.).

Material examined of Pilumnus pannosus

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			°C.						
North Carolina: Bogue Sound, off Beaufort.						July —, 1912		W. P. Hay, Bureau of Fisheries.	1♀ 1 y	51390	
Florida:											
Aucilla section	29 54 00	84 06 00	4.5	R. Co. Sh	14	Dec. 5, 1901	7191	*Fish Hawk*	1 y	60118	
Do	29 52 10	83 51 47	3	S. Co	20	Nov. 6, 1901	7147	do	1 y. ♂	60117	
Pepperfish Key section.	29 32 10	83 29 50	3	sdy	21.8	Nov. 5, 1901	7144	do	1♀ 1 y	60116	
					°F.						
Off Cedar Keys	Cedar Keys Light, N. ¾ E., 21¾ miles.		5.75	Co	63.45	Jan. 11, 1913	7807(21)	do	2♂	60146	
En route to James City.	Bell buoy off Sanibel Id. Light, NE., 10 2½ miles.					Jan. 1, 1913	7795(9)	do	1♀ 1 y. ♀	60145 60144	
					°C.						
North Key section	28 57 30	82 58 00	3	rky	15.5	Dec. 9, 1901	7207	do	2♀	60119	
Off northwest end St. Martins Reef.	Near 28° 50′ 00″ N., 83° 00′ 00″ W.					1887		Lieut J. F. Moser, U S. Navy.	1♀	18031	
Goodland Point								H. Hemphill	2♂ 2♀	18033	
Eastern Dry Rocks								Edward Palmer	1♀	14436	
Off Cape Sable	E. end of Sawyer Key, S. ¼ W., 2¼ miles.		4.75	rky	22.5	Dec. 22, 1902	7390	*Fish Hawk*	2♂ 2♀ 1 y	60133	
Do	25 10 10	81 28 30	4.75	gy. S. Sh	23.5	Dec. 17, 1902	7354	do	3♂ 6♀	60125	
Do	25 09 52	81 21 53	3.75	gy. S. Sh	23.5	do	7352	do	1♂ 1♀	60124	
Do	25 09 37	81 15 15	2.5	rky. Co	23.5	do	7350	do	6♂ 4♀	60123	
Do	25 07 05	81 25 50	4.5	gy. S	23	Dec. 18, 1902	7360	do	2♂ 1♀	60127	
			Feet								
Do	25 06 30	81 12 25	11.5	rky	22	do	7356	do	7♂ 8♀ (1 ovig.).	60126	
			Fathoms								
Do	25 03 30	81 12 10	2.75		22	do	7366	do	1♂	60128	
Do	25 00 55	81 22 15	4	rky	22	Dec. 19, 1902	7372	do	2♂ 2♀	60132	1 female soft-shell.
Do	25 00 40	81 15 37	2.5	rky	22.5	do	7370	do	2♂	60131	Soft-shell.
			Feet								
Do	25 00 30	81 12 20	11.5	rky	22	do	7369	do	1♂	60130	
Do	WSW. ½ W., 7¼ miles from signal.		11	gy. S. G	22	do	7368	do	3♂	60129	
Do						Dec. 17, 1902		do	1♂ 1♀	60122	Male soft-shell.

Key West				S. R. Co. algae		1885		H. Hemphill	20♂ 20♀	13814	Sand flats, between tides; among rocks, low tide; among corals, on reefs; among algae, 2 feet below low tide. Types.
Do						Apr. 15, 1844 to Apr. 27, 1884		*Albatross*	19♂ 23♀ 1 y.	11192	
Do								C. N. E. Eliot	1♀	22992	
Key West harbor								Edward Palmer	2♂ 6♀ 1 y.	13894	
Off Key West inside the reef.	Key West Light to East Channel Bar Buoy, 71° 53′, to Beacon "A", 74° 46′.	5.25	co. S. G	20	Feb. 13, 1902	7278	*Fish Hawk*	3♂ 3♀ 2 y.	60121	
Do	E. Martello Tower to Key West Light, 36° 00′, to Sand Key Light, 52° 36′.	5.25	co. S. G	20	do	7277	do	1♂ 1♀	60120	
		Feet								
Hawk Channel	3½ miles N. ¾ E. of Sombrero Light.	11.5	rky	24.5	Jan. 27, 1903	7427	do	1♀	60139	
		Fathoms								
Do	1 mile NNW. ½ W. of East Washerwoman.	2.75	rky	24.5	do	7428	do	1 y. ♀	60140	
Do	½ mile SE. by S. of SE. end of Duck Key.	2.25	rky	24.5	do	7429	do	1♂ 3♀ (1 ovig.).	60141	
Do	1 ¼ miles S. by W. of SE. point of Long Key.	2.5	Barry	21	Feb. 18, 1903	7463	do	1♂	60143	
No Name Key								H. Hemphill	1♂ 2♀	18032	
Pigeon Key Lake	Nearly 1½ mile NNE ½ E. of Money Key.	9	S. G	17.5	Jan. 7, 1903	7402	*Fish Hawk*	1♂	60134	
Knights Key					Jan. 21, 1903		do	1♂	60135	
		Feet								
North of Knights Key Channel.	3 miles NE. by N. of E. Bahia Honda Key.	11	rky	20	Jan. 22, 1903	7412	do	1♂ 1♀	60136	
Do	2¾ miles N. of Basin Bank	10.5	rky	21	do	7416	do	1♀	60137	
Florida Bay	9½ miles NW. ½ N. of Bamboo Key.	8	S. G	20	Jan. 23, 1903	7425	do	2 y	60138	
Do		8–11.5		23–23.5	Jan. 29, 1903		do	1♂	60142	
Biscayne Bay	Near Cape Florida.						U. S. Fish Commission.	1♂ 1♀	31472	
Cape Florida							Edward Palmer	2♂	14435	
Miami							G. M. Gray	1♂	42151	

Material examined of Pilumnus pannosus—Continued

Locality	Latitude N.	Longitude W.	Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	° ′ ″	° ′ ″									
Bahamas								Frederick Stearns	Specimens		In living sponges.
Bahama Banks						May 15, 1893		Biological Expedition, State University Iowa.	2♂	Returned to sender. Mus. S. U. I.	
Do						May 17, 1893		do	1♂	do	From millepores.
Jamaica						May 1, 1884 to Mar. 11, 1884	*Albatross*		1♂ 2♀	8933	
Kingston Harbor								P. W. Jarvis	1 y	19677	
Porto Rico: Reefs at Ponce						Jan. 30, 1899	*Fish Hawk*		1♂ 1♀ 1 y	24372	
Playa de Ponce Reef						Feb. 1, 1899	do		1♂ 1♀	24373	
St. Thomas						Jan. 17–24, 1884.	*Albatross*		2♂ 3♀	19889	
St. John: Coral Bay									1♂	Copenhagen Mus.	

PILUMNUS LIMOSUS Smith

Plate 208; Plate 209, Figures 1–3

Pilumnus limosus SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 285 (type-localities, Zorritos, Peru, and Panama; types in P. M. Y. U.).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 291, pl. 50, figs. 4–4*b*.

Diagnosis.—Covered with a velvety pubescence forming a pattern leaving scattered tubercles exposed on carapace. Four lateral teeth. Upper and outer surfaces of both palms rough and hairy; only a small spot bare near immovable finger of major manus.

Description.—Body and appendages covered with a light brown, velvet like pubescence composed of short clavate hairs, among which the tubercles and granules appear as depressed pits in the general surface; and around them the pubescence forms a regular, ornamental and somewhat reticulate pattern. Carapace strongly deflexed in front, much flattened posteriorly, and when the hairs are removed, distinctly areolated, and showing above about forty scattered small tubercles or granules. About fourteen of these are on the gastric region, two on each epigastric lobe, three or four on each protogastric lobe, one at the extremity of the mesogastric and three

in a triangle behind it; two of the largest are on the hepatic region and smaller ones are scattered on the branchial and posterior regions. Median lobes of front almost perpendicular, separated by a deep, acutely triangular sinus, anterior margins oblique, arcuate, and slightly denticulate; the small lateral lobes are minute teeth or tubercles. Upper margin of orbit armed with three small pointed teeth, the outer one forming the external angle. Antero-lateral margin armed with three long, triangular teeth which are separated from the angle of the orbit by a broad shallow sinus below which there is a slender subhepatic tubercle. Lower margin of orbit broken by a deep sinus, the inner lobe prominent and usually somewhat bituberculate at tip, outer lobe armed along the margin with three or four small tubercles; external hiatus well marked. Inferior orbital region with a few scattered granules. An oblique line of 8 or 10 small tubercles on the subbranchial region terminating just behind the posterior tooth of the antero-lateral margin.

Chelipeds slightly unequal, carpus armed with a strong spine on the inner edge and a few scattered tubercles on the upper surface, hand tuberculate above and externally, the major palm with a naked and smooth space on the lower edge at base of finger; fingers smooth, striate and dark brown, the color not spreading on palm. Legs armed with a few scattered sharp granules on upper side.

Measurements.—Male, cotype (Panama), length of carapace 11.4, width of same 15 mm. Female (60225), length of carapace 6.6, width of same 9.5, fronto-orbital width 6, width of front 2.7 mm.

Range.—Panama; Ecuador; Peru.

Material examined.—Panama; Capt. J. M. Dow; 1 female (4080).

Panama; shore, on rocks, low tide; May–July, 1924; Elizabeth Deichmann; 1 male, 1 female (60225).

Ecuador: South side Point Santa Elena; September 17, 1926; W. L. Schmitt; 1 female (60821).

Paita, Peru; October 8, 1926; W. L. Schmitt; 1 female (60950).

PILUMNUS HOLOSERICUS Rathbun

Plate 207, Figures 8 and 9

Pilumnus holosericus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 268, pl. 5, fig. 1 (type-locality, St. Thomas, Virgin Islands; Cat. No. 19705, U.S.N.M.); Bull. U. S. Fish Comm. for 1900, vol. 20, part 2 (1901), p. 39.

Diagnosis.—Covered with a smooth thick felt, concealing the tubercles of the carapace in large part. Four lateral teeth. Half or less than half of outer surface of major manus bare and smooth.

Description.—Carapace suboval; dorsal surface entirely covered with a dense pubescence forming a smooth felt-like surface but dis-

posed in nodules or areoles corresponding largely to the regions and subregions; a median gastric furrow extends nearly to posterior end of region; a tuft of coarse tubular hairs on each protogastric and epibranchial lobe and eight single or double similar hairs regularly disposed on the carapace and one on each eyestalk. When the pubescence is removed numerous small tubercles are exposed. Front with two oblique entire lobes, no outer lobules or angulations, a large median V-sinus. Antennal flagellum as long as width of front. Upper margin of orbit interrupted by two well marked sinuses; outer tooth small; lower margin granulate, a large acute inner tooth. Antero-lateral margin with three broad, thick teeth with tuberculiform tips. In the long interval between them and the orbital tooth a subhepatic tubercle is visible. Carpus and manus of chelipeds with a covering similar to that of the carapace. Carpus and manus

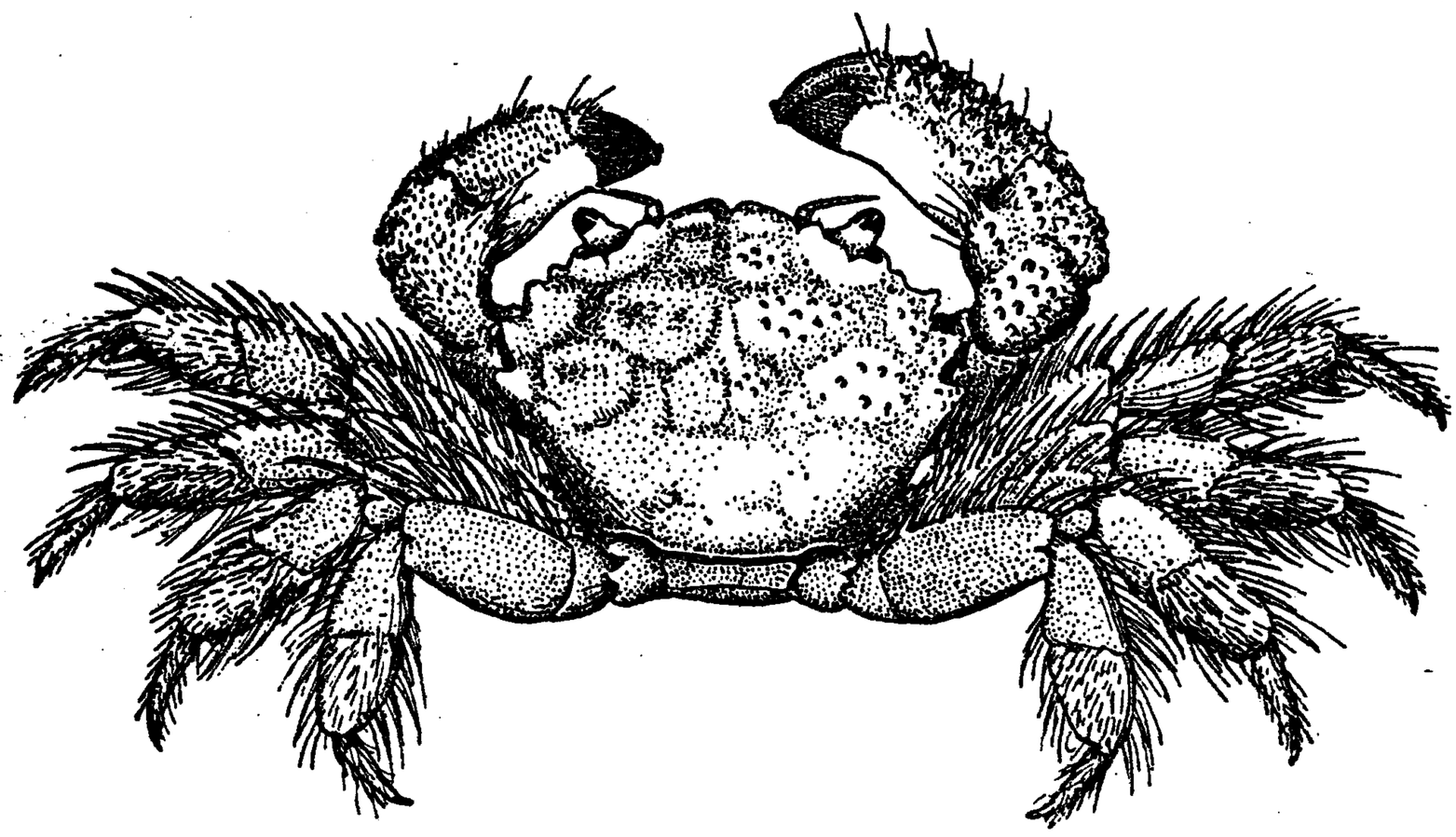

FIGURE 81.—PILUMNUS HOLOSERICUS, MALE, DORSAL VIEW SHOWING TUBERCLES ON RIGHT HALF OF CARAPACE, ×3

of chelipeds with a covering similar to that of the carapace, excepting that the lower distal end (half or less than half) of the major manus is bare and smooth; tubercles small and numerous and plainly visible embedded in the felt. Fingers relatively short and stout. Ambulatory legs covered with a very short velvet and margined with numerous coarse tubular hairs.

Color.—Hands pink, the pink of the tubercles persisting for many years in preserved specimens.

Measurements.—Male (24377), entire length of carapace 7.3, entire width of same 9.2, fronto-orbital width 6.6, width of front 3.1 mm.

Range.—Tortugas, Bahamas, and Porto Rico to Trinidad and Curaçao.

Material examined.—Tortugas, Florida; 1924; W. L. Schmitt; gift of Carnegie Institution: Rocks on east side of Loggerhead Key; July 28; 1 male, 1 ovigerous female (60947). Middle section of Bird Key reef; July 26; 1 ovigerous female (60948).

Egg Island, Bahamas; 1893; Biological Expedition, State University of Iowa; 1 male (Mus. S. U. I.).

Porto Rico; 1899; *Fish Hauk:* Mayaguez; on coral reef; January 23; 1 male, 3 females (24378). Porto Real; January 27; 1 male, 2 females (24374). Boqueron Bay; on coral reef; January 28, 1 male, 2 females (24379). Ponce; February 1; 1 male (24380). Reefs at Ponce; January 30; 2 males, 3 females (24375). Lighthouse reef, Playa de Ponce, January 31, 1 female (24376) and February 1, 4 males, 15 females (24377). Lighthouse reef, Arroyo; February 3; 5 males, 2 females, 2 young (24381). Porto Rico; 1 male, 1 young (24382).

St. Thomas: Krebs collector; from Copenhagen Mus.; 1 male, holotype (19705). *Albatross;* 1 male (19893).

St. John: 1 female (Copenhagen Mus.).

Trinidad; Feb. 1878; Crosby collector; from Boston Society of Natural History; 1 ovigerous female (57014).

Caracas Bay, Curaçao; 1920; C. J. van der Horst: Under stones near shore; May 3; 2 males (Amsterdam Mus.). In coral; May 13; 1 male, 1 female (56901), 4 females (1 ovigerous) (Amsterdam Mus.).

PILUMNUS RETICULATUS Stimpson

Plate 209, Figures 4 and 5; Plate 210

Pilumnus reticulatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 214 [86] (type-locality, St. Thomas; type not extant).—RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 38.

Pilumnus tessellatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 295, pl. 51, figs. 2–2*d* (type-locality, Desterro, Brazil; type in Paris Mus.).

Pilumnus fragosus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 296, pl. 52, figs. 1–1*f* (type-locality, St. Thomas; type in Paris Mus.).

Pilumnus meridionalis NOBILI, Boll. Mus. Zool. Anat. Comp. R. Univ. Torino, vol. 16, No. 402, 1901, p. 8 (type-locality, Mar del Plata, Argentina; type in Turin Mus.).

Diagnosis.—Hairs reticulated, a single large tubercle in the interstices. Frontal lobes oblique, concave. A few strong suborbital teeth. Greater part of outer surface of major palm bare; at least half of minor palm hairy.

Description.—Carapace, upper surface of chelipeds, and also the legs clothed with short, stout setae, closely arranged to form reticulating lines inclosing small naked polygonal areoles which on the anterior half of carapace and chelipeds are mostly each occupied by a large tubercle projecting forward and flattened on its superior and posterior surface. About eleven such tubercles on carapace excluding marginal ones, and fifteen or more on each cheliped. On the legs there are two tubercles at proximal end of carpus and one at distal end of propodus; otherwise the naked cavities are unoccupied by tubercles; about two areoles occupy width of leg. Some much longer

and stouter clavate setae are dispersed among the short ones which clothe the general surface. Margin of frontal lobes oblique and slightly concave; at the outer ends there is a small blunt subrectangular tooth. Antero-lateral margin with four teeth (including the orbital), similar to the dorsal tubercles. There is also a subhepatic and a subbranchial tubercle. Two or three, occasionally four, projecting teeth on lower margin of orbit between the large inner tooth and the outer orbital tooth.

Lower and distal two-thirds of outer surface of larger palm and half or less of smaller palm smooth and naked; in the young the smaller palm is hairy all over its outer face. Fingers also smooth; only a few setae at base of dactyl.

Variations.—There is considerable variation in the shape of teeth and tubercles. In typical *reticulatus* (pl. 209, figs. 4 and 5) the tubercles are depressed and their surface slightly convex, the lateral teeth are similar lobes or tubercles flattened in a vertical plane, that is, perpendicular to the dorsum. In some specimens the lateral teeth are dentiform, depressed, forming an acute edge corresponding to and continuous with the edge of carapace; this is *forma tessellata* = *forma meridionalis* (plate 210, figs. 7–11). In occasional specimens some of the tubercles are fungiform or mushroomlike; this is *forma fragosa* (plate 210, figs. 1–6).

Measurements.—Male (60220), entire length of carapace 10.8, entire width of same 15.3, fronto-orbital width 9.5, width of front 4.2 mm. Male (48319), entire length of carapace 14, entire width of same 19, fronto-orbital width 11, width of front 5.2 mm.

Range.—From Jamaica and Porto Rico to Patagonia. Panama (Pacific).

Material examined.—

WEST INDIES AND CARIBBEAN SEA.—Jamaica: P. W. Jarvis; specimens returned to sender. March 1–11, 1884; *Albatross;* 1 male, 2 females (18538); *forma fragosa.* Drunken Man's Key, off Kingston Harbor; May 6, 1893; R. P. Bigelow; 1 female (17993); *forma tessellata.*

Porto Rico; 1899; *Fish Hawk:* 1 male, 1 female (24251). Mayaguez; January 19 and 20; 2 males (24249). Mayaguez Harbor; January 20; 1 male (24253). Playa de Ponce Reef; February 1; 1 male (24252). Arroyo; February 4; 1 male, 1 female (24250). Puerto Real; 1 young female (24248).

St. Thomas: January 17–24, 1884; *Albatross*; 4 males (18515). 1915; C. R. Shoemaker, for Carnegie Institution: St. Thomas Harbor, on the bottom of small boat, July 10, 1 female (60219); Gregerie Bay, ½ to 2¾ fathoms, Co. R. S. seaweed, station 7, July 7, 1 male, 4 females (60218). St. Thomas; *Hassler* Exped.; 1 ovigerous female (2457, M.C.Z.).

Virgin Islands; from piles; 1915; C. R. Shoemaker; 5 males, 1 female, 1 young (60220), gift of Carnegie Institution.

Curaçao; 1884; *Albatross;* 1 female (17904).

PANAMA.—Shore of Panama (Pacific side); low tide, rocks; May-July, 1924; Elizabeth Deichmann; 1 male (60224).

Near Panama City; under stones on reefs; May, 1927; Melbourne Ward; 1 female, *forma tessellata;* returned.

BRAZIL.—Pernambuco stone reef at Ilha de Nogueira; July 10, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 male (25725), 1 female (Stanford Univ.).

Recife Mapelle; 1876–1877; R. Rathbun, Hartt Explorations; 1 male (19966); *forma tessellata.*

Bay of Bahia; specimens in Copenhagen Museum.

Rio de Janeiro; one specimen lent by Copenhagen Museum.

Villa Bella, Ilha São Sebastião, São Paulo; October, 1925; H. Luederwaldt; 1 young (61128); *forma tessellata.*

Ponta da Cruz, São Francisco, Santa Catharina; October 7, 1925; W. L. Schmitt; 1 male (60952); *forma tessellata.*

Florianopolis (formerly Desterro); Fritz Müller; 3 males, cotypes (Paris Mus.), 1 female, cotype (20261), received from Paris Museum; *forma tessellata.*

ARGENTINA.—Buenos Aires (?); 1 male (48319), received from H. von Ihering; *forma tessellata.*

San Antonio W.; A. Carcelles and A. Radice, collectors; 2 males, 9 ovigerous females; lent by Buenos Aires Mus. (14833).

Puerto Militar; Luis Alimonda collector; 2 males; lent by Buenos Aires Mus. (11775, 11776); *forma tessellata.*

PATAGONIA.—Eastern Patagonia; C. E. Porter; 1 male (60951), *forma tessellata,* variety with dorsum nearly smooth.

PILUMNUS NUDIMANUS Rathbun

Pilumnus nudimanus RATHBUN, Bull. U. S. Fish Comm. for 1900, vol. 20, pt. 2 (1901), p. 39, text-fig. 7 (type-locality, Arroyo, Porto Rico; holotype female, Cat. No. 23770, U. S. N. M.).

Diagnosis.—Carpus of chelipeds covered with large tubercles set in, but not concealed by, a short dense fur. Palms naked. A tuberculate ridge on hepatic region.

Description.—Carapace covered with a short dense pubescence (easily rubbed off) among which are a few tufts of longer stout setae on the frontal, gastric, and anterior branchial regions. Hepatic region prominent, having an oblique row, parallel to the antero-lateral margin, of five or six small, reddish-brown beadlike tubercles, visible amid pubescence. Antero-lateral margin armed with three spines, stout at the base but sharp at the ends which are hooked forward, the anterior one with a denticle on its posterior slope. A denticle at outer angle of orbit and another behind it. Upper orbital

margin with two or three beadlike tubercles similar to those in the hepatic row; lower margin granulate or crenulate. A subhepatic spinule or denticle. Median sinus of front V-shaped, margin of lobes arcuate, finely granulate; outer tooth small, a reddish tubercle at tip.

Upper margin of arm with a strong subterminal tooth. Wrist densely furred, except in a narrow groove parallel to distal margin, and bearing a number of large tubercles plainly visible of which there is in the major cheliped about 26 behind the groove and 11 in front of it. Hands of female very unequal, naked, sparingly dotted on the outer surface with tubercles, except on lower third of major hand, and a smaller area at proximal end of minor hand, which are smooth. Major dactylus with tubercles above at the basal end. Fingers of minor chela deeply furrowed, three ridges on dactylus granulated for half or two-fifths their length, one ridge on fixed finger granulated for half its length. Legs long-hairy, upper surface of carpal and propodal segments flattened and paved with depressed acorn-shaped tubercles.

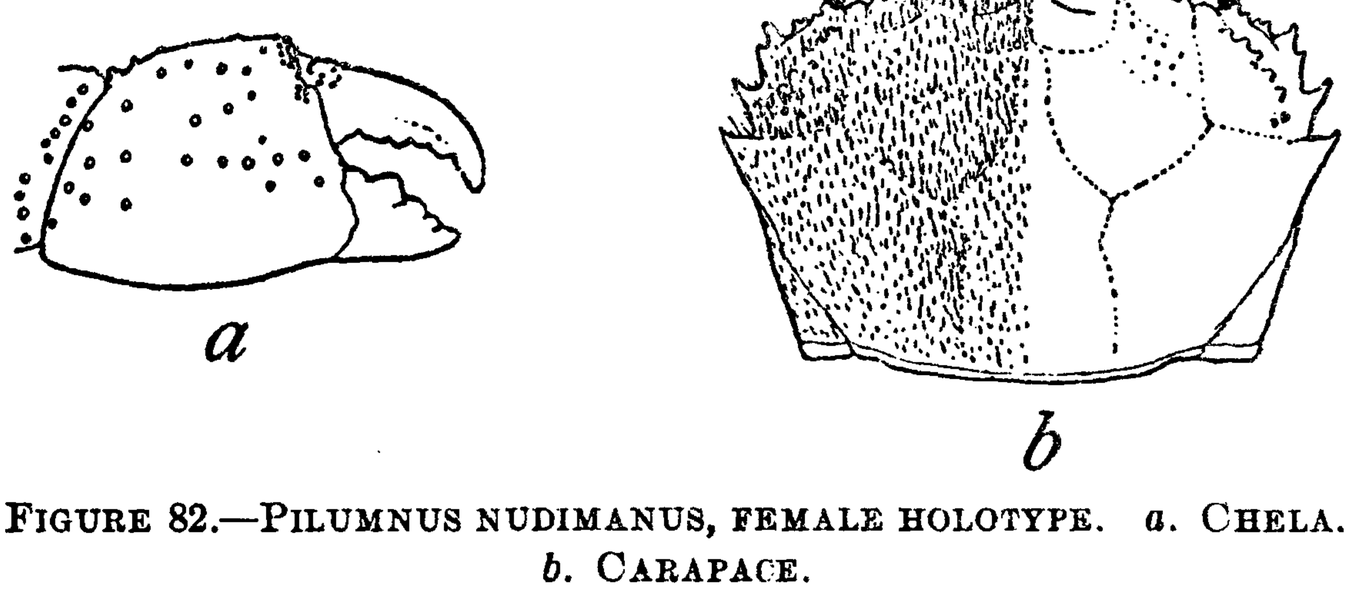

FIGURE 82.—PILUMNUS NUDIMANUS, FEMALE HOLOTYPE. *a*. CHELA. *b*. CARAPACE.

Measurements.—Female holotype, entire length of carapace 6, entire width of same 8.8 mm.

Range.—Porto Rico.

Material examined.—Arroyo, Porto Rico; 1899; *Fish Hawk*: February 4; 1 ovigerous female, holotype (23770). On Lighthouse reef; February 3; 1 young (24241).

PILUMNUS STIMPSONII Miers

Plate 205, Figures 5 and 6

Pilumnus marginatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 109 [19] (type-locality, Cape St. Lucas; type not extant).

Pilumnus stimpsonii MIERS, *Challenger* Rept., Zool., vol. 17, 1886, p. 147; name substituted for *P. marginatus* Stimpson 1871, preoccupied by Stimpson himself in 1858 for another species from Loo Choo.

Diagnosis.—Small, one-fourth wider than long. Carapace tuberculate, sparsely hairy; antero-lateral margin short, four-toothed or spined. No subhepatic tooth. Both palms rough outside.

Description.—A very small species. Carapace somewhat hairy, moderately convex; middle gastric region distinctly outlined, others less so; surface regularly covered with small, mostly distant, acute tubercles, between which the surface is very minutely punctate.

The punctae probably served as hair sockets. Posterior extremity very narrow. Areolets not protuberant. Median frontal channel rather deep and conspicuous. Front broad, most advanced at middle, lobes with slightly concave, nearly straight oblique margin, separated from the supra-orbital margin by a small notch; its margin is granulated and has a slight channel running parallel with it and separating it from the frontal region. Orbital margin unarmed except by small tubercles or granules, according to Stimpson, and has a single slight fissure at the middle above. In the dried specimen (60223) there is a sharp spinule on the upper margin of each orbit a little within or anterior to the fissure; also two spines on lobe at inner lower angle. Antero-lateral margin sharply defined, almost limbed; armed with three very slightly prominent spines besides angle of orbit and a broad lobe posterior to it, neither of which project beyond the general outline. The three teeth are each composed of two or three denticles of about the size of the dorsal tubercles. Last tooth minute and almost directly behind and above the one in front of it and is easily overlooked. There is no subhepatic tooth but the region is finely granulate.

Ridges of endostome sufficiently marked. Chelipeds large, bristling with spines and acute tubercles. The spines occupy the upper surface of carpus and manus, the longest spines on the margin, five or six on margin of manus; lower down on the outer surface the spines become sharp tubercles which toward the smooth lower margin are scarcely more than granules. The ridges of both fingers are granulate for half their length.

Color.—Chelipeds rosy red in a dried specimen.

Measurements.—Ovigerous female, dried (60223), length of carapace 3.9, width of same 5, posterior width of same 3.7, fronto-orbital width 4, width of front 1.8 mm. Male type, length 4 mm. (0.16 inch), width 5 mm. (0.2 inch).

Range.—West coast of Mexico: Cape St. Lucas to Manzanillo.

Material examined.—Manzanillo, State of Colima; on drifted pile; July 17, 1913; C. R. Orcutt; 1 ovigerous female, 2 young (60223).

Genus LOBOPILUMNUS A. Milne Edwards

Lobopilumnus A. Milne Edwards, Crust. Rég. Mex., 1880, p. 297; type, *L. agassizii* (Stimpson).

Closely allied to *Pilumnus*. Carapace unusually thick, much swollen and deeply lobulate anteriorly. Front consisting of two rounded lobes plainly separated from the inner orbital angles by a rectangular emargination. Orbits with two fissures above and a third below the outer angle. Antero-lateral margin cut into three large teeth behind the orbital tooth or lobe; they are roughened by numerous spinules or tubercles. A tubercle or small tooth on sub-

hepatic region. Basal article of outer antennae very short, not reaching or barely reaching the prolongation of the front. Merus of outer maxillipeds wider than long, anterior border concave, inner emargination obtusangled. Buccal cavity wide anteriorly; endostome with a sharp crest on each side. Abdomen of seven distinct segments.

LOBOPILUMNUS AGASSIZII (Stimpson)

FORMA TYPICA

Plate 211, Figures 1 and 2

Pilumnus agassizii STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 142 (type-localities, between East and Middle Keys, Tortugas, 5 to 7 fathoms, and east of the Tortugas, 13 fathoms; types not extant).

FORMA PULCHELLA

Plate 211, Figure 3

Lobopilumnus pulchellus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 299, pl. 52, figs. 4*a* and 5 (type-locality, Florida reefs; cotypes in M.C.Z., cotype from Sombrero in Paris Mus.).

FORMA BERMUDENSIS

Plate 211, Figure 5

Lobopilumnus agassizii A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 298, pl. 52, fig. 4–4*c* (Florida reefs, Bermudas).

Lobopilumnus agassizii bermudensis RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, vol. 4, 1898, p. 269 (type-locality, Bermuda; type, Cat. No. 42798, U.S.N.M.).

Lobopilumnus agassizii bermudensis A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 319.

Lobopilumnus agassizii var. *bermudensis* VERRILL, Trans. Connecticut Acad. Arts and Sci., vol. 13, 1908, p. 360, pl. 14, figs. 1 and 2.

FORMA TRINIDADENSIS, new

Plate 211, Figure 4

See below.

Diagnosis of species.—Carapace rough and hairy. Marginal teeth sharp, divergent. Frontal lobes denticulate. Chelae thickly tuberculate.

Description of typical form.—Areolets of carapace protuberant. Surface pubescent everywhere except on the anterior and antero-lateral areolets which are naked and thickly granulated. The depressions between the protuberant areolets are broad, occupying fully as much space as the areolets themselves. Two of the areolets form the broad lobes of the front, which are as large and prominent as the epigastric lobes, or even larger. Frontal surface vertical, not much projecting, but the lobes are deeply separated from each other and from the small lobules at the outer ends of the front. Orbital region protuberant and granulate; margin not toothed, but crenulated with granules, not advanced at outer angle, and marked by two fissures above and one less conspicuous one below. The antero-lateral margin

behind the orbit is armed with three triangular, spine-tipped, equal teeth of moderate size. Subhepatic tooth distinct.

Chelipeds short, stout; carpus covered above with granulated tubercles which are confluent exteriorly, forming transverse ridges; hand covered above and outwardly with small but prominent mammillary tubercles, having their apices pointing forward and arranged largely in longitudinal lines on the outer surface. Legs pubescent and hairy, carpal and propodal articles armed with minute spines or spiniform granules above.

Color.—Above sand filled gray pile, granules and knobs are ochraceous rufous + madder brown; inner sides of meral joints of legs and chelipeds smooth and much white. Whitish spots. (Schmitt, Cat. No. 61110.) *Forma bermudensis:* Yellowish or salmon; fingers black (Verrill). Fingers dark burnt umber with whitish apices; hands pink flesh color on inside and between articulation of fingers on outside (Schmitt).

Variation.—The species is variable especially as to the number and prominence of the areolets on the carapace. The typical form is not uncommon on the west coast of Florida. Some of the extremes are worthy of distinct names. In *forma bermudensis* the areolets are fewer and lower than in typical *agassizii*, those of the protogastric and epibranchial regions are inconspicuous. Pubescence more widespread, concealing much of the granulation. Sharp granules few or altogether absent from upper surface of carpus and propodus of legs. This form has been found not only at Bermuda but on the Florida reefs (A. M. E.) and near Key West. (See table, pp. 528 and 529.)

Contrasting with *bermudensis* is a form (*forma pulchella*) reaching further south to Cuba and the Yucatan Channel which was described by A. Milne Edwards from the Florida reefs. It is the roughest form, the areolets embracing the mesogastric region, which has three, the whole protogastric region which has four or five, and that part of the branchial region between the mesogastric region and the posterior of the lateral teeth. The bare areolets form a striking pattern against the pubescent background.

Quite at the other extreme is a single specimen supposed to have come from Trinidad, in which the regions and subregions show little signs of areolation and the hairy coat is unusually thick. The granules or tubercles are few, even on the antero-lateral teeth. I call this *forma trinidadensis*.

Habits.—Verrill says [53] of *forma bermudensis:* "When living the carapace and legs are often rather thickly covered, and sometimes almost concealed, by a coating of whitish calcareous mud and sand that adheres to the hairs that cover the back. * * * It is most

[53] Trans. Connecticut Acad. Arts and Sci., vol. 13, 1908, p. 360.

Material examined of Lobopilumnus agassizii and its formae

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
Florida:	° ′ ″	° ′ ″			°C.						
Pensacola						1882		Silas Stearns	1♂	4498	
Southwest of Cape San Blas.	29 18 15	85 32 00	25	crs. gy. S. brk. Sh		Feb. 7, 1885	2370	*Albatross*	1♂	17811	
Do	29 15 30	85 29 30	27	G		do	2372	do	2♀	17816	
Do	29 11 30	85 29 00	26	S. G. brk. Sh		do	2374	do	1♂	17822	
Pepperfish Key section	29 03 45	83 38 00	9¾	Sh. S	17.5	Nov. 27, 1901	7172	*Fish Hawk*	1 y. ♀	60756	
South of St. George Island.	28 46 00	84 49 00	26	crs. S. Co		Mar. 15, 1885	2406	*Albatross*	2♂ 4♀	17817	
Do	28 47 30	84 37 00	24	Co. brk. Sh		do	2407	do	1♂	17818	
North Key section	28 54 00	83 30 30	11	R. Co. S	17	Nov. 28, 1901	7185	*Fish Hawk*	1♀	53741	
Do	28 47 45	83 28 00	11½	R. Sh	17	do	7186	do	2♂	53740	
Southwest of Sarasota	27 04 00	83 21 15	26	crs. gy. S. brk. Sh.		Mar. 18, 1885	2409	*Albatross*	2♀	9815	
Off Charlotte Harbor	26 33 00	83 10 00	28	sdy	19.1	Apr. 2, 1901	7123	*Fish Hawk*	1♂ 1♀	25626	
West of Sanibel Islands	26 18 30	83 08 45	27	fne. gy. S. bk. Sp. brk Sh.		Mar. 19, 1885	2412	*Albatross*	2♀	9833	
West of Marco	26 00 00	82 57 30	24	fne. S. bk. Sp. brk. Sh.		do	2413	do	2♂ 4♀	9837	
Off Cape Romano	25 50 15	82 41 45	21	sdy	20	Apr. 2, 1901	7124	*Fish Hawk*	3♀	25625	
Inside Sombrero								U. S. C. S. str. *Bache*; Wm. Stimpson.	1♂ 3♀	2989, M.C.Z.	*Forma bermudensis.*
North of Tortugas	25 04 30	82 59 15	26	fne. wh. S. brk. Sh.		Mar. 19, 1885	2414	*Albatross*	1♂ 2♀ 1y	17819	
Off Northwest Channel	24 46 12	81 53 30	10¼	Co	19	Feb. 24, 1902	7290	*Fish Hawk*	1♂	53742	*Forma bermudensis.*
Do	24 42 30	81 55 52	7¼	Co	20	do	7293	do	1♂ 1♀ ovig.	53743	
Off Key West, inside the reef.	Key West Light to E. channel Bar Buoy, 71° 53′, to Beacon A, 74° 46′.		5¼	Co. S. G	20	Feb. 13, 1902	7278	do	1 y.♂	60755	
Off Key West			(1)			June 26, 1893	45, 46	Biological Expedition, State University of Iowa.	2♂ 1♀ 1y	S. U. I.	
Tortugas						1893		do	2♂ 1♀ 1y 1♀	S. U. I. 20024	
Do						1873		W. H. Jaques	1♀ ovig.	4816 M.C.Z.	Typical.
Do	In channel 5/8 mile N. of Bird Key.		10.5			July 17, 1924	7	W. L. Schmitt	1♀	60899	Gift of Carnegie Institution.
Do	Across S. end of White Shoal.		9.5			July 19, 1924	23	do	1♂	60900	Do.

Do	S. of No. 2 buoy		(2)			July 22, 1924	40	do	1 ♀	60902	Do.
Do	6 miles S. of No. 2 buoy		18			do	44	do	1 ♂	61110	Do.
Do	Between No. 2 buoy and No. 1 spar, cross channel haul.		8–5			June 11, 1925	213	do	2 chelae	60903	Do.
			Feet								
Do	3 miles N. of Loggerhead Key on shoals.		10–45			June 17, 1925		Taylor and Dexter	1 ♂	60904	Do.
Do	S. of Loggerhead Key toward old wreck.					June 19, 1925		Taylor	1 ♂	60901	Do.
West Florida			19					U. S. C. S. str. *Bache;* Wm. Stimpson.	1 ♀ ovig.	2975, M.C.Z.	Typical.
Do								do	1 ♂ 1 ♀	2976, M.C.Z.	Cotypes of *pulchella.*
Off Majeres			12					do	1 y	2988, M.C.Z.	Cotype of *pulchella.*
Gulf of Mexico						1885		*Albatross*	1 ♂	40275	
			Fathoms								
Yucatan:											
North of Cape Catoche	22 07 30	87 06 00	21	wh. R. Co		Jan. 30, 1885	2363	do	1 ♀	17820	*Forma pulchella.*
Do	22 18 00	87 04 00	24	wh. R. Co		do	2365	do	1 ♀	17821	Do.
Contoy Island			12–18					Wm. Stimpson	1 ♀	2977, M.C.Z.	Cotype of *pulchella.*
Cuba: Reef Lavesos Italienos, opposite Cayo Lavesos.			2–3	Co. S. R		June 2, 1914		Henderson and Bartsch.	1 ovig. ♀	48563	*Forma pulchella.*
Trinidad:								Crosby	1 ♀	56764	Type of *forma trinidadensis.* Received from Boston Society of Natural History.
Bermuda:						1876–1877		G. Brown Goode	7 ♂ 9 ♀	42798	Types of *forma bermudensis.*

[1] Shallow.

[2] About 20.

frequently found under stones and dead corals. * * * Common, both on the reefs and rocky shores, at low tide."

Measurements.—Male, *forma typica* (53742), entire length of carapace 22.7, entire width of same 30.2, fronto-orbital width 19, width of front 8.8 mm. Female, *forma pulchella* (48563), entire length of carapace 18.5, entire width of same 25.3, fronto-orbital width 16, width of front 7.4 mm. Male, *forma bermudensis* (42798), entire length of carapace 24.6, entire width of same 33.2, fronto-orbital width 21.9, width of front 10 mm. Female, *forma trinidadensis* (56764), entire length of carapace 21.3, entire width 30.3, fronto-orbital width 19.1, width of front 8.8 mm.

Range.—Gulf of Mexico (west coast of Florida and Florida Keys), Yucatan Channel, Cuba, Trinidad.

Material examined.—See table, pages 528 and 529.

Genus HETERACTAEA Lockington

Heteractaea LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 97 [3]; type, *H. pilosus* Lockington=*H. lunata* Milne Edwards and Lucas.

Dorsal aspect hairy as in *Pilumnus*. Carapace approaching a typical Xanthid form, little swollen. Fronto-orbital distance great, front with a straight thick border. Orbital border thick, lobed below. Antero-lateral border spinous. No palatal ridge. Carpus of ambulatory legs armed above with a raised crest in the shape of a horn. Abdomen of male with third, fourth and fifth segments fused. Known only in tropical and subtropical waters of America.

KEY TO THE SPECIES OF THE GENUS HETERACTAEA

A[1]. Crest of carpus of ambulatory legs bearing only one horn. Orbit bilobed below ..... **ceratopus**, p. 530.

A[2]. Crest of carpus of first three ambulatory legs bearing two horns. Orbit trilobed below ..... **lunata**, p. 532.

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
ceratopus	*lunata*

HETERACTAEA CERATOPUS (Stimpson)

Plate 212, Figures 5–8; Plate 213

Pilumnus ceratopus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 215 [87] (type-locality, Key Biscayne, Florida; type not extant).

Pilumnus? SCHRAMM, in Desbonne and Schramm, Crust. Guadeloupe, 1867, p. 33, pl. 3, figs. 9 and 10.

Heteractaea ceratopus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 300, pl. 52, fig. 3–3*d*.

Diagnosis.—Crest of carpus of all the ambulatory legs with a single horn at distal end. Inferior orbital margin bilobed.

Description.—Body clothed above with very short tufts of pubescence somewhat irregularly arranged, leaving many open spaces;

feet much more thickly covered with a longer hairy coat. Carapace flattened posteriorly but anteriorly sloping moderately toward the margins. Regions sufficiently distinct. A transverse ridge on frontal region, interrupted at middle. Surface naked along anterior margins which are obtuse and thickened. Three long and strong acute spines on antero-lateral margin, directed more forward than outward, and in the same line a slender spinule in front of the first and of the second principal spine. One principal and one or two minor subhepatic spines. Front nearly horizontal, very little advanced; a large median V emargination separating two slightly oblique lobes, each with a projecting lobule at inner end. Superior margin of orbit unarmed, fissured at middle; outer angle tuberculiform, projecting laterally; inferior margin deeply bilobate; lobes large, triangular, projecting; external hiatus well marked.

Chelipeds very unequal, covered above and externally with short spines more or less pyramidal in form; infero-distal half of outer surface of palm naked; upper half of inner surface tuberculate and granulate. Fingers channeled. Legs compressed, densely hairy; merus spined above and with a larger spine at extremity; carpus with a large, smooth, procumbent, hornlike process lying on its upper side, in front of which are three or four spines along the anterior margin. All the leg spines have a tuft of long hairs inserted on one side near the tip.

Color.—Carapace milk white. Naked part of palm bright red or purplish; fingers black. Feet a little red; nails brown. Hairs russet.

Measurements.—Male (24845), entire length of carapace 20.5, width excluding spines 27.2, including spines 30, fronto-orbital width 15, width of front 7.7 mm.

Range.—From Bahamas and Miami, Florida, to Trinidad.

Material examined.—

BAHAMAS.—Green Turtle Cay; E. A. Andrews; 1 female (20711).

Andros Island; in sponge; Frederick Stearns; 1 male (42794).

Bahamas; Dr. Henry Bryant; 1 male (56820), received from Boston Society of Natural History.

FLORIDA.—Miami; G. M. Gray; 1 female (42142).

Hawk Channel, 4¼ miles W. by N. of Elbow Reef beacon; 2¾ fathoms; barry, S.; temperature 20.5° C.; February 19, 1903; station 7467, *Fish Hawk;* 1 male (60741).

Duck Key; in coral; December 19, 1912; *Fish Hawk;* 1 male (60740).

Key West; January 28, 1901; B. A. Bean and W. H. King; 2 males, 3 females (24845).

Tortugas; June 5–8, 1893; Biological Expedition, State University of Iowa; 1 male (S. U. I.), 1 female (20025).

Tortugas; 1924; gift of Carnegie Institution: Washed from weeds and rocks off mid-section of Bush Key reef inside, 3 feet before eelgrass; August 1; W. L. Schmitt; 1 male (62520). S. end of Loggerhead Key, from large rock 2 feet by 18 inches by 18 inches; August 10; W. H. Longley; 2 females, 1 young (62521).

CUBA.—Los Arroyas; May 20, 1914; Henderson and Bartsch; station 8, *Tomas Barrera* Expedition; 1 young (48521).

Punta Colorado; 2 to 3 fathoms; Sh. Grs.; May, 1914; same collectors; station 10; 1 male (47920).

CARIBBEAN SEA.—Caracas Bay, Curaçao; 1920; C. J. van der Horst: May 5; 1 male in sponge (56882), 1 female, in coral (56881). 6 males, 3 females, 2 young (Amsterdam Mus.).

Trinidad; February, 1878; Crosby, collector; 1 male (56821), from Boston Society of Natural History.

Barbados; from coral heads; June 4, 1918; Barbados-Antigua Expedition; 2 females (58004), from State University of Iowa.

HETERACTAEA LUNATA (Milne Edwards and Lucas)

Plate 212, Figures 1–4; Plate 214

Pilumnus lunatus MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1843, p. 20; atlas, vol. 9, 1847, pl. 9, figs. 2–2*d* (type-locality, Valparaiso; type in Paris Mus.).—STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 216 [88].—STREETS and KINGSLEY, Bull. Essex Inst., vol. 9, 1877 (1878), p. 106.

Heteractaea pilosus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 97 [3] (type localities, San José Island, Amortiguado Bay; and Port Escondido, both in the Gulf of California; types not extant).

Heteractaea lunata KINGSLEY, Proc. Acad. Nat. Sci. Philadelphia, 1879 (1880), p. 396.—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 301, pl. 52, fig. 2–2*b*.

Diagnosis.—Crest of carpus of ambulatory legs two-horned or crescentic; no crest on last pair. Inferior orbital margin trilobed, a small lobe between two large ones.

Description.—Similar to the preceding. Carapace wider in proportion to its length; surface rugose or granulous. Front thick as in *ceratopus*, but doubled by a padlike crest which runs parallel and close to the marginal crest. Superior margin of orbit without fissure; inferior margin with a small tooth or tubercle between the two large lobes. Antero-lateral margin with three pointed teeth, directed more outward than forward. Two large tubercles on subhepatic region; one is visible from above between the first antero-lateral tooth and the exorbital lobe, the other is below the outer end of that lobe and is partially concealed by it; the subhepatic tubercles form a continuous line with the antero-lateral teeth (but not the exorbital lobe) and lead up to the outer lobe of the inferior orbital margin.

Chelipeds covered with coarse conical tubercles each of which forms a center for a rosette of short coarse hairs. Ambulatory legs

more hairy than chelipeds. The crest of the carpus in the first three pairs only has two spines above, one near each end, forming a crescent.

Color.—Carapace and legs russet brown. Palms rose color, fingers deep brown.

Measurements.—Male (33274), entire length of carapace 10.2, width excluding spines 14.6, including spines 15.5, fronto-orbital width 9, width of front 4.3 mm. Male (Gulf of California), length of carapace 19, width 27 mm. (Lockington).

Range.—From San Diego, California (Faxon) to Valparaiso, Chile.

Material examined.—

MEXICO.—Los Coronados Island; imbedded in coral [54]; 1 female; returned to Mrs. Kate Stephens, San Diego Society of Natural History.

Maria Madre Island; California Acad. Sci.: E. part of bay; 5–8 meters; May 17, 1925; F. Contreras; 2 males (62700). 4–10 fathoms; 2 males, returned.

PANAMA.—Capt. J. M. Dow; 2 males, 3 females (2146). March 12, 1891; *Albatross;* 1 male (20603). Low tide, rocks; May–July, 1924; E. Deichmann; 1 male, soft shell (60742).

Taboguilla Island; *Albatross:* 1 fathom; low tide, from coral; October 31, 1904; 4 males, 2 females, 1 young (33274). Between tide-marks; October 31, 1899; 1 male, 1 female (M.C.Z.).

Genus ACIDOPS Stimpson

Acidops Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 110 [20]; type, *A. fimbriatus* Stimpson.—A. Milne Edwards, Crust. Rég. Mex., 1880, p. 301.

Carapace broad, smooth, with convex antero-posterior and nearly plane transverse dorsal outline; surface nearly even. Antero-lateral margin short, acute, with three inconspicuous teeth, besides the angle of the orbit. Eyes and orbits elongate, resembling somewhat those of certain Macrophthalmoids. Orbits destitute of teeth or fissures. Eye-peduncles flattened, with an acute anterior edge continuous with the margin of the carapace. The basal article of the external antennae fills the orbital hiatus and just reaches the front. Chelipeds short. Legs broad and compressed except the dactyli which are narrow. Abdomen of male with the third segment much produced on either side; appendages of first pair broadly laminate at base, geniculated at the posterior third of their length and tapering to a fine point somewhat incurved toward the extremity and reaching to the penult segment of the abdomen; those of the second pair two-thirds as long as the first, slender, cylindrical, and tapering to a filiform extremity.

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[54] Of this coral Dr. T. Wayland Vaughan says, "probably near *Pocillopora capitata* Verrill, which is found along the west coast of America from Lower California to Panama."

Somewhat allied to *Pilumnus* but differs greatly in the character of orbits and eye-peduncles. (Stimpson.)

West Coast of Mexico; South Australia.

ACIDOPS FIMBRIATUS Stimpson

Plate 215

Acidops fimbriatus STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 10, 1871, p. 111 [21] (type-locality, Cape St. Lucas; type not extant).

? Ceratoplax ciliata CANO, Bull. Soc. Nat. Napoli, ser. 1, vol. 3, 1889, p. 229 (Ecuador). Not *C. ciliata* Stimpson.

Diagnosis.—Eyestalks long (for a Xanthid) and flattened. An anterior fringe of hair. Lateral teeth inconspicuous. Chelipeds short.

Description.—Anterior and antero-lateral margins of carapace ciliated with a fringe of long fine hairs. Carapace covered with a short pubescence and areolated, the areolets being sufficiently distinct, but not at all protuberant. Angle of orbit and next tooth of antero-lateral margin about equal in size; the other two teeth very small. Subhepatic region smooth. Front not prominent; median sinus slight; lobes very slightly convex. A strong, prominent endostomial ridge, continued to the epistome. External maxillipeds hairy; merus somewhat swollen. Chelipeds somewhat hairy; hand granulated on outer side; fingers short, acuminate and with granulated longitudinal ridges. Legs ciliated. Resembles *Ceratoplax ciliatus* in appearance. (After Stimpson.)

Measurements.—Male type, length of carapace 5.3 mm. (0.21 inch); width of same 7.1 mm. (0.28 inch). Female (Baumoris), length of carapace 10.3, width of same 14.3 mm.

Range.—Cape St. Lucas, Lower California, Mexico (type-locality); ? Ecuador; South Australia.

Material examined.—Baumoris, Port Phillip, Victoria, Australia; J. Gabriel; 1 female (Australian Mus.). This specimen sent for examination some years ago fits Stimpson's description except in one minor point, that is, the first 3 lateral teeth are subequal and larger than the fourth, instead of the last two very small. The Australian specimen is twice as large as the type and of the opposite sex. The areolation of the carapace is fairly distinct in spite of the pubescence which is very short and dense and mixed on the elevations with a few long, coarse hairs. Maxillipeds wide, merus transversely oblong-oval, without a notch at the inner angle. First segment of abdomen (female) much wider than any of the others.

Genus PILUMNOIDES Milne Edwards and Lucas

Pilumnoides MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, Crust., 1843, p. 21; type, *P. perlatus* (Poeppig).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 303.

Carapace thick, swollen, suborbicular, narrow behind. Regions well marked, little prominent. Front bilobed and deflexed. Orbits deep, almost circular, superior emarginations typically replaced by closed fissures. Antero-lateral margins little oblique, prolonged inward and backward from the last lateral tooth by a small crest on the branchial regions. Basal article of outer antennae remarkably short, second article scarcely reaching the subfrontal prolongation; flagellum short. Basal article of inner antennae wide and raised, the fossette in which the remaining articles are folded is oblique. The buccal cavity bears on either side a small emargination, corresponding to an endostomial crest which limits the canal of the branchial chamber. Outer maxillipeds wide; merus rounded at external angle and slightly cut inside for insertion of palp. Chelipeds subequal, short and strong; arm entirely concealed under carapace; three large lobes or tubercles on upper margin of palm. Last three articles of ambulatory legs rounded above, dactyli terminated by slender, pointed nails. Abdomen of male with seven free segments.

Panama to Chile; southern Florida and West Indies; Argentina to Straits of Magellan.

KEY TO THE SPECIES OF THE GENUS PILUMNOIDES

A[1]. Carapace and chelipeds not thickly covered with hair. A large tubercle on outer surface of immovable finger.
B[1]. Branchial ridge almost transverse----------**perlatus, p. 535.**
B[2]. Branchial ridge almost longitudinal----------**hassleri, p. 537.**
A[2]. Carapace and chelipeds thickly covered with hair. No large tubercle on outer surface of immovable finger----------**nudifrons, p. 538.**

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
hassleri	*perlatus*

PILUMNOIDES PERLATUS (Poeppig)

Plate 216; Plate 217, Figure 3; Plate 218, Figure 3

Hepatus perlatus POEPPIG, Arch. f. Naturg., vol. 2, pt. 1, 1836, p. 135, pl. 4, fig. 2 (type-locality, St. Vincent Bay, near Talcahuano, Chile; type in Mus. Univ. Leipzig).

Pilumnoides perlatus MILNE EDWARDS and LUCAS, d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, Crust., 1844, p. 21; atlas, vol. 9, 1847, pl. 9, figs. 1–1*c*.—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 304, pl. 54, figs. 6, 6*a*.—RATHBUN, Revista Chilena Hist. Nat., vol. 11, 1907, p. 49, pl. 2, figs. 1 and 2; Proc. U. S. Nat. Mus., vol. 38, 1910, p. 544, pl. 50, fig. 2.

Pilumnoides danai KINAHAN, Journ. Roy. Dublin Soc., vol. 1, 1857, pp. 333 and 337, pl. 14, fig. 2 (type-locality, Chinchas Islands, Peru, 7 fathoms; type in Mus. Roy. Dublin Soc.).

Diagnosis.—Branchial ridge almost transverse. Short transverse granulated ridges on anterior part of carapace.

Description.—Carapace broader than long, anterior two-thirds tuberculate, the tubercles forming, in part, short transverse striae,

posterior third nearly smooth; antero-lateral margin with five or six irregular teeth. Front most produced at middle. Outer orbital sinus narrow, between two flat sharp-edged teeth. Chelipeds tuberculate, tubercles arranged in rows on lower half of palm, the next to the lowest row terminating in a large tooth or tubercle on the outside of the immovable finger; upper edge of palm trilobate or tridentate; fingers brown with white tips, gaping slightly in basal half. Legs slender, terminal half or third furry.

Color.—Larger specimens, dark bistre with a whitish area either side of posterior portion. Smaller ones almost black; clove brown carapace and legs; chelipeds except fingers a sort of lavender gray; fingers olive or bistre. (Schmitt.)

Measurements.—Male, Valparaiso, length of carapace 18, width of same 23.3 mm. Female, ovigerous, Valparaiso, length of carapace 10.2, width of same 13 mm.

Range.—Panama (Cano) to Chile. Accidental at Queenstown, Ireland, and Plymouth, England (Calman).

Material examined.—

PERU.—Paita; October 7 and 8, 1926; 1 male, 3 young (60929, 60932).

Bay of Sechura, west of Matacaballa; about 5 fathoms, in trawl; April 8, 1907; R. E. Coker, collector, for the Peruvian Government; specimens returned.

Salavery; 1926; W. L. Schmitt: October 19; 1 male, 1 female, 10 young (60927). October 21; 11 males, 9 females (1 ovigerous), 12 young (60816). October 23 and 24; 18 males, 37 females (7 ovigerous) 9 young (60815).

Near northeast side of San Lorenzo Island; 2.5 fathoms, dredged; same collector; 1 male, 2 females (40423).

San Lorenzo Island; 1926; W. L. Schmitt: November 1; 1 female (60928); November 3; 6 males, 1 female, 5 young (60819). November 7; 1 young female (60818). Dredged; 4 young (60930).

Callao; specimens in Copenhagen Museum.

CHILE.—Antofagasta: November 6, 1914; J. N. Rose; 2 females (49058), received from the Carnegie Institution. November 15, 1926; W. L. Schmitt; 3 females (1 ovigerous), 6 young (60817).

Valparaiso Bay; C. E. Porter; 1 male, 1 female, returned to Mus. Hist. Nat. Valparaiso; 1 female (32263).

Valparaiso; April, 1920; Edwyn Reed; 8 males, 11 females (5 ovigerous); lent by Buenos Aires Museum (10806).

Valparaiso; January 7, 1927; W. L. Schmitt; 16 young (62551).

Talcahuano; January 15, 1927; W. L. Schmitt; 1 male, 2 females (60931).

PILUMNOIDES HASSLERI A. Milne Edwards

Plate 217, Figures 1 and 2

Pilumnoides hassleri A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 304, pl. 54, fig. 5–5*d*, (immature female) (type-locality, lat. 40° 22′ S., long. 60° 35′ W., 30 fathoms; cotypes in M.C.Z., cotypes in Paris Mus.); Bull. Mus. Comp. Zoöl., vol. 8 ,Dec. 1880, p. 13.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 317.

Pilumnoides perlatus RATHBUN (not Poeppig), Proc. U. S. Nat. Mus., vol. 21, 1898, p. 586.

Diagnosis.—Branchial ridge longitudinally oblique, almost parallel to postero-lateral margin. Carapace granulate.

Description.—Less strongly marked than *P. perlatus*. Carapace longer and narrower, postero-lateral margins more convergent. Surface of anterior two-thirds finely granulate; two hepatic nodules, the outer one small. Antero-lateral margin definitely quinquedentate, counting the angle of the orbit and a lobe immediately behind it; the margin is prolonged on the branchial region in a line almost parallel to the postero-lateral margin. The upper margin of the orbit sometimes but not always shows traces of emargination at the fissures; outer fissure narrow, its borders not raised. Ornamentation of chelipeds similar to that in *perlatus* but on the upper half of outer surface of palm the tubercles are in large part clustered together, forming larger unequal tubercles. The lobes on the upper margin are more dentiform than in the allied form. The lobe on the outside of the propodal finger is more projecting than in *perlatus;* the lower margin of that finger is arcuate, not straight. Fingers light colored in preserved specimens.

Measurements.—Male (53446), length of carapace 11.7, width of same 13.1 mm.

Range.—From Uruguay to the Straits of Magellan.

Material examined.—

URUGUAY.—Lat. 35° 24′ S., long. 53° 10′ W.; 70–75 fathoms; June 13–July 1, 1925; *Undine*, Capt. C. Alexandersson; 7 males, 1 female, 5 young; lent by Buenos Aires Museum (15885).

ARGENTINA.—Off the Rio de la Plata; January 13, 1888; *Albatross:* Lat. 36° 42′ S., long. 56° 23′ W.; 11.5 fathoms; S. brk. Sh.; 3 young (21989). Lat. 36° 43′ S., long. 56° 23′ W.; 10.5 fathoms; S. brk. Sh.; 4 males, 3 females, 5 young (21990). Lat. 36° 47′ S., long. 56° 23′ W.; 10.5 fathoms; S. brk. Sh.; 1 male, 4 females (21991).

Mar del Plata: April 29, 1919; F. Felippone; 1 male (53446). Martin Doello-Jurado collector; lent by Buenos Aires Museum: 25 fathoms, March 1918, 4 females (1 ovigerous), Cat. No. 9359; from the market, August 7, 1918, 1 male, 3 females; 2 males, 7 females, Cat. No. 10763; 2 males, 3 females, Cat. No. 9445. August 28, 1920,

3 females, Cat. No. 11381. April 14, 1921, M. Lesieux collector, 2 males, 2 females (1 ovigerous), lent by Buenos Aires Museum. February 1924, Leloir and Francheshi collectors, 1 male, lent by Buenos Aires Museum (14292).

Off Mar del Plata, 1914, *Patria*, lent by Buenos Aires Museum: Station 76, 1 male, 9 females, Cat. No. 8620; station 81, 2 males, 4 females (3 ovigerous).

Off Punta Mogotes; about 25 meters; *Patria;* lent by Buenos Aires Museum; Second voyage, station 75, 1 male, 2 females; second voyage, stations 75 and 76, 4 males, 4 females; station 77, 11 males, 8 females, 1 young.

Off Argentina; 1872; *Hassler:* E. of Creek Id.; lat. 40° 22′ S., long. 60° 35′ W.; 30 fathoms; March 3; station 27; 12 specimens, cotypes (2979, M.C.Z.). Off Bermeja Head; lat. 41° 17′ S., long. 63° 00′ W.; 17 fathoms; March 4; station 28; 1 specimen (2978, M.C.Z.).

Coast of Argentina; F. Felippone; 1 female (61123).

PATAGONIA.—Point Madryn (probably); 2 young females; lent by Buenos Aires Museum.

CHILE.—Straits of Magellan; lat. 52° 22′ 30″ S., long. 69° 22′ 00″ W.; 29.5 fathoms; S. St.; January 18, 1888; station 2775, *Albatross;* 1 male (21992).

PILUMNOIDES NUDIFRONS (Stimpson)

Plate 218, Figures 1 and 2

Pilumnus nudifrons STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 143 (type-locality, off Sombrero Key, 111 and 125 fathoms; types destroyed in the Chicago fire).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 293, pl. 53, figs. 1–1*g*.—A. MILNE EDWARDS and BOUVIER, Mem. Mus. Comp. Zoöl., vol. 47, 1923, p. 320.

Pilumnoides nudifrons RATHBUN, Bull. Lab. Nat. Hist., State Univ. Iowa, vol. 4, 1898, p. 263.

Diagnosis.—Carapace and chelipeds thickly hairy; a bare strip across front and orbits. No large tubercle on outside of propodal finger.

Description.—Carapace more swollen than in the other species and front more deflexed; surface densely clothed with a short vesicular pubescence except for a naked band across the front and postorbital region; some longer hairs on anterior portion. When the hairs are removed the surface shows granulation on the highest parts of the subregions, separated by broad smooth spaces. Frontal lobes less oblique than in *perlatus* and *hassleri.* Slight emarginations in the upper border of the orbit, separated by a shallow lobe; outer sinus broad and shallow. Lateral teeth much as in *hassleri* but the last three are erect.

Material examined of Pilumnoides nudifrons

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.
	Latitude N.	Longitude W.								
Florida:	° ′ ″	° ′ ″			°F.					
Gulf Stream, off Key West	24 21 55	81 58 25	98	S	55	Feb. 14, 1902	7279	*Fish Hawk*	3 ♀ ovig	60811
Do	24 13 45	81 58 15	304	S	52	do	7281	do	1 ♂	60813
Do	24 18 37	81 36 50	127	rky	58	Mar. 4, 1902	7301	do	1 ♀ ovig	60814
Off Key West	Sand Key Light, NNW.		(1)			June 20, 1893	30	Biol. Exped. State Univ. Iowa	1 ♂	Mus. S.U.I.
Off Sand Key	Sand Key Light, N., about 6 miles.		116			June 19, 1893	29	do	1 ♀	20023
Off American Shoal	American Shoal Light, NE. by N., 8 miles		70–80			June 29, 1893	62	do	1 ♂	Mus. S.U.I.
Sambo Key			118			1916		*Eolis* (J. B. Henderson)	1 ♀	60812

[1] About 100.

Merus of outer maxillipeds produced obliquely forward and outward. Outer aspect of chelipeds densely hairy, hairs longer than the pubescence of the carapace and extending over the base of the dactylus and all but the tip of the propodal finger. When the hairs are removed, four or five rows of tubercles are visible but less regular than in the above species and interspersed on the distal portion including bases of fingers with closely placed tubercles. No large tubercle on outside of propodal finger. Three large tubercles on upper margin of palm, the first two subequal and subacute, the third or most distal very much larger, broadly rounded, domelike. Last three articles of ambulatory legs as well as sternum and abdomen densely hairy.

Measurements.—Male, station 30, length of carapace 14.8, width of same 17.4 mm.

Range.—Florida Straits; Barbados (A. Milne Edwards). 70 to 304 fathoms.

Material examined.—See table on this page.

Genus OZIUS Milne Edwards

Ozius Milne Edwards, Hist. Nat. Crust., vol. 1, 1834, p. 404; type, *O. tuberculosus* Milne Edwards.

Carapace broad, transversely oblate-oval, moderately convex fore and aft, slightly convex or nearly flat from side to side; the regions, except gastric, little defined; the surface smooth or granular, often rugose anteriorly. Antero-lateral borders of good length, strongly arched, usually

broadly crenate or lobulate; postero-lateral borders convergent, about as long as or shorter than antero-lateral. Front rather broad (considerably more than a fourth, the greatest breadth of carapace), obliquely deflexed, cut into four lobules or teeth of about equal size, separated from orbit by a notch. Orbits deep, rather small, the grooves near outer angle inconspicuous; eyes on short, thick stalks. The antennules fold nearly transversely. Basal antennal article prolonged between side of front and orbital plate; the flagellum, which is very small (about half the major diameter of the orbit in length,) stands in the orbital hiatus. The ridges of the endostome, defining the expiratory channels, are very strong, and the opposed margin of the merus of the external maxillipeds is notched, usually very deeply, so that a permanent expiratory orifice results. Chelipeds massive, unequal in both sexes; the fingers of good length, pointed, not hollowed. The abdomen of the male consists of seven segments.

Indo-Pacific region; both sides of middle America.

KEY TO THE AMERICAN SPECIES OF THE GENUS OZIUS

A[1]. Carapace less than one and a half times as wide as long. Size large. Chelipeds smooth ..... **verreauxii**, p. 540.

A[2]. Carapace more than one and a half times as wide as long. Size small. Chelipeds rough.

B[1]. Minor manus more than half as high as major. Lateral border marginate.

C[1]. Inner surface of manus not swollen near proximal end. Anterior and antero-lateral borders together not broadly arched. **reticulatus**, p. 542.

C[2]. Inner surface of manus swollen near proximal end. Anterior and antero-lateral borders together broadly arched ... **perlatus**, p. 543.

B[2]. Minor manus not more than half as high as major. Lateral border thick, not marginate ..... **agassizii**, p. 544.

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
reticulatus	*perlatus*

Ozius rugosus Milne Edwards and Lucas, "Chili,"[55] is a synonym of *Lydia tenax* (Rüppell), which inhabits the western part of the Indian Ocean, from the Red Sea to Baluchistan. "Chili" is very likely an error in locality.

OZIUS VERREAUXII Saussure

Plate 219; Plate 220, Figure 3

Ozius verreauxii SAUSSURE, Rev. Mag. Zool., ser. 2, vol. 5, 1853, p. 359 [6], pl. 12, fig. 1 (type-locality, Mazatlan, Mexico; type not extant).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 277, pl. 5, fig. 4.

Xantho grandimanus LOCKINGTON, Proc. California Acad. Sci., vol. 7, 1876 (1877), p. 98 [4] (type-locality, La Paz, L. C.; type not extant).

[55] In d'Orbigny's Voy. l'Amér. Mérid., vol. 6, pt. 1, 1844, p. 17; atlas, vol. 9, 1847, pl. 8 bis.

Diagnosis.—Of large size. Carapace less than one and a half times as wide as long; last two lateral teeth, though small, distinct and projecting. Chelipeds smooth.

Description.—Carapace narrow, less than one and a half times as wide as long. Surface covered with depressed granules, antero-lateral regions rugose. Grooves deep about the anterior portion of the gastric and mesogastric regions; a broad median groove between mesogastric region and edge of front. An oblique furrow runs across the front and behind the orbit; from it a short branch partially subdivides the protogastric regions. There is an oblique branchial ridge ending at the base of the penult lateral tooth. Front divided into four well separated lobes, those of the outer pair smaller than those of the inner. Orbits heavily rimmed, the rim enveloping the outer suborbital tooth; a tooth below at inner angle. Behind the orbital rim, 5 antero-lateral projections, the first three lobate, the last two shallow teeth.

Inner angle of carpus of cheliped blunt. Manus swollen, punctate, the punctae arranged chiefly in longitudinal lines. Fingers narrow, those of major chela widely gaping, teeth of movable finger larger and fewer than those of the dactylus, the large basal tooth excepted. Fingers of minor chela scarcely gaping, teeth numerous, those of the immovable finger running larger. The color of the major fixed finger runs backward and upward a little on the palm. Dactylus, propodus and distal end of carpus of ambulatory legs densely pubescent.

Color.—Slate gray with bandings of coral at meral and carpal joints of ambulatory legs. (Boone.)

Measurements.—Female (48779), length of carapace 52.4, width of same 81.7, fronto-orbital width 32.7, width of front 18.1 mm.

Range.—From Magdalena Bay, Lower California, to Ecuador (Nobili).

Material examined.—

MEXICO.—Magdalena Bay; June, 1917; C. R. Orcutt; 1 large female (Mus. San Diego Soc. Nat. Hist.).

La Paz, Gulf of California; L. Belding; 1 female (4627).

Teacapan, Sinaloa; from oyster beds; Secretaria de Agricultura y Fomento; 1 male (61029).

PANAMA.—Pacific shore of Panama; low tide, rocks; May–July, 1924; E. Deichmann; 1 male (60791).

Taboga Island: May 12–15, 1911; Meek and Hildebrand, Smithsonian Biological Survey; 1 female (43994). June, 1914; J. Zetek; 2 females (48775, 48779).

Taboguilla Island; between tide marks; October 31, 1904; *Albatross;* 1 female (33303).

Naios Island; G. M. Gray; 1 female (42145).

GALAPAGOS ISLANDS.—James Island; April 11, 1888; *Albatross;* 2 males (21981).

Indefatigable Island: April 12, 1888; *Albatross;* 1 male (21983). April 25, 1923; Williams Galapagos Expedition; 1 male (57737); gift of New York Zoological Society.

Charles Island; April 1, 1891; *Albatross;* 1 female (20605).

Chatham Island; April 4, 1888; *Albatross;* 1 female (21982).

OZIUS RETICULATUS (Desbonne and Schramm)

Plate 220, Figures 1 and 2

Lagostoma reticulata DESBONNE and SCHRAMM, Crust. Guadeloupe, 1867, p. 34, pl. 4, fig. 6 (type-locality, Guadeloupe, "au Moule et à la Pointe-à-Pitre"; type not extant).

Lagostoma reticulata DESBONNE and SCHRAMM, Crust. Guadeloupe, 1867, explanation of pl. 4, fig. 6.

Ozius integer SMITH, Rept. Peabody Acad. Sci., for 1869 (1871), p. 89 (type-locality, Aspinwall; type in M.C.Z.).

Ozius reticulatus A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 278, pl. 55, fig. 3–3*d*.

Diagnosis.—Size small. Carapace more than one and a half times as wide as long. Lateral borders subentire, the teeth scarcely projecting outward beyond the marginal curve. Antero-lateral regions and wrist and palm eroded.

Description.—Carapace more than one and a half times as wide as long; deeply eroded along the antero-lateral regions, covered with depressed granules and punctae elsewhere. Gastric and mesogastric regions well delimited. Mesogastric region constricted before it widens out; protogastric lobes partly subdivided. The oblique branchial ridge does not extend to the antero-lateral margin. Submedian frontal lobes subtriangular, outer lobes smaller, triangular; median sinus narrower than lateral ones. Above the margin of the front a transverse ridge, giving the appearance of a double-edged front. From this ridge the median groove leads backward. Inner suborbital tooth small, inconspicuous. Antero-lateral border marginate, entire or subentire; the positions of three of the obsolete teeth are indicated by short, oblique, dorsal ridges, but the teeth can best be discerned from the ventral side.

Carpus and manus of chelipeds eroded. Minor manus two-thirds as high as major. The dark color of the minor fingers covers only the distal half, of the major fingers reaches nearly to the proximal end.

Color.—Wine-color or dirty rose forming a reticulated pattern with lakes or spots of fawn-color. (Desbonne and Schramm.)

Measurements.—Male (24354), length of carapace 15, width of same 23.8, fronto-orbital width 9.2, width of front 6.2 mm.

Range.—Bahamas; West Indies; north coast of South America.

Material examined.—Bahamas; Charles L. Edwards; specimens returned to sender.

Jamaica: Southeast Cay; P. W. Jarvis; specimens returned to sender.

Culebra Island: Ensenada Honda; February 9 and 10, 1899; *Fish Hawk;* 4 males, 1 female (24354).

St. John Island, Virgin Islands; specimens in Copenhagen Museum.

St. Croix Island; specimens in Copenhagen Museum.

Curaçao, D. W. I.; Spanish Bay; among stones in the surf; May 11, 1920; C. J. van der Horst; 1 male (Amsterdam Museum), 1 ovigerous female (56886).

Curaçao, D. W. I.; 1905; J. Boeke: Rifwater; shallow water; muddy bottom; September 23; 1 male (Leiden Mus.). Bay of Wacao; sandy beach; October 4–5; 1 ovigerous female (Leiden Mus.).

Colombia: Sabanilla; March 16–22, 1884; *Albatross;* 10 males, 18 females (17824).

Panama: Colon [Aspinwall]; J. A. McNeil; 1 male, type of *O. integer* (4827, M.C.Z.).

OZIUS PERLATUS Stimpson

Plate 221, Figures 1 and 2

Ozius perlatus Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 211 [83] (type-locality, Cape St. Lucas; cotypes in Museum of Comparative Zoölogy).—A. Milne Edwards, Crust. Rég. Mex., 1880, p. 278, pl. 55, figs. 2–2*c*.—Boone, Zoologica, 1927, p. 228, text-fig. 84.

Diagnosis.—Anterior and antero-lateral borders together strongly arched. Inner surface of palm swollen near its proximal end. Otherwise much as in *reticulatus*.

Description.—Carapace very broad and depressed. Anterior part of carapace and upper side of chelipeds rugose, the raised portions reticulating, the pits and channels deep, as if eroded. The antero-lateral borders form with the front a curve of a large circle, their outline is entire anteriorly, but posteriorly there is an indication of three teeth. Carapace flat and obscurely granulate posteriorly, anteriorly deflexed, well areolated, the anterior branchial lobule being circumscribed. Latero-inferior regions granulated. Front depressed and transversely channeled, nearly straight in a view from above, but strongly bidentate at the middle in a front view; teeth obtuse. Basal article of external antennae projecting, being jammed in the inner angle of the orbit. External maxillipeds more or less pubescent; merus rather deeply bisulcate and anteriorly conspicuously notched at the efferent aperture. (Stimpson, A. Milne Edwards.)

Color.—Dark reddish. (Stimpson.)

Measurements.—Length of carapace 16.5 mm. [0.65 inch], width 28 mm. [1.1 inch] (Stimpson). Female, length of carapace 10, width 16 mm. (A. Milne Edwards).

Range.—Cape St. Lucas, Lower California, Mexico; Panama; Galapagos Islands; Ecuador.

Material examined.—Cape St. Lucas; John Xantus; 1 male, 1 female, cotypes (1256, M. C. Z.).

Ecuador: South side of Point Santa Elena; September 17, 1926; W. L. Schmitt; 1 female (60790).

OZIUS AGASSIZII A. Milne Edwards

Plate 221, Figures 3 and 4

Ozius agassizii A. Milne Edwards, Crust. Rég. Mex., 1880, p. 279, pl. 55, figs. 1–1*d* (type-locality, Panama; type in M. C. Z.).—Nobili, Boll. Mus. Zool. Anat. Comp. Univ. Torino, vol. 16, 1901, no. 415, p. 36.—Boone, Zoologica, vol. 8, 1927, p. 225, text-fig. 83.

Diagnosis.—Minor cheliped very slender, especially the fingers. Carapace and chelipeds tuberculate. Lateral margin of carapace thick.

Description.—Approaches the two preceding in form of carapace but is less regularly ovoid. The anterior surface bears instead of depressions small unequal tubercles, which give it a very rough appearance. Regions indistinct. An oblique granulate line runs from the lateral angle to the gastric region. Front quadrilobate, the lobes of the median pair very broad, subtriangular and blunt. Antero-lateral borders thick, not margined as in *reticulatus*, entire in front, two shallow teeth at the widest part; sometimes an indication of another tooth in front of, or behind these two.

Chelipeds very unequal, the minor manus only half as high as the major; both are swollen and approach the cylindrical. Merus, carpus, manus and half of dactylus very rough with tubercles, which form irregular lines above the manus. Fingers long and slender, those of major chela gaping; those of minor chela extremely long, exceeding palm in length, and extremely slender, fitting tight together; teeth minute.

Color.—Uniform red brown, or a rather bright carmine band on the anterior and antero-lateral regions. (Nobili.)

Measurements.—Female (33329), length of carapace 13.1, width of same 21.5, fronto-orbital width 11, width of front 5.4 mm.

Range.—From Costa Rica to Ecuador (Nobili).

Material examined.—Costa Rica: Punta Arenas; 3 large specimens (Copenhagen Mus.).

Panama: Pacific shore of Panama; low tide, rocks; May–July, 1924; E. Deichmann; 1 male, 1 ovigerous female (60788). Taboga Island: July, 1924; E. Deichmann; 1 male (60789). May, 1927; Melbourne Ward; 1 male, 1 female; returned. Taboguilla Island; between tide marks; October 31, 1899; *Albatross;* 2 males, 4 females, 7 young (33329), 2 males, 2 females, 3 young (M. C. Z.). Perico Island; Oct. 26, 1904; *Albatross;* 1 male, 1 young (33288).

Galapagos Islands: James and Charles Islands; *Hassler* Expedition; specimens in M. C. Z. Chatham Island; Dr. W. H. Jones, U. S.

Navy; 2 females, 1 young (17804). Duncan Island; *Albatross;* 2 males, 5 females (21984).

Genus ERIPHIA Latreille

Eriphia LATREILLE, Nouv. Dict. Hist. Nat., vol. 10, 1817, p. 404; type, *E. spinifrons* (Herbst).

Carapace thick and deep, approaching a quadrilateral shape, very little convex or nearly flat, not remarkably broader than long. Antero-lateral borders slightly curved, much shorter than postero-lateral, and meeting the latter, not at a strong angle, as in most xanthids, but at a very open and imperceptible angle; though spinate, they are not cut into lobes. Fronto-orbital border extremely broad, much more than three-quarters the greatest breadth of carapace; the front is strongly deflexed, almost straight, cut in the middle into two lobes, beyond which the wide inner orbital lobe is in contact with a singularly broad prolongation of the infra-orbital plate. The orbits, which are deep and oval, are therefore completely closed and widely separated from the antennae. Basal antennal article very small, short, and broad; flagellum long, more than the major diameter of the large orbit. The antennules fold transversely. The crests of endostome, defining the expiratory canals, are strong, and the canal is completed below by the foliaceous process of the first maxillipeds, the anterior edge of that process being concave. Oblique anterior border of merus of external maxillipeds not notched. Chelipeds massive, unequal in both sexes; fingers stout, pointed, not hollowed. The abdomen of the male has all seven segments separate.

Inhabits both coasts of middle America; eastern Atlantic and southern Europe to the Indo-Pacific region.

KEY TO THE AMERICAN SPECIES OF THE GENUS ERIPHIA

A¹. Carapace roughened antero-laterally with tubercles each formed of a row of two or more granules.
  B¹. Male abdominal appendages of first pair with extremity gradually tapering and sharp pointed ---------- **gonagra**, p. **545.**
  B². Male abdominal appendages of first pair with thickened, blunt tips ---------- **squamata**, p. **550.**
A². Carapace covered with single granules, coarser in front half **granulosa**, p. **551.**

ANALOGOUS SPECIES ON OPPOSITE SIDES OF THE CONTINENT

Atlantic	Pacific
gonagra	*squamata*

ERIPHIA GONAGRA (Fabricius)

CALICO CRAB

Plate 222

Cancer gonagra FABRICIUS, Species Insectorum, 1781, p. 505 (type-locality, Jamaica; type in Kiel Mus.).

Eriphia gonagra MILNE EDWARDS, Hist. Nat. Crust., vol. 1, 1834, p. 426, pl. 16, figs. 16 and 17.—HAY and SHORE, Bull. Bur. Fisheries, vol. 35, 1915–16 (1918), p. 439, pl. 35, fig. 6.

Eriphia armata DANA, U. S. Expl. Exped., vol. 13, Crust., part 1, 1852, p. 248, atlas, 1855, pl. 14, fig. 6 *a–d* (type-locality, Rio Negro, Patagonia; type not extant).

Eriphia laevimana var. *smithii* CANO, Boll. Soc. Nat. Napoli, ser. 1, vol. 3, 1889, p. 210 (part), not MacLeay, 1838.

Diagnosis.—Male abdominal appendages of first pair with extremity gradually tapering and sharp pointed. Carapace roughened antero-laterally with tubercles each formed of a row of two or more granules. Frontal lobes (between antennae) divided each into a broad, transverse, inner lobe and a very small outer lobule. Tubercles of proximal row on wrist not dissimilar to remaining tubercles.

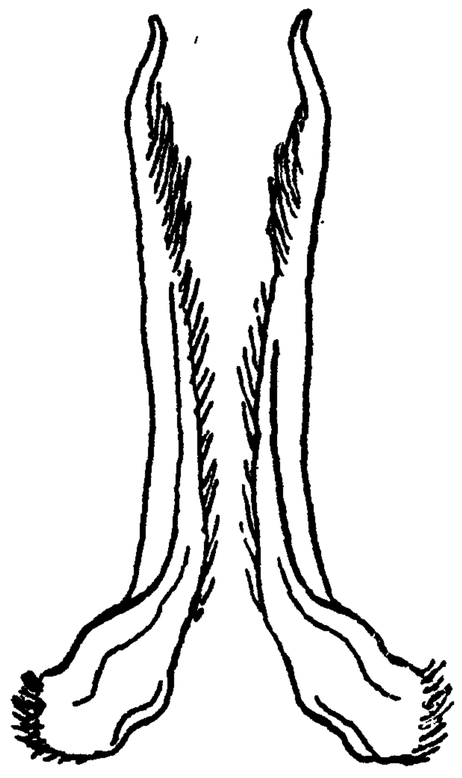

FIGURE 83.—ERIPHIA GONAGRA, MALE (59423), FIRST PAIR OF ABDOMINAL APPENDAGES, × 3

Description.—Carapace of moderate width, regions clearly marked on anterior two-thirds; postorbital grooves very deep; a transverse broken granulated line in front of epigastric lobes, another similar line across protogastric and hepatic lobes; a line of tubercles parallel to antero-lateral margins; these last armed with five or six spiniform teeth behind the orbital tooth. Front wide, deflexed, and divided into four lobes; the two median wider and more advanced than the lateral, truncate, with a finely granulated border; lateral lobes very small, close to the median pair. The so-called outer frontal lobe which lies alongside the inner suborbital tooth, pertains to the upper orbital border. Inner orbital suture very sinuous; below it a line of large tubercles.

Chelipeds strong, swollen, unequal. Hand covered with large, round, flattened, squamiform tubercles, more elevated on the small hand than on the large; the major dactylus has a large rounded tooth at its base. Wrist covered with less prominent tubercles. Legs clothed with fine, stiff hairs on the last three articles.

Color of Tortugas specimens (Schmitt).—Carapace brownish green, marked along areolations and on anterior rugae with a warmer bluish brown; anterior spines, edge of orbits and of front touched with yellow. Under parts whitish suffused with pink, becoming yellowish posteriorly and on abdomen, and bluish anteriorly and laterally; maxillipeds purplish. Antennules claret color as is ridge of epistome between efferent branchial openings. Fingers and tubercles (upper four or five rows) of manus and carpus deep purplish brown, becoming grape juice color on anterior inner portion and lower edge of palm. Ground color of manus, carpus and merus light bluish purple, more or less suffused with yellow on inner portion.

Extreme tips of fingers light yellowish followed by a narrow, not prominent, reddish brown band; a similar band about bases of fingers. Ambulatory legs yellowish along upper edge, becoming light pinkish purple to bluish white on anterior and posterior sides and beneath, each article marked on middle of upper edge with a patch of reticulating lines of grape juice color, the patches extending part way down anterior and posterior sides. Two smaller patches, more or less inconspicuous occur on the meri.[56]

Measurements.—Male (22016), total length of carapace 30.5, width of same 43.8, fronto-orbital width 33.4, width of front 11.6 mm.

Range.—North Carolina to Patagonia (Dana); Bermudas.

Material examined.—

NORTH CAROLINA.—Shackleford Bank: On the jetties; August, 1915; *Fish Hawk*; 5 specimens (51066). Inside; washed from seaweed; September 12, 1928; Schmitt and Shoemaker; 1 young female (62513).

FLORIDA.—Indian Key; H. Hemphill; 2 males, 4 females (14987).

Key Vaccas; H. Hemphill; 1 male (14985).

Big Pine Key; H. Hemphill; 2 males, 1 female (14986).

Key West: H. Hemphill; 3 males, 3 females (9271). Maynard, collector; 8 males, 6 females (2 ovigerous) (56810, 56811, 57009); from Boston Society of Natural History. Off east Martello Tower; July 14, 1924; W. L. Schmitt; 1 male (59422); gift of Carnegie Institution.

Tortugas; P. Bartsch: Loggerhead Key; June 1, 1916; 1 female (56364). Bush Key; June, 1921; 1 male, 1 female (57127).

Tortugas; W. L. Schmitt; gift of Carnegie Institution: Loggerhead Key; rocks on east side; July 28, 1924; 3 males, 1 ovigerous female (59421). Bird Key Reef: North end, "Channel reef," August 12, 1924, 1 male, 1 ovigerous female (59426); south end, August 13, 1924, 3 males, 1 female (59423); July 26, 1924, Bender collector, 2 females (60869). June 2, 1925, 1 male (60867); stations 25 and 26, June 7, 1925, 1 male, 3 females (1 ovigerous) (60866). Long Key beach; east side; August 5, 1924; 1 female (59420). Bush Key Reef: Mid-section, August 1, 1924, 6 males, 8 females (1 ovigerous) (59425); northern section, August 2, 1924, 1 male (59424).

Tortugas; Bush Key Reef; July 16, 1926; C. R. Shoemaker; 1 male, 1 female (60864); gift of Carnegie Institution.

BAHAMAS.—Doctor Bryant; 1 male, 1 female (56813), from Boston Society of Natural History. Green Turtle Cay; E. A. Andrews; 1 male, 3 females (20712). Biological Expedition of State University of Iowa: Harbor Island, July 8, 1 male (Mus. S.U.I.); Spanish Wells, July 12, 1 male, 1 female (Mus. S.U.I.). Andros

[56] For color, see also Rathbun, Proc. Washington Acad. Sci., vol. 2, 1900, p. 141; and Hay and Shore, Bull. Bur Fisheries, vol. 35, 1915–16 (1918), p. 439.

Banks, in sponges, Frederick Stearns; specimens returned to sender. Andros Island; 1912; Paul Bartsch: East side, near lighthouse south of South Bight, May 14, 1 male, 2 females (45548). Smith's place, south side of east end of South Bight, Long Bay Key District, May 5, 2 males, 1 female (45547).

CUBA.—Ensenada de Cajon, off Cape San Antonio; May 22, 1914; Henderson and Bartsch; station 11, *Tomas Barrera* Expedition; 1 male (48560), 1 ovigerous female (48555).

Bahia Honda; June 7, 1914; Henderson and Bartsch, *Tomas Barrera* Expedition; 1 male, 1 female (48565).

Marianao Playa; C. F. Baker; 1 male (31890).

Cardenas; 1923; Dr. Francisco R. Sosa; 1 male, 1 female (58388), 1 specimen (59374).

JAMAICA.—Jamaica; 1 male, type (Kiel Mus.).

Montego Bay; P. W. Jarvis; 2 males (19068). Small brackish pond near shore; June 23, 1910; C. B. Wilson; 1 male (42930). 1910; E. A. Andrews: Coral reef near Bogue Islands, June 21, 1 male, 2 females (42925); rocks in front of Sea View, August 30, 9 males, 2 females (1 ovigerous) (43052).

Umbrella Point; July 14, 1910; E. A. Andrews; 1 female (42924).

Rocks on Hale shore; September 2, 1910; E. A. Andrews; 1 ovigerous female (42923).

Port Royal Cays; P. W. Jarvis; specimens returned to sender.

Robins Bay; January 31, 1928; C. R. Orcutt; 1 young (61344).

Jack's Bay; February 15, 1928; C. R. Orcutt; 1 female, 2 young (62515).

SAN DOMINGO.—1878; W. M. Gabb, 23 males, 19 females, 1 young (3197).

PORTO RICO.—1899; *Fish Hawk:* Mayaguez; on coral reef; January 23; 1 young female (24306). Boqueron Bay; January 28; 1 male (24307). Ponce; January 31; 2 males (24270). Reefs at Ponce; January 30; 1 male, 2 females (24308). Playa de Ponce Reef; February 1; 1 male (24273). Hucares; February 13; 1 male (24310). Ensenada Honda, Culebra Island; February 9; 1 female (24309). Caballo Blanco Reef, Vieques Island; February 7; 2 males, 3 females (24267).

VIRGIN ISLANDS.—St. Thomas; Riise collector; specimens in Copenhagen Mus.

St. John; Örsted collector; specimens in Copenhagen Mus.

St. Croix Island; Örsted collector; specimens in Copenhagen Mus.

ANTIGUA.—Pillars of Hercules, English Harbor; 1918; Barbados-Antigua Expedition, State University of Iowa; 1 young (Mus. S.U.I.).

BARBADOS.—May 8, 1890; U. S. Eclipse Expedition to Africa, W. H. Brown; 1 female (14884). 1918; Barbados-Antigua Expedition, State University of Iowa: 1 male, 3 females (Mus. S.U.I.).

Bathsheba; 2 males (57998), 1 male (Mus. S.U.I.). Needham Point; 3 females (1 ovigerous) (Mus. S.U.I.). Pelican Island; tide pool; May 11; 1 female, 1 young (57999).

Rock pool at Bathsheba; February 22, 1924; Gerrit S. Miller; 1 female (62514).

TRINIDAD.—February, 1878; Crosby collector; 2 males, 3 females (56812); from Boston Society of Natural History.

ARUBA, D.W.I.—Playa; July, 1905; 1 female (Leiden Mus.).

COLOMBIA.—Sabanilla; *Albatross;* 3 males, 6 females, 2 young (17773).

Cartagena; Colegio de San Pedro Apostal; 1 young (53409).

PANAMA.—Colon (Aspinwall): C. F. Winslow; 1 male (56814), from Boston Society of Natural History. Meek and Hildebrand, Smithsonian Biological Survey: Coral reef, May 2, 1911, 1 male (44179), 1 female (Field Mus.). Tide pools, March 13, 1912, 1 male (59296).

BRAZIL.—State of Parahyba: Mamanguape stone reef; June 23, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 male (25741).

State of Pernambuco: 1899; A. W. Greeley, Branner-Agassiz Expedition: Rio Goyanna stone reef, 7 males, 2 females (Stanford Univ.); Pernambuco stone reef, July 7, 3 males, 2 females (25742); Boa Viagem stone reef, July 6, 1 female, soft shell (25743). 1876–1877; R. Rathbun, Hartt Explorations: Pernambuco, 1 male, 1 female (40572); Santo Aleixo, 2 young (40596); Rio Formoso, 2 males, 1 female (40595).

State of Alagoas: Maceio coral reef; July 25, 1899; A. W. Greeley, Branner-Agassiz Expedition; 8 males, 3 females (25744).

State of Bahia: Bahia; December 23, 1877; *Albatross;* 1 female (22017). Abrolhos Islands; December 27–28, 1887; 25 specimens (22016). 1876–1877, R. Rathbun, Hartt Explorations: Plataforma, 1 young (40592), 2 males, 2 females (1 ovigerous) (40594), 1 male, 1 female (40593). Rio Vermelho, February 6, fragments (19967). Abrolhos Islands, 1 male (40573).

State of Rio de Janeiro: Nictheroy, Bay of Rio de Janeiro; July 20, 1915; J. N. Rose; 1 female (48302); gift of Carnegie Institution.

State of São Paulo: Villa Bella, Ilha São Sebastião; October, 1925; H. Luederwaldt collector; W. L. Schmitt; 1 male (60870). Iguape; 1902; R. Kroner; 1 male (47840); gift of H. von Ihering.

State of Santa Catharina: São Francisco; 1925; W. L. Schmitt: October 28 and 29, 3 males, 1 ovigerous female (60868). October 30, 1 male, 2 females (1 ovigerous) (60865).

BERMUDA.—Hungry Bay; July–September; F. G. Gosling; 1 female (25443).

ERIPHIA SQUAMATA Stimpson

Plate 223; Plate 224, Figure 1

Eriphia squamata STIMPSON, Ann. Lyc. Nat. Hist. New York, vol. 7, 1859, p. 56 [10] (type-locality, Mazatlan; type not extant).—A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 339, pl. 56, figs. 3–3*e*.—RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 544, pl. 41, fig. 1.

Eriphia laevimana var. *smithii* CANO, Boll. Soc. Nat. Napoli, ser. 1, vol. 3, 1889, p. 210 (part), not MacLeay, 1838.

Diagnosis.—Like *gonagra*, but with the tubercles of the palms larger, rounder and closer together and ciliated on the margin. Male abdominal appendages of first pair with thickened blunt tips.

Measurements.—Male (6698), total length of carapace 36.6, width of same 51.3, fronto-orbital width 37.3, width of front 12.2 mm.

Range.—Mexico to Chile (A. Milne Edwards).

Material examined.—

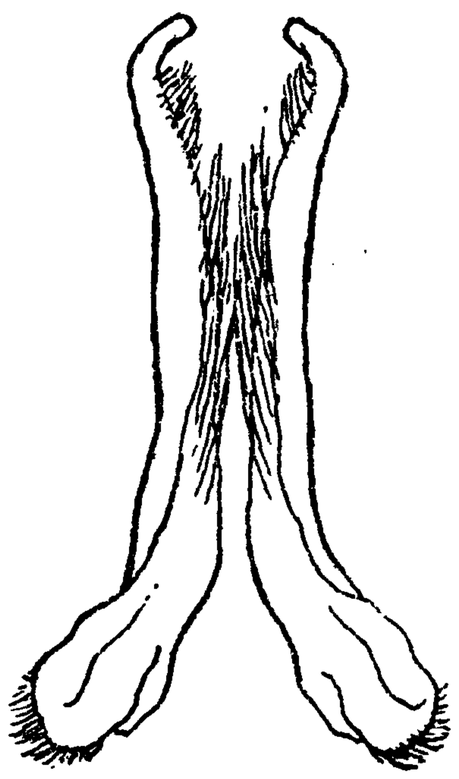

FIGURE 84.—ERIPHIA SQUAMATA, MALE (50629), FIRST PAIR OF ABDOMINAL APPENDAGES, × 3

MEXICO.—Magdalena Bay, Lower California: 1917; C. R. Orcutt; 4 males, 3 females (50629). Shore; Hanna and Jordan, California Acad. Sci.; 1 male, soft shell; returned.

La Paz, Lower California; L. Belding; 1 male, 3 females (4625). January 14, 1921; A. L. Herrera; 1 female (61140). La Paz Harbor; March 12, 1889; *Albatross;* 2 males, 2 females (17411).

Pichilinque Bay; *Albatross:* April 29, 1888; 1 female (22018). March 27, 1911; 2 males, 3 females (2 ovigerous) (50480).

Agua Verde Bay; April 1, 1911; *Albatross;* 1 male, 1 female (50481).

Bocochibampo Bay; 1922; C. R. Orcutt; 2 chelipeds (57062), 2 chelipeds (57058).

Mazatlan; 1911; *Albatross;* 1 propodus of cheliped (53348).

Maria Magdalena Id.; Hanna and Jordan, California Acad. Sci.; 1 male (62699).

Santa Isabel Id., Tepic Territory; among rocks; Secretaria de Agricultura y Fomento; 1 male (61033).

NICARAGUA.—Corinto; J. A. McNiel; specimens in M.C.Z.

COSTA RICA.—Punta Arenas (Pacific side); in the rocks; January, 1907; P. Biolley collector; 1 female (39090); from J. Fid. Tristan.

PANAMA.—Capt. J. M. Dow; 1 male (3268). H. A. Ward; 1 male, 1 female (17787). Panama City; December 16, 1913: J. Zetek; 1 male (48797).

1912; Meek and Hildebrand, Smithsonian Biological Survey: Balboa, Canal Zone: tide pool, February 8, 1 male (Field Mus.); February 7, 3 males, 1 female (59299); February 9, 1 ovigerous female (59297). Rio de Panama, tide pools, March 21, 1 female (59300). Panama Bay: February 19, 1 male (59298); island at end

of breakwater, February 5, 1 male (Field Mus.). Panama, March 23, 1 male, 3 females (Field Mus.).

Taboguilla Island, Bay of Panama; between tide marks; October 31, 1899; *Albatross;* 1 female (33281), 1 female (M.C.Z.).

ECUADOR.—South side Point Santa Elena; 1926; W. L. Schmitt: On neck; September 16; 1 male (60872). September 17; 2 males, 1 young female (60729).

Salinas; 1926; W. L. Schmitt: September 12–14; 14 males, 25 females (4 ovigerous, 1 soft shell, 1 shedding), 1 young (60730). Under rocks; September 15; 1 female (60872).

GALAPAGOS ISLANDS.—Chatham Island; April 16–17, 1884; Dr. W. H. Jones, U. S. Navy; 1 male (17783).

PERU.—Las Vacas, near Capon; beach; January 23, 1908; R. E. Coker; 1 female (40424); gift of Peruvian Government.

ERIPHIA GRANULOSA A. Milne Edwards

Plate 224, Figures 2–4

Eriphia granulosa A. MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 339. pl. 56, fig. 2–2*b* (type-locality, Chile (?); type in Paris Mus.).

Diagnosis.—Carapace covered with single granules, coarser in front half. Frontal lobes (between antennae) undivided, smooth and convex, edge arcuate. Tubercles of proximal row on wrist longitudinally elongate. Male abdominal appendages of first pair stout.

Description.—Carapace narrower and flatter than in the two preceding species; front less deflexed. Regions well defined, the hepatic plainly circumscribed. Dorsal surface all over granulate, the granules coarser on the gastric, hepatic, and anterior half of branchial region; scattered tufts of hair. Antero-lateral border armed with five small, spiniform teeth (not counting orbital angle). Median emargination of front acutely pointed; lobe on either side smooth, surface convex, edge entire. The so-called outer lobe of the front really represents the inner supra-orbital angle; it is lobiform, smooth, and bent down to the smaller inferior orbital lobe; upper border finely granulate, a spine at outer angle; lower margin smooth. Jugal region smooth below inner orbital suture.

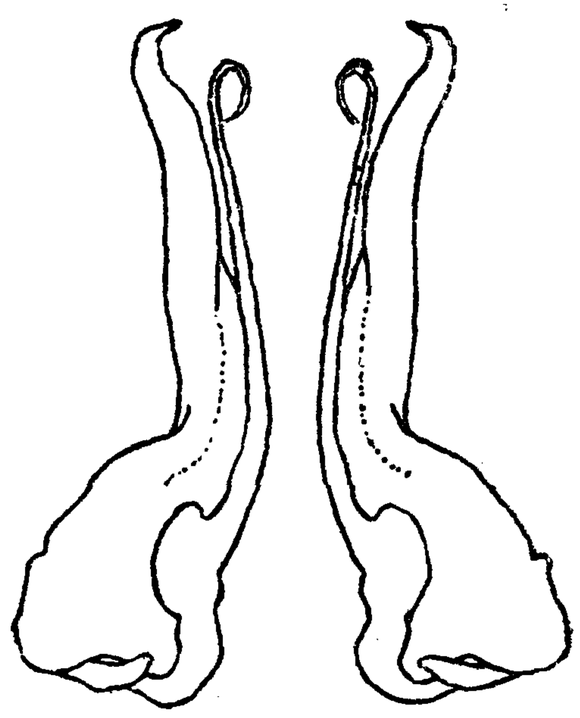

FIGURE 85.—ERIPHIA GRANULOSA, MALE (25667), ABDOMINAL APPENDAGES, × 10

Carpus and manus of chelipeds covered with large rounded tubercles, each with a marginal fringe of short hair; on the carpus the tubercles are arranged in transverse rows, those of each row confluent proximally; on the row nearest the manus the tubercles are almost obliterated and form a scalloped edge. The tubercles of the manus are round or approximately so, except the row bordering the carpus

which are longitudinally oblong. Legs slender, edged with long, fine hairs.

Color.—Red purple. (A. Milne Edwards.)

Measurements.—Female (25667), total length of carapace 9.2, width of same 12.6, fronto-orbital width 11.4, width of front (between antennae) 3.8 mm.

Range.—Cocos Island, off Panama (Boone); Galapagos Islands; Chile (?).

Material examined.—

GALAPAGOS ISLANDS.—Albemarle Island: Reef north of Tagus Hill, Tagus Cove; March 16, 1899; Stanford University; 1 male, 1 female, 1 young (25667).

Eden Island, off Indefatigable Island; rock pools; April 6, 1923; Williams Galapagos Expedition; 1 young (57730); gift of New York Zoological Society.

Chatham Island; Dr. W. H. Jones, U. S. Navy; 1 ovigerous female (15378).

CHILE.—Chile (?);[57] 1 female, holotype (Paris Mus.).

Remarks.—Very distinct from, and not to be confused with, the *gonagra-squamata* type. In *granulosa* the lobes of the front and inner orbit, both above and below, have smooth convex surfaces which is not the case in *gonagra* and *squamata*. The granules of the gastric region in *granulosa* are single, not combined in rows, and the arrangement of tubercles on wrist and hand is distinctive.

Genus ERIPHIDES Rathbun

Pseuderiphia A. Milne Edwards, Crust. Rég. Mex., 1880, p. 340; type, *P. hispida* (Stimpson). Not *Pseuderiphia* Reuss, 1859, a genus of fossil crabs.

Eriphides Rathbun, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 164; substituted for *Pseuderiphia* preoccupied.

Carapace strongly narrowed behind; regions faintly marked. Front between orbits very wide; outer antennae very remote from orbits. A deep suborbital hiatus. Buccal cavity a little narrowed anteriorly; margin of outer maxillipeds with a sinus on anterior border. Sternal plastron narrow and flat. Chelipeds unequal; fingers of minor chela ending in a spoon. Ambulatory legs with short, stout dactyls, ending in strongly hooked nails. Carapace, chelipeds and legs covered with short bristly hairs.

Contains only one species.

ERIPHIDES HISPIDA (Stimpson)

Plates 225 and 226

Eriphia hispida Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 218 [90] (type-locality, west coast of Central America; type not extant).

Pseuderiphia hispida A. Milne Edwards, Crust. Rég. Mex., 1880, p. 340, pl. 56, figs. 1–1c.

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[57] On the label in the Paris Museum, "Chili" is followed by an interrogation point.

Eriphides hispida RATHBUN, Proc. Washington Acad. Sci., vol. 4, 1902, p. 282.—BOONE, Zoologica, vol. 8, 1927, p. 237, text-fig. 87 A (not 87 B, which is a *Pilumnus*).

Diagnosis.—Covered with black setae. Carapace and chelipeds very rough with subacute tubercles. Front between orbits extremely wide.

Description.—Carapace depressed except anteriorly where it rounds downward; a deep median sulcus in front of mesogastric region. Surface rough with squamiform tubercles, larger anteriorly than posteriorly; stiff black setae proceed chiefly from the tubercles. Frontal margin between orbits armed with numerous short, obtuse spines. Antero-lateral margins with 7 to 9 spiniform teeth, often themselves denticulate. Orbits further from antennae than in the genus *Eriphia*. Below outer angle of orbit a deep emargination, deeper than wide.

Chelipeds tuberculate or granulate above and outside, and hands inside. Fingers of major chela rounded, blunt; those of minor chela broader, hollowed out in a long spoon, edge mostly thin. Legs very broad, compressed, non-granulate; upper border of meri thin and crenulated.

Color.—Purplish brown. (A. Milne Edwards.)

Measurements.—Female (22019), total length of carapace 47.3, width of same 62.6, fronto-orbital width 44.6, width between orbits 32.8, width of front between antennae 15.2 mm.

Range.—West coast of Costa Rica; Panama (A. Milne Edwards); Galapagos Islands.

Material examined.—

COSTA RICA.—Peñón de Tivives near Boca Jesús Maria; J. F. Tristan; specimen returned to sender.

GALAPAGOS ISLANDS.—Albemarle Island; April 10, 1888; *Albatross;* 2 females (22019).

Duncan Island; April, 1888; *Albatross;* 1 female (40631).

Eden Island, off Indefatigable Island; 1923; Williams Galapagos Expedition; 1 female; gift of New York Zoological Society.

Genus DOMECIA Eydoux and Souleyet

Domecia EYDOUX and SOULEYET, Voy. *Bonite*, I, Crust., 1842, p. 234; type, *D. hispida* Eydoux and Souleyet.—A MILNE EDWARDS, Crust. Rég. Mex., 1880, p. 345.

Domaecius DANA, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 128; U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 230.

Domaecia DANA, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 251.

Domoecia A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat. Paris, vol. 9, 1873, p. 263.

Neleus DESBONNE and SCHRAMM, Crust. Guadeloupe, 1867, p. 35; type, *N. acanthophorus* Desbonne and Scramm = *D. hispida* Eydoux and Souleyet.

Eupilumnus KINGSLEY (not Kossmann), Proc. Acad. Nat. Sci. Philadelphia, vol. 31, 1879 (1880), p. 397; type, *E. websteri* Kingsley = *D. hispida* Eydoux and Souleyet.

Carapace somewhat transversely oval, but much contracted posteriorly, flat, somewhat hairy, with no trace of regions. Fronto-orbital border not much less than greatest breadth of carapace. Front profusely spinate, the spines being sharp and a little curved. The antero-lateral borders pass backward with but little outward slope, a little shorter than the concave and convergent postero-lateral borders, and armed with a number of sharp curved spines. The orbits are at antero-lateral angles of carapace and do not conceal the eyes; their edge shows no fissures nor sutures; their upper and lower inner angles are broadly in contact, or almost in contact, so as to exclude the antennae. The antennules fold nearly transversely. The basal antennal article hardly reaches the front, though its outer angle is produced toward front; the flagellum is short, hardly as long as orbit. Buccal cavern broad; crests of endostome not very strong, nor is the foliaceous process of first maxillipeds produced far forward; external maxillipeds very long, merus remarkably broad and short. Chelipeds somewhat unequal, short, and not very massive; arm almost entirely hidden by carapace; fingers compressed, pointed. Legs stout, especially meropodites. The abdomen of the male has all seven segments distinct and separate.

Both sides of tropical America; Indo-Pacific region.

DOMECIA HISPIDA Eydoux and Souleyet

Plate 227

Domécie hérissée Eydoux and Souleyet, Voy. *Bonite*, 1841 (?), pl. 2, figs. 5 to 10.

Domecia hispida Eydoux and Souleyet, Voy. *Bonite*, vol. 1, Crust., 1842, p. 235 (type-locality, Sandwich Islands; type in Paris Mus.).—A. Milne Edwards, Crust. Rég. Mex., 1880, p. 345, pl. 58, figs. 2–2*d*.—Verrill, Trans. Connecticut Acad. Arts and Sci., vol. 13, 1908, p. 364, text-fig. 21.

Neleus acanthophorus Desbonne and Schramm, Crust. Guadeloupe, 1867, p. 35 (type-locality, Guadeloupe; type not extant).

Pilumnus melanacanthus Kingsley, Proc. Boston Soc. Nat. Hist., vol. 20, 1879, p. 156 (type-locality, Key West; cotypes in Mus. Comp. Zoöl.).

Eupilumnus websteri Kingsley, Proc. Acad. Nat. Sci. Phila., vol. 31, 1879 (1880), p. 397, pl. 14, fig. 3 (type-locality, Key West; type not located).

Diagnosis.—Carapace much narrowed behind. Carapace and chelipeds armed with black spines. Merus of outer maxillipeds very short. Fingers compressed and pointed.

Description.—Carapace covered with light-colored hairs; antero-lateral border with four to six (including orbital angle) acute dark-tipped spines, and several similar spines on carapace just inside antero-lateral border, and also just inside spiny fronto-orbital border. Upper orbital margin and prominent edge of the epistome finely denticulate; lower orbital margin spinous. Merus of external maxillipeds extremely broad and short, with an elevated patch of denticles on outer surface. Chelipeds unequal; arm, wrist, hand, and dactylus

studded with acute spines above. Legs stout, of moderate length; upper surface of last four articles fringed with hairs, upper edge of merus spinate, as also, but much less distinctly, is the upper edge of carpus and propodus.

Color.—Light yellowish red, front darker; spines blackish. (Verrill.)

Measurements.—Male (24315), total length of carapace 7, total width of same 9.5, fronto-orbital width 7.6, width of front between antennae 3.8 mm.

Habitat.—Among sponges and branches of corals and in holes of dead corals and stones.

Range.—From off South Carolina to Brazil; eastern Atlantic, Indian, and Pacific Oceans to American coast: Gulf of California to Panama (Verrill).

American material examined.—

SOUTH CAROLINA.—Open ocean off Gulf Stream; lat. 32° + N., long. 74° + W.; June 12, 1903; B. A. Bean; 1 female (31057); gift of Geographic Society of Baltimore.

BAHAMAS.—From sponges; Frederick Stearns; specimens returned to sender. J. I. Northrop; specimens returned to sender.

FLORIDA.—Rodriguez Creek; 1884; Edward Palmer; 6 males, 7 females (13569).

Key West; A. S. Packard, Jr.; 2 males, 1 female, cotypes of *Pilumnus melanacanthus* (4811, M. C. Z.).

Key West; among corals and algae, low tide; H. Hemphill; 1 male (14453).

Dry Tortugas; 1884; Edward Palmer; 2 males, 2 females (18044).

Sand Key Light; among sponges and rocks; 1893; Biological Expedition, State University of Iowa; 5 females (Mus. S.U.I.).

WEST INDIES.—Cuba: On reef flat between Cayo Hutia and Little Cayo, NE. of Light; May 12, 1916; *Tomas Barrera* Expedition; 1 male, soft shell (48516); from Henderson and Bartsch.

Jamaica: P. W. Jarvis; specimens returned to sender. Kingston Harbor; 1884; *Albatross;* 1 male, 4 females (18043).

St. Thomas; shore; January 17–24, 1884; *Albatross;* 5 males, 4 females (18042).

Porto Rico; 1899; *Fish Hawk:* Mayaguez; on corals; January 21; 11 females, 2 young (24311). Mayaguez; on coral reef; January 23; 5 males, 11 females, 2 young (24312). Porto Real; January 27; 1 female (24313). Playa de Ponce reef; February 1; 1 male (24314). Off Humacao; Humacao N. ¾ W. 5¼ miles; 10 fathoms; Co.; temperature 26° C.; February 14; station 6097; 1 male (24317).

Culebra Island: Ensenada Honda; February 9 and 11, 1899; *Fish Hawk;* 4 males, 1 female (24315).

Off Vieques Island: Culebrita Lighthouse, NE. ⅜ E., 7¼ miles; 16 fathoms; Co.; temperature 25.2° C.; February 10, 1899; station 6092, *Fish Hawk;* 1 male, 1 female (24316).

Barbados; 1918; Barbados-Antigua Expedition, State University of Iowa: In corals; May and June; 1 male, 2 females (1 ovigerous), 1 young (Mus. S.U.I.), 1 male, 3 ovigerous females, 1 young (57996). Okra Reef; May 13; 1 male, 6 females (4 ovigerous) (Mus. S.U.I.). Needham Point; May 18; 1 male (Mus. S.U.I.). Off Needham Point; 84 fathoms; rky.; 1 male, 4 females (2 ovigerous) (Mus. S.U.I.). W. by N. of Pelican Island, 1½ miles; 80 fathoms; rky; May 16; 1 young (Mus. S.U.I.).

CURAÇAO.—Caracas Bay; 1920; C. J. van der Horst: In corals; April; 5 males, 6 females, 9 young (Amsterdam Mus.). In *Meandrina;* April 7; 2 males, 1 female (56875).

Spanish Water; in *Porites furcata;* May 5, 1920; C. J. van der Horst; 1 male (Amsterdam Mus.).

BRAZIL.—Maceio coral reef, Alagôas; July 25, 1899; A. W. Greeley, Branner-Agassiz Expedition; 1 female (25745).

Pernambuco; 1876–77; R. Rathbun, Hartt Explorations: 1 male (19968). Rio Formoso; December, 1875; J. C. Branner collector; 1 female (19965).

WEST COAST OF MEXICO.—Maria Madre Island; March–May, 1927; from Secretaria de Agricultura y Fomento, Mexico, through A. L. Herrera; 1 male (60728).

Maria Madre Island; E. part of bay; 5–8 meters; May 17, 1925; F. Contreras; California Acad. Sci.; 1 ovigerous female; returned.

Genus TRAPEZIA Latreille

Trapezia Latreille, Encyc. Méth., vol. 10, 1825, p. 695; type, *T. dentifrons* Latreille, 1825, = *T. cymodoce* (Herbst, 1801).

Grapsillus MacLeay, in Andrew Smith, Ill. Zool. S. Africa, Annulosa, 1838, p. 67; type, *G. maculatus* MacLeay = *Trapezia cymodoce maculata* (MacLeay).

Carapace approaching the quadrilateral, little convex, not much broader than long, smooth and without trace of regions. Antero-lateral borders much shorter than postero-lateral, running backwards almost straight and parallel with each other or curved outward and away from each other, not therefore meeting the convex curved and convergent postero-lateral borders at any angle. Fronto-orbital border extremely broad, about as extensive as greatest breadth of carapace. Front broad, horizontal, lamellar, separated from supra-orbital angle by a notch; cut into two lobes of which both inner and outer angles are pronounced, so that with the supraorbital angle the front usually appears 6-toothed. Orbits large, cut out of antero-lateral angles of carapace; their dentiform upper and lower inner angles broadly in contact, so that the antennae are widely excluded; margins without fissures or sutures. The antennules fold nearly trans-

versely. Basal article of antennae slender and very short, not nearly reaching front; flagellum very long, much longer than major diameter of orbit. Crests of endostome well developed, the expiratory canals closed in below by the foliaceous process of the first maxillipeds; anterior edge of merus of slender external maxillipeds not notched.

Chelipeds long, very massive, not very unequal in either sex; the arm usually projects a long way beyond carapace, its anterior edge sharp, crest-like, serrate; the fingers have usually a thin and sharp cutting edge, best marked on the immobile finger. Legs stout, of moderate length. Third to fifth segments of male abdomen fused. (After Alcock.)

Red Sea, Indo-Pacific region and west American continent and islands from Cape St. Lucas to Galapagos Islands.

KEY TO THE AMERICAN SPECIES AND SUBSPECIES OF THE GENUS TRAPEZIA

A¹. Carapace widest at middle in full grown.
  B¹. Front not prominent, lobes shallow. Lateral projection of carapace a tooth.....**cymodoce ferruginea**, p. 557.
  B². Front prominent, lobes strongly marked. Lateral projection a spine. Carapace covered with small red spots...**cymodoce maculata**, p. 558.
A². Carapace not widening from orbits backward. Front finely denticulate. Lateral projection absent or insignificant.....**digitalis**, p. 559.

TRAPEZIA CYMODOCE FERRUGINEA Latreille

Plate 228, Figures 1 and 2

Trapezia ferruginea Latreille, Encyc. Méth., Hist. Nat., Entom., vol. 10, 1825, p. 695 (type-locality, Red Sea; type not in Paris Mus.).—Alcock, Journ. Asiat. Soc. Bengal, vol. 67, 1898, p. 220.

? *Trapezia cymodoce* S. I. Smith, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 287; Pearl Islands, Bay of Panama.—Faxon, Mem. Mus. Comp. Zoöl., vol. 18, 1895, p. 22; Acapulco.

Grapsillus ferrugineus Rathbun, Bull. U. S. Fish Comm. for 1903, part 3, 1906, p. 865.

Trapezia cymodoce ferruginea Rathbun, Mem. Mus. Comp. Zoöl., vol. 35, 1907, p. 58.

Diagnosis.—Antero-lateral margins diverging backward in the full grown; lateral projection a tooth or not very spiniform. Front not prominent, lobes shallow.

Description.—Front not very prominent, but advanced beyond the inner supra-orbital angle, and cut into two shallow lobes, each of which has the inner angle dentiform and the outer angle rounded. Tooth at lower inner angle of orbit not very sharp; outer angle acute but scarcely spiniform; lateral epibranchial tooth short and not very spiniform. Upper border of palm subacute; outer surface smooth, bare and polished.

Typical *cymodoce* has the front and all the marginal teeth and spines more prominent than in the subspecies *ferruginea*, the upper and lower

edges of palms sharp, the upper part of the outer surface covered with silky wool. There are gradations between these two forms.[58]

Color.—Orange; fingers grayish or brownish yellow; short spines at extremity of ambulatory dactyls brownish yellow. (Dana.)

Measurements.—Ovigerous female (33337), length of carapace 12.2, width of same 15.1, fronto-orbital width 12.6, width of front between antennae 5.5 mm.

Range.—From Clarion Islands and Acapulco, Mexico, to Panama and Galapagos Islands (Boone); Red Sea to Indo-Pacific region.

American material examined—

MEXICO.—Clarion Island; March 4, 1889; *Albatross;* 7 males, 5 females (17416).

Acapulco; April 18, 1891; *Albatross;* 1 female (20617).

California Academy of Sciences; 1925:

Maria Madre Island: E. part of bay; 5–8 meters; May 17, 1925; F. Contreras; 11 males, 21 females (62708); 29 males, 21 females, returned. Hanna and Jordan; 4–10 fathoms; 1 male, 1 female, returned; 1 female (62694).

Socorro Island; 2 ovigerous females: 1 returned; 1 (62695).

Clarion Island; shore; 1 male, returned.

PANAMA.—Panama; Henry A. Ward; 1 female (17302).

Taboga Island; among corals; June, 1924; E. Deichmann; 1 ovigerous female (60830).

Taboguilla Island; from coral, low tide, 1 fathom; October 31, 1904; *Albatross;* 3 males, 7 females (33337).

Pearl Islands; F. H. Bradley; specimens in M.C.Z.

TRAPEZIA CYMODOCE MACULATA (MacLeay)

Plate 228, Figures 3 and 4

Grapsillus maculatus MacLeay, in Andrew Smith, Ill. Zool. S. Africa, Annulosa, 1838, p. 67 (type-locality, South Africa, type probably not extant).

Trapezia maculata Dana, U. S. Expl. Exped., vol. 13, Crust., pt. 1, 1852, p. 265; atlas, 1855, p. 15, figs. 4*a–d*.—Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 219 [91].

Trapezia rufopunctata A. Milne Edwards (not Herbst), Crust. Rég. Mex., 1880, p. 342.

Trapezia ferruginea maculata Ortmann, Zool. Jahrb., Syst., vol. 10, 1897, p. 206.

Diagnosis.—Covered with small red spots. Antero-lateral margins diverging backward in the full grown; lateral projection a spine. Front prominent, lobes strongly marked.

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[58] Latreille described *T. ferruginea* as having the upper edge of the palm sharp. Concerning the specimens in the Paris Museum, Professor Bouvier wrote as follows:

"De *Trapezia ferruginea* caracterisée par 'la tranche supérieure des mains aigués' il n'en trouve pas dans notre collection. Mais en comparant les assez nombreux exemplaires qui s'y trouvent j'ai pu remarquer qu'il y a des différences très sensible dans cette tranche, chez les divers spécimens. Dans les uns le bout supérieur est franchement arrondi et ne mérite pas le nom de 'tranche'; dans d'autres il est étroit, bien distinct, et forme à vrai dire une tranche, mais une tranche à peine saillante et jamais aigué. Entre les deux extrêmes que je vous ai signalé, il me parait y avoir tous les intermediaires."

Description.—Front prominent, well advanced beyond the rounded, inner supra-orbital angle, cut into two well marked lobes, each of which has the inner angle dentiform and outer angle rounded. Tooth at lower inner angle of orbit with spiniform tip turned inward; outer angle of orbit acute. Lateral epibranchial angle marked with a sharp spine. Upper border of palm blunt, lower border acute; outer surface covered with a short down easily rubbed off.

Color.—A grayish or reddish yellow spotted above and below rather coarsely with small, rounded, deep-red spots. (Dana.)

Measurements.—Male (29486), total length of carapace 12, width of same 13.5, fronto-orbital width 12.4, interorbital width 7.3, width of front between antennae 5.5 mm.

Range.—From the Red Sea eastward through the Indo-Pacific region to the Hawaiian Islands and the west coast of Mexico (Stimpson).

Material examined.—No American material has been seen by the writer. The subspecies was reported by Stimpson from Socorro Island, Revilla Gigedo Islands, Mexico.

TRAPEZIA DIGITALIS Latreille

Plate 228, Figures 5 and 6

Trapezia digitalis Latreille, Encyc. Méth., Hist. Nat., Entom., vol. 10, 1825, p. 696 (type-locality, Red Sea; type not extant).

Trapezia corallina Gerstaecker, Arch. f. Naturg., vol. 22, pt. 1, 1856 (1857), p. 126 (type-locality, Veragua; type in Berlin Mus.).

Trapezia nigro-fusca Stimpson, Ann. Lyc. Nat. Hist. New York, vol. 7, 1860, p. 219 [91] (type-locality, Cape St. Lucas; type not extant).

Trapezia formosa Smith, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 286 (type-locality, Pearl Islands, Bay of Panama; cotypes in M.C.Z.).—A. Milne Edwards, Crust. Rég. Mex., 1880, p. 343, pl. 58, fig. 1–1*b*.

Diagnosis.—Antero-lateral margins parallel; lateral projection lacking or a slight tooth in the full grown. Front finely denticulate, lobes obscure.

Description.—Surface smooth and burnished. Carapace with a much broader look than the preceding owing to the somewhat lesser prominence of the front and the greater convergence of the postero-lateral borders. Antero-lateral margins subparallel. Front slightly notched in the middle line and separated from the scarcely dentiform supra-orbital angles by a shallow notch; it is thus obscurely divided into two lobes each of which has the free edge finely and irregularly denticulate. Outer angle of orbit acute and also the inner angle of the lower margin. Lateral margins either entire or with a slight notch, but no spine except in the very young.

Chelipeds subequal in both sexes. Arm short, broader than long, its foliaceous anterior border dentate or crenate; inner angle of wrist acute; upper border of hand rounded, lower border acute. Legs smooth, except the dactyls.

Color.—Dark brown, either uniform or with darker patches on the carapace. Inner side of claws and also the fingers lead-color. Legs light brown tending toward yellowish. (Latreille.) It is probable that this color description was made from preserved specimens, as other authors give brighter colors for the species: Gerstaecker says, body light coral red, fingers black-brown (*corallina*), while Smith for *formosa* gives uniform orange, a little darker above than below, fingers, brownish.

Measurements.—Male (25365), length of carapace 10, fronto-orbital and greatest width of carapace 12, interorbital width 7.9, width of front between antennae 6.2 mm.

Range.—Cape St. Lucas, Lower California, Mexico, to Panama; Red Sea to Indo-Pacific region.

American material examined.—

MEXICO.—California Academy of Sciences; 1925:

Maria Madre Island: E. part of bay; 5–8 meters; May 17, 1925; F. Contreras; 3 males, 4 females (62710); 4 males, 4 females, returned. Hanna and Jordan; 4–10 fathoms; 1 male, 1 ovigerous female, returned.

Socorro Island; 1 ovigerous female, returned.

Clarion Island; shore; 1 male, 1 ovigerous female, returned; 1 ovigerous female (62709).

PANAMA.—Veragua; 1 male, 1 female (Berlin Mus.; Cat. No. 2259); types of *T. corallina.*

Pearl Islands; F. H. Bradley; 1 female (4834, M.C.Z.); cotype of *T. formosa.*

Genus QUADRELLA Dana

Quadrella Dana, Amer. Journ. Sci., ser. 2, vol. 12, 1851, p. 128 (no species mentioned); Proc. Acad. Nat. Sci. Philadelphia, 1852, p. 84; type, *Q. coronata* Dana; U. S. Expl. Exped., vol. 13, Crust., part 1, 1852, p. 265.

Carapace squarely hexagonal, nearly as long as broad, moderately convex, perfectly smooth without trace of regions. Antero-lateral borders straight, sloping slightly outwards and joining the subequal postero-lateral borders at a very wide but distinct angle marked usually by a spine. Fronto-orbital border a little less than greatest width of carapace, interorbital border six spined, front proper cut into four spines, external to which, on either side is seen the spiniform internal angle of the lower edge of the orbit projecting beyond the acute supra-orbital angles. Orbits small, cut out of the antero-lateral angles of the carapace and not concealing eyes. Antennules folding almost transversely. Basal antennal article slender, not nearly reaching front; flagellum slender and long, nearly half the length of carapace. Crests of endostome distinct, expiratory canals closed as in *Trapezia.*

Chelipeds somewhat unequal, massive and long, the whole of the long arm projecting beyond the carapace. Legs long and slender,

the dactyli spined along inner edge. Abdomen of male with third to fifth segments fused. (After Alcock.)

Indo-Pacific region to the west coast of tropical America.

QUADRELLA NITIDA Smith

Plate 229

Quadrella nitida SMITH, Proc. Boston Soc. Nat. Hist., vol. 12, 1869, p. 288 (type-locality, Pacheca, Pearl Islands, Bay of Panama; types in P. M. Y. U.).—RATHBUN, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 590.

Quadrella coronata ORTMANN, Zool. Jahrb., Syst., vol. 10, 1897, p. 210 (part).—RATHBUN, Proc. U. S. Nat. Mus., vol. 38, 1910, pp. 586 and 617.

Diagnosis.—One spine on wrist. No spine in old specimens at lateral angle of carapace. Anterior border of carapace not deeply cut, so that the spines are shorter than in *coronata*.

Description.—Median sinus deeper than lateral sinuses of front. A spine at lateral angle of carapace in small specimens but only a slight angular projection in larger ones. Posterior edge of merus of cheliped rounded, anterior edge armed with six to eight slender spines. Carpus smooth, evenly rounded on outer side and with a single short spine on the anterior part of the inner side. Hands stout and considerably swollen, especially the larger one, smooth and unarmed, equalling or exceeding breadth of carapace. Fingers not gaping, those of larger chela rather stout and strongly incurved, those of smaller chela longer and more slender. Dactyli of legs pubescent.

Color.—Alcoholic specimens light yellowish, fingers tinged with orange and encircled with a median band of black (Smith). Small specimens (22021) show the color of fingers extending only three-fifths of length from tip and ending in an oblique line.

Measurements.—Male (22021), total length of carapace 8.9 mm., width of same 9.6 mm.; fronto-orbital width 7.6, width of front between antennae 3.7 mm.; female (22021), total length 6.6 mm., width 6.7 mm.

Range.—Lower California, Mexico, to Panama. 6 to 31 fathoms.

Material examined.—

Off Cape St. Lucas, Lower California; lat. 22° 52′ 00″ N., long. 109° 55′ 00″ W.; 31 fathoms; rky.; temperature 74.1° F.; May 1, 1888; station 2829, *Albatross;* 2 males, 2 females (22021).

Genus MELYBIA Stimpson

Melybia STIMPSON, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 144; type, *M. thalamita* Stimpson.

Carapace rather narrow, subquadrate, slightly convex, regions faintly marked. Antero-lateral margins very short, with four teeth or spines, including the orbital. Fronto-orbital width great, about five-sixths the greatest width of carapace. Front about two-fifths the width of carapace. Front depressed, bilobed, separated by a notch from inner orbital angle. Orbits large, Portunid-like, com-

pletely filled by the stout eyes; two superior notches in margin, and a broader notch below on outside. Basal article of antenna narrow, reaching a process of front and closing the orbital hiatus. Outer maxillipeds much smaller than buccal cavity; the exognath half the width of the endognath. Chelipeds unequal, long and strong, the arm reaching far beyond the carapace; spinulous. Legs long and narrow, spinulous; dactyli long. Abdomen of male with third to fifth segments fused.

Contains only one species.

MELYBIA THALAMITA Stimpson

Plate 230

Melybia thalamita Stimpson, Bull. Mus. Comp. Zoöl., vol. 2, 1871, p. 144 (type-localities, off French Reef, 15 fathoms, and west of Tortugas, 35–42 fathoms; cotypes not extant).—A. Milne Edwards, Crust. Rég. Mex., 1880, p. 275.

Melybia forceps A. Milne Edwards, Crust. Rég. Mex., 1880, p. 274, pl. 49, fig. 1–1*e* (type-locality, Abrolhos Islands, Brazil; type in M. C. Z.).

Diagnosis.—Orbits and eyes large. Outer maxillipeds much smaller than buccal cavity. Chelipeds large. Legs slender.

Description.—Surface covered with a short, thin pubescence; carapace nearly even, minutely granulate. Median notch of front large, V-shaped; lobes oblique, margin nearly straight, subentire. Inner-upper tooth of orbit subtriangular; margin of orbit minutely crenulated; space between superior notches arcuate; outer point, in line with lateral margin of carapace, not at all produced. Immediately behind is the first antero-lateral tooth; teeth spiniform, acuminate; first and fourth small, second and third large; the first is sometimes bifid at tip, and in small specimens is altogether absent.

Merus of chelipeds armed with spines on upper and inner margin. Carpus spinulous on outer surface; three spines along inner margin, the middle one the longest, the one nearest the palm a little above the margin. Manus with a double row of spines above. Fingers two-thirds as long as palm, heavy, broad, compressed, grooved; prehensile edges furnished with shallow teeth; dactyl slightly roughened on its superior carina toward the proximal end. Ambulatory legs sparsely long-hairy; merus with a row of spines on upper margin and in the first three pairs one spine near distal end of lower margin. Dactylus nearly as long as propodus.

Color.—In some preserved specimens, the ambulatory legs show broad transverse bands of dark mottled with light.

Measurements.—Male (7774), total length of carapace 6.9, total width of same 9.8, fronto-orbital width 8.2, width of front 3.7 mm.

Variation.—Stimpson notes a smooth variety; this is equivalent to *M. forceps* A. Milne Edwards.

Range.—Florida Straits to Brazil.

Material examined.—See table page 563.

Material examined of Melybia thalamita

Locality	Bearings		Fathoms	Bottom	Temperature	Date	Station	Collector	Specimens	Catalogue No.	Remarks
	Latitude N.	Longitude W.									
	° ′ ″	° ′ ″			°F.						
Loggerhead Key, Tortugas, Florida.			Beach	Under Sargassum.		July 15, 1924		W. L. Schmitt	1 ovig. ♀	61112	Gift of Carnegie Institution.
Tortugas, Florida	About 10 miles S. of No. 2 buoy.		[1] 45			July 23, 1924	50	do	1♂	61113	Do.
Off Havana, Cuba	23 10 40	82 20 30	201	Co		May 1, 1884	2167	*Albatross*	1♂ 1♀	7774	
Do	23 10 39	82 20 29	192	Co		do	2164	do	1♂	8943	
Do	23 10 25	82 20 24	33	Co	79.1	Jan. 17, 1885	2324	do	1 ovig. ♀	18271	
Off Port Antonio, Jamaica								J. E. Duerden			Specimens returned to sender.
Port Royal Cays, Jamaica								do			Do.
Between Jamaica and Haiti	17 44 05	75 39 00	23	Co. brk. Sh		Feb. 29, 1884	2138	*Albatross*	1♂ 1♀	7763	
					°C.						
Off Culebra Island	Pt. Mula Lighthouse, SW. ¼ S., 10½ miles.		15.25	Co. S	25	Feb. 8, 1899	6087	*Fish Hawk*	1♂	24351	
Do	Culebrita Lighthouse NE. 5¼ miles.		15	Co	25.2	Feb. 10, 1899	6093	do	1♂ 1♀	24352	
Off Vieques Island	Pt. Mula Lighthouse, E. by N. 10¾ miles.		12.5	Co	27	Feb. 14, 1899	6095	do	1♀	24353	
Barbados				brk. Co		May 27, 1918		Barbados-Antigua Exped., State Univ. Iowa.	1 ovig. ♀	58013	
Do						1918		do	2♂ 1 ovig. ♀	Mus. S.U.I.	
Do	SW. of Pelican Island, 1 mile.		38	fne. co. Frags.		May 13, 1918	1	do	1 ovig. ♀ 1 y.	do	
St. Joris Bay, Curaçao			1	rky		Apr. 3, 1905		J. Boeke	2♂	Leiden Mus.	
Near Colon [Aspinwall], Panama.	9 32 00	79 54 30	34	brk. Sh		Apr. 2, 1884	2146	*Albatross*	1♂ 1♀	18439	
Off Abrolhos Islands, Brazil			30					*Hassler* Exped	1♂	2971, M.C.Z.	Type of *M. forceps*.

[1] About.

EXPLANATION OF PLATES

PLATE 1

FIGURE 1. *Pseudocorystes sicarius* (after Milne Edwards and Lucas), Valparaiso, carapace 55 mm. long, dorsal view.
2. Same, outer face of chela and carpus.
3. Same, outer maxilliped.
4. *Gomeza serrata* (after Dana), Patagonia, 50 fathoms, carapace about 2.7 mm. long, dorsal view.
5. Same, rostrum.
6. Same, antennal and buccal regions.

PLATE 2

Ovalipes ocellatus ocellatus, male (32448), carapace 68 mm. wide, ventral view

PLATE 3

FIGURE 1. *Ovalipes ocellatus ocellatus*, male (32448), carapace 68 mm. wide. ventral view showing stridulating ridge on carapace.
2. Same, ventral view showing stridulating ridge at base of arm.

PLATE 4

FIGURE 1. *Ovalipes ocellatus guadulpensis*, holotype, female, carapace 36 mm. wide, dorsal view.
2. *Ovalipes ocellatus guadulpensis*, immature female (17959), ventral view.

PLATE 5

Ovalipes punctatus, male. Type of *Platyonichus purpureus* in M.C.Z.

PLATE 6

Ovalipes punctatus, ovigerous female (61020), carapace 91.5 mm. wide, dorsal view

PLATE 7

FIGURE 1. *Ovalipes punctatus*, male (61019), width of carapace 108.6 mm., ventral view.
2. *Ovalipes punctatus*, ovigerous female (61020), width of carapace 91.5 mm., ventral view.

PLATE 8

FIGURE 1. *Ovalipes punctatus*, male (61019), ventral view showing stridulating ridge on lower margin of chelae, chela 81.4 mm. long.
2. Same, first right ambulatory leg showing horny ridge on distal margin of merus.

PLATE 9

Bathynectes superba

FIGURE 1. Male, enlarged, Florida reefs, carapace from behind. After A. Milne Edwards.
2. Male (11366), width of carapace 55.2 mm., ventral view showing chela.
3. Chela, outer face. After A. Milne Edwards.
4. Female (18759), width of carapace 65 mm., dorsal view.

PLATE 10

Bathynectes superba, male (11366), width of carapace 55.2, ventral view showing abdomen

PLATE 11

Coenophthalmus tridentatus, male, 39° 02′ S., 59° 27′ W., carapace 17.6 mm. wide, dorsal view

PLATE 12

Coenophthalmus tridentatus, male, 39° 02′ S., 59° 27′ W.

FIGURE 1. Ventral view showing abdomen.
2. Ventral view showing chelae.

PLATE 13

FIGURE 1. *Portunus* (*Portunus*) *ventralis*, ovigerous female (53763), carapace 28 mm. wide, ventral view showing right chela.
2. Same, dorsal view.
3. *Coenophthalmus tridentatus*, male, near Montevideo, chela, outer face, enlarged.
4. Same specimen, dorsal view.
5. Same, antennal and buccal regions.

PLATE 14

Portunus (*Portunus*) *sayi*, male (8217), carapace 37 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 15

Portunus (*Portunus*) *anceps*, male (24503), carapace 29.4 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 16

Portunus (*Portunus*) ***gibbesii***, male (11217), carapace 70 mm. wide, dorsal view

PLATE 17

Portunus (*Portunus*) *gibbesii*, male (11217), carapace 70 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Ventral view showing abdomen.

PLATE 18

Portunus (*Portunus*) *xantusii*, male (21782), carapace 56.7 mm. wide

FIGURE 1. Ventral view showing outer surface of chela.
2. Dorsal view.
3. Ventral view.

PLATE 19

Portunus (*Portunus*) *acuminatus*, male (40270), carapace 65 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 20

FIGURE 1. *Portunus* (*Portunus*) *panamensis*, female, Panama Bay, carapace about 25 mm. wide, dorsal view.
2. *Portunus* (*Portunus*) *asper*, female (22025), carapace 75 mm. wide, ventral view showing left chela.
3. Same, dorsal view.

PLATE 21

Portunus (*Portunus*) *asper*, female cotype in Paris Museum

PLATE 22

FIGURE 1. *Portunus* (*Portunus*) *asper*, male (61332), carapace 51.2 mm. wide, ventral view showing chelae.
2. Same, ventral view showing abdomen.
3. *Portunus* (*Portunus*) *panamensis*, male (22023), 44 mm. wide, ventral view showing chelae.

PLATE 23

Portunus (*Portunus*) *panamensis*, male (22023), carapace 44 mm. wide, dorsal view

PLATE 24

Portunus (*Portunus*) *panamensis*, male (22023), carapace 44 mm. wide, ventral view showing abdomen

PLATE 25

Portunus (*Portunus*) *vocans*

FIGURE 1. Male (6930), carapace 23.5 mm. wide, ventral view showing chelae.
2. Same, ventral view.
3. Holotype, carapace 43 mm. wide (after A. Milne Edwards), dorsal surface.
4. Same, ventral surface, showing stridulating ridge.
5. Same, left half of front and orbit, dorsal surface.
6. Same, right half of anterior part, ventral surface.

PLATE 26

Portunus (*Achelous*) *spinimanus*, male (61277), carapace 85.6 mm. wide, dorsal view

PLATE 27

Portunus (*Achelous*) *spinimanus*, male (61277), carapace 85.6 mm. wide, ventral view showing outer surface of chelae

PLATE 28

Portunus (*Achelous*) *spinimanus*, male (61277), carapace 85.6 mm. wide, ventral view showing abdomen

PLATE 29

Portunus (*Achelous*) *brevimanus*, male (20608), carapace 73.5 mm. wide, dorsal view

PLATE 30

Portunus (*Achelous*) *brevimanus*, male (20608), carapace 73.5 mm. wide

FIGURE 1. Ventral view showing cheliped.
2. Same, ventral view showing abdomen.

PLATE 31

Portunus (*Achelous*) *stanfordi*, male (22032), carapace 48 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 32

Portunus (*Achelous*) *angustus*, female holotype, carapace 36.7 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view.

PLATE 33

Portunus (*Achelous*) *ordwayi*, male (31048), carapace 48.5 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view.

PLATE 34

Portunus (*Achelous*) *sebae*, male (61249), carapace 87.6 mm. wide, dorsal view

PLATE 35

Portunus (*Achelous*) *sebae*, male (61249), carapace 87.6 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Ventral view showing abdomen.

PLATE 36

Portunus (*Achelous*) *minimus*, male (18206), carapace 28 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view.

PLATE 37

Portunus (*Achelous*) *pichilinquei*, male (60011), carapace 26 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 38

Portunus (*Achelous*) *affinis*, male (22035), carapace 46 mm. wide, dorsal view

PLATE 39

Portunus (*Achelous*) *affinis*, male (22035), left chela 46 mm. long

FIGURE 1. Outer face of chelae.
2. Ventral view showing abdomen.

PLATE 40

Portunus (*Achelous*) *floridanus*, male (15043), carapace 20.3 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 41

Portunus (*Achelous*) *depressifrons*, male (7513), carapace 20.3 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 42

Portunus (*Achelous*) *bahamensis*, male (31069), carapace 37.2 mm. wide, dorsal view

PLATE 43

Portunus (*Achelous*) *bahamensis*, male (31069), carapace 37.2 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Ventral view showing abdomen.

PLATE 44

Portunus (*Achelous*) *tuberculatus*

FIGURE 1. Male (22040), carapace 36 mm. wide, dorsal view.
2. Same, ventral view showing chelae.
3. Same, ventral view showing abdomen.
4. Male, Cape St. Lucas, enlarged, dorsal view. After A. Milne Edwards
5. Same, abdomen.

PLATE 45

Portunus (*Achelous*) *spinicarpus*, male (61256), carapace 57.7 mm. wide

FIGURE 1. Ventral view showing outer surface of chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 46

Portunus (*Achelous*) *iridescens*

FIGURE 1. Female type (17445), carapace 34.5 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Male (17434), carapace 51.5 mm. wide, dorsal view.
4. Same, ventral view showing abdomen.

PLATE 47

Callinectes sapidus, male (61058), carapace 138 mm. wide, dorsal view

PLATE 48

Callinectes sapidus acutidens, male, type in M.C.Z., dorsal view

PLATE 49

Callinectes bellicosus, male, dorsal view

PLATE 50

Callinectes ornatus, cotype, Cat. No. 5137, M.C.Z., dorsal view

PLATE 51

Callinectes danae, male, cotype, Pernambuco, Cat. No. 5143, M.C.Z., dorsal view

PLATE 52

Callinectes arcuatus, male, cotype, Cape St. Lucas, Cat. No. 16833, U.S.N.M., dorsal view

PLATE 53

Callinectes marginatus, male, cotype of *C. larvatus*, Bahamas, Cat. No. 5152, M.C.Z., dorsal view

PLATE 54

Callinectes toxotes, male, cotype, Cape St. Lucas, Cat. No. 5183, M.C.Z., dorsal view

PLATE 55

Callinectes bocourti, male, dorsal view. After M. J. Rathbun

PLATE 56

Callinectes exasperatus, cotype of *C. tumidus*, Gonaives, Haiti, Cat. No. 5162, M.C.Z., dorsal view

PLATE 57

After A. Milne Edwards

Lupella forceps, Haiti, male, carapace 67 mm. wide

FIGURE 1. Dorsal view.
2. Antennal regions, enlarged.
3. Facial region, showing outer maxillipeds advanced as far as front.
4. Sternal plastron, after removal of abdomen, showing median suture.
5. Abdomen
   Lupella forceps, female.
6. Chela, inner view.
7. Same, outer view.

PLATE 58

FIGURE 1. *Arenaeus mexicanus*, male, dorsal view. After A. Milne Edwards.
2. *Arenaeus cribrarius*, male (42451), carapace 107 mm. wide, ventral view showing outer surface of chelae.
3. *Arenaeus cribrarius*, male (4508), carapace 109 mm. wide, ventral view showing abdomen.

PLATE 59

Arenaeus cribrarius, male (42851), carapace 107.6 mm. wide, dorsal view

PLATE 60

Arenaeus cribrarius, male (42851), carapace 107.6 mm. wide, ventral view

PLATE 61

Arenaeus mexicanus, male (60975), carapace 87.5 mm. wide

FIGURE 1. Front view showing chelipeds.
2. Dorsal view.
3. Ventral view.

PLATE 62

Cronius ruber, male (48801), carapace 74 mm. wide, dorsal view

PLATE 63

Cronius ruber, male (48801), carapace 74 mm. wide

FIGURE 1. Ventral view showing outer surface of chelae.
2. Ventral view showing abdomen.

PLATE 64

Cronius tumidulus, male (14053), carapace 31 mm. wide

FIGURE 1. Ventral view showing chelae.
2. Dorsal view.
3. Ventral view showing abdomen.

PLATE 65

After A. Milne Edwards

FIGURE 1. *Euphylax dovii*, west coast of America, carapace 59 mm. wide, dorsal view.
2. Same, fronto-orbital region, anterior view.
3. Same, chela, outer side.

After Stimpson

4. *Euphylax dovii*, west coast of Central America, frontal region, fronto-orbital distance 57 mm.
5. Same, outer maxilliped.

PLATE 66

After A. Milne Edwards

Euphylax robustus, Mazatlan, female, carapace 94 mm. wide, dorsal view

PLATE 67

Euphylax robustus, Mazatlan, male, carapace, 94 mm. wide

FIGURE 1. Fronto-orbital region, anterior view.
2. Antennal and buccal regions.
3. Chela, outer side.
4. Abdomen.

PLATE 68

Erimacrus isenbeckii, male (15345), carapace 73 mm. wide, ventral view for abdomen

PLATE 69

After Dana

FIGURE 1. *Peltarion spinulosum*, S. Patagonia, carapace 43 mm. long, dorsal view.
2. Same, abdomen of male.
3. *Peltarion dextrum*, male holotype, carapace 42.4 mm. long, ventral view.

PLATE 70

Trachycarcinus spinulifer, male holotype, carapace 33.8 mm. wide, dorsal view.

PLATE 71

Trachycarcinus spinulifer, male holotype, carapace 33.8 mm. wide, ventral view

PLATE 72

Trachycarcinus corallinus. After Faxon

FIGURE 1. Male denuded, station 3356, enlarged.
2. Abdomen of male, enlarged.
3. Minor cheliped of male, enlarged.
4. Male, station 3418, *Albatross*, enlarged.
5. Abdomen of ovigerous female, station 3356, enlarged.
6. Oral and antennal region, enlarged.
7. Sternal region of male, enlarged.

PLATE 73

Trichopeltarion nobile, off Santa Lucia, 151 fathoms, male, carapace 65 mm. wide without spines. After A. Milne Edwards

FIGURE 1. Dorsal view. The hairs have been removed from the right half of carapace and feet.
2. Antennal and buccal regions.
3. Right chela.
4. Left chela.
5. Abdomen.

PLATE 74

Pliosoma parvifrons, Cape San Lucas

FIGURE 1. Male, carapace 20 mm. long, dorsal view.
2. Ventral view.
3. Male holotype, carapace 15.5 mm. long, dorsal view. After Stimpson.

PLATE 75

FIGURE 1. *Acanthocyclus gayi*, male (17617), carapace 23.2 mm. wide. Ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view showing abdomen.

PLATE 76

FIGURE 1. *Acanthocyclus hassleri*, male (3265), carapace 13.7 mm. wide, dorsal view.
2. *Acanthocyclus albatrossis*, anterior part of body and appendages, front view.
3. *Acanthocyclus albatrossis*, W. coast of Patagonia, right chela, outer side. After Tozzetti.
4. *Acanthocyclus gayi*, Chile, anterior part of body and appendages, front view. After Strahl.
5. *Acanthocyclus albatrossis*, Puerto Harris, male (12710), carapace 29 mm. wide, dorsal view.
6. *Acanthocyclus albatrossis*, Puerto Harris, male (12710), carapace 29 mm. wide, ventral view for chelae.

PLATE 77

FIGURE 1. *Acanthocyclus albatrossis*, male, Puerto Harris (12710), carapace 29 mm. wide, ventral view.
2. *Acanthocyclus albatrossis*, female, Puerto Harris (12710), carapace 26 mm. wide, ventral view for maxillipeds.

PLATE 78

Corystoides chilensis

FIGURE 1. Male (18509), carapace 7 mm. wide, ventral view.
2. Female (18509), carapace 9.5 mm. wide, dorsal view.
3. Male, Rio de la Plata, 7 fathoms, cotype of *C. abbreviatus*, carapace 18 mm. long, dorsal view.
4. Same, front and appendages, enlarged.
5. Same, left orbital-antennal region, ventral view, enlarged.

Figures 3–5 after A. Milne Edwards and Bouvier.

PLATE 79

FIGURE 1. *Bellia picta*, male (22066), carapace 28.5 mm. long, front view.
2. Same, dorsal view.
3. Same, ventral view.

PLATE 80

Cancer edwardsii, female (14855), carapace 126 mm. wide, dorsal view

PLATE 81

Cancer plebejus, female (14845), carapace 82 mm. wide, dorsal view

PLATE 82

FIGURE 1. *Cancer plebejus*, dorsal view, much reduced. After Bell.
2. *Cancer polyodon*, dorsal view, much reduced. After Bell.

PLATE 83

Cancer porteri, male (13870), carapace 121.2 mm. wide, ventral view

PLATE 84

Cancer porteri (*longipes* Bell), male, Valparaiso, width of carapace 6 inches (15 cm.). After Bell

PLATE 85

FIGURE 1. *Cancer irroratus*, alive, Woods Hole, 1905.
2. *Cancer edwardsii*, male abdomen, Valparaiso, width of carapace 7½ inches (19 cm.). After Bell.
3. *Cancer plebejus* (*irroratus* Bell), male abdomen, South America, width of carapace 4 inches (10 cm.). After Bell.
4. *Cancer porteri* (*longipes* Bell), male abdomen, Valparaiso, width of carapace 6 inches (15 cm.). After Bell.
5. *Cancer polyodon* (*dentatus* Bell), male abdomen, Valparaiso, width of carapace 5½ inches (14 cm.). After Bell.

PLATE 86

Cancer luederwaldti, holotype, Mus. Paulista, carapace 25 cm. wide, dorsal view

PLATE 87

Cancer luederwaldti, holotype, ventral view

PLATE 88

Cancer luederwaldti, holotype, frontal view

PLATE 89

Cancer luederwaldti, chelae, propodus 165.4 mm. long

PLATE 90

Cancer polyodon, male (40416), carapace 110 mm. wide, dorsal view

PLATE 91

FIGURES 1, 2. *Cancer amphioetus*, females (20140), carapaces 16 to 17 mm. wide, dorsal view.
3. *Cancer amphioetus*, juvenile female (18967), San Diego Bay, width of carapace 13+mm., dorsal view. After Schmitt.
4, 5. *Cancer amphioetus*, males (20140), carapaces 16.3 to 17.3 mm. wide, dorsal view.

PLATE 92

Cancer antennarius, male (50280), Venice breakwater, dorsal view. After Schmitt

PLATE 93

FIGURE 1. *Cancer branneri*, female, station 5790, carapace 29.5 mm. wide, dorsal view. After Schmitt.
2. *Cancer antennarius*, male, Sausalito, California, carapace 71 mm. wide, dorsal view. After Schmitt.

PLATE 94

After Schmitt

FIGURE 1. *Cancer jordani*, male (50300), Isthmus Hbr., Catalina, width between post-lateral teeth 19 mm., dorsal view.
2. *Cancer jordani*, male (39116), Monterey Bay, width of carapace 26½ mm., dorsal view.
3. *Cancer anthonyi*, male (22246), San Diego Bay 3577, width between post-lateral teeth 33½+mm., dorsal view.

PLATE 95

Cancer gracilis, male (52717), San Francisco Bay Sta. 5802, width between post-lateral teeth 41½ mm., dorsal view. After Schmitt

PLATE 96

FIGURE 1. *Cancer oregonensis*, form *b*, male, Alaska (17424), dorsal view.
2. *Cancer oregonensis*, typical, male, Admiralty Inlet, Washington (50477), dorsal view. After Schmitt.
3. *Cancer oregonensis*, form *a*, female, dorsal view. After Schmitt.

PLATE 97

FIGURE 1. *Carpilius corallinus*, female (4094), carapace 107.4 mm. wide, front view.
2. *Carpilius corallinus*, male (7342), carapace 61.3 mm. wide, ventral view showing abdomen.

PLATE 98

Carpilius corallinus, female (4094), carapace 107 mm. wide, dorsal view

PLATE 99

Carpilius corallinus, female (4094), carapace 107 mm. wide, ventral view

PLATE 100

FIGURE 1. *Carpilodes cinctimanus*, male (17795), carapace 28.2 mm. wide, dorsal view.
2. Same, front view.
3. Same, ventral view.

PLATE 101

FIGURE 1. *Paraliomera longimana*, male (24255), carapace 22.2 mm. wide, ventral view showing chelae.
2. Same, showing abdomen.
3. Same, dorsal view.
4. *Paraliomera dispar*, female (58008), carapace 5.5 mm. wide, dorsal view.
5. Same, front view.

PLATE 102

FIGURE 1. *Platypodia rotundata*, ovigerous female (4079), carapace 11 mm. wide, front view.
2. Same, ventral view.
3. Same, dorsal view.
4. *Platypodia spectabilis*, female (7688), carapace 19.3 mm. wide, dorsal view.

PLATE 103

FIGURE 1. *Actaea setigera*, male (57989), carapace 23 mm. wide, front view.
2. Same, dorsal view.
3. Same, ventral view.

PLATE 104

FIGURE 1. *Actaea dovii*, female (20600), carapace 9.6 mm. wide, ventral view.
2. Same, dorsal view.
3. *Actaea bifrons*, St. Barthelemy, chela, outer side. After Odhner.
4. Same, dorsal view, carapace about 10 mm. wide.
5. *Actaea bifrons*, ovigerous female (53769), carapace 10.5 mm. wide, ventral view.
6. Same, dorsal view.
7. *Actaea angusta*, type female, carapace 5.8 mm. wide, ventral view. The right chela is broken near its lower margin.
8. Same, dorsal view.

PLATE 105

FIGURE 1. *Actaea rufopunctata nodosa*, female (15010), carapace 22.6 mm. wide, ventral view.
2. Same, dorsal view.
3. *Actaea sulcata*, male (60721), carapace 9 mm. wide, front view.
4. Same, dorsal view.
5. *Actæa acantha*, female (48568), carapace 32.4 mm. wide, front view.

PLATE 106

FIGURE 1. *Actaea acantha*, St. Barthelemy, chela. After Odhner.
2. Same, dorsal view, carapace about 13 mm. wide.
3. *Actaea palmeri*, St. Barthelemy, chela. After Odhner.
4. Same, dorsal view, carapace about 22 mm. wide.
5. *Actaea palmeri*, female (25572), carapace 34.7 mm. wide, ventral view.
6. Same, dorsal view.

PLATE 107

Glyptoxanthus erosus, male (25573), carapace 47.3 mm. wide

FIGURE 1. Ventral view, showing chelae.
2. Ventral view showing abdomen.
3. Front view.
4. Dorsal view.

PLATE 108

FIGURE 1. *Glyptoxanthus labyrinthicus*, female (3272), carapace 32.6 mm. wide, front view.
2. Same, dorsal view.
3. Same, ventral view.
4. *Glyptoxanthus vermiculatus*, female (7589), carapace 32.3 mm. wide, ventral view, showing chelae.

PLATE 109

FIGURE 1. *Glyptoxanthus vermiculatus*, female (7589), carapace 32.6 mm. wide, front view.
2. Same, dorsal view.
3. Same, ventral view, showing abdomen.

PLATE 110

FIGURE 1. *Daira americana*, female (5768), carapace 36.6 mm. wide, ventral view.
2. Same, dorsal view.
3. *Carpoporus papulosus*, male, Florida Strait, carapace 8 mm. wide. After A. Milne Edwards. Chela, outer view.
4. Same, anterior view showing respiratory orifices between the manus and carpus.
5. Same, antennal and buccal regions.
6. Same, dorsal view.

PLATE 111

FIGURE 1. *Carpoporus papulosus*, male (15006), carapace 14.7 mm. wide, front view.
2. Same, dorsal view.
3. Same, ventral view.

PLATE 112

Lipaesthesius leeanus

FIGURE 1. Male holotype, carapace 11.7 mm. wide, front view.
2. Same, dorsal view.
3. Same, ventral view.
4. Unique type of *Medaeus rugosus* Boone, female, dorsal view.
5. Male, Maria Madre Island, carapace 7.6 mm. wide, dorsal view.
6. Same, ventral view.

PLATE 113

FIGURE 1. *Medaeus spinimanus*, male (31085), carapace 34.5 mm. wide, front view.
2. Same, dorsal view.
3. Ventral view for abdomen and sternum.

PLATE 114

FIGURE 1. *Medaeus lobipes*, male holotype, carapace 25.5 mm. wide, front view.
2. Same, dorsal view.
3. Same, ventral view showing abdomen.

PLATE 115

Platyxanthus orbignyi (46331), carapace 79 mm. wide, dorsal view. Original painted the natural colors

PLATE 116

FIGURE 1. *Platyxanthus crenulatus*, Patagonia, type male, carapace 57 mm. wide, dorsal view. After A. Milne Edwards.
2. *Platyxanthus orbignyi*, dorsal view. After Milne Edwards and Lucas.

PLATE 117

Platyxanthus crenulatus, male (57124), carapace 72 mm. wide, dorsal view

PLATE 118

Platyxanthus crenulatus, male (57124), carapace 72 mm. wide, ventral view showing chelae

PLATE 119

Platyxanthus crenulatus, male (57124), carapace 72 mm. wide, ventral view showing abdomen

PLATE 120

Platyxanthus cokeri, type male, carapace 88.3 mm. wide, ventral view

PLATE 121

Platyxanthus cokeri, type male, carapace 88.3 mm. wide, ventral view showing chelae

PLATE 122

Platyxanthus cokeri, type male, carapace 88.3 mm. wide, dorsal view

PLATE 123

After A. Milne Edwards

Platyxanthus patagonicus, Patagonia, type male, 100 mm. wide

FIGURE 1. Dorsal view.
2. Antennal and buccal regions.
3. Left chela, outer side.

PLATE 124

Platyxanthus patagonicus, male, Puerto Piramides (9185*a*, B. A. Mus.), carapace 91 mm. wide, dorsal view

PLATE 125

Platyxanthus patagonicus

FIGURE 1. Ovigerous female, Mar del Plata (12908, B. A. Mus.), carapace 91 mm. wide, dorsal view.
2. Male, 37° 50′ S., 56° W. (17635, B. A. Mus.), carapace 97 mm. wide, ventral view.

PLATE 126

FIGURE 1. *Gaudichaudia gaudichaudii*, female (21993), carapace 37 mm. wide, ventral view showing chelae.
2. Same, dorsal view.

PLATE 127

FIGURE 1. *Gaudichaudia gaudichaudii*, dorsal view. After Milne Edwards and Lucas.
2. *Gaudichaudia gaudichaudii*, male (21993), carapace 32.7 mm. wide, ventral view showing abdomen.

PLATE 128

Homalaspis plana, female (46340), carapace 145 mm. wide, dorsal view. Original painted the natural colors

PLATE 129

Homalaspis plana, male (60883), carapace 76 mm. wide, ventral view showing chelae

PLATE 130

Homalaspis plana, male (60883), carapace 76 mm. wide, dorsal view

PLATE 131

Paraxanthus barbiger, Valparaiso, male type, carapace 82 mm. wide, dorsal view. After Milne Edwards and Lucas

PLATE 132

Paraxanthus barbiger, Valparaiso, male type, carapace 82 mm. wide
After Milne Edwards and Lucas

FIGURE 1. Abdomen of male.
2. Sternal plastron of male.
3. Abdomen of female.
4. First maxilliped.
5. Outer maxilliped.
6. Antennal region.

PLATE 133

FIGURE 1. *Paraxanthus barbiger*, ovigerous female (10807, B. A. Mus.), carapace 36.2 mm. wide, ventral view.
2. Same, dorsal view.
3. *Cycloxanthops vittatus*, male (3208), carapace 24 mm. wide, ventral view, showing chelae.
4. Same, dorsal view.
5. *Cycloxanthops sexdecimdentatus*, male (40431), carapace 45.7 mm. wide, ventral view showing chelae.
6. Same, dorsal view.

PLATE 134

FIGURE 1. *Cycloxanthops novemdentatus*, male (19505), major propodus 70.3 mm. long, ventral view for chelae.
2. *Cycloxanthops sexdecimdentatus*, male (40431), carapace 45.7 mm. wide, ventral view for abdomen.
3. *Cycloxanthops vittatus*, male (3208), carapace 24 mm. wide, ventral view for abdomen.

PLATE 135

FIGURE 1. *Cycloxanthops sexdecimdentatus*, Chile, dorsal view. After Milne Edwards and Lucas.
2. *Cycloxanthops novemdentatus*, female (50250), Isthmus Hbr., Catalina Islands, carapace 24 mm. wide, dorsal view.
3. *Cycloxanthops novemdentatus*, male, Guadalupe Island, dorsal view.

PLATE 136

FIGURE 1. *Phymodius maculatus*, female (59467), carapace 28.2 mm. wide, dorsal view.
2. *Phymodius maculatus*, male (13833), carapace 22.8 mm. wide, ventral view.

PLATE 137

FIGURE 1. *Leptodius floridanus*, male (57126), carapace 30.2 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. *Leptodius occidentalis*, male (50626), carapace 39.6 mm. wide, ventral view showing chelae.
4. Same, dorsal view.
5. *Leptodius sanguineus*, male (2229), carapace 33.3 mm. wide, ventral view showing chelae.
6. Same, dorsal view.

PLATE 138

FIGURE 1. *Leptodius floridanus*, male (57126), carapace 30.2 mm. wide, ventral view showing abdomen.
2. *Leptodius occidentalis*, male (50626), carapace 39.6 mm. wide, ventral view, showing abdomen.
3. *Leptodius sanguineus*, male (2229), carapace 33.3 mm. wide, ventral view showing abdomen.

PLATE 139

FIGURE 1. *Leptodius snodgrassi*, type male (24831), carapace 20.5 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view showing abdomen.

PLATE 140

FIGURE 1. *Leptodius taboganus*, male (43658), carapace 20 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view showing abdomen.

PLATE 141

FIGURE 1. *Leptodius parvulus*, type (Copenhagen Mus.), dorsal view.
2. *Leptodius parvulus*, male (14886), carapace 18.6 mm. wide, ventral view showing chelae.
3. Same, dorsal view.
4. *Leptodius agassizii*, male (18008), carapace 19.4 mm. wide, ventral view showing chelae.
5. Same, dorsal view.

PLATE 142

FIGURE 1. *Leptodius cooksoni*, male (22008), carapace 24.8 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same ventral view showing abdomen.

PLATE 143

Leptodius tridentatus, Juan Fernandez. After Lenz

FIGURE 1. Dorsal view of cotype of *L. spinoso-granulatus*, carapace about 12 mm. wide.
2. Last left ambulatory leg.
3. Outer maxilliped, enlarged.
4. Dorsal view of cotype, carapace 17 mm. wide.

Xanthodius stimpsoni, Cape San Lucas, male enlarged. After A. Milne Edwards.

FIGURE 5. Outer maxilliped.
6. Antennal region.
7. Dorsal view.

PLATE 144

FIGURE 1. *Xanthodius sternberghii*, male (48802), carapace 34 mm. wide, ventral view showing chelae.
2. Same, dorsal view.

PLATE 145

FIGURE 1. *Xanthodius denticulatus*, male (25719), carapace 30.4 mm. wide, ventral view showing abdomen.
2. *Xanthodius sternberghii*, male (48802), carapace 34 mm. wide, ventral view showing abdomen.

PLATE 146

FIGURE 1. *Xanthodius denticulatus*, male (25719), carapace 30.4 mm. wide, front view.
2. Same, ventral view showing chelae.
3. Same, dorsal view.

PLATE 147

FIGURE 1. *Xanthodius hebes*, male (50485), carapace 31 mm. wide, ventral view showing chelae.
2. Same, dorsal view. Major fixed finger abnormally short.
3. Same, ventral view showing abdomen.

PLATE 148

FIGURE 1. *Metopocarcinus truncatus*, female (60629), carapace 4 mm. wide, ventral view.
2. Same, dorsal view. The lower part of the carapace has separated from the upper part and is visible outside the postero-lateral margins.
3. *Lophoxanthus lamellipes*, male (50968), carapace 22.6 mm. wide, ventral view.
4. Same, dorsal view.

PLATE 149

FIGURE 1. *Lophopanopeus heathii*, male (54014), carapace 21 mm. wide, front view.
2. Same, ventral view showing chelae.
3. *Lophopanopeus heathii*, male, Monterey Bay, dorsal view.
4. *Lophopanopeus heathii*, female (22870), Monterey Bay, carapace 17 mm. wide, dorsal view.
5. *Lophopanopeus heathii*, male (54014), carapace 21 mm. wide, ventral view showing abdomen.

PLATE 150

FIGURE 1. *Lophopanopeus bellus*, male cotype, dorsal view. After Stimpson.
2. *Lophopanopeus bellus*, male (14970), carapace 26 mm. wide, dorsal view. After Schmitt.
3. *Lophopanopeus bellus*, variety, male (31542), carapace 16 mm. wide, dorsal view.

PLATE 151

FIGURE 1. *Lophopanopeus bellus*, male (14970), carapace 29.6 mm. wide, front view.
2. Same, ventral view showing chelipeds.
3. Same, ventral view showing abdomen.

PLATE 152

FIGURE 1. *Lophopanopeus frontalis*, type male, carapace 23.4 mm. wide, front view.
2. Same, ventral view showing chelae.
3. *Lophopanopeus frontalis*, male, Southern California, dorsal view.
4. *Lophopanopeus frontalis*, Anaheim Bay, carapace 14 mm. wide, dorsal view.
5. *Lophopanopeus frontalis*, type male, carapace 23.4 mm. wide, ventral view.

PLATE 153

FIGURE 1. *Lophopanopeus lockingtoni*, male (32976), carapace 14 mm. wide, front view.
2. Same, ventral view showing chelae.
3. *Lophopanopeus somaterianus* (61135), right movable finger 10 mm. long, outer view.
4. Same, ventral view.
5. *Lophopanopeus leucomanus*, male (50208), carapace 14.8 mm. wide, ventral view showing chelae.
6. *Lophopanopeus diegensis*, male (50239), carapace 19 mm. wide, ventral view showing chelae.
7. Same, front view.
8. *Lophopanopeus lockingtoni*, male (32976), carapace 14 mm. wide, ventral view showing abdomen.
9. *Lophopanopeus leucomanus*, male (50208), carapace 14.8 mm. wide, ventral view showing abdomen.
10. *Lophopanopeus diegensis*, male (50239), carapace 19 mm. wide, ventral view showing abdomen.

PLATE 154

FIGURE 1. *Lophopanopeus lockingtoni*, female, station 3591, dorsal view, natural size.
2. *Lophopanopeus lockingtoni*, male (19973), San Diego, carapace 13.3 mm. wide, dorsal view.
3. *Lophopanopeus lockingtoni*, male (50239), Venice Breakwater, carapace 19 mm. wide, dorsal view.
4. *Lophopanopeus leucomanus*, male (50208), Isthmus Hbr., Catalina, carapace 15 mm. wide.

PLATE 155

FIGURE 1. *Lophopanopeus distinctus*, female (11403), carapace 9.5 mm. wide, dorsal view.
2. Same, ventral view.

Lophopanopeus lobipes, Florida, male, enlarged. After A. Milne Edwards

3. Left chela, outer side.
4. Right chela, outer side.
5. Dorsal view.

PLATE 156

FIGURE 1. *Panopeus herbstii forma typica*, male (15780), ventral view showing chelae; major propodus 26.4 mm. long.
2. *Panopeus herbstii forma typica*, male, dorsal view.
3. *Panopeus herbstii forma obesa*, male, dorsal view.

PLATE 157

FIGURE 1. *Panopeus herbstii forma simpsoni*, type, female, carapace 35.5 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. *Panopeus herbstii forma crassa*, male (44181), carapace 48.5 mm. wide, dorsal view.

PLATE 158

FIGURE 1. *Panopeus purpureus*, dorsal view. After A. Milne Edwards.
2. *Panopeus convexus*, type (Paris Mus.), dorsal view.
3. *Panopeus chilensis*, dorsal view. After Milne Edwards and Lucas.

PLATE 159

FIGURE 1. *Panopeus purpureus*, male (40427), carapace 51.1 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view for abdomen.

PLATE 160

FIGURE 1. *Panopeus chilensis*, male (60803), ventral view showing chelae; length of major propodus 32.6 mm.
2. *Panopeus chilensis*, male, dorsal view.
3. *Panopeus chilensis*, male (60803), ventral view showing abdomen.

PLATE 161

FIGURE 1. *Panopeus occidentalis forma serrata*, male (15713), carapace 28 mm. wide, ventral view to show chelae.
2. *Panopeus occidentalis forma typica*, male, dorsal view.
3. *Panopeus occidentalis forma serrata*, male (15713), carapace 28 mm. wide, dorsal view.

PLATE 162

Panopeus rugosus, Brazil, male, carapace 60 mm. wide, dorsal view. After A. Milne Edwards

PLATE 163

FIGURE 1. *Panopeus rugosus*, female (17715), carapace 57.2 mm. wide, front view showing chelae.
2. Same, dorsal view.
3. *Panopeus rugosus*, male (17304), carapace 24 mm. wide, ventral view showing abdomen.

PLATE 164

FIGURE 1. *Panopeus harttii*, male (25737), carapace 17.6 mm. wide, ventral view.
2. *Panopeus harttii*, male, dorsal view.
3. *Panopeus americanus*, male (59447), ventral view showing chelae; major chela 22 mm. long.
4. *Panopeus americanus*, male, dorsal view.
5. *Panopeus harttii*, male (16259), carapace 15.5 mm. wide, ventral view showing abdomen.
6. *Panopeus americanus*, male (59447), ventral view showing abdomen.

PLATE 165

FIGURE 1. *Panopeus bermudensis*, ovigerous female (60792), carapace 10.5 mm. wide, dorsal view.
2. *Panopeus bermudensis*, male (60792), carapace 15.6 mm. wide, ventral view to show chelae.
3. Same, dorsal view.

PLATE 166

FIGURE 1. *Panopeus turgidus*, type male, carapace 19.3 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. *Panopeus turgidus*, a second specimen, dorsal view.
4. *Panopeus turgidus*, type male, carapace 19.3 mm. wide, ventral view showing abdomen.

PLATE 167

FIGURE 1. *Panopeus boekei*, type male, carapace 13 mm. wide, front view.
2. Same, dorsal view.
3. Same, ventral view showing chelae.
4. Same, ventral view showing abdomen.

PLATE 168

FIGURE 1. *Neopanope texana*, male (15383), ventral view showing chelae; major chela 18.5 mm. long.
2. *Neopanope texana*, male, dorsal view.
3. *Neopanope texana sayi*, male (3827), ventral view to show chelae; major chela 17.3 mm. long.
4. *Neopanope texana sayi*, male, dorsal view.
5. *Neopanope packardii*, male (13042), carapace 19 mm. wide, ventral view showing chelae.
6. *Neopanope packardii*, male, dorsal view.

PLATE 169

FIGURE 1. *Hexapanopeus angustifrons*, male, dorsal view.
2. *Hexapanopeus angustifrons*, female (15757), carapace 21.7 mm. wide, ventral view showing chelae.
3. *Hexapanopeus schmitti*, type male, carapace 12.6 mm. wide, ventral view showing chelae.
4. Same, dorsal view.
5. Same, ventral view showing abdomen.

PLATE 170

FIGURE 1. *Hexapanopeus sinaloensis*, type male, carapace 8.5 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. *Hexapanopeus orcutti*, type male, carapace 6.6 mm. wide, ventral view showing chelae.
4. Same, dorsal view.
5. *Hexapanopeus paulensis*, type male, carapace 8.4 mm. wide, ventral view showing chelae.
6. Same, dorsal view.

PLATE 171

FIGURE 1. *Hexapanopeus hemphillii*, male (15652), carapace 7.6 mm. wide, ventral view to show chelae; major propodus 6.4 mm. long.
2. Same, dorsal view.
3. *Hexapanopeus caribbaeus*, male (19402), carapace 11.4 mm. wide, ventral view showing chelae.
4. Same, dorsal view.
5. Same, ventral view showing abdomen.
6. *Hexapanopeus hemphillii*, male (15652), carapace 7.6 mm. wide, ventral view showing abdomen.

PLATE 172

FIGURE 1. *Eurypanopeus abbreviatus*, male (59844), ventral view showing chelae; major propodus 15.7 mm. long.
2. Same species, male, dorsal view.
3. *Eurypanopeus abbreviatus ater*, male holotype, carapace 19.8 mm. wide, ventral view to show chelae.
4. Same, dorsal view.
5. *Eurypanopeus transversus*, male, dorsal view, natural size.
6. Same species, male (32282), carapace 20 mm. wide, ventral view to show chelae.
7. Same specimen, dorsal view.

PLATE 173

FIGURE 1. *Eurypanopeus dissimilis*, male type (15640), ventral view for chelae; major propodus 9.3 mm. long.
2. Same species, male, dorsal view.
3. *Eurypanopeus depressus*, male (15399), ventral view for chelae; major propodus 11.2 mm. long.
4. Same species, male, dorsal view.
5. *Eurypanopeus ovatus*, male (16078), ventral view for chelae, carapace 19.6 mm. wide.
6. Same specimen, dorsal view.

PLATE 174

FIGURE 1. *Eurypanopeus crenatus*, male, dorsal view.
2. *Eurypanopeus crenatus*, female (16213), ventral view for chelae; major propodus 15.3 mm. long.
3. Same species, male (16213), carapace 19.6 mm. wide, ventral view showing abdomen.
4. *Eurypanopeus ovatus*, male (16078), carapace 19.6 mm. wide, ventral view showing abdomen.

PLATE 175

FIGURE 1. *Eurypanopeus planissimus*, male, dorsal view.
2. *Eurypanopeus planissimus*, male (50966), carapace 13.3 mm. wide, ventral view showing chelae.
3. *Eurypanopeus planus*, male (44188), carapace 27.3 mm. wide, ventral view showing chelae.
4. Same, dorsal view.
5. Same, ventral view showing abdomen.
6. *Eurypanopeus planissimus*, male (50966), carapace 13.3 mm. wide, ventral view showing abdomen.

PLATE 176

FIGURE 1. *Eurytium limosum*, male (44184), carapace 43 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. *Eurytium tristani*, male (40418), carapace 51.7 mm. wide, dorsal view.

PLATE 177

FIGURE 1. *Eurytium affine*, male (19516), carapace 24.6 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. *Eurytium tristani*, male (40418), carapace 51.7 mm. wide, ventral view showing chelae.

PLATE 178

FIGURE 1. *Micropanope sculptipes*, female (20719), carapace 6 mm. wide, front view showing chelae.
2. Same, dorsal view.
3. *Micropanope sculptipes*, male (60777), carapace 6.6 mm. wide, dorsal view.
4. *Micropanope lobifrons*, female (58014), carapace 6 mm. wide, ventral view showing chelae. Rhizocephalid parasite on abdomen.
5. Same, dorsal view.
6. *Micropanope lobifrons*, male, enlarged, Antilles, dorsal view. After A. Milne Edwards.
7. *Micropanope truncatifrons*, type female, carapace 10.3 mm. wide, ventral view to show chelae.
8. Same, dorsal view.

PLATE 179

FIGURE 1. *Micropanope xantusii*, male cotype, ventral view.
2. Same, dorsal view.
3. *Micropanope xantusii*, male (60785), carapace 10.2 mm. wide, ventral view showing chelae.
4. Same, dorsal view.
5. *Micropanope xantusii taboguillensis*, type male, carapace 10 mm. wide, ventral view to show chelae.
6. Same, dorsal view.
7. *Micropanope pusilla*, male (49171), carapace 5.6 mm. wide, ventral view.
8. Same, dorsal view.

PLATE 180

FIGURE 1. *Micropanope granulimanus*, female (20052), ventral view to show chelae.
2. Same, dorsal view.
3. *Micropanope polita*, male (19972), carapace 9.5 mm. wide, ventral view showing chelae.
4. Same, dorsal view.
5. *Micropanope lata*, male holotype, carapace 10.25 mm. wide, antennal and oral regions. After Faxon.
6. Same, dorsal view.
7. *Micropanope xanthiformis*, female (60912), carapace 11 mm. wide, ventral view showing chelae.
8. Same, dorsal view.

PLATE 181

FIGURE 1. *Micropanope spinipes*, female (20508), carapace 12.6 mm. wide, ventral view to show chelae.
2. Same, dorsal view.
3. *Micropanope nitida*, male (21583), carapace 11.8 mm. wide, ventral view showing chelae.
4. Same, dorsal view.

PLATE 182

FIGURE 1. *Micropanope areolata*, male (58113), carapace 10.3 mm. wide, ventral view.
2. Same, dorsal view.
3. *Micropanope urinator*, male (7806), carapace 10 mm. wide, ventral view.
4. Same, dorsal view.

PLATE 183

FIGURE 1. *Micropanope urinator*, male, enlarged, Antilles, antennal and buccal regions.
2. Same, chela, outer side.
3. Same, dorsal view.
4. *Micropanope cristimanus*, male (46080), carapace 6.8 mm. wide, ventral view showing chelae.
5. *Micropanope cristimanus*, ovigerous female (46080), carapace 5.6 mm. wide, dorsal view.
6. *Micropanope cristimanus*, male (46080), carapace 6.8 mm. wide, ventral view showing abdomen.
7. *Rhithropanopeus harrisii*, male (3149), carapace 17.4 mm. wide, ventral view to show chelae.
8. *Rhithropanopeus harrisii*, male, dorsal view.

PLATE 184

FIGURE 1. *Tetraxanthus bidentatus*, male (9759), carapace 20 mm. wide, ventral view showing chelae.
2. Same, ventral view showing abdomen.
3. Same, dorsal view.

PLATE 185

FIGURE 1. *Tetraxanthus rugosus*, type male, carapace 11.5 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view showing abdomen.

PLATE 186

FIGURE 1. *Chlorodiella longimana*, male (60862), carapace 17.8 mm. wide, ventral view.
2. Same, dorsal view.

PLATE 187

FIGURE 1. *Xanthias inornatus*, male holotype of *X. vestitus*, carapace 4.6 mm. long, dorsal view.
2. Same, ventral view.
3. *Xanthias inornatus*, male (57002), propodus 5 mm. long, right chela and wrist, outer view.

PLATE 188

FIGURE 1. *Paraxanthias taylori*, female (45580), Venice, Calif., carapace 21 mm. wide, dorsal view. After Schmitt.
2. *Paraxanthias taylori*, female (23920), carapace 42 mm. wide, front view.
3. *Paraxanthias taylori*, male (23920), carapace 25 mm. wide, ventral view showing abdomen.

PLATE 189

FIGURE 1. *Paraxanthias taylori*, female, type, dorsal view, slightly enlarged. After Stimpson.
2. *Paraxanthias sulcatus* (*Xanthodes sulcatus* Faxon), antennal and oral region, enlarged. After Faxon.
3. Same, dorsal view, enlarged.
4. *Paraxanthias insculptus*, immature male, 4 mm. wide, Eden Island, Galapagos, dorsal view.

PLATE 190

FIGURE 1. *Eucratodes agassizii*, male (24318), carapace 8.5 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view.

PLATE 191

Menippe mercenaria, male (20096), major chela 41 mm. high, inner view to show striae

PLATE 192

Menippe mercenaria, male (20096), carapace 90 mm. wide, dorsal view

PLATE 193

FIGURE 1. *Menippe mercenaria*, male (20096), carapace 90 mm. wide, front view showing chelae.
2. Same, ventral view showing abdomen.

PLATE 194

Menippe frontalis, male (60758), major chela 51.5 mm. high, inner view to show striae

PLATE 195

FIGURE 1. *Menippe frontalis*, male (60758), carapace 111.5 mm. wide, ventral view to show tubercles on orbital and antero-lateral regions.
2. Same, ventral view showing abdomen.

PLATE 196

Menippe frontalis, male (60758), carapace 111.5 mm. wide, dorsal view

PLATE 197

FIGURE 1. *Menippe obtusa*, male (17301), carapace 52 mm. wide, front view.
2. Same, dorsal view.

PLATE 198

FIGURE 1. *Menippe obtusa*, type female, minor chela showing striae on inner surface, propodus 26 mm. long.
2. *Menippe obtusa*, male (17301), major chela, showing striae on inner surface of palm, propodus 46.4 mm. long.
3. *Menippe nodifrons*, male (59309), carapace 71.7 mm. wide, outer view of chelae.

PLATE 199

Menippe nodifrons, male (59309), carapace 71.7 mm. wide, dorsal view

PLATE 200

FIGURE 1. *Pilumnus sayi*, male (53718), carapace 29.5 mm. wide, ventral view.
2. Same, dorsal view.
3. *Pilumnus caribaeus*, male (31082), carapace 13 mm. wide, ventral view to show chelae.
4. *Pilumnus caribaeus*, female (31082), carapace 18 mm. wide, dorsal view.
5. *Pilumnus dasypodus*, male (50535), carapace 15 mm. wide, ventral view.
6. Same, dorsal view.
7. *Pilumnus spinosissimus*, female (22268), carapace 15 mm. wide, ventral view to show chelae.
8. Same, dorsal view.

PLATE 201

Pilumnus xantusii, Cape San Lucas, male, enlarged. After A. Milne Edwards

FIGURE 1. Dorsal view.
2. Fronto-orbital region, anterior view.
3. Chela, outer side.

Pilumnus sayi, Antilles, enlarged. After A. Milne Edwards

4. Dorsal view of male.
5. Antennal and buccal regions.
6. Right chela, outer side.
7. Hepatic region of female with an unusual number of dorsal spines.

Pilumnus gracilipes, Antilles, female, enlarged. After A. Milne Edwards

8. Dorsal view, chelipeds lacking.
9. Antennal and buccal regions.

PLATE 202

FIGURE 1. *Pilumnus townsendi*, female (17413), dorsal view, enlarged.
2. *Pilumnus diomedeae*, type female, carapace 16 mm. wide, ventral view showing chelae.
3. Same, dorsal view.
4. *Pilumnus longleyi*, type female, carapace 19.6 mm. wide, ventral view.
5. Same, dorsal view.

PLATE 203

FIGURE 1. *Pilumnus spinohirsutus*, female (32964), Santa Catalina Island, Calif., carapace 7 mm. wide, dorsal view.
2. *Pilumnus spinohirsutus*, female (54763), carapace 17.2 mm. long, dorsal view.
3. Same, ventral view.

PLATE 204

FIGURE 1. *Pilumnus townsendi*, female holotype, carapace 13.8 mm. long, ventral view showing chelae.
2. Same, dorsal view.
3. *Pilumnus gonzalensis*, male (17415), carapace 17.4 mm. wide, dorsal view.
4. Same, ventral view showing chelae.

PLATE 205

FIGURE 1. *Pilumnus lacteus*, male (60217), carapace 11.5 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. *Pilumnus floridanus*, male (11306), carapace 9.6 mm. wide, ventral view showing chelae.
4. Same, dorsal view. Carapace largely denuded.
5. *Pilumnus stimpsonii*, ovigerous female (60223), chela, outer view, propodus 2.6 mm. long.
6. Same, carapace 5 mm. wide, dorsal view.

PLATE 206

Pilumnus quoyi, Brazil, male, enlarged. After A. Milne Edwards

FIGURE 1. Dorsal view; pubescence removed from right half.
2. Antennal and buccal regions.
3. Front, anterior view.
4. Left chela, outer side.

Pilumnus miersii, Antilles, male. After A. Milne Edwards

5. Dorsal view, enlarged.

PLATE 207

FIGURE 1. *Pilumnus gemmatus*, female (56900), carapace 13.5 mm. wide, dorsal view.
2. *Pilumnus gemmatus*, female (17913), carapace 22.5 mm. wide, ventral view.
3. Same, dorsal view, carapace denuded.
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5. Same, ventral view.
6. *Pilumnus pannosus*, male (13814), carapace 12.5 mm. wide, ventral view showing chelae.
7. Same, dorsal view.
8. *Pilumnus holosericus*, male (24377), carapace 9.7 mm. wide, dorsal view.
9. Same, ventral view showing chelae.

PLATE 208

FIGURE 1. *Pilumnus limosus*, female (4080), carapace 8.3 mm. wide, dorsal view. Carapace and chela largely denuded.
2. *Pilumnus limosus*, female (60821), carapace 10.6 mm. wide, ventral view showing chelae.
3. Same, dorsal view.

PLATE 209

Pilumnus limosus, Panama, male, carapace about 16 mm. wide. After A. Milne Edwards

FIGURE 1. Dorsal view; pubescence removed from right half.
2. Left chela, outer side.
3. Antennal and buccal regions; pubescence removed from left half.

Pilumnus reticulatus, male (60220), carapace 15 mm. wide

4. Ventral view.
5. Same, dorsal view.

PLATE 210

Pilumnus reticulatus forma fragosa, Antilles, male, enlarged. After A. Milne Edwards

FIGURE 1. Dorsal view.
2. Minor chela, outer side.
3. Major chela, outer side.
4. Fronto-orbital region, dorsal view.
5. Antennal and buccal regions.
6. Abdomen.

Pilumnus reticulatus forma tessellata, Brazil, male, enlarged. After A. Milne Edwards

7. Antennal and buccal regions
8. Ambulatory leg denuded.
9. Dorsal view.
10. Chela, outer side.
11. Carapace of younger specimen on which the hairs have been preserved.

PLATE 211

FIGURE 1. *Lobopilumnus agassizii forma typica*, female (17891), carapace 20 mm. wide, ventral view.
2. Same, dorsal view.
3. *Lobopilumnus agassizii forma pulchella*, ovigerous female (48563), carapace 25 mm. wide, dorsal view.
4. *Lobopilumnus agassizii forma trinidadensis*, type female, carapace 30.1 mm. wide, dorsal view.
5. *Lobopilumnus agassizii forma bermudensis*, male (42798), carapace 33.6 mm. wide, dorsal view.

PLATE 212

Heteractaea lunata, young female, carapace about 17 mm. wide. After Milne Edwards and Lucas

FIGURE 1. Dorsal view.
2. Chela, outer face.
3. Outer maxilliped.
4. Frontal region, ventral view.

Heteractaea ceratopus, Guadeloupe, male, enlarged. After A. Milne Edwards

FIGURE 5. Dorsal view.
6. Abdomen.
7. Chela, outer side.
8. Antennal and buccal regions.

PLATE 213

FIGURE 1. *Heteractaea ceratopus*, male (24845), carapace 29.6 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view showing abdomen.

PLATE 214

FIGURE 1. *Heteractaea lunata*, male (2146), Panama, carapace 21 mm. wide, dorsal view. After Schmitt.
2. *Heteractaea lunata*, male (33274), carapace 19 mm. wide, ventral view.
3. Same, dorsal view.

PLATE 215

FIGURE 1. *Acidops fimbriatus*, female, Australia (Austral. Mus. P. 17), carapace 14.3 mm. wide, ventral view.
2. Same, dorsal view.

PLATE 216

Pilumnoides perlatus, near Lima. After Milne Edwards and Lucas

FIGURE 1. Antennal region.
2. Chela, outer face.
3. Outer maxilliped.

PLATE 217

FIGURE 1. *Pilumnoides hassleri*, male (21990), carapace 11 mm. wide, dorsal view.
2. Same, ventral view.
3. *Pilumnoides perlatus*, male, Valparaiso Bay, dorsal view, × 2. After C. E. Porter.

PLATE 218

FIGURE 1. *Pilumnoides nudifrons*, female (20023), carapace 13.5 mm. wide, ventral view showing chelae.
2 Same, dorsal view.
3. *Pilumnoides perlatus*, male, Valparaiso Bay, ventral view, × 2. After C. E. Porter.

PLATE 219

FIGURE 1. *Ozius verreauxii*, male (21983), carapace 53.8 mm. wide, ventral view.
2. Same, dorsal view.
3. *Ozius verreauxii*, anterior part of carapace. After Saussure.

PLATE 220

FIGURE 1. *Ozius reticulatus*, female (17824), carapace 21 mm. wide, ventral view.
2. Same, dorsal view.
3. *Ozius verreauxii*, male (21983), carapace 53.8 mm. wide, ventral view for abdomen.

PLATE 221

FIGURE 1. *Ozius perlatus*, female (60790), carapace 14.3 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. *Ozius agassizii*, female (33329), carapace 21.4 mm. wide, ventral view showing chelae.
4. Same, dorsal view.

PLATE 222

FIGURE 1. *Eriphia gonagra*, male (59423), carapace 41.8 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view showing abdomen.

PLATE 223

FIGURE 1. *Eriphia squamata*, male (50629), carapace 42 mm. wide, ventral view showing chelae.
2. Same, dorsal view.
3. Same, ventral view showing abdomen.

PLATE 224

FIGURE 1. *Eriphia squamata*, male, dorsal view, slightly reduced. After A. Milne Edwards.
2. *Eriphia granulosa*, female (25667), carapace 12.5 mm. wide, dorsal view.
3. Same species, male (25667), carapace 11 mm. wide, ventral view showing chelae.
4. Same specimen, ventral view showing abdomen.

PLATE 225

Eriphides hispida, female (22019), carapace 62.4 mm. wide, dorsal view

PLATE 226

FIGURE 1. *Eriphides hispida*, female (22019), carapace 62.4 mm. wide, front view.
2. Same, ventral view.

PLATE 227

FIGURE 1. *Domecia hispida*, male (24315), carapace 11 mm. wide, ventral view.
2. Same, dorsal view.

Domecia hispida, Antilles, male, enlarged. After A. Milne Edwards

3. Dorsal view.
4. Chela, outer side.
5. Antennal and buccal regions.
6. Abdomen.
7. Outer maxilliped.

PLATE 228

FIGURE 1. *Trapezia cymodoce ferruginea*, male (17416), carapace 16 mm. wide, ventral view.
2. Same, dorsal view.
3. *Trapezia cymodoce maculata*, male (29486), carapace 13.6 mm. wide, ventral view.
4. Same, dorsal view.
5. *Trapezia digitalis*, male (41336), carapace 11 mm. wide, ventral view.
9. Same, dorsal view.

PLATE 229

FIGURE 1. *Quadrella nitida*, female (22021), carapace 6.7 mm. wide, dorsal view. Left cheliped lacking.
2. *Quadrella nitida*, male (22021), carapace 9.5 mm. wide, dorsal view.
3. Same, ventral view.

PLATE 230

FIGURE 1. *Melybia thalamita*, male (18439), carapace 6 mm. wide, ventral view.
2. *Melybia thalamita*, ovigerous female (18271), carapace 8.2 mm. wide, dorsal view.

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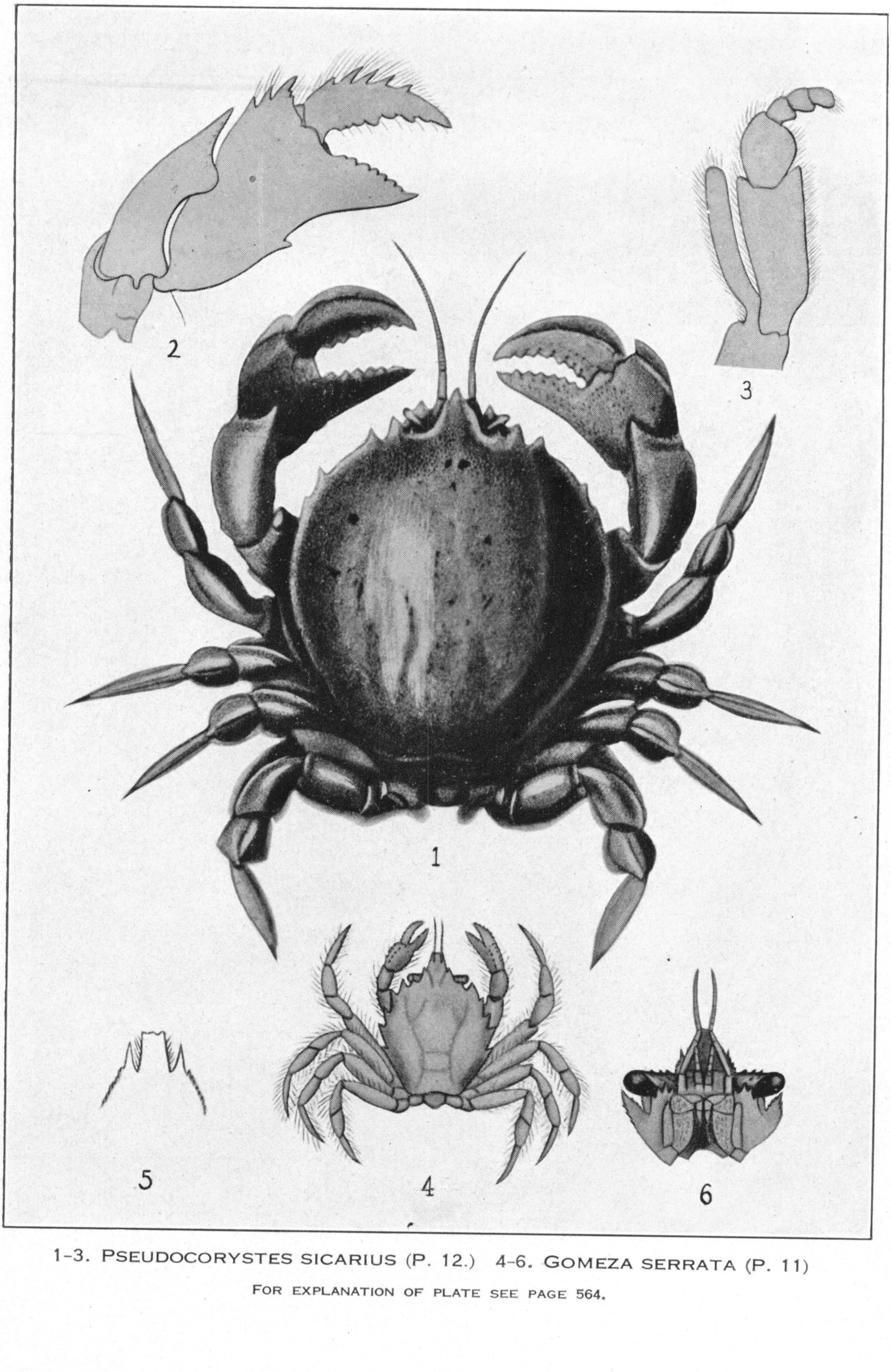

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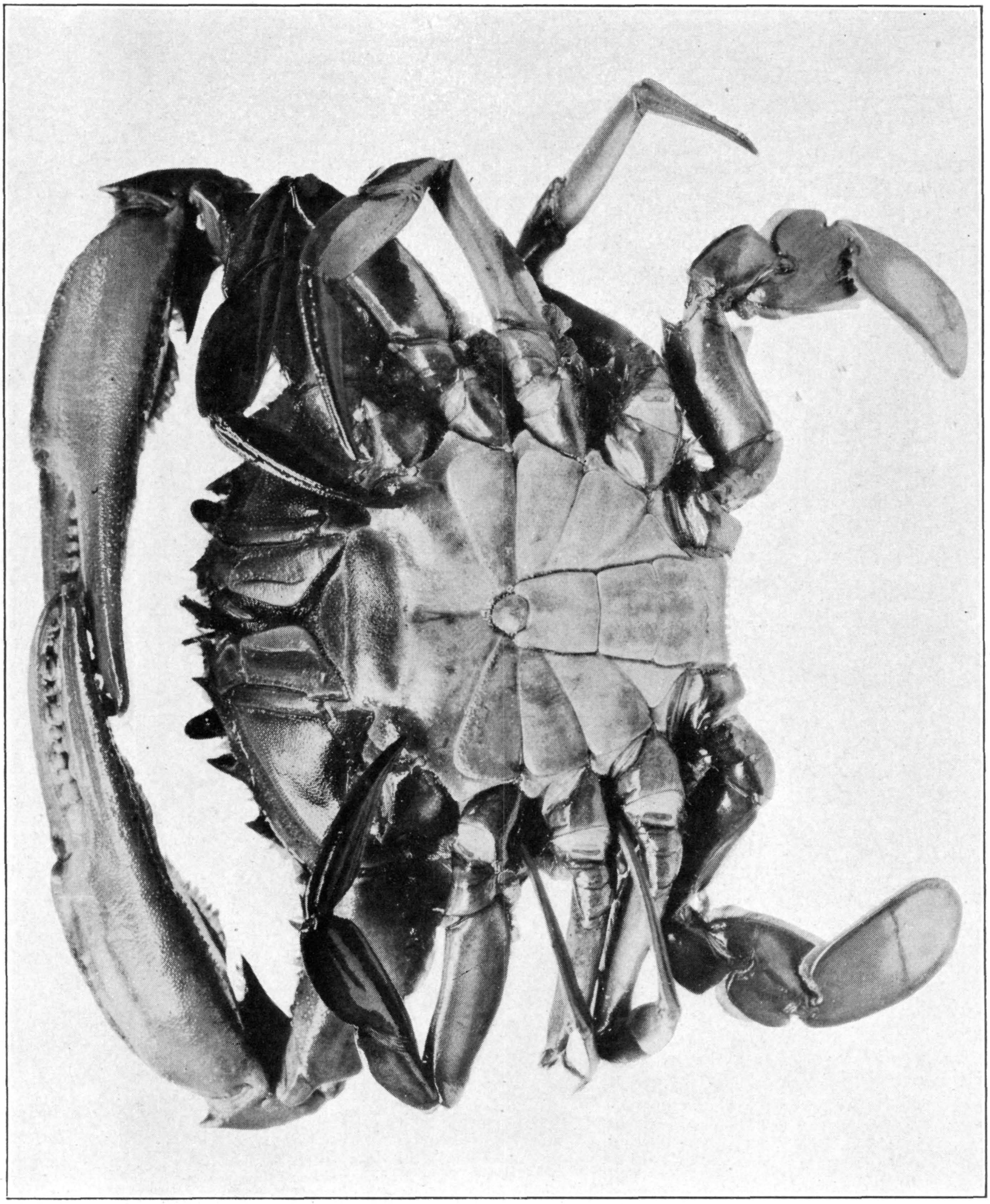

OVALIPES OCELLATUS OCELLATUS (P. 19)

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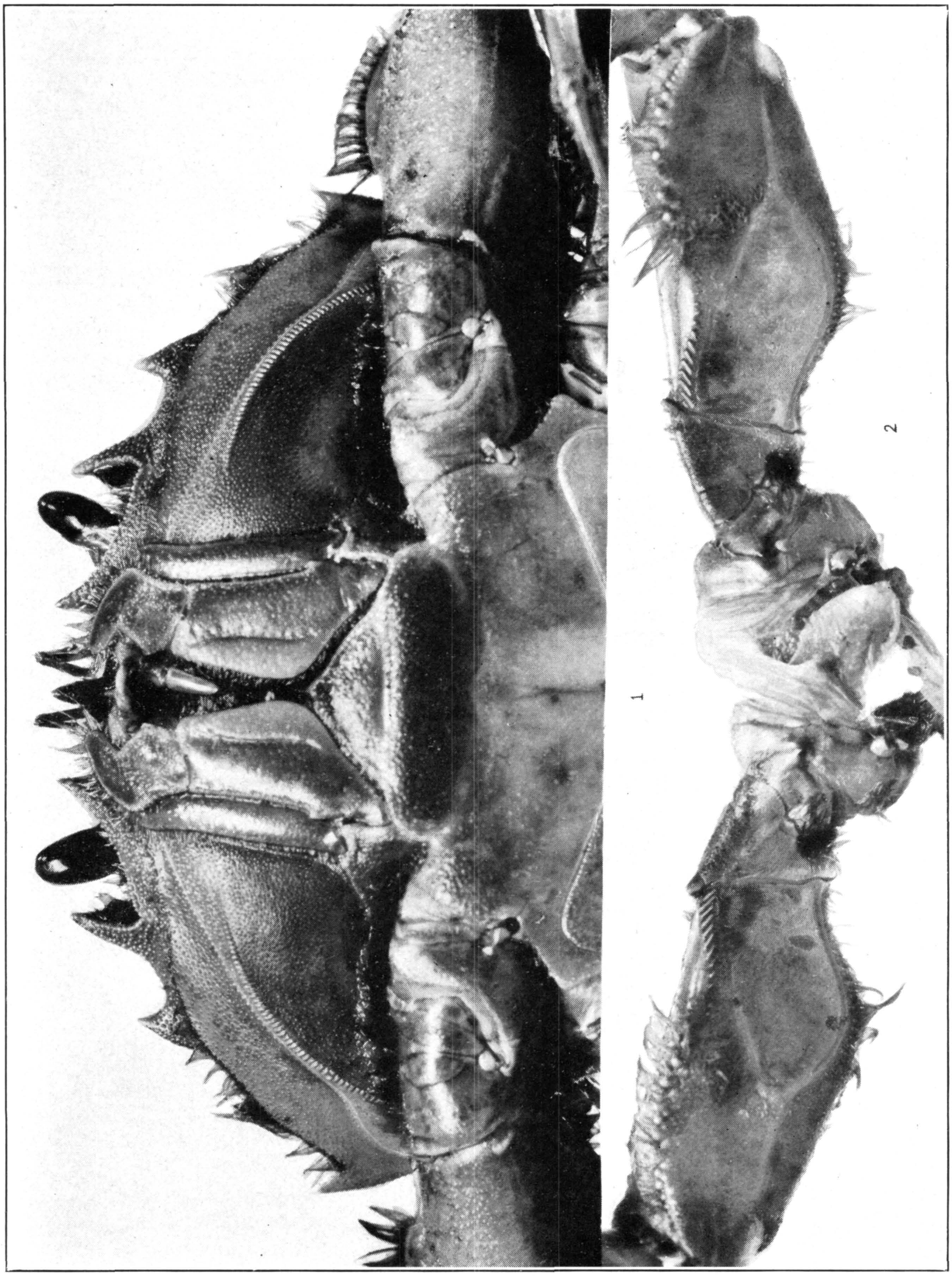

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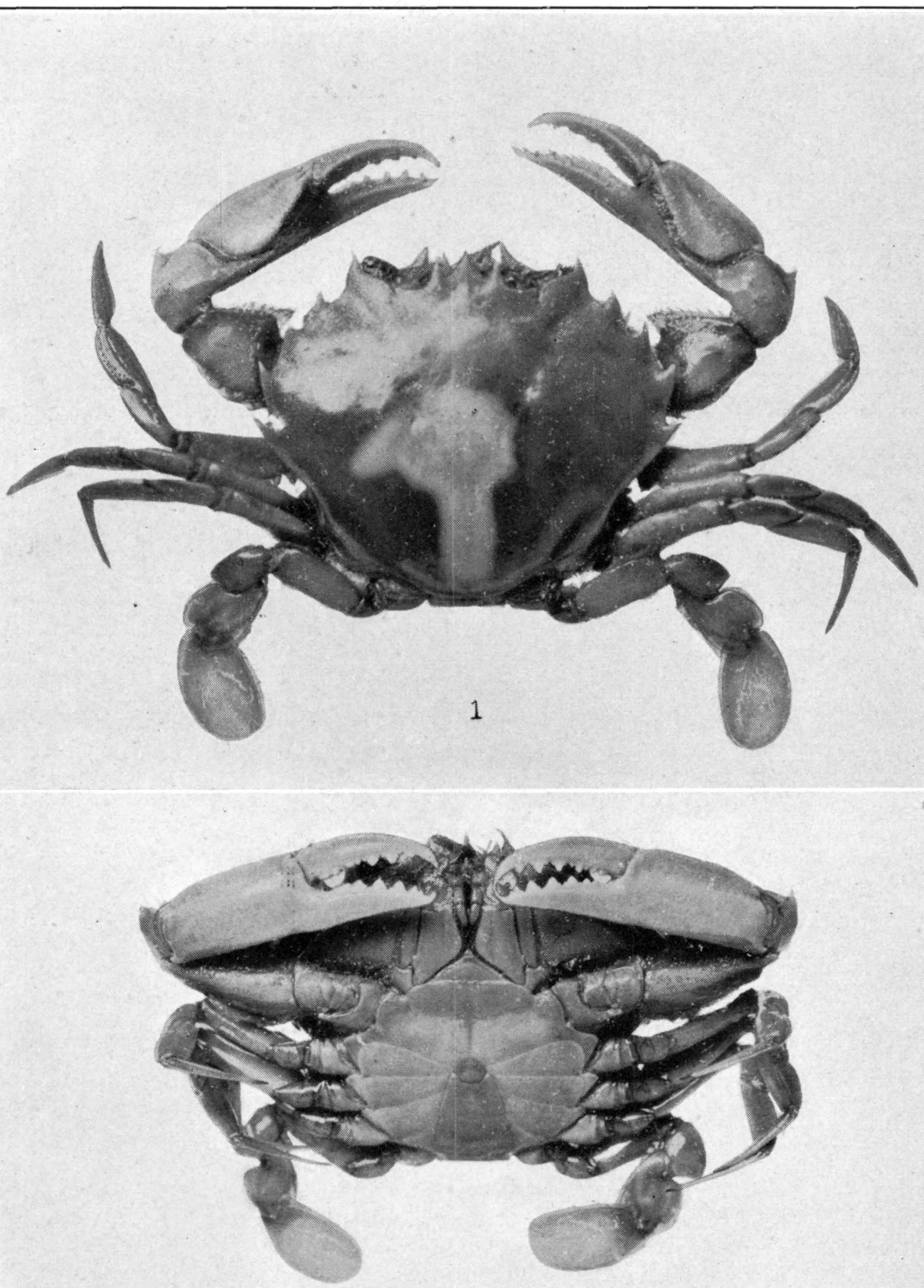

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OVALIPES OCELLATUS GUADULPENSIS (P. 23)

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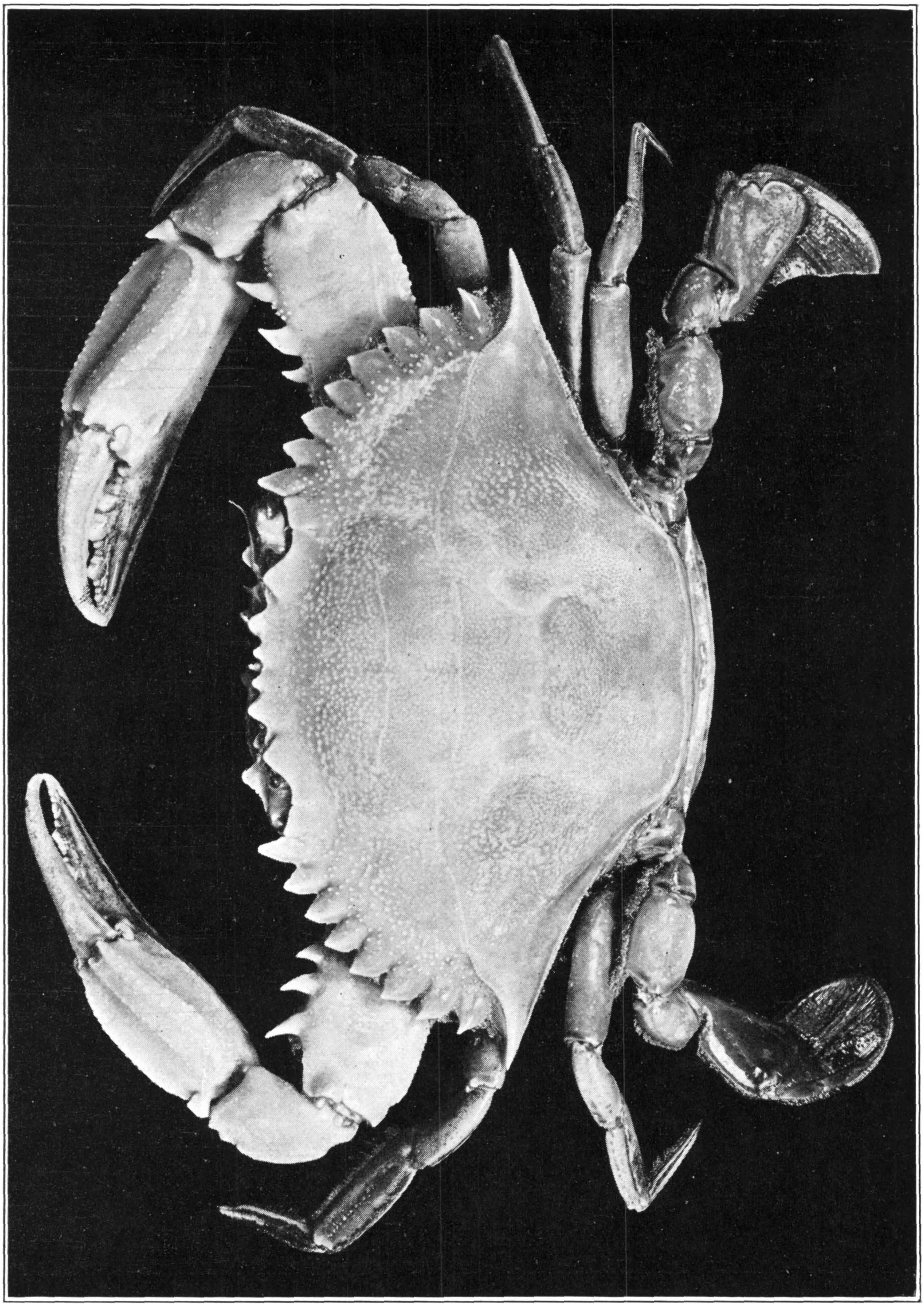

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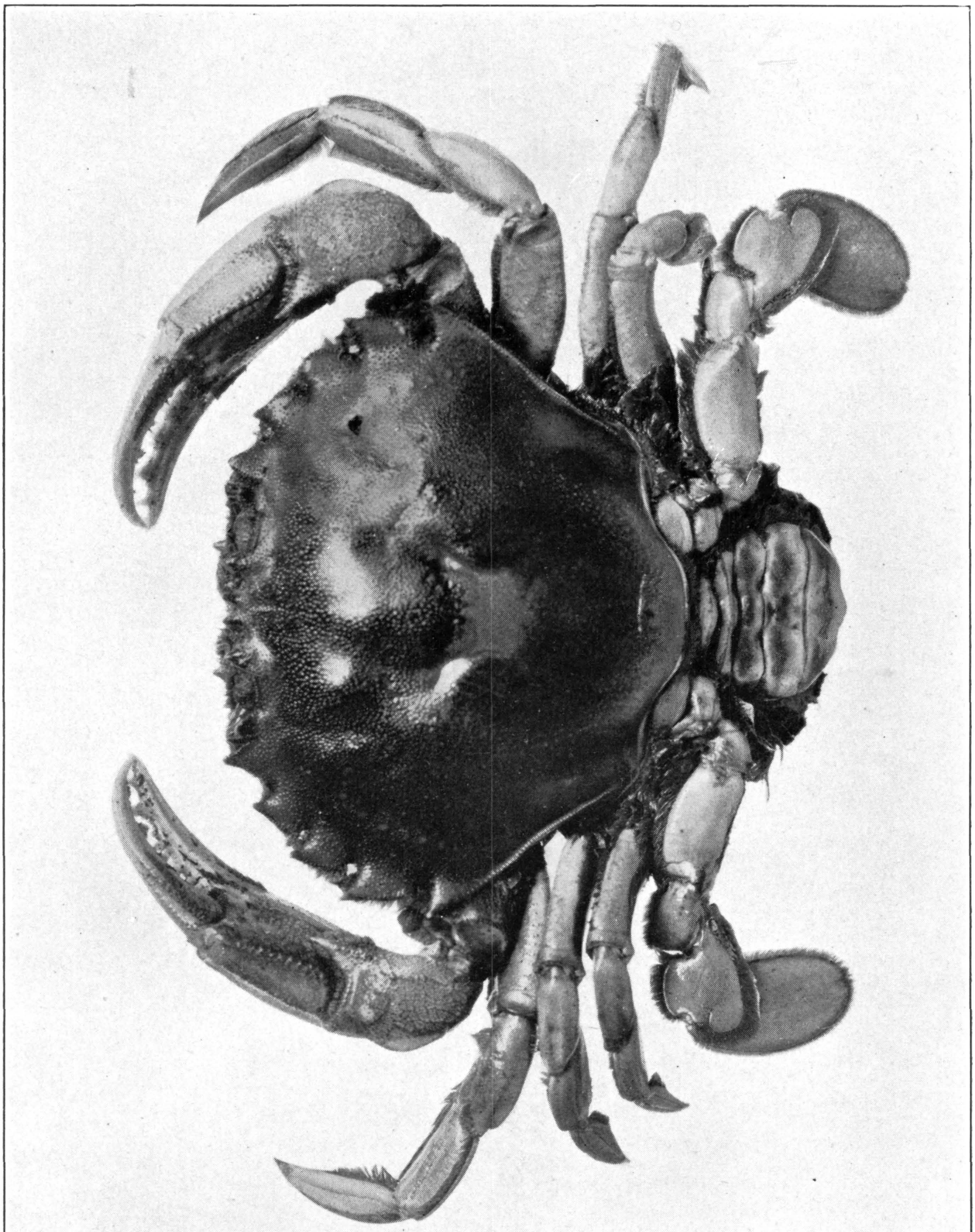

OVALIPES PUNCTATUS (P. 24)

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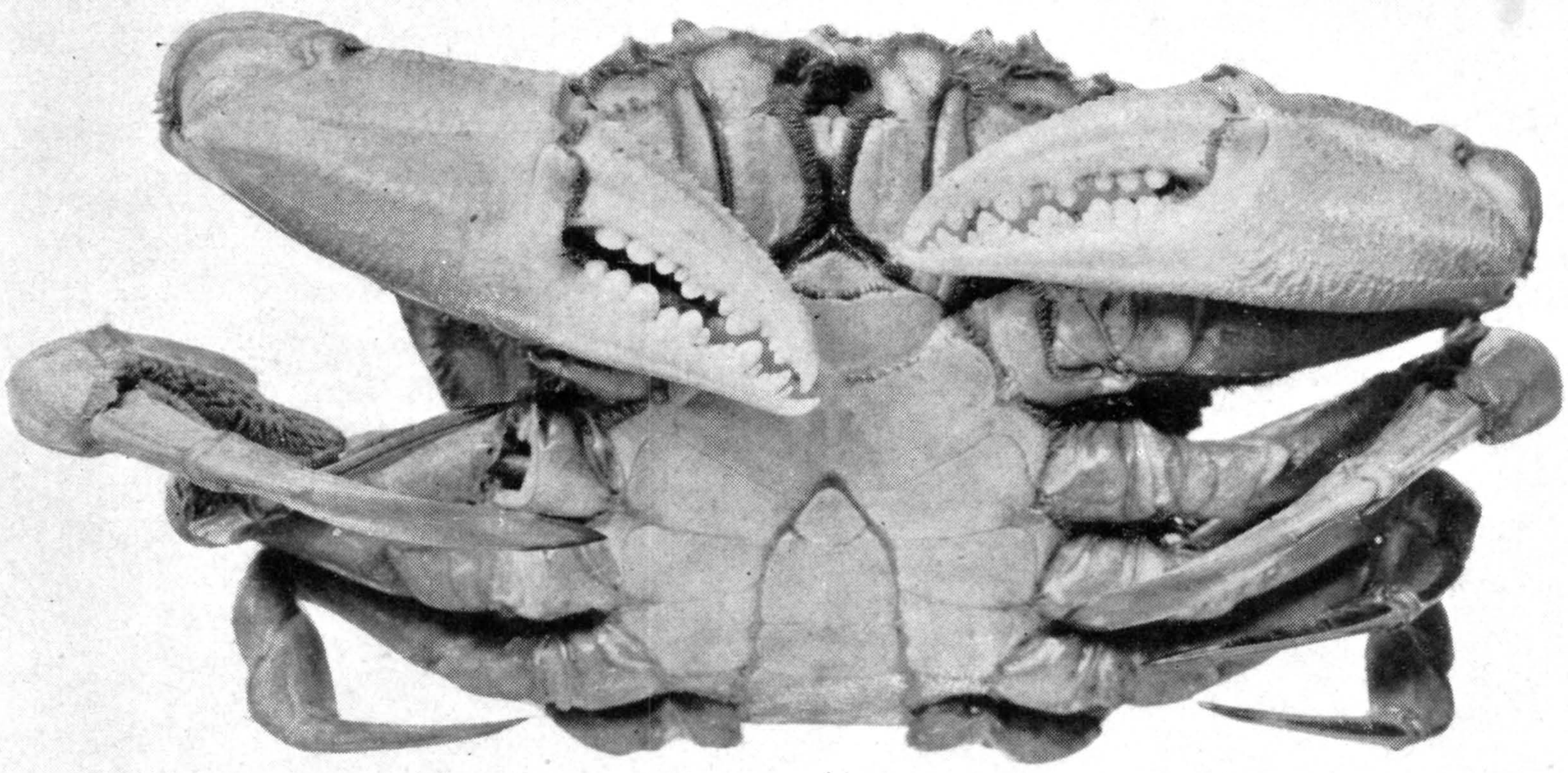

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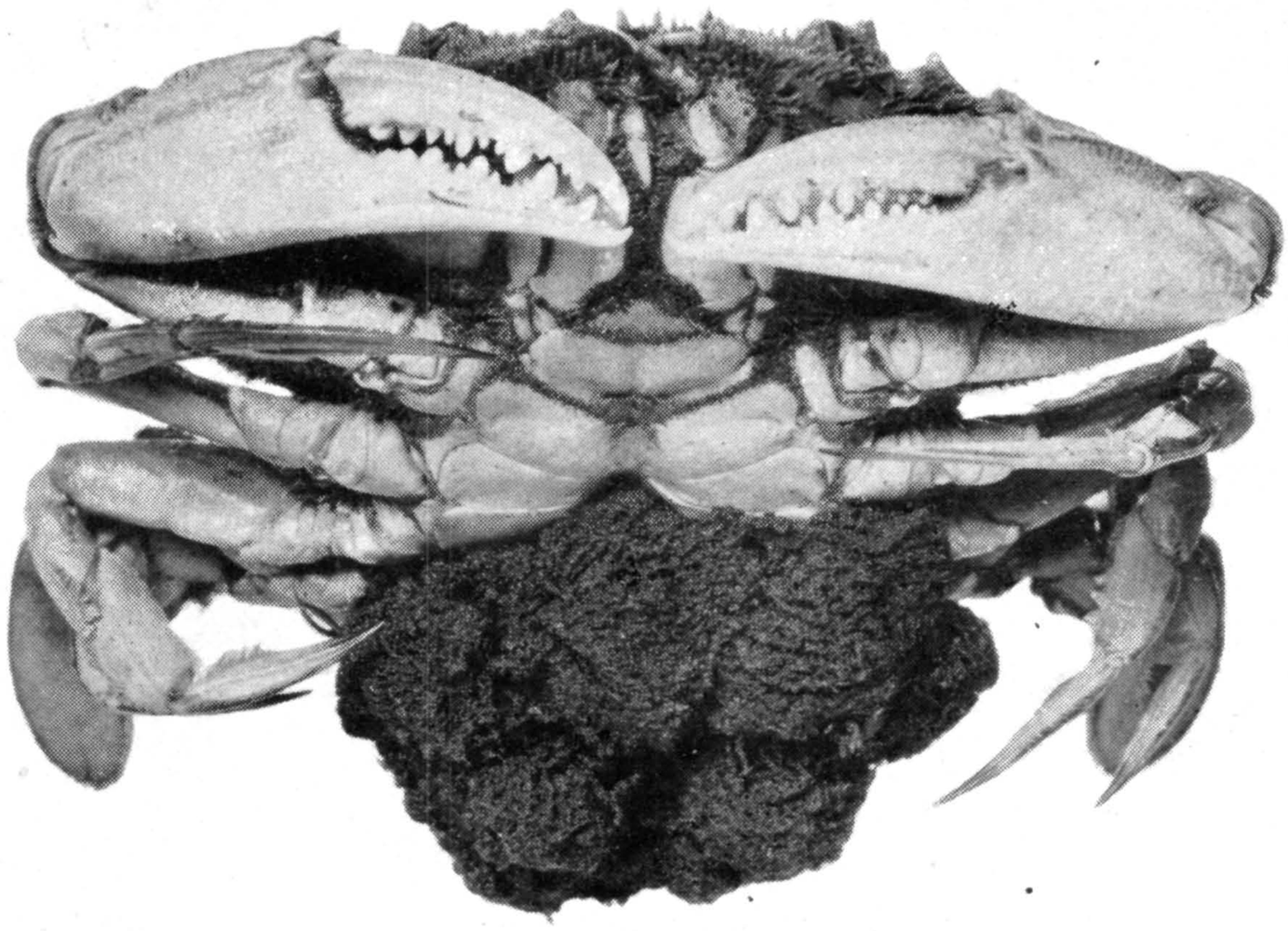

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OVALIPES PUNCTATUS (P. 24)

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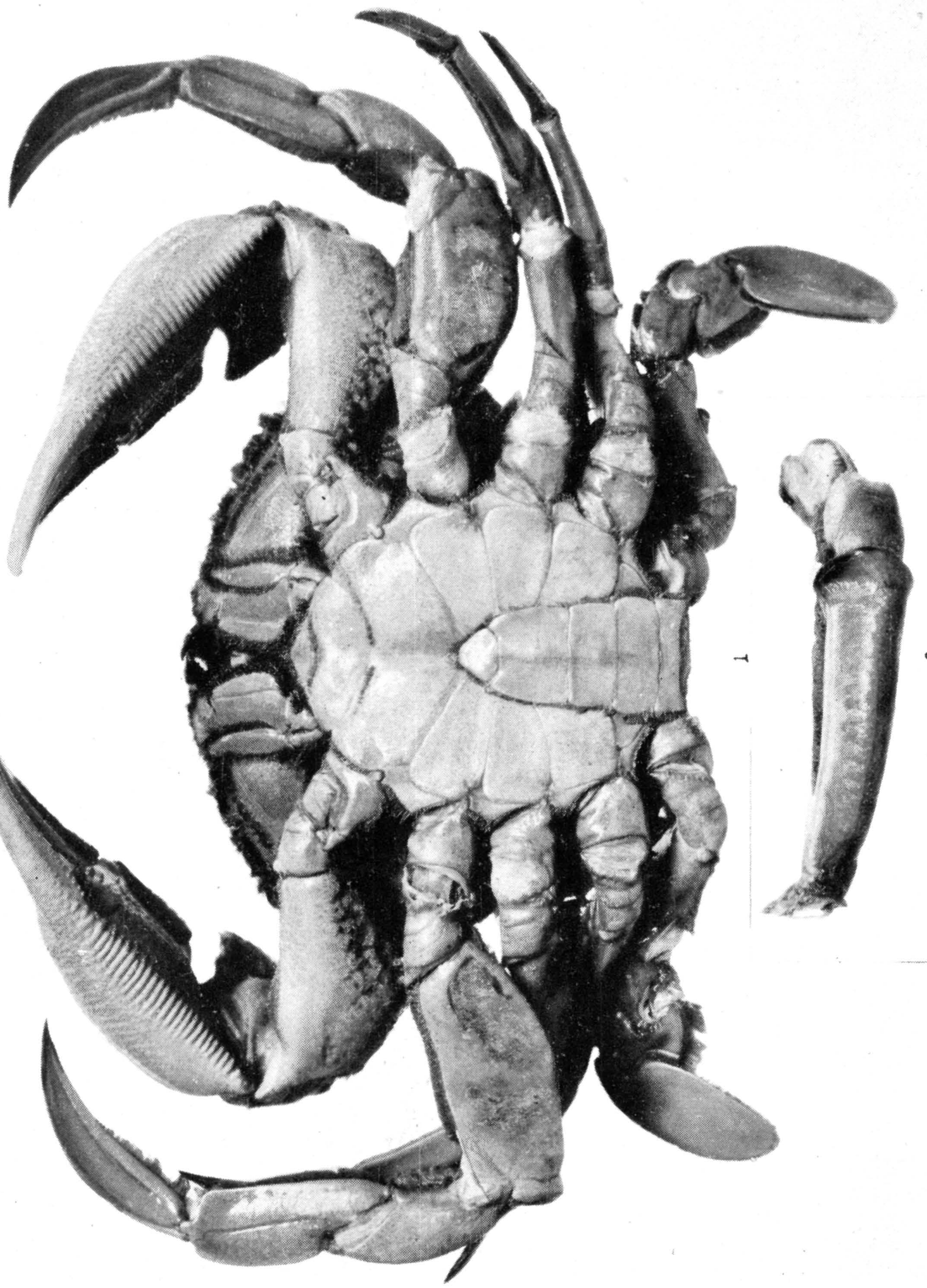

OVALIPES PUNCTATUS (P. 24)

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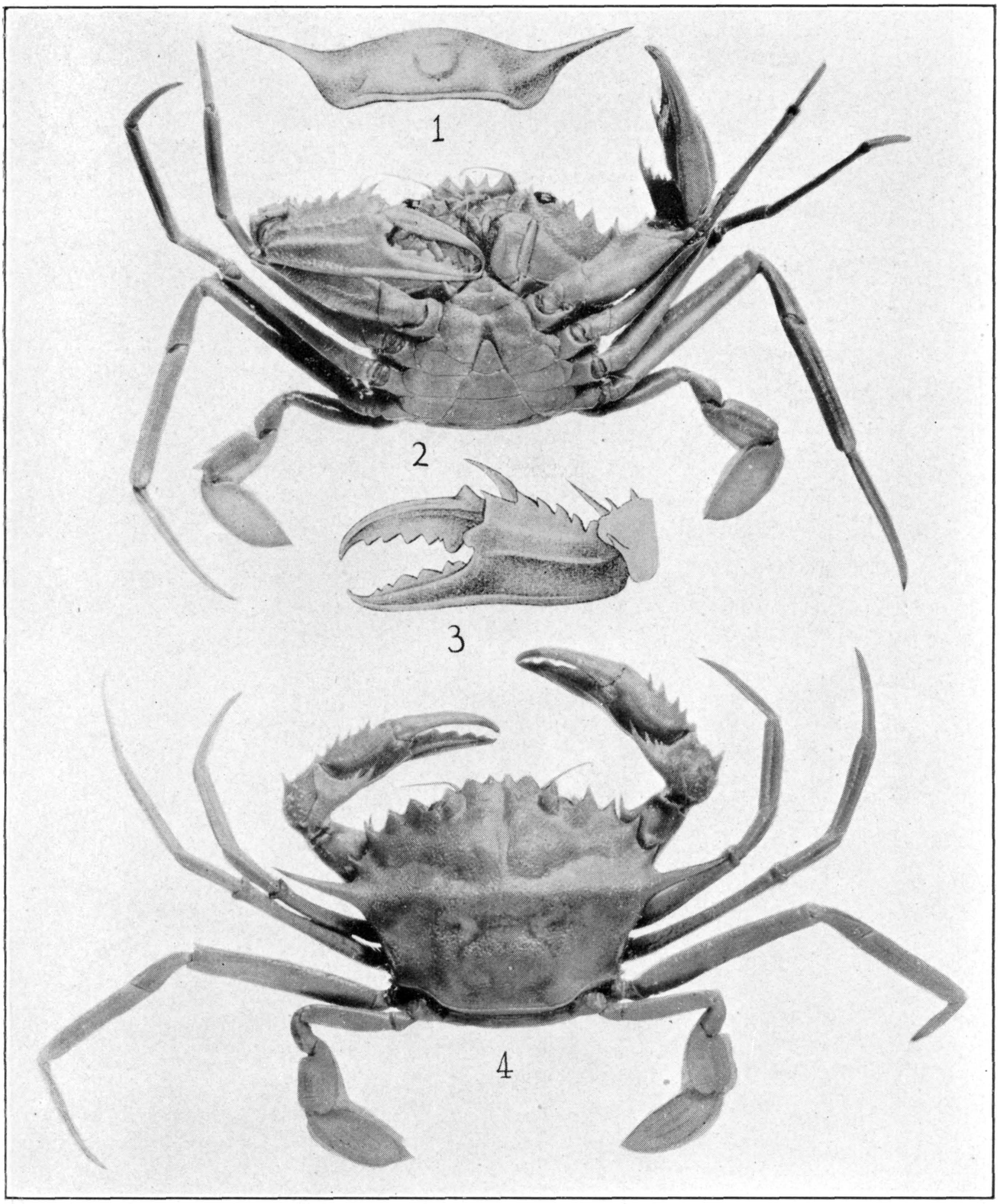

BATHYNECTES SUPERBA (P. 28)

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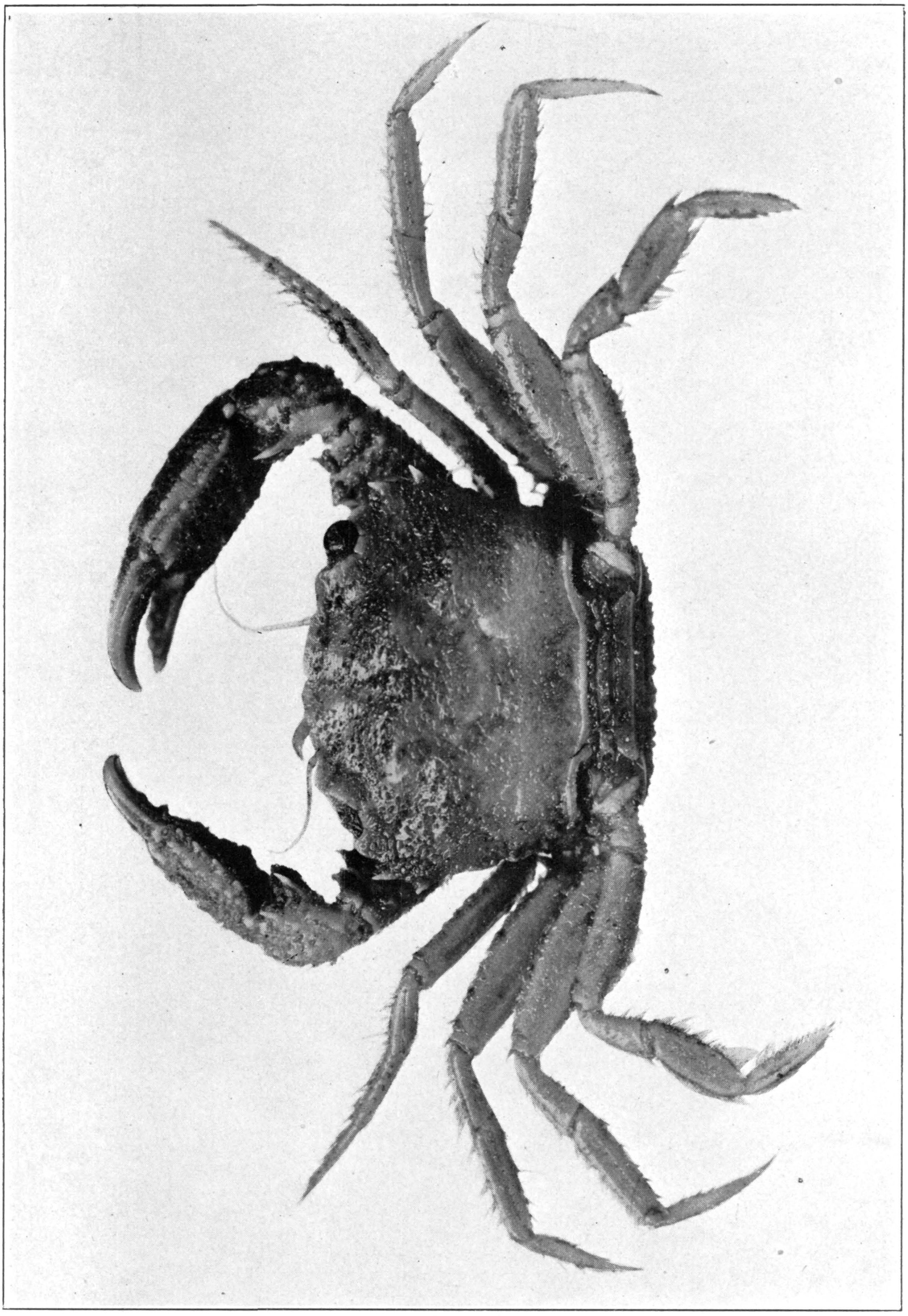
BATHYNECTES SUPERBA (P. 28)

FOR EXPLANATION OF PLATE SEE PAGE 565.



COENOPHTHALMUS TRIDENTATUS (P. 31)

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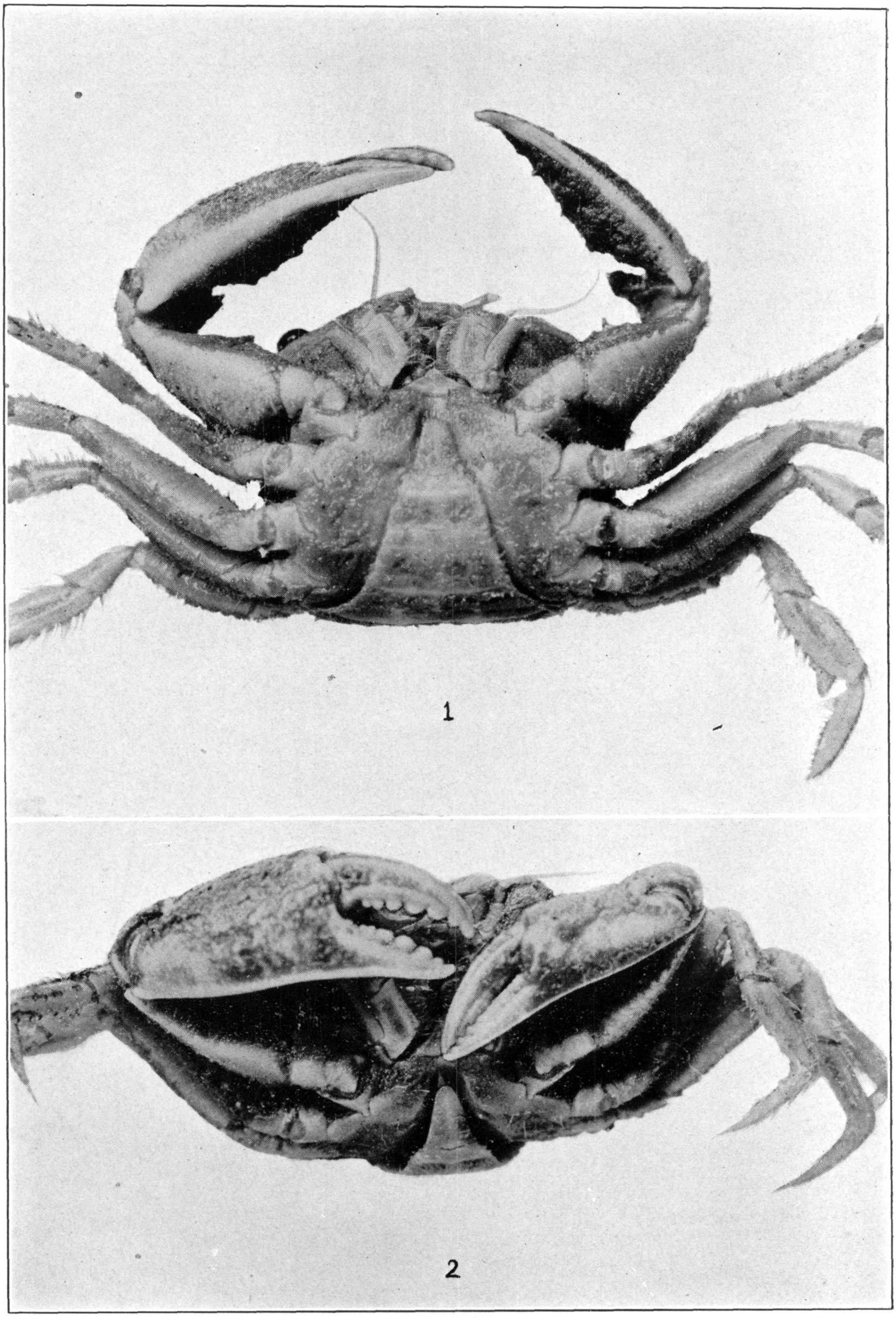

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COENOPHTHALMUS TRIDENTATUS (P. 31)

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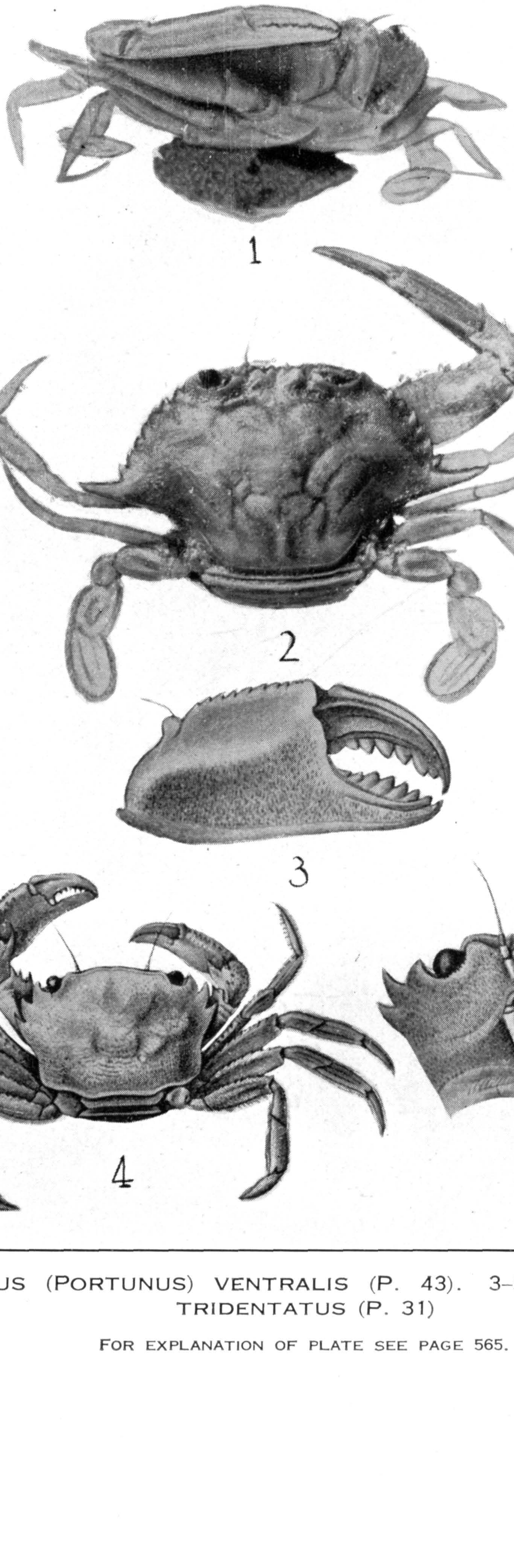

1, 2. PORTUNUS (PORTUNUS) VENTRALIS (P. 43). 3–5. COENOPHTHALMUS TRIDENTATUS (P. 31)

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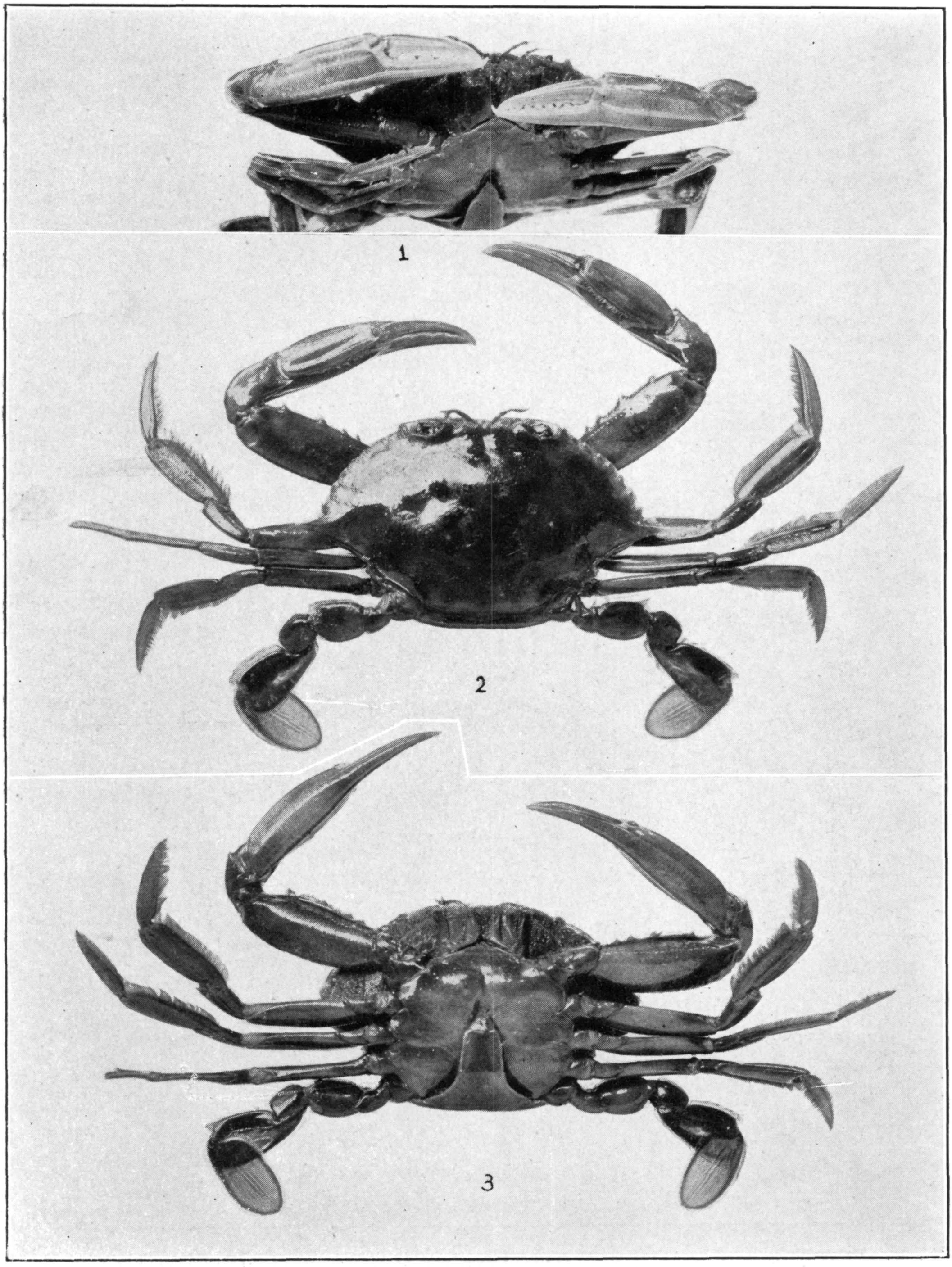

PORTUNUS (PORTUNUS) SAYI (P. 37)

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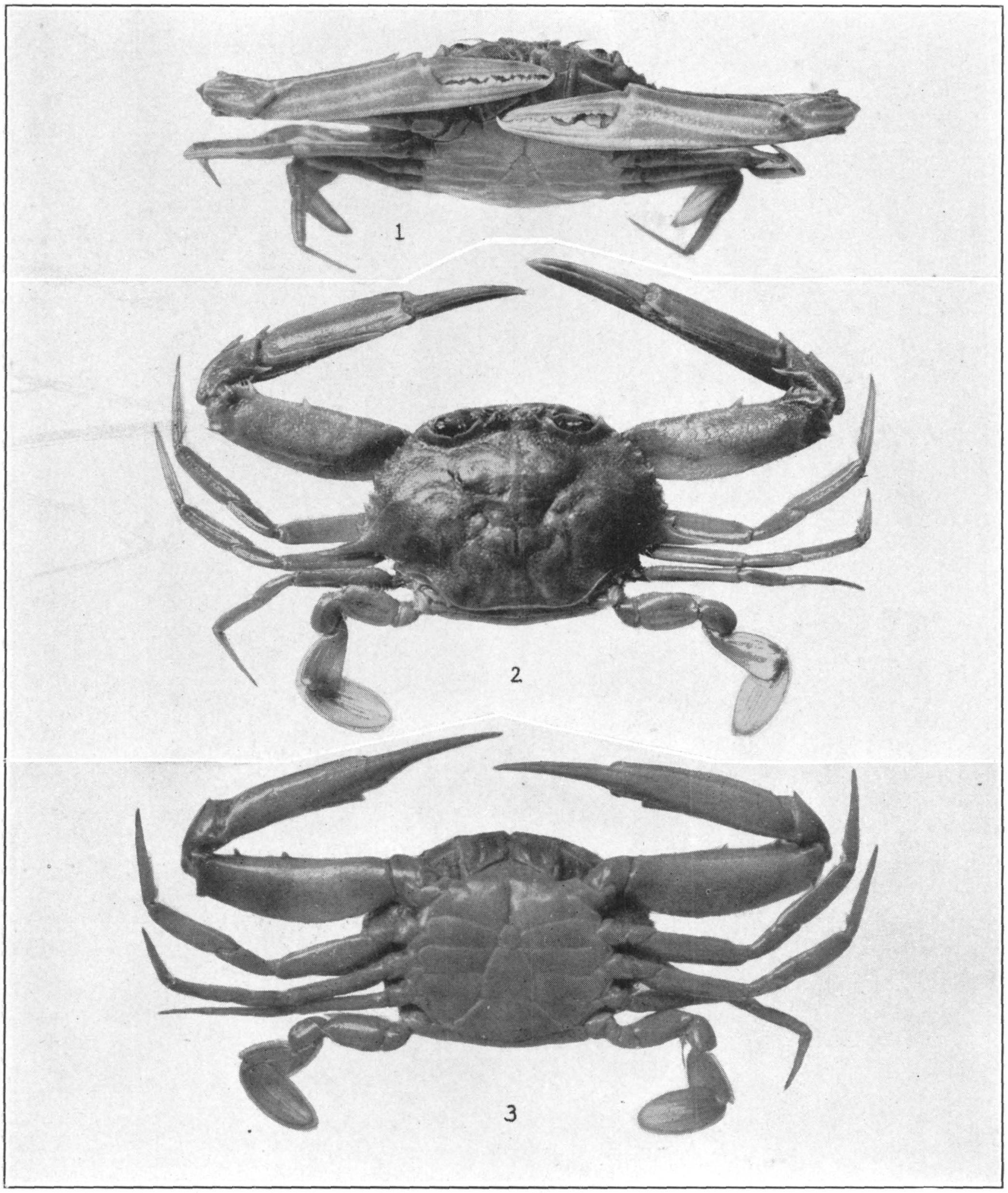

PORTUNUS (PORTUNUS) ANCEPS (P. 38)

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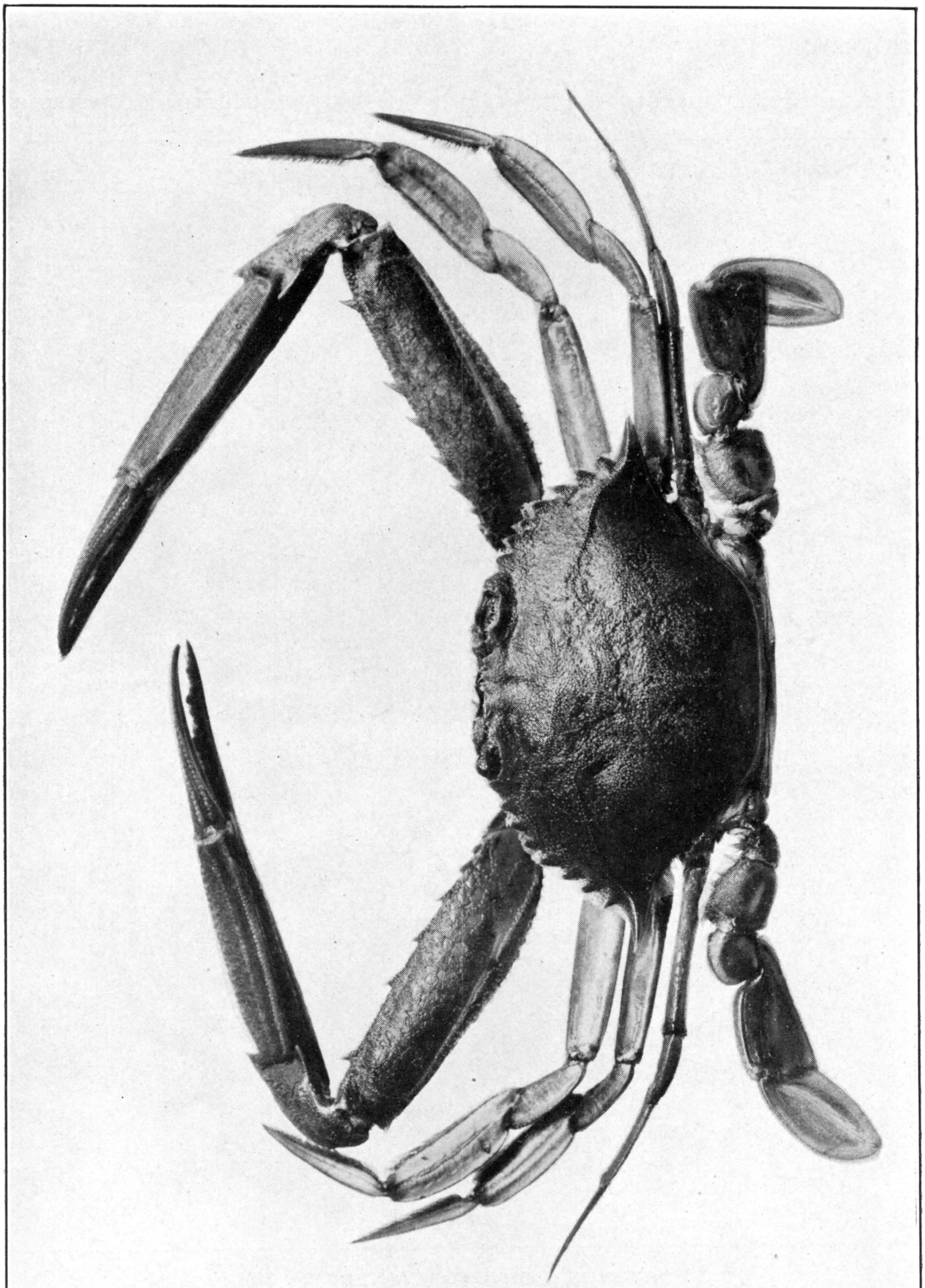

PORTUNUS (PORTUNUS) GIBBESII (P. 49)

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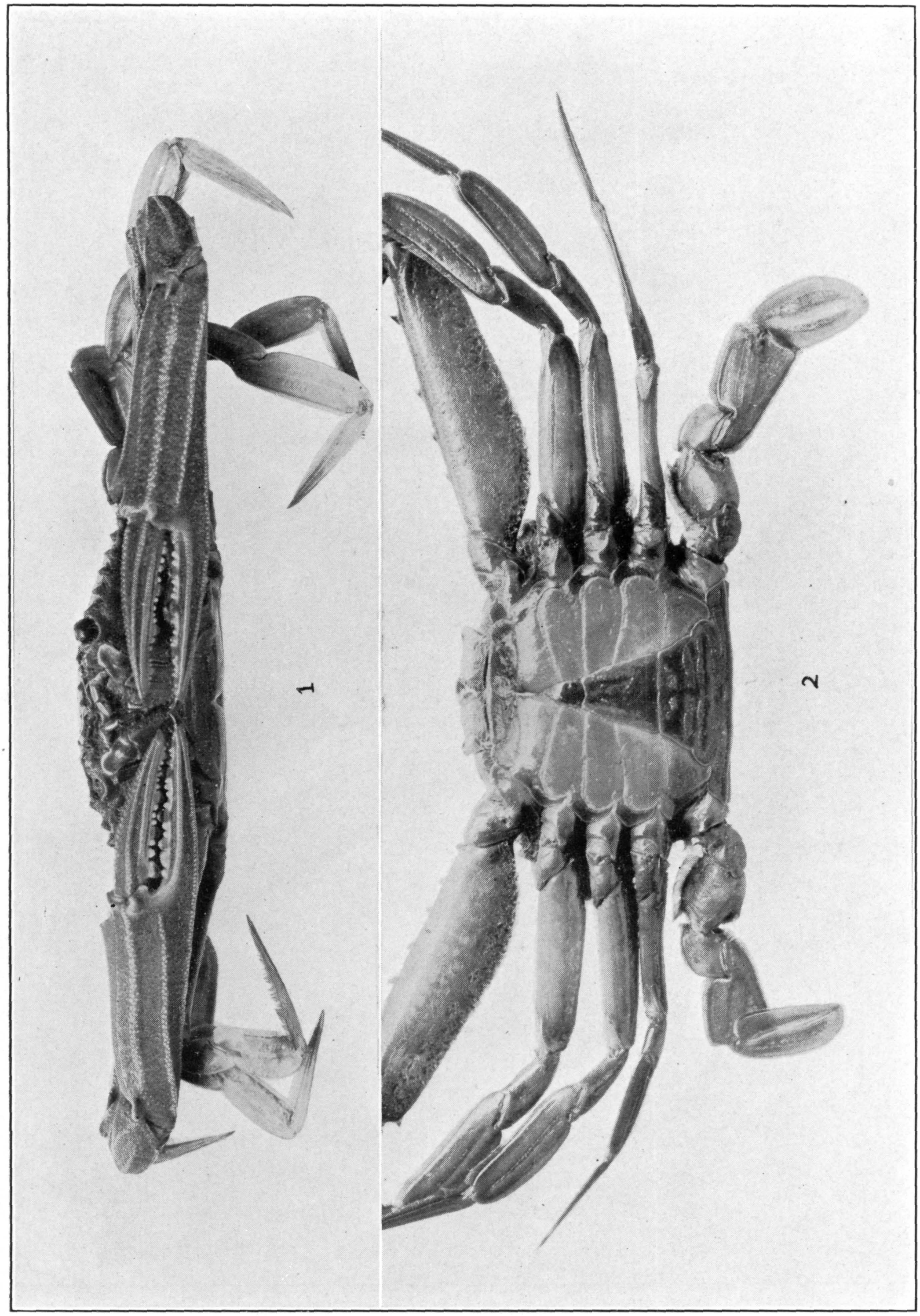

PORTUNUS (PORTUNUS) GIBBESII (P. 49)

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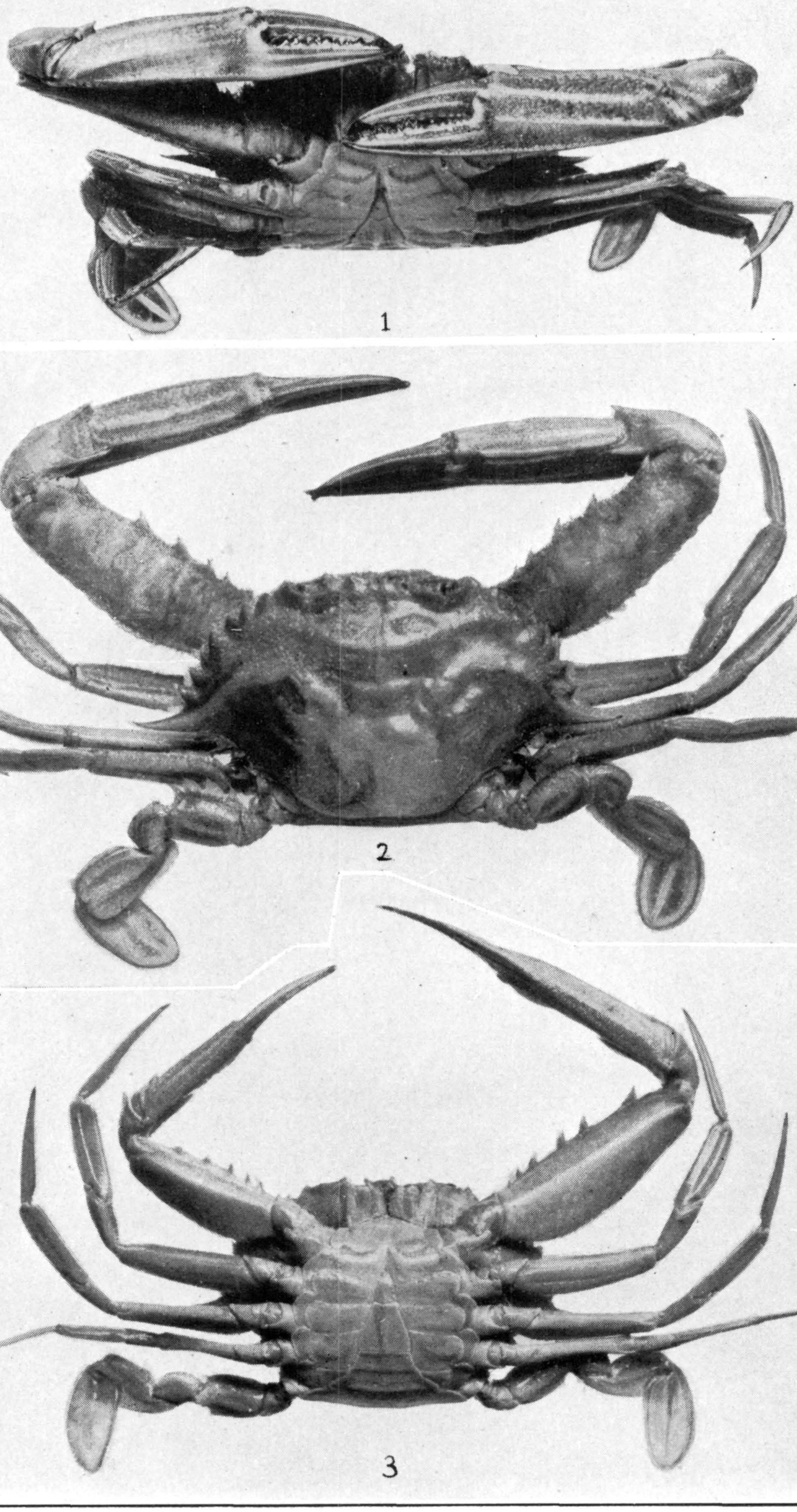

PORTUNUS (PORTUNUS) XANTUSII (P. 50)

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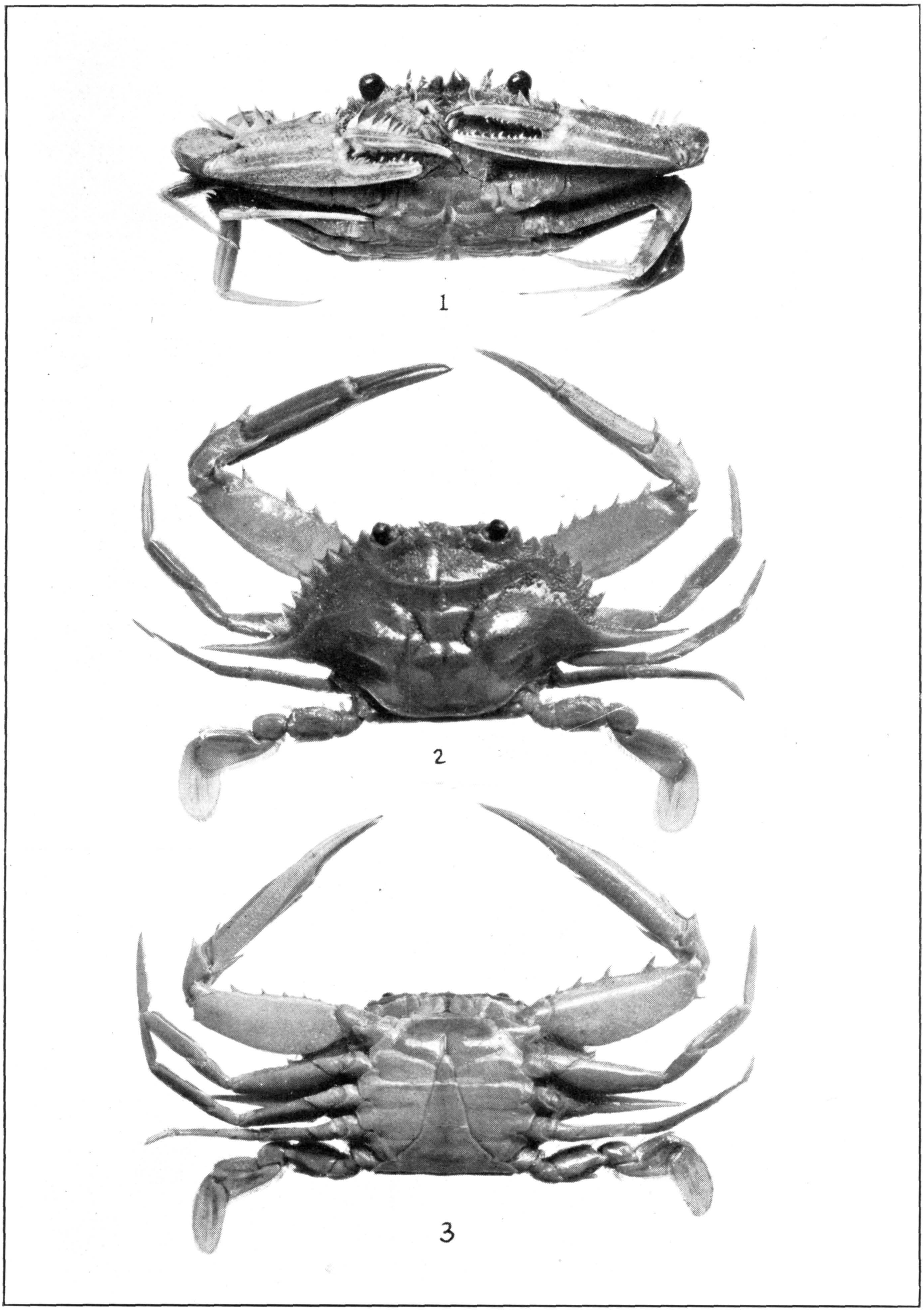

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PORTUNUS (PORTUNUS) ACUMINATUS (P. 56)

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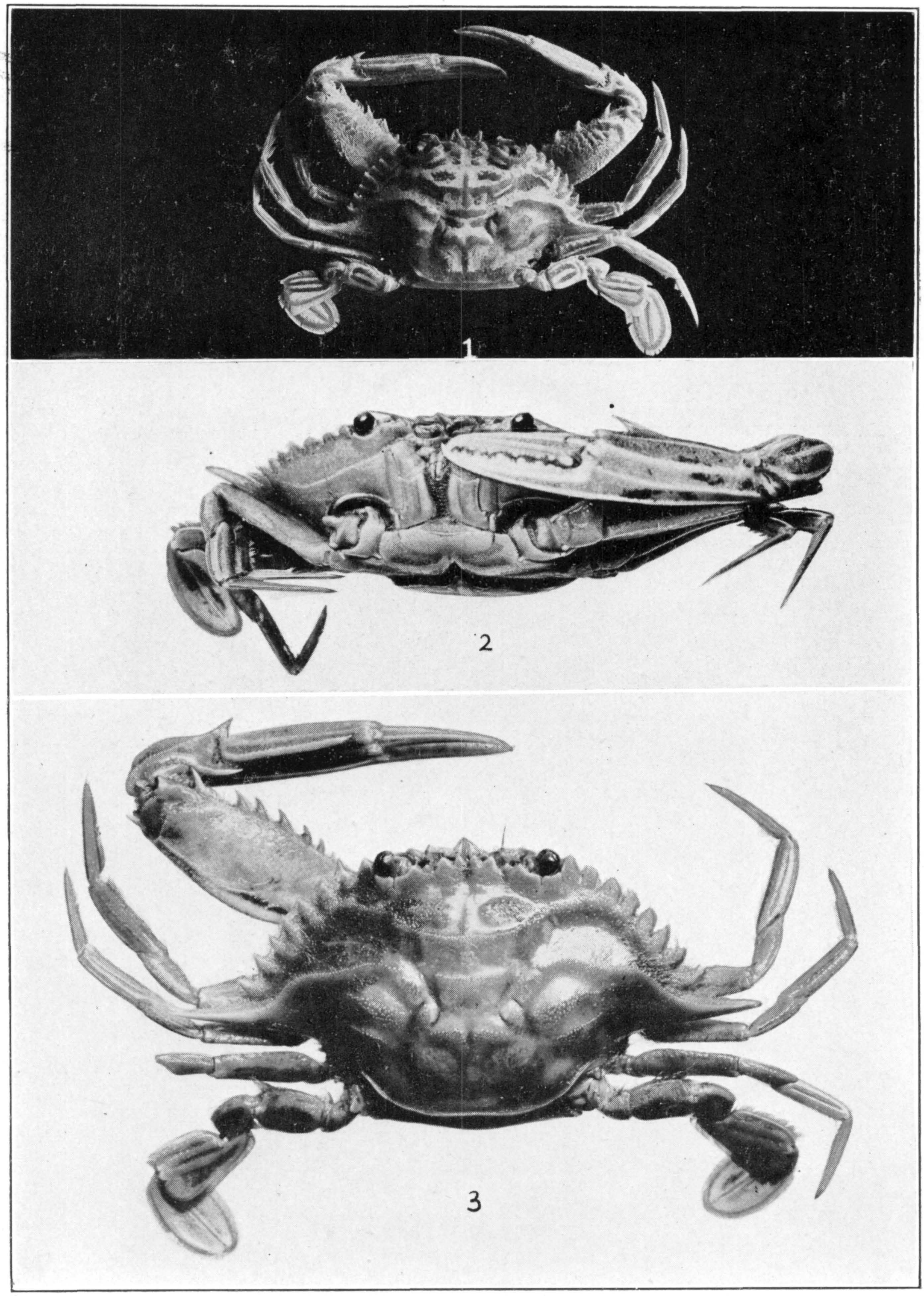
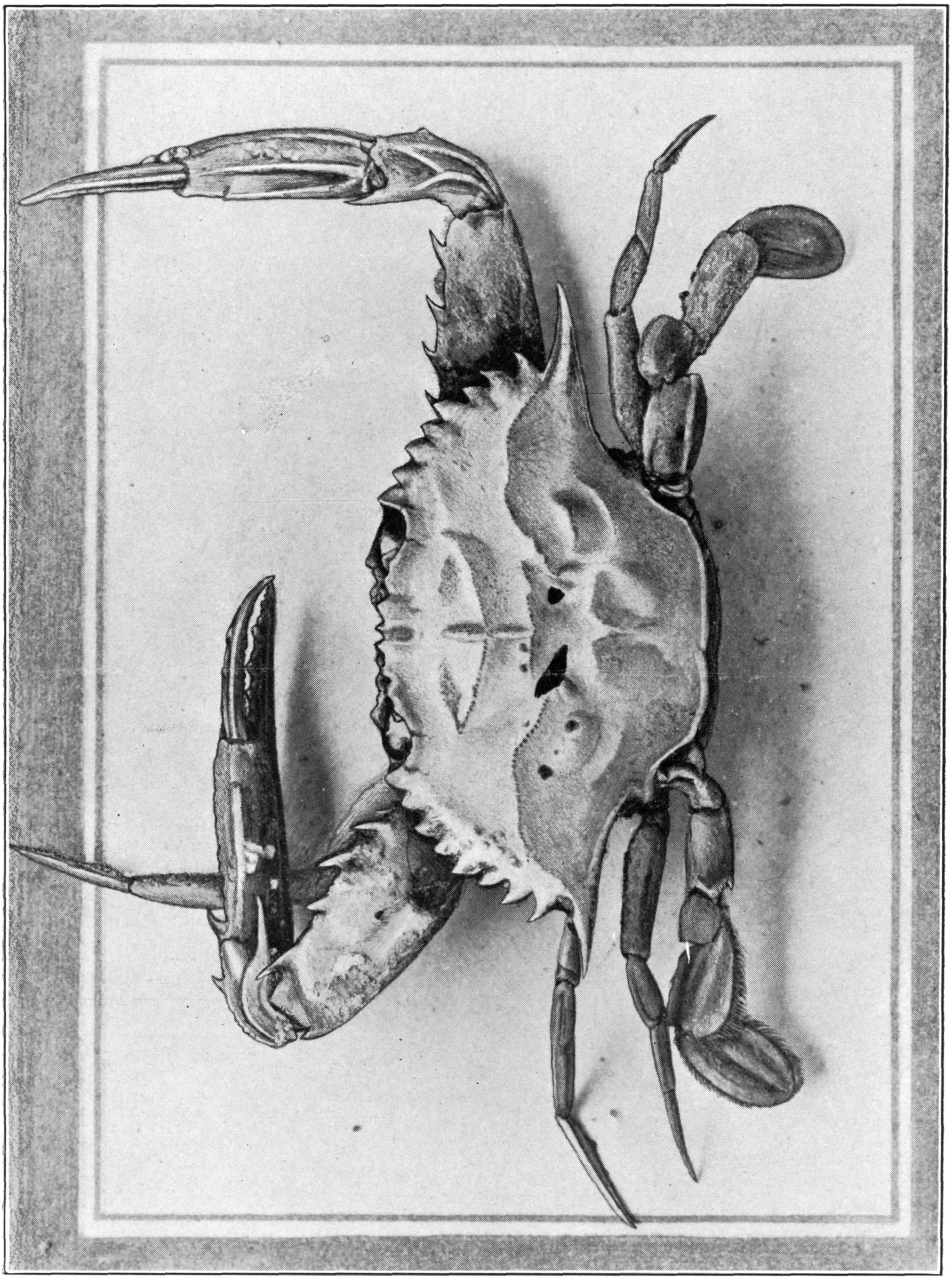


1. PORTUNUS (PORTUNUS) PANAMENSIS (P. 58). 2, 3. P. (P.) ASPER (P. 56)

FOR EXPLANATION OF PLATE SEE PAGE 566.



PORTUNUS (PORTUNUS) ASPER (P. 56)

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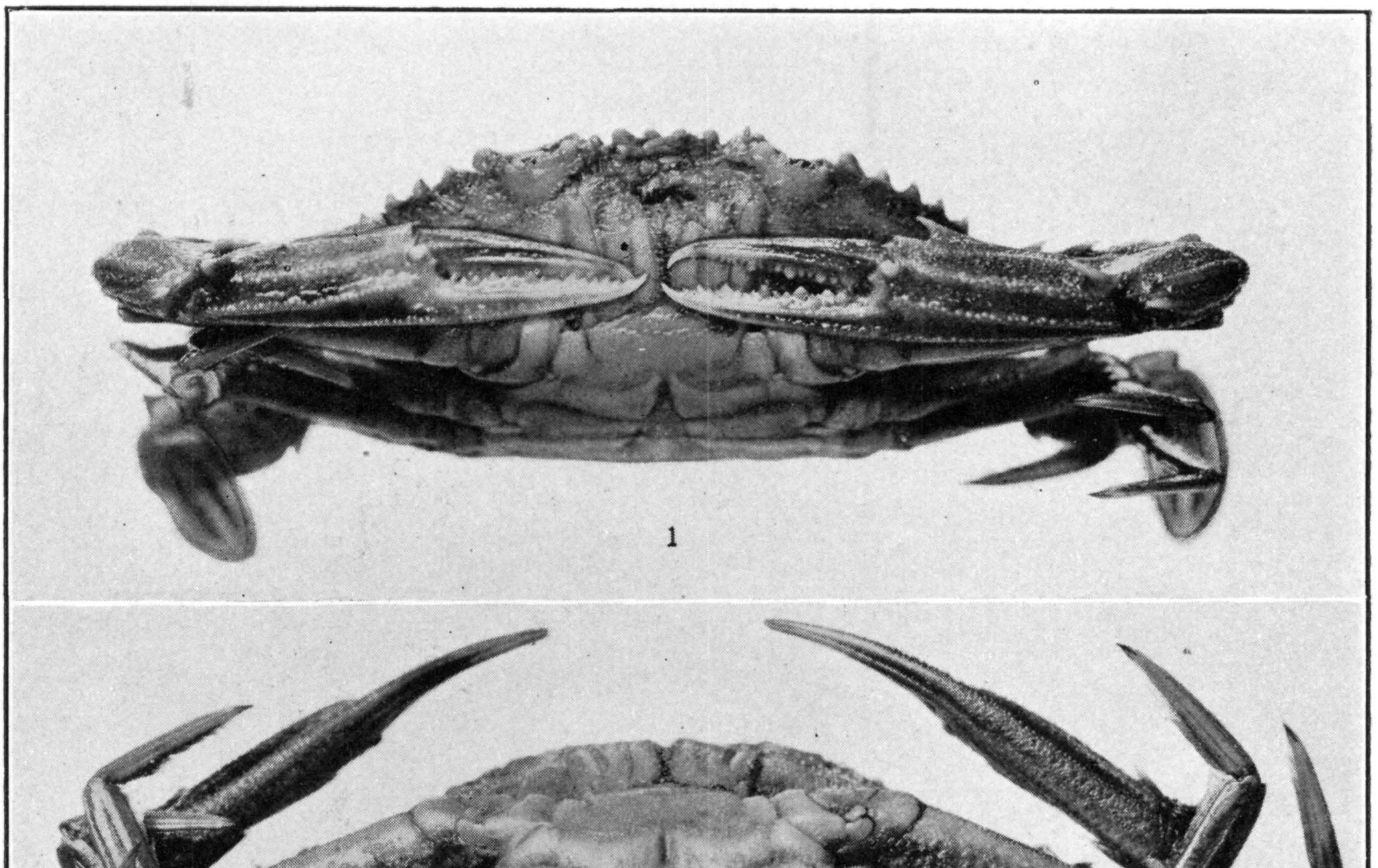

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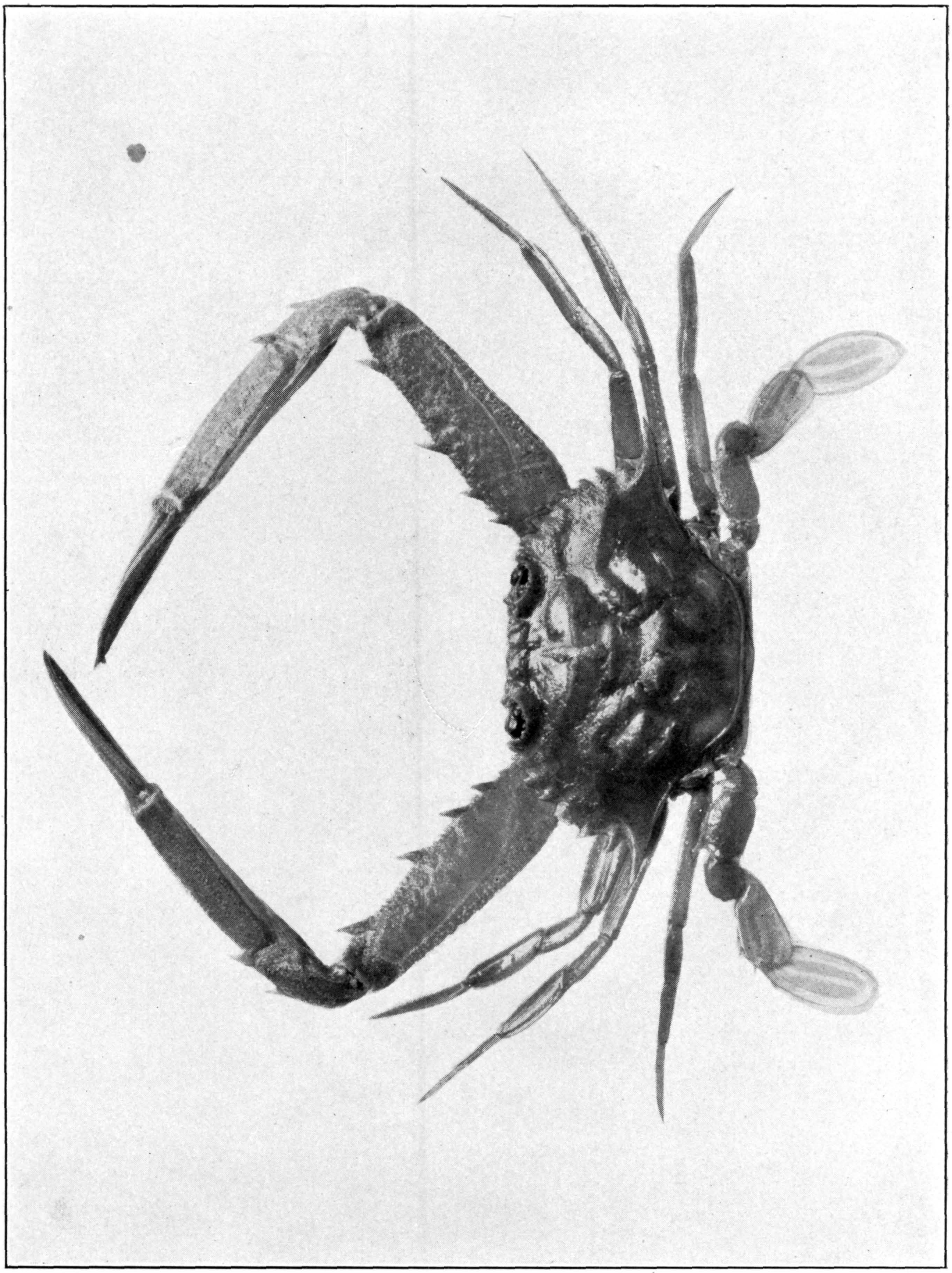

PORTUNUS (PORTUNUS) PANAMENSIS (P. 58)

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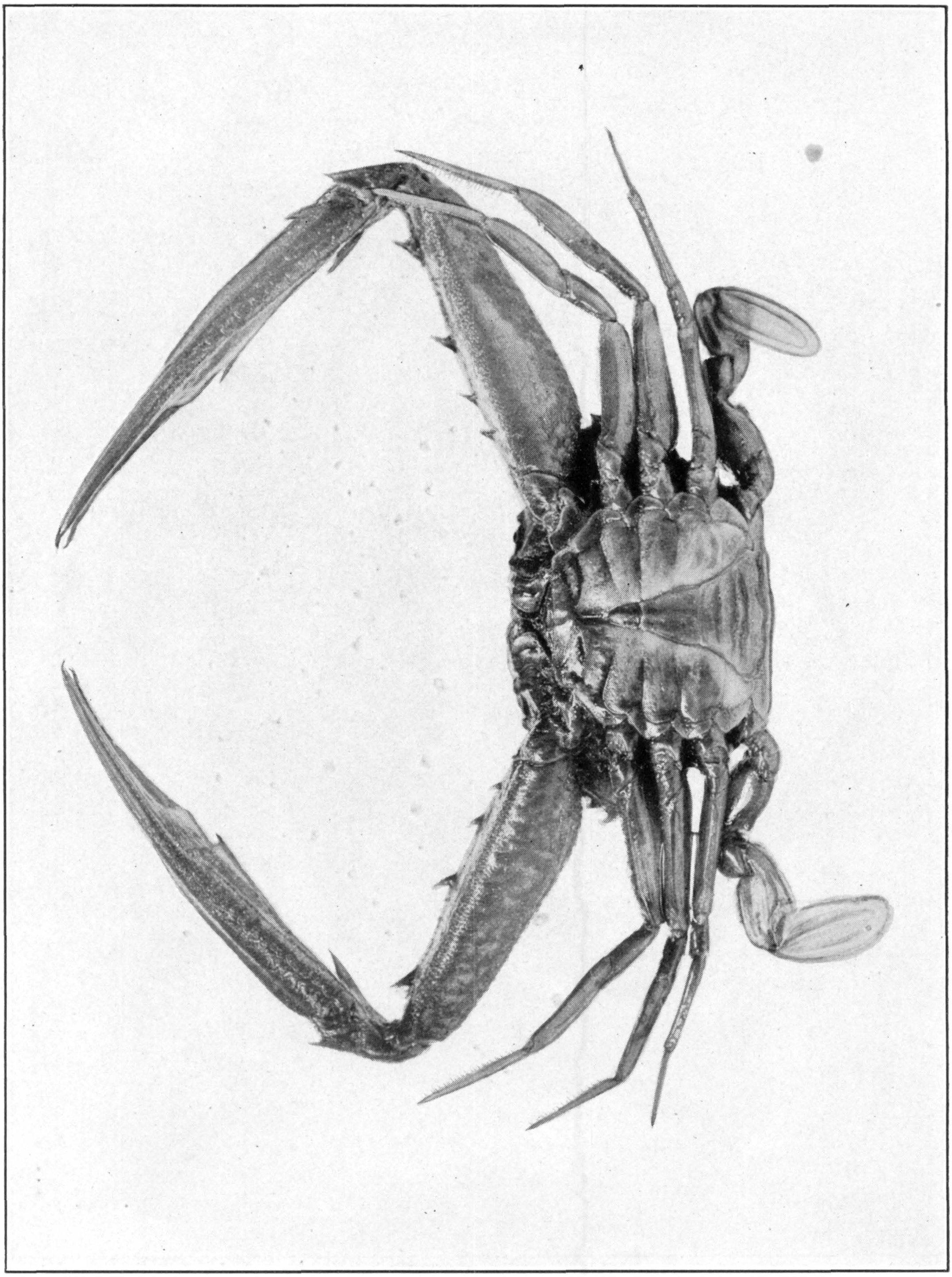

PORTUNUS (PORTUNUS) PANAMENSIS (P. 58)

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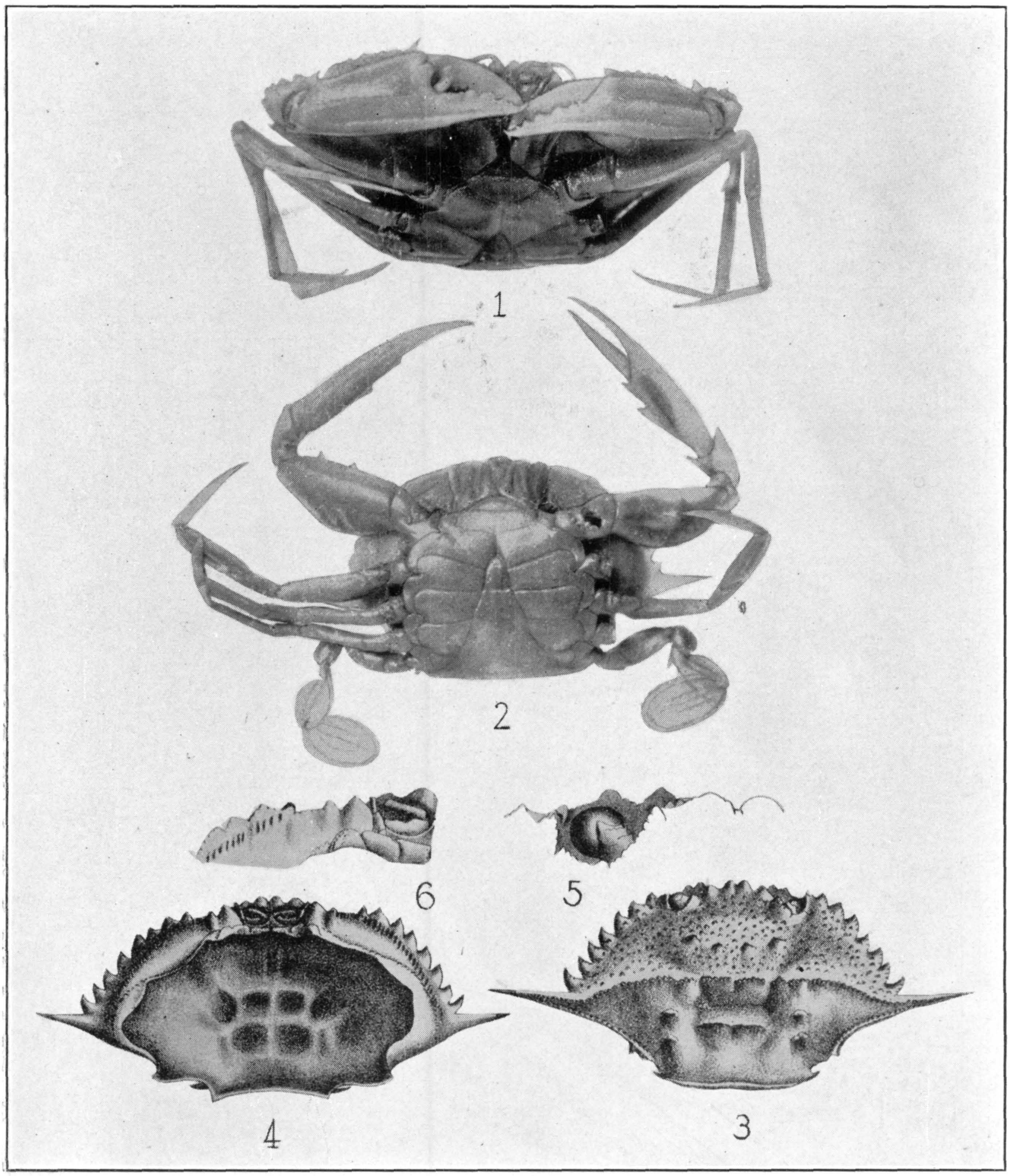

PORTUNUS (PORTUNUS) VOCANS (P. 60)

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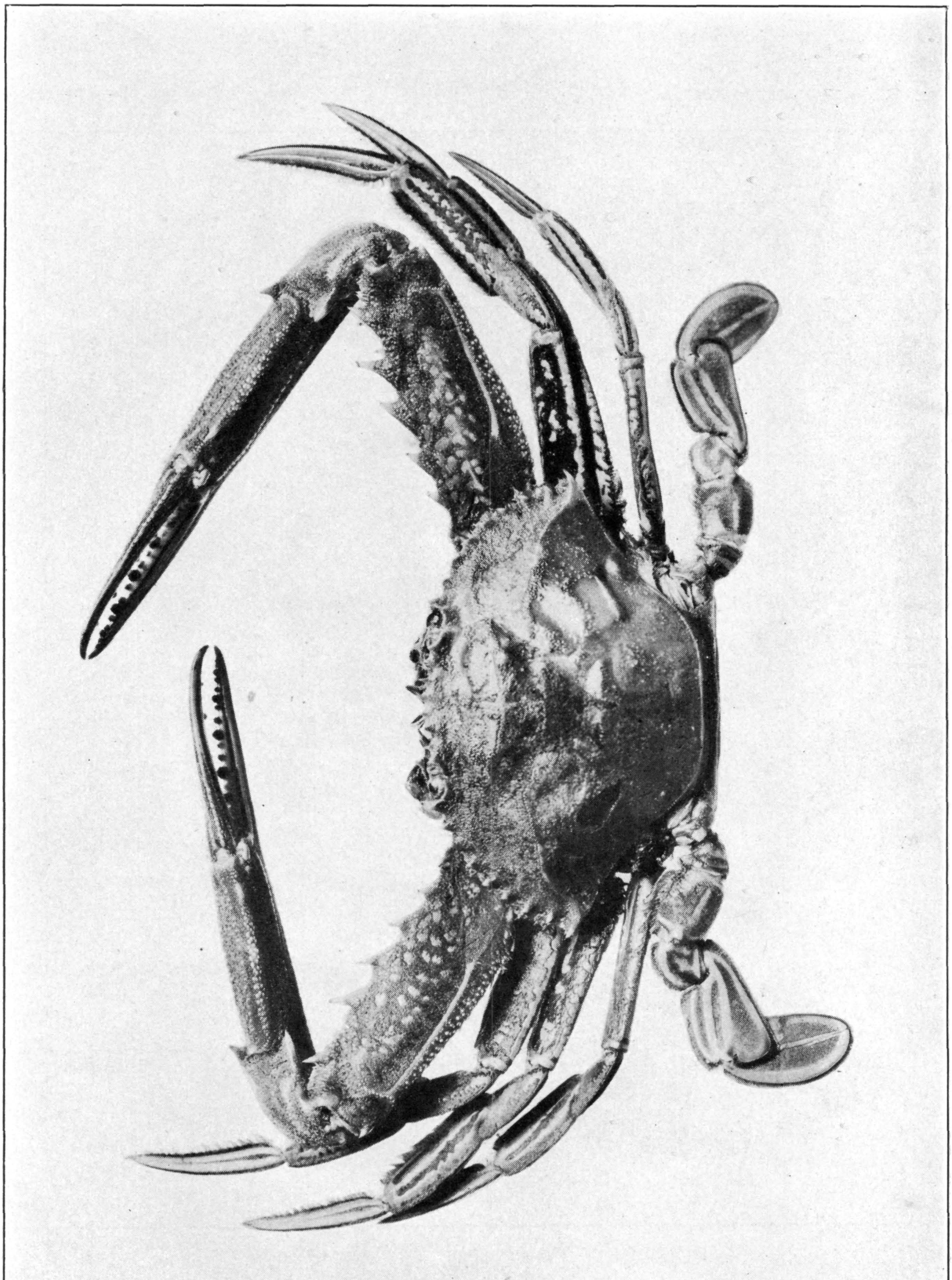
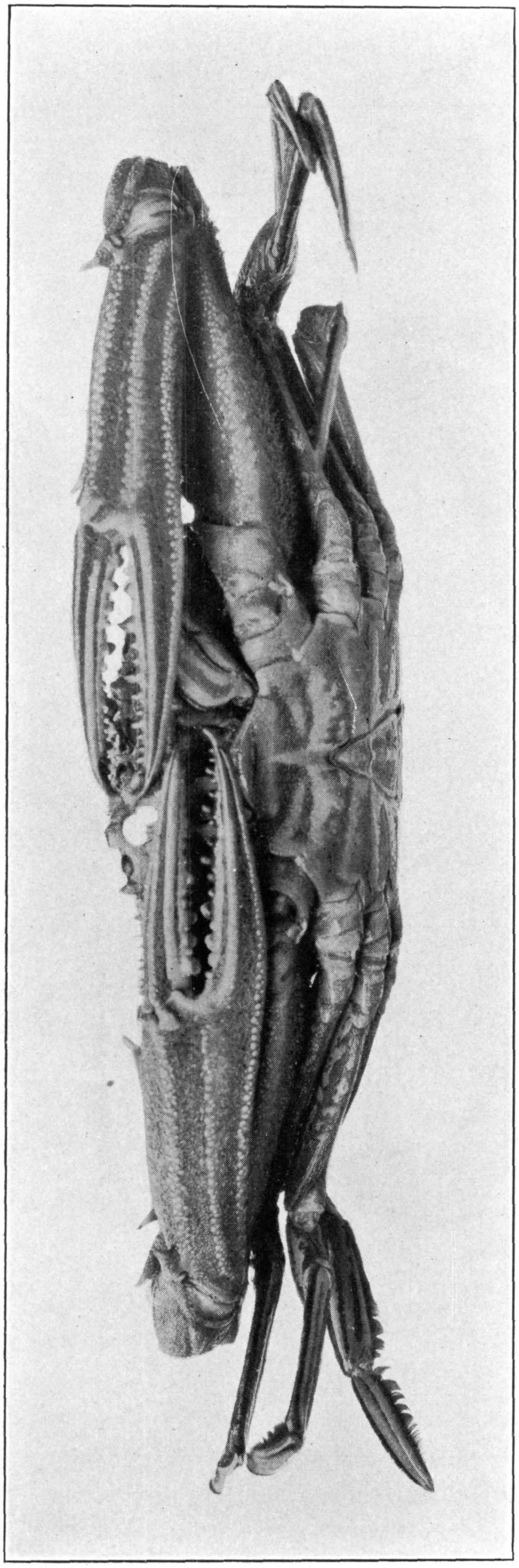


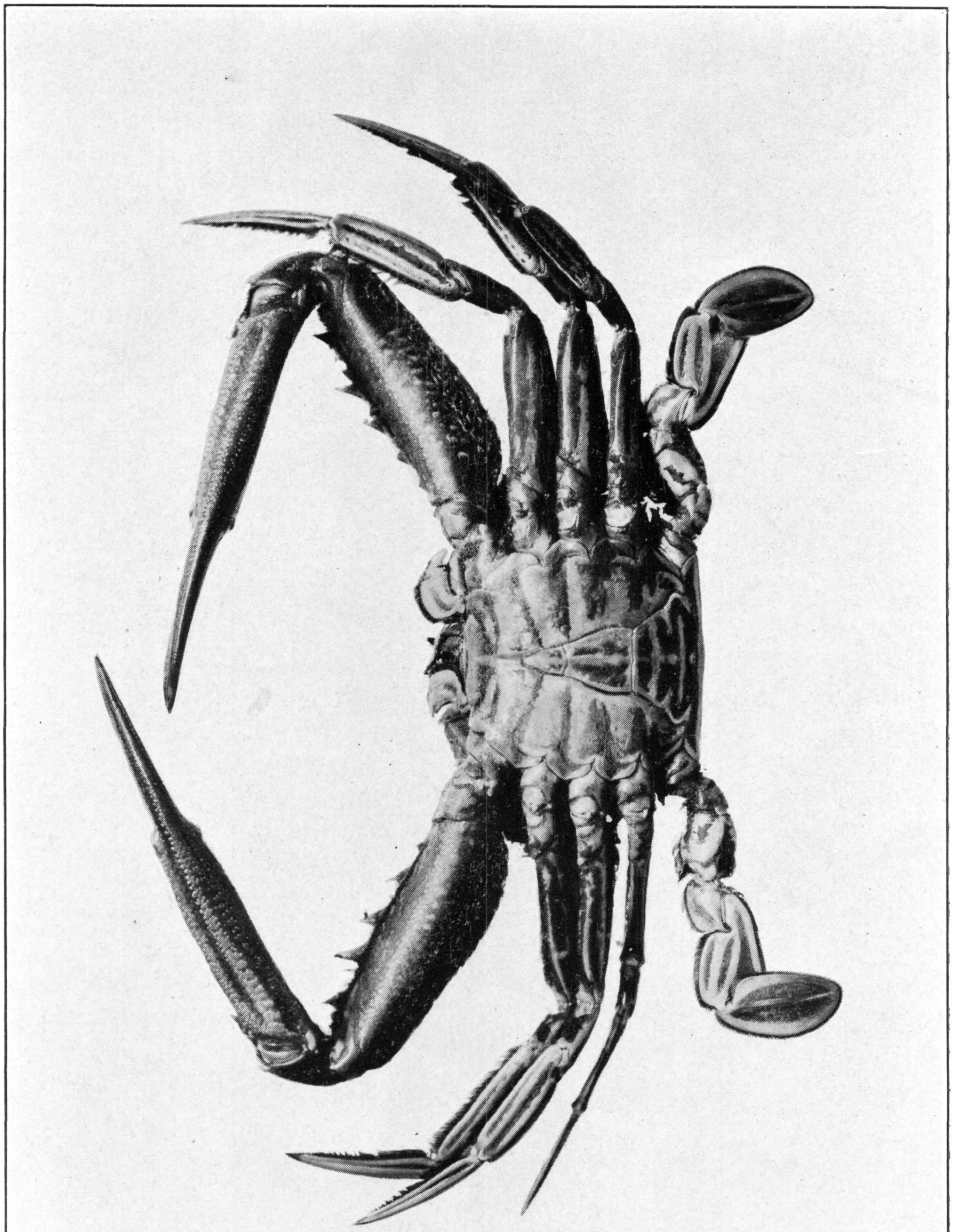
PORTUNUS (ACHELOUS) SPINIMANUS (P. 62)

FOR EXPLANATION OF PLATE SEE PAGE 566.



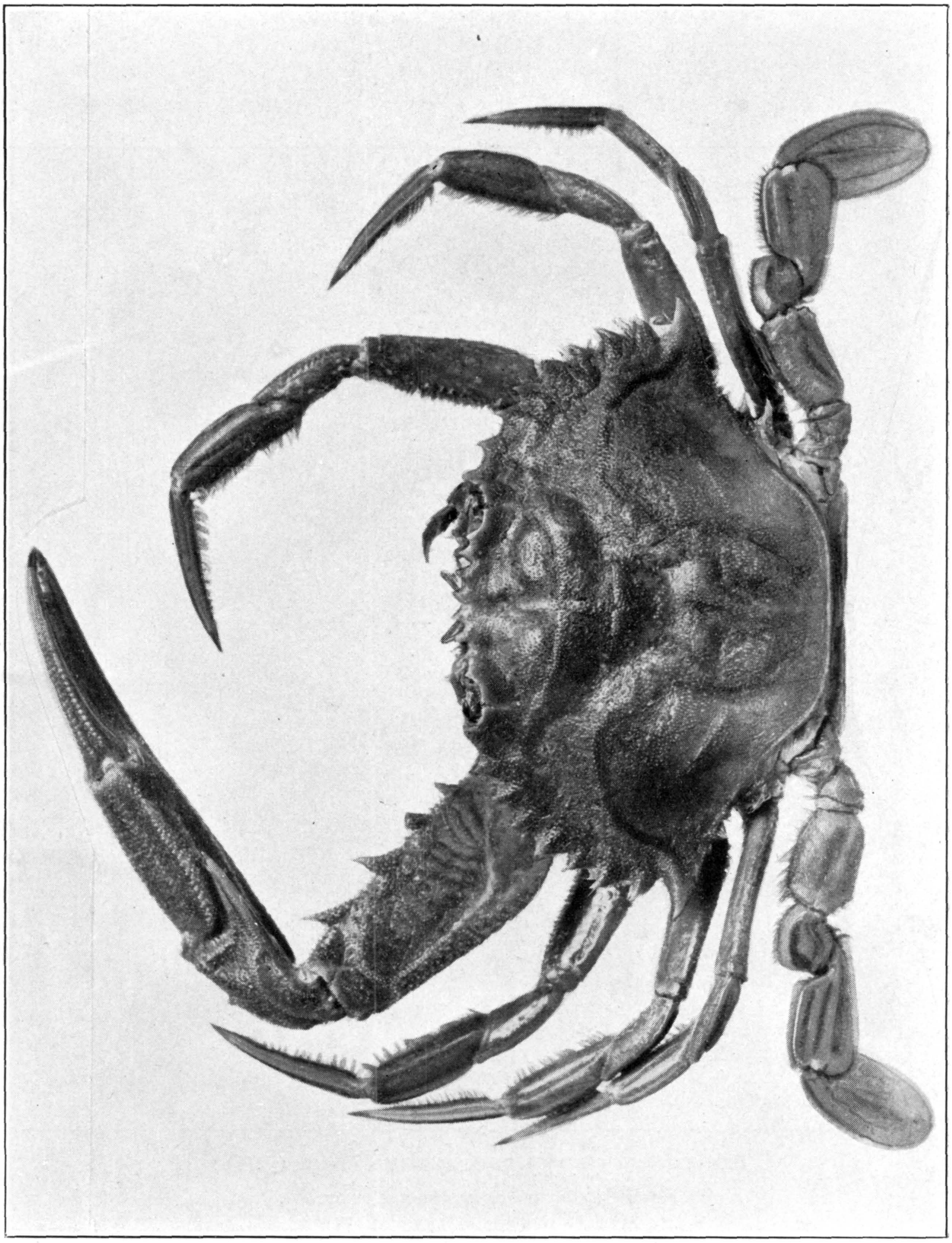
PORTUNUS (ACHELOUS) SPINIMANUS (P. 62)

FOR EXPLANATION OF PLATE SEE PAGE 566.



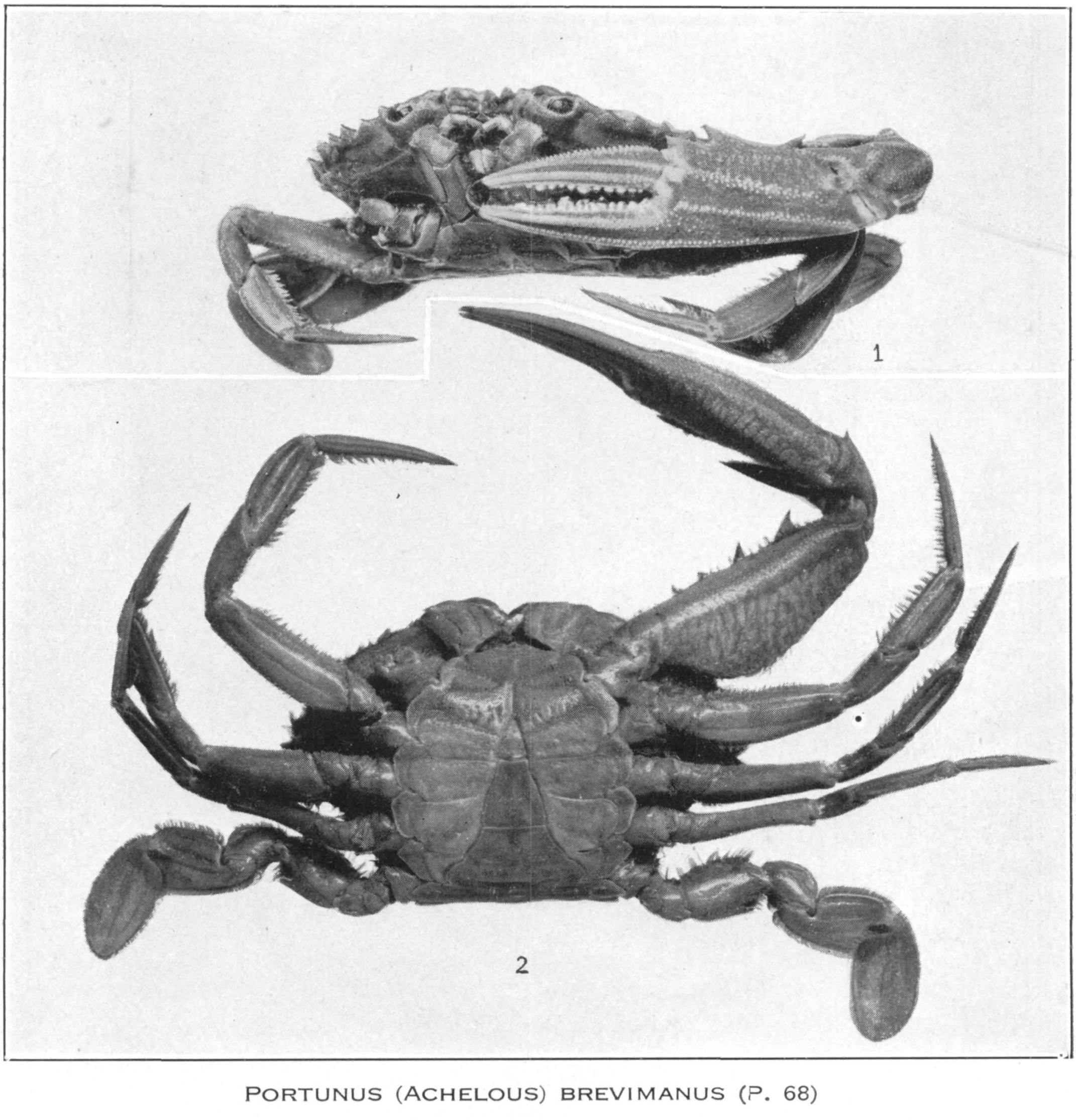
PORTUNUS (ACHELOUS) SPINIMANUS (P. 62)

FOR EXPLANATION OF PLATE SEE PAGE 567.



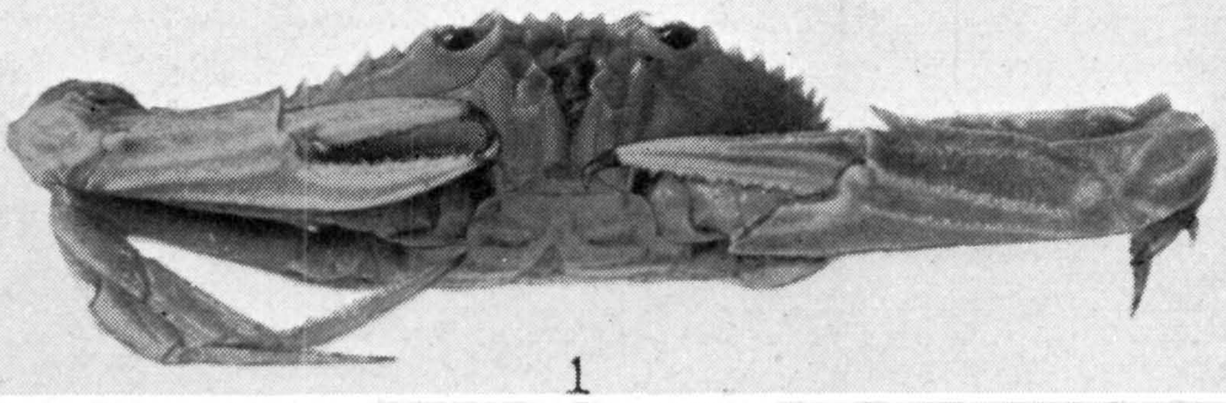
PORTUNUS (ACHELOUS) BREVIMANUS (P. 68)

FOR EXPLANATION OF PLATE SEE PAGE 567.



PORTUNUS (ACHELOUS) BREVIMANUS (P. 68)

FOR EXPLANATION OF PLATE SEE PAGE 567.



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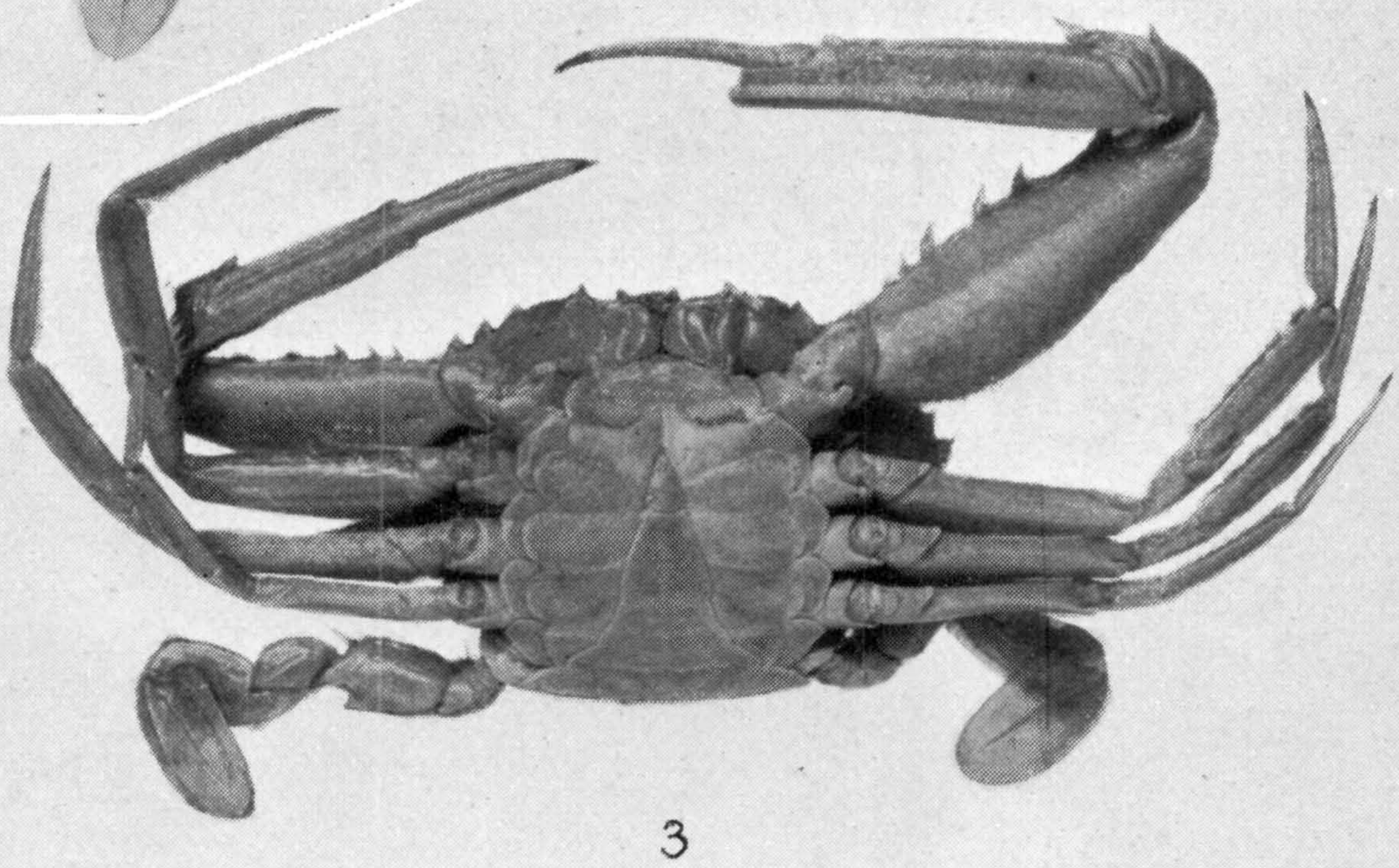

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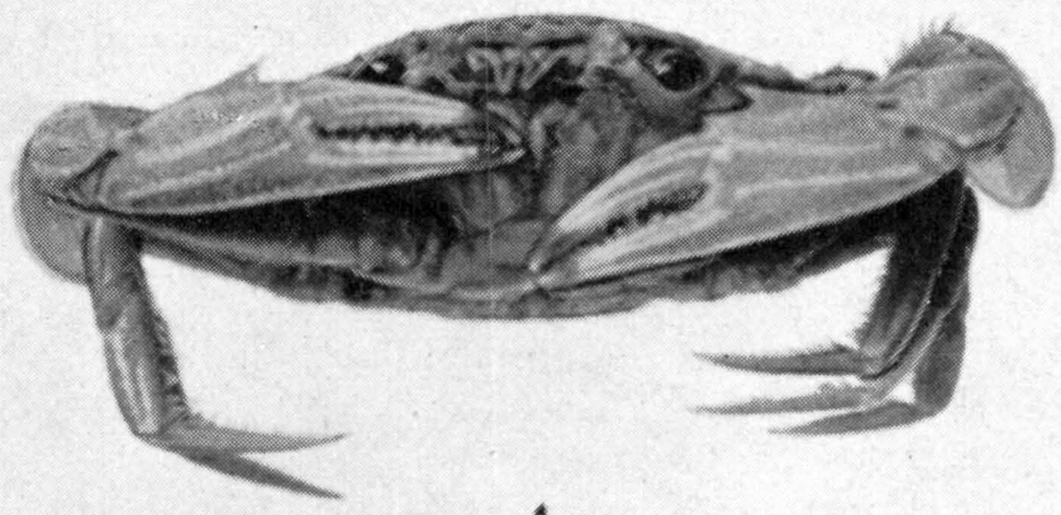
PORTUNUS (ACHELOUS) STANFORDI (P. 69)

FOR EXPLANATION OF PLATE SEE PAGE 567.

79856—30——41



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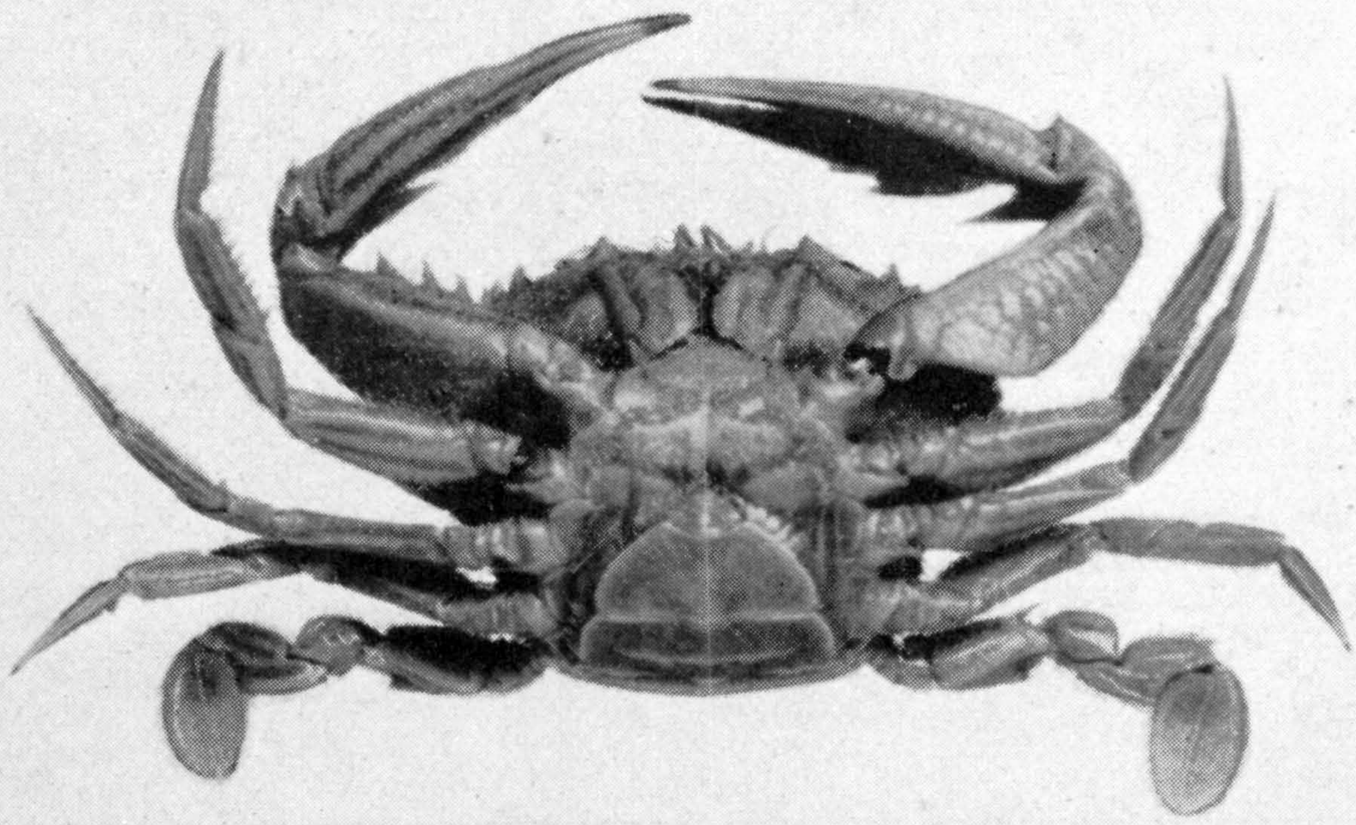

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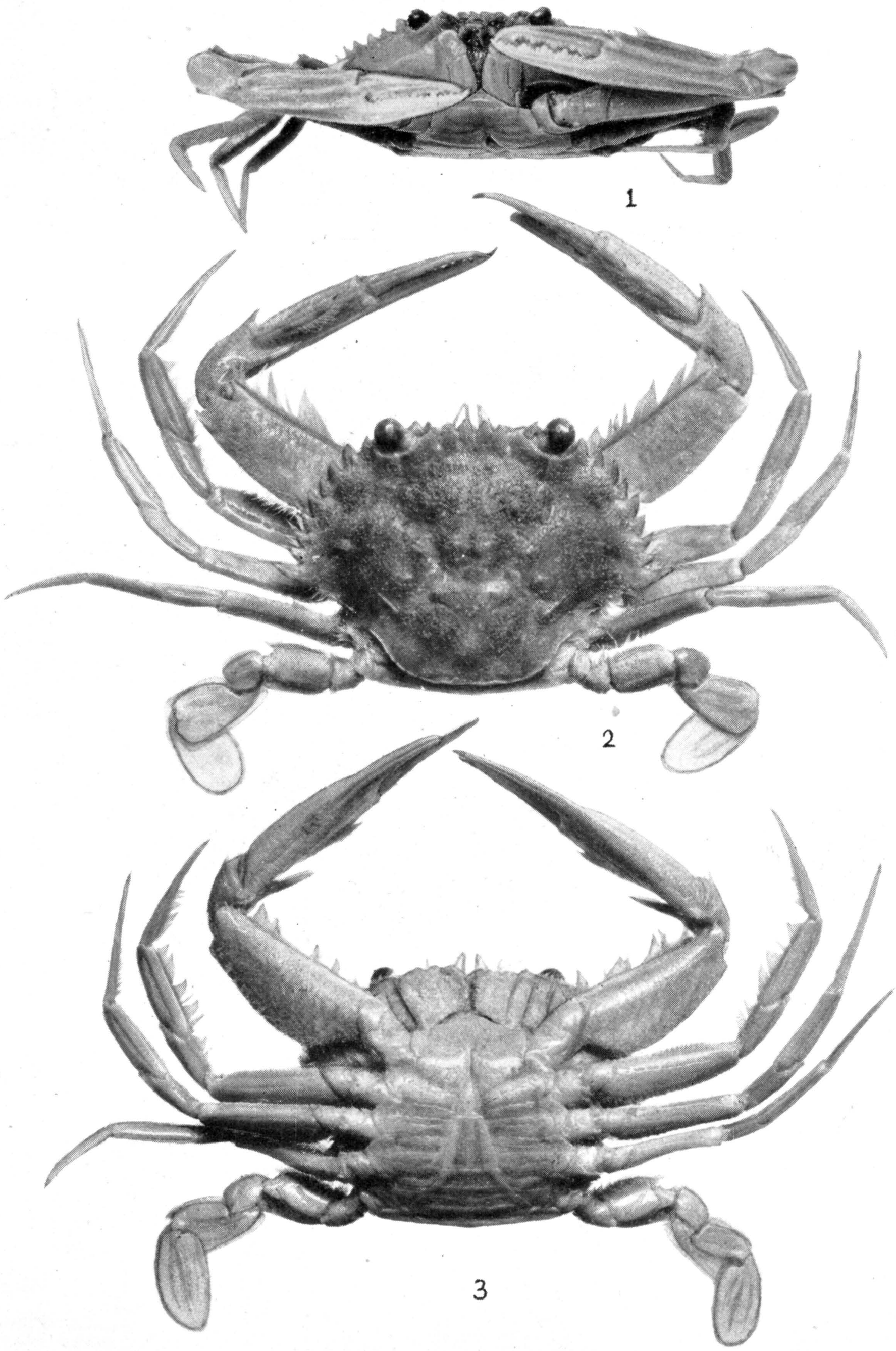
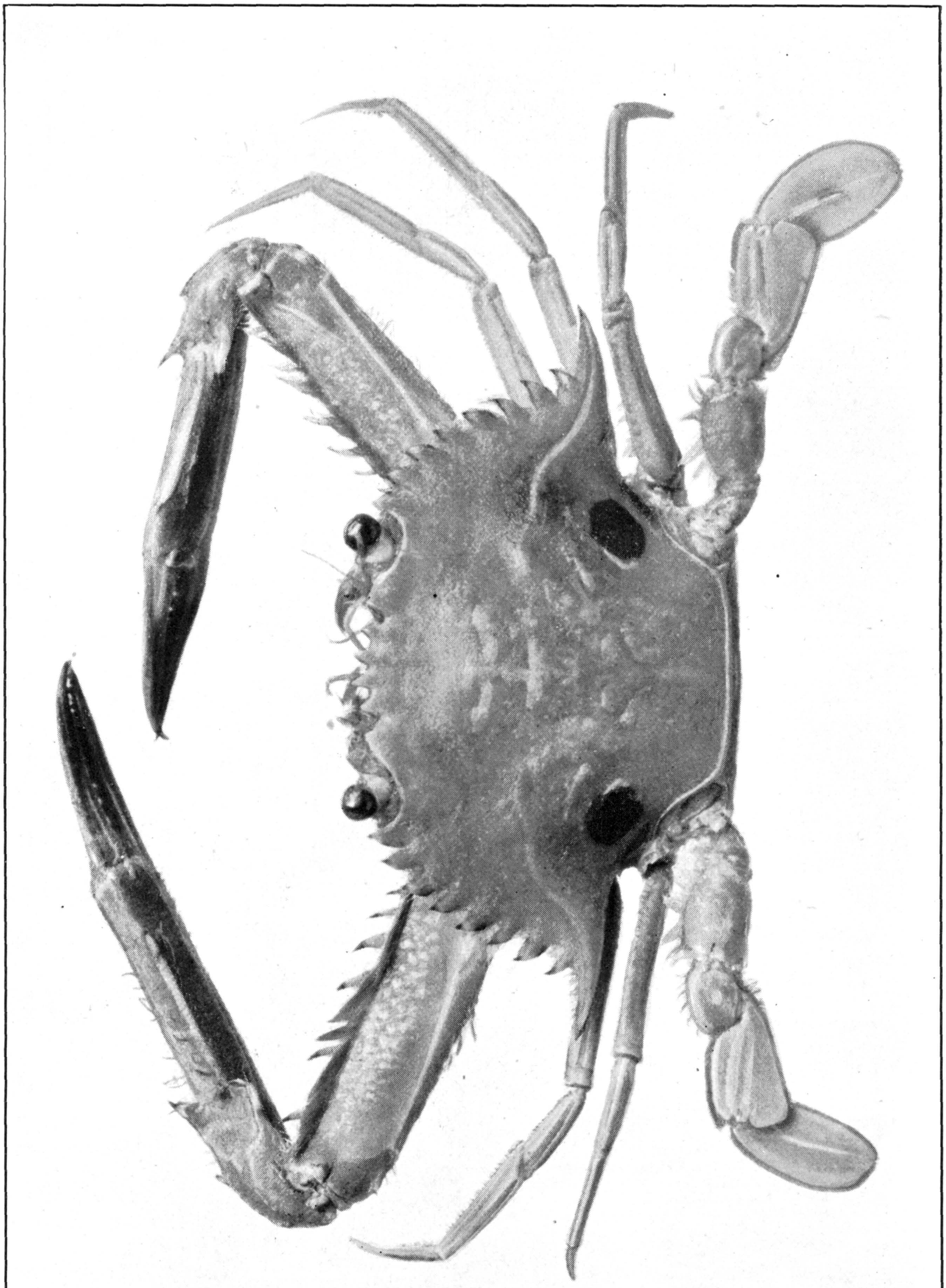
PORTUNUS (ACHELOUS) ANGUSTUS (P. 70)

FOR EXPLANATION OF PLATE SEE PAGE 567.



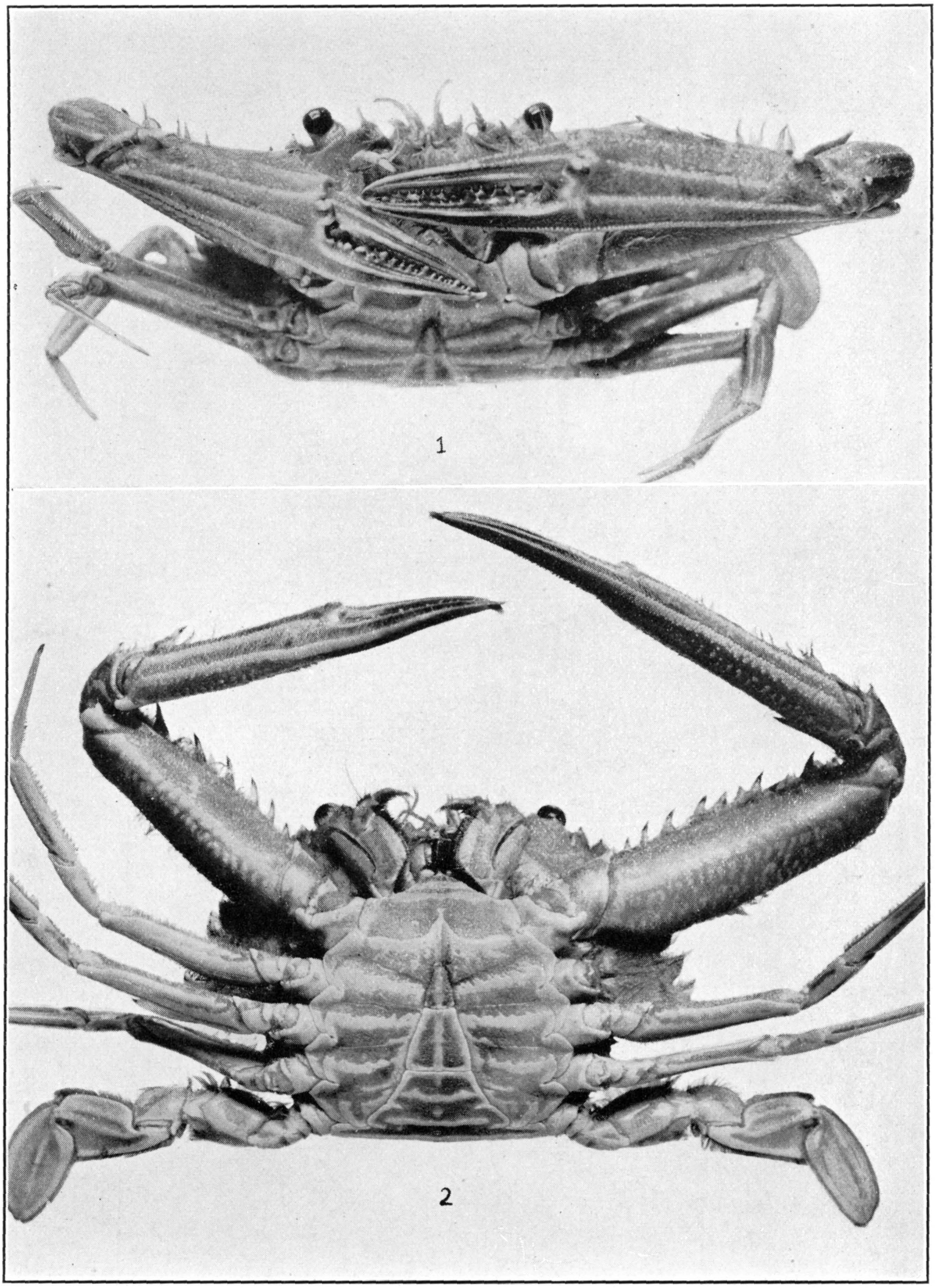
PORTUNUS (ACHELOUS) ORDWAYI (P. 71)

FOR EXPLANATION OF PLATE SEE PAGE 567.



PORTUNUS (ACHELOUS) SEBAE (P. 79)

FOR EXPLANATION OF PLATE SEE PAGE 567.



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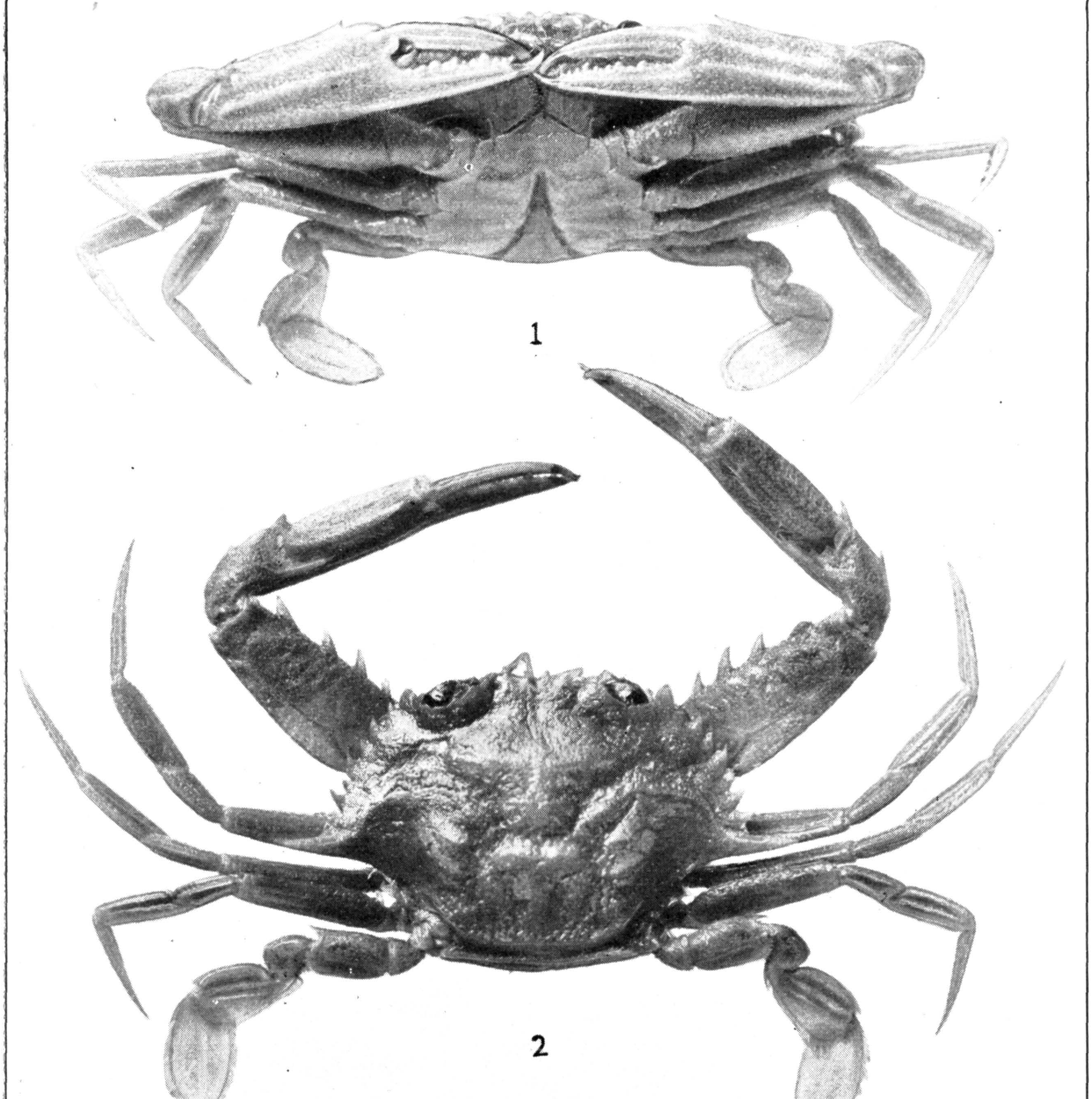
PORTUNUS (ACHELOUS) SEBAE (P. 79)

FOR EXPLANATION OF PLATE SEE PAGE 567.

PORTUNUS (ACHELOUS) MINIMUS (P. 76)

FOR EXPLANATION OF PLATE SEE PAGE 567.



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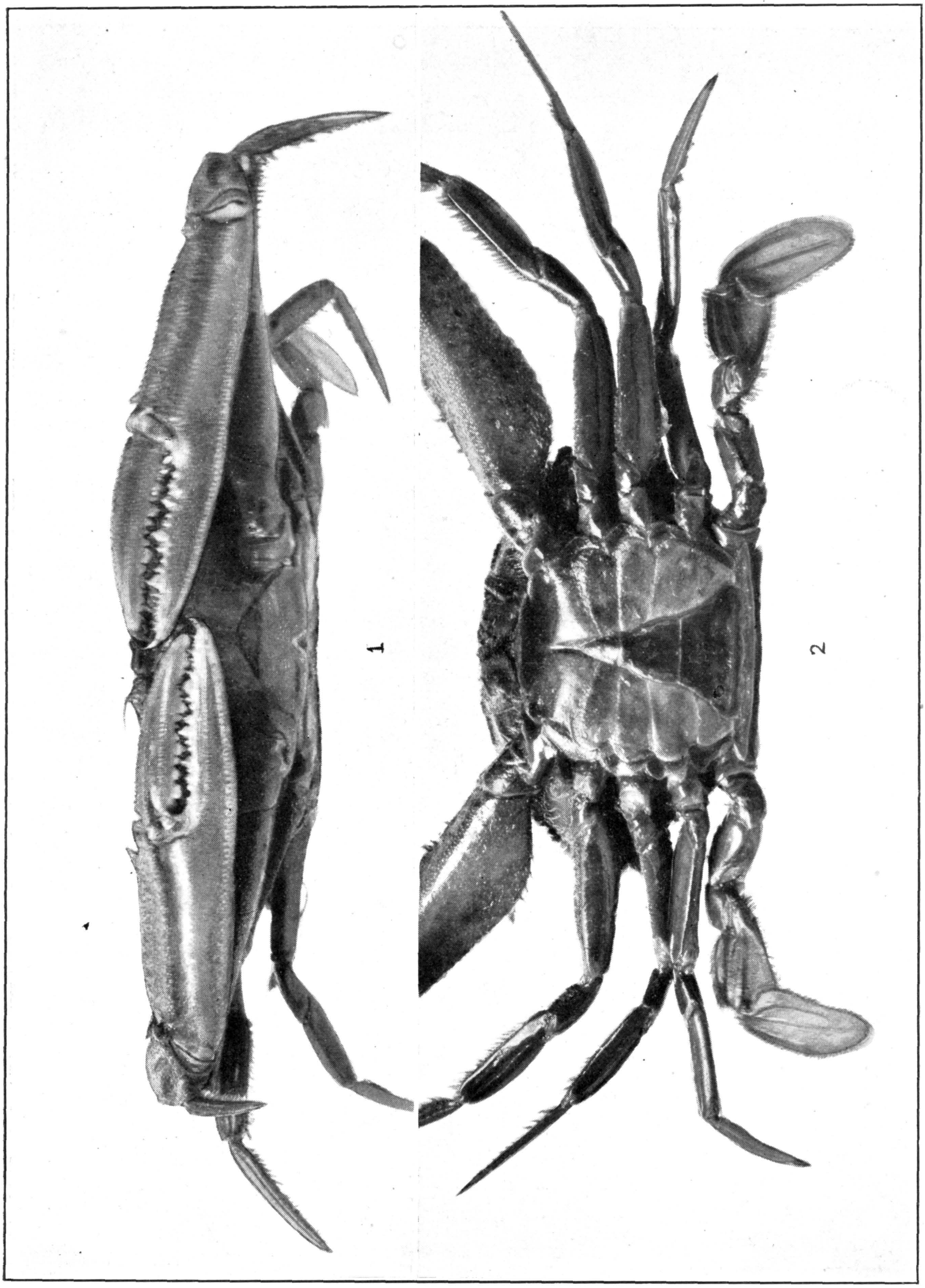
PORTUNUS (ACHELOUS) PICHILINQUEI (P. 78)

FOR EXPLANATION OF PLATE SEE PAGE 567.

PORTUNUS (ACHELOUS) AFFINIS (P. 80)

FOR EXPLANATION OF PLATE SEE PAGE 568.

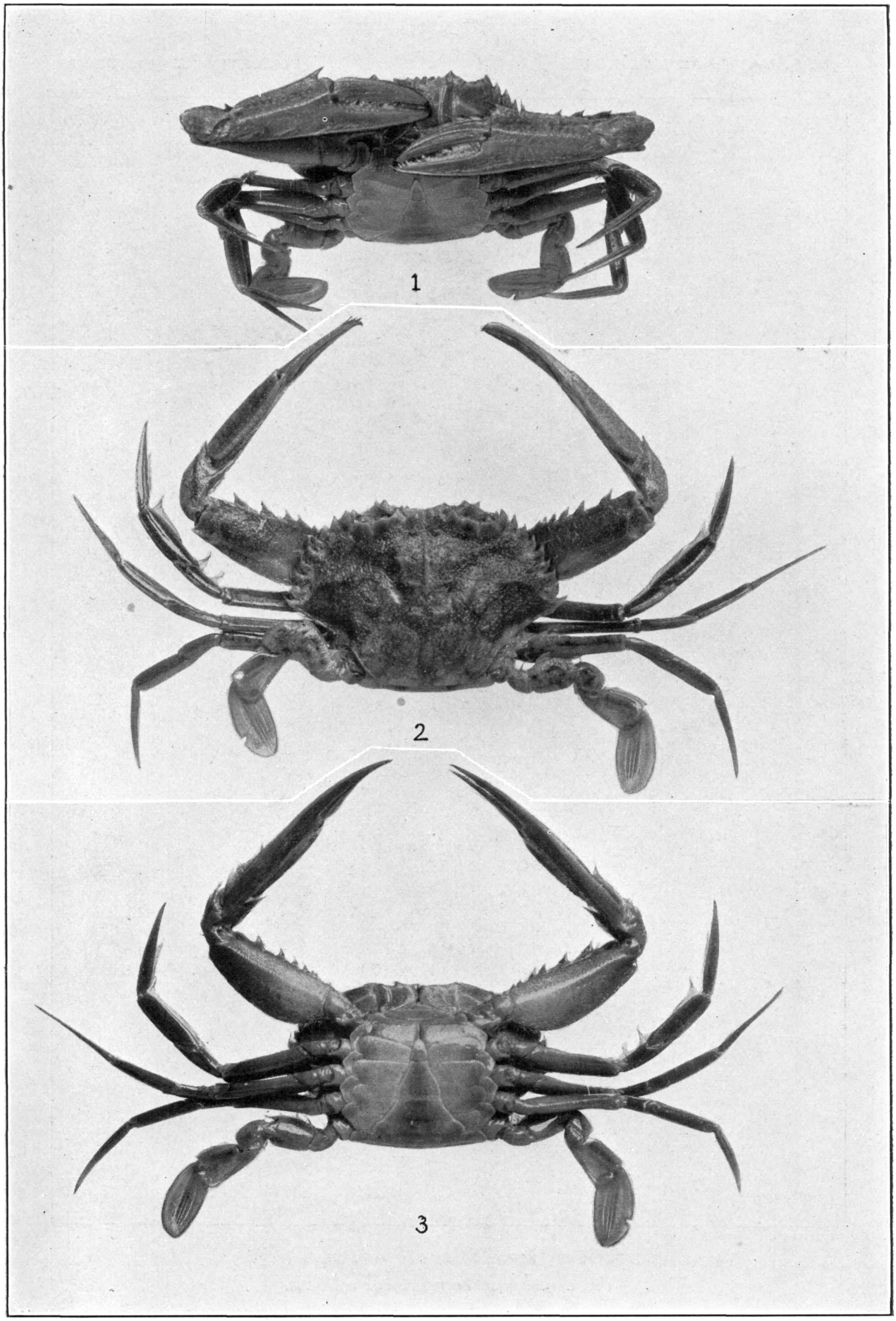


PORTUNUS (ACHELOUS) AFFINIS (P. 80)

FOR EXPLANATION OF PLATE SEE PAGE 568.

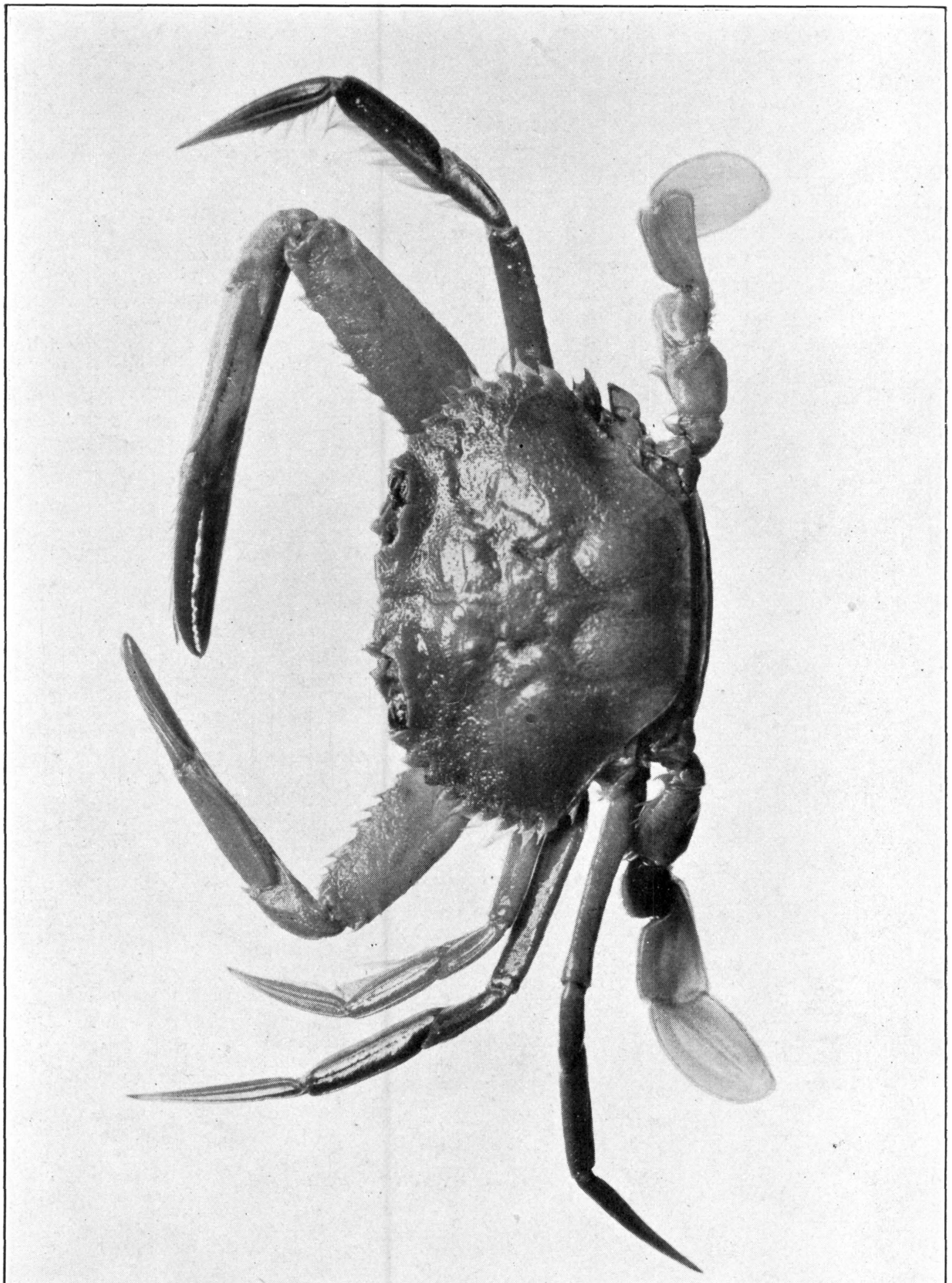
PORTUNUS (ACHELOUS) FLORIDANUS (P. 82)

FOR EXPLANATION OF PLATE SEE PAGE 568



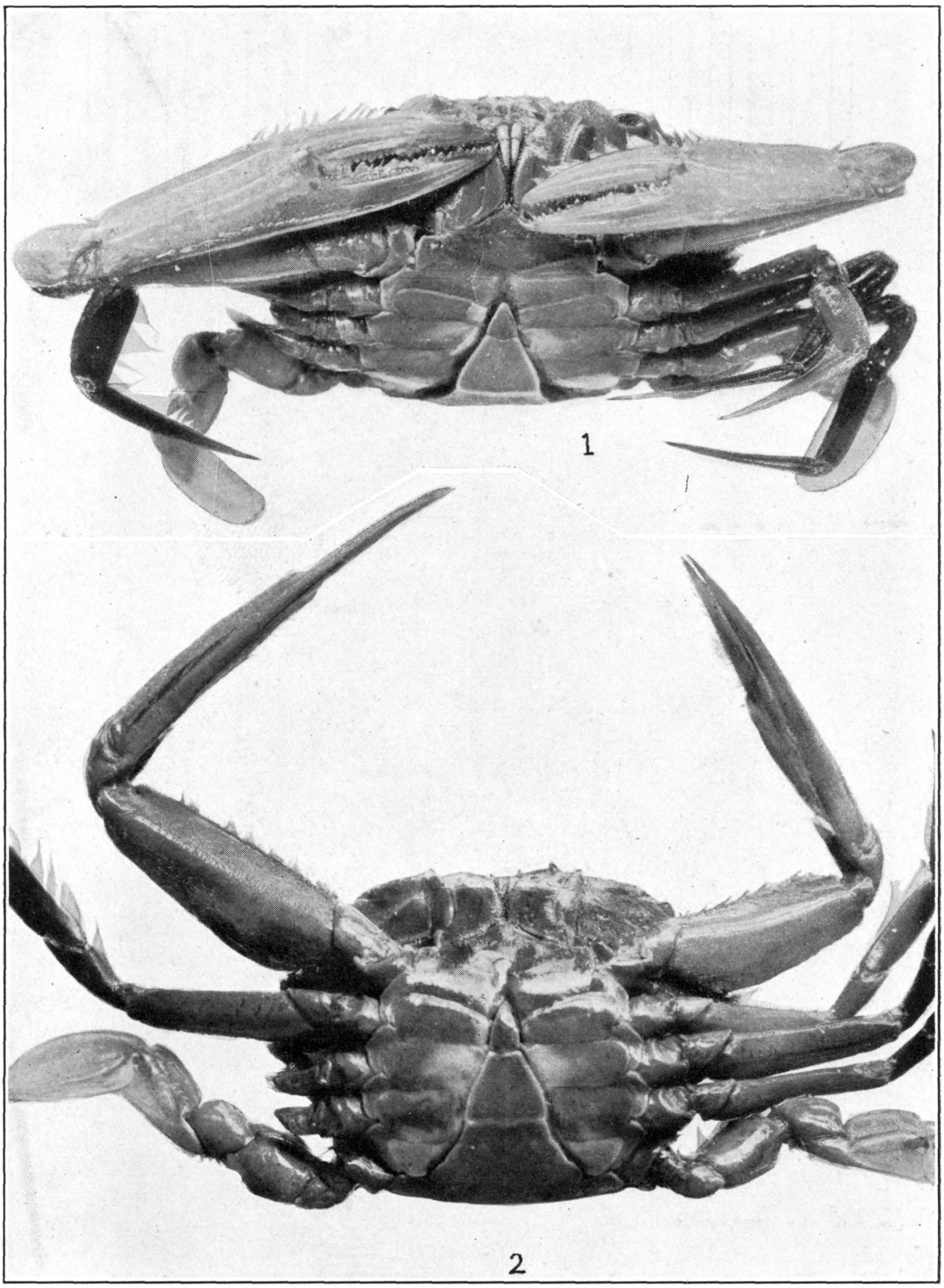
PORTUNUS (ACHELOUS) DEPRESSIFRONS (P. 84)

FOR EXPLANATION OF PLATE SEE PAGE 568.



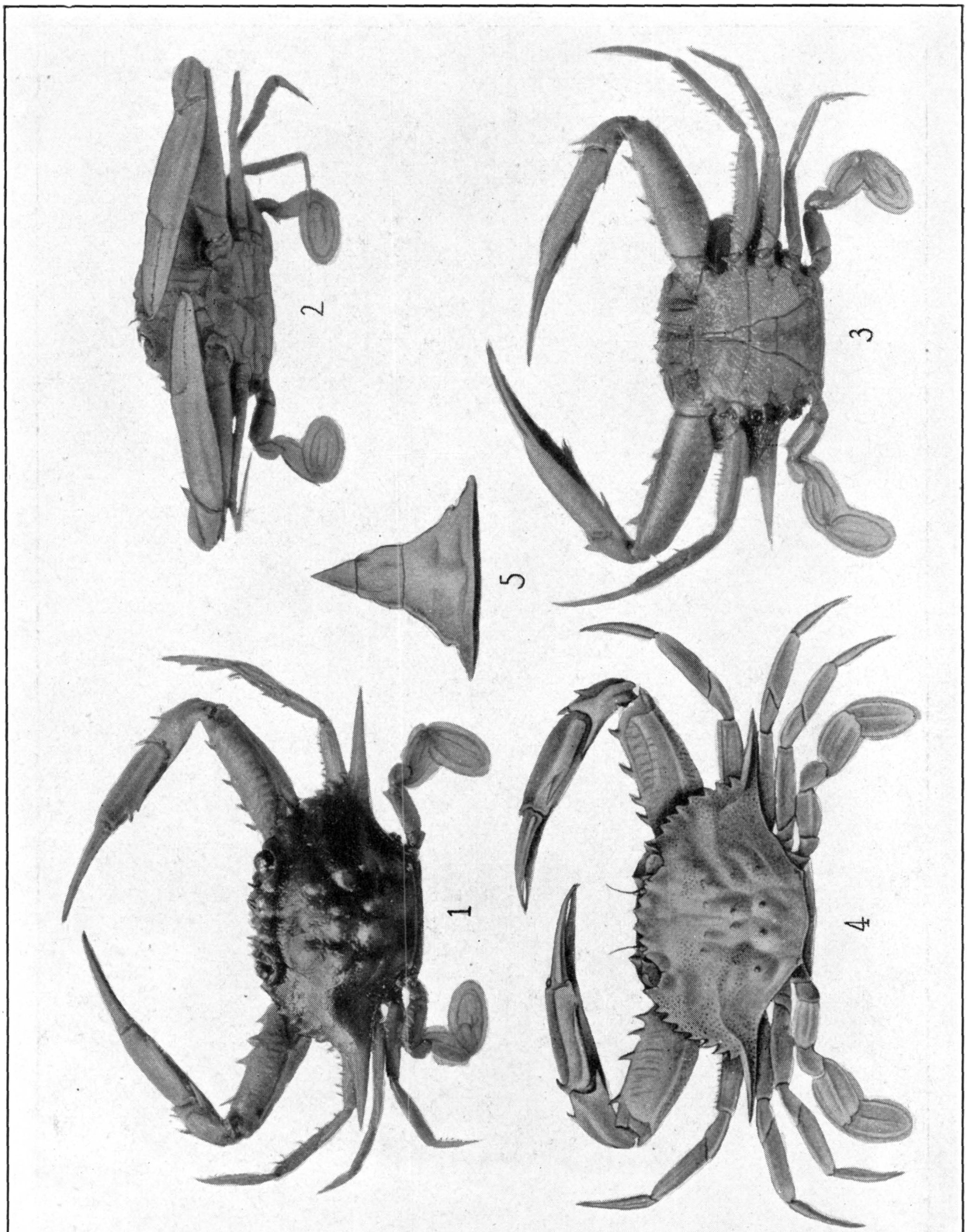
PORTUNUS (ACHELOUS) BAHAMENSIS (P. 90)

FOR EXPLANATION OF PLATE SEE PAGE 568.



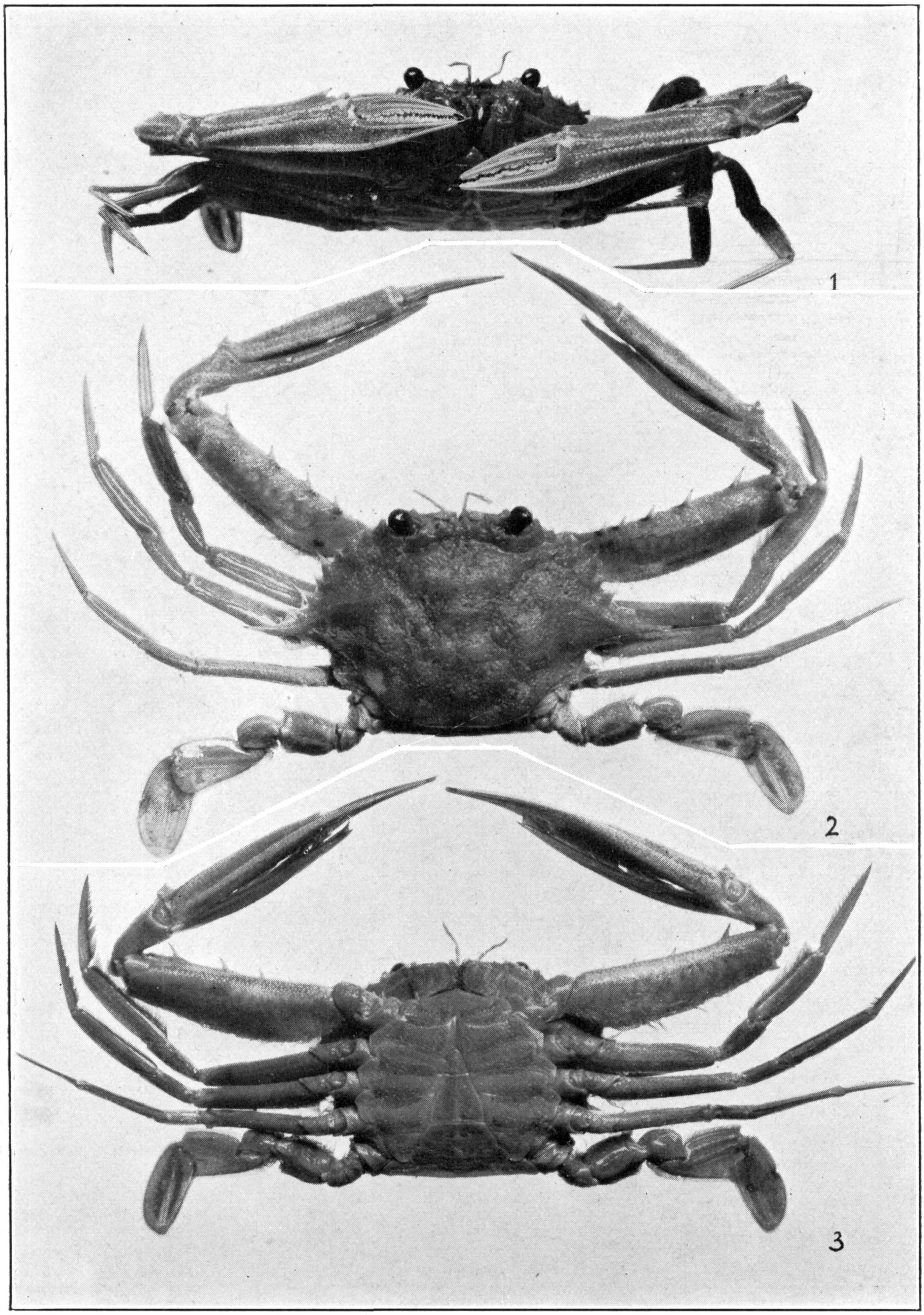
PORTUNUS (ACHELOUS) BAHAMENSIS (P. 90)

FOR EXPLANATION OF PLATE SEE PAGE 568.



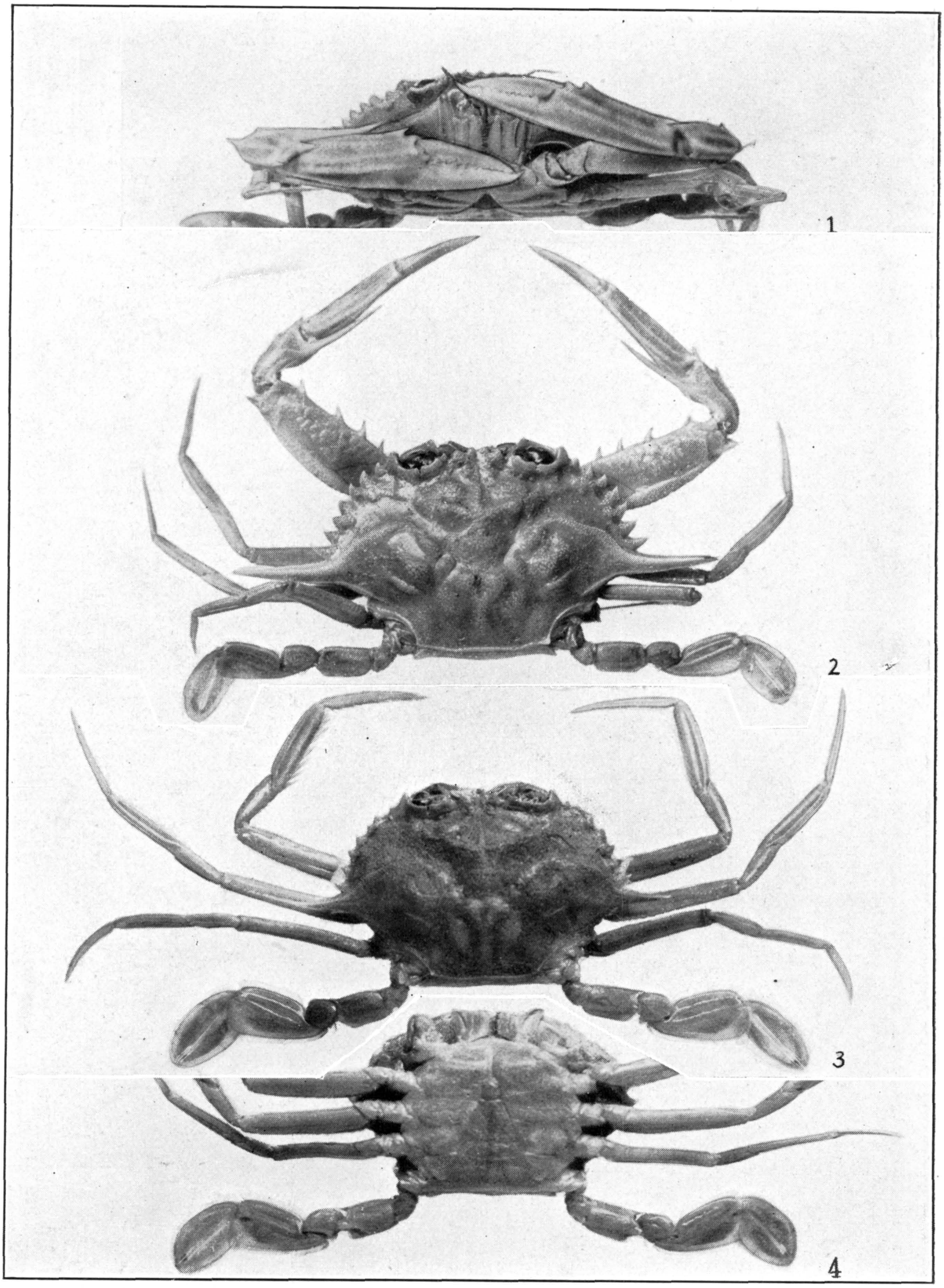
PORTUNUS (ACHELOUS) TUBERCULATUS (P. 90)

FOR EXPLANATION OF PLATE SEE PAGE 568.



PORTUNUS (ACHELOUS) SPINICARPUS (P. 92)

FOR EXPLANATION OF PLATE SEE PAGE 568.



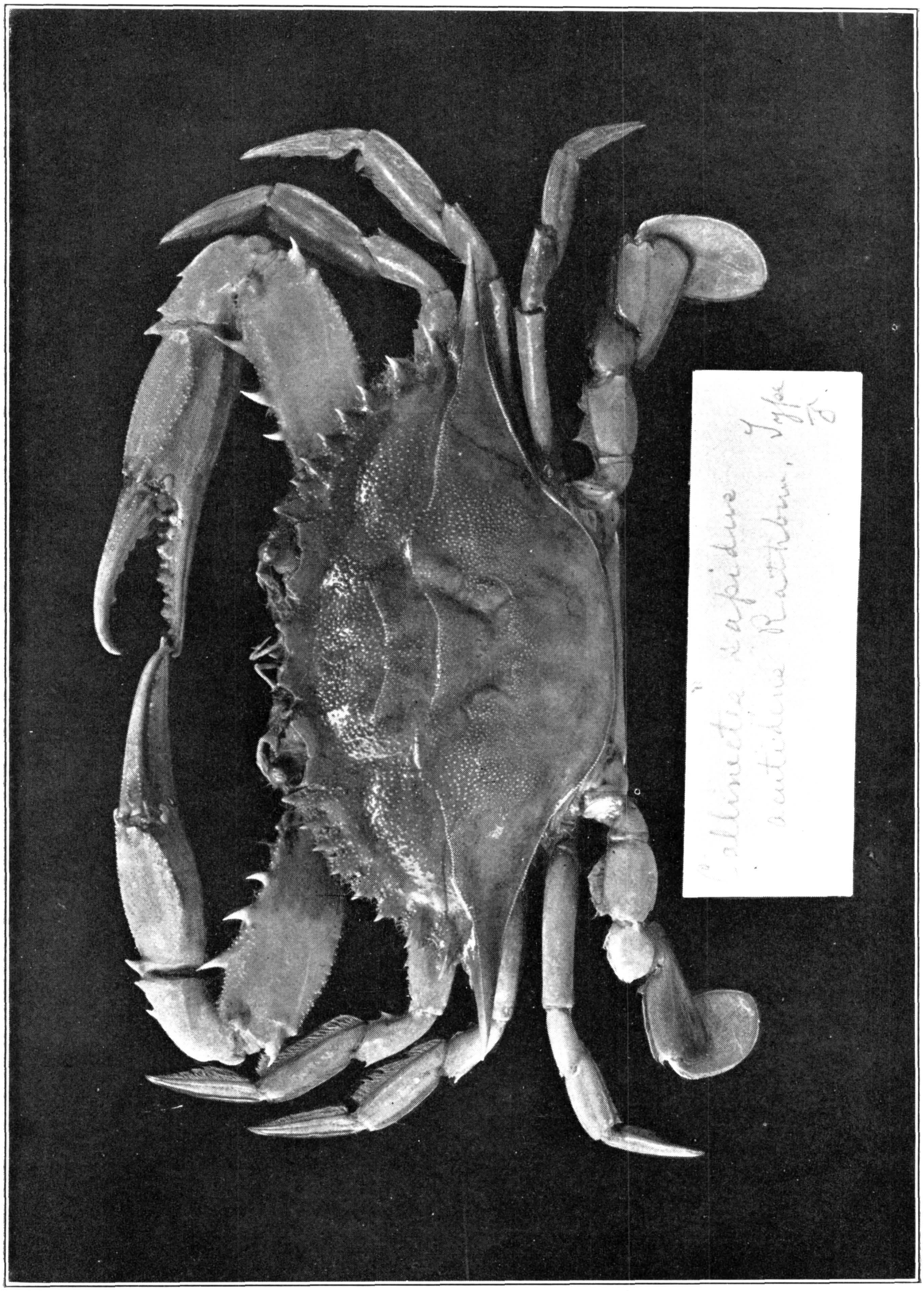
PORTUNUS (ACHELOUS) IRIDESCENS (P. 93)

FOR EXPLANATION OF PLATE SEE PAGE 568.

CALLINECTES SAPIDUS (P. 99)

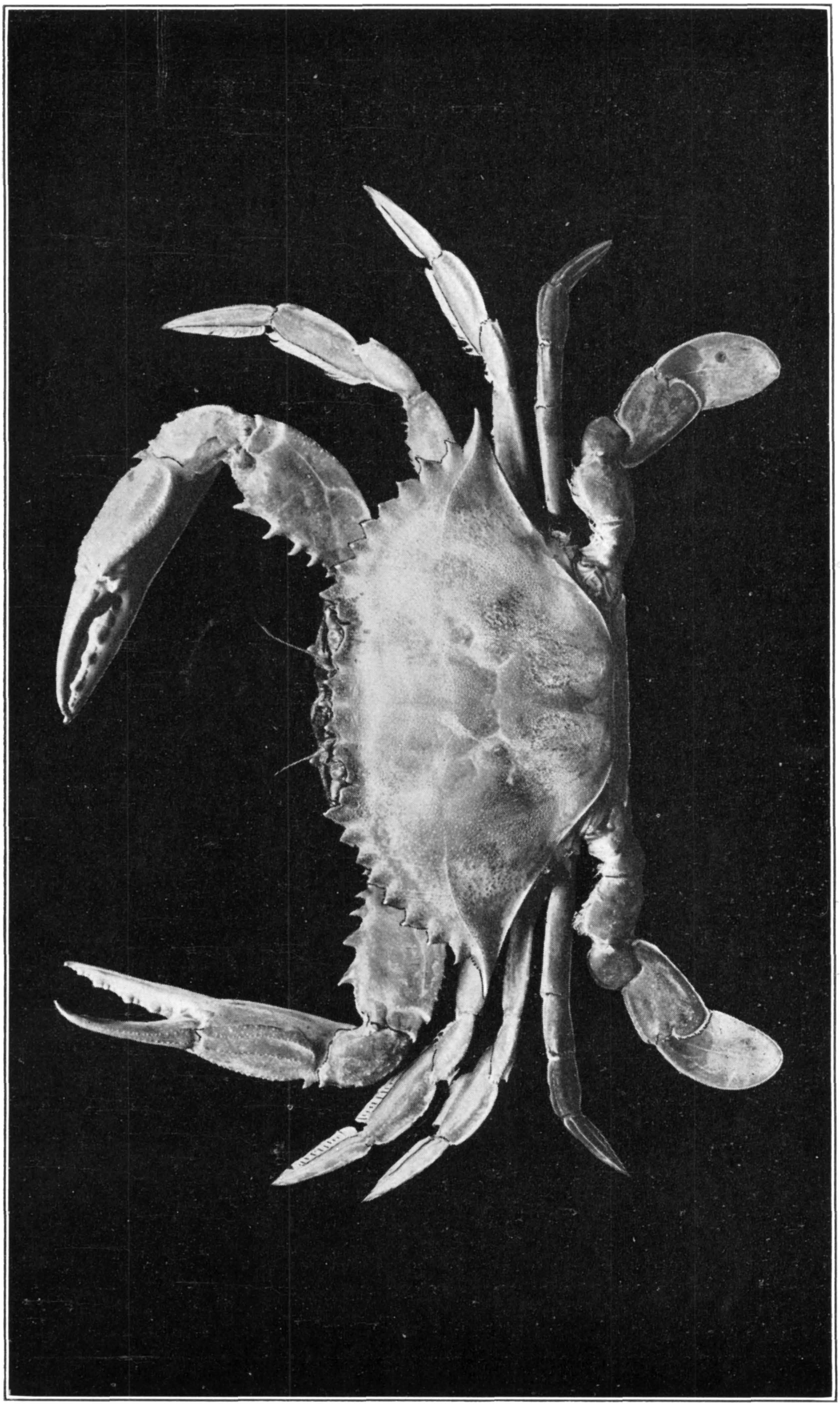
FOR EXPLANATION OF PLATE SEE PAGE 569.

79856—30——42



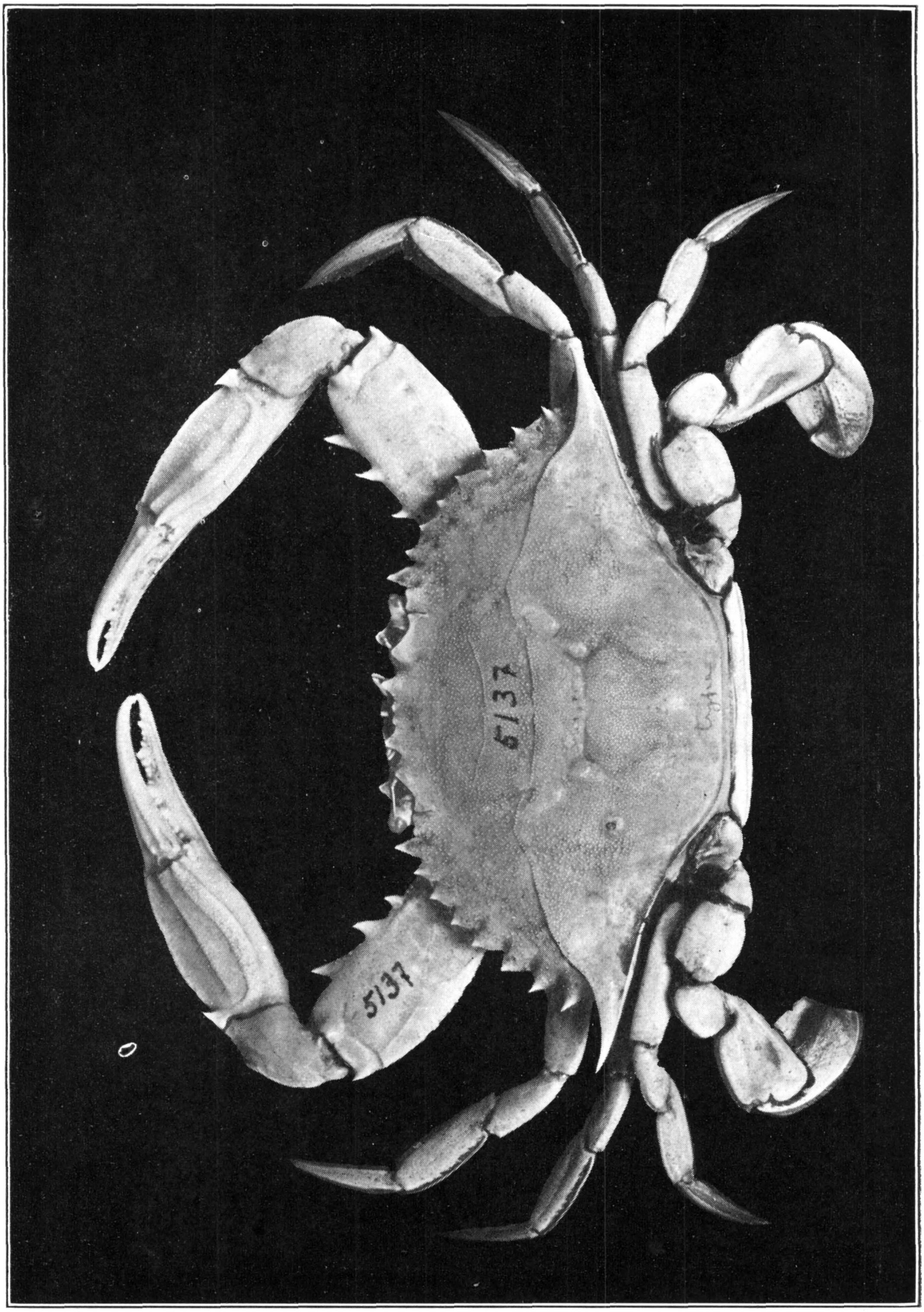
CALLINECTES SAPIDUS ACUTIDENS (P. 111)

FOR EXPLANATION OF PLATE SEE PAGE 569.



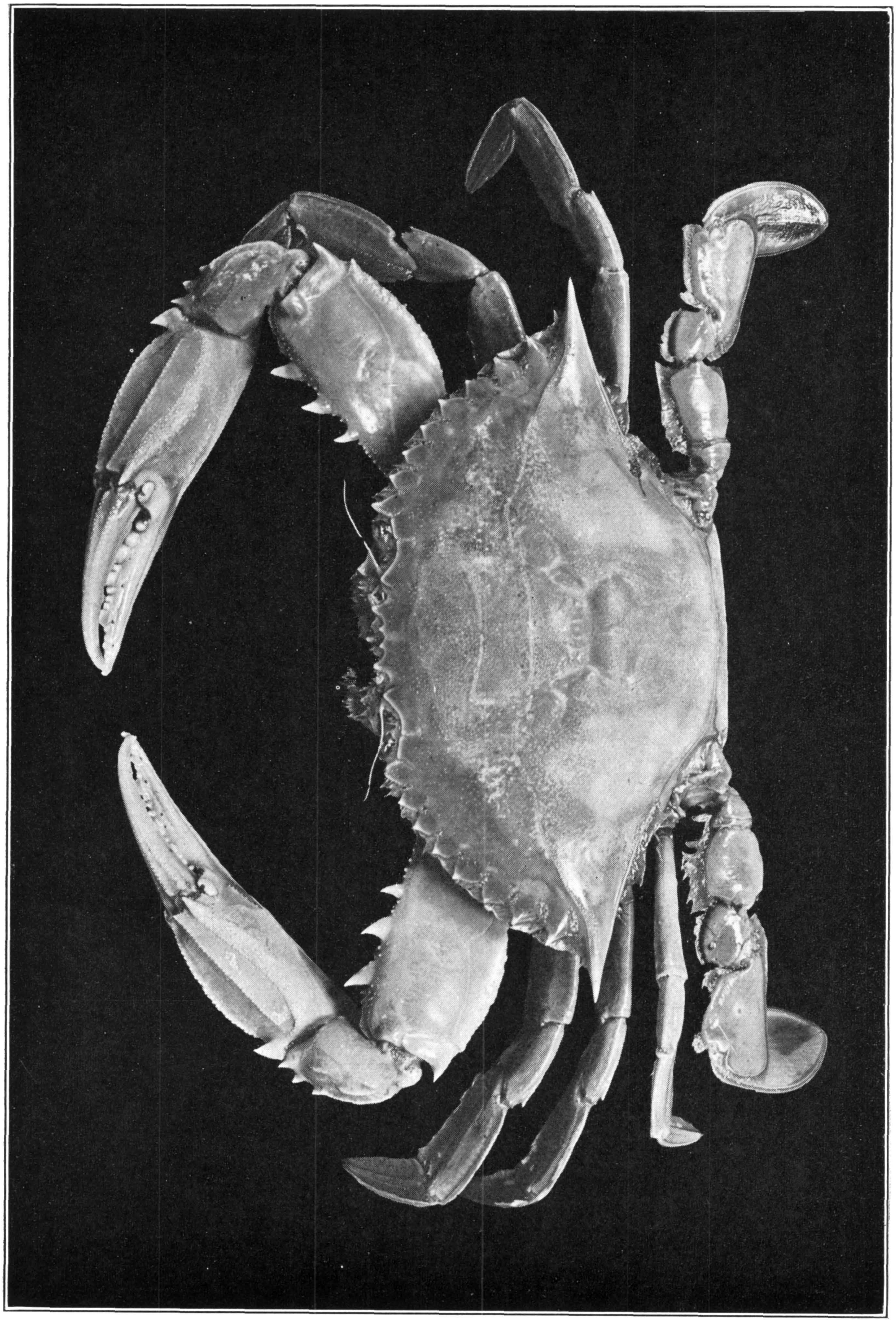
CALLINECTES BELLICOSUS (P. 112)

FOR EXPLANATION OF PLATE SEE PAGE 569.



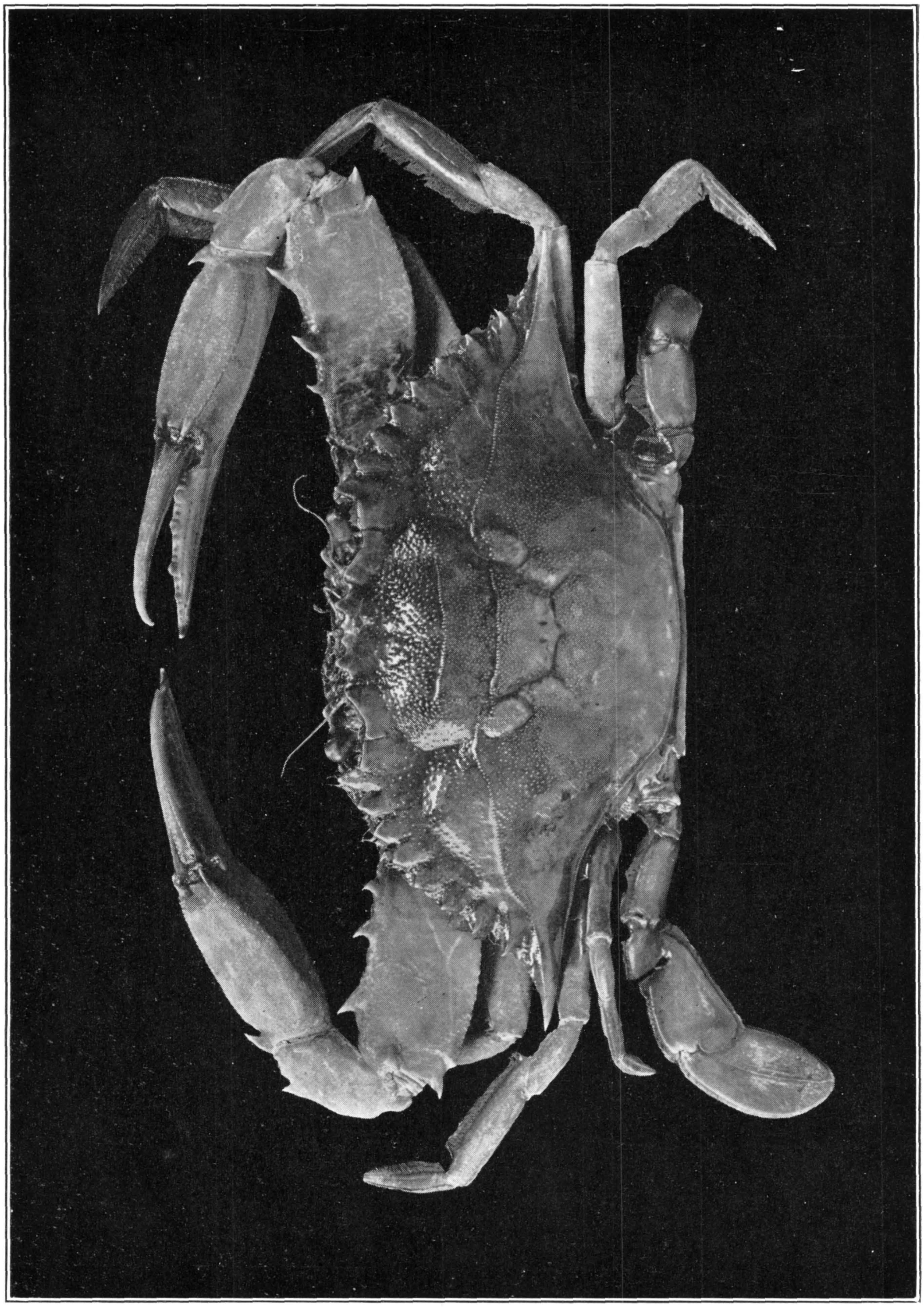
CALLINECTES ORNATUS (P. 114)

FOR EXPLANATION OF PLATE SEE PAGE 569.



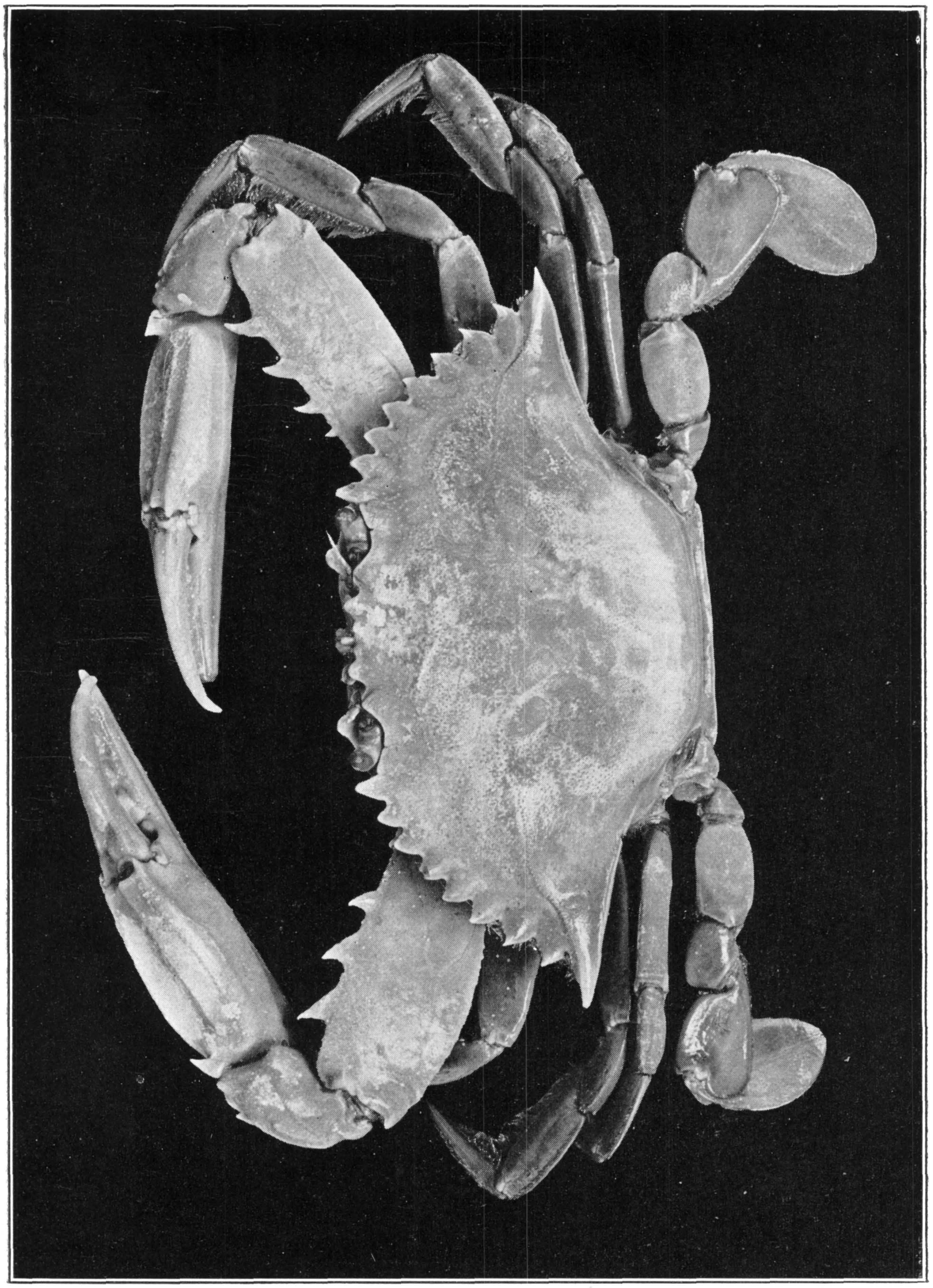
CALLINECTES DANAE (P. 118)

FOR EXPLANATION OF PLATE SEE PAGE 569.



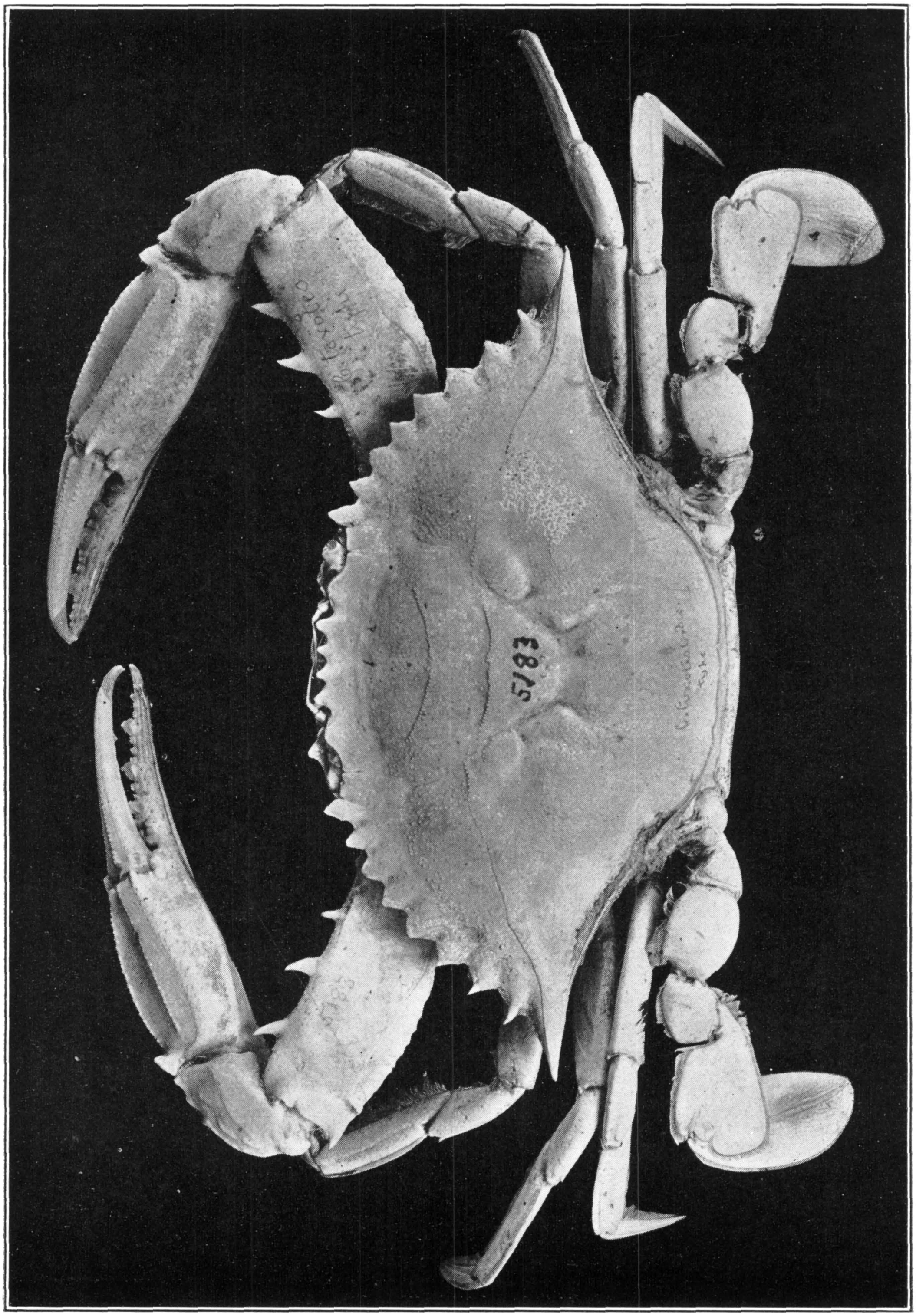
CALLINECTES ARCUATUS (P. 121)

FOR EXPLANATION OF PLATE SEE PAGE 569.



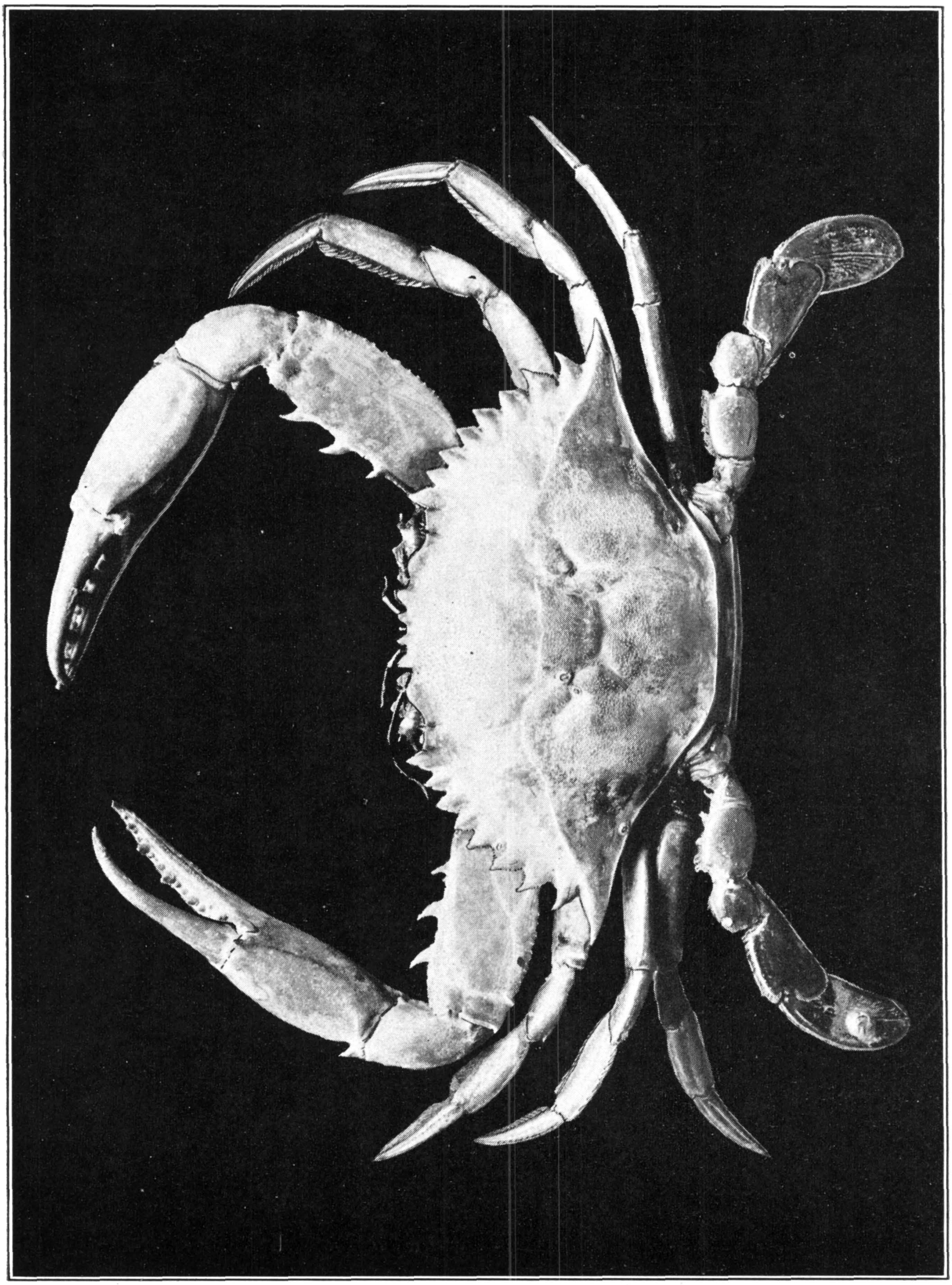
CALLINECTES MARGINATUS (P. 123)

FOR EXPLANATION OF PLATE SEE PAGE 569.



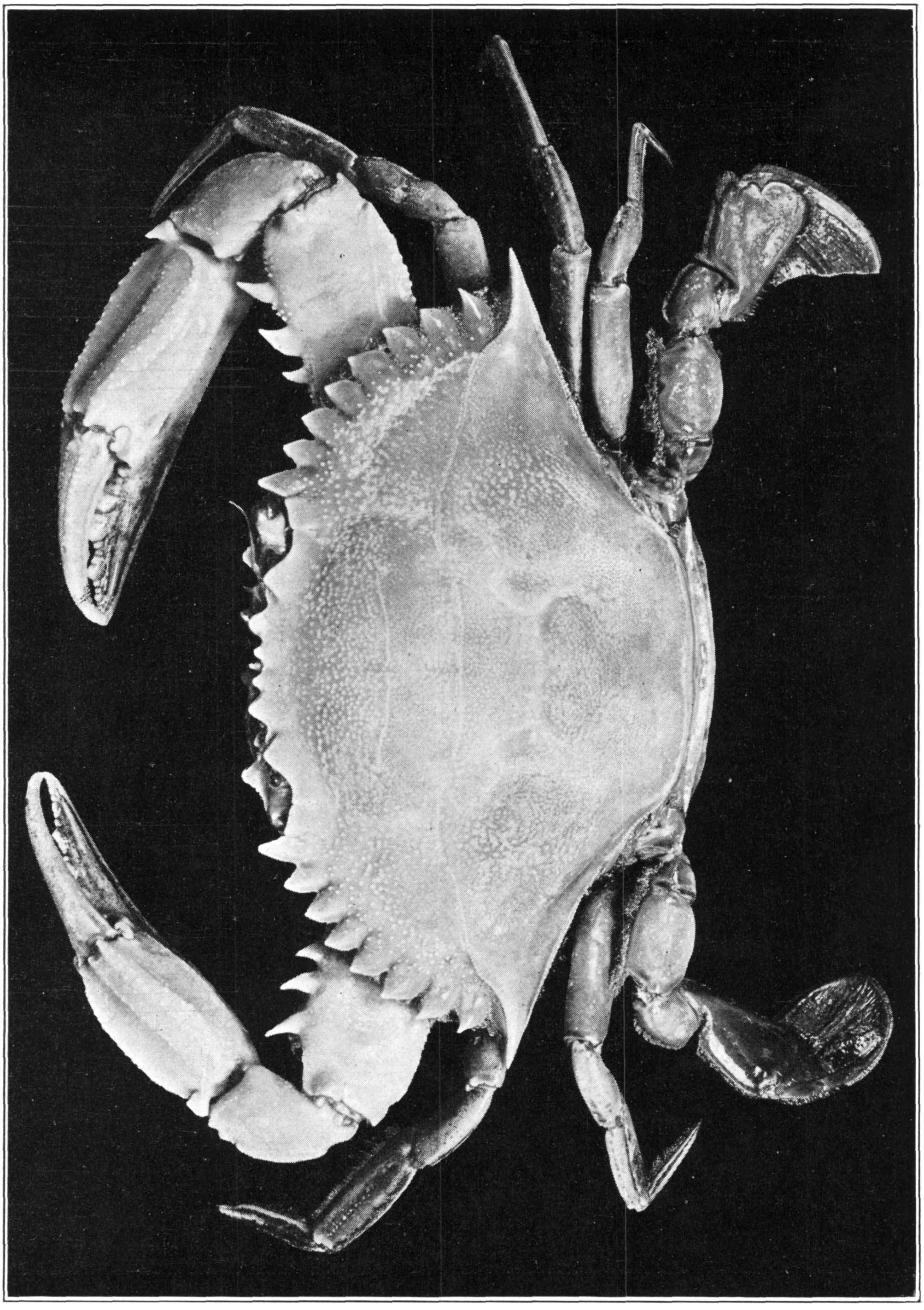
CALLINECTES TOXOTES (P. 127)

FOR EXPLANATION OF PLATE SEE PAGE 569.



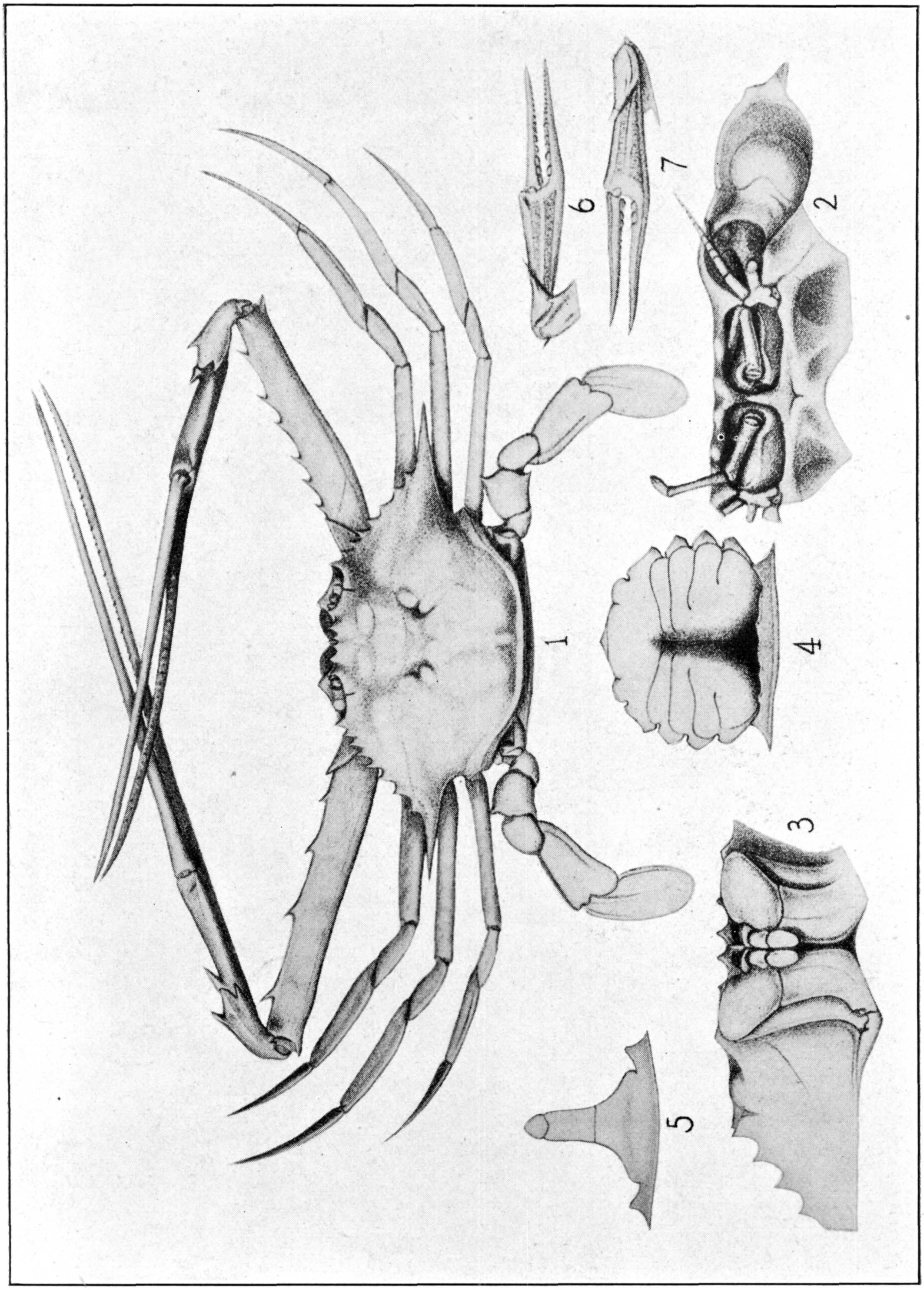
CALLINECTES BOCOURTI (P. 128)

FOR EXPLANATION OF PLATE SEE PAGE 569.



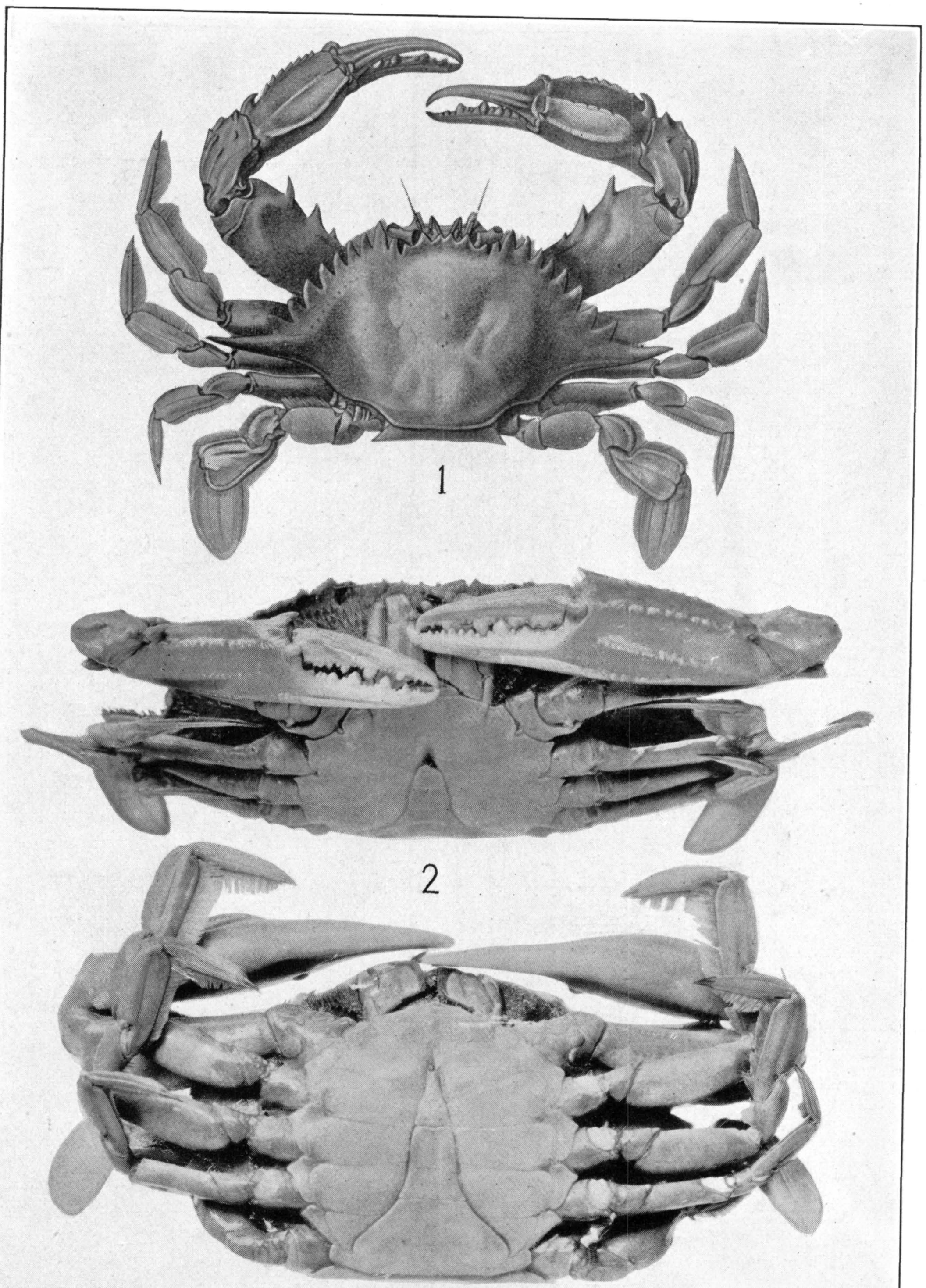
CALLINECTES EXASPERATUS (P. 130)

FOR EXPLANATION OF PLATE SEE PAGE 569.



LUPELLA FORCEPS (P. 133)

FOR EXPLANATION OF PLATE SEE PAGE 569.



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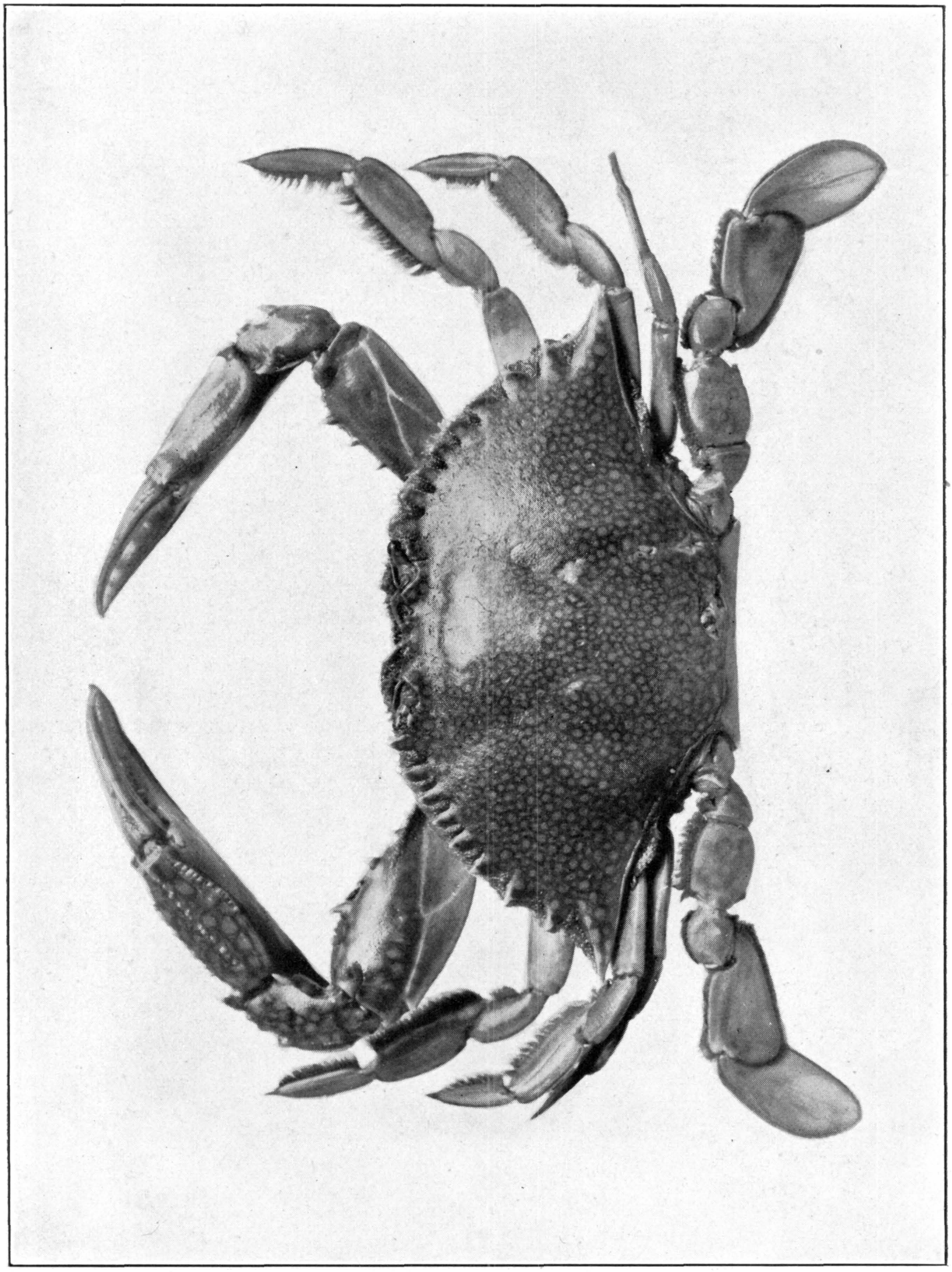
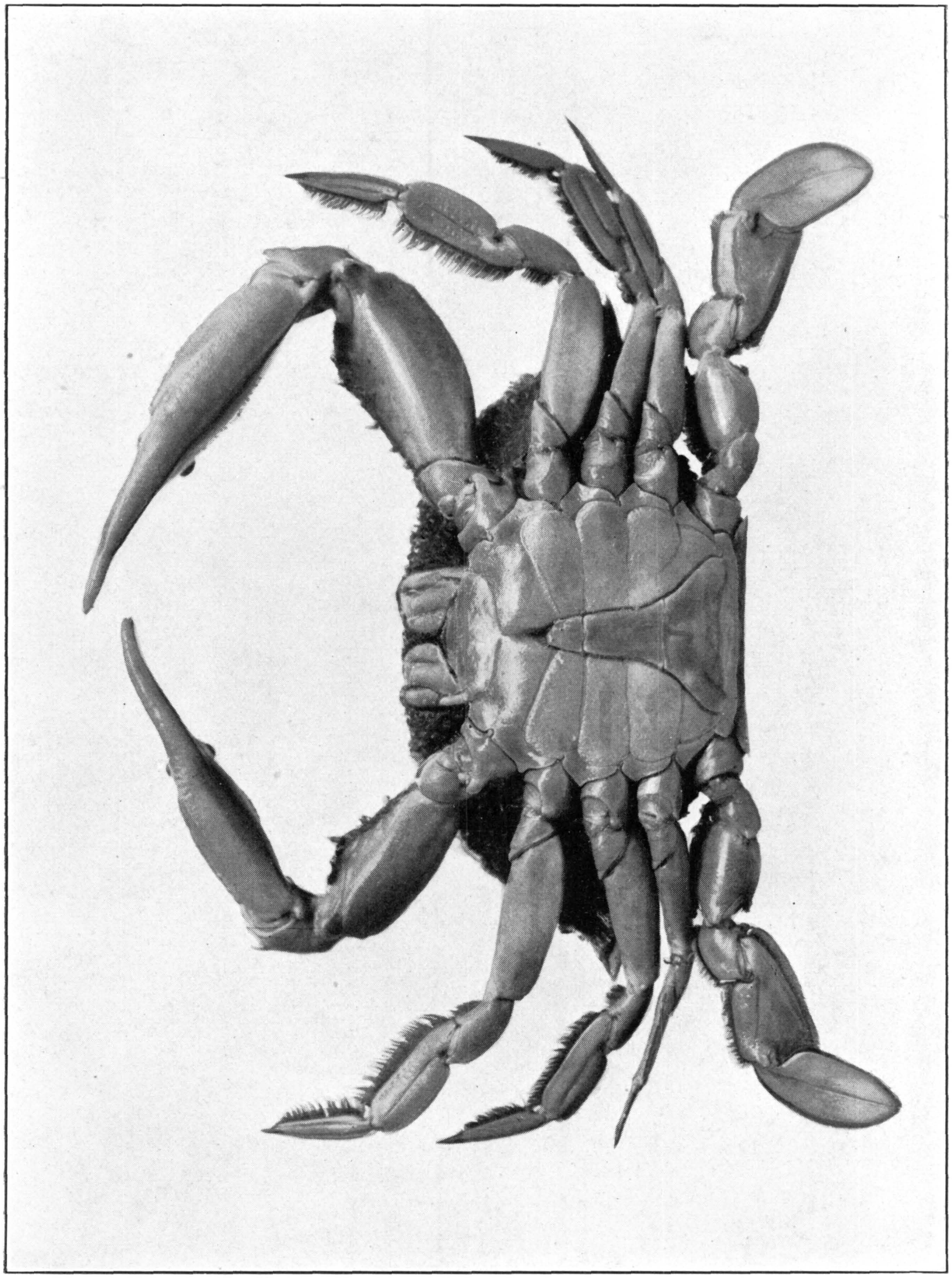
1. ARENAEUS MEXICANUS (P. 137). 2, 3. A. CRIBRARIUS (P. 134)

FOR EXPLANATION OF PLATE SEE PAGE 570.



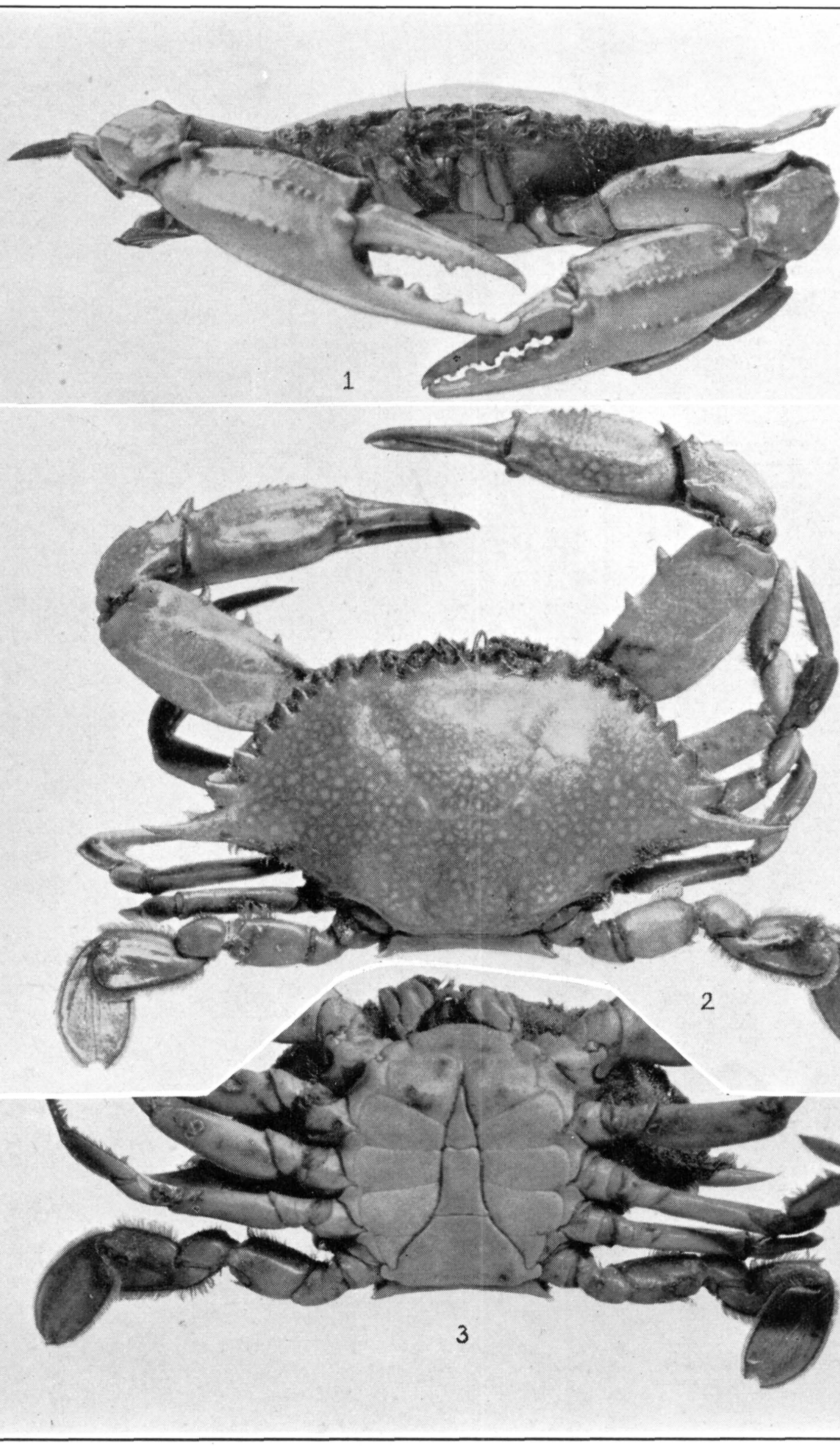
ARENAEUS CRIBRARIUS (P. 134)

FOR EXPLANATION OF PLATE SEE PAGE 570.



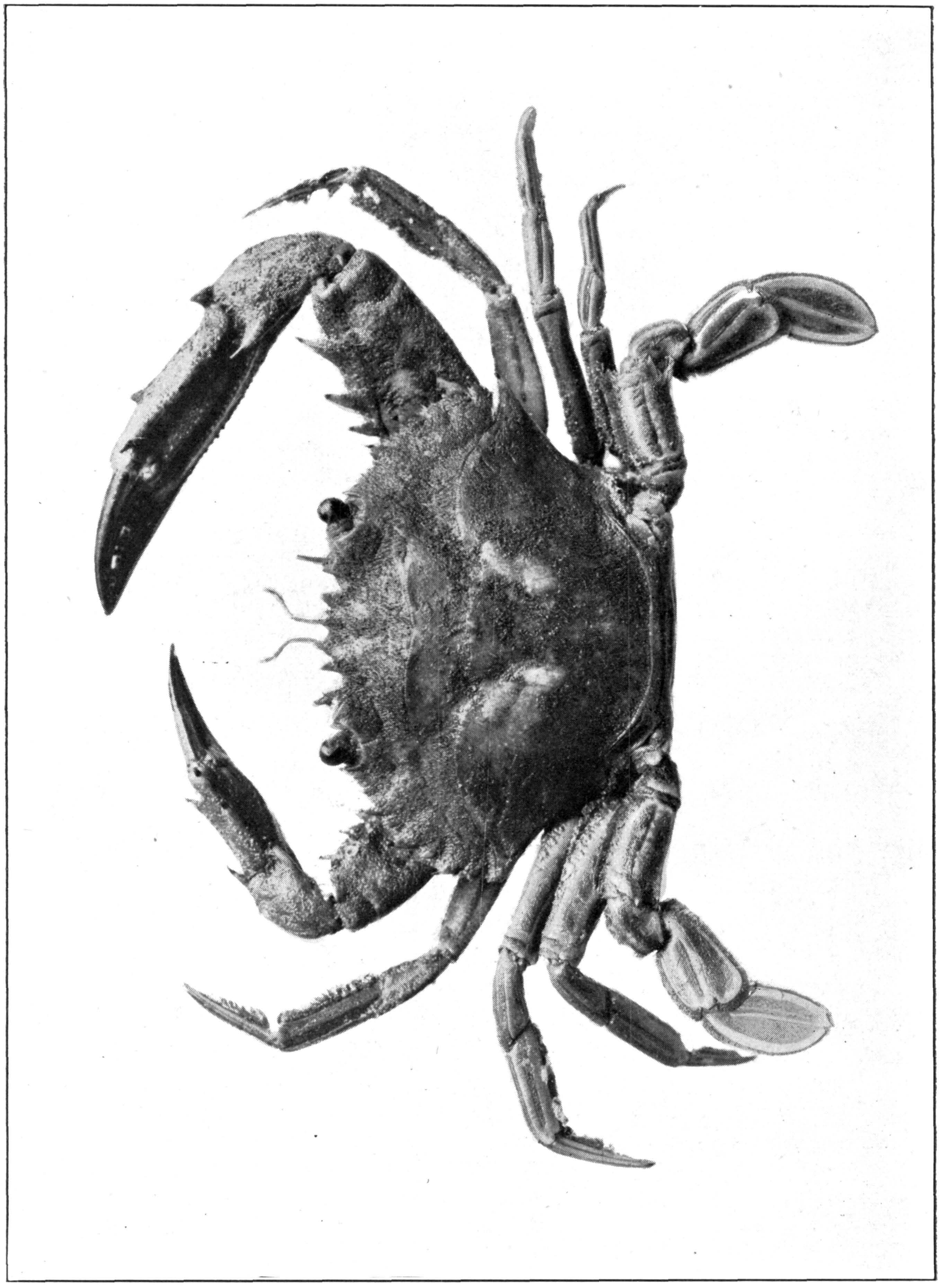
ARENAEUS CRIBRARIUS (P. 134)

FOR EXPLANATION OF PLATE SEE PAGE 570.



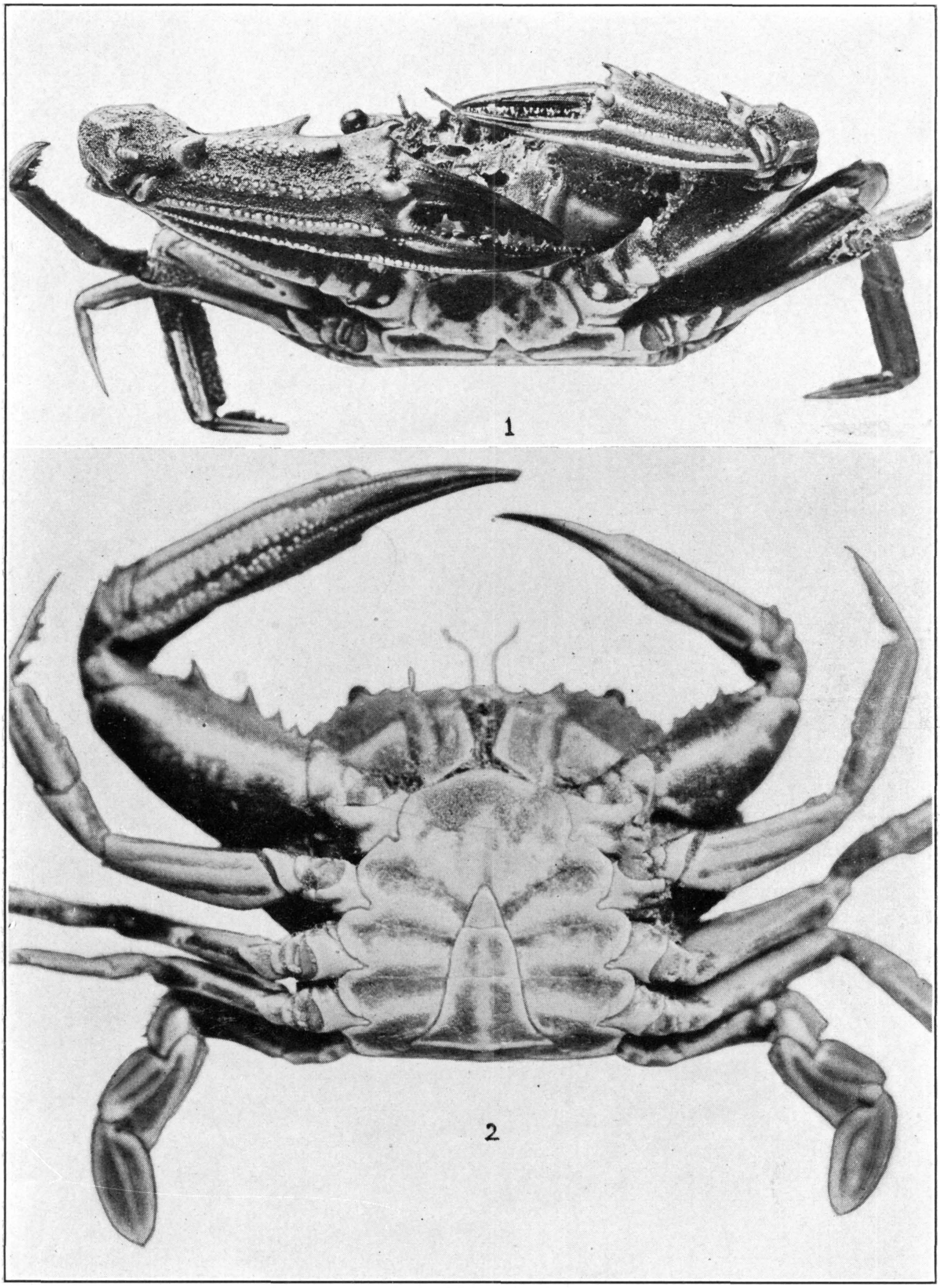
ARENAEUS MEXICANUS (P. 137)

FOR EXPLANATION OF PLATE SEE PAGE 570.



CRONIUS RUBER (P. 139)

FOR EXPLANATION OF PLATE SEE PAGE 570.



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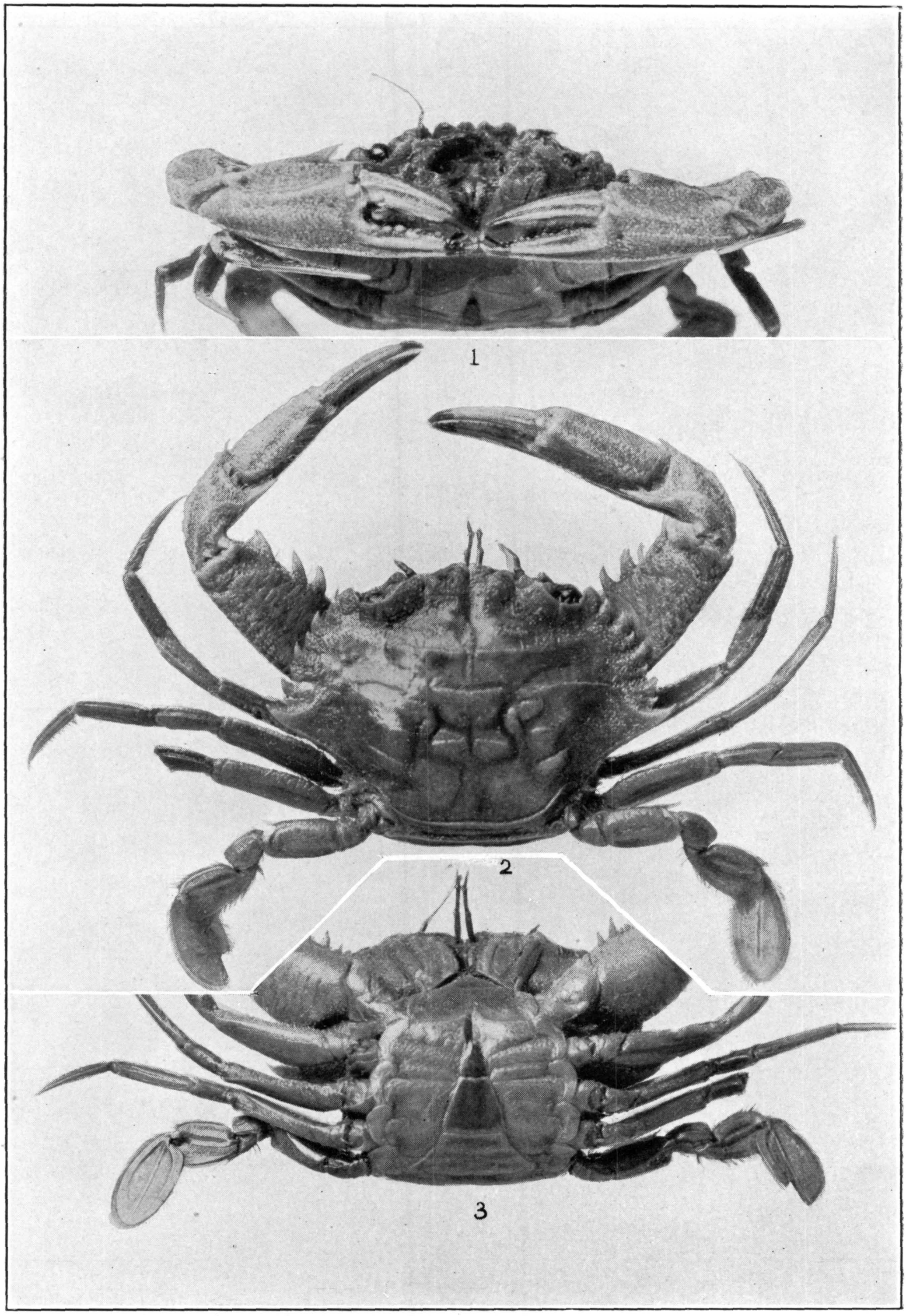
CRONIUS RUBER (P. 139)

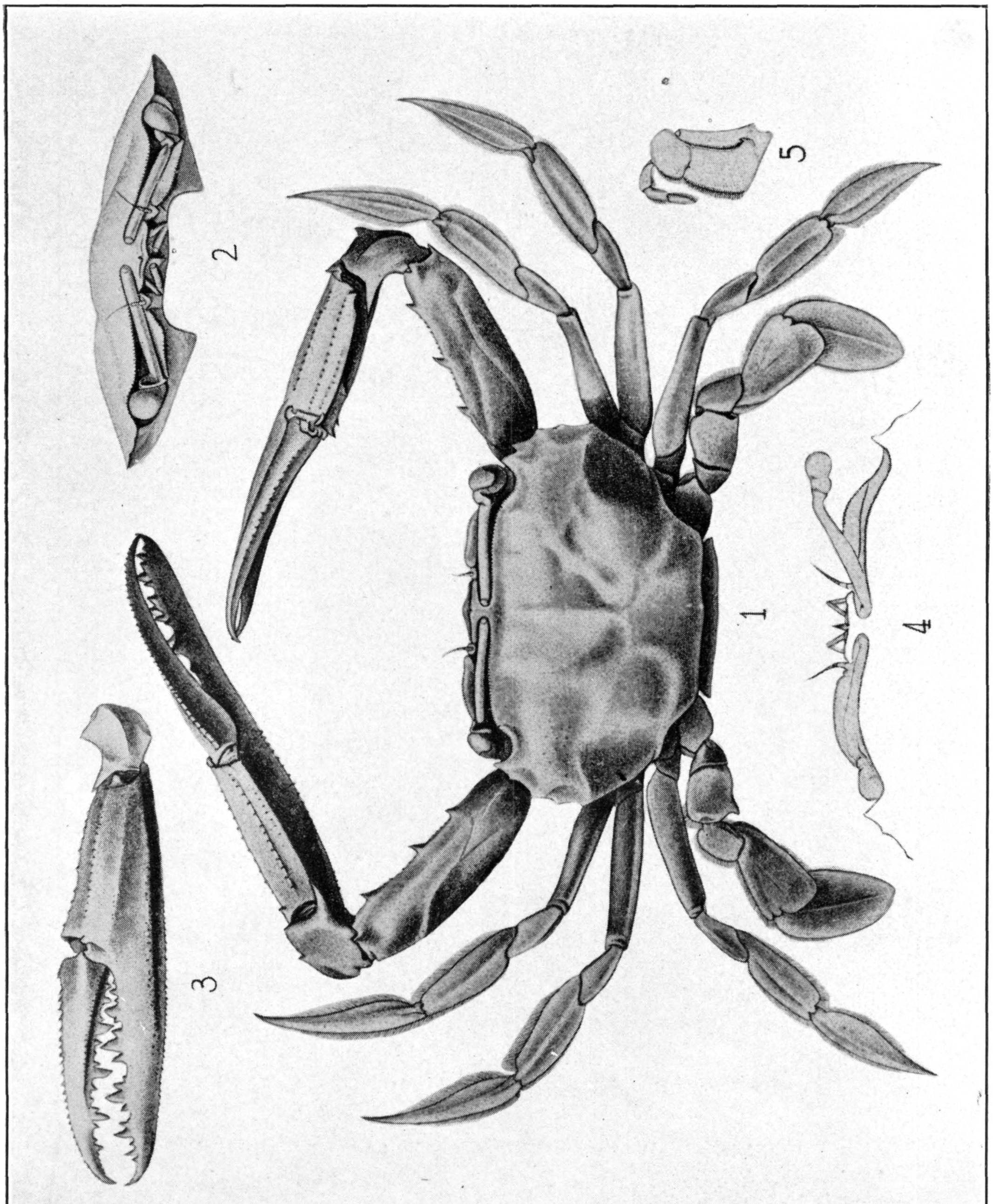
FOR EXPLANATION OF PLATE SEE PAGE 570.

79856—30——43



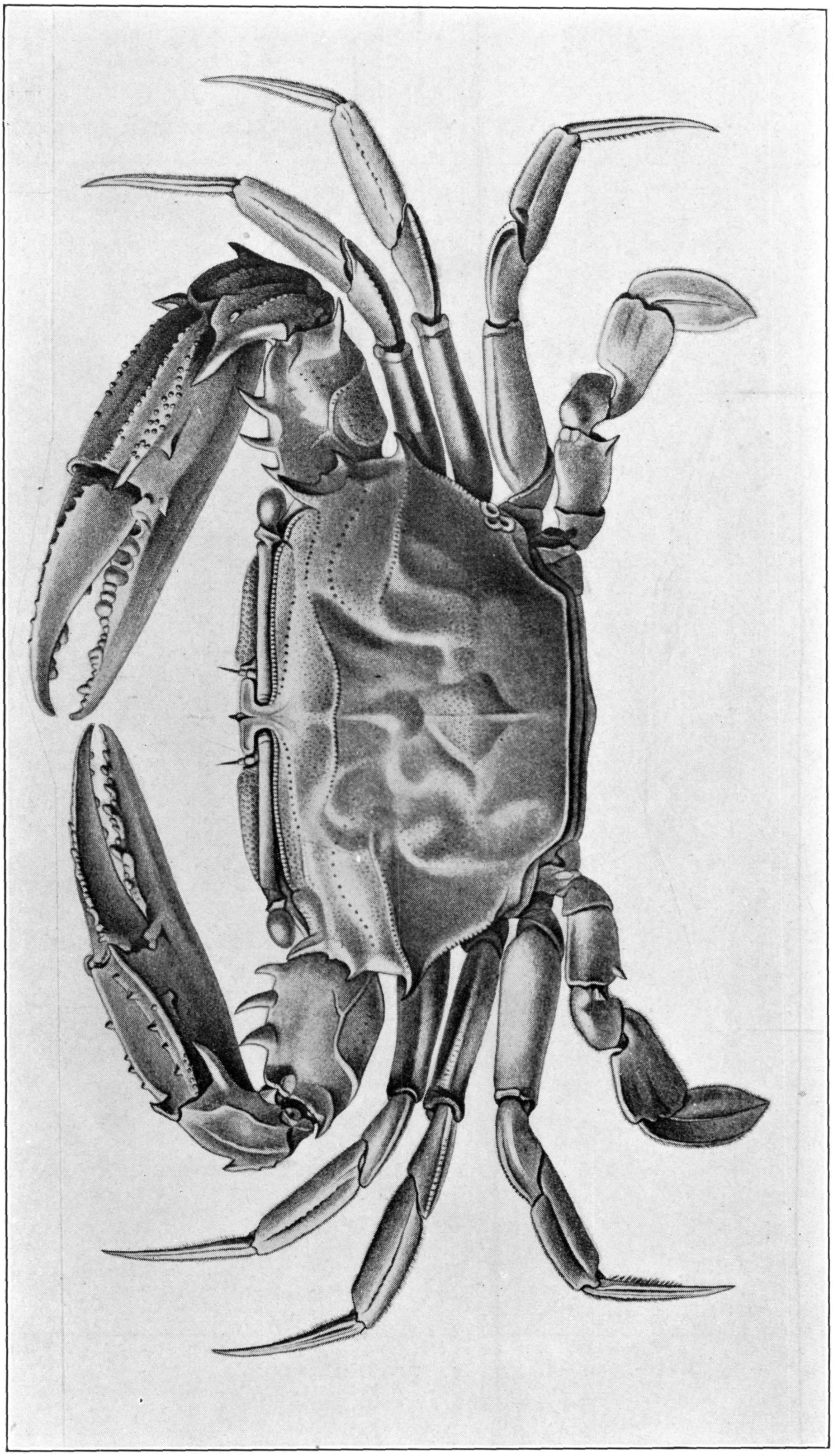
CRONIUS TUMIDULUS (P. 142)

FOR EXPLANATION OF PLATE SEE PAGE 570.



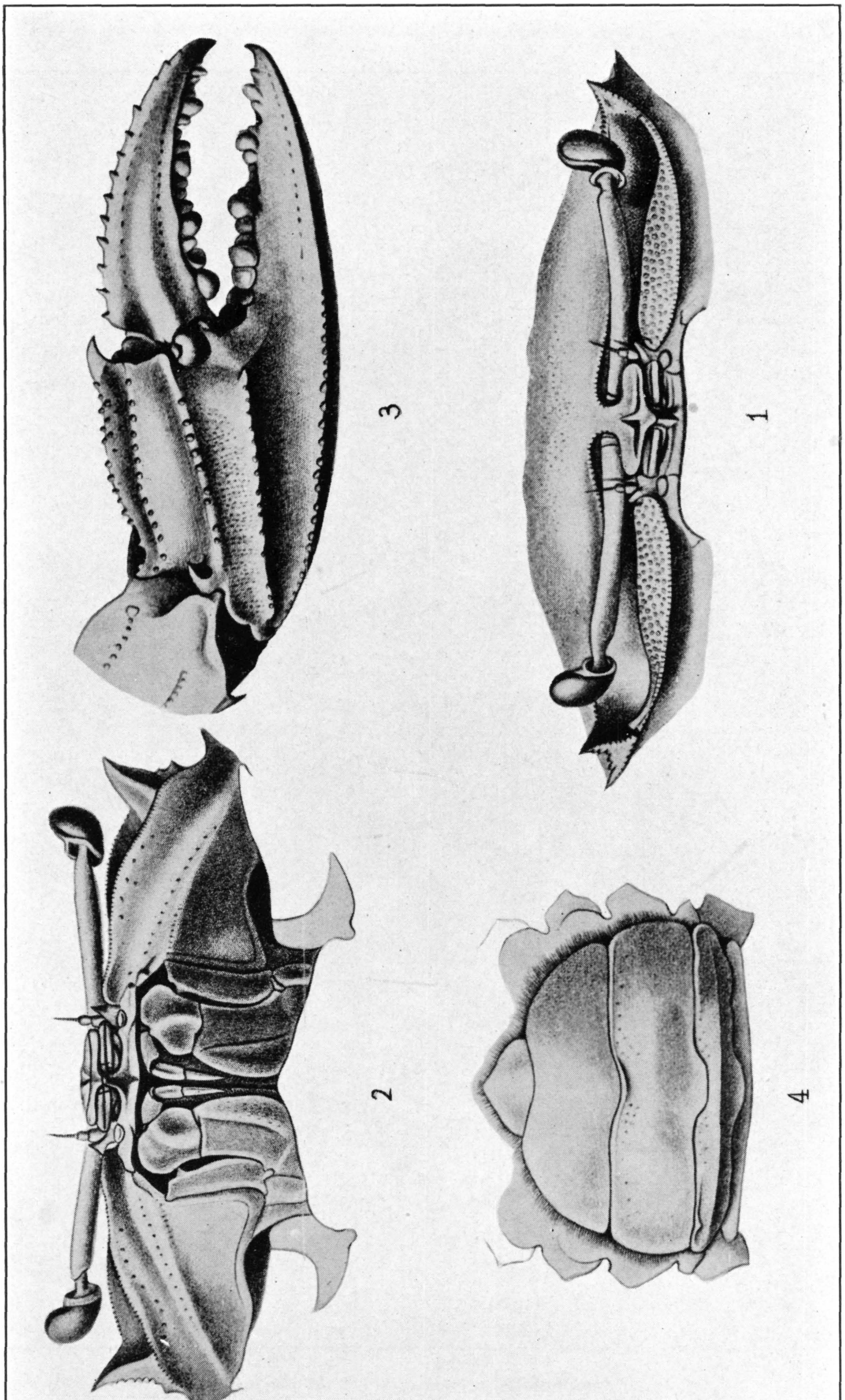
EUPHYLAX DOVII (P. 147)

FOR EXPLANATION OF PLATE SEE PAGE 570.



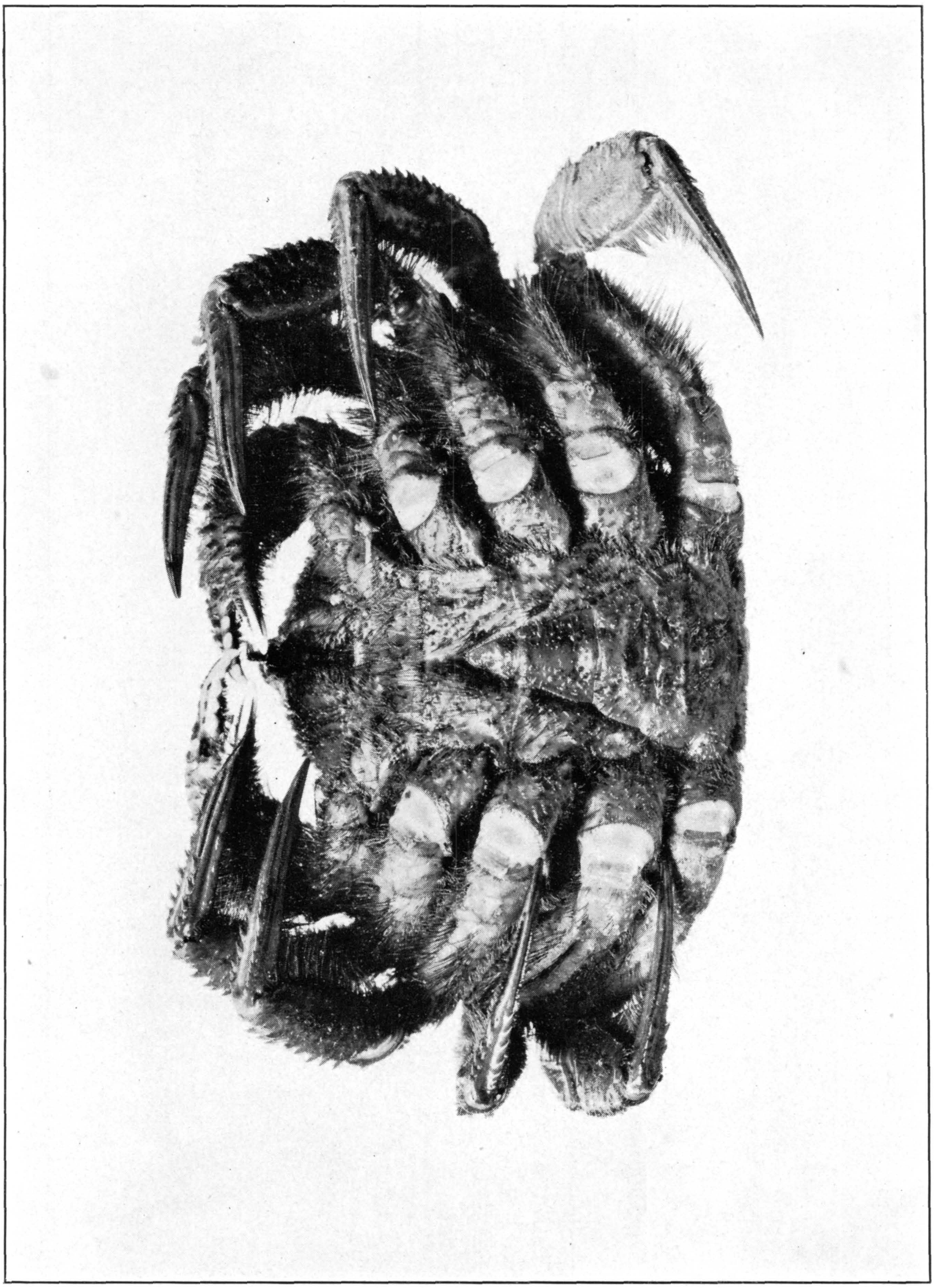
EUPHYLAX ROBUSTUS (P. 148)

FOR EXPLANATION OF PLATE SEE PAGE 570.



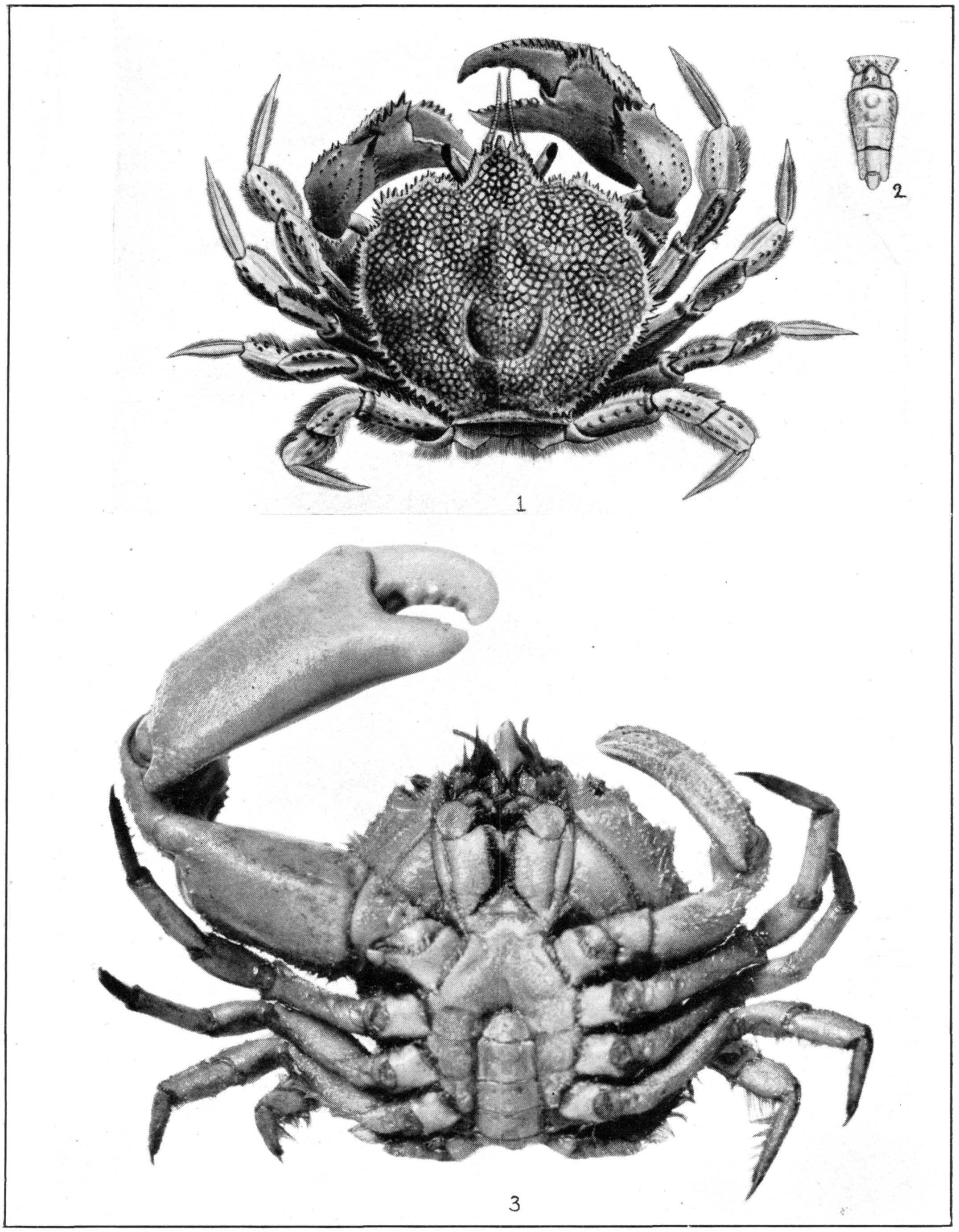
EUPHYLAX ROBUSTUS (P. 148)

FOR EXPLANATION OF PLATE SEE PAGE 571.



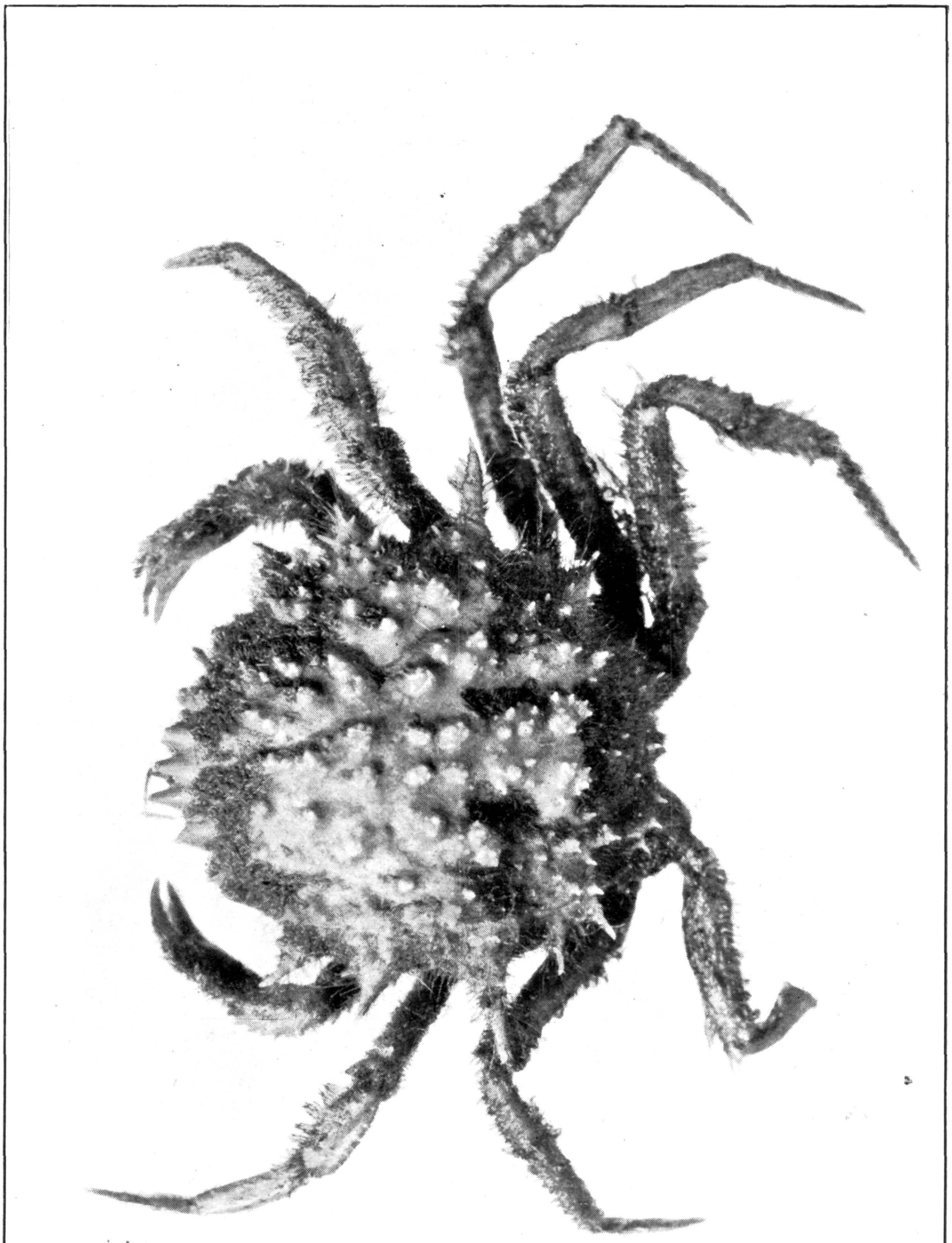
ERIMACRUS ISENBECKII (P. 155)

FOR EXPLANATION OF PLATE SEE PAGE 571



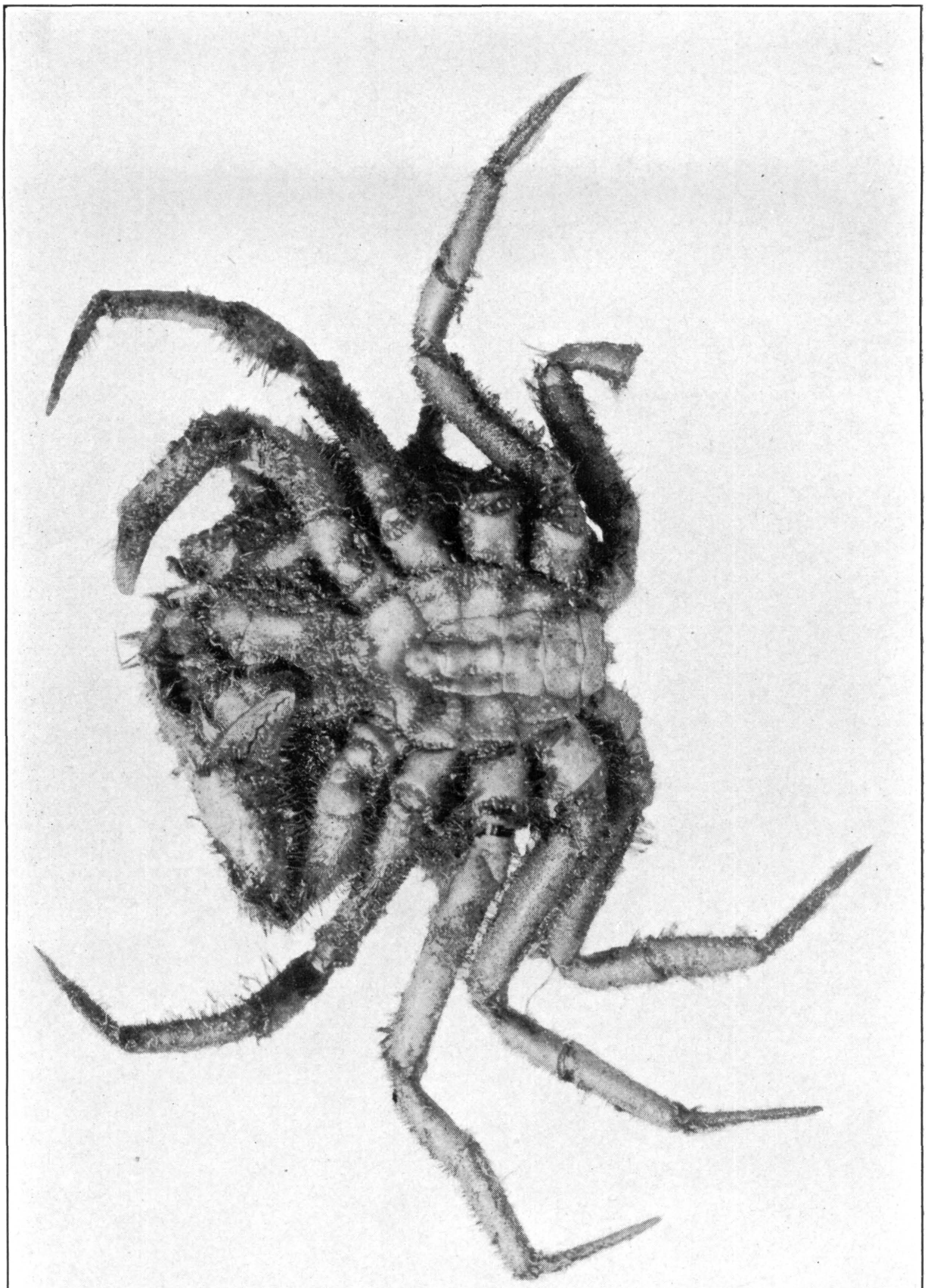
1, 2. PELTARION SPINULOSUM (P. 160). 3. P. DEXTRUM (P. 161)

FOR EXPLANATION OF PLATE SEE PAGE 571.



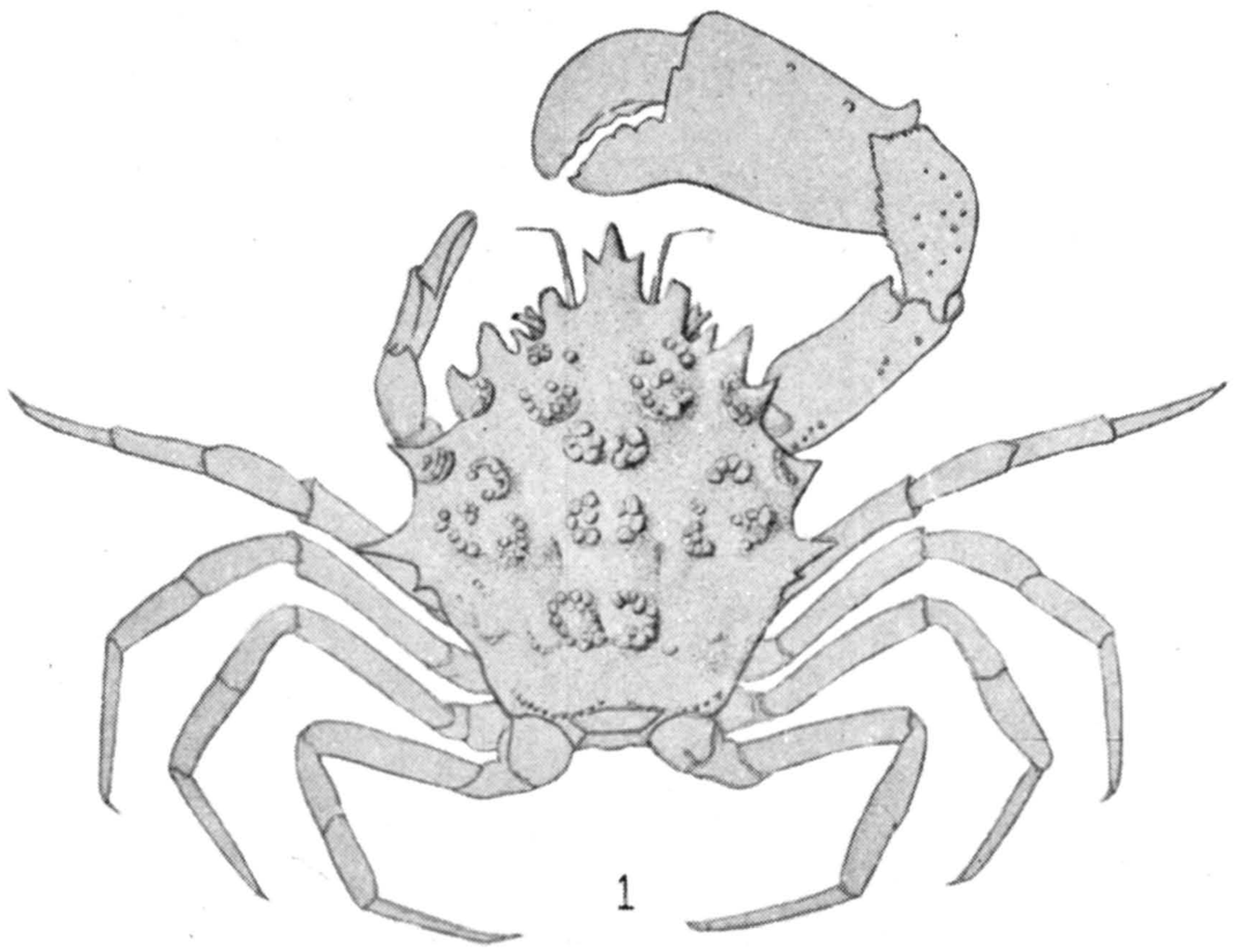
TRACHYCARCINUS SPINULIFER (P. 166)

FOR EXPLANATION OF PLATE SEE PAGE 571.



TRACHYCARCINUS SPINULIFER (P. 166)

FOR EXPLANATION OF PLATE SEE PAGE 571



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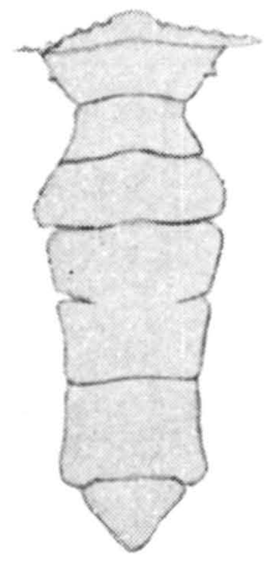

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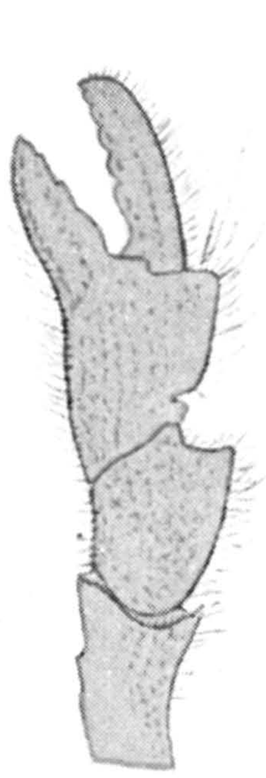

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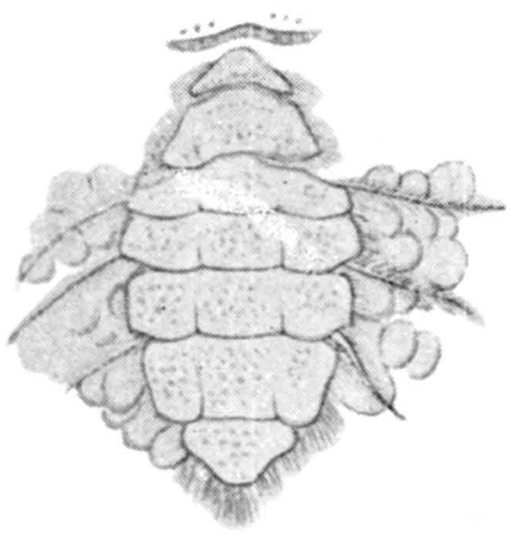

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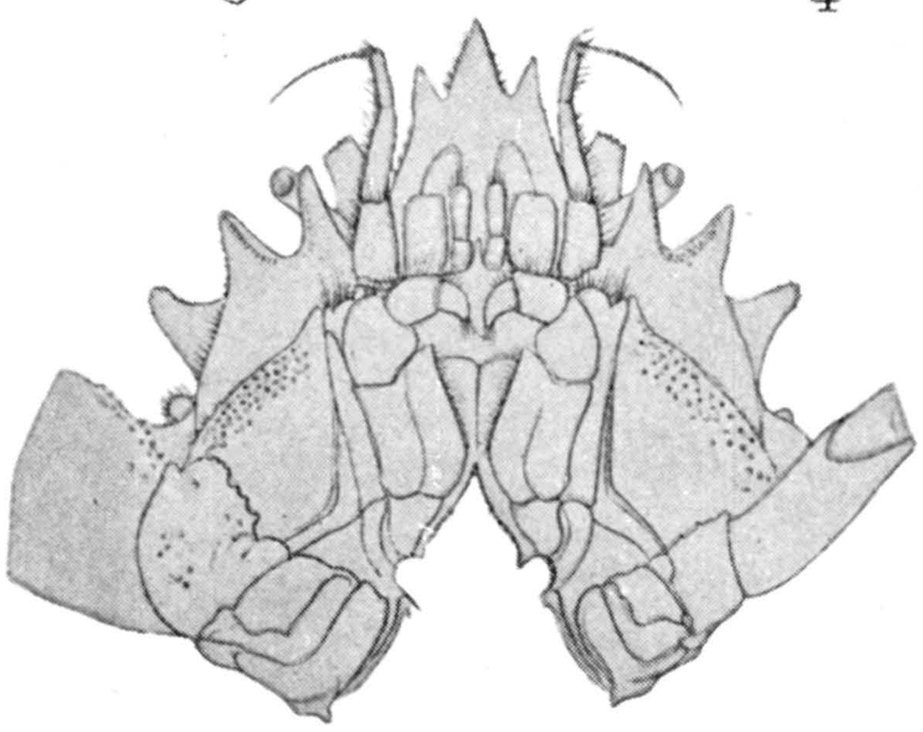

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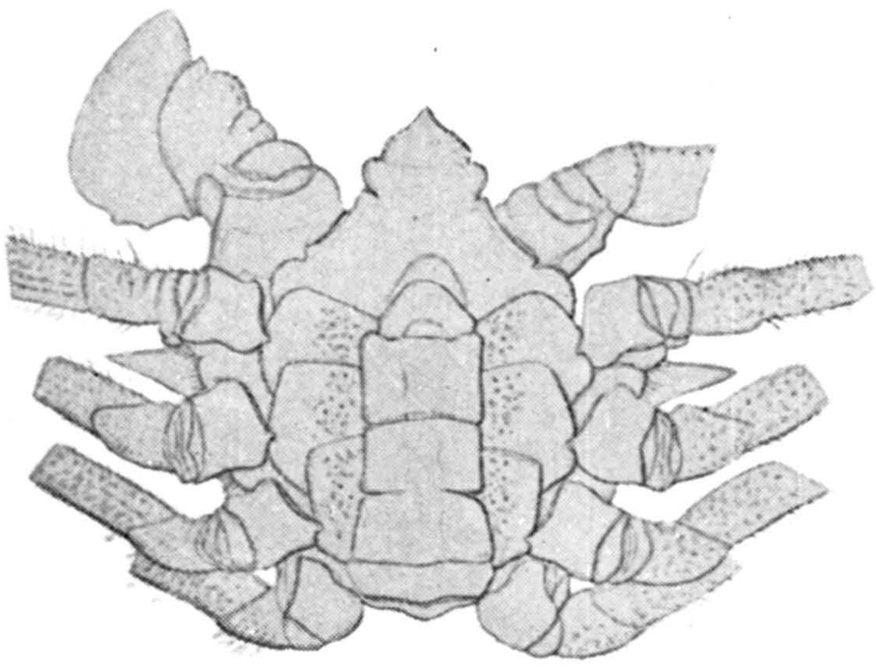

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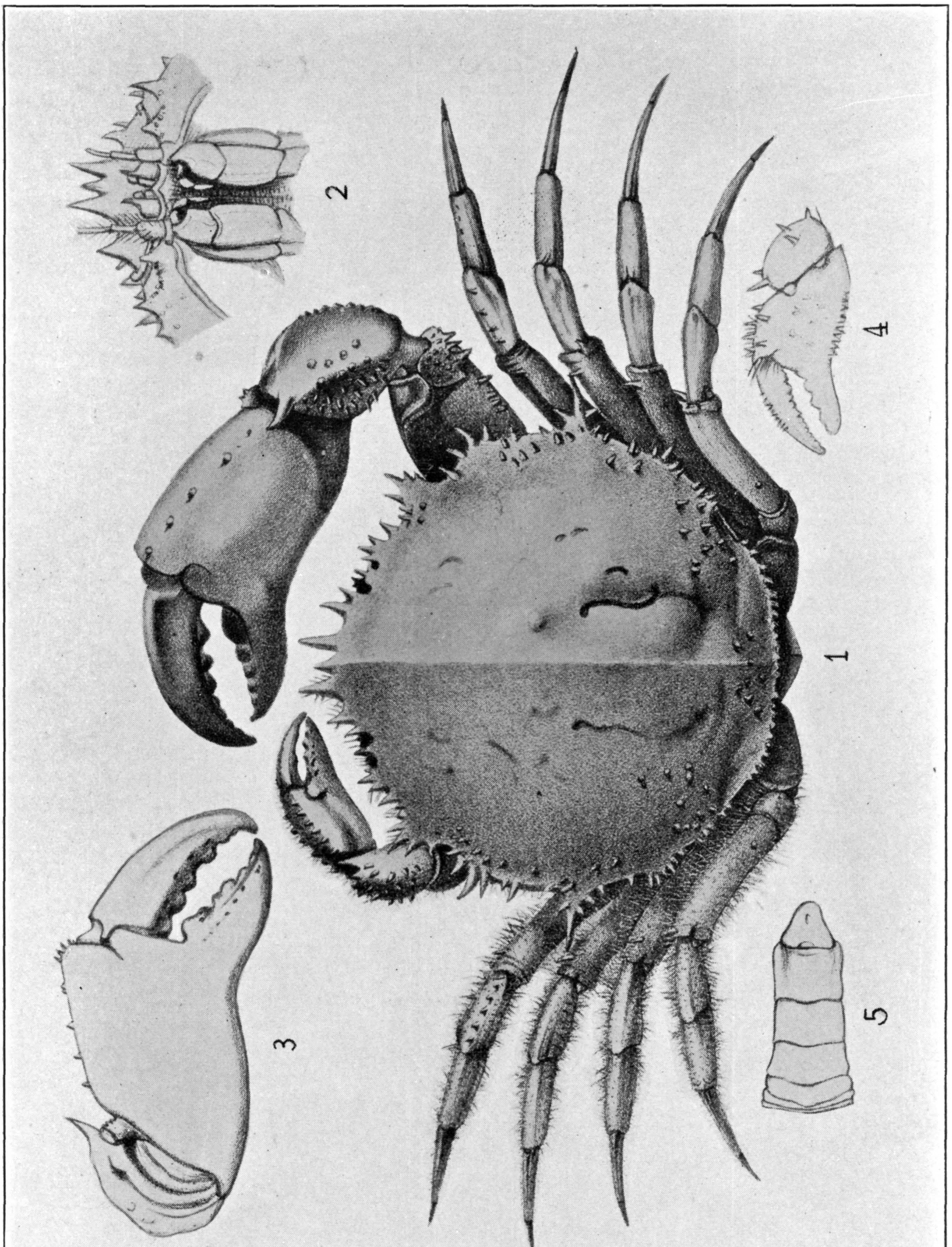
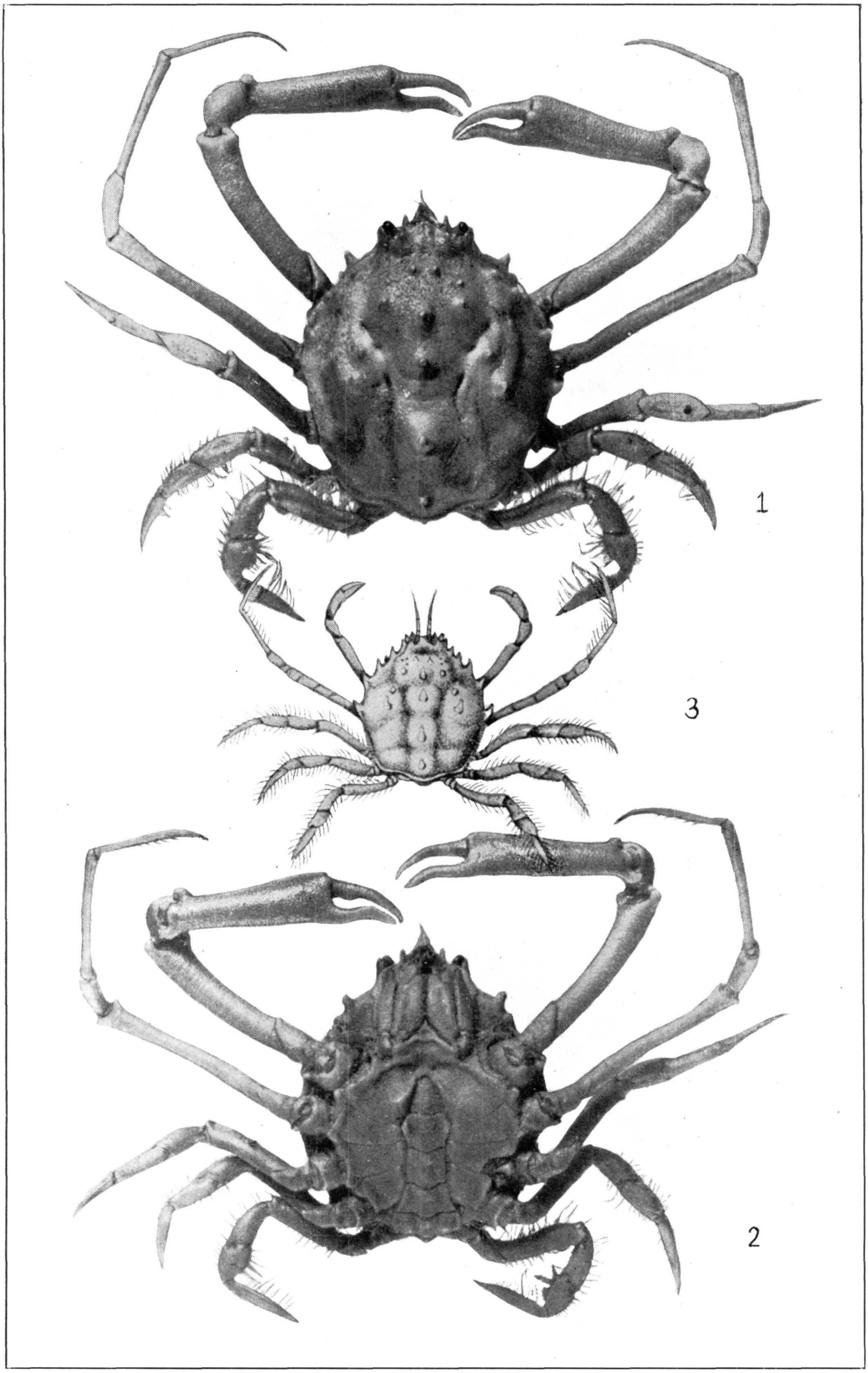
TRACHYCARCINUS CORALLINUS (P. 165)

FOR EXPLANATION OF PLATE SEE PAGE 571.



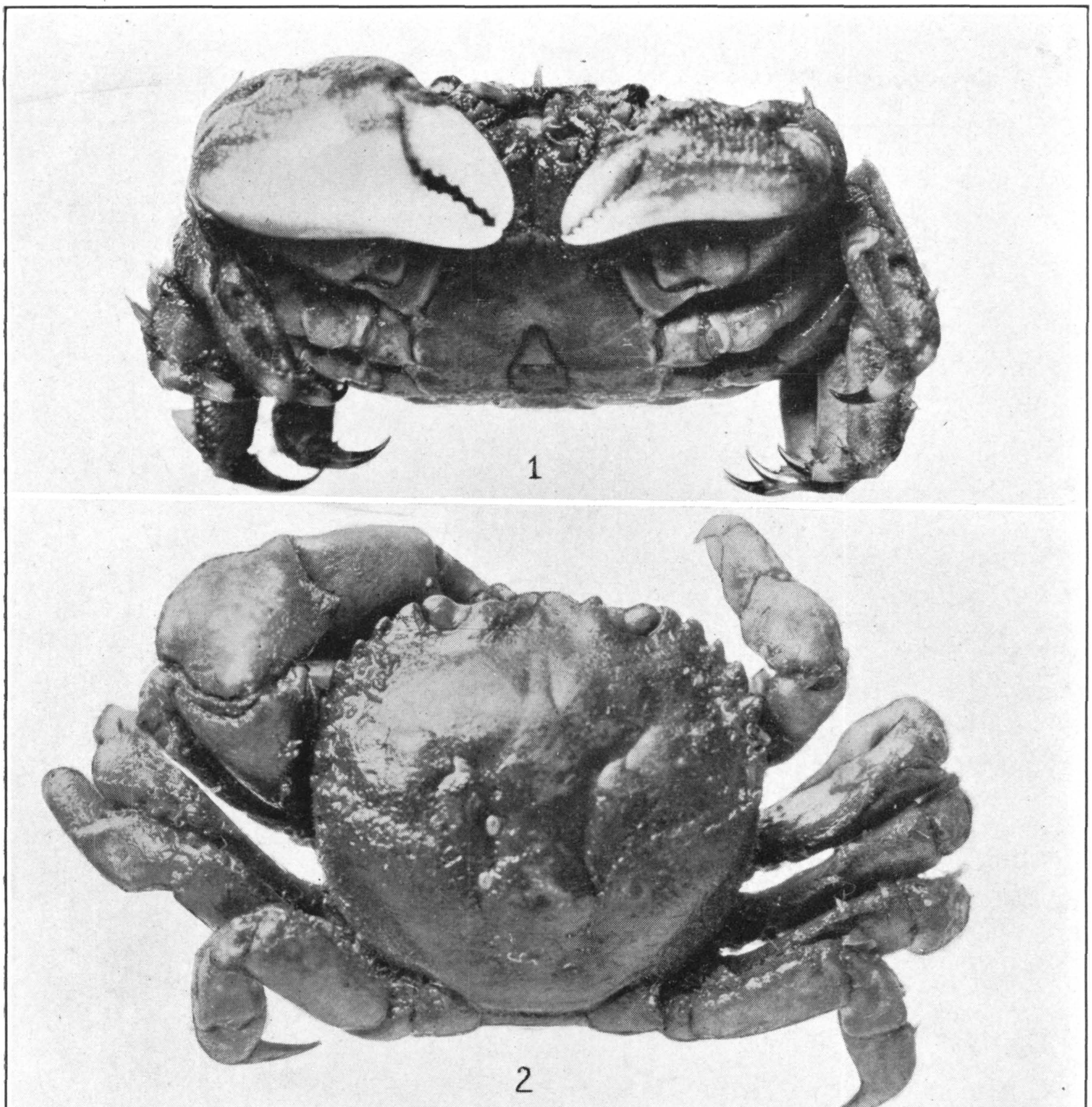
TRICHOPELTARION NOBILE (P. 168)

FOR EXPLANATION OF PLATE SEE PAGE 571.



PLIOSOMA PARVIFRONS (P. 169)

FOR EXPLANATION OF PLATE SEE PAGE 571.



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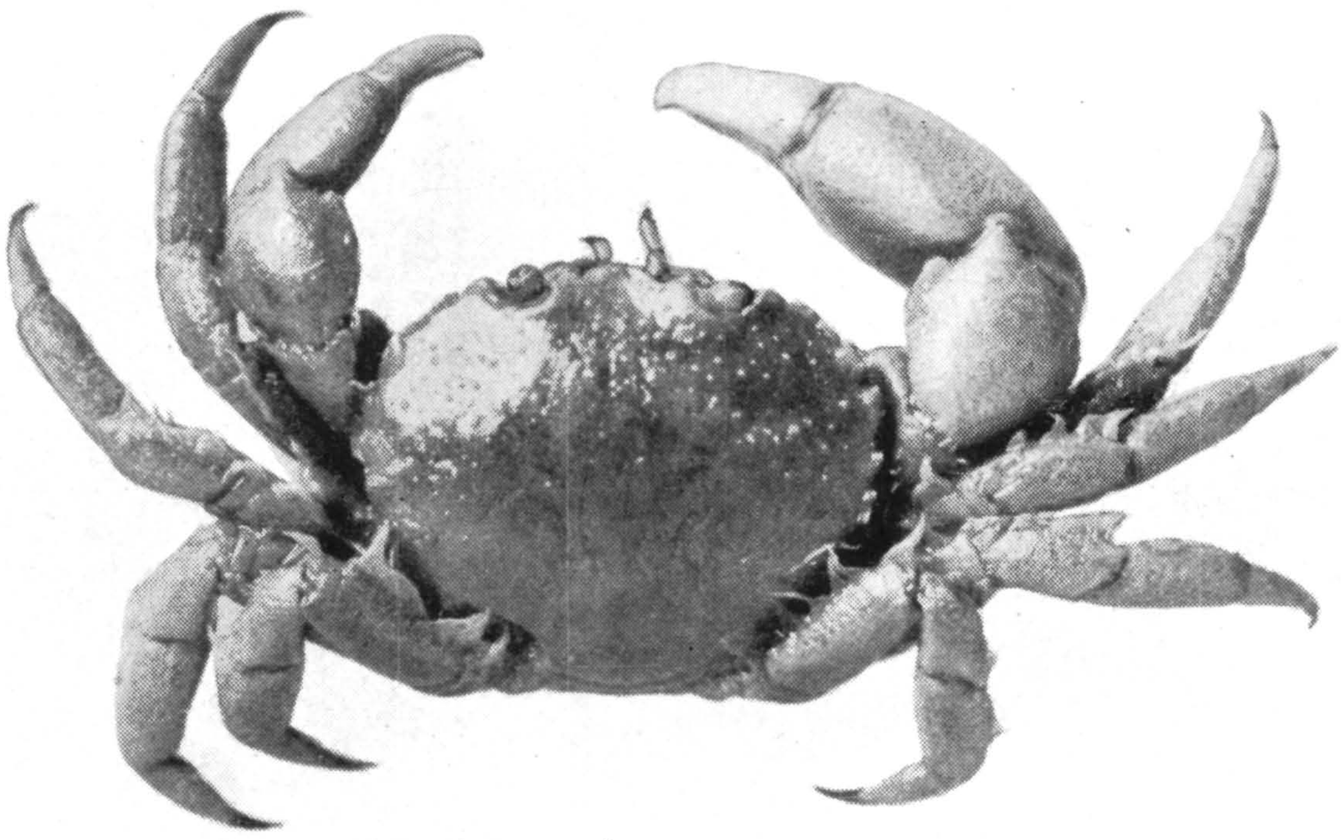
ACANTHOCYCLUS GAYI (P. 171)

FOR EXPLANATION OF PLATE SEE PAGE 572.



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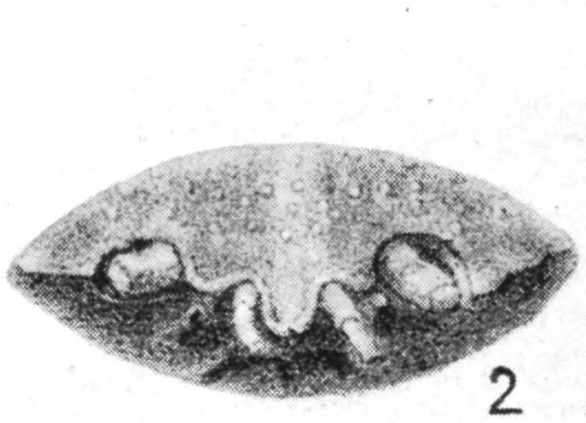

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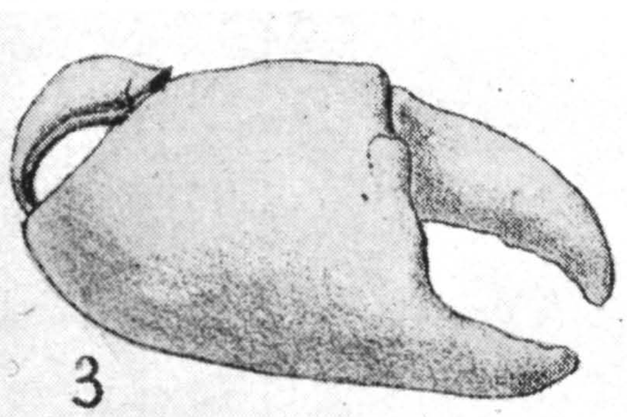

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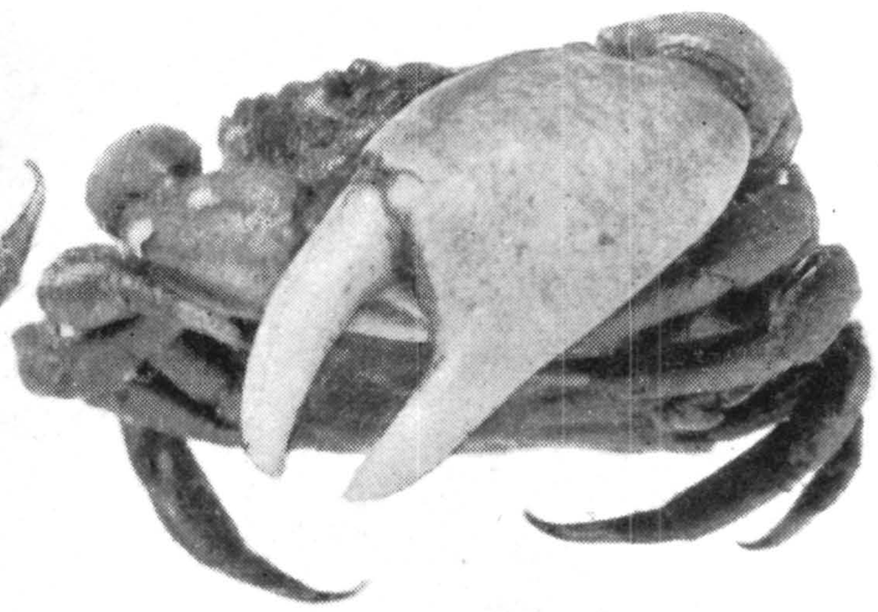
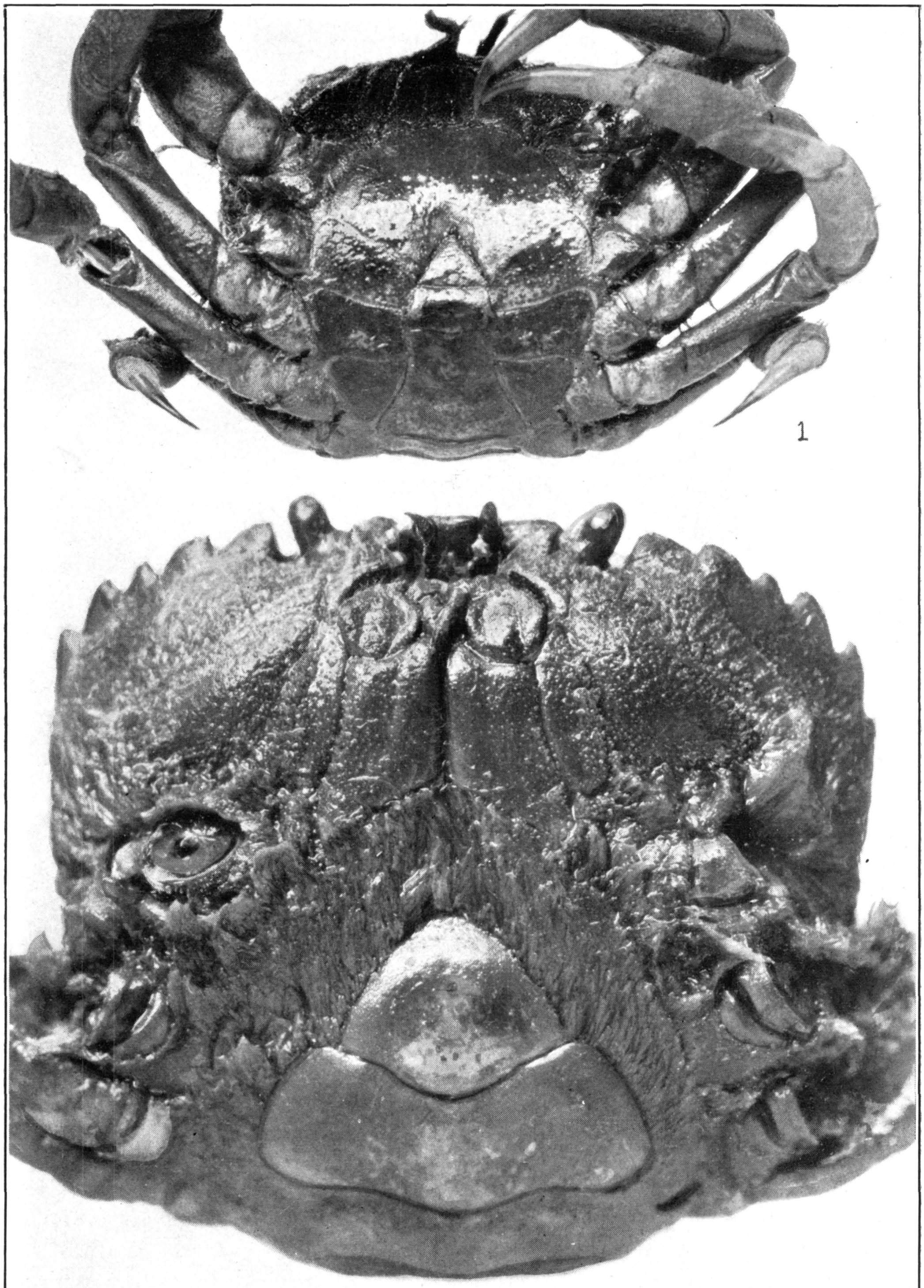


6

1. ACANTHOCYCLUS HASSLERI (P. 173). 2, 3, 5, 6. A. ALBATROSSIS (P. 172). 4. A. GAYI (P. 171)

FOR EXPLANATION OF PLATE SEE PAGE 572.



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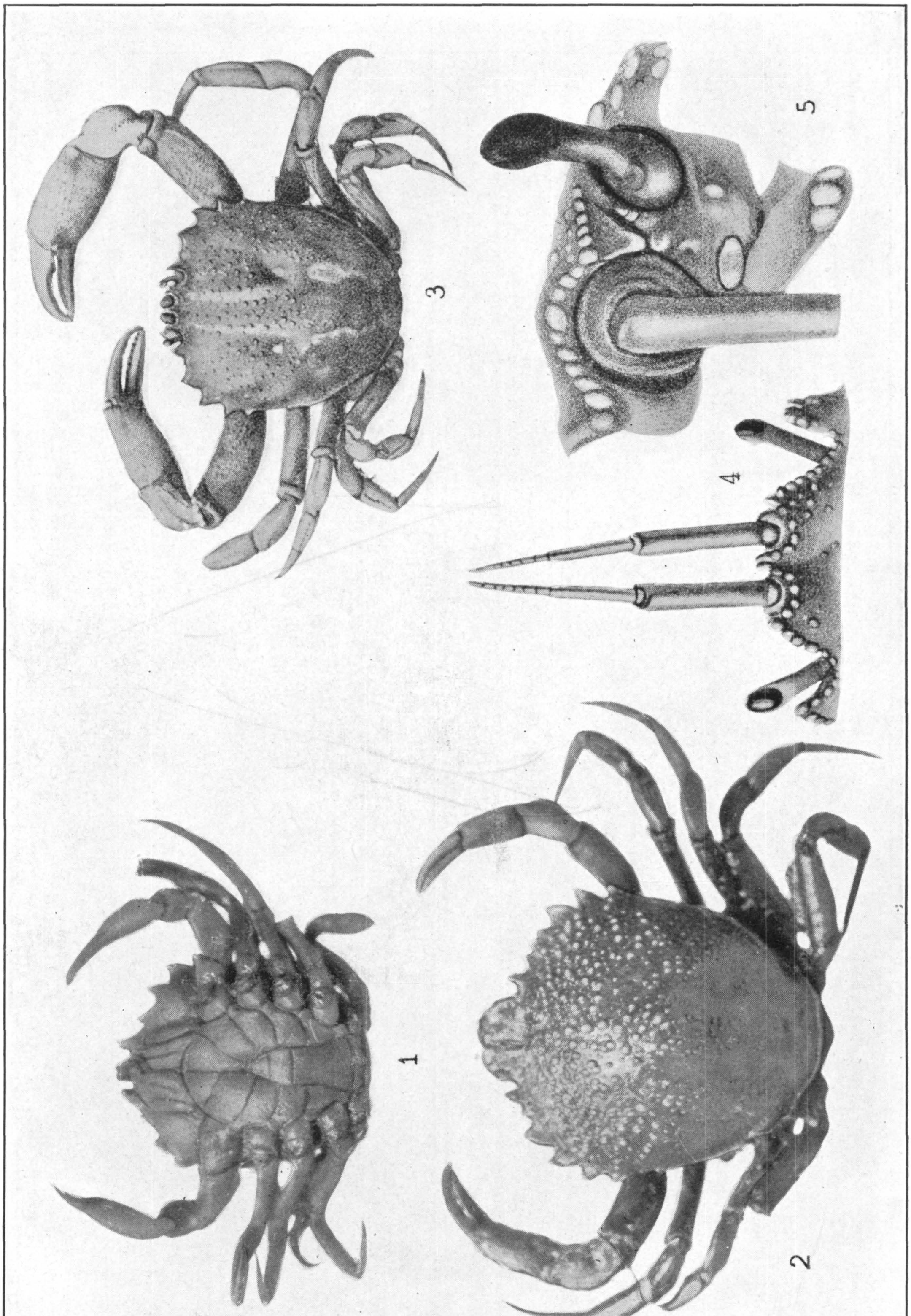
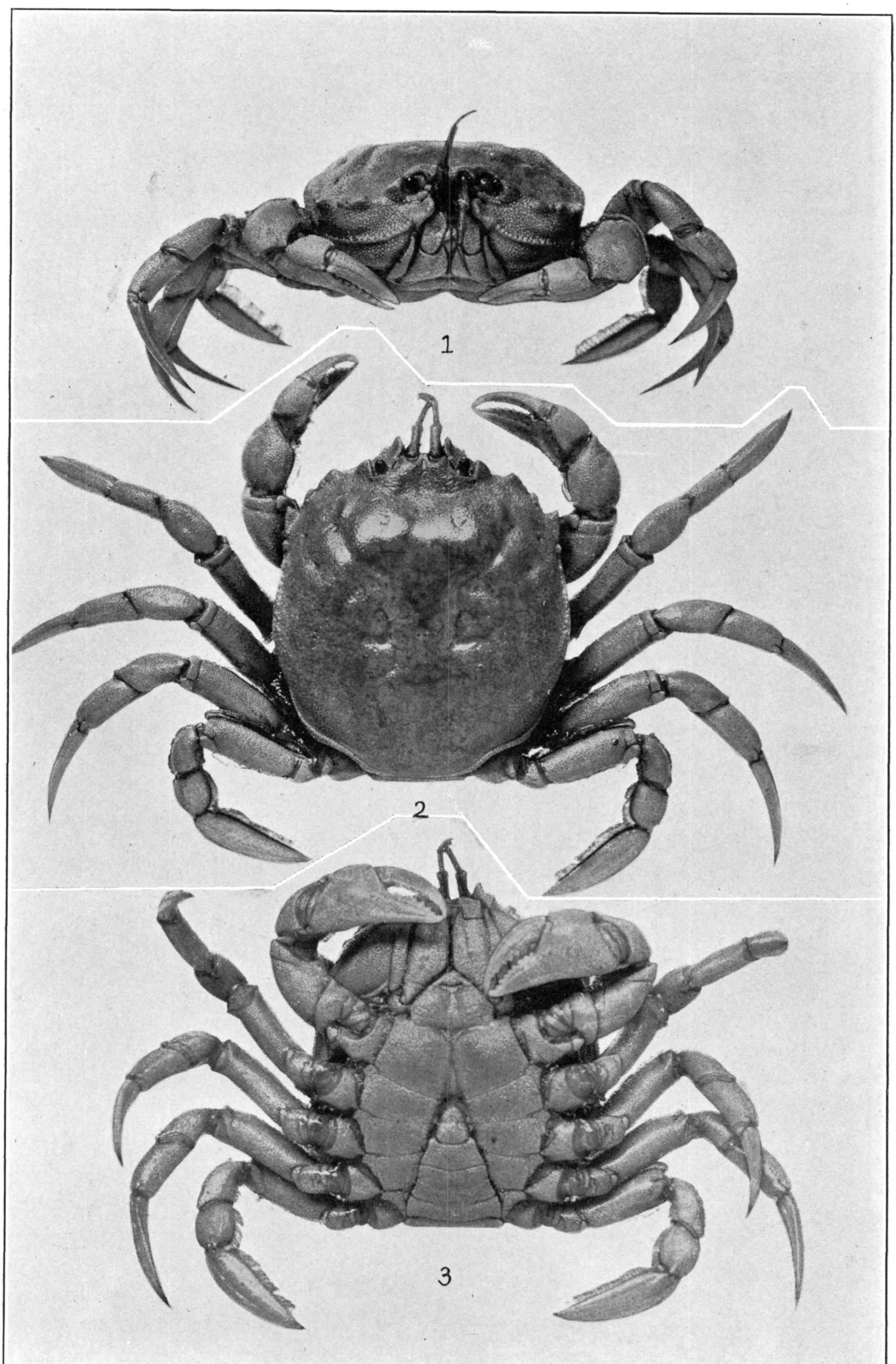
ACANTHOCYCLUS ALBATROSSIS (P. 172)

FOR EXPLANATION OF PLATE SEE PAGE 572.



CORYSTOIDES CHILENSIS (P. 174)

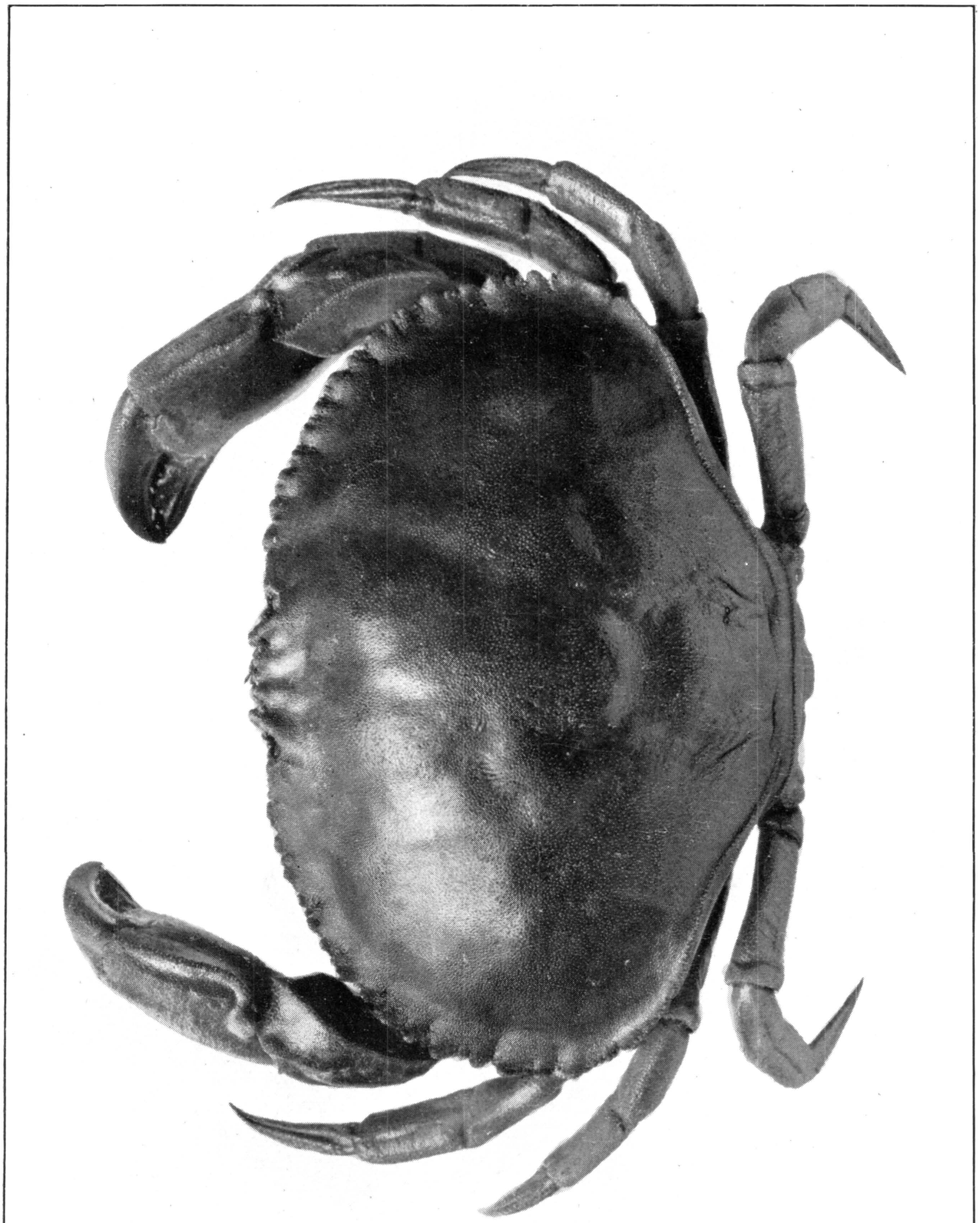
FOR EXPLANATION OF PLATE SEE PAGE 572.



BELLIA PICTA (P. 175)

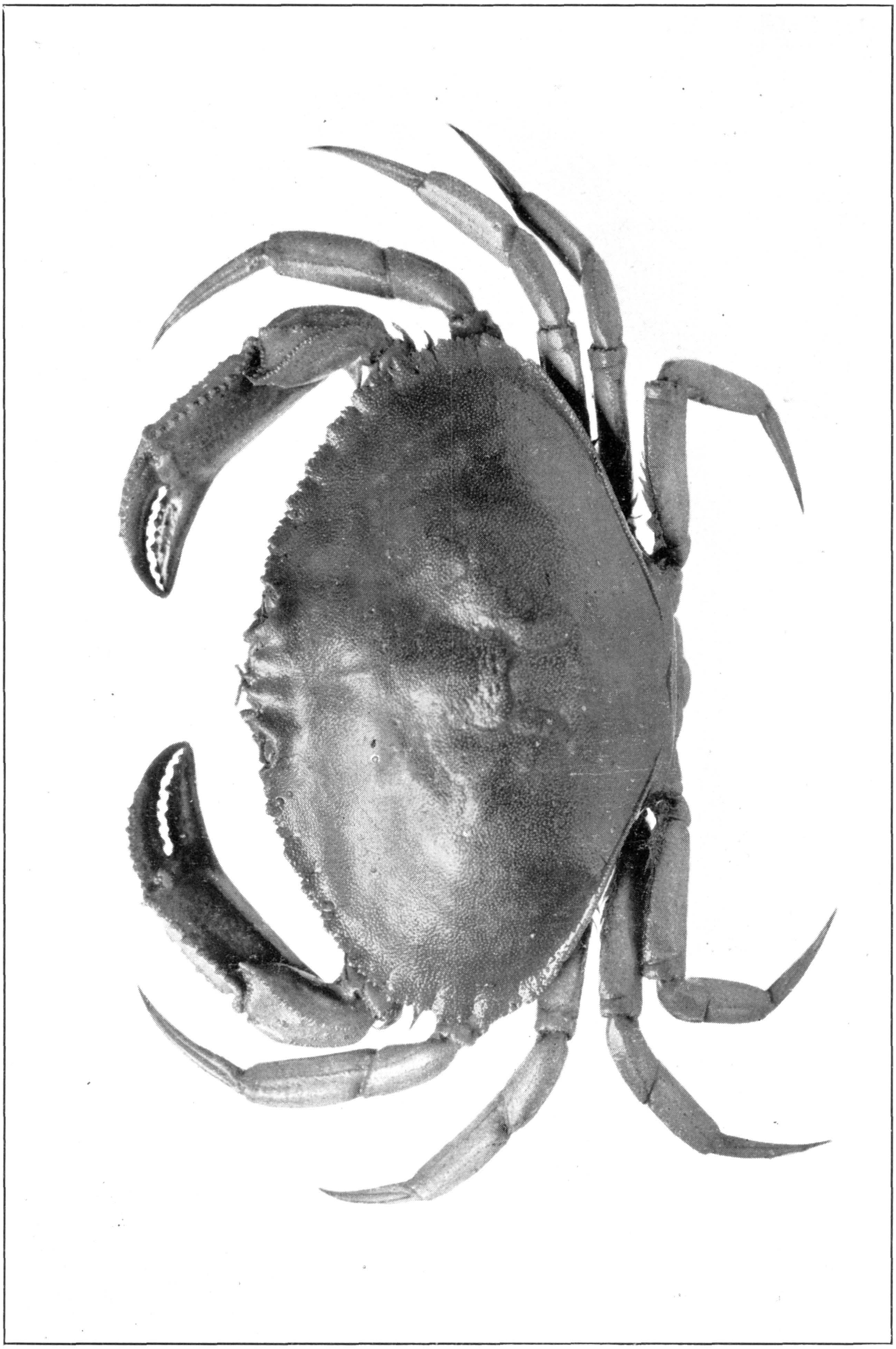
FOR EXPLANATION OF PLATE SEE PAGE 572.

79856—30———44



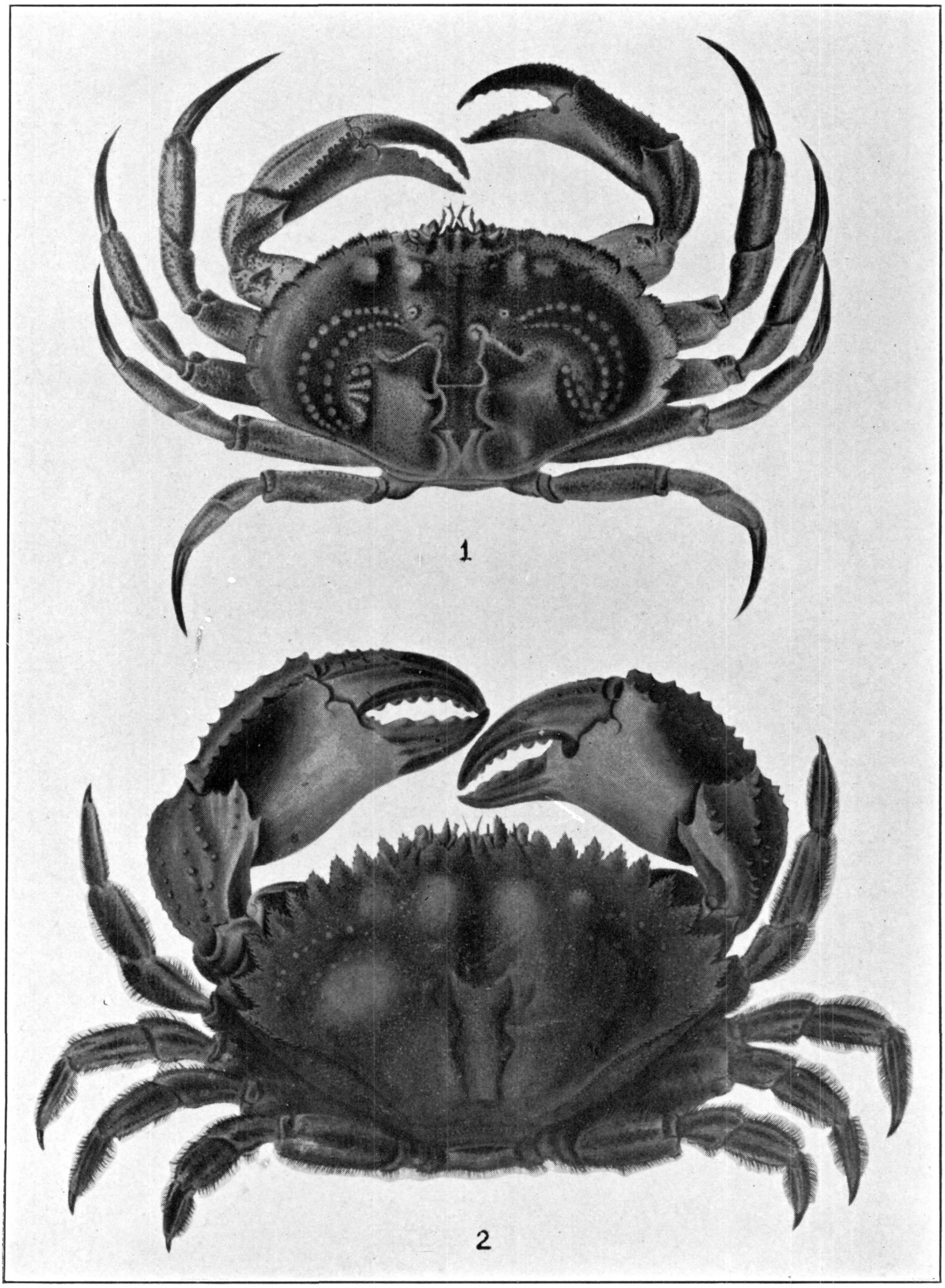
CANCER EDWARDSII (P. 193)

FOR EXPLANATION OF PLATE SEE PAGE 572.



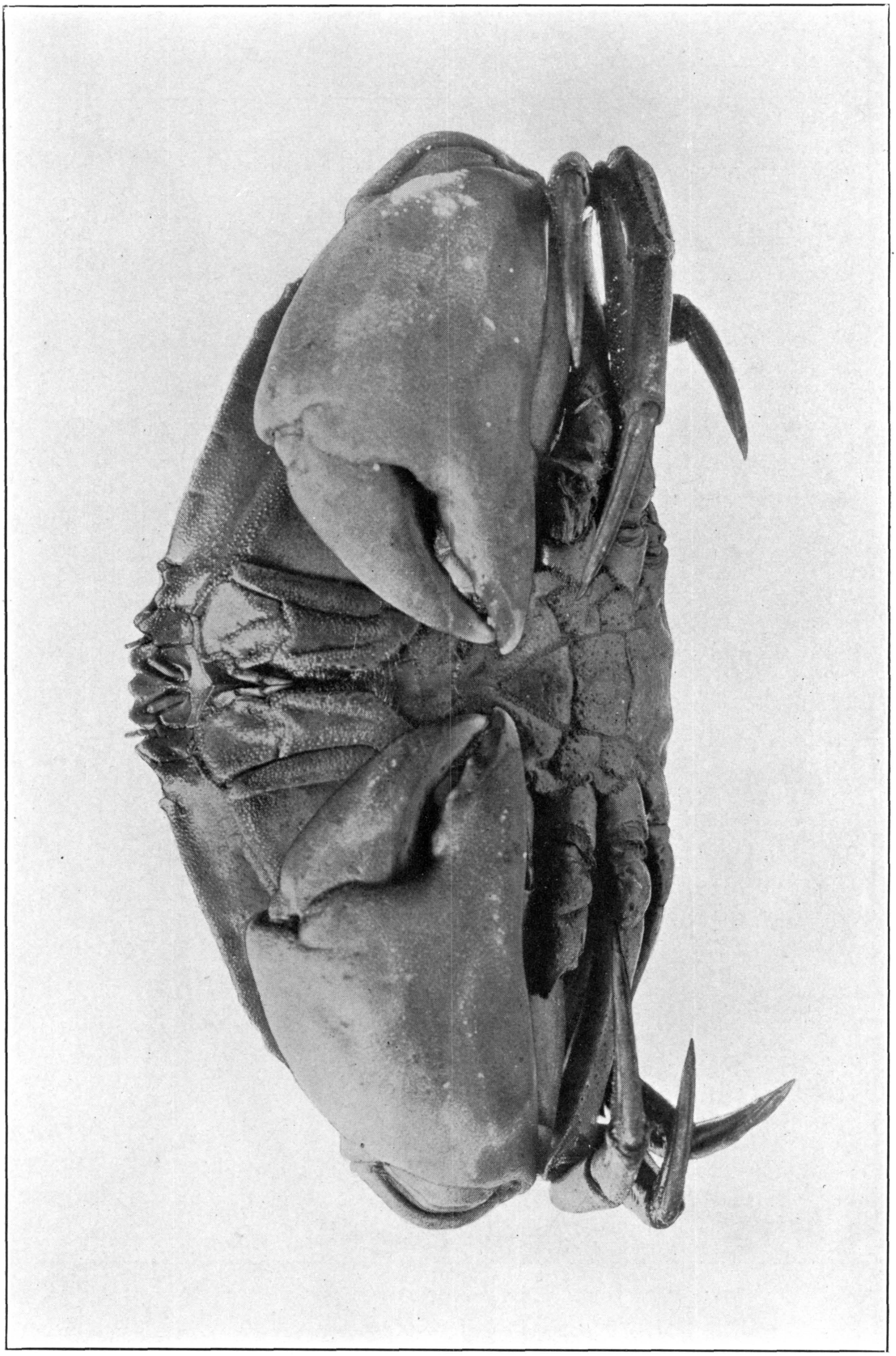
CANCER PLEBEJUS (P. 198)

FOR EXPLANATION OF PLATE SEE PAGE 572.



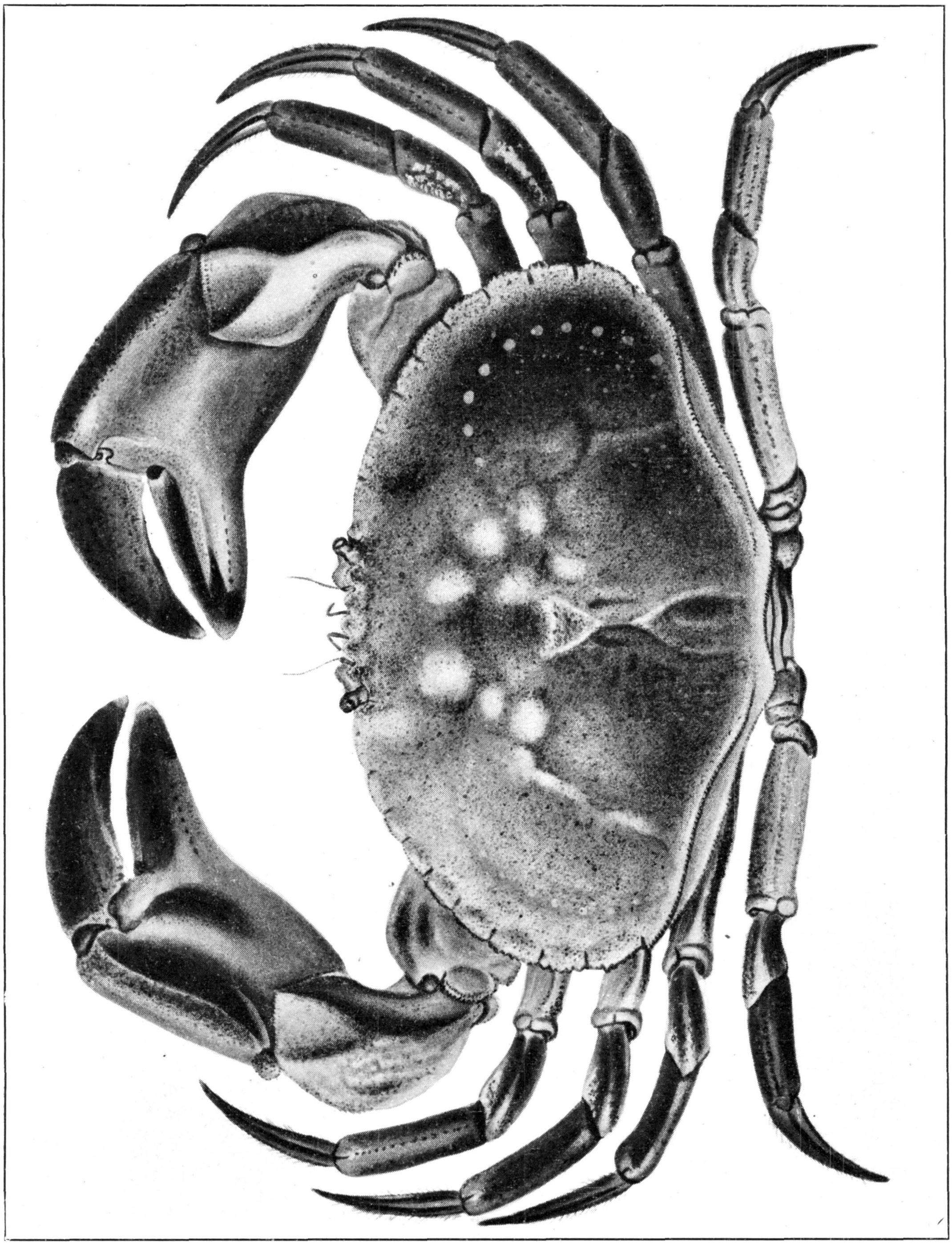
1. CANCER PLEBEJUS (P. 198). 2. C. POLYODON (P. 202)

FOR EXPLANATION OF PLATE SEE PAGE 572.



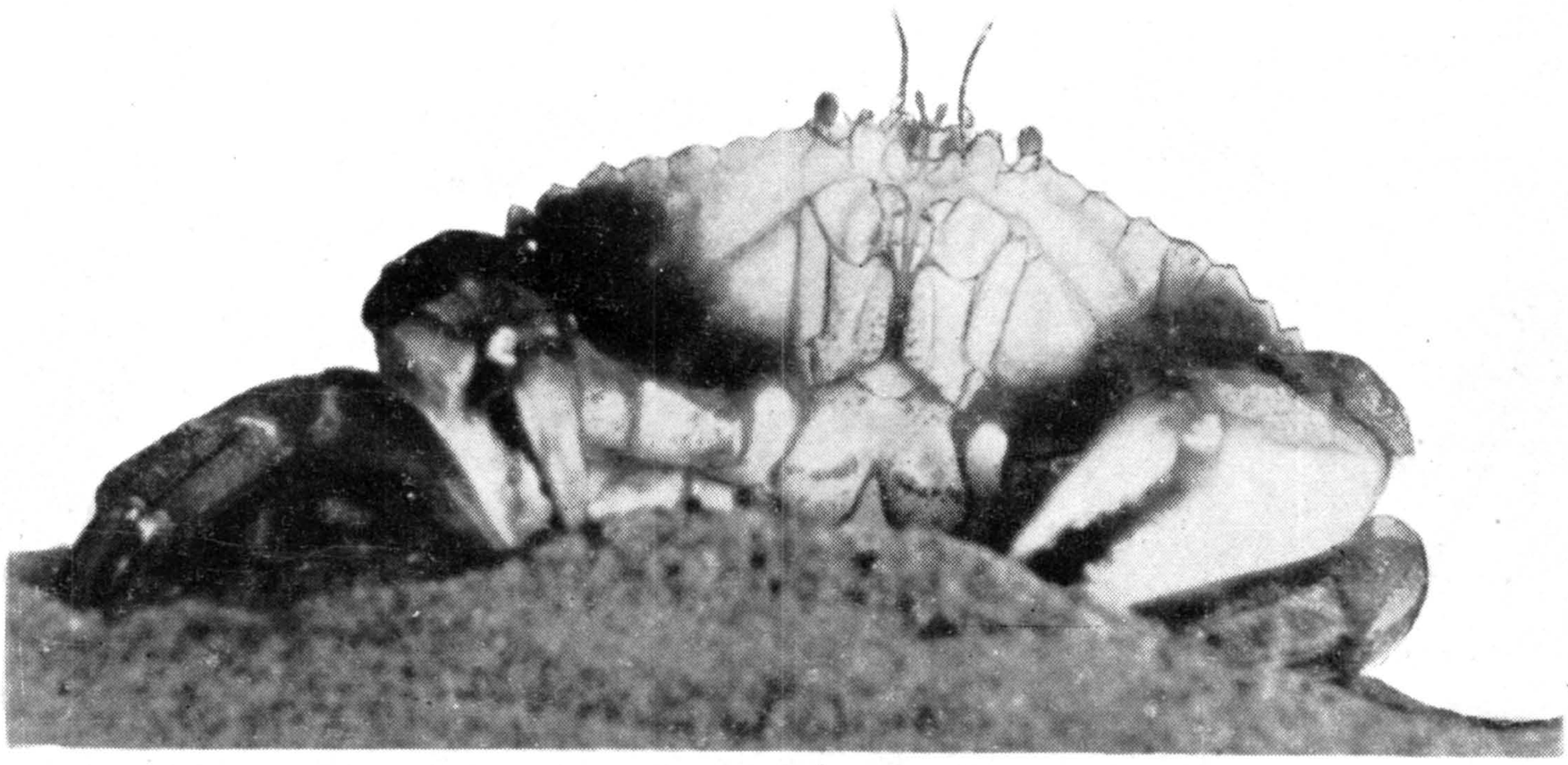
CANCER PORTERI (P. 199)

FOR EXPLANATION OF PLATE SEE PAGE 573.



CANCER PORTERI (P. 199)

FOR EXPLANATION OF PLATE SEE PAGE 573.



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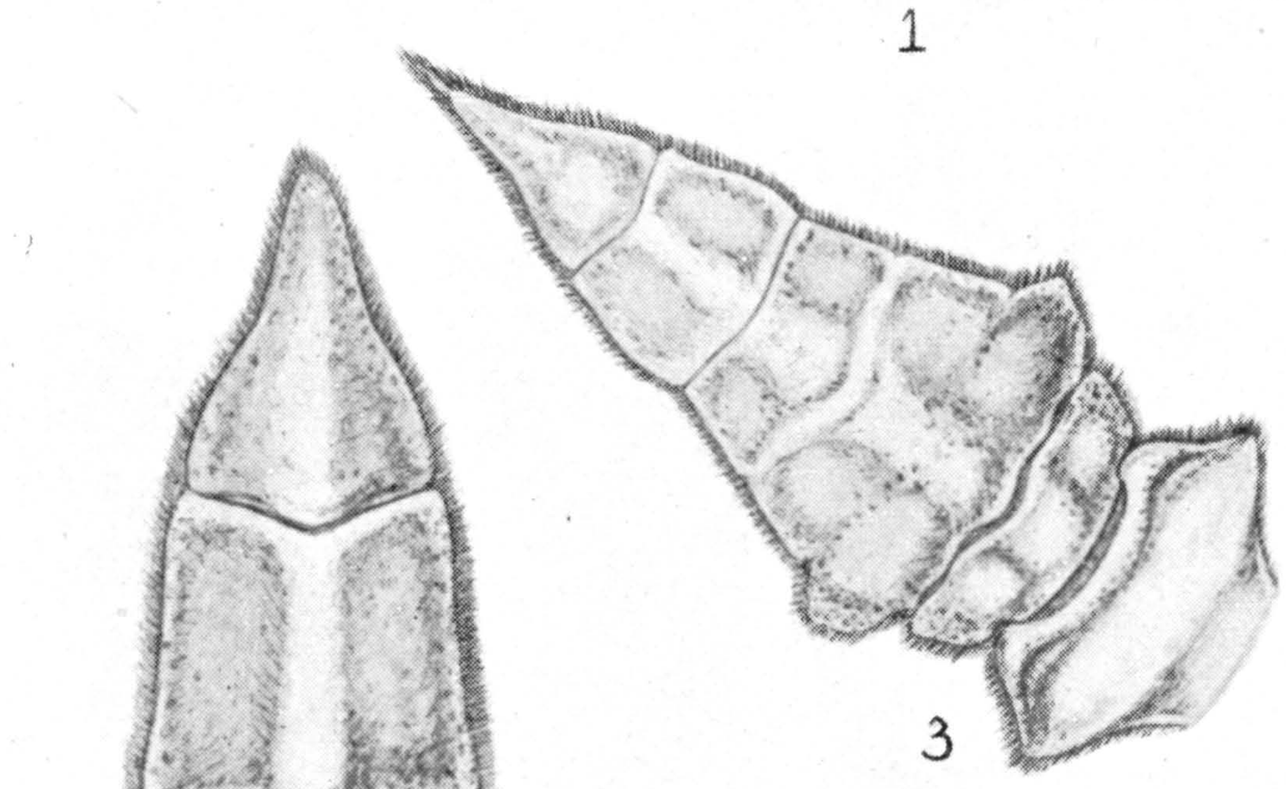

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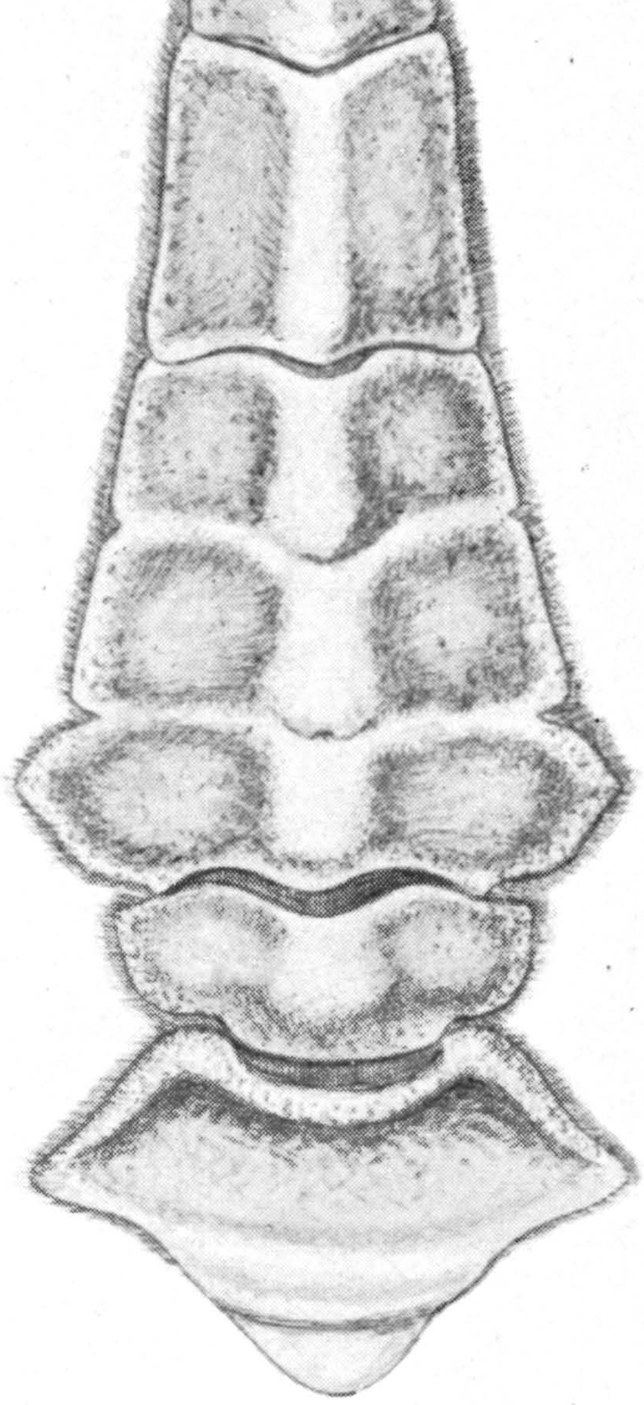

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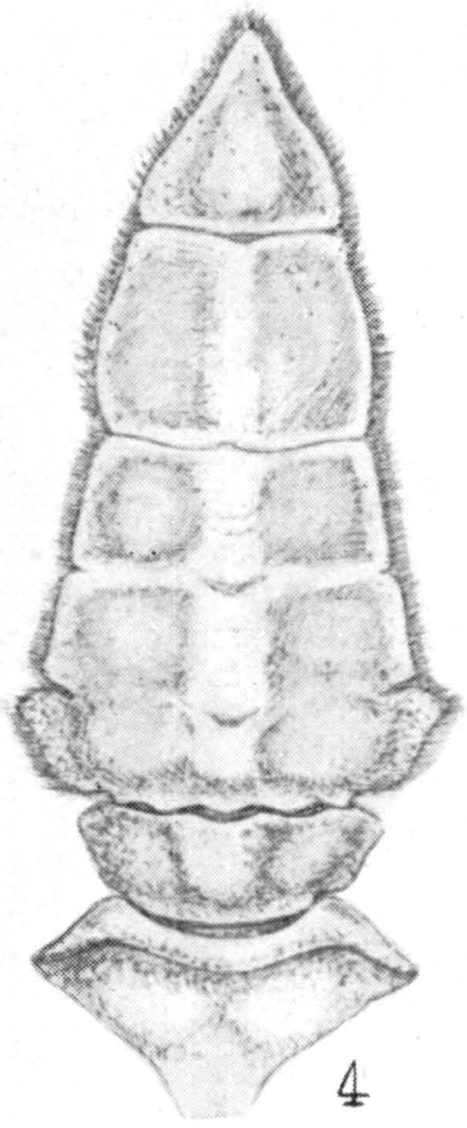

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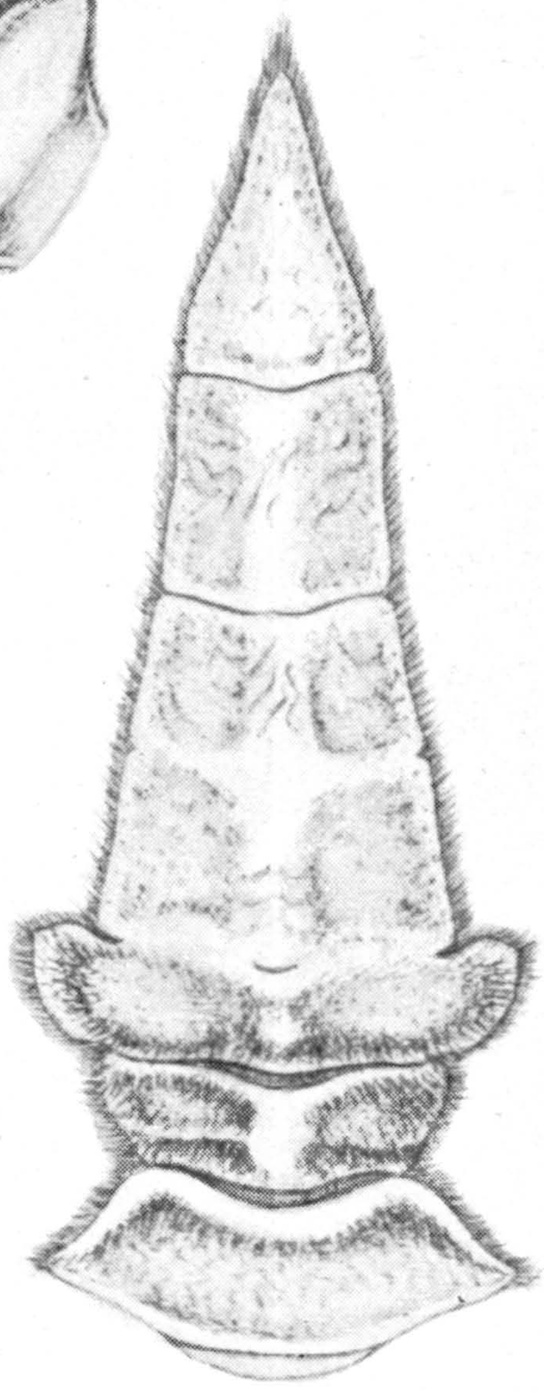
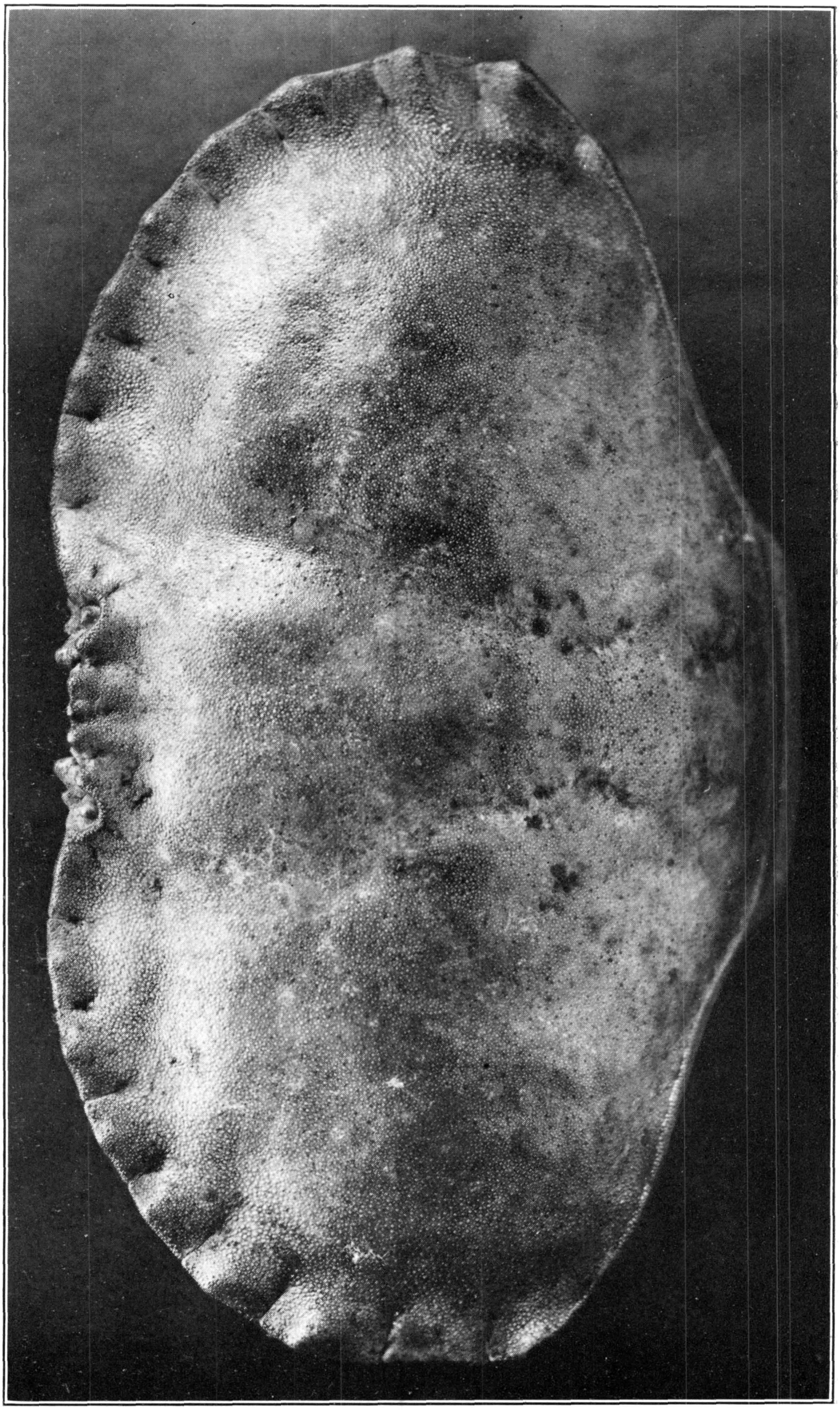


5

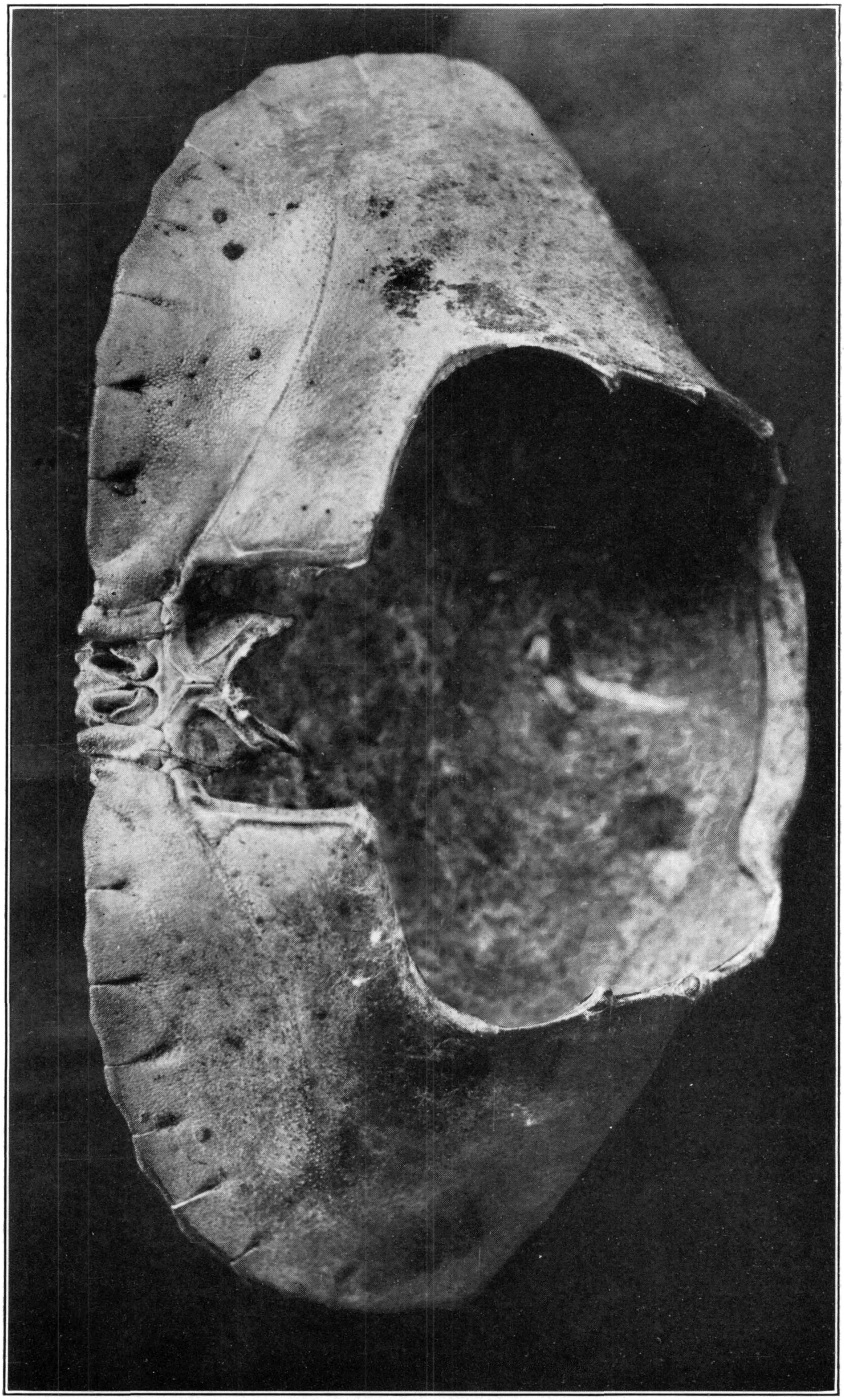
1. CANCER IRRORATUS (P. 180). 2. C. EDWARDSII (P. 193). 3. C. PLEBEJUS (P. 198). 4. C. PORTERI (P. 199). 5. C. POLYODON (P. 202)

FOR EXPLANATION OF PLATE SEE PAGE 573.



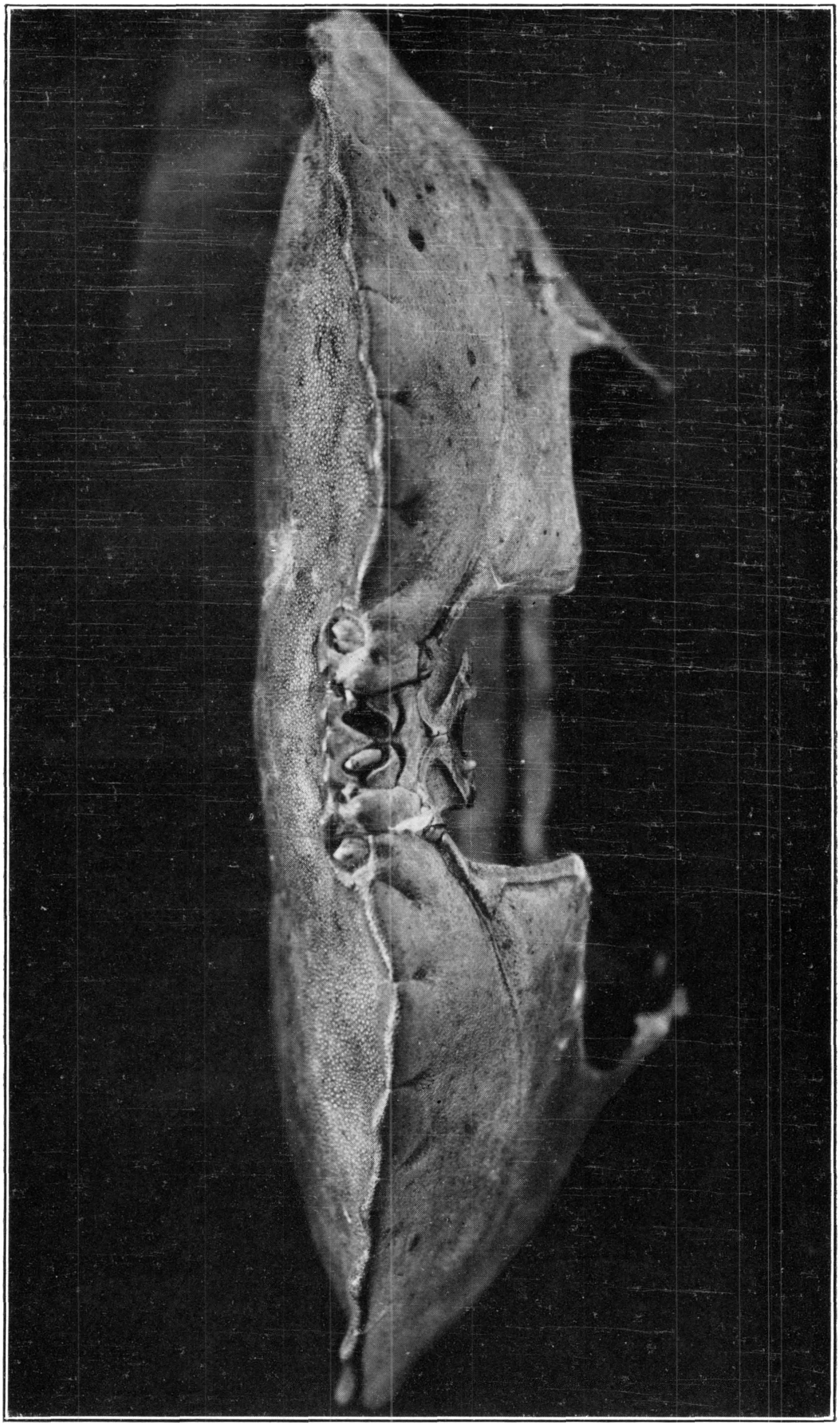
CANCER LUEDERWALDTI (P. 200)

FOR EXPLANATION OF PLATE SEE PAGE 573.



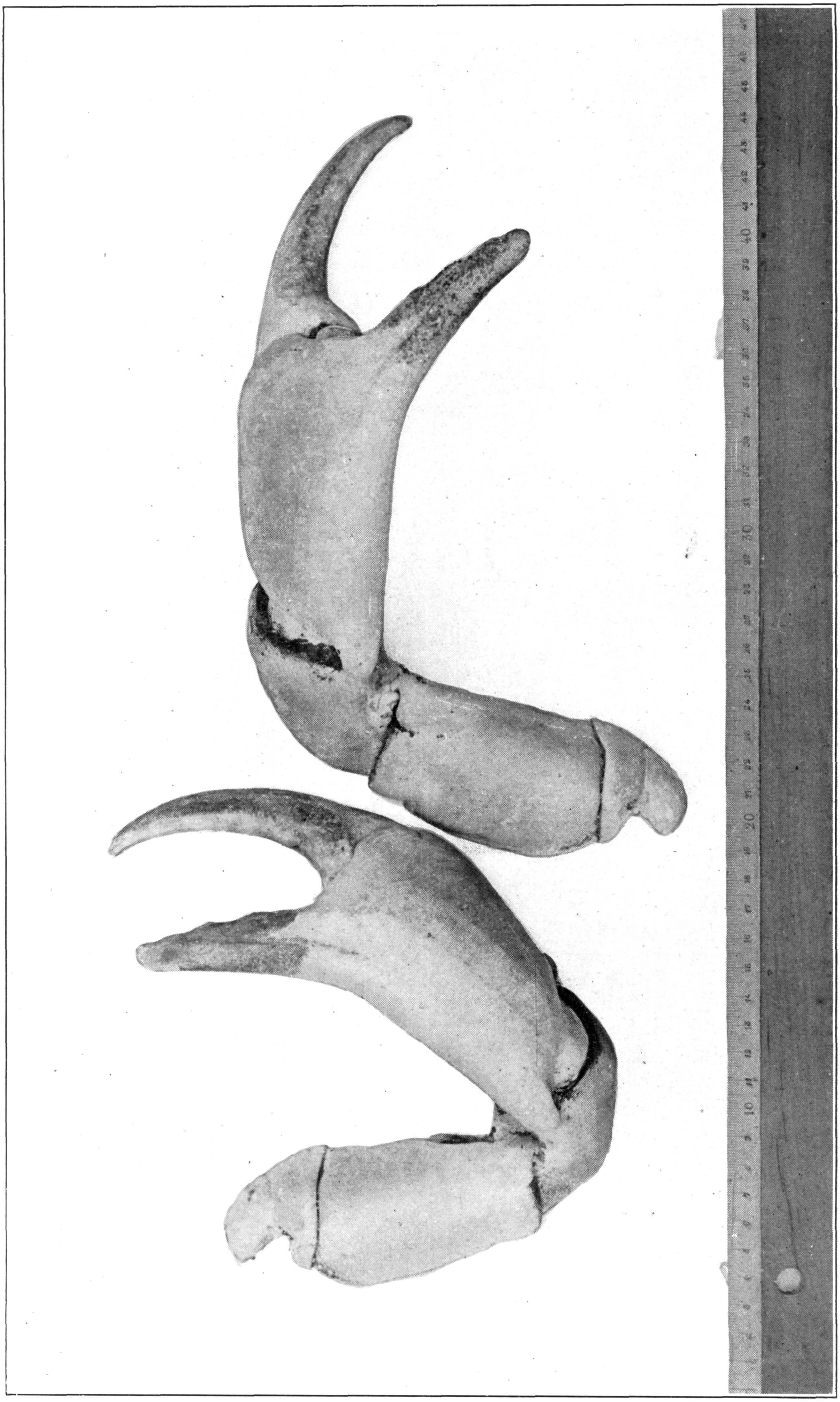
CANCER LUEDERWALDTI (P. 200)

FOR EXPLANATION OF PLATE SEE PAGE 573.



CANCER LUEDERWALDTI (P. 200)

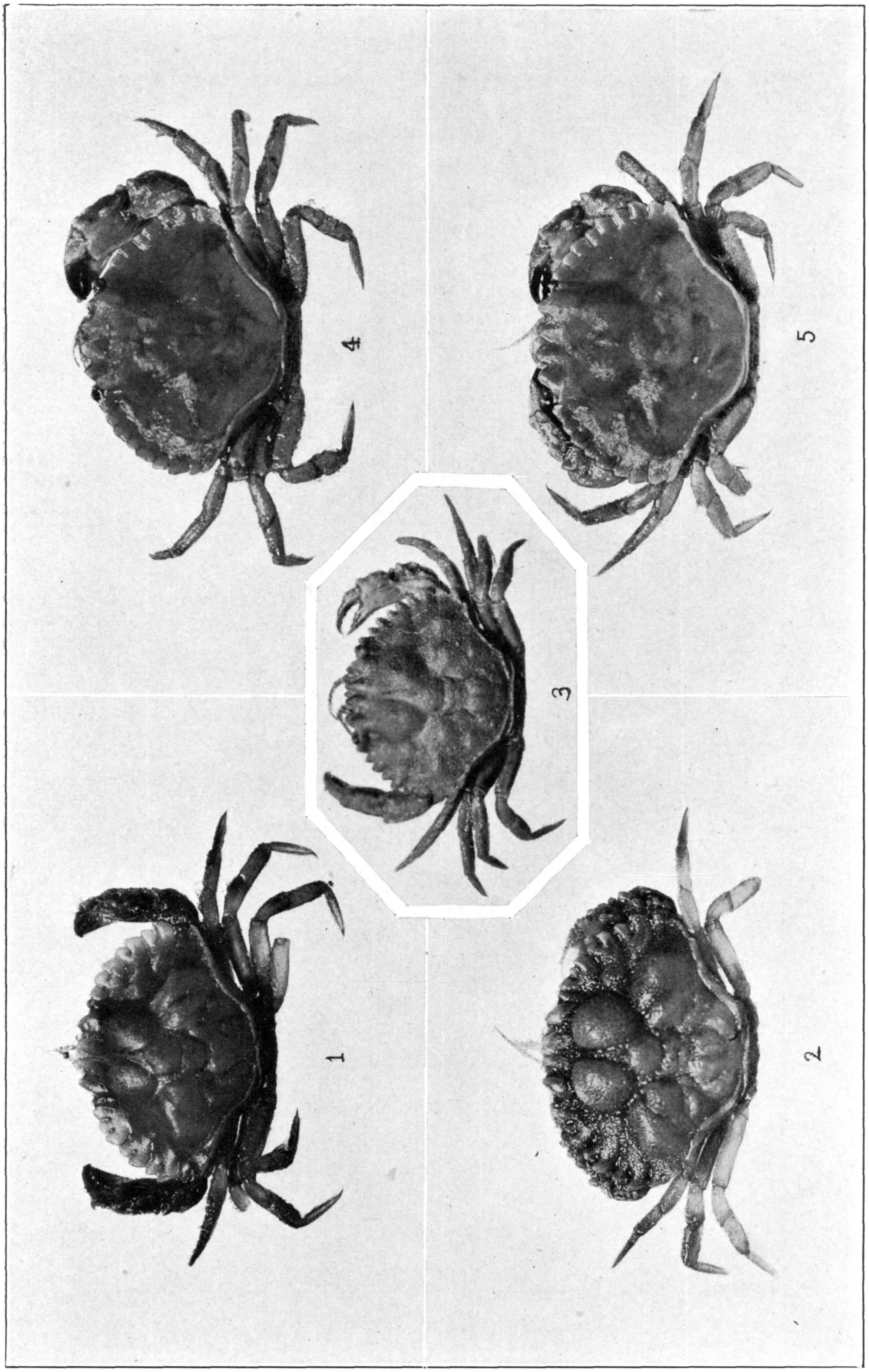
FOR EXPLANATION OF PLATE SEE PAGE 573.



CANCER LUEDERWALDTI (P. 200)

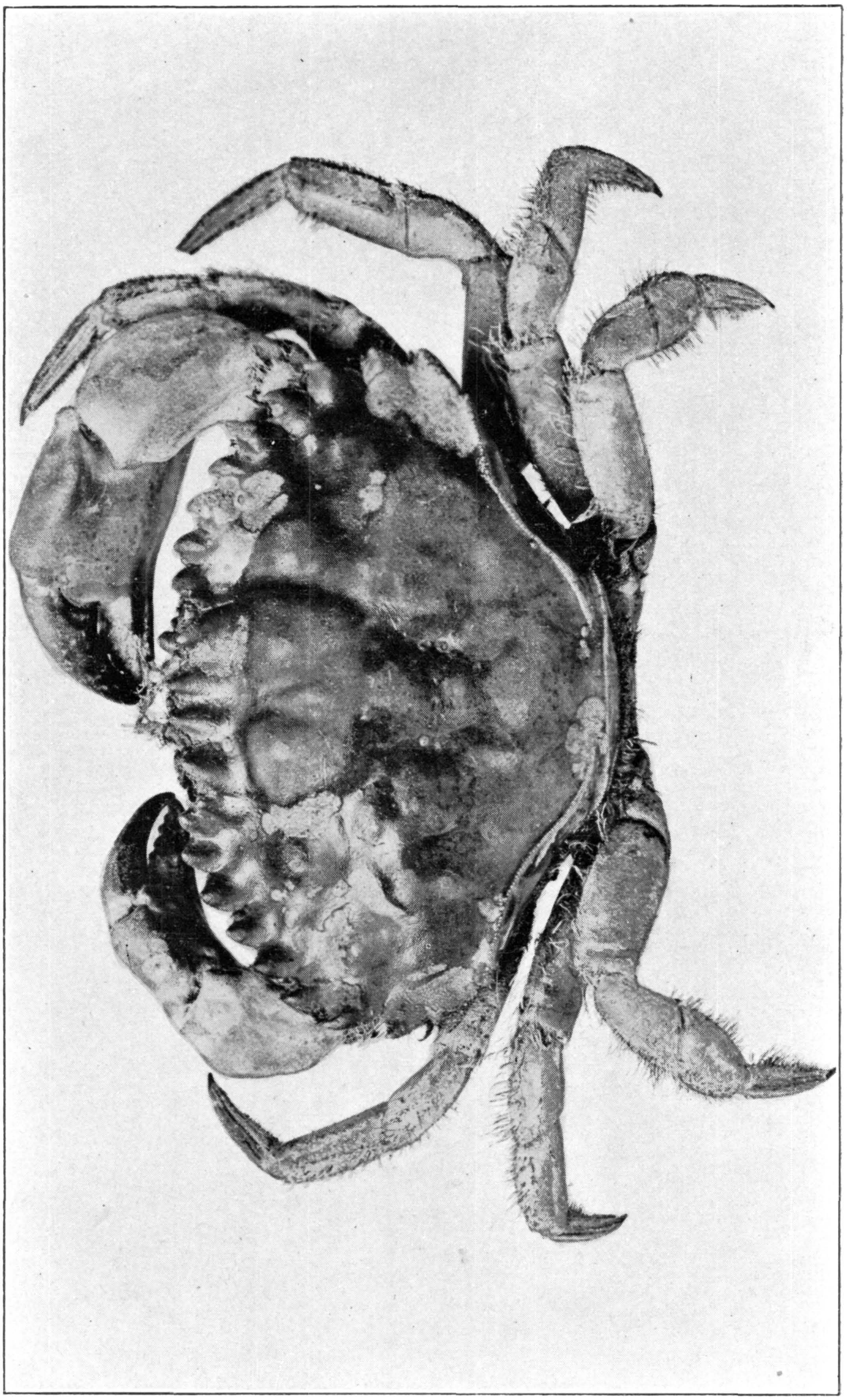
CANCER POLYODON (P. 202)

FOR EXPLANATION OF PLATE SEE PAGE 573.



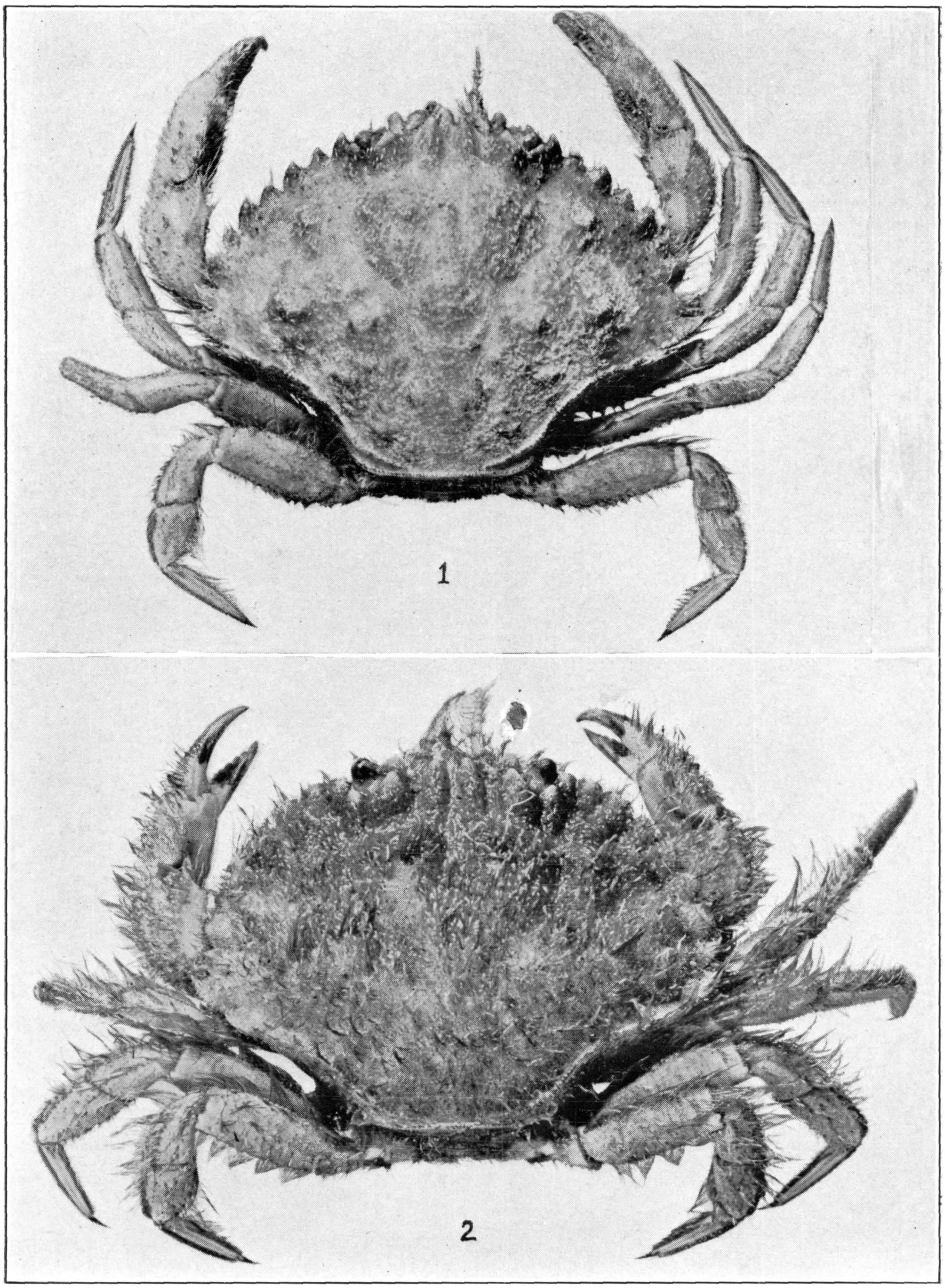
CANCER AMPHIOETUS (P. 205)

FOR EXPLANATION OF PLATE SEE PAGE 573.



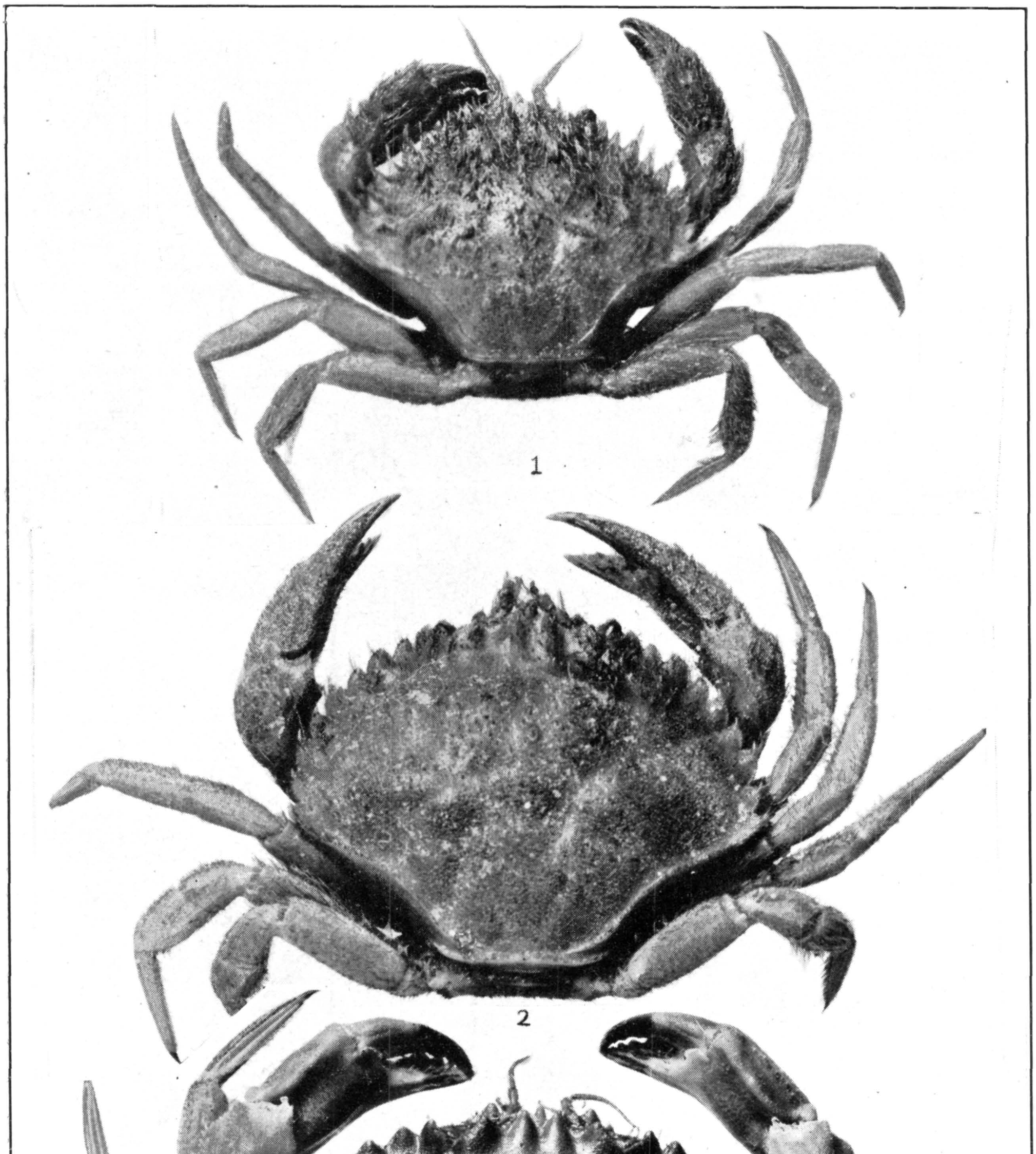
CANCER ANTENNARIUS (P. 210)

FOR EXPLANATION OF PLATE SEE PAGE 573.



1. CANCER BRANNERI (P. 211). 2. C. ANTENNARIUS (P. 210)

FOR EXPLANATION OF PLATE SEE PAGE 573.



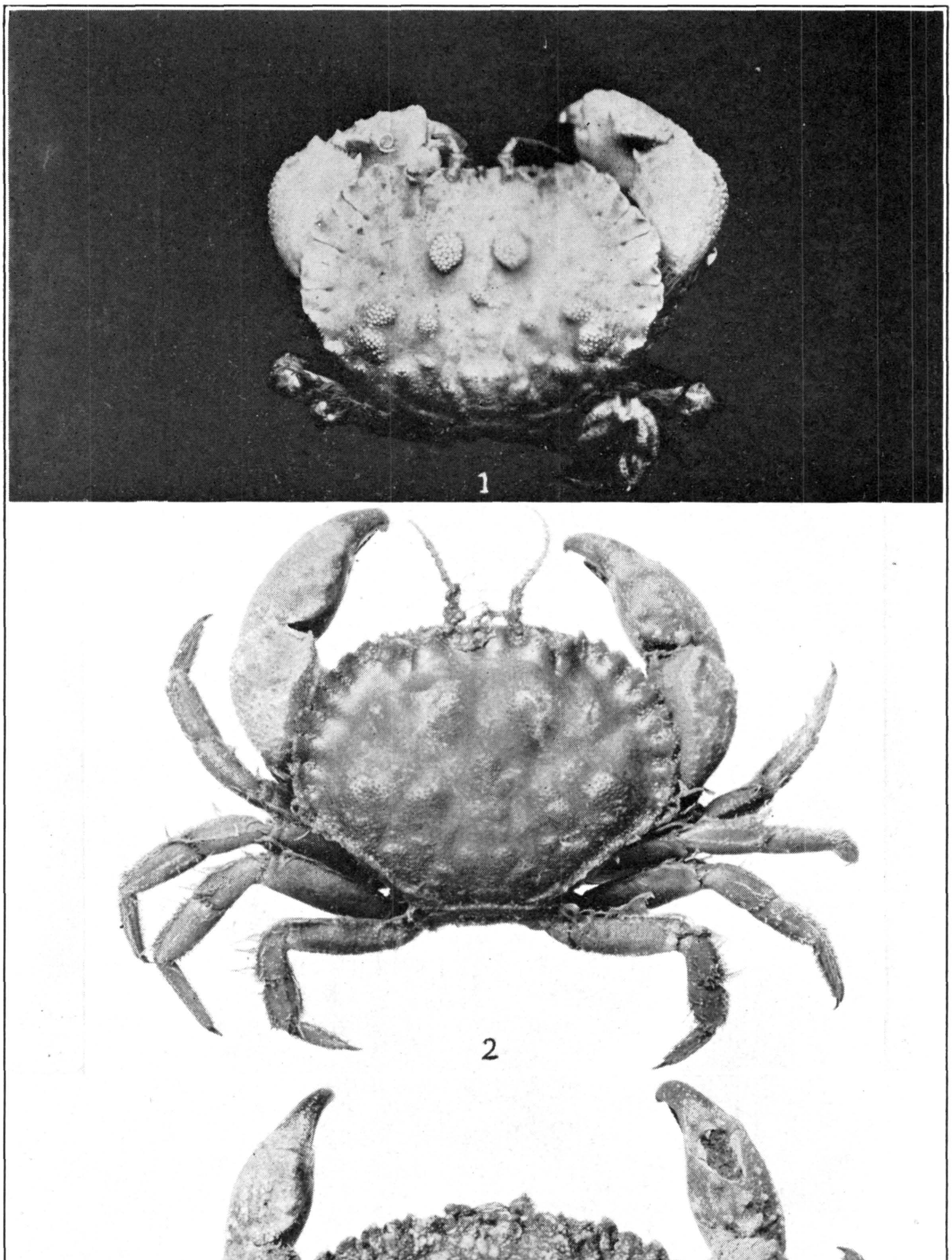
1, 2. CANCER JORDANI (P. 215). 3. C. ANTHONYI (P. 218)

FOR EXPLANATION OF PLATE SEE PAGE 574.

CANCER GRACILIS (P. 219)

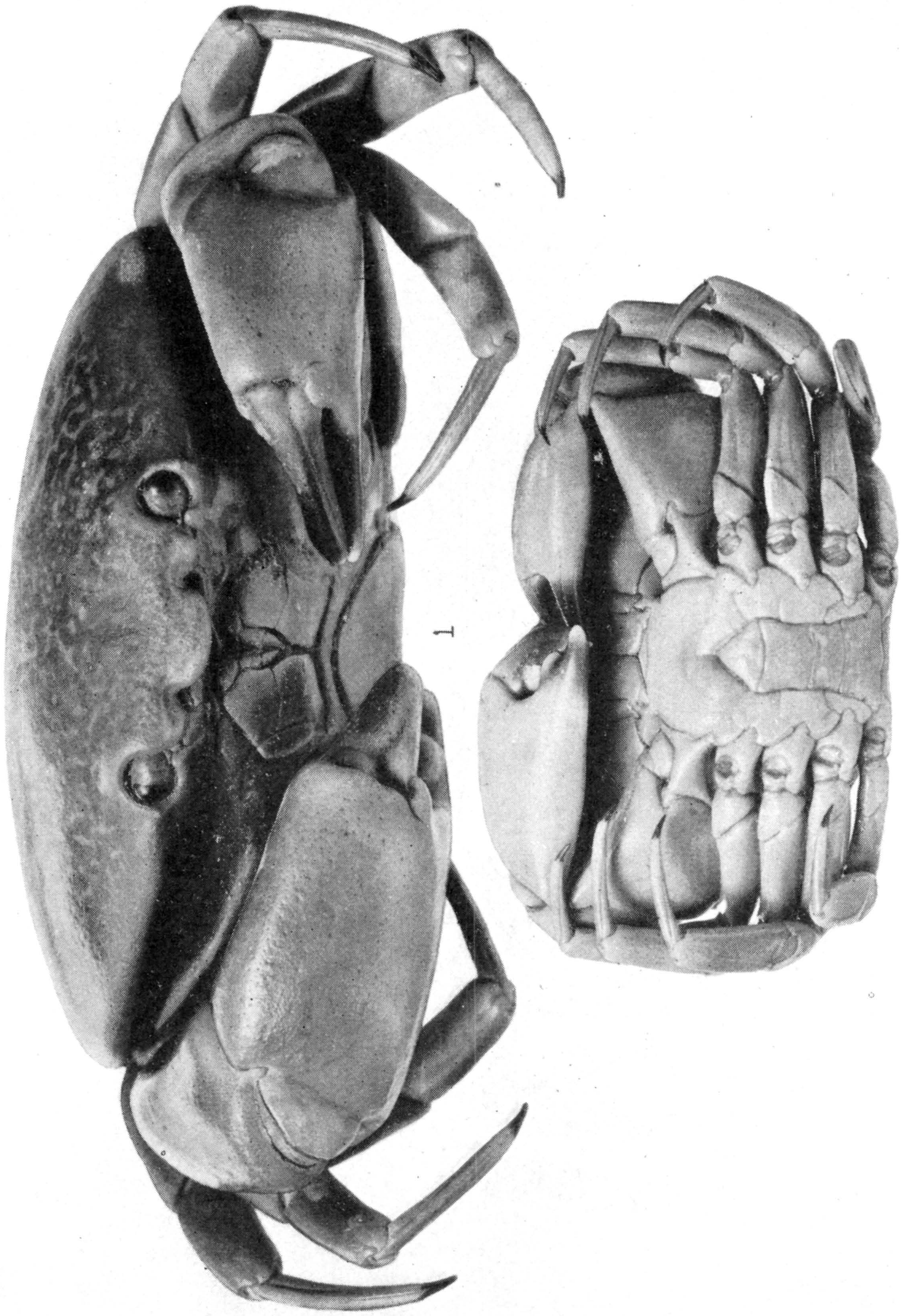
FOR EXPLANATION OF PLATE SEE PAGE 574.

79856—30——45



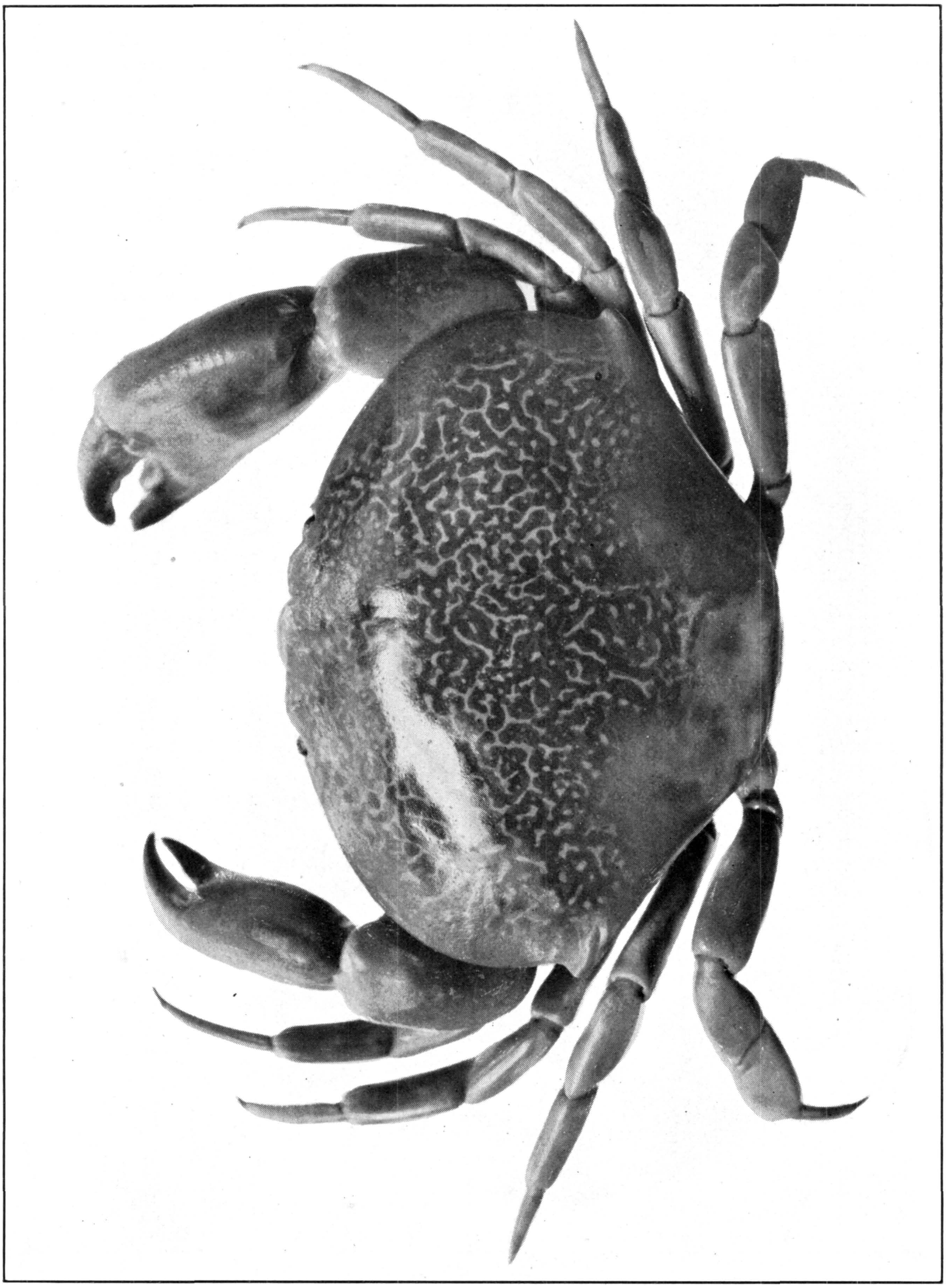
CANCER OREGONENSIS (P. 226)

FOR EXPLANATION OF PLATE SEE PAGE 574.



CARPILIUS CORALLINUS (P. 240)

FOR EXPLANATION OF PLATE SEE PAGE 574.

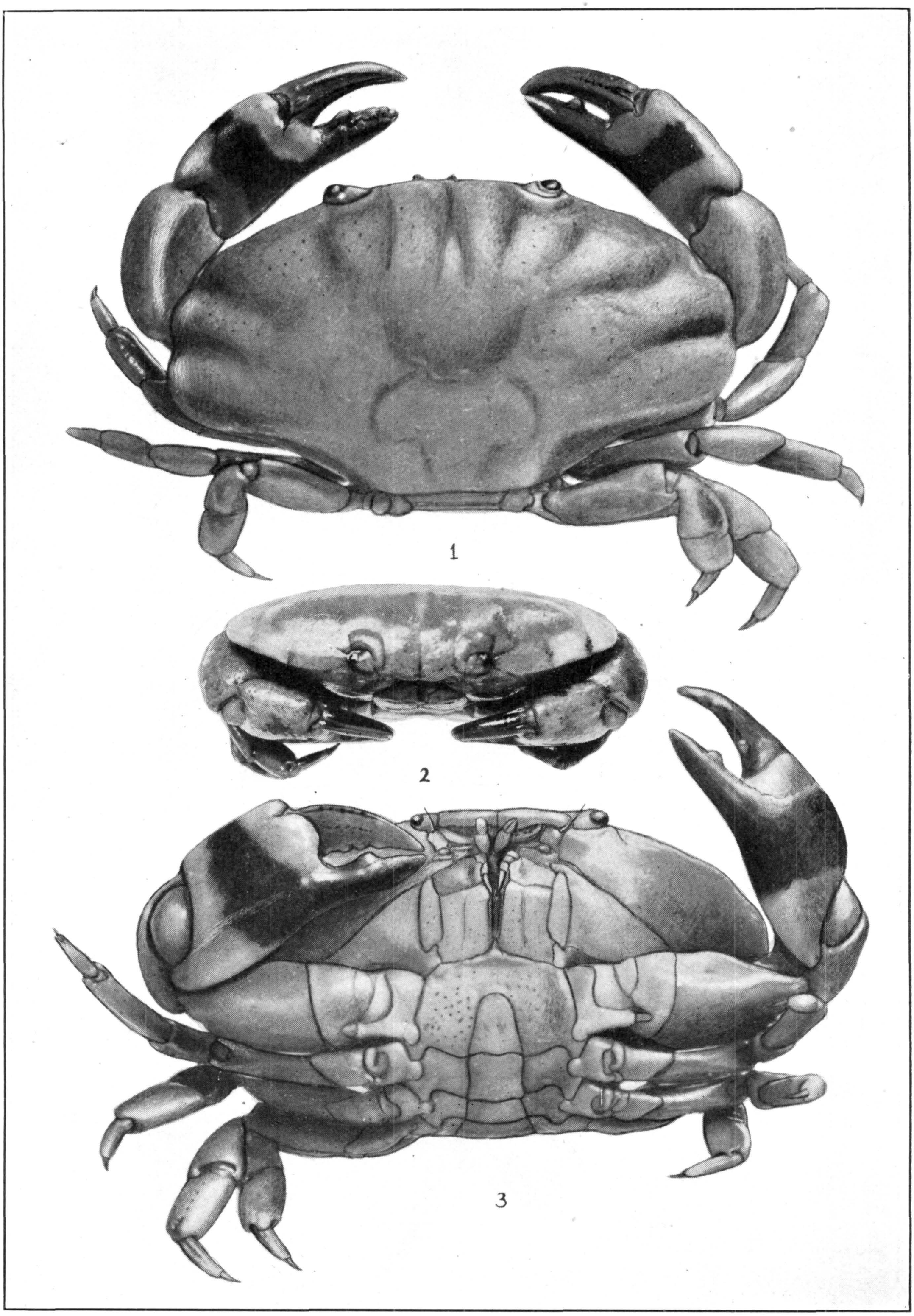


CARPILIUS CORALLINUS (P. 240)

FOR EXPLANATION OF PLATE SEE PAGE 574.

CARPILIUS CORALLINUS (P. 240)

FOR EXPLANATION OF PLATE SEE PAGE 574.



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CARPILODES CINCTIMANUS (P. 242)

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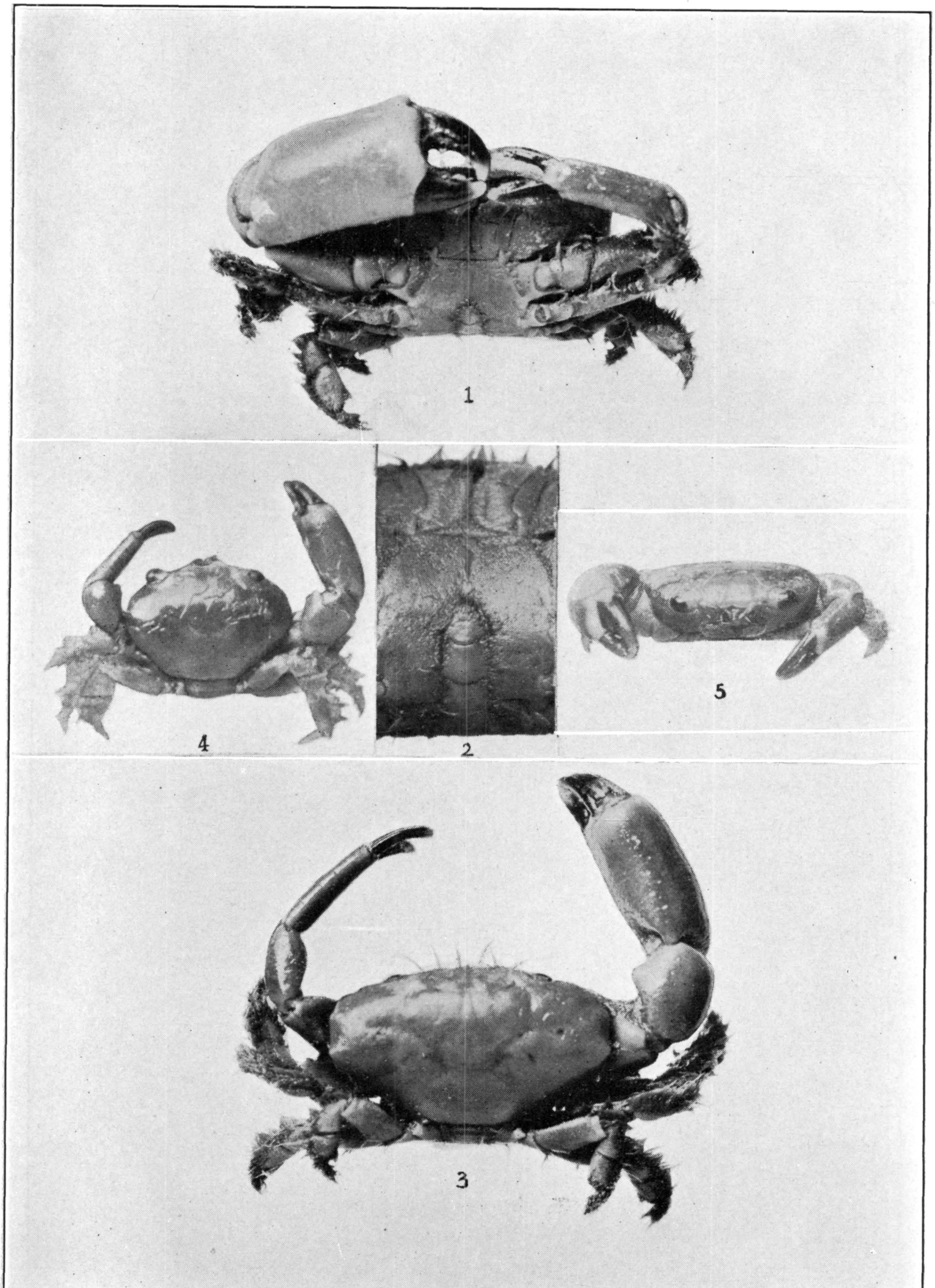
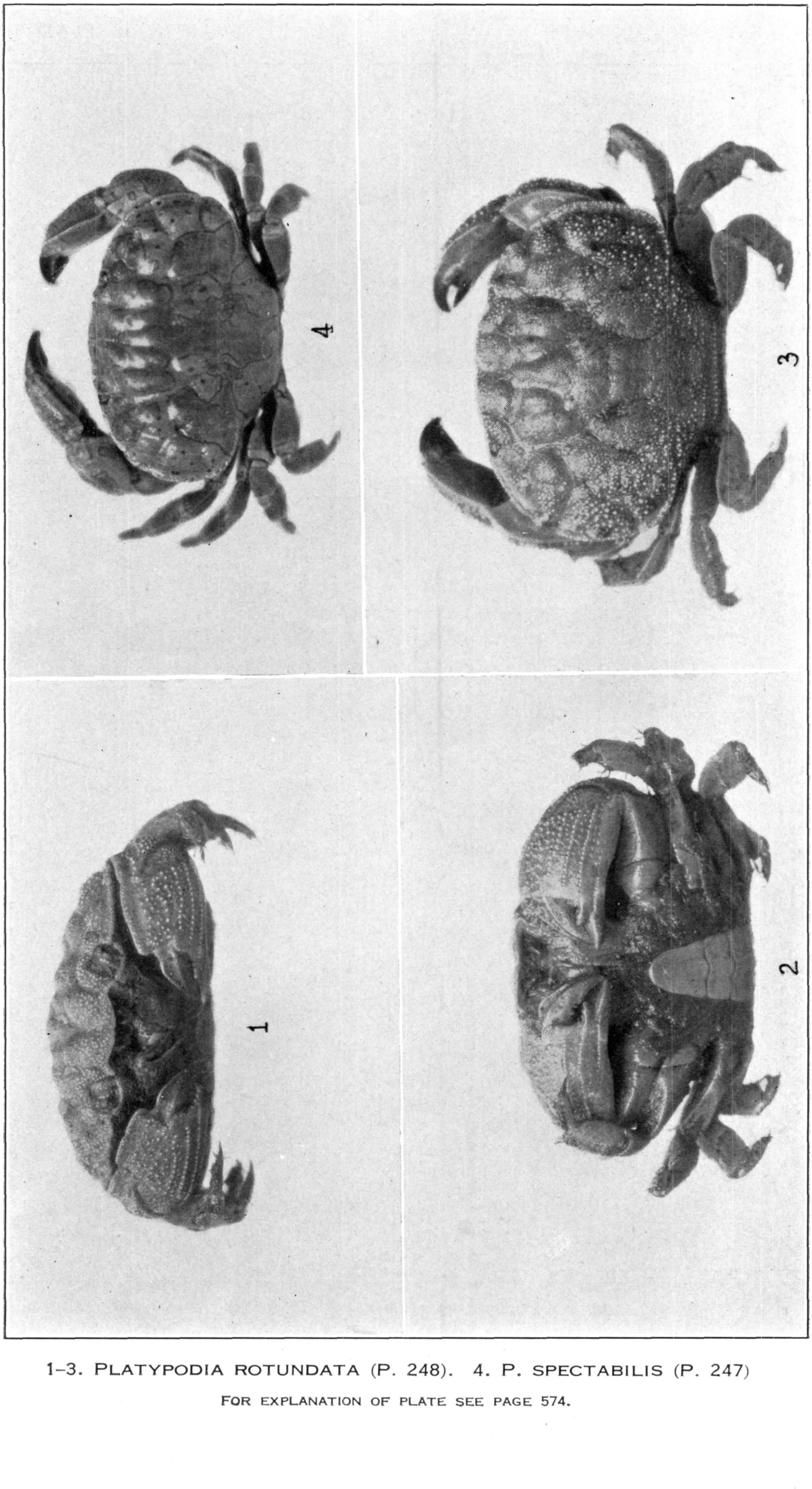


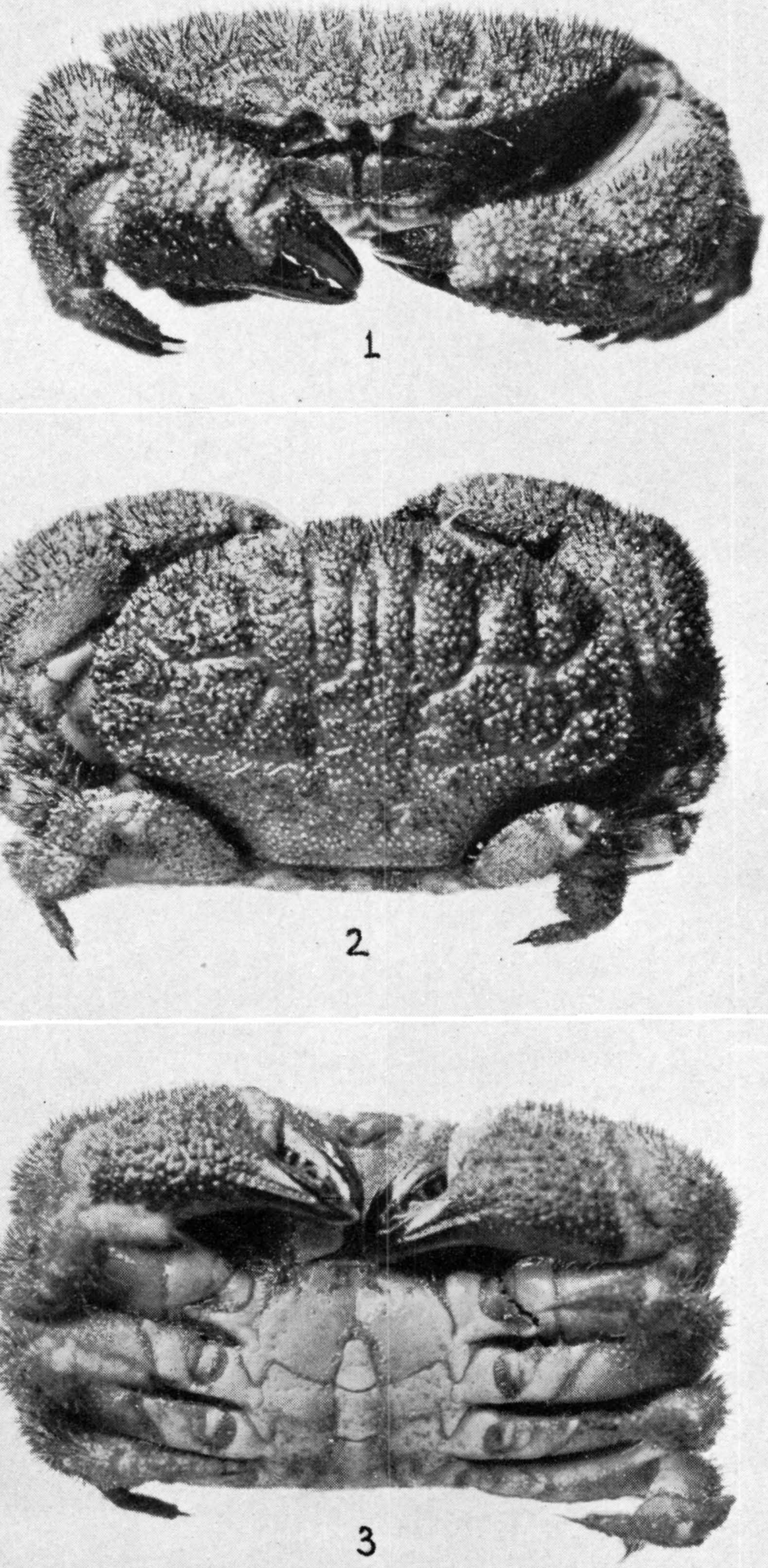
1–3. PARALIOMERA LONGIMANA (P. 243). 4, 5. P. DISPAR (P. 244)

FOR EXPLANATION OF PLATE SEE PAGE 574.



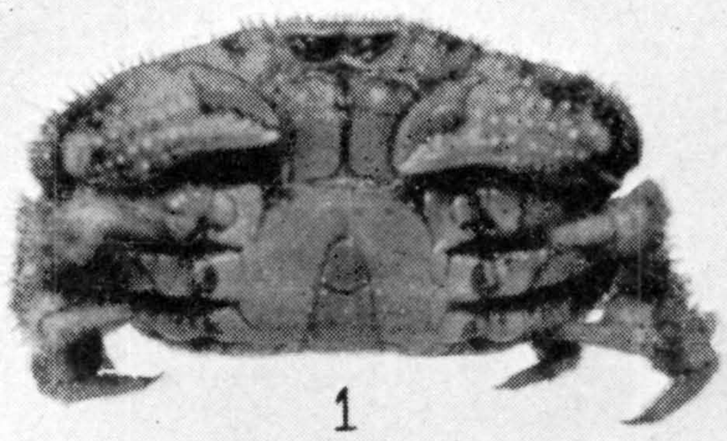
1–3. PLATYPODIA ROTUNDATA (P. 248). 4. P. SPECTABILIS (P. 247)

FOR EXPLANATION OF PLATE SEE PAGE 574.



ACTAEA SETIGERA (P. 251)

FOR EXPLANATION OF PLATE SEE PAGE 575.



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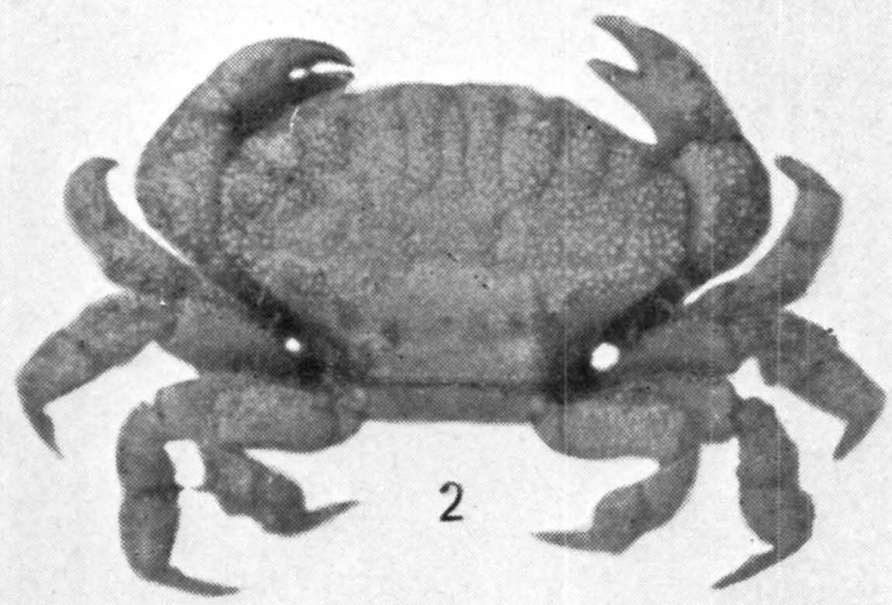

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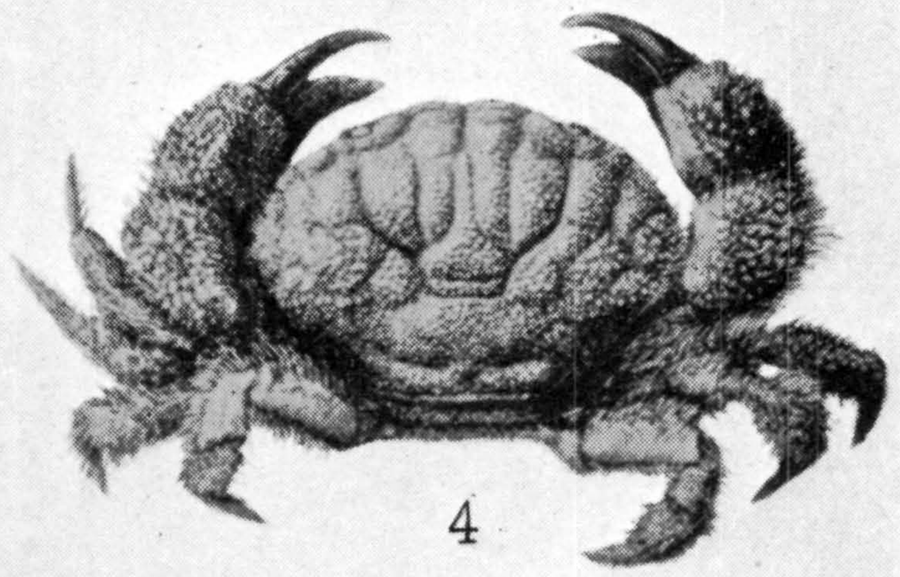

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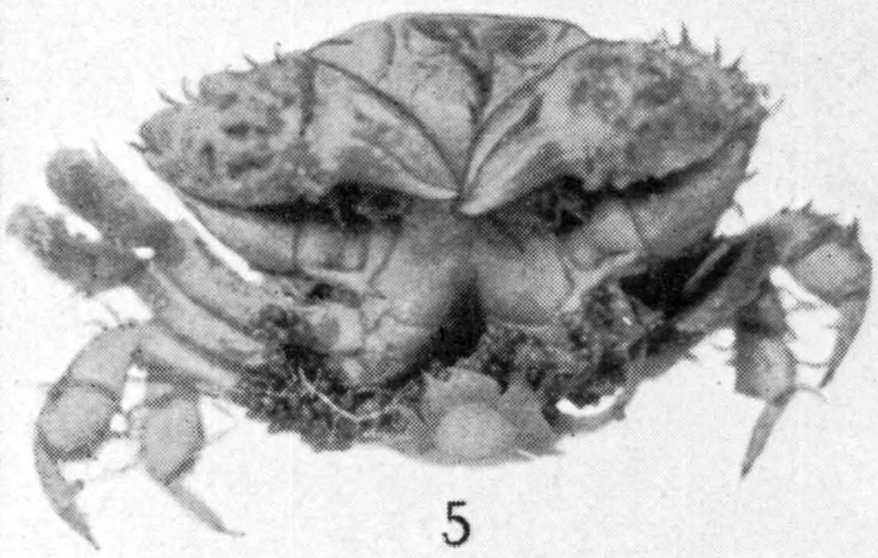

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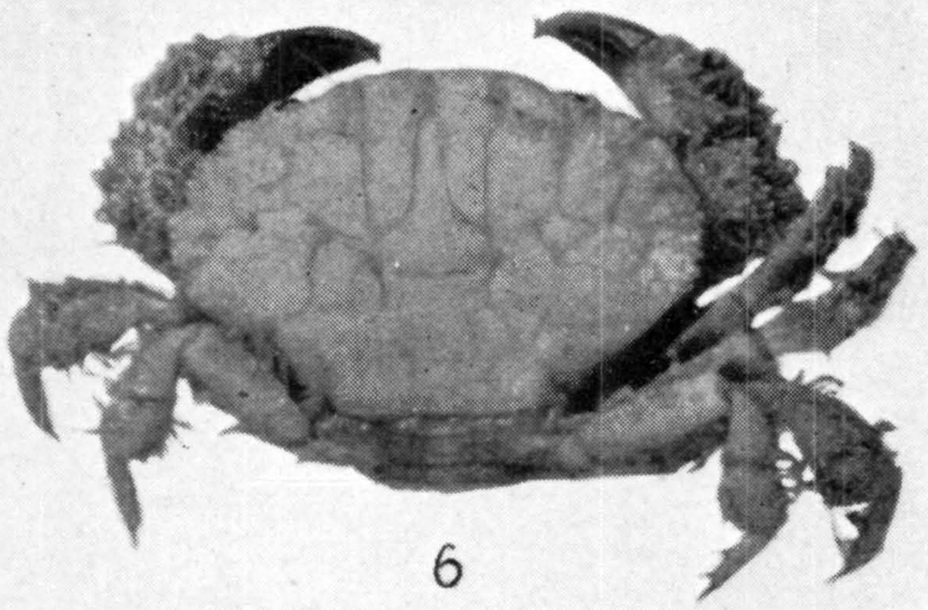

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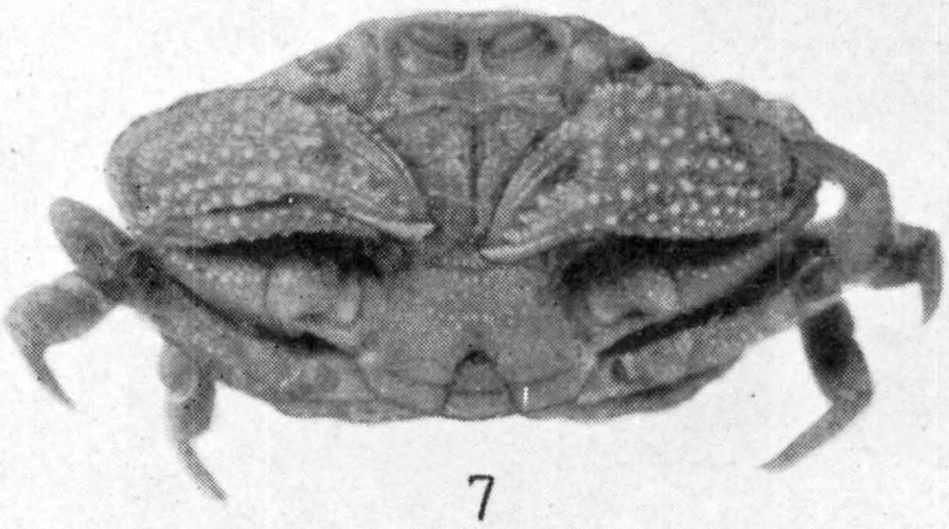

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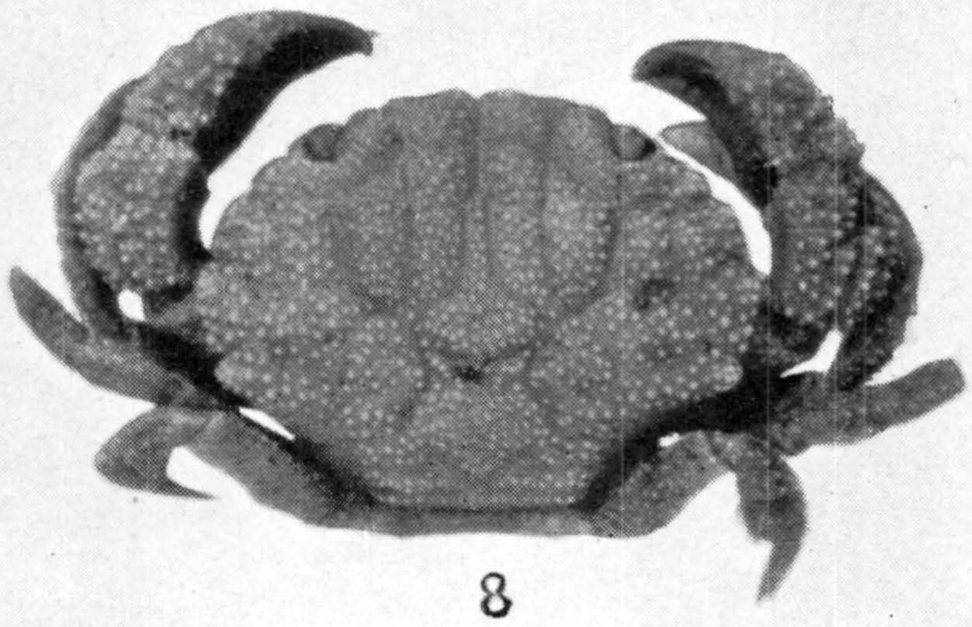
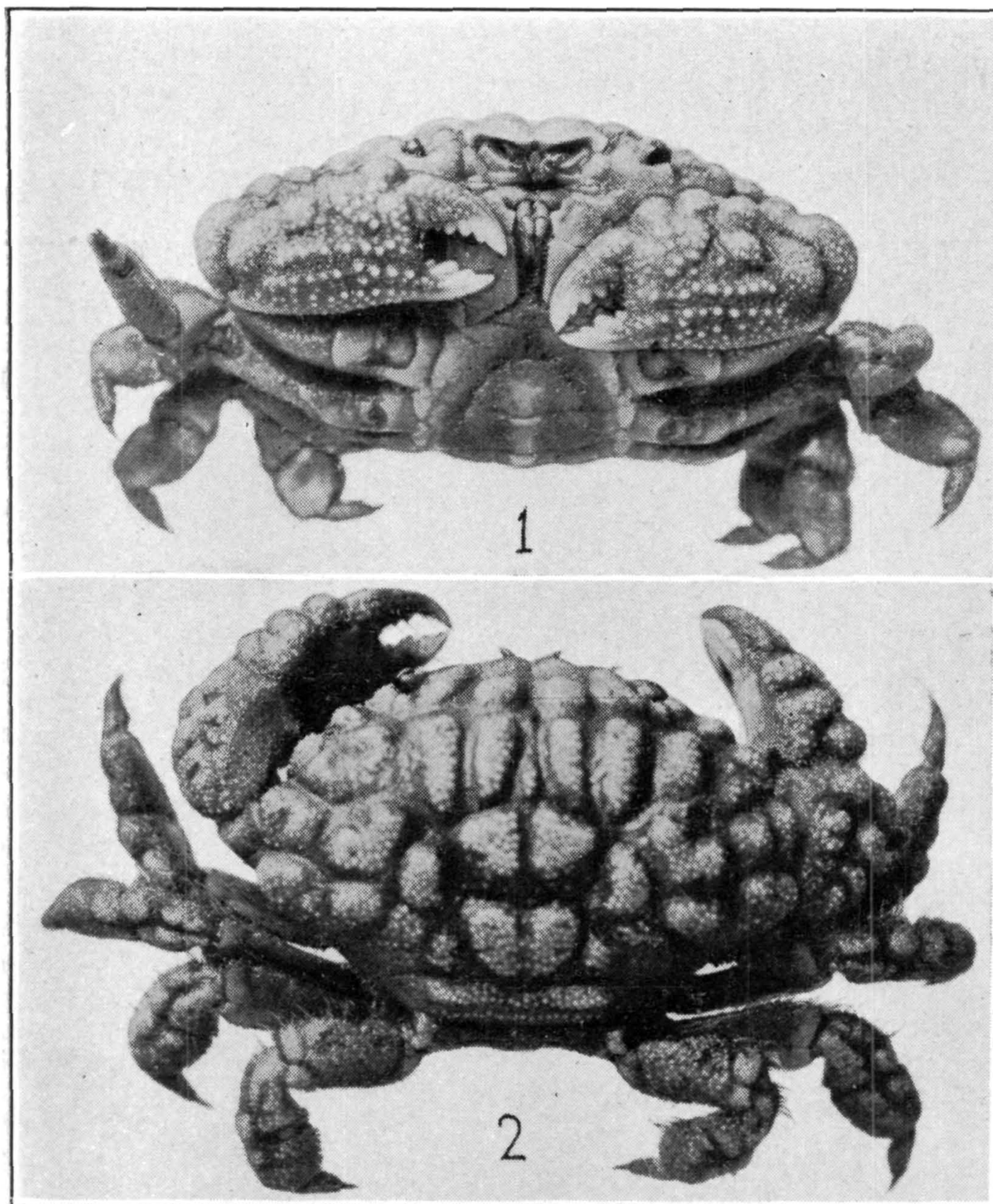
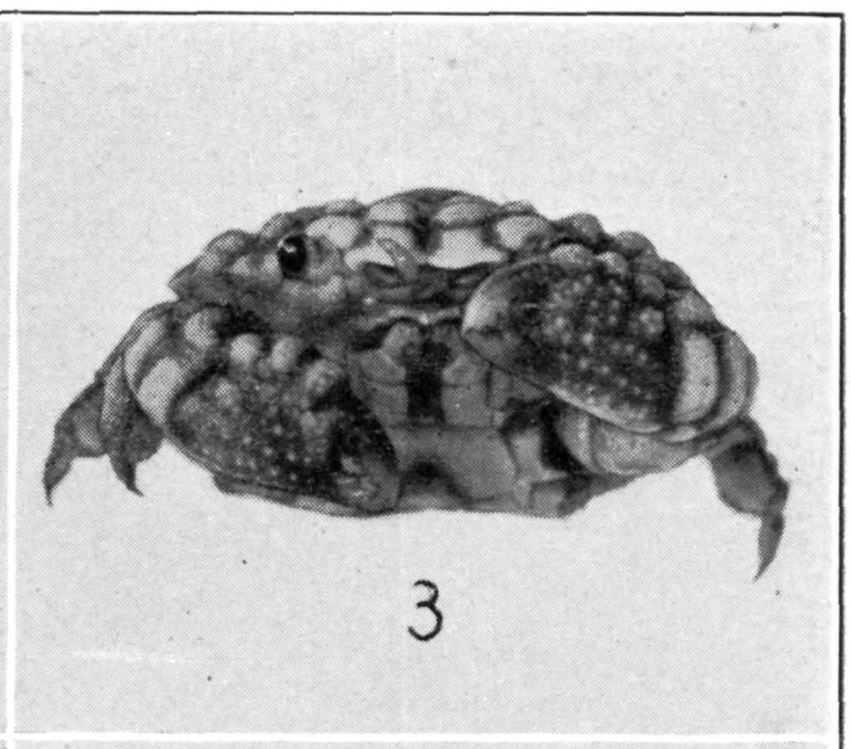


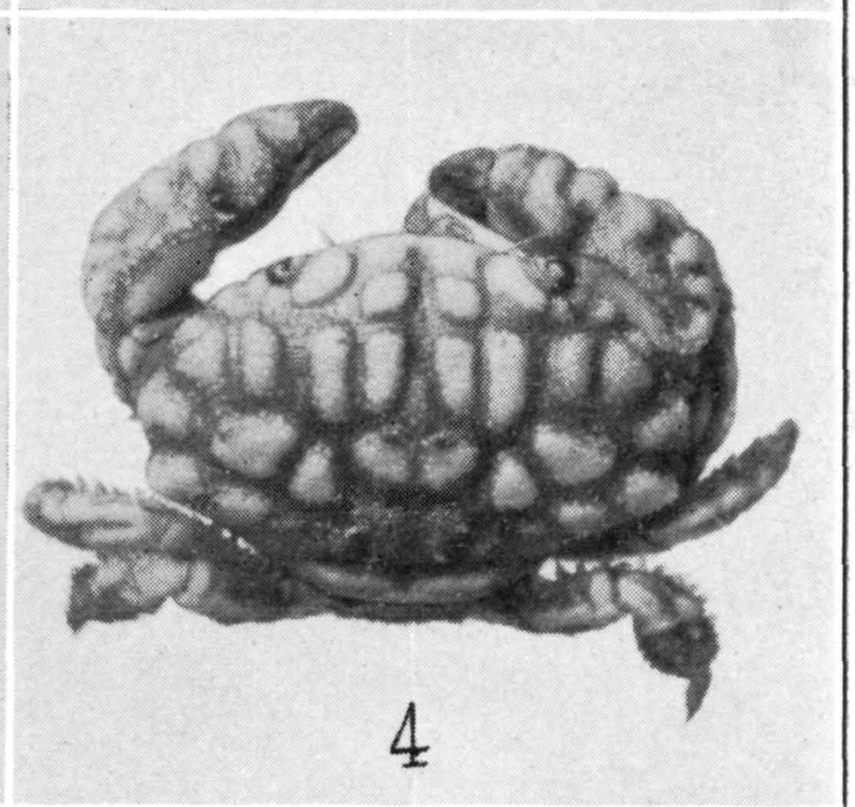
8

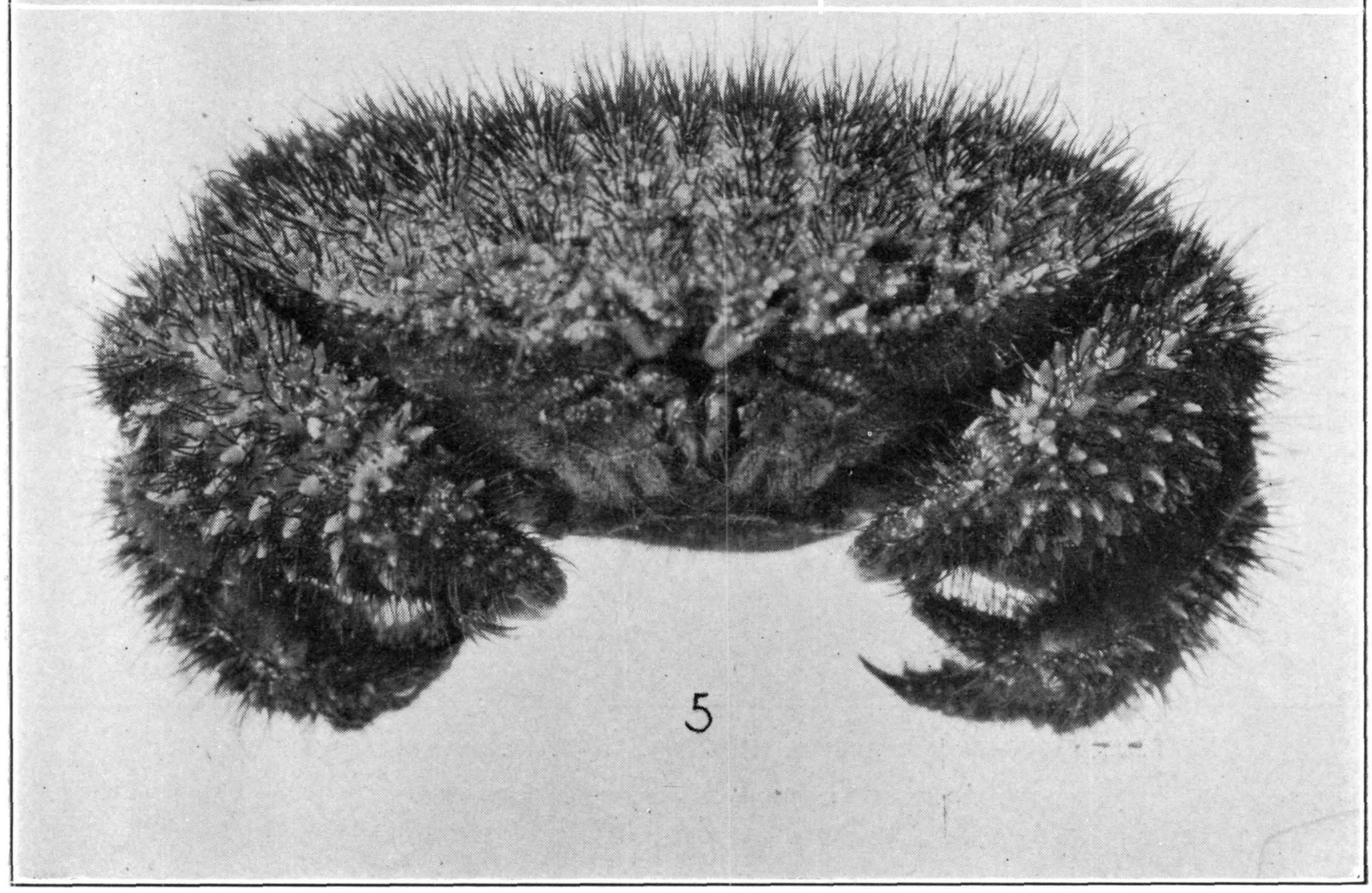
1, 2. ACTAEA DOVII (P. 254). 3–6. A. BIFRONS (P. 255). 7, 8. A. ANGUSTA (P. 256)

FOR EXPLANATION OF PLATE SEE PAGE 575.







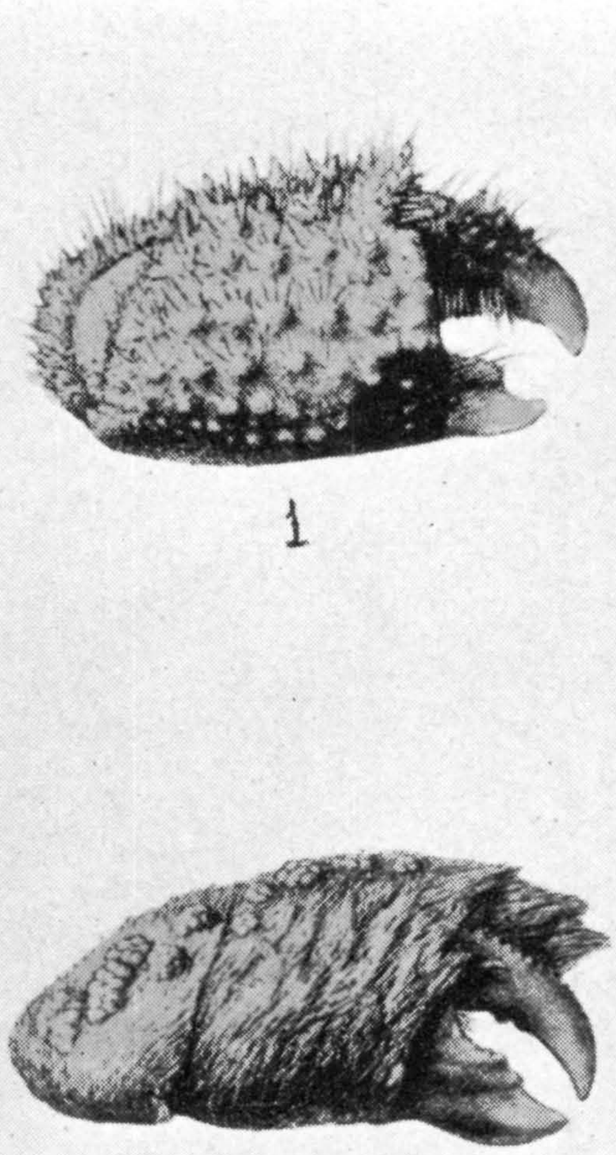


1, 2. ACTAEA RUFOPUNCTATA NODOSA (P. 257). 3, 4. A. SULCATA (P. 259). 5. A. ACANTHA (P. 261)

FOR EXPLANATION OF PLATE SEE PAGE 575.

1

2



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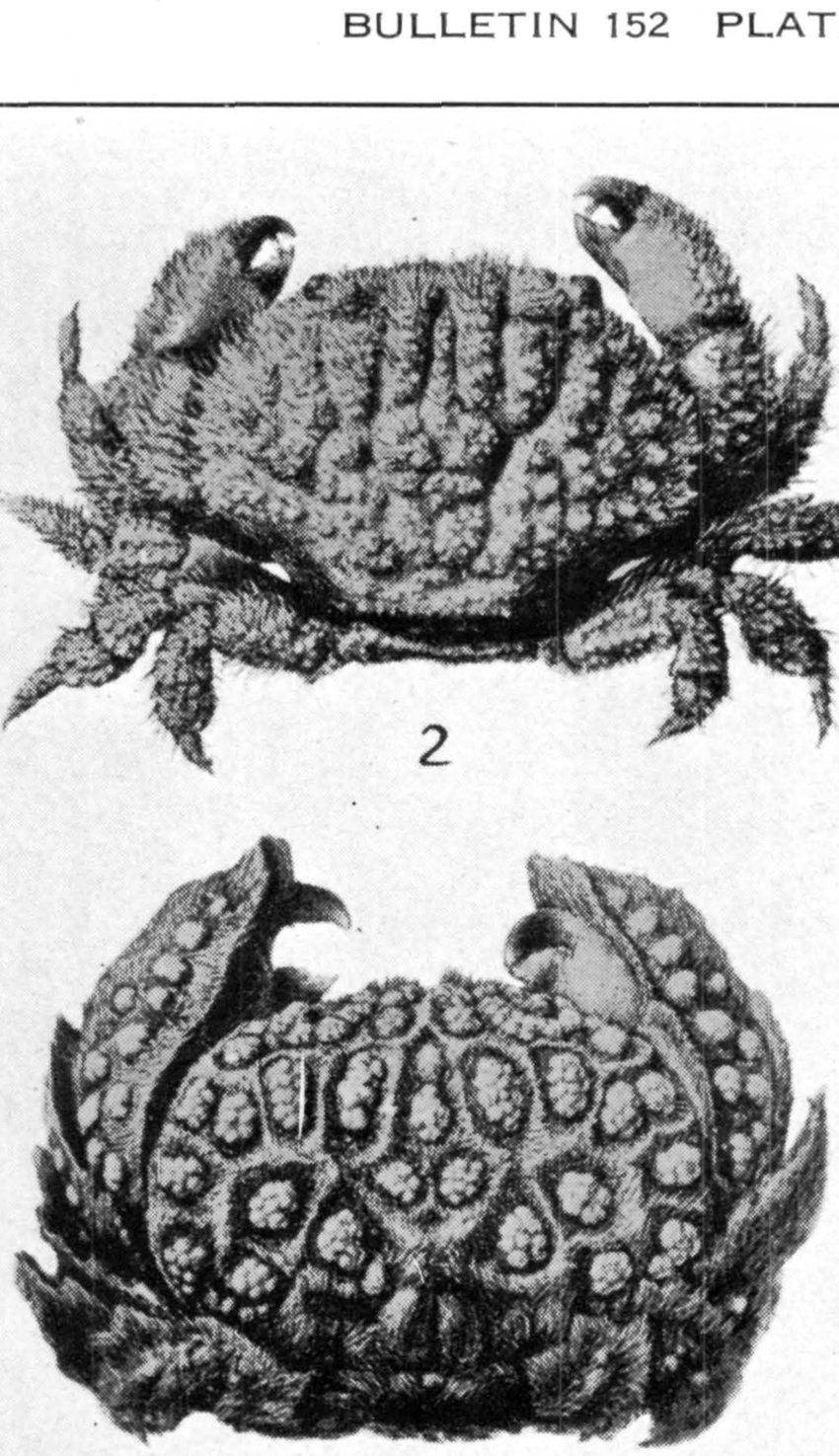

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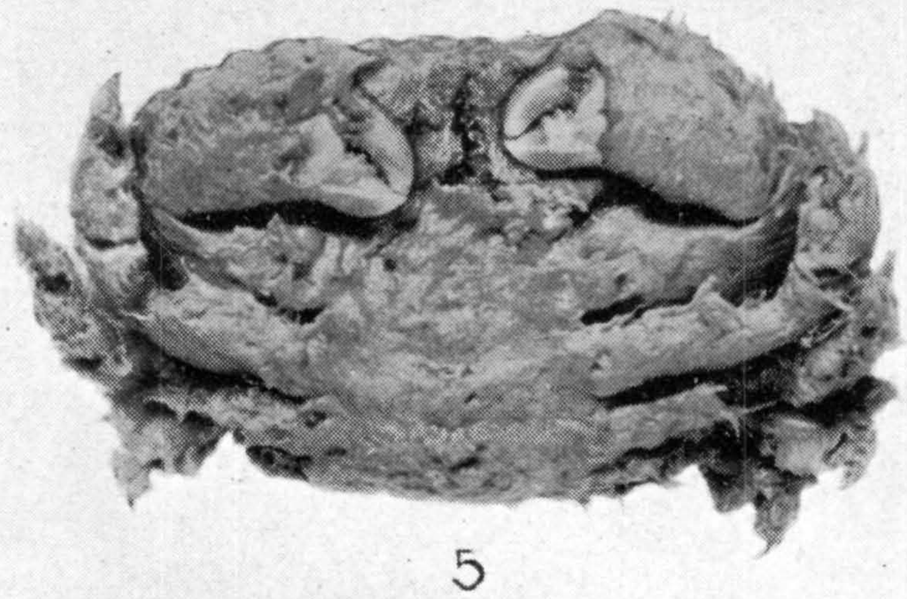

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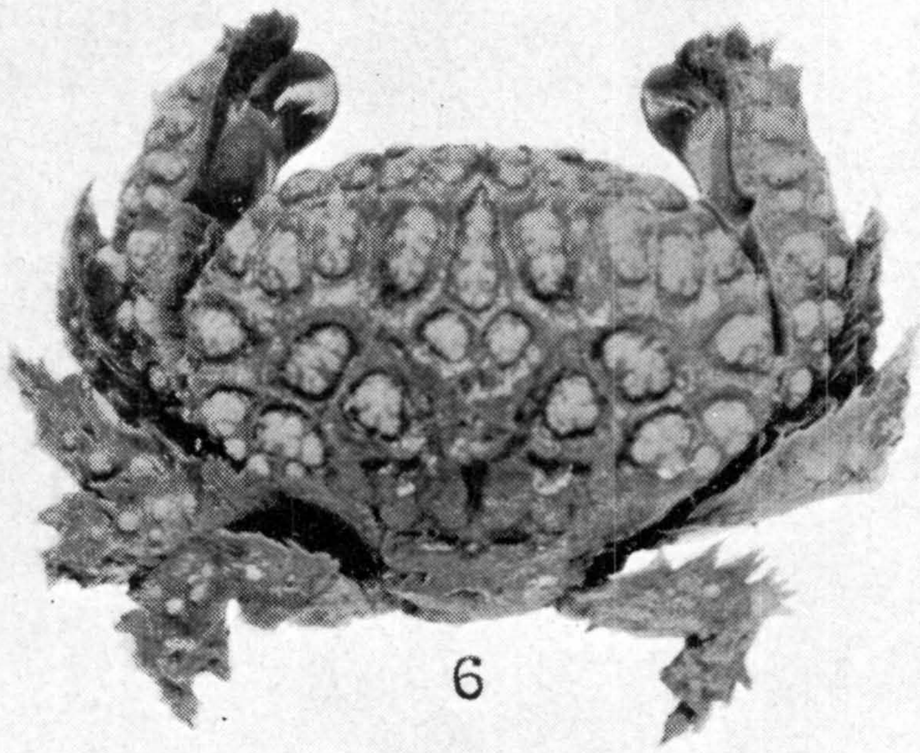

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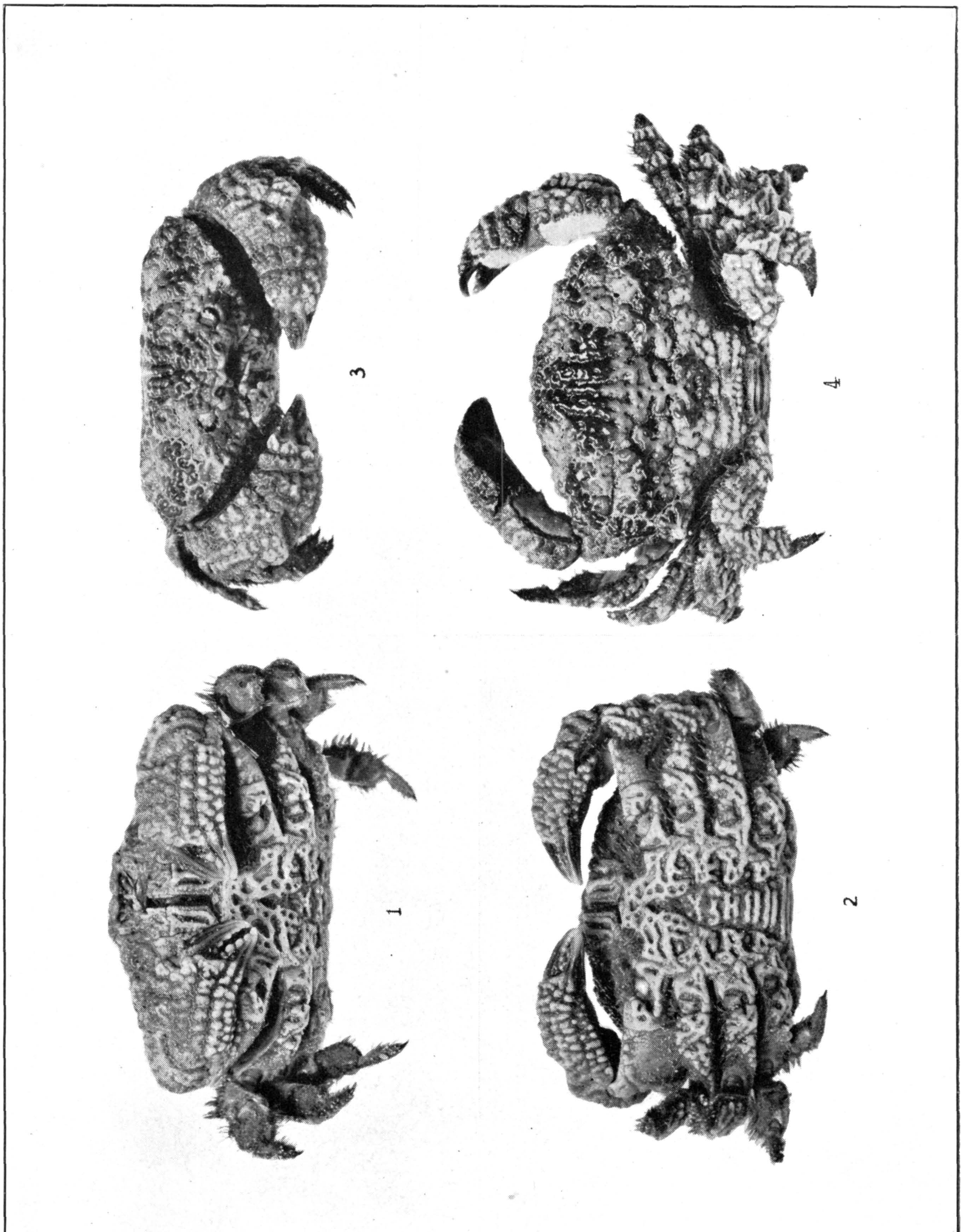
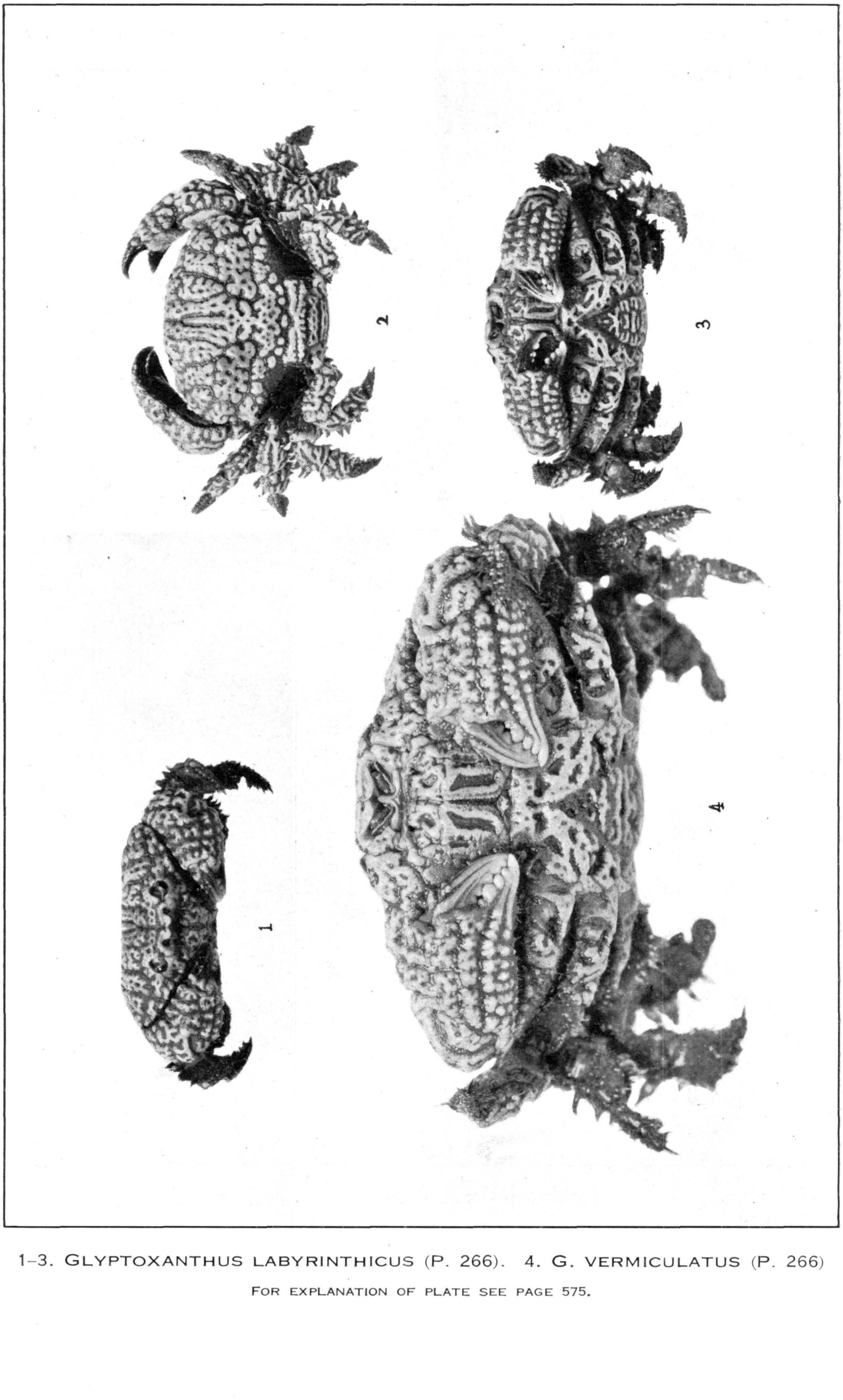
1, 2. ACTAEA ACANTHA (P. 261). 3–6. A. PALMERI (P. 260)

FOR EXPLANATION OF PLATE SEE PAGE 575.



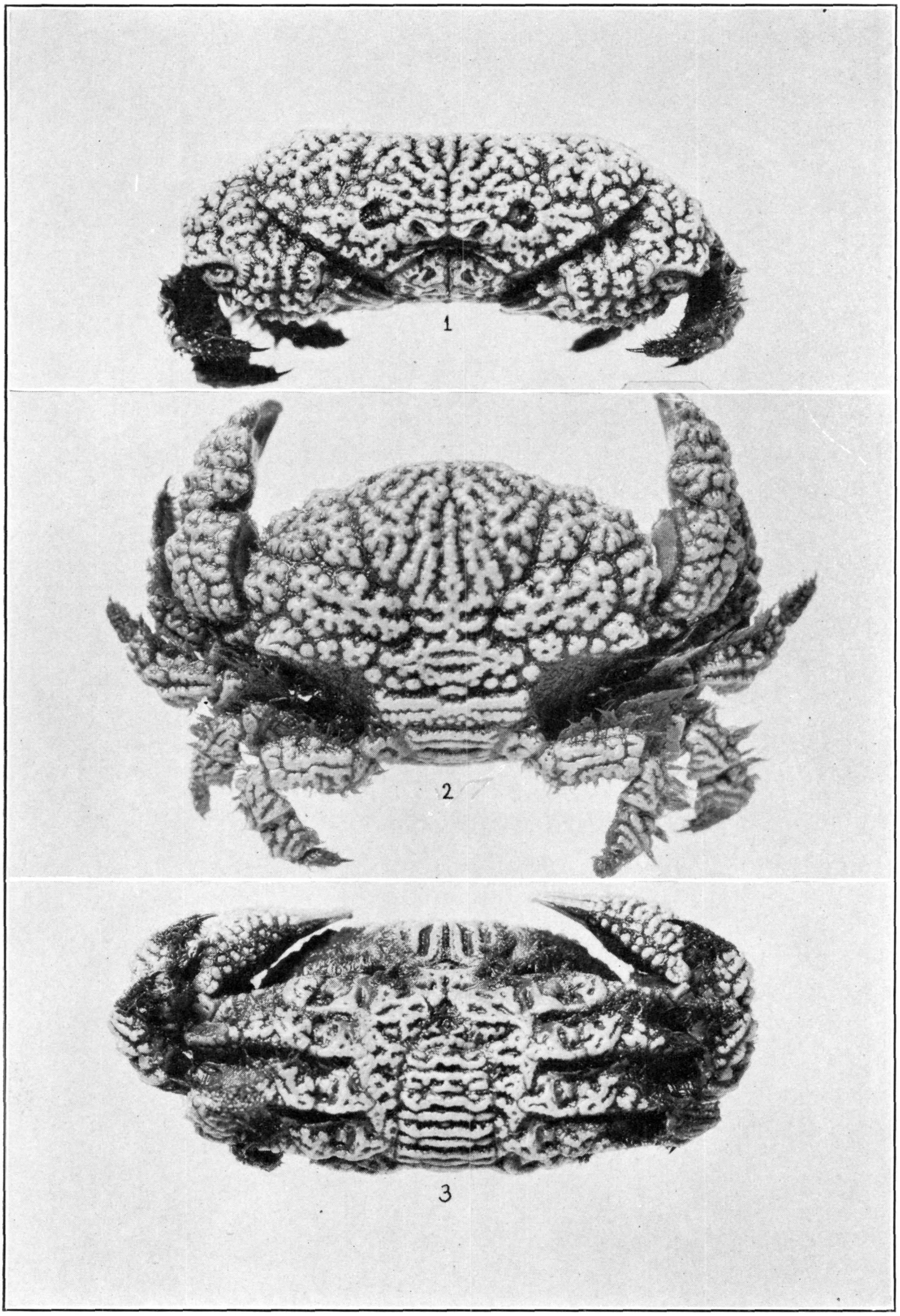
GLYPTOXANTHUS EROSUS (P. 263)

FOR EXPLANATION OF PLATE SEE PAGE 575.



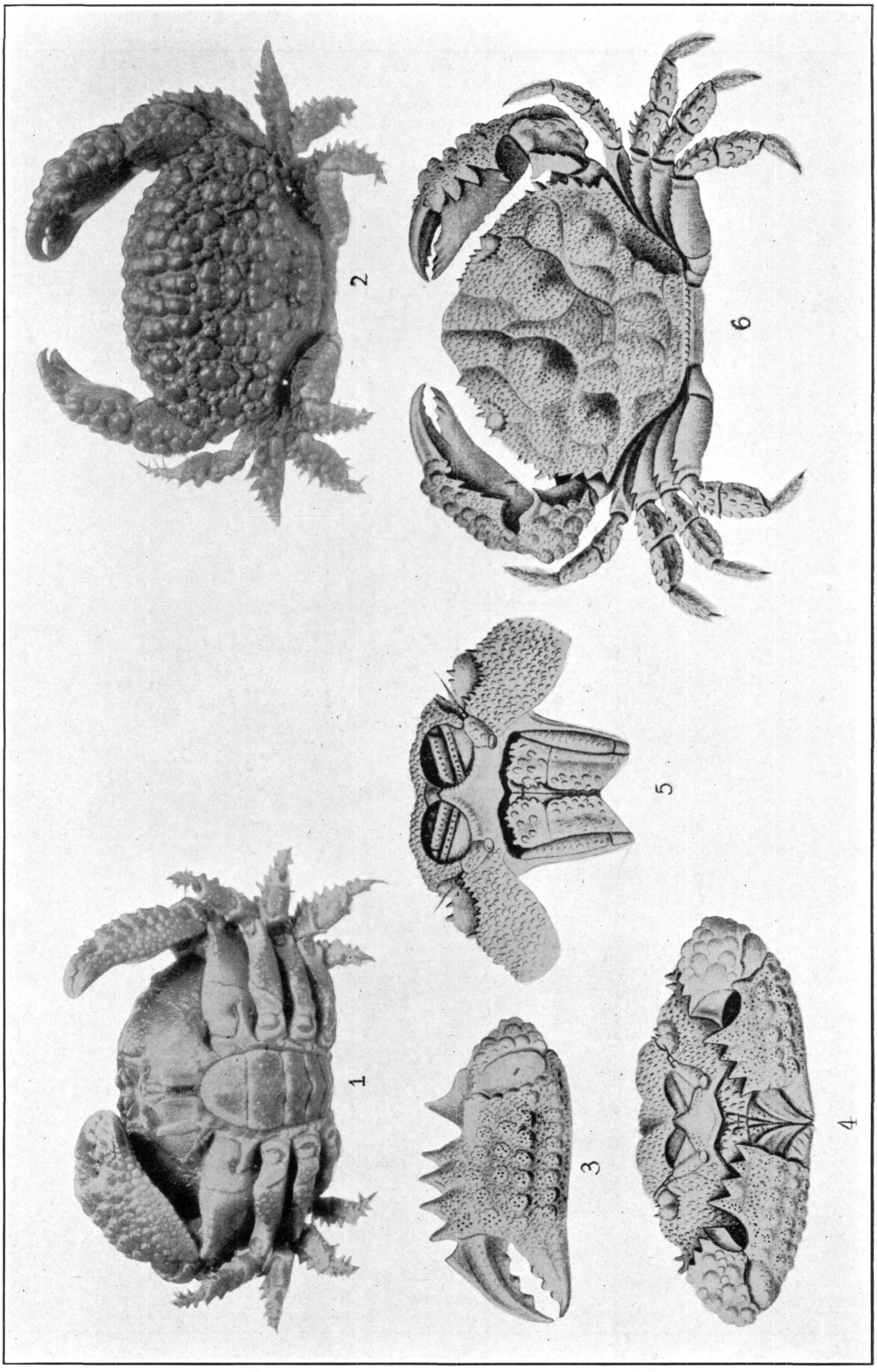
1–3. GLYPTOXANTHUS LABYRINTHICUS (P. 266). 4. G. VERMICULATUS (P. 266)

FOR EXPLANATION OF PLATE SEE PAGE 575.



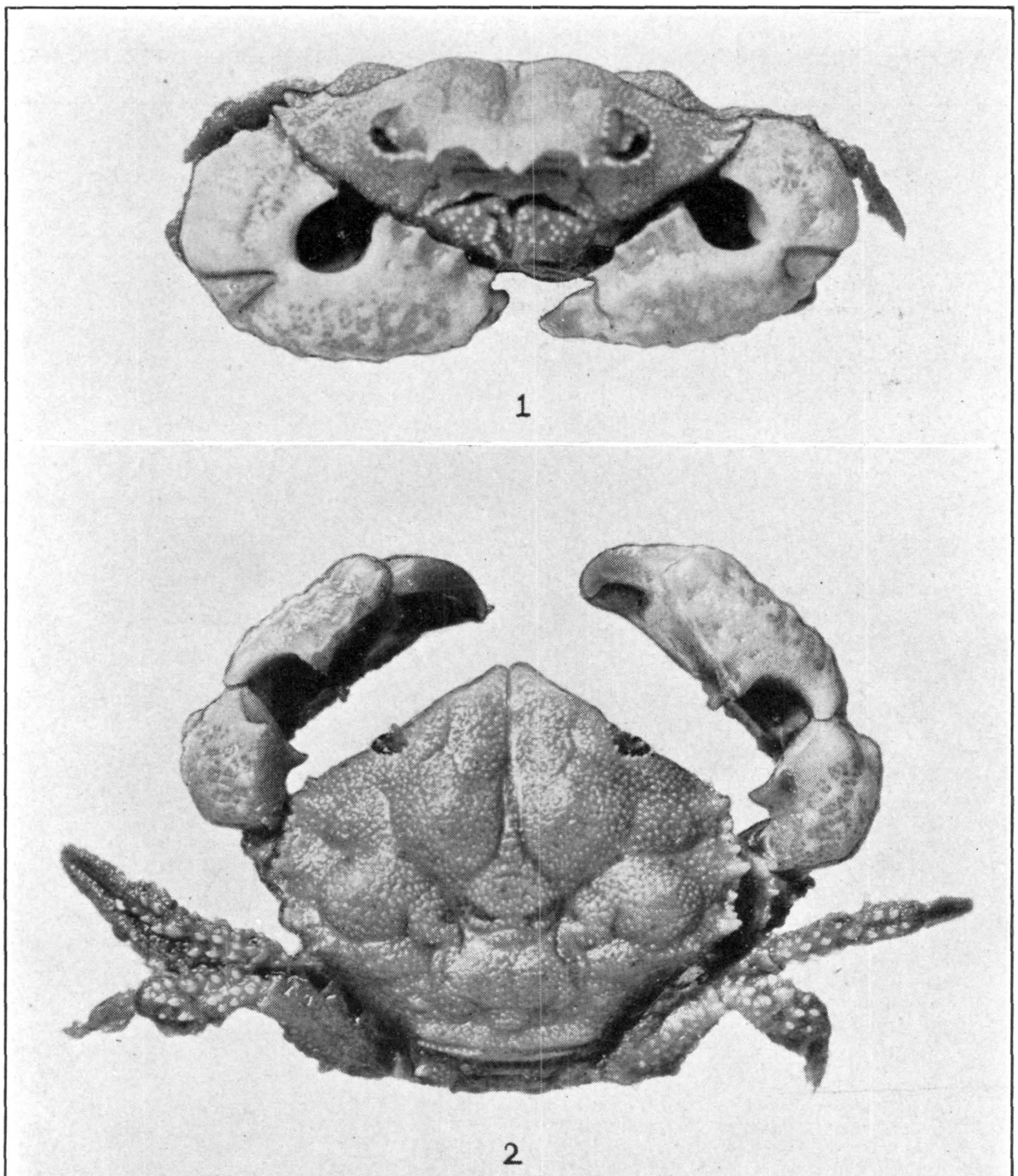
GLYPTOXANTHUS VERMICULATUS (P. 266)

FOR EXPLANATION OF PLATE SEE PAGE 575.



1, 2. DAIRA AMERICANA (P. 268). 3–6. CARPOPORUS PAPULOSUS (P. 269)

FOR EXPLANATION OF PLATE SEE PAGE 576.



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CARPOPORUS PAPULOSUS (P. 269)

FOR EXPLANATION OF PLATE SEE PAGE 576.

79856—30——46

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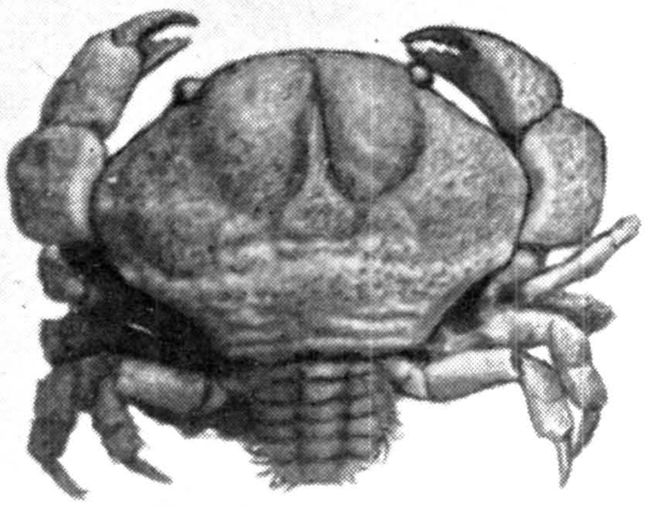

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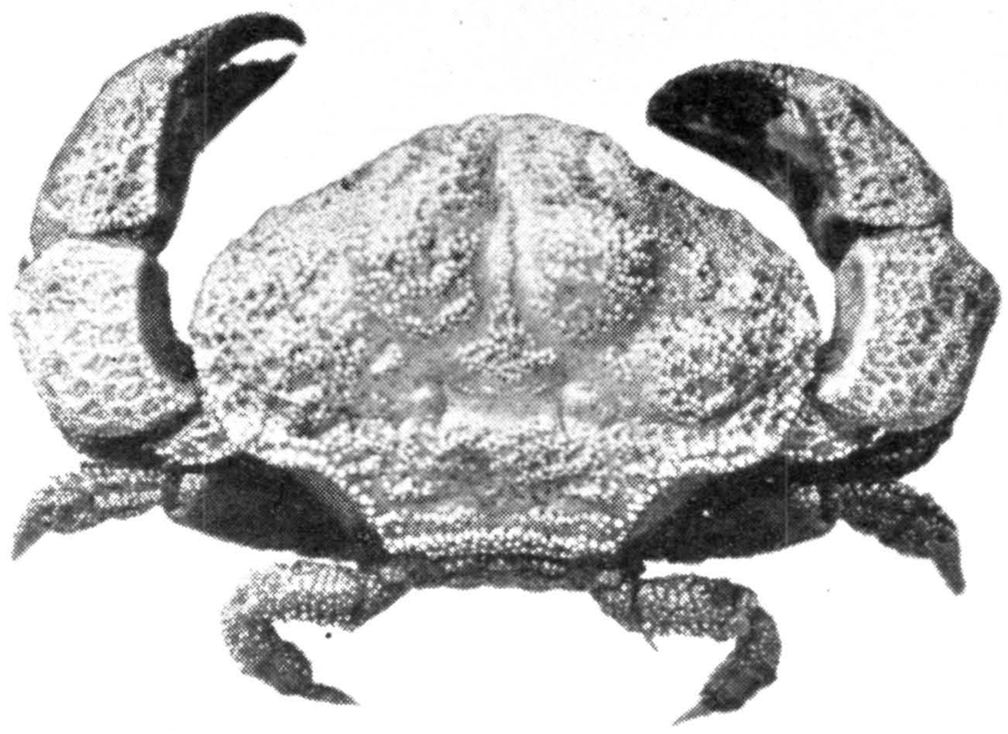

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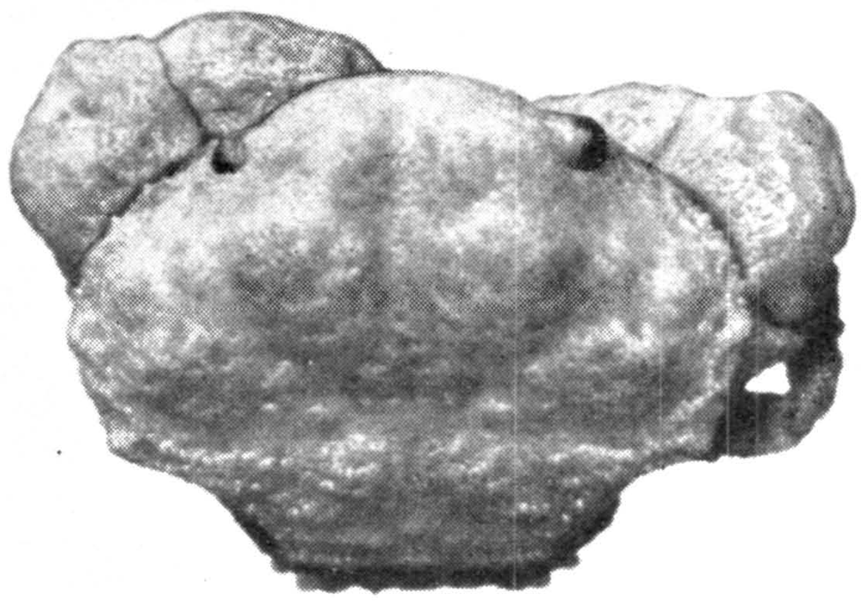

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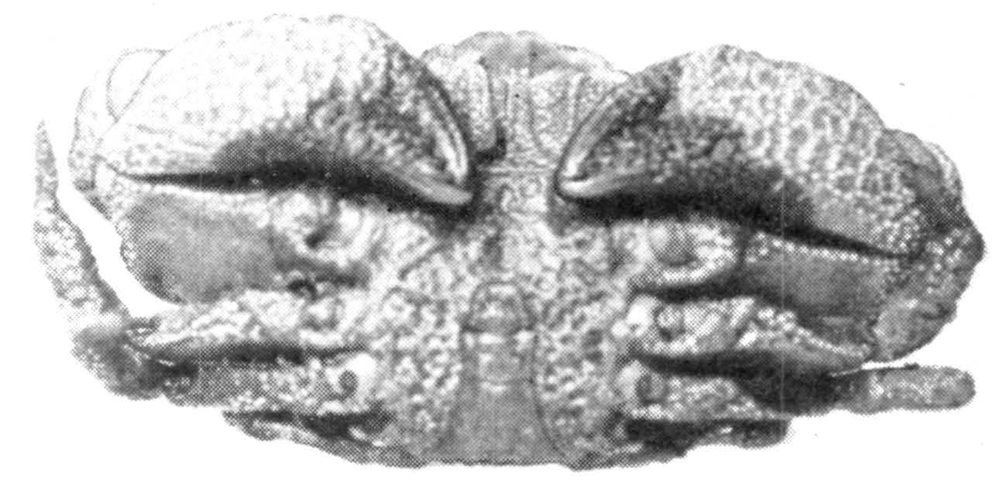

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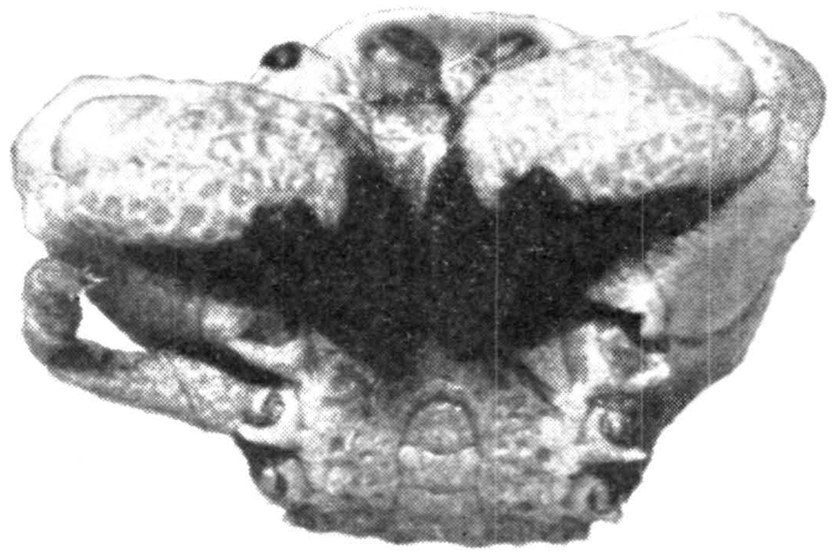

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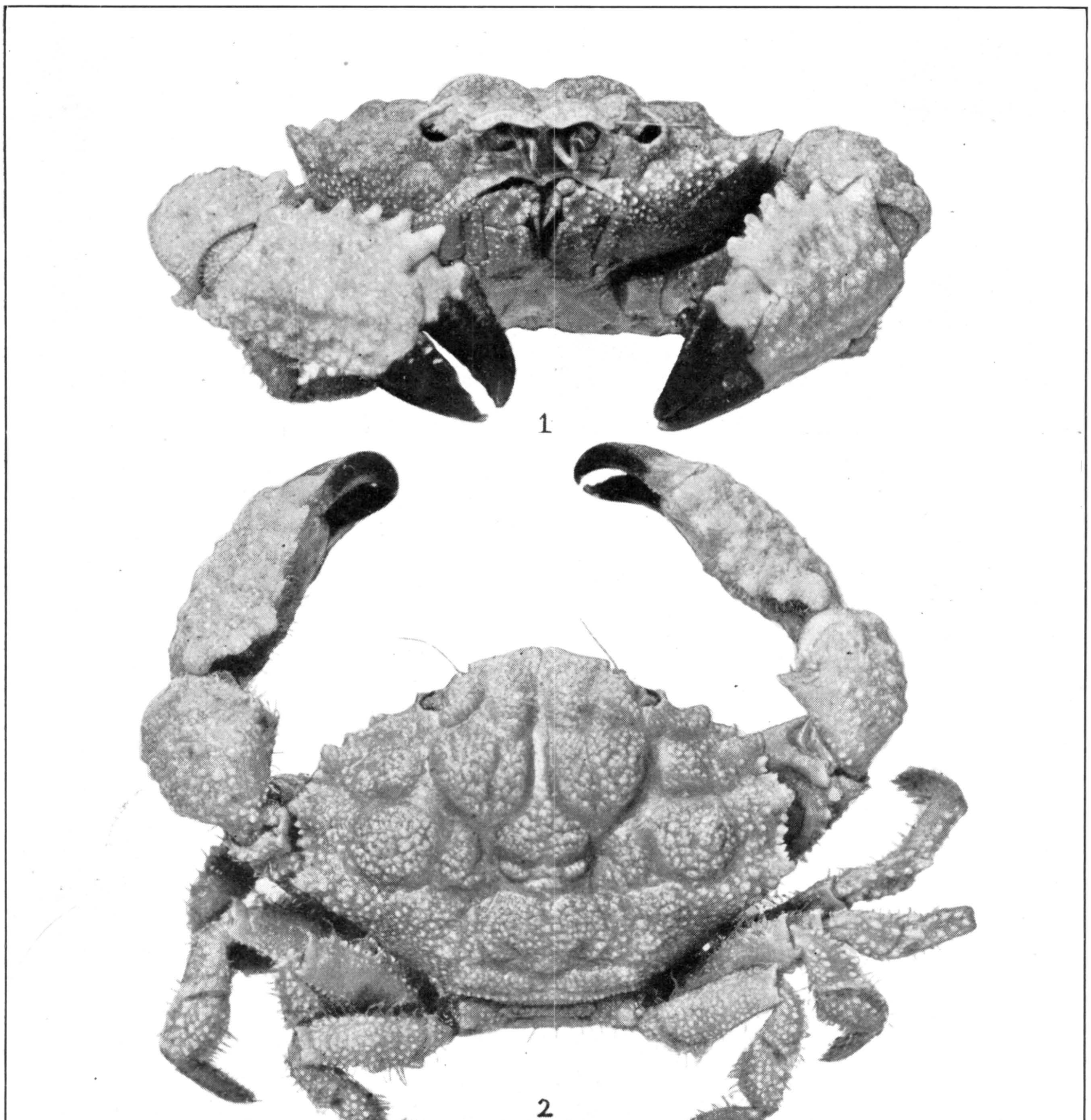
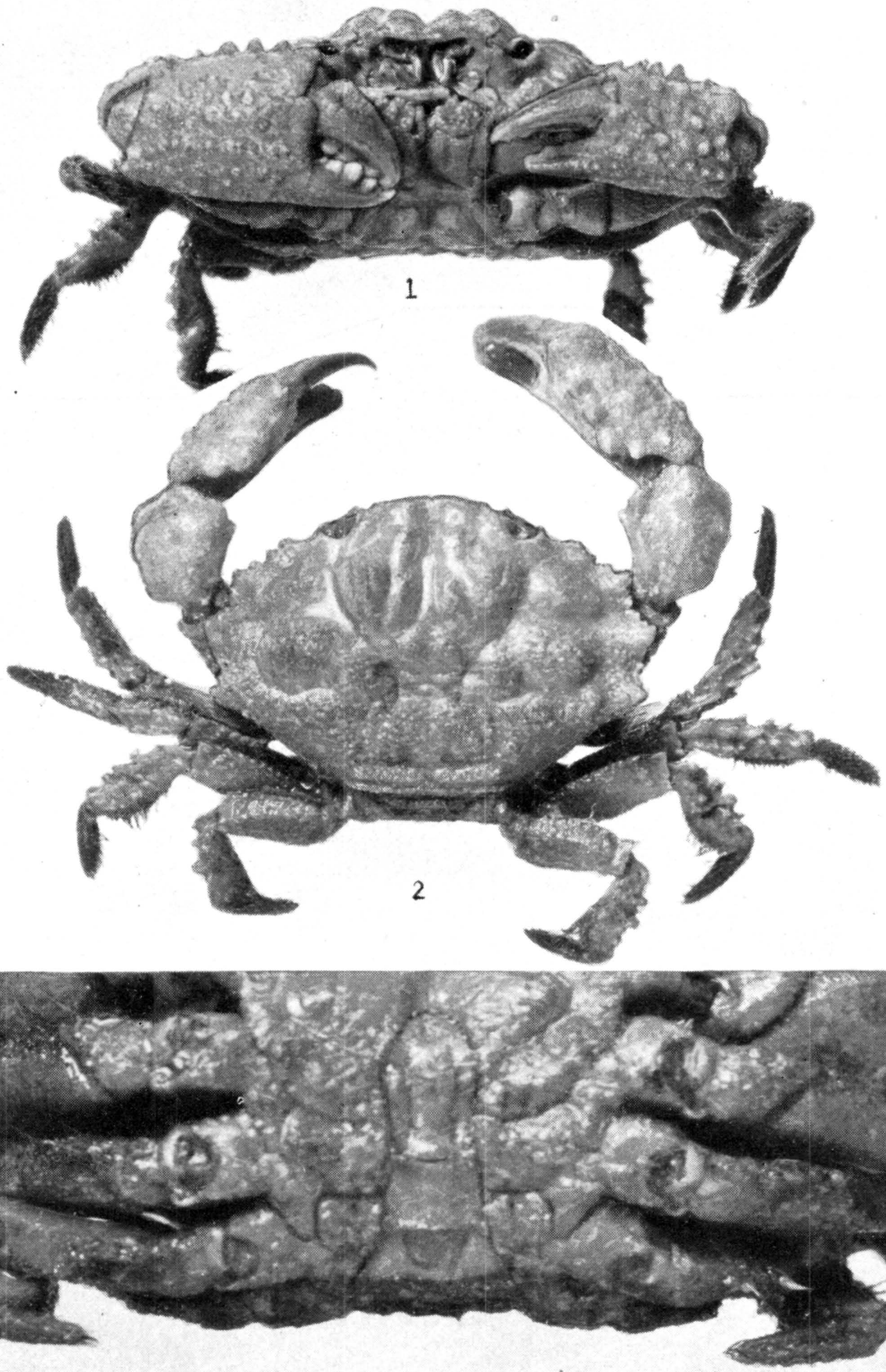
LIPAESTHESIUS LEEANUS (P. 272)

FOR EXPLANATION OF PLATE SEE PAGE 576.



MEDAEUS SPINIMANUS (P. 274)

FOR EXPLANATION OF PLATE SEE PAGE 576.



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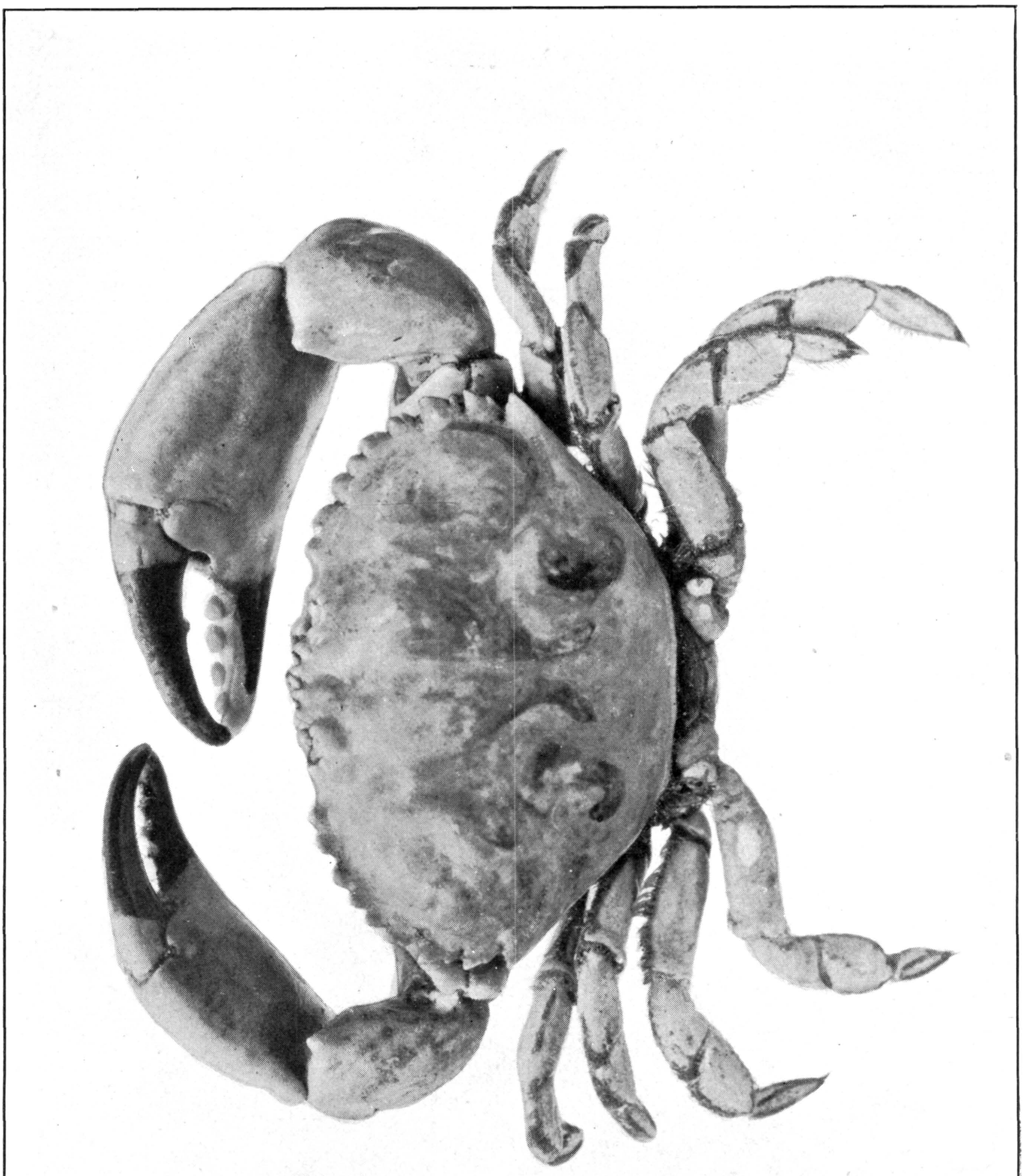
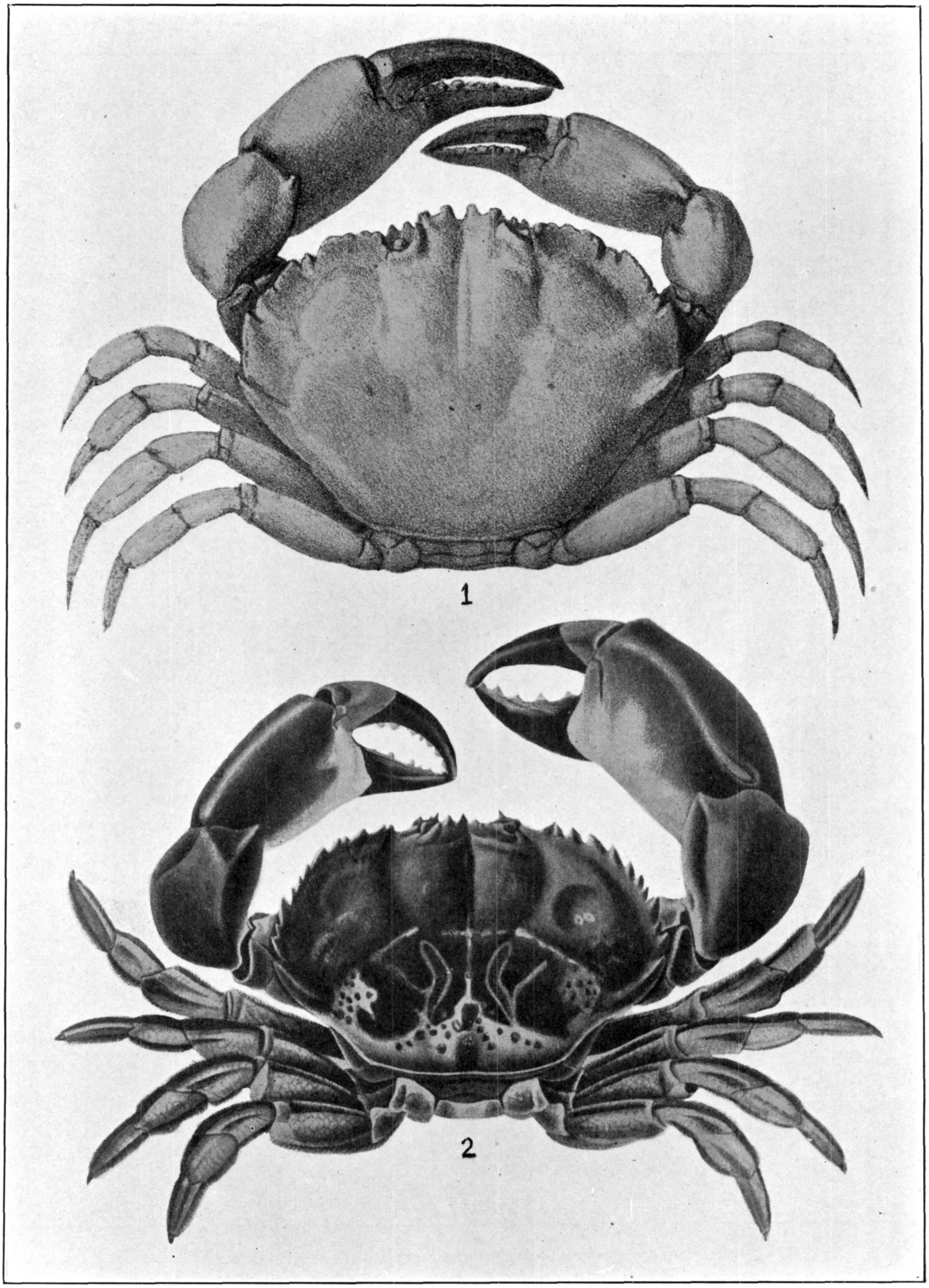
MEDAEUS LOBIPES (P. 275)

FOR EXPLANATION OF PLATE SEE PAGE 576.



PLATYXANTHUS ORBIGNYI (P. 280)

FOR EXPLANATION OF PLATE SEE PAGE 576.

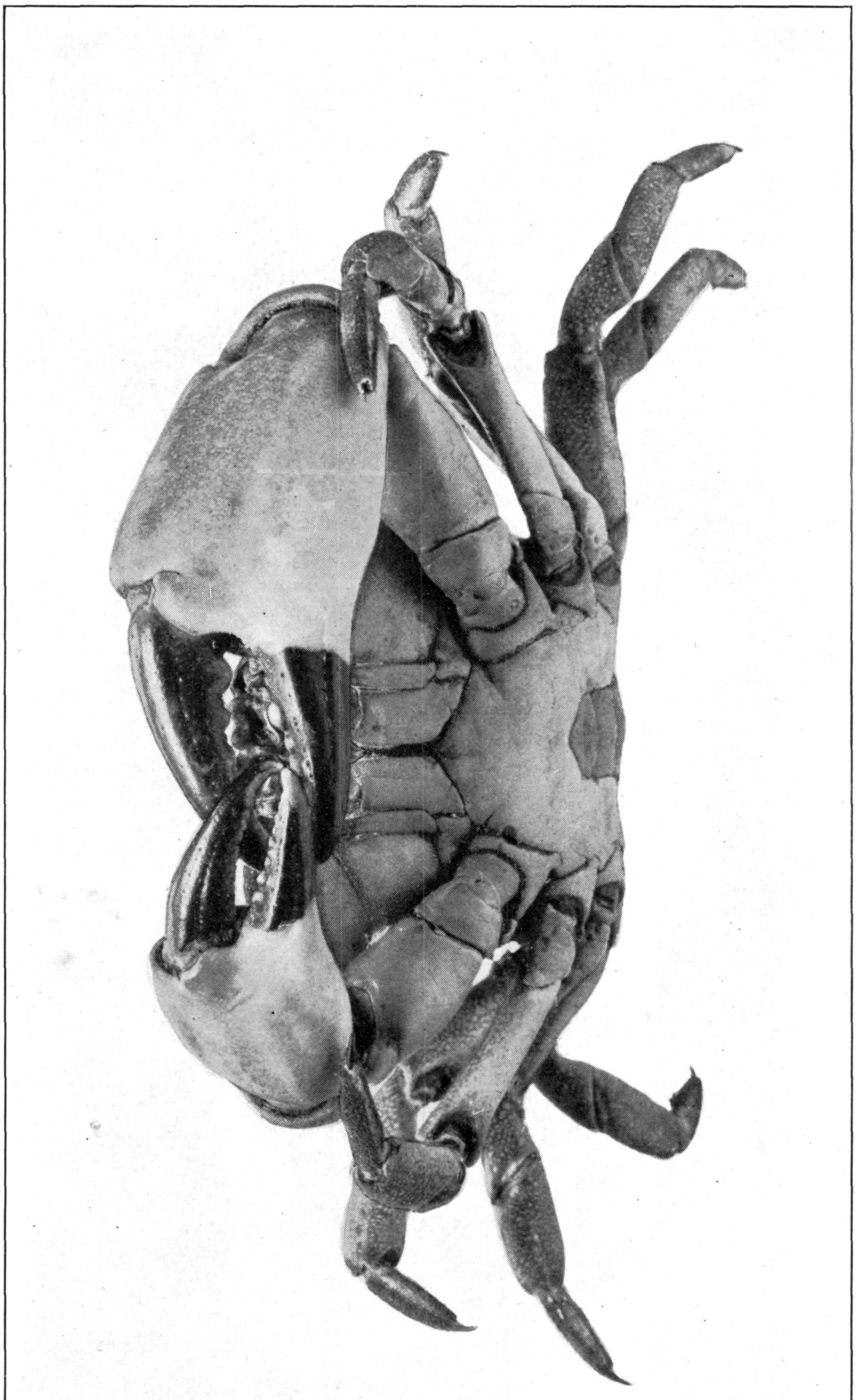


1. PLATYXANTHUS CRENULATUS (P. 281). 2. P. ORBIGNYI (P. 280)

FOR EXPLANATION OF PLATE SEE PAGE 576.

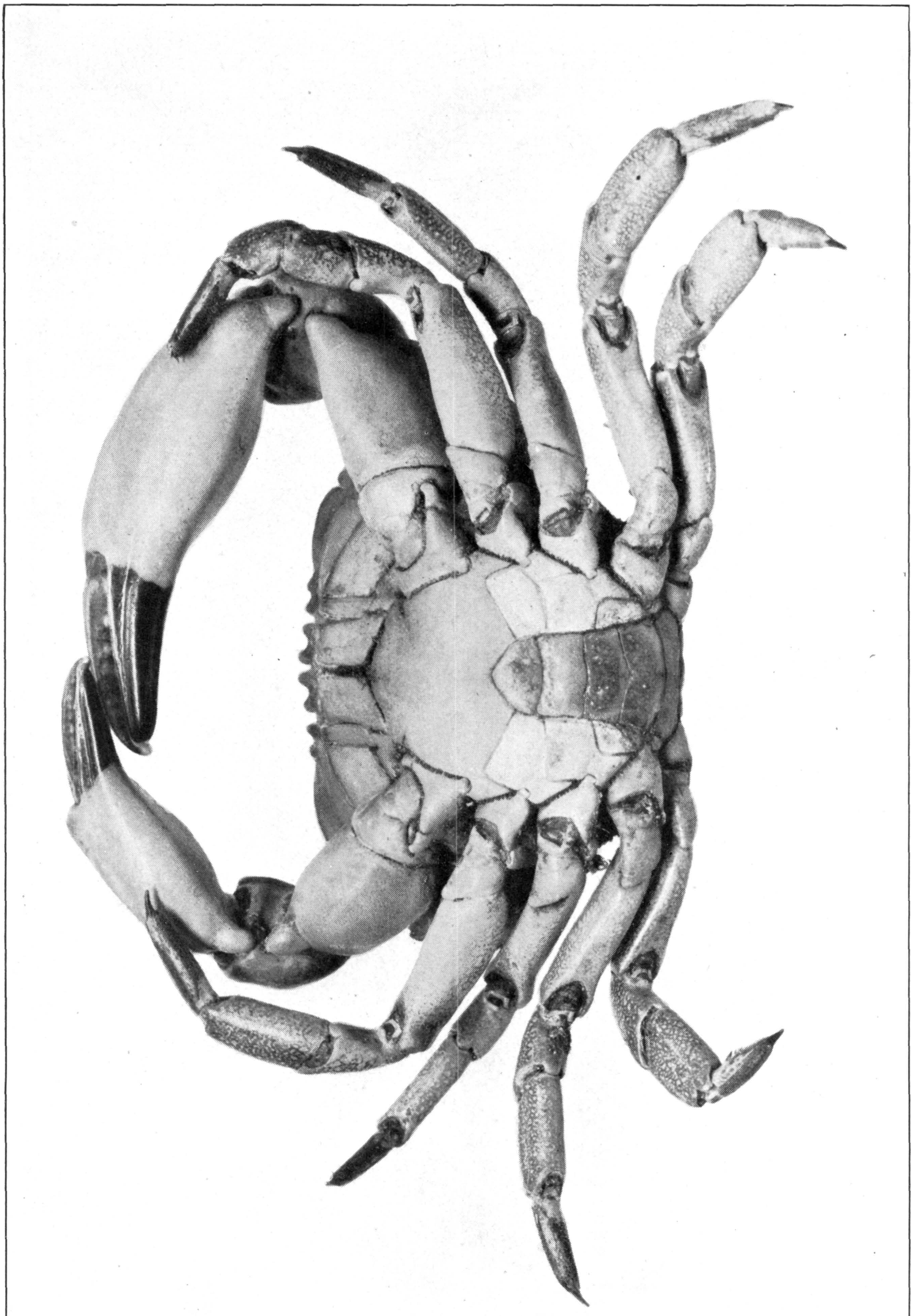
PLATYXANTHUS CRENULATUS (P. 281)

FOR EXPLANATION OF PLATE SEE PAGE 576.



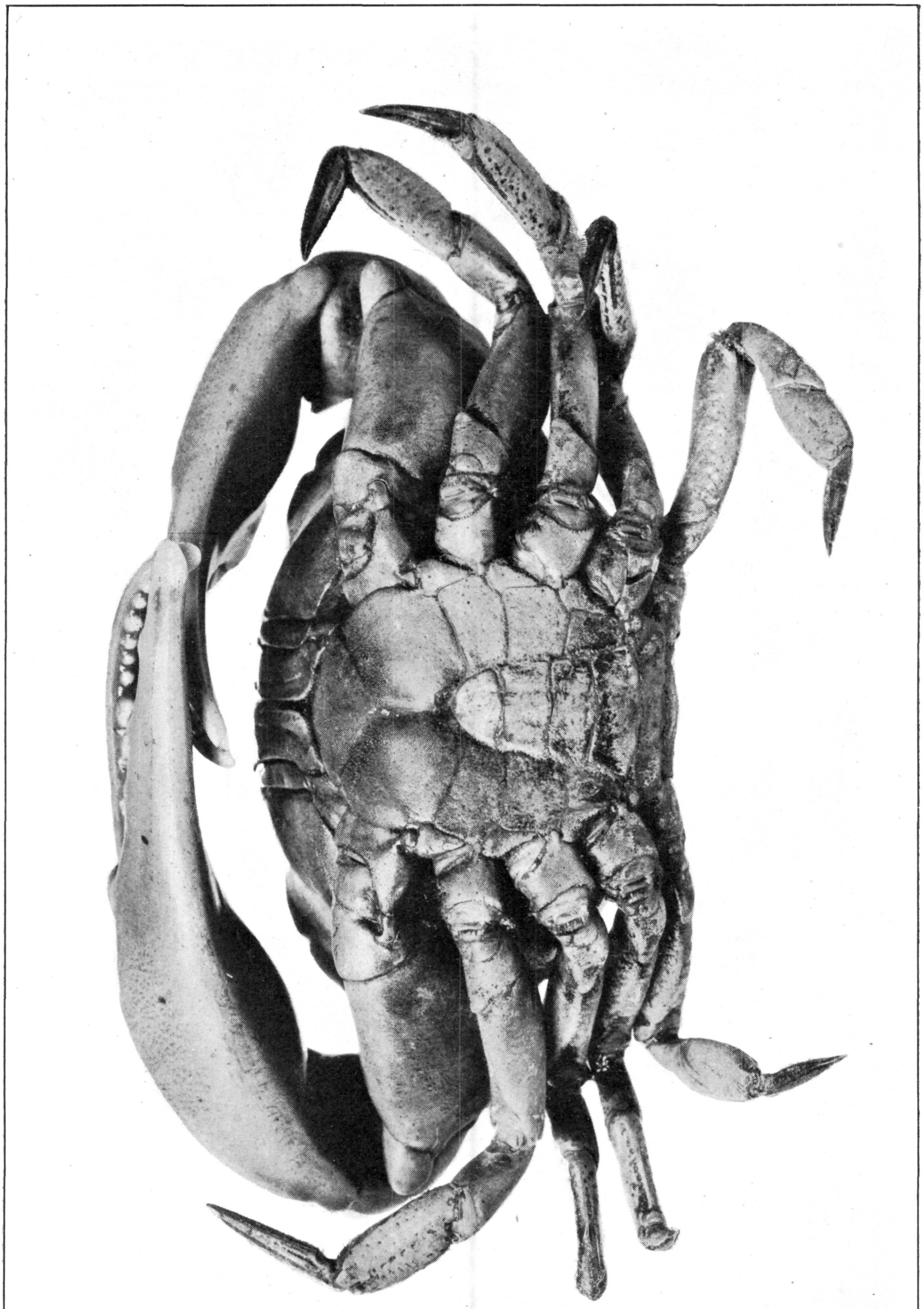
PLATYXANTHUS CRENULATUS (P. 281)

FOR EXPLANATION OF PLATE SEE PAGE 576.



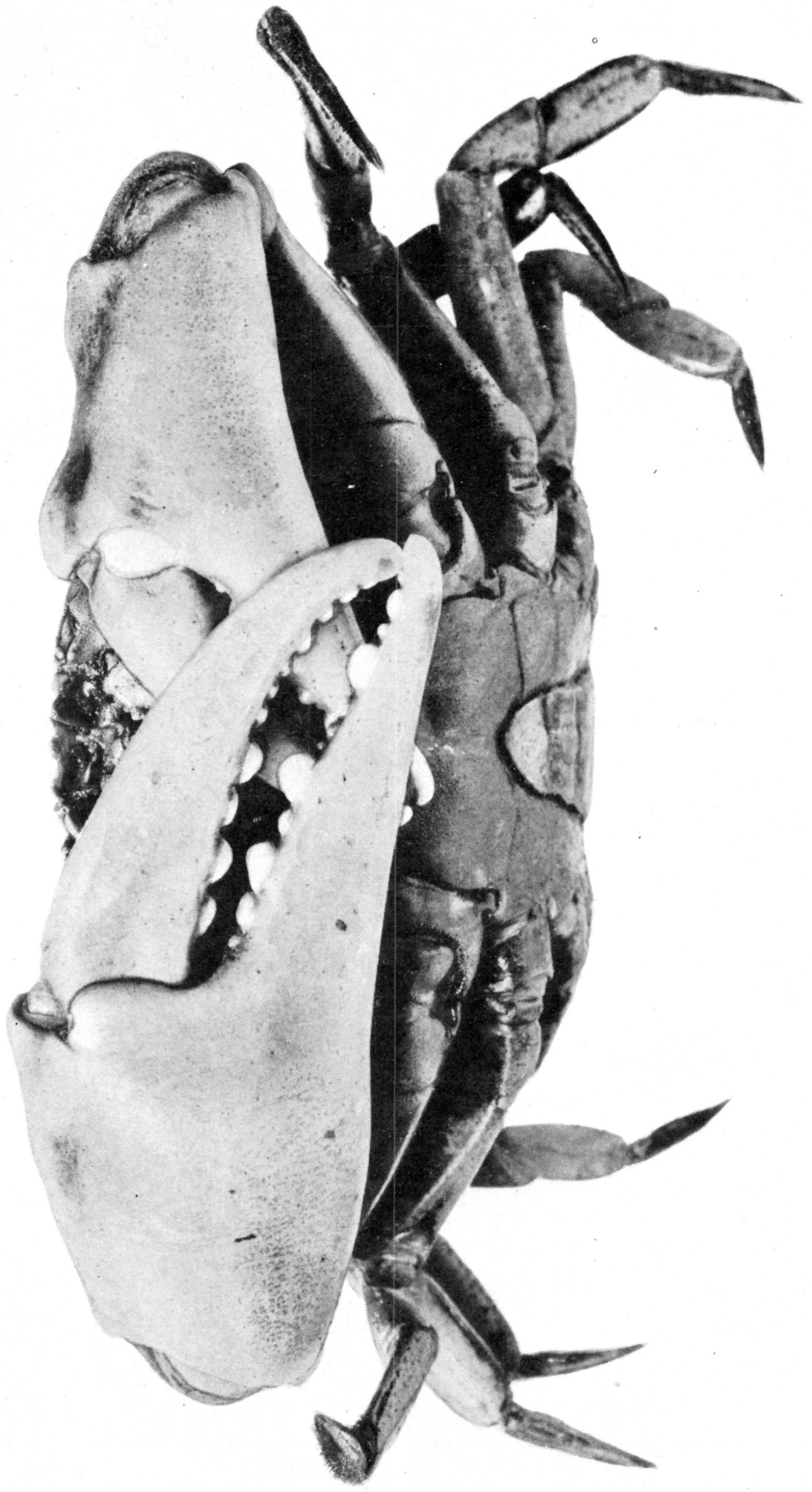
PLATYXANTHUS CRENULATUS (P. 281)

FOR EXPLANATION OF PLATE SEE PAGE 577.



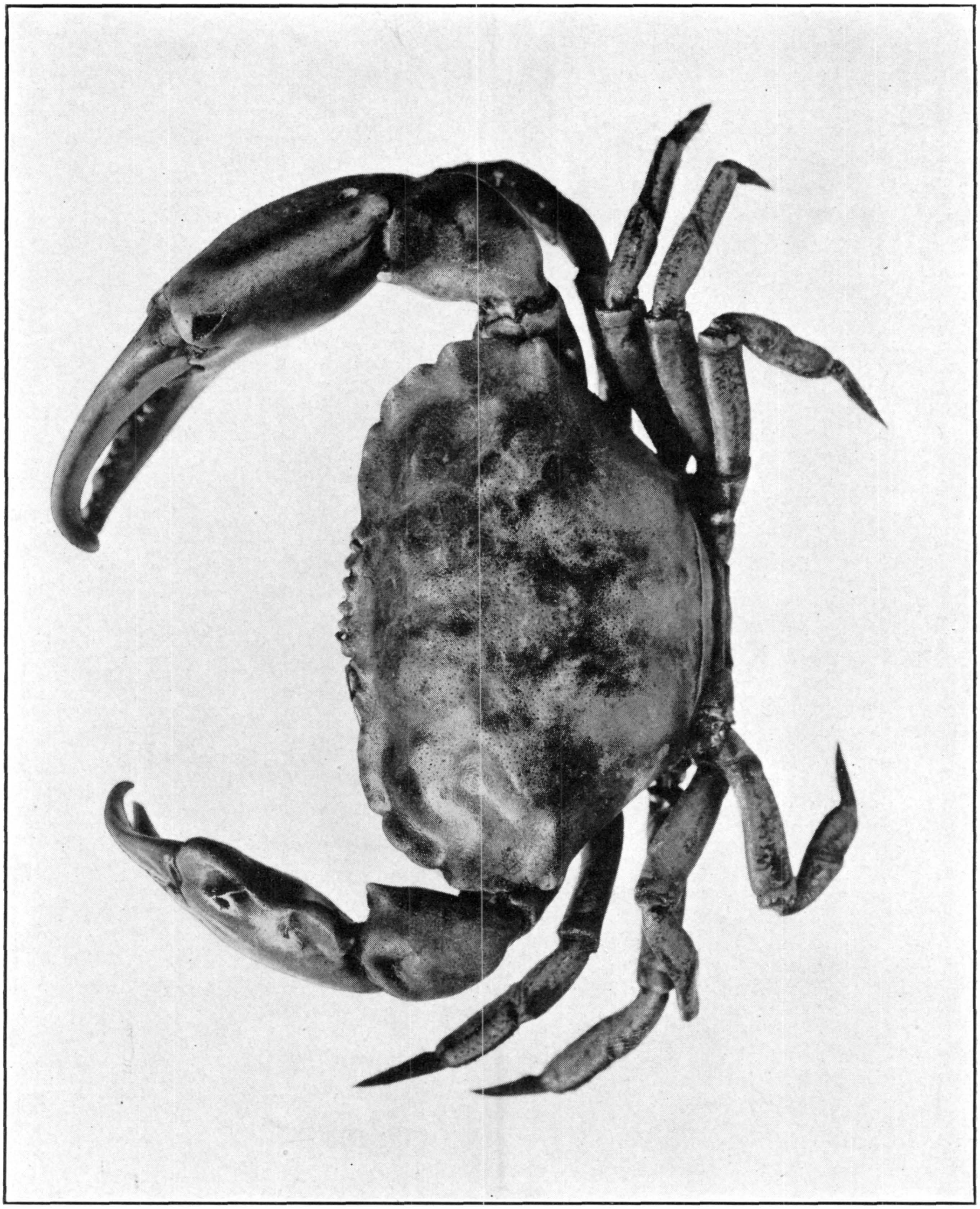
PLATYXANTHUS COKERI (P. 283)

FOR EXPLANATION OF PLATE SEE PAGE 577.



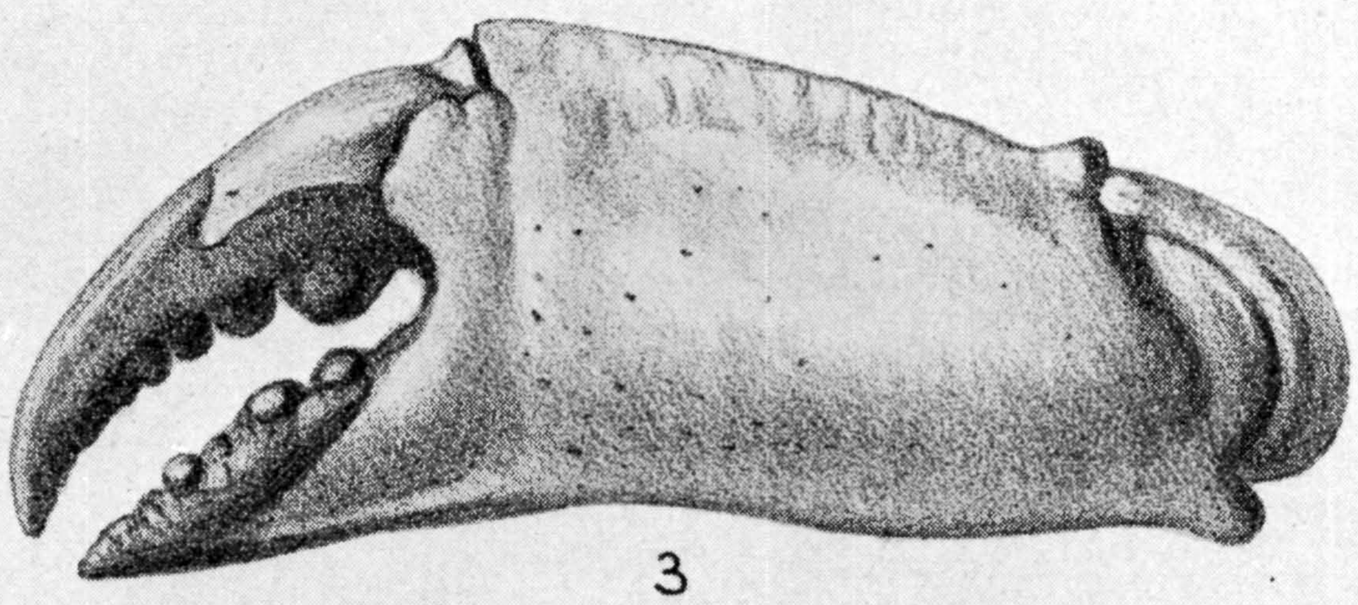
PLATYXANTHUS COKERI (P. 283)

FOR EXPLANATION OF PLATE SEE PAGE 577.



PLATYXANTHUS COKERI (P. 283)

FOR EXPLANATION OF PLATE SEE PAGE 577.



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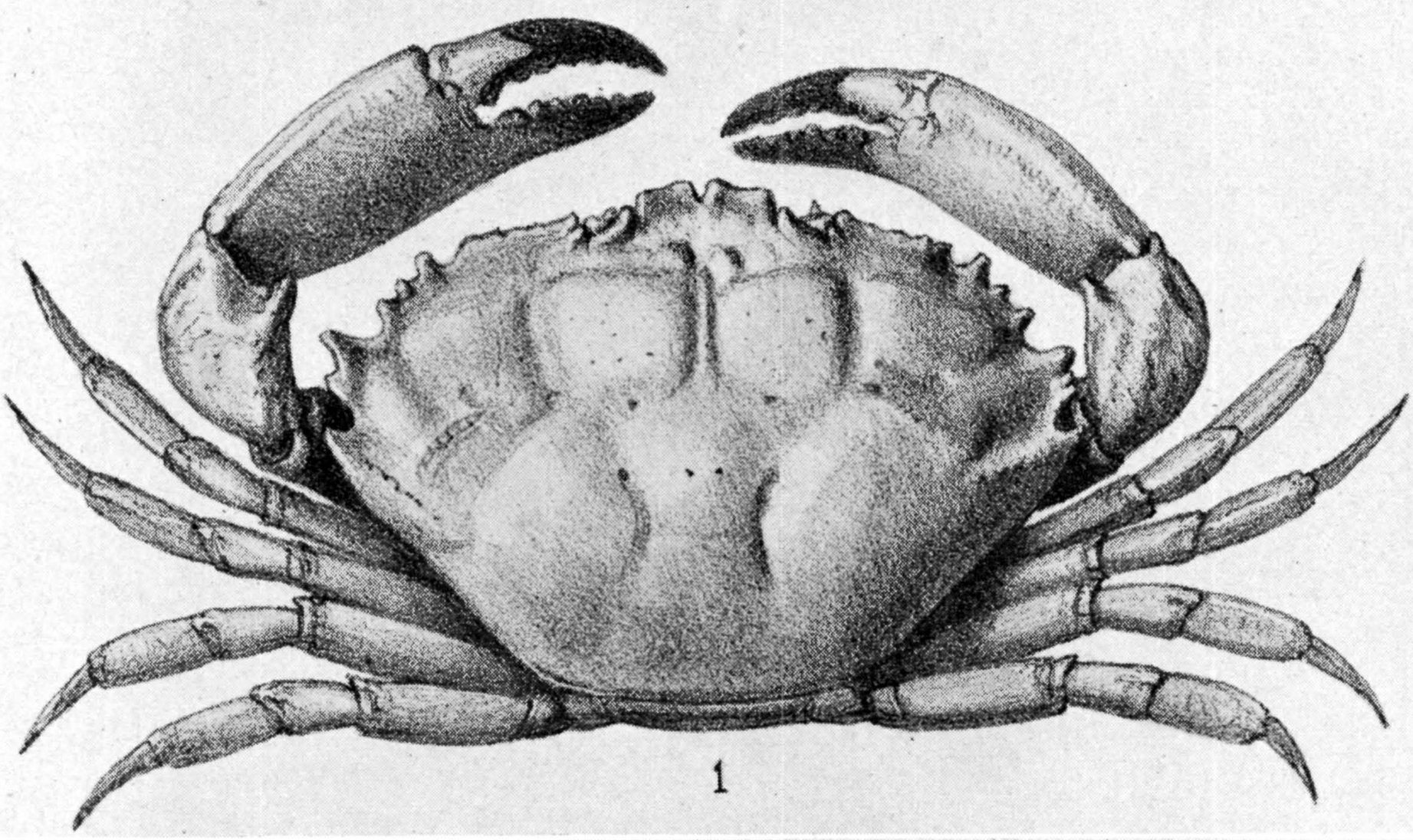

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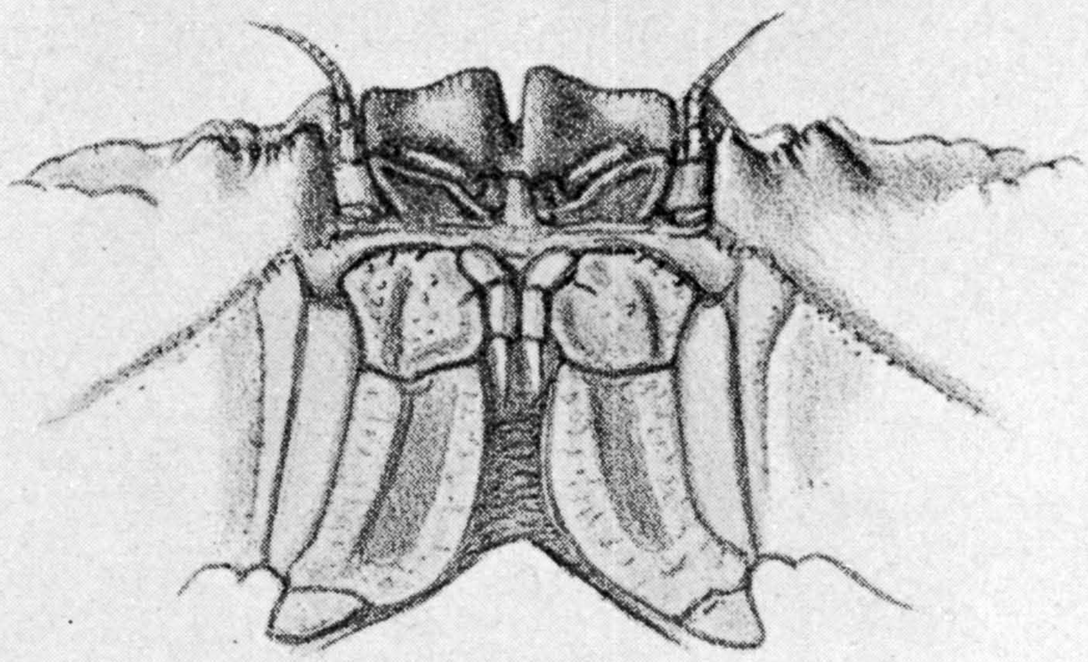

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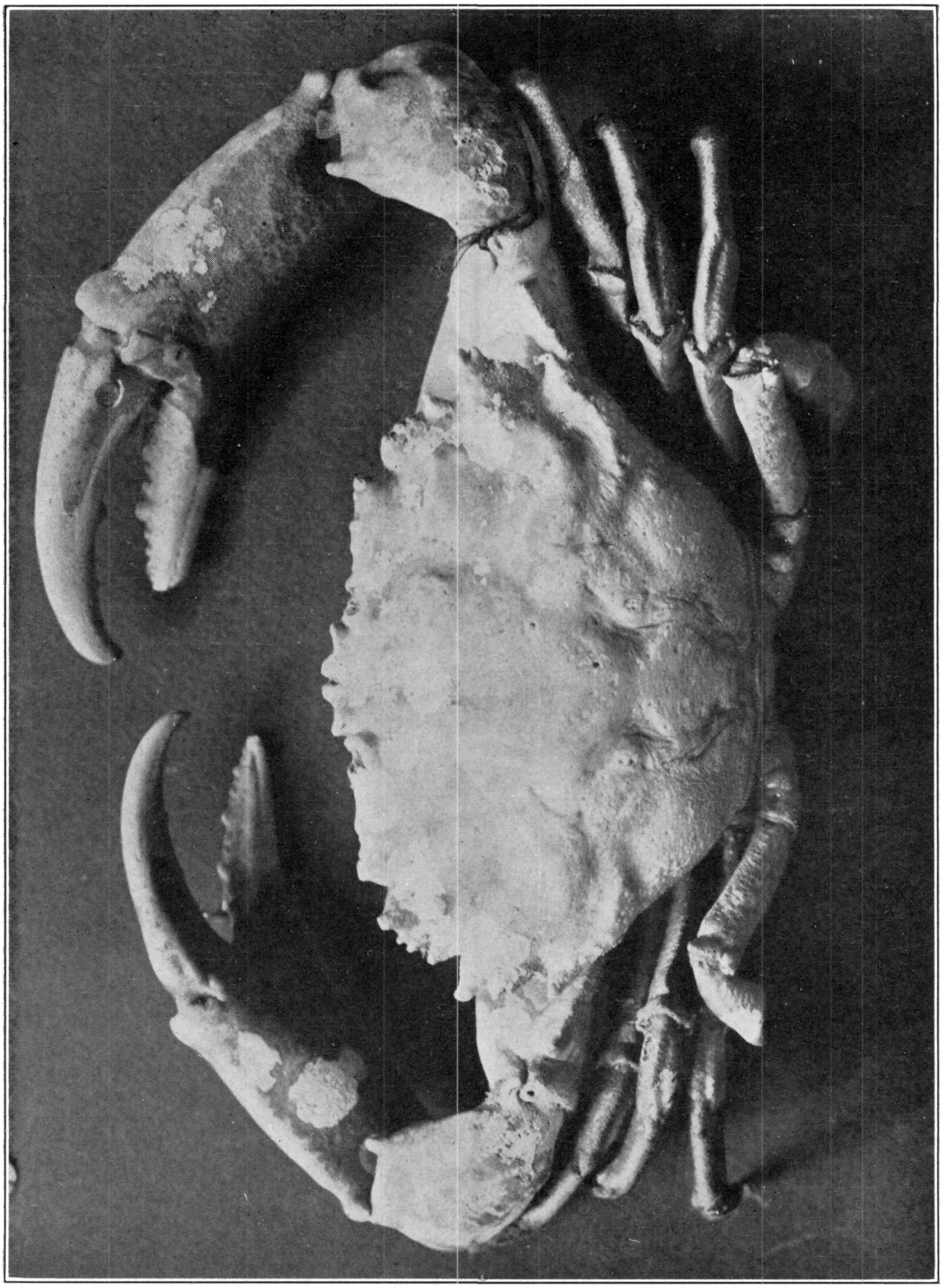
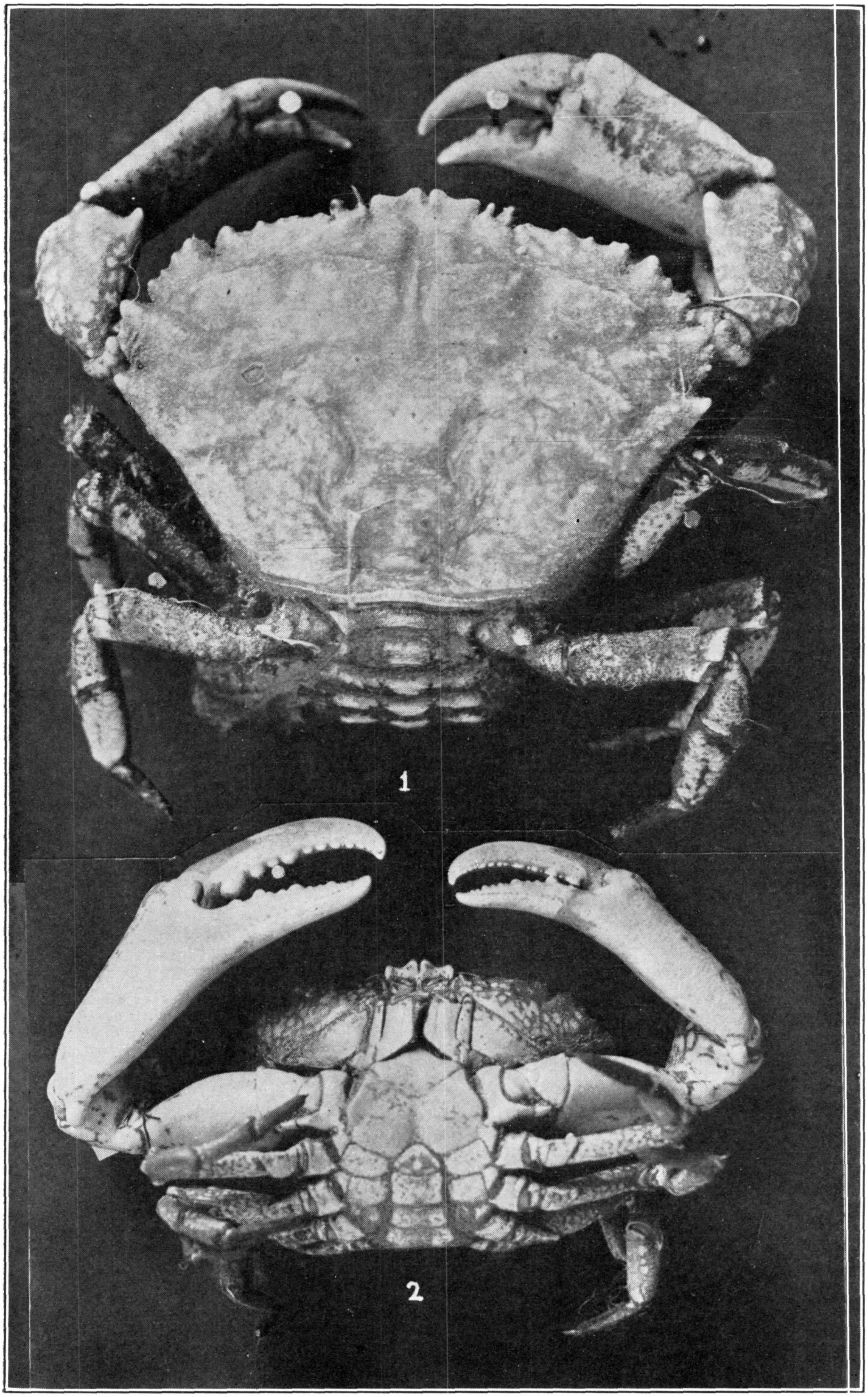
PLATYXANTHUS PATAGONICUS (P. 284)

FOR EXPLANATION OF PLATE SEE PAGE 577.



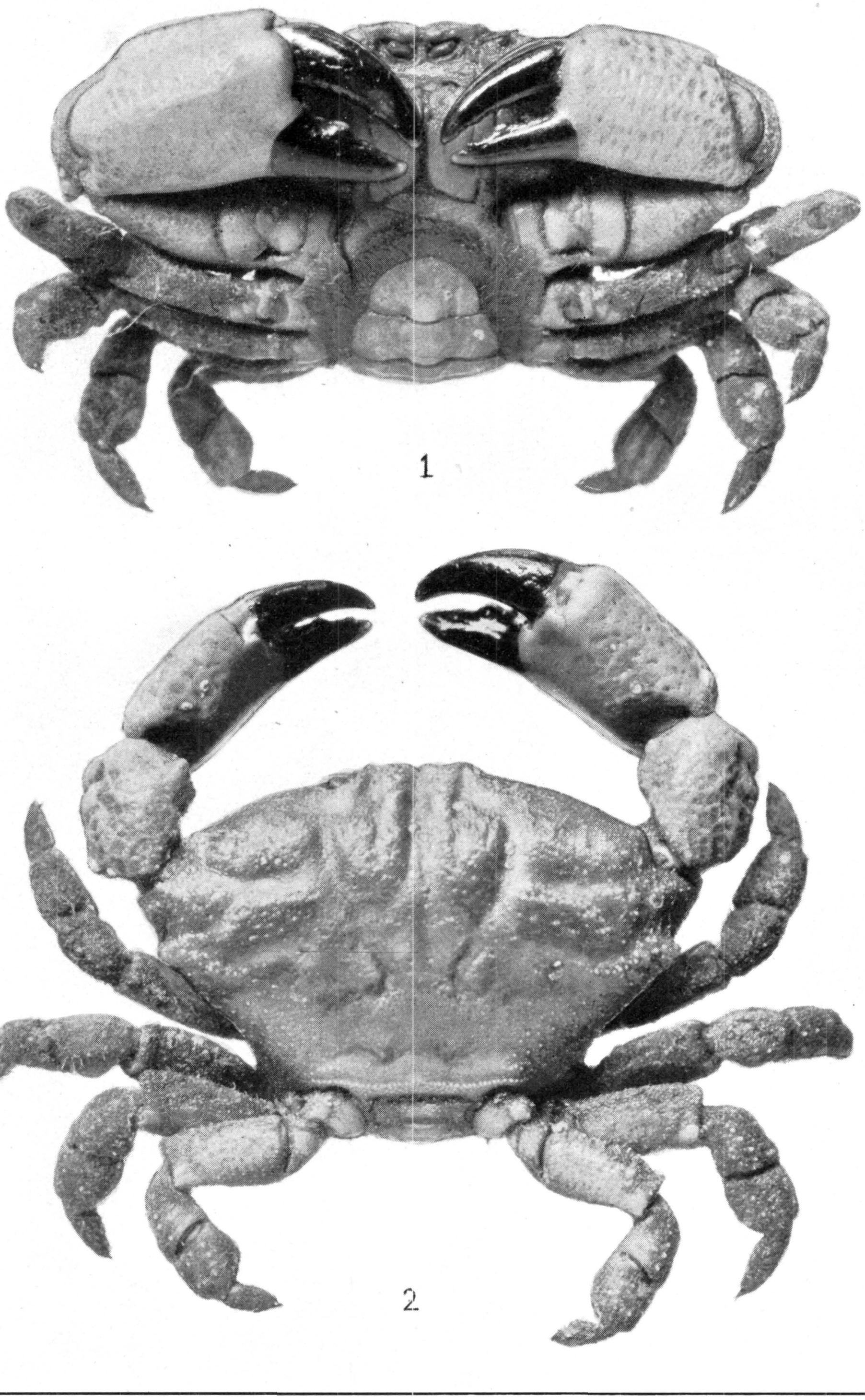
PLATYXANTHUS PATAGONICUS (P. 284)

FOR EXPLANATION OF PLATE SEE PAGE 577.



PLATYXANTHUS PATAGONICUS (P. 284)

FOR EXPLANATION OF PLATE SEE PAGE 577.



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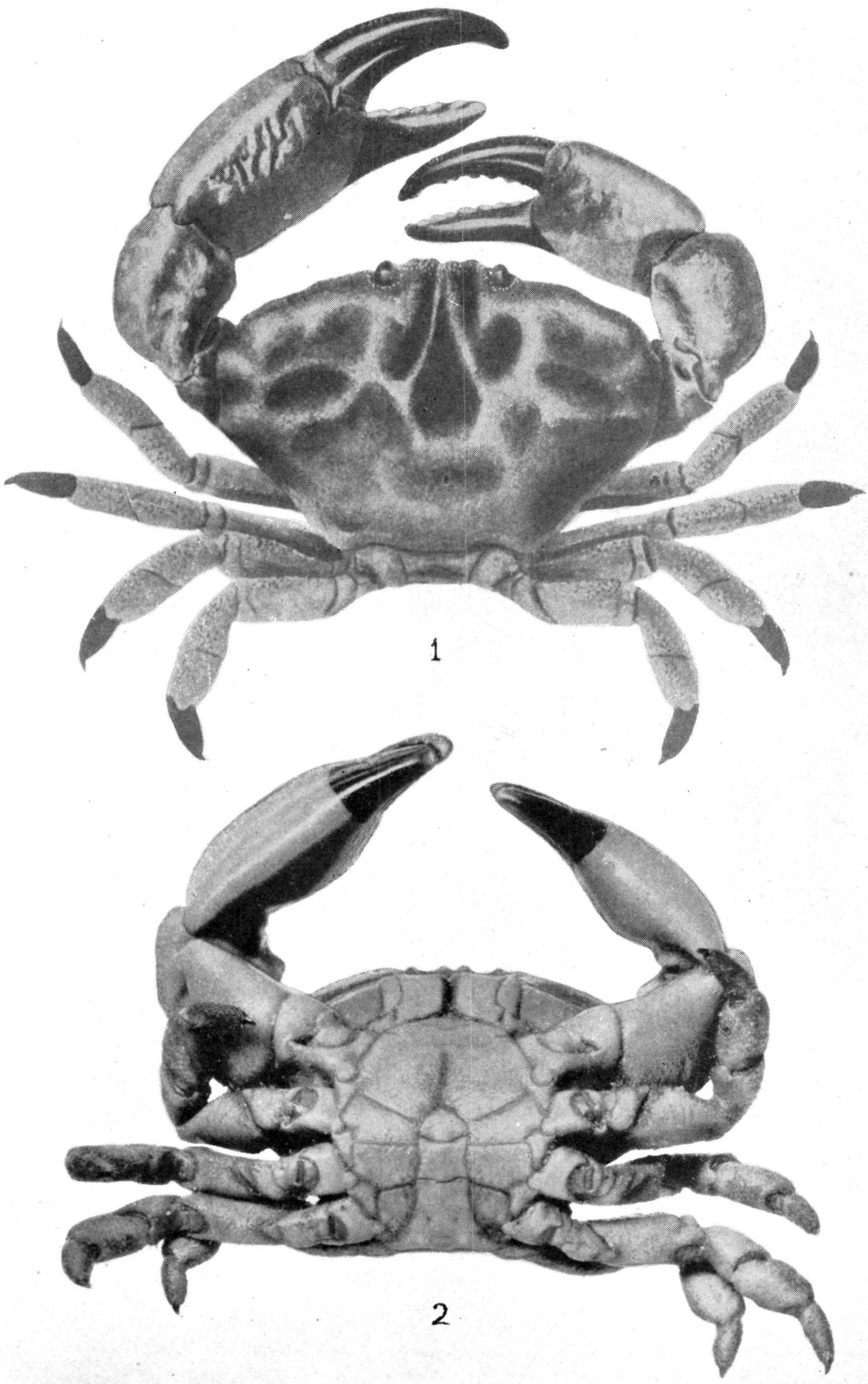
GAUDICHAUDIA GAUDICHAUDI (P. 278)

FOR EXPLANATION OF PLATE SEE PAGE 577.



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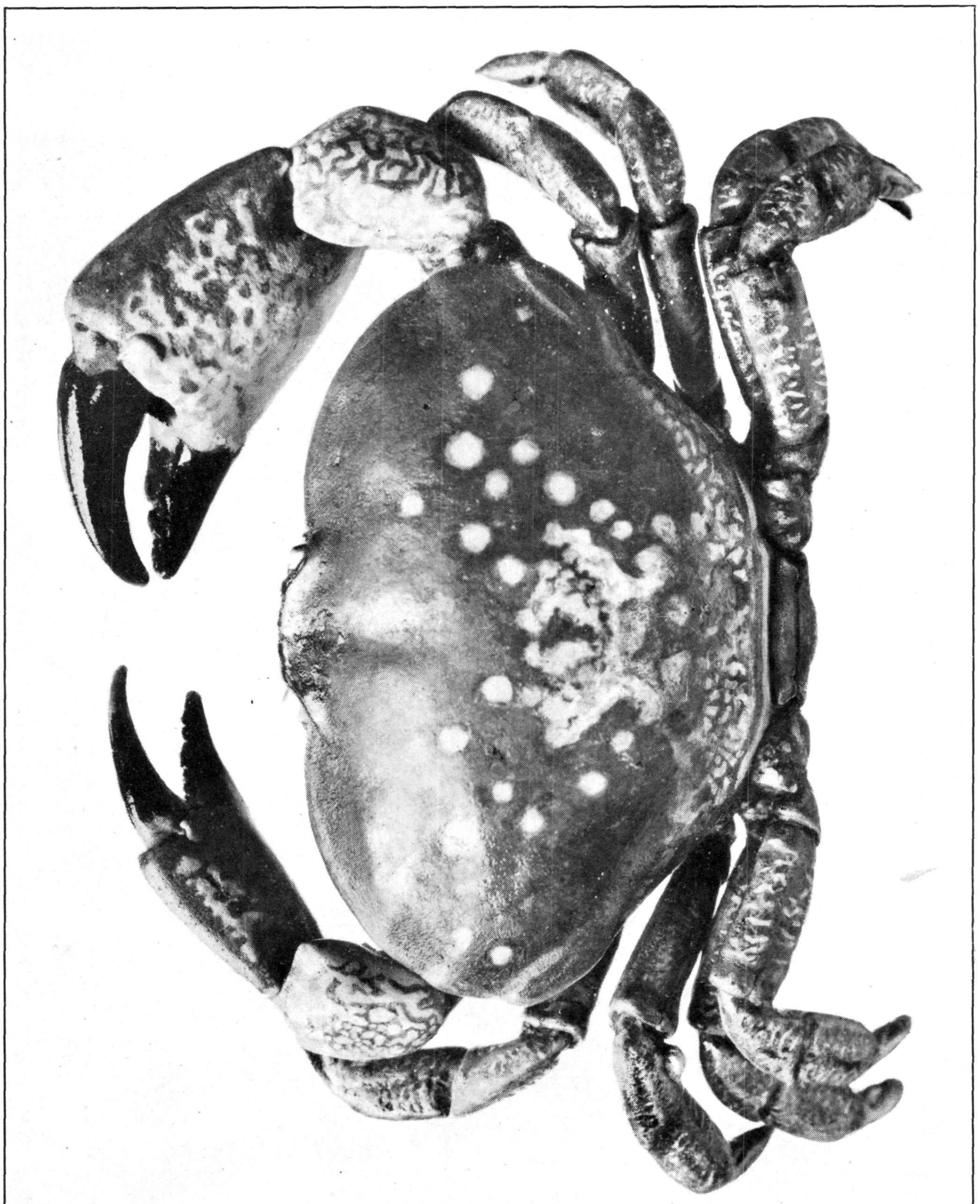
GAUDICHAUDIA GAUDICHAUDII (P. 278)

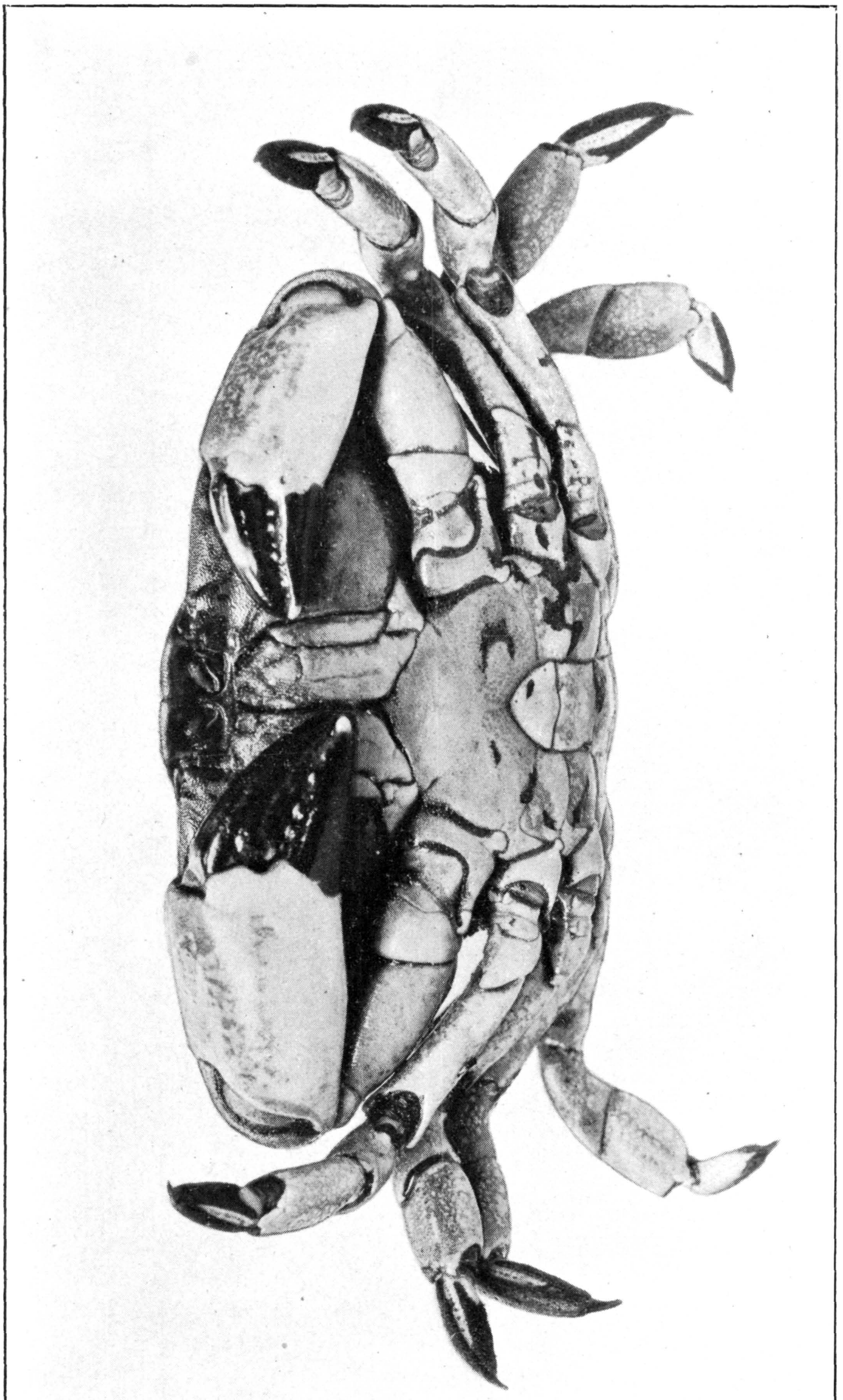
FOR EXPLANATION OF PLATE SEE PAGE 577.

79856—30——47



HOMALASPIS PLANA (P. 288)

FOR EXPLANATION OF PLATE SEE PAGE 577.

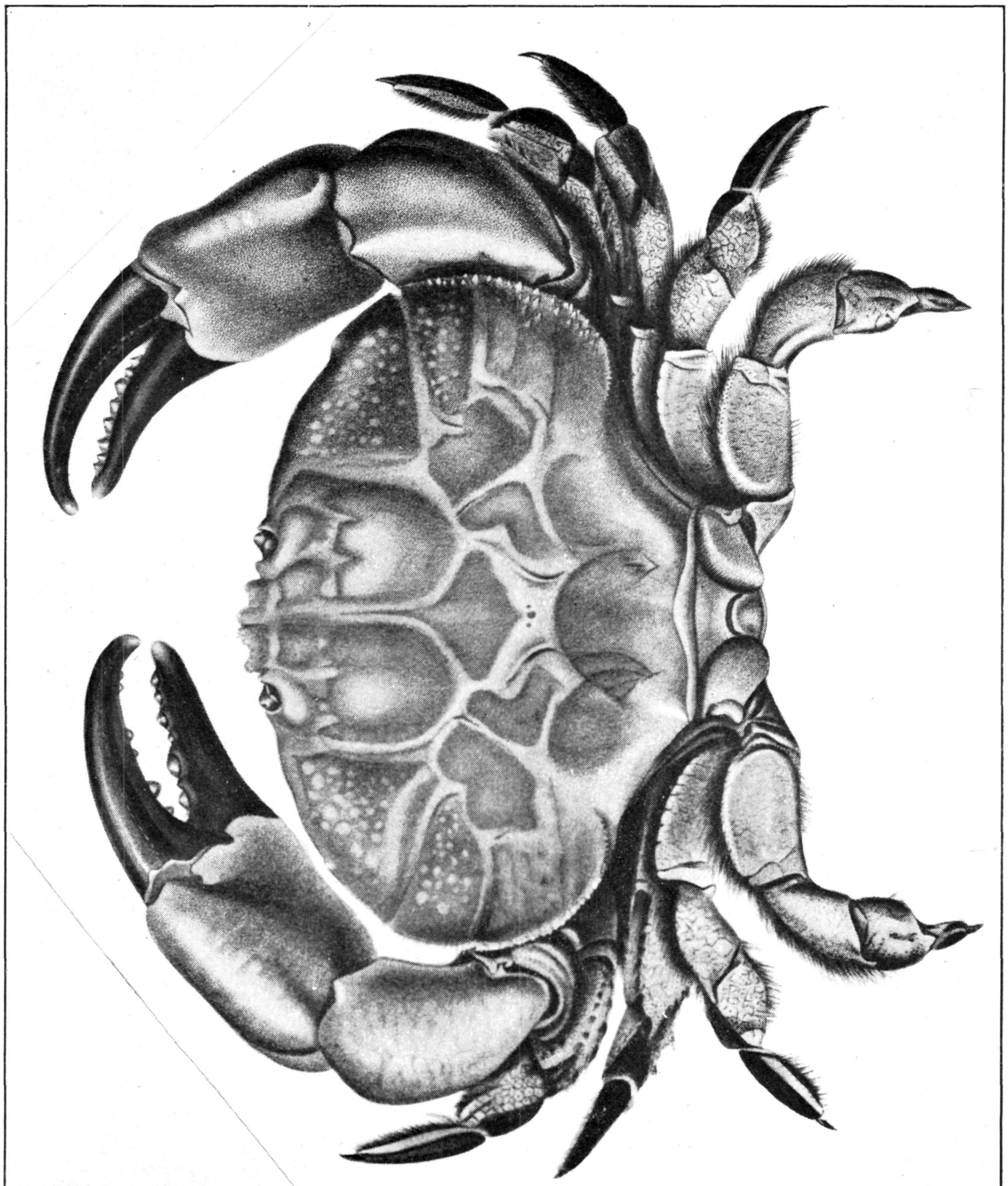


HOMALASPIS PLANA (P. 288)

FOR EXPLANATION OF PLATE SEE PAGE 577.

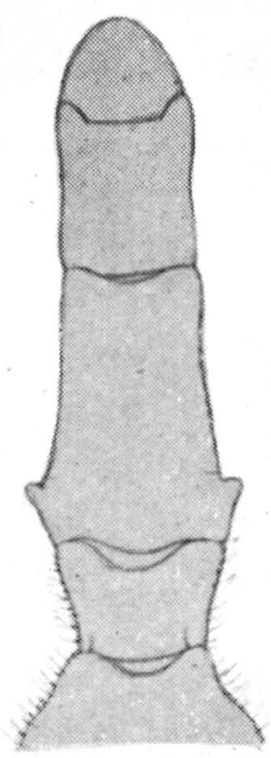
HOMALASPIS PLANA (P. 288)

FOR EXPLANATION OF PLATE SEE PAGE 578.



PARAXANTHUS BARBIGER (P. 286)

FOR EXPLANATION OF PLATE SEE PAGE 578.



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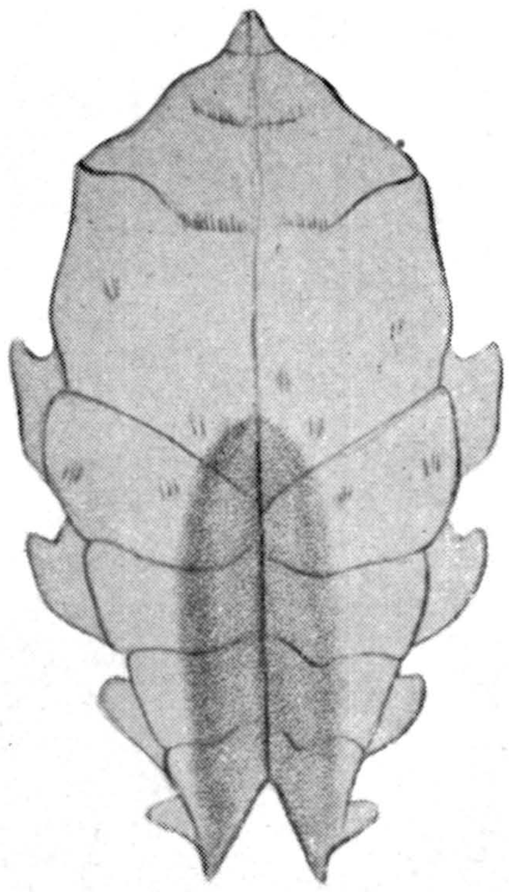

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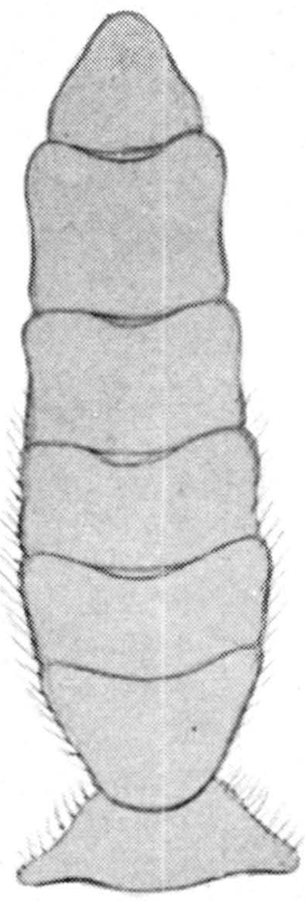

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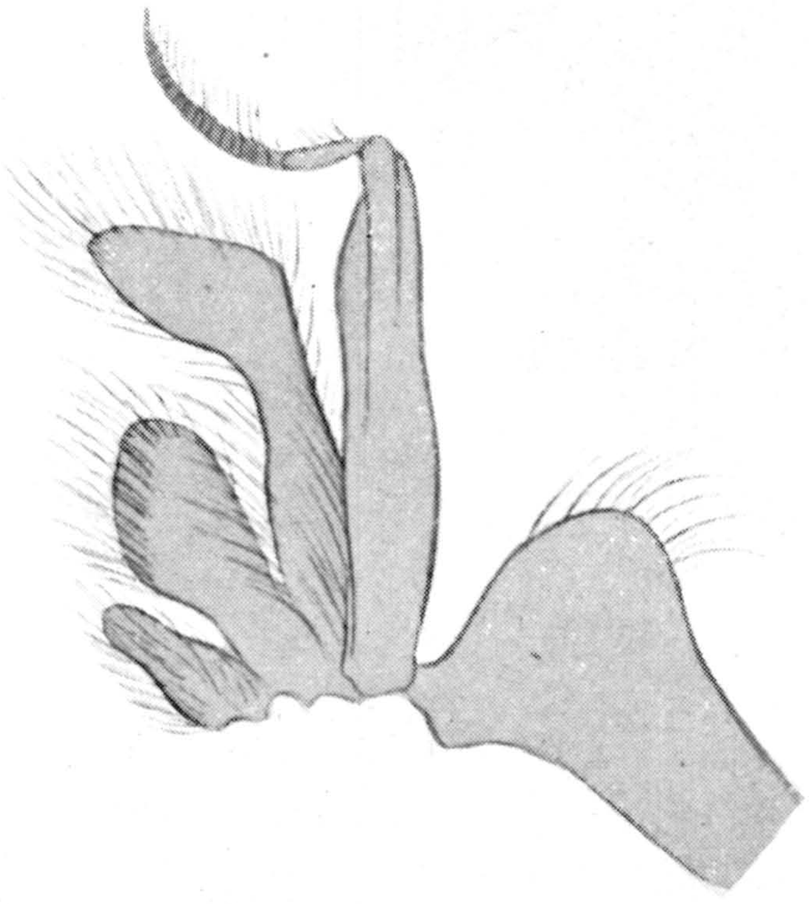

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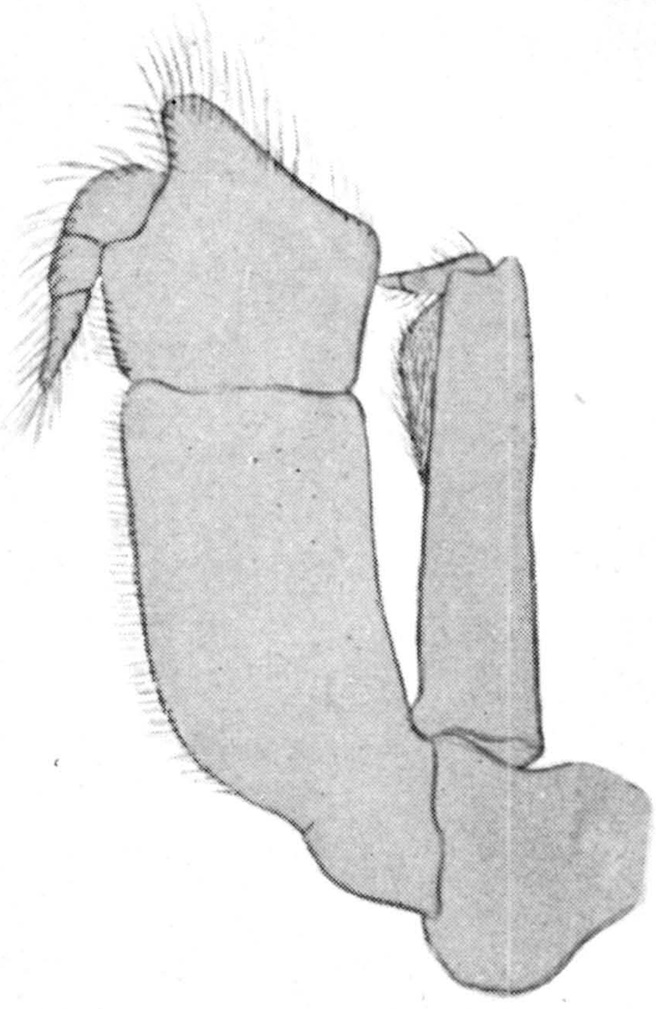

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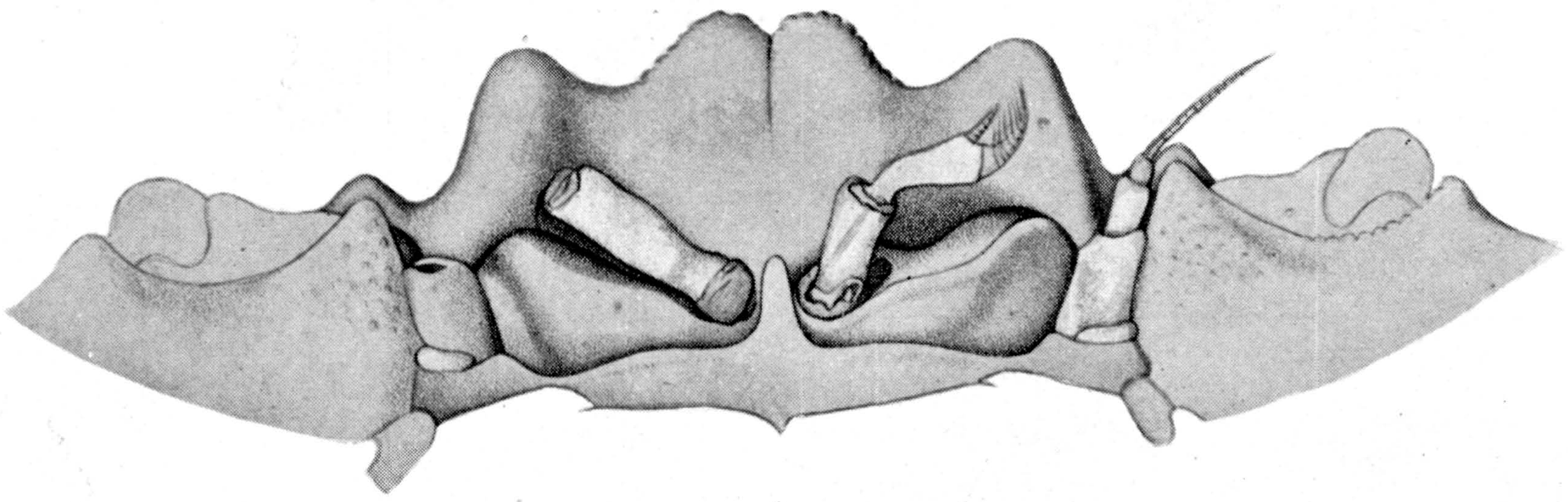

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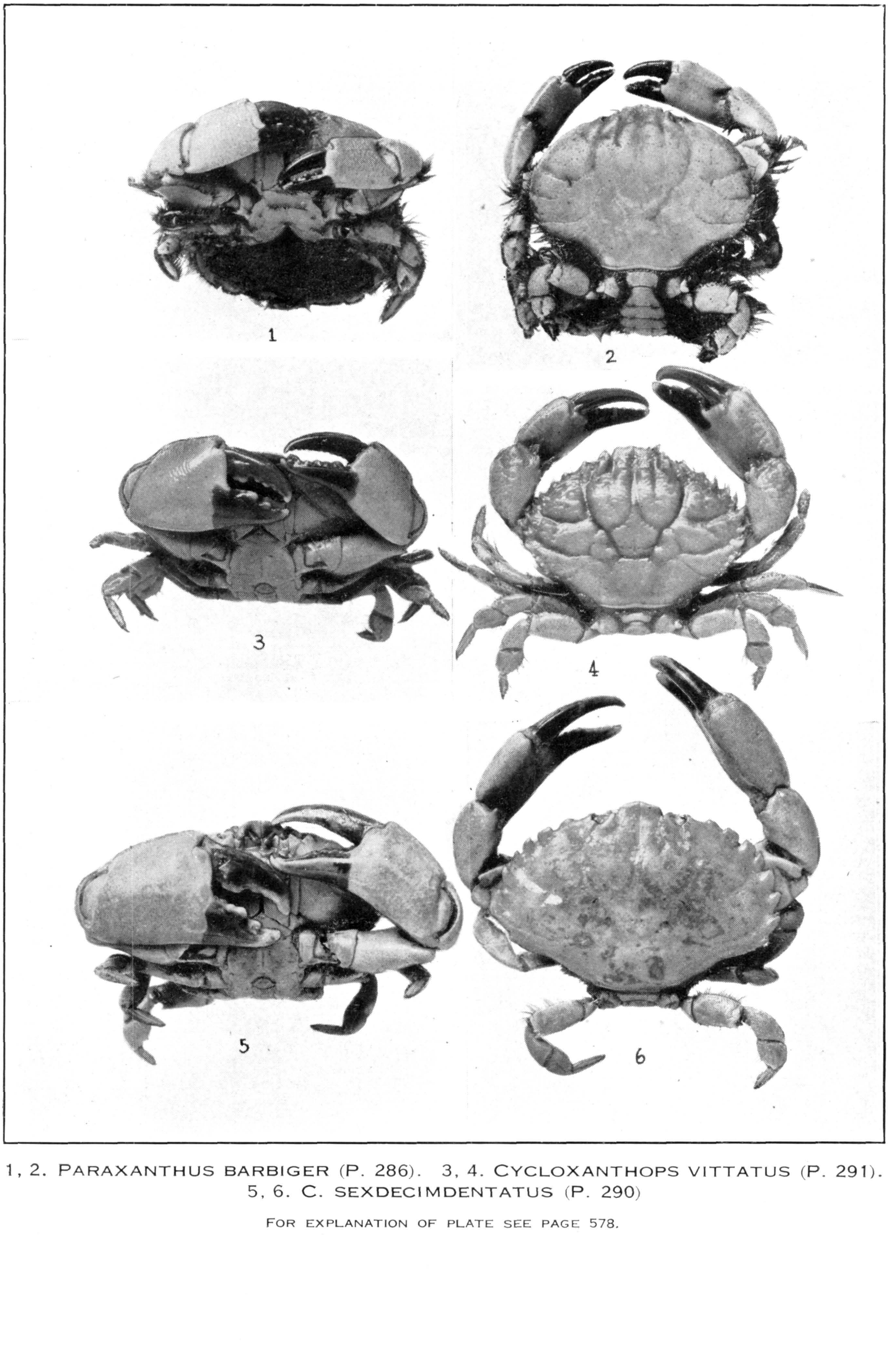
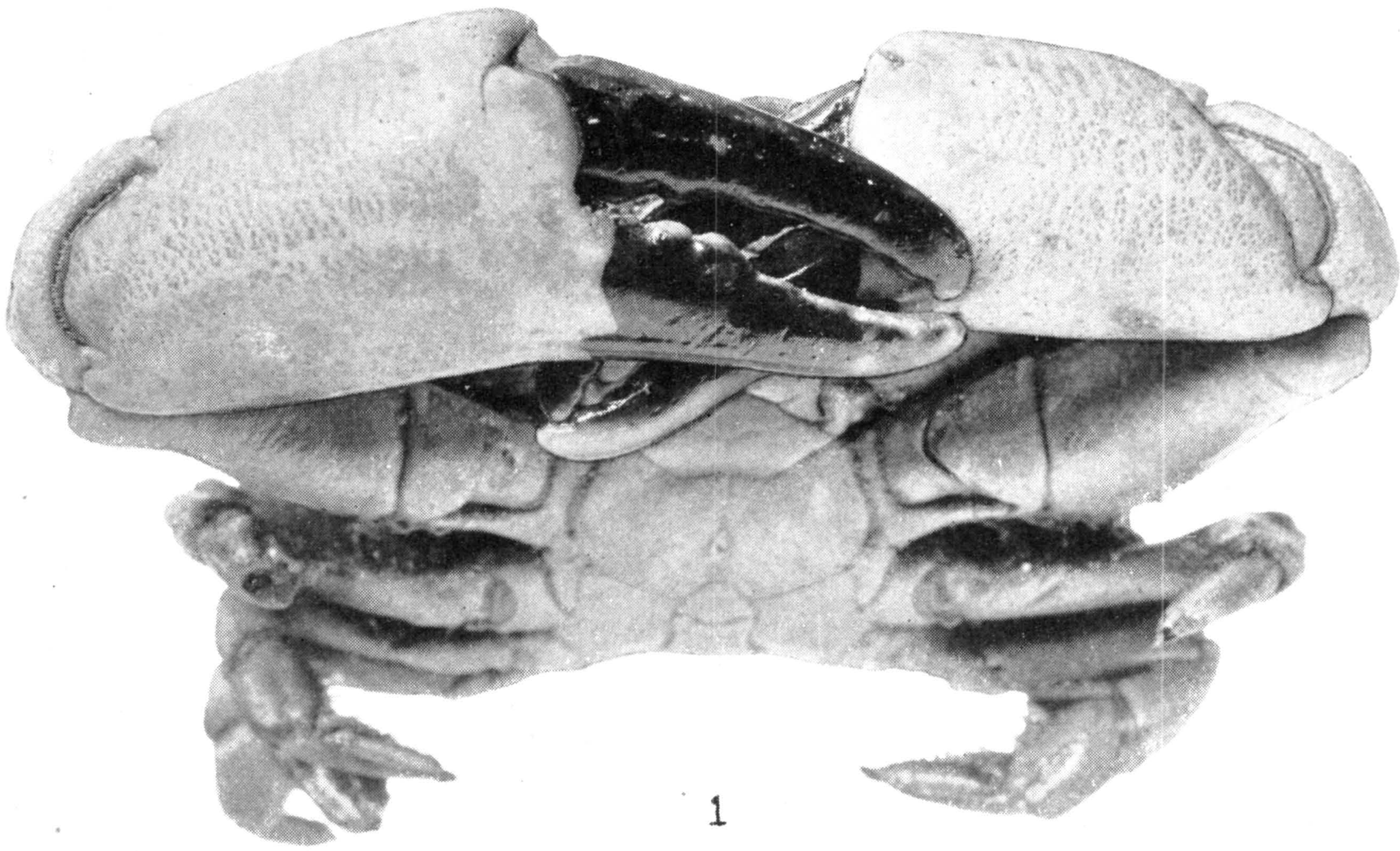
PARAXANTHUS BARBIGER (P. 286)

FOR EXPLANATION OF PLATE SEE PAGE 578.



1, 2. PARAXANTHUS BARBIGER (P. 286). 3, 4. CYCLOXANTHOPS VITTATUS (P. 291). 5, 6. C. SEXDECIMDENTATUS (P. 290)

FOR EXPLANATION OF PLATE SEE PAGE 578.



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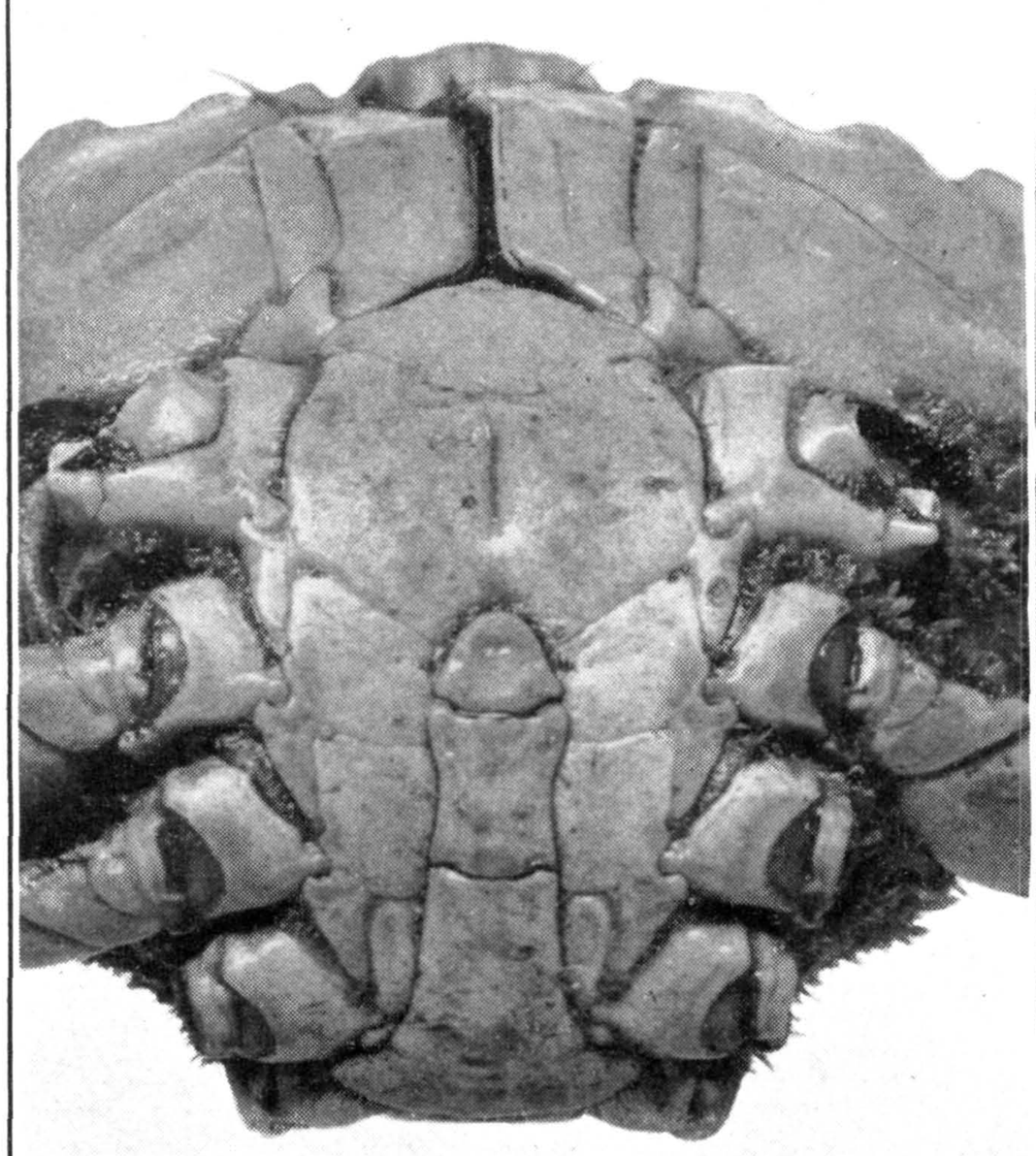

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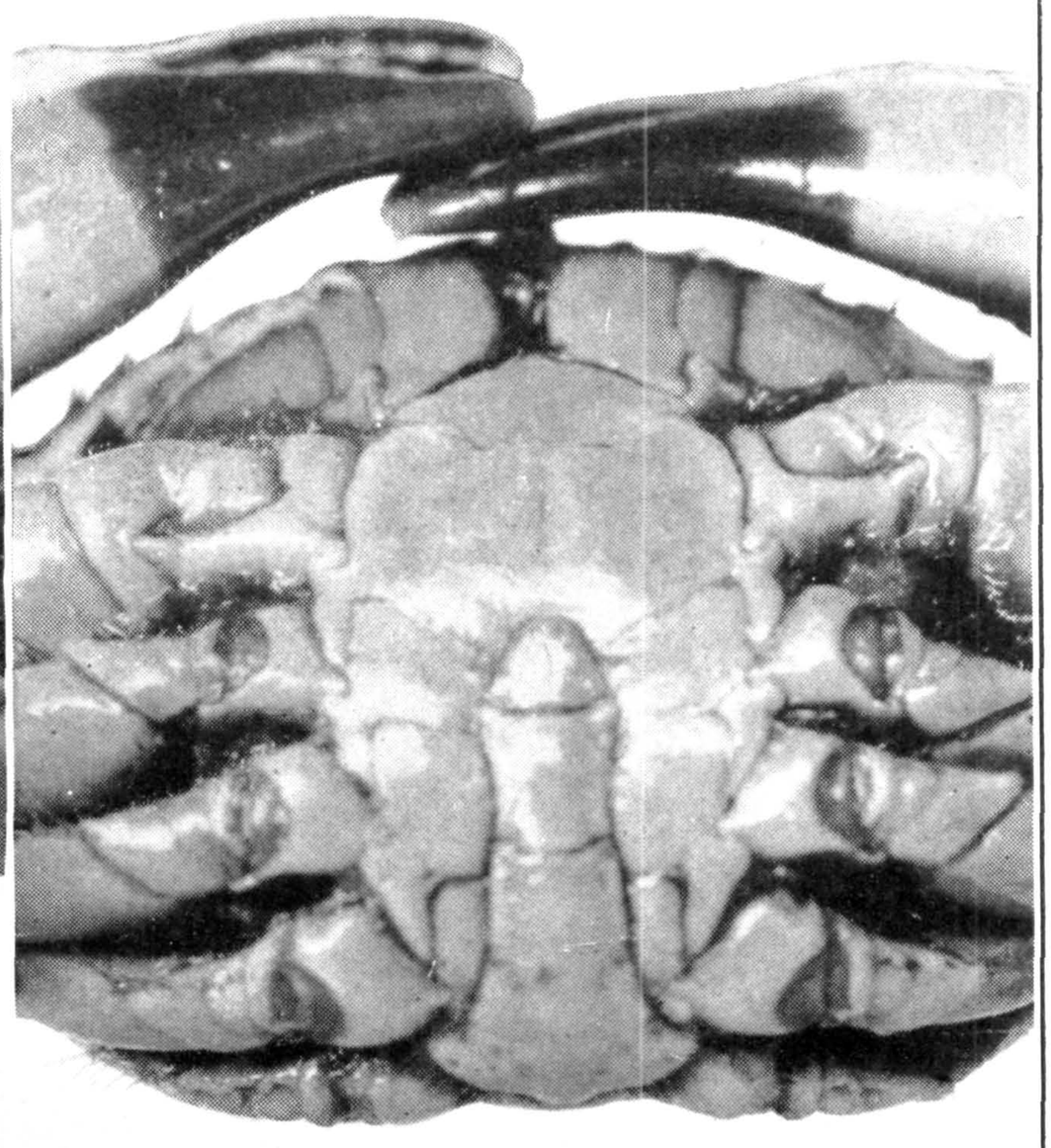

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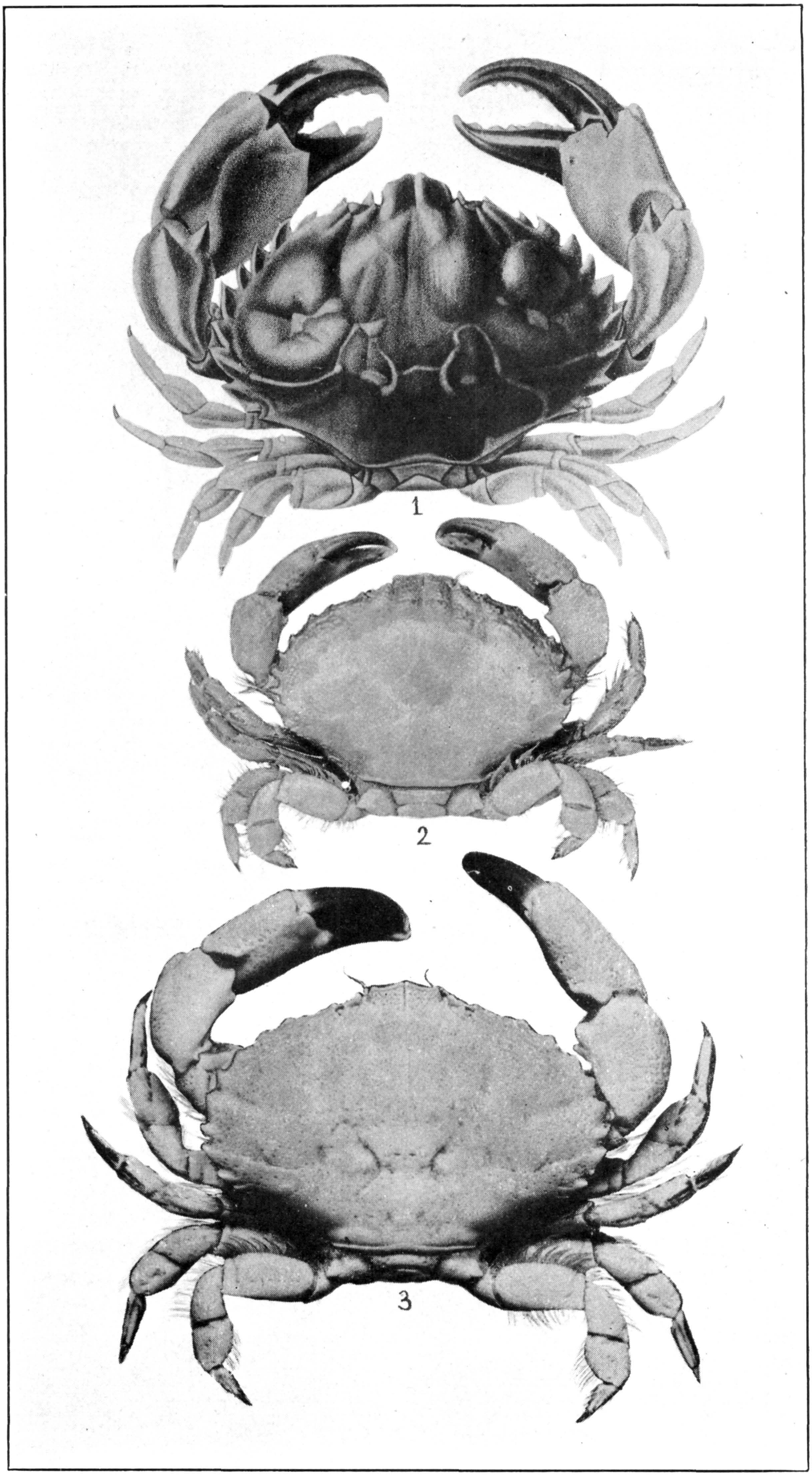
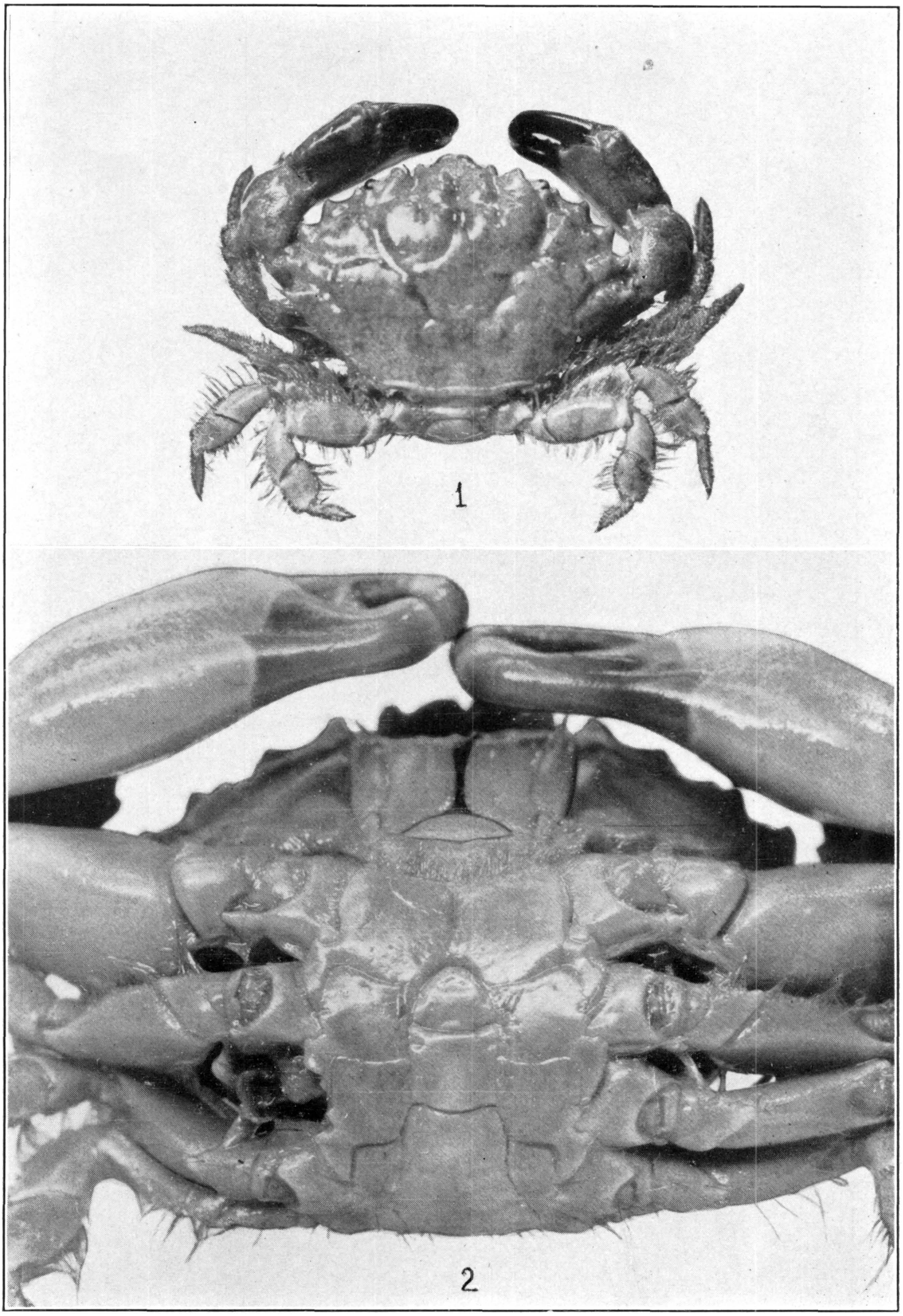
1. CYCLOXANTHOPS NOVEMDENTATUS (P. 292). 2. C. SEXDECIMDENTATUS (P. 290). 3. C. VITTATUS (P. 291)

FOR EXPLANATION OF PLATE SEE PAGE 578.



1. CYCLOXANTHOPS SEXDECIMDENTATUS (P. 290). 2, 3. C. NOVEMDENTATUS (P. 292)

FOR EXPLANATION OF PLATE SEE PAGE 578.



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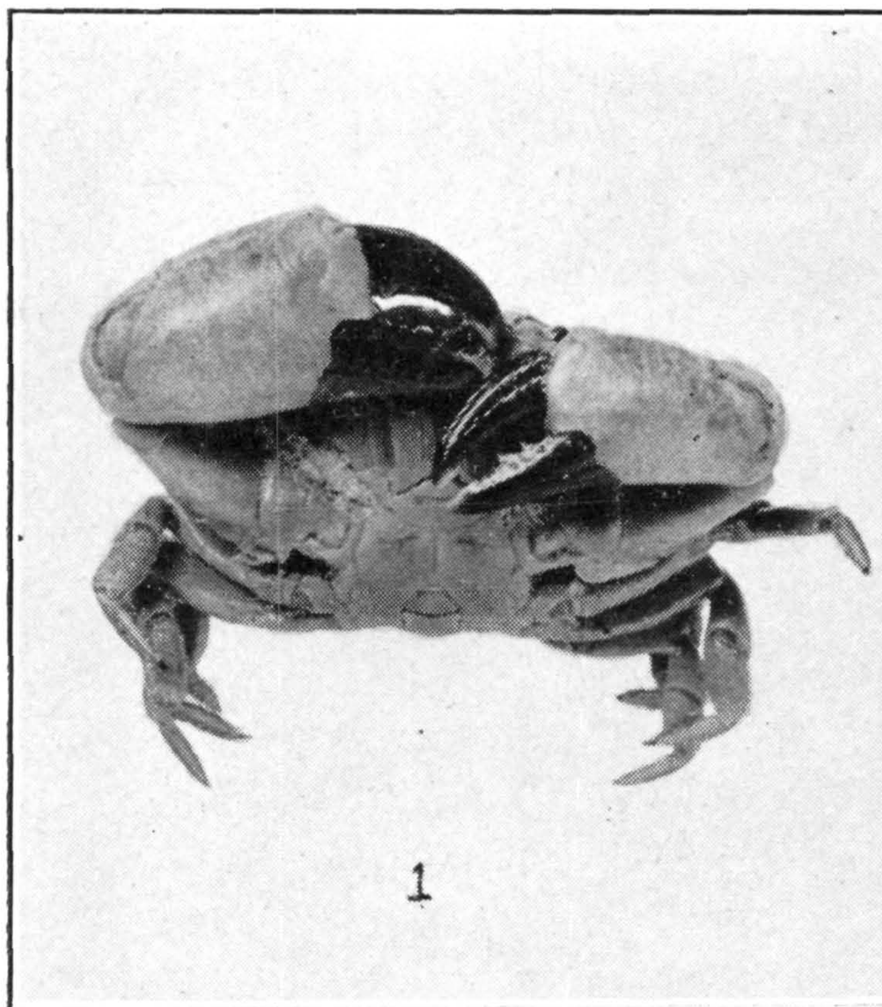
PHYMODIUS MACULATUS (P. 295)

FOR EXPLANATION OF PLATE SEE PAGE 578.



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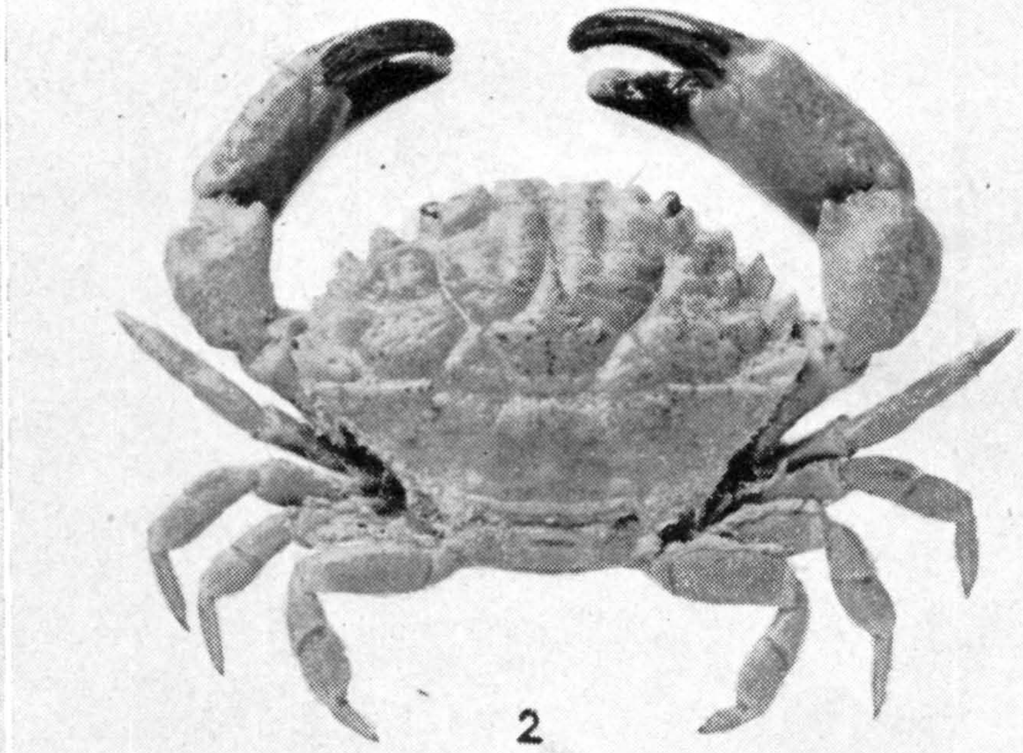

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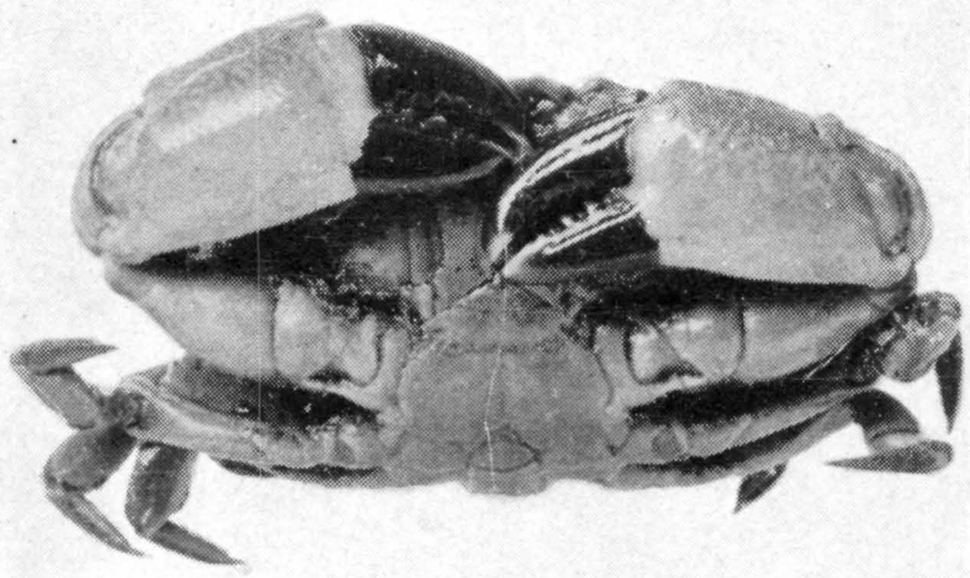

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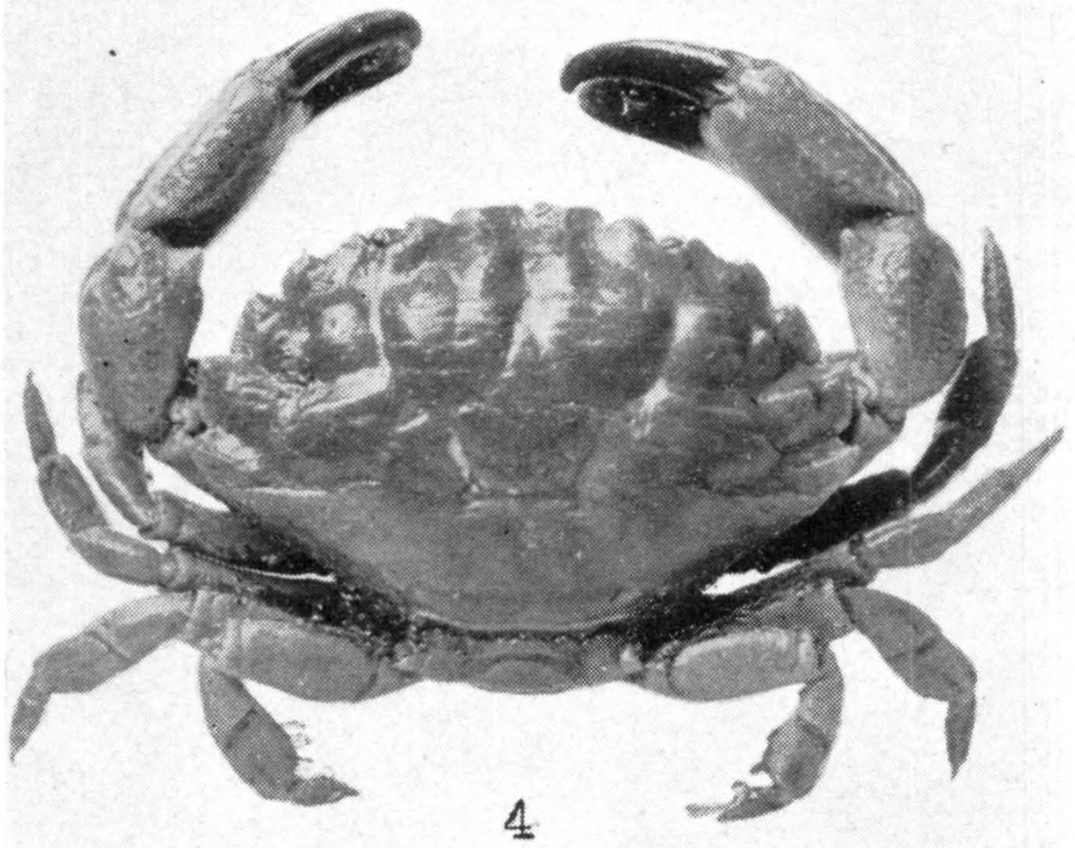

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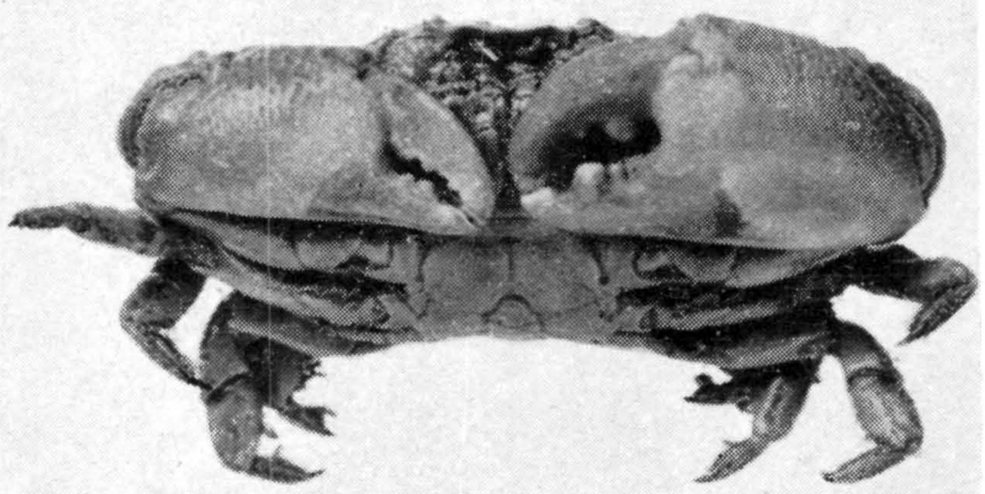

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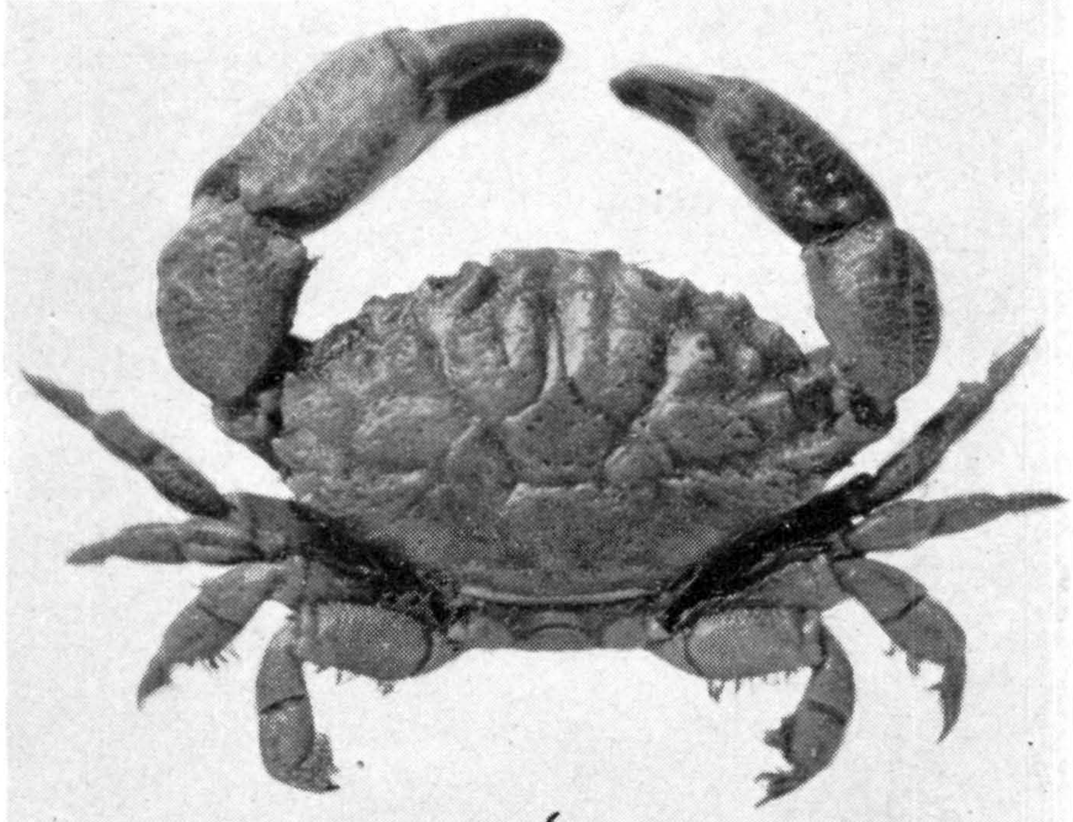

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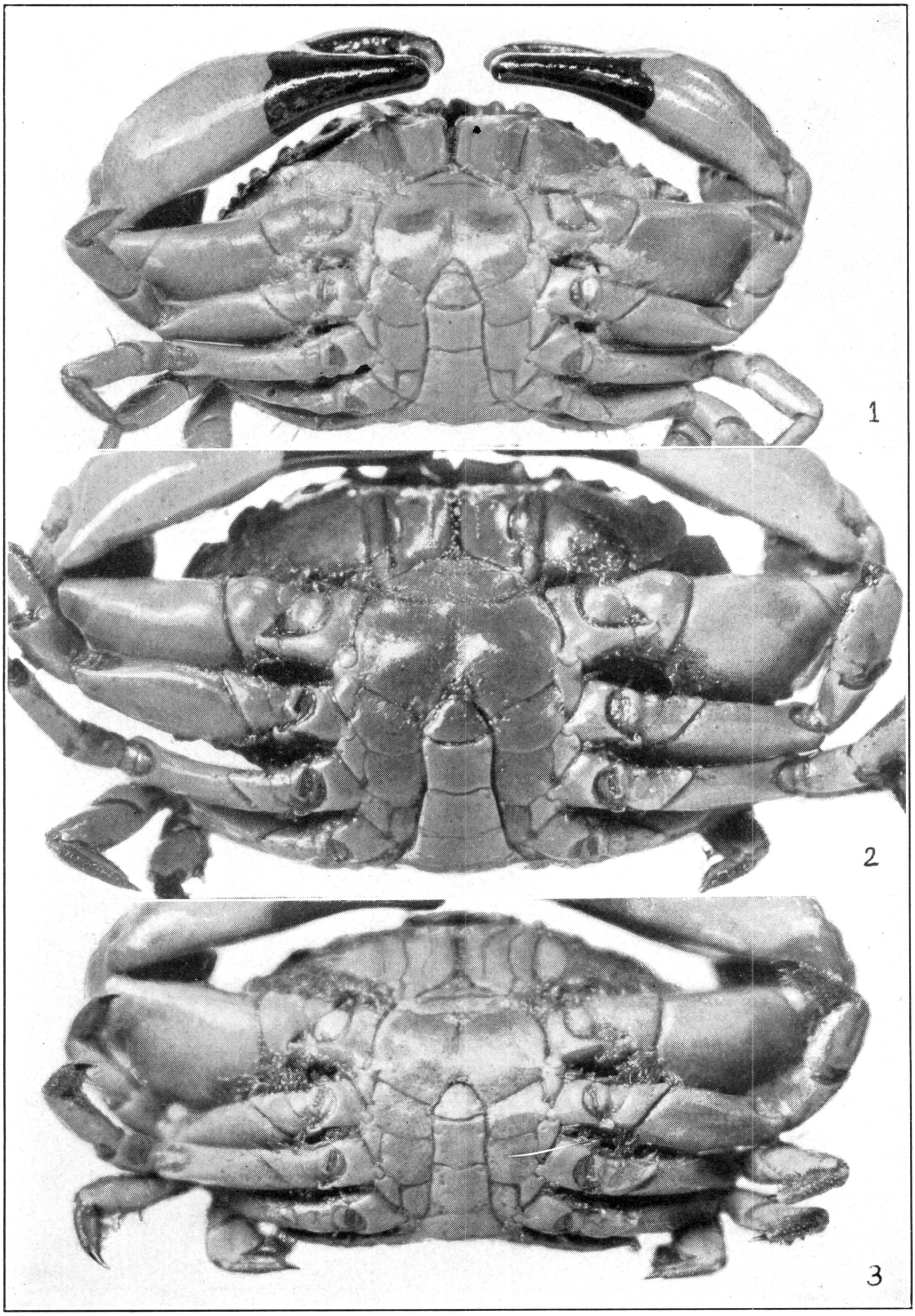
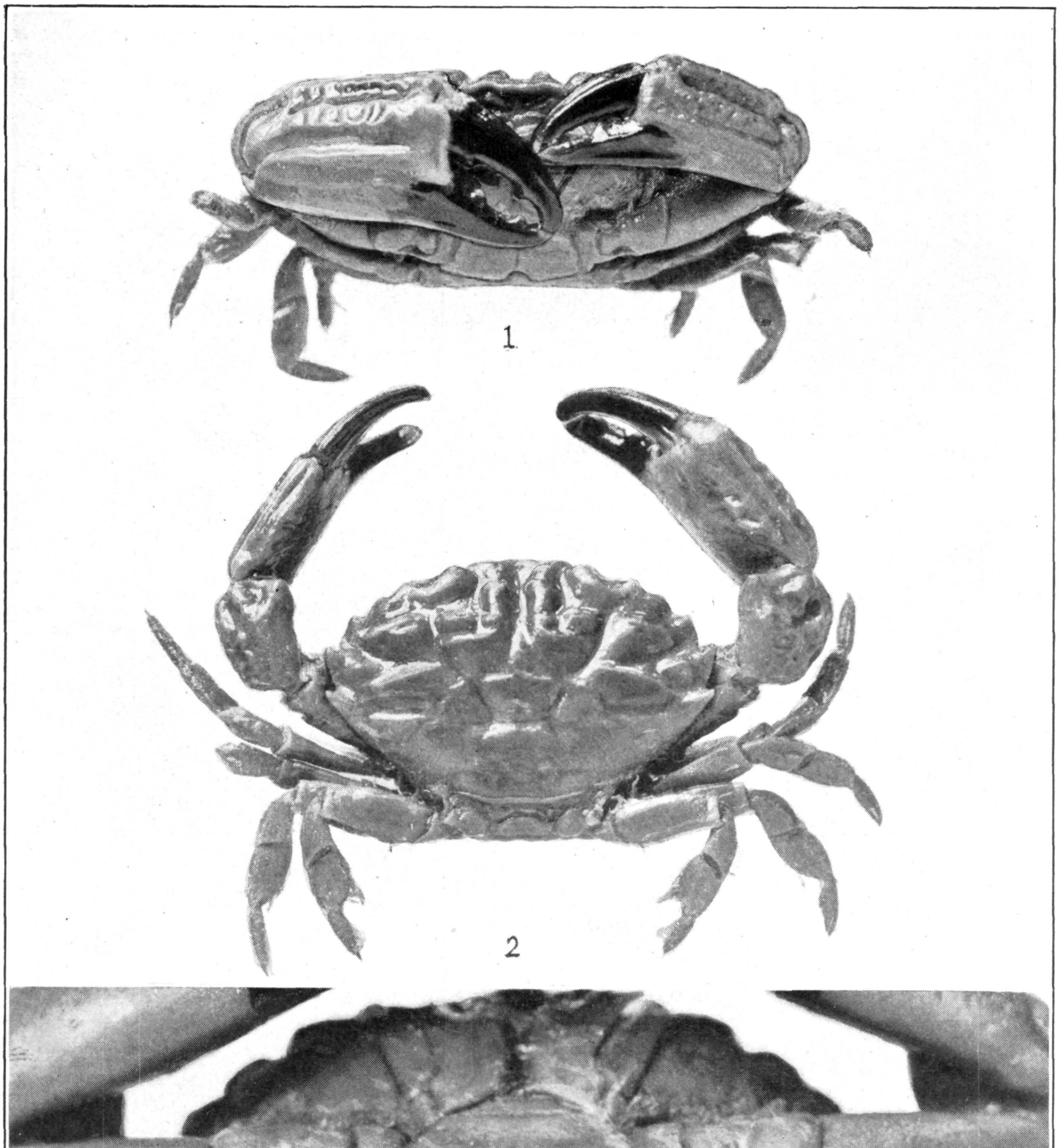
1, 2. LEPTODIUS FLORIDANUS (P. 297). 3, 4. L. OCCIDENTALIS (P. 301). 5, 6. L. SANGUINEUS (P. 302)

FOR EXPLANATION OF PLATE SEE PAGE 579.



1. LEPTODIUS FLORIDANUS (P. 297). 2. L. OCCIDENTALIS (P. 301). 3. L. SANGUINEUS (P. 302)

FOR EXPLANATION OF PLATE SEE PAGE 579.



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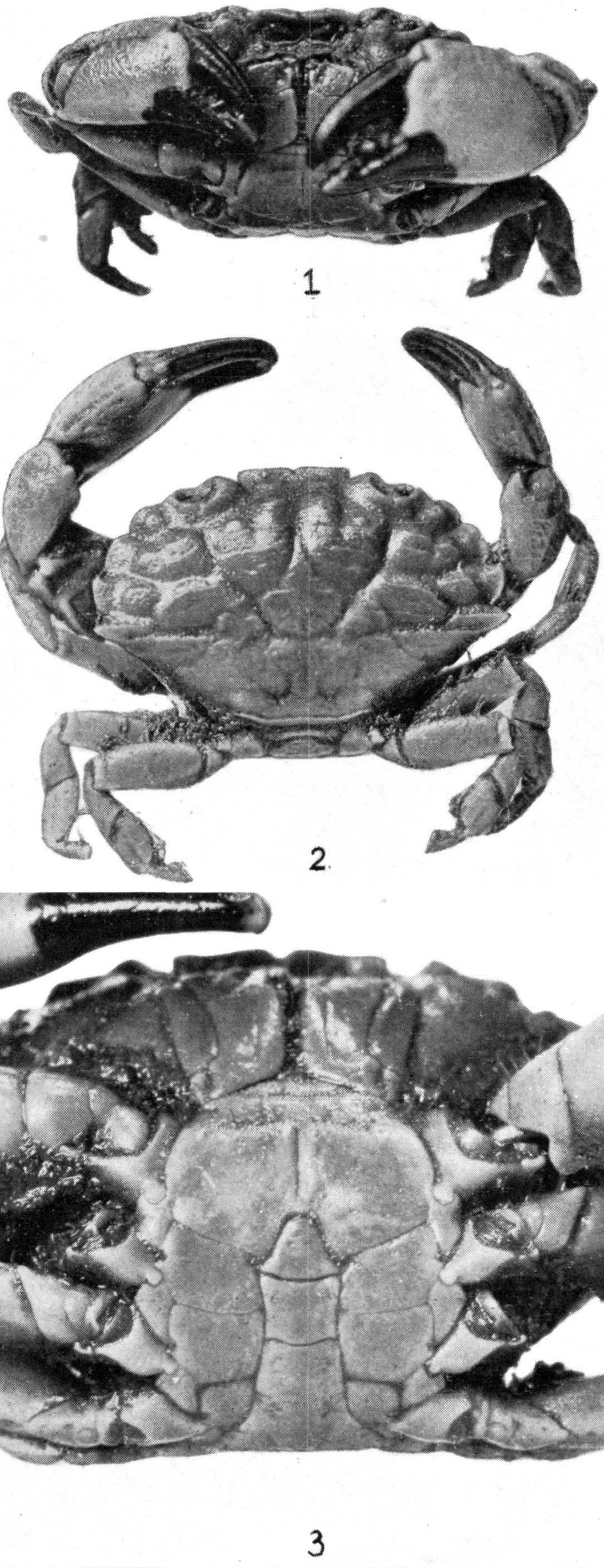
LEPTODIUS SNODGRASSI (P. 303)

FOR EXPLANATION OF PLATE SEE PAGE 579.



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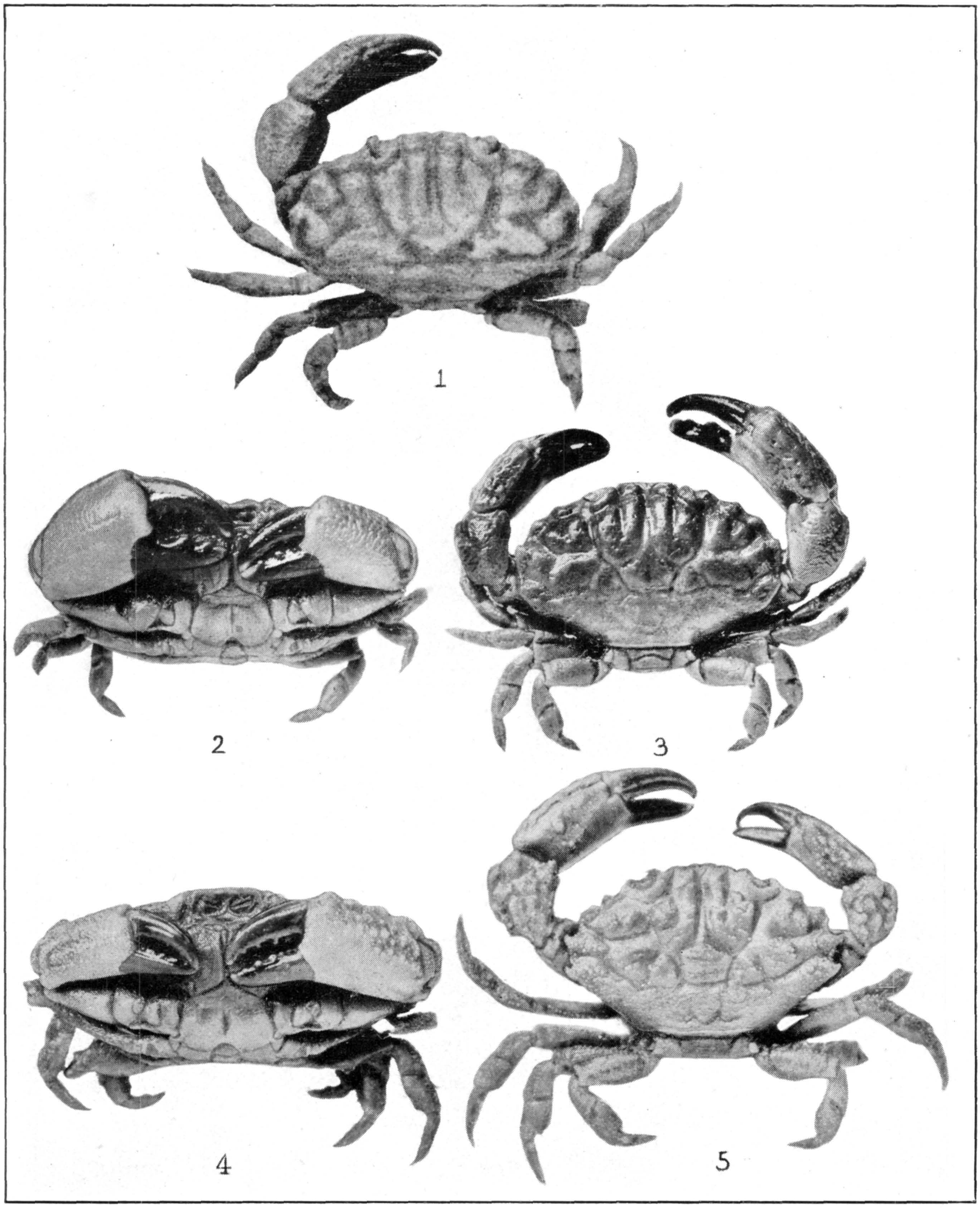
LEPTODIUS TABOGANUS (P. 304)

FOR EXPLANATION OF PLATE SEE PAGE 579.



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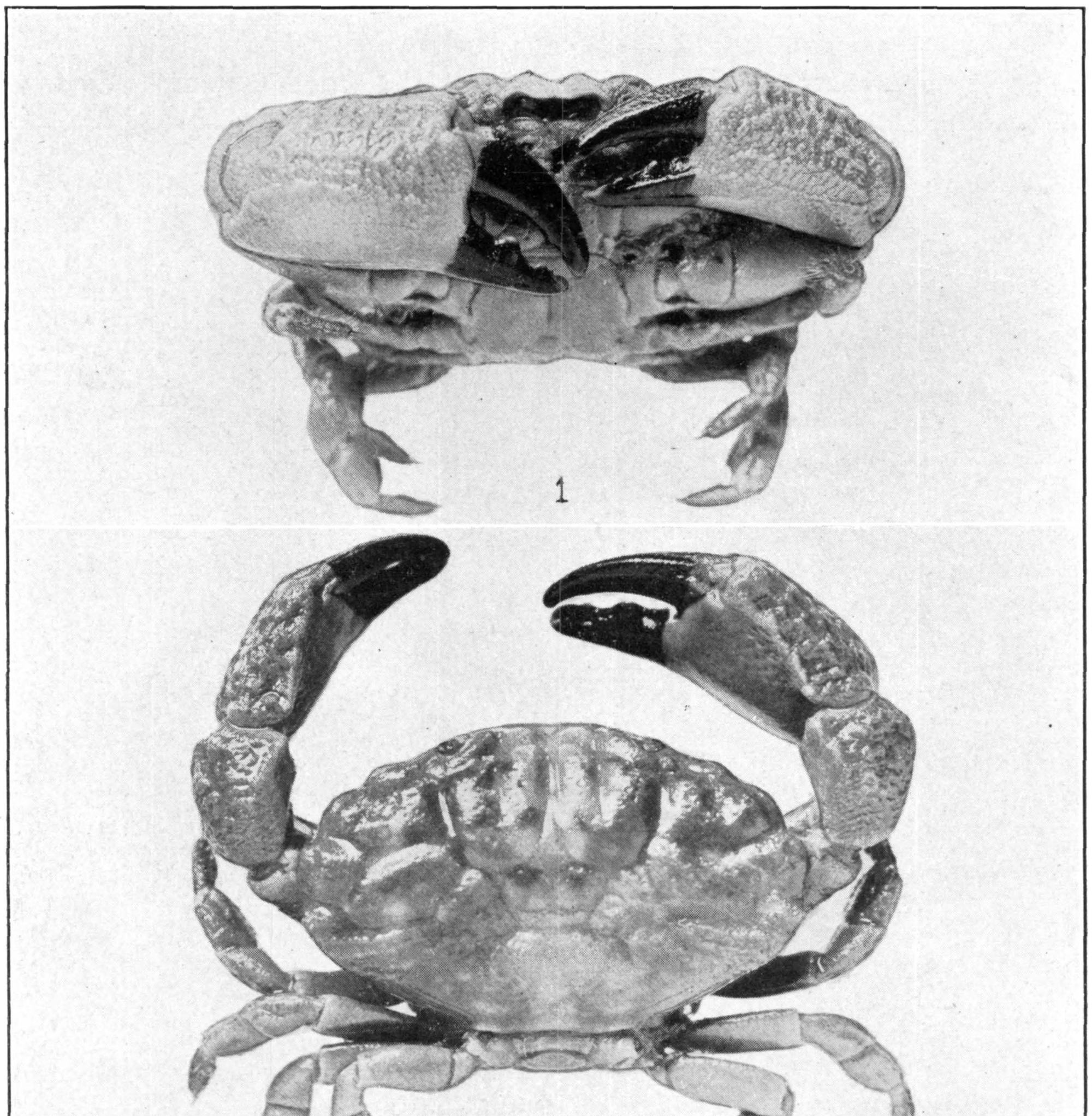
1–3. LEPTODIUS PARVULUS (P. 305). 4, 5. L. AGASSIZII (P. 307)

FOR EXPLANATION OF PLATE SEE PAGE 579.



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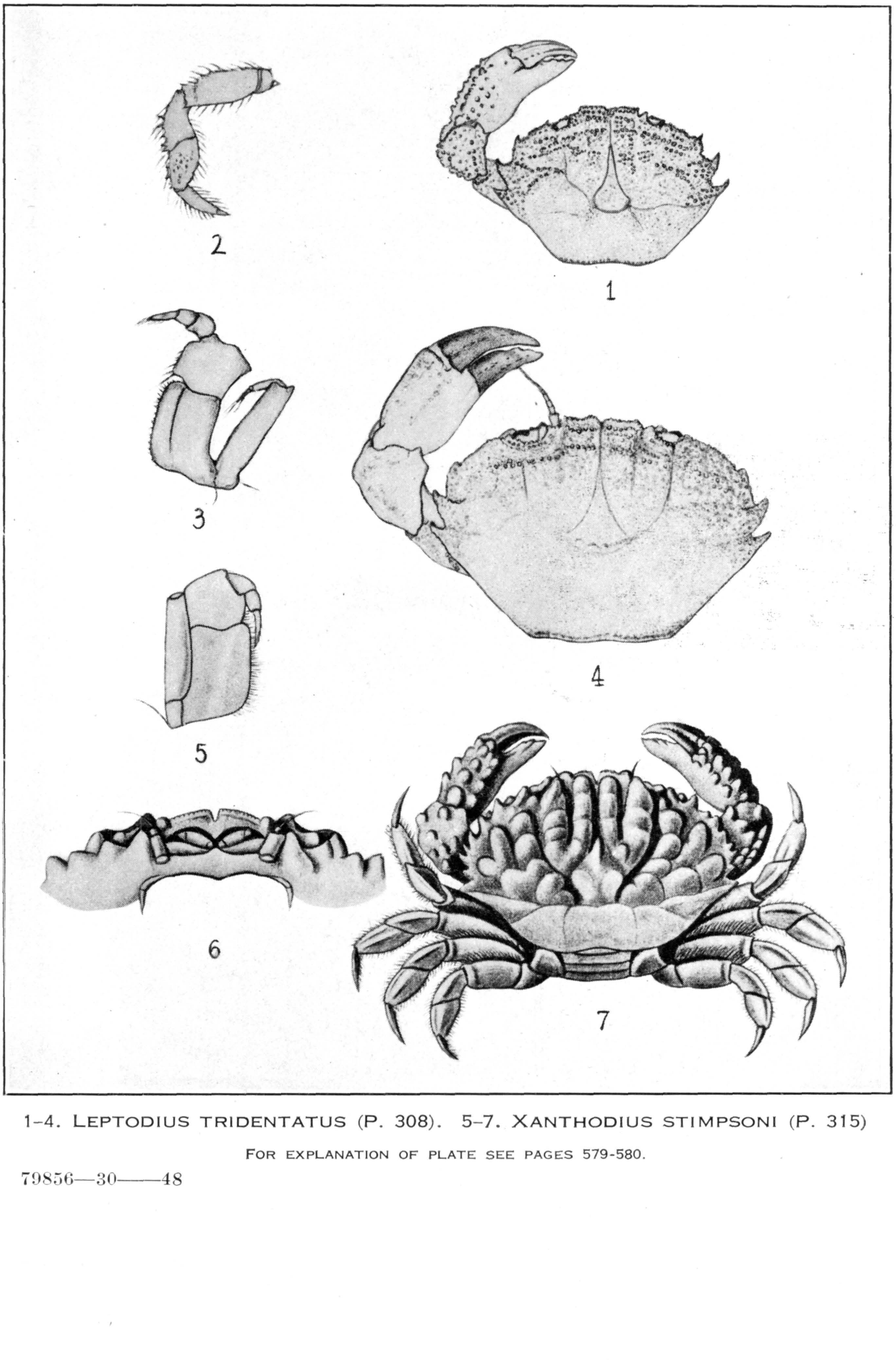
LEPTODIUS COOKSONI (P. 310)

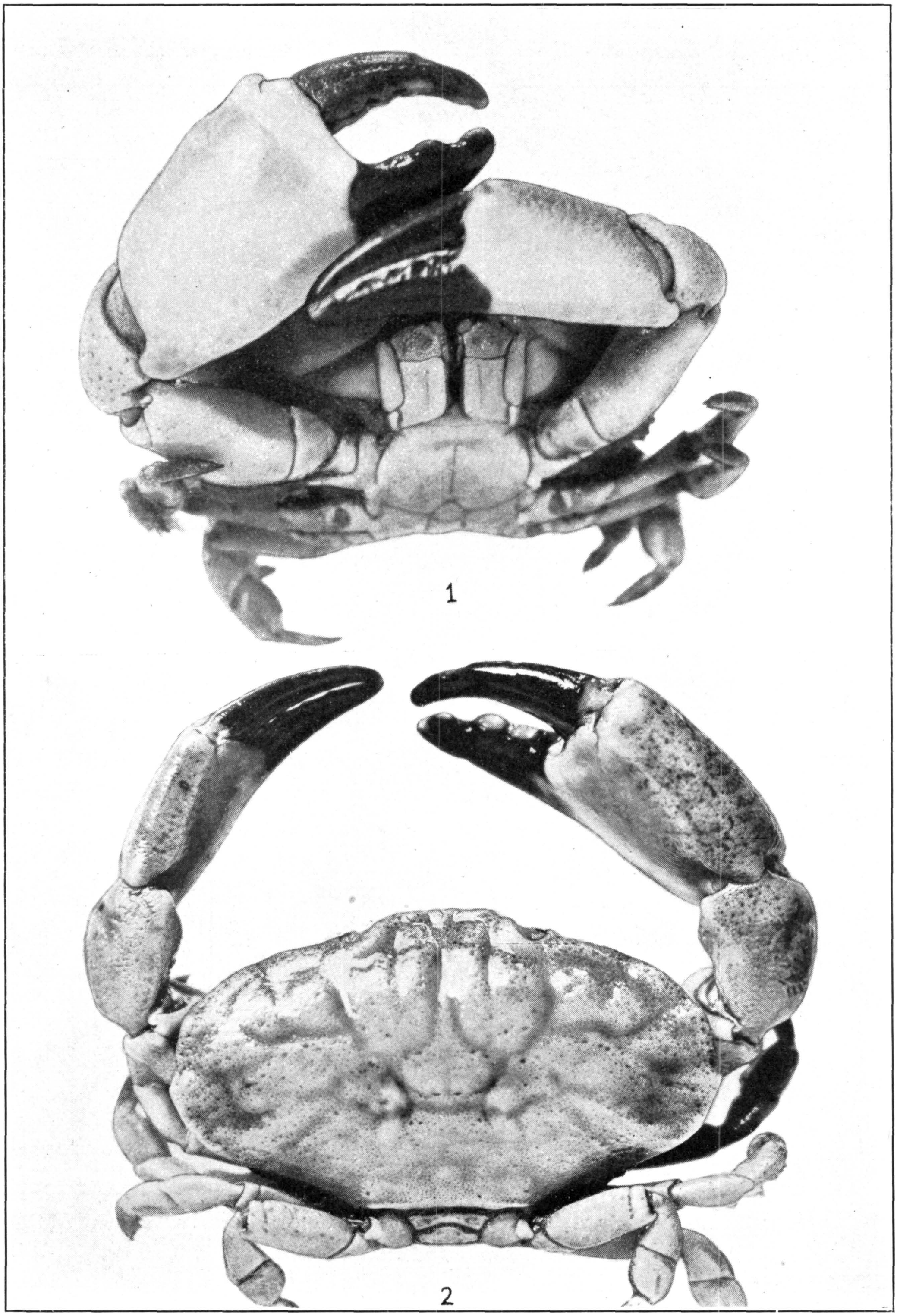
FOR EXPLANATION OF PLATE SEE PAGE 579.



1–4. LEPTODIUS TRIDENTATUS (P. 308). 5–7. XANTHODIUS STIMPSONI (P. 315)

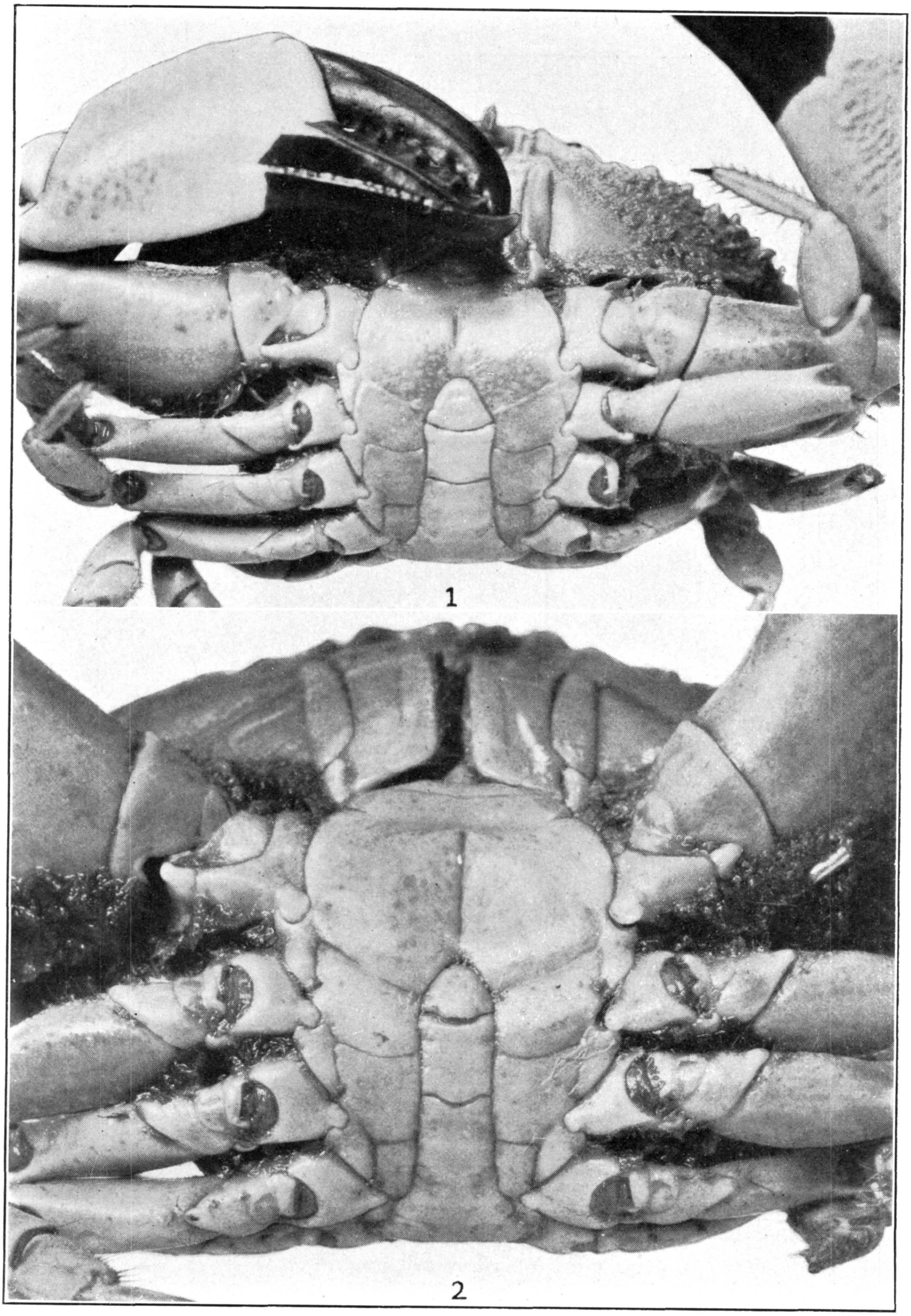
FOR EXPLANATION OF PLATE SEE PAGES 579-580.

79856—30——48



XANTHODIUS STERNBERGHII (P. 311)

FOR EXPLANATION OF PLATE SEE PAGE 580.



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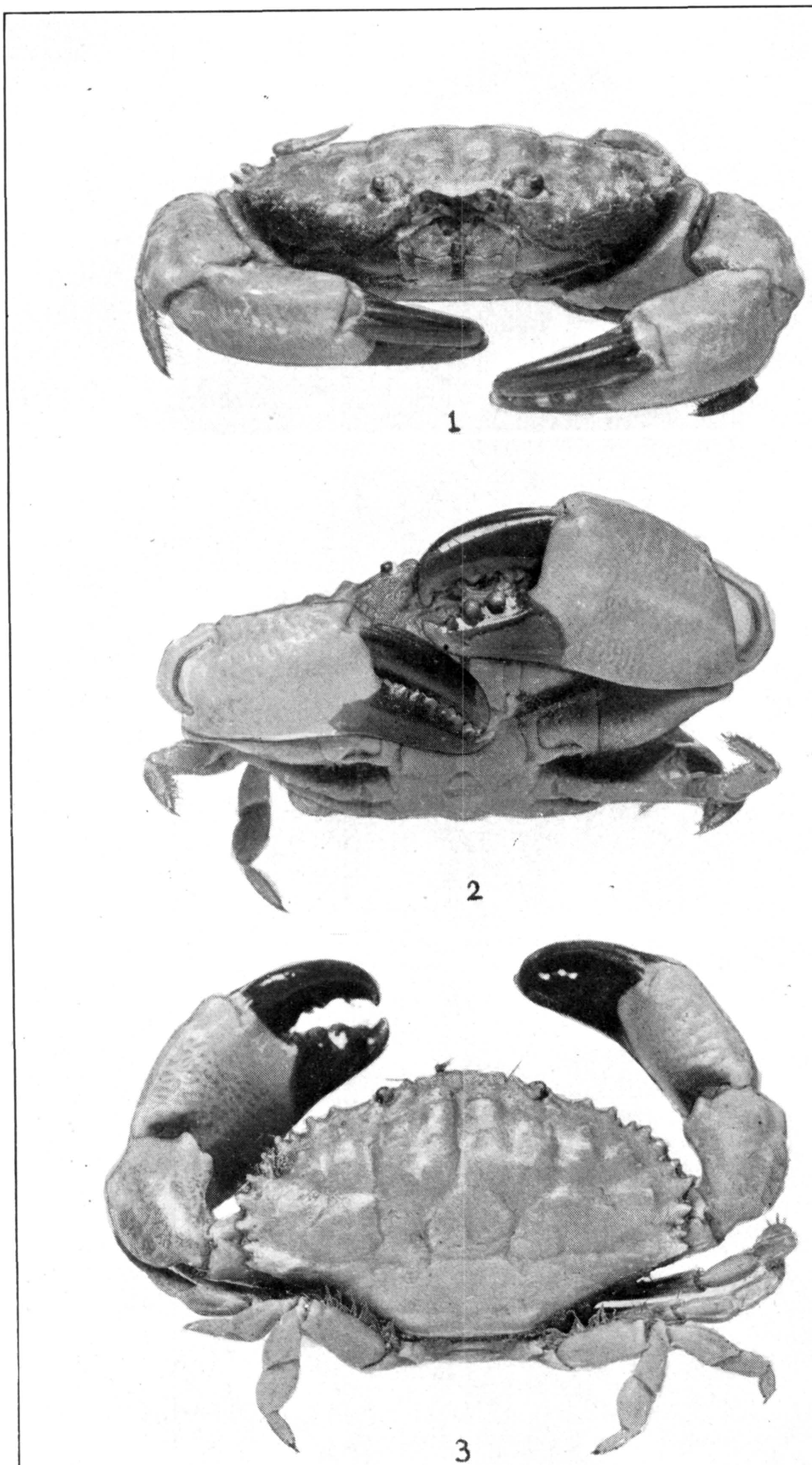
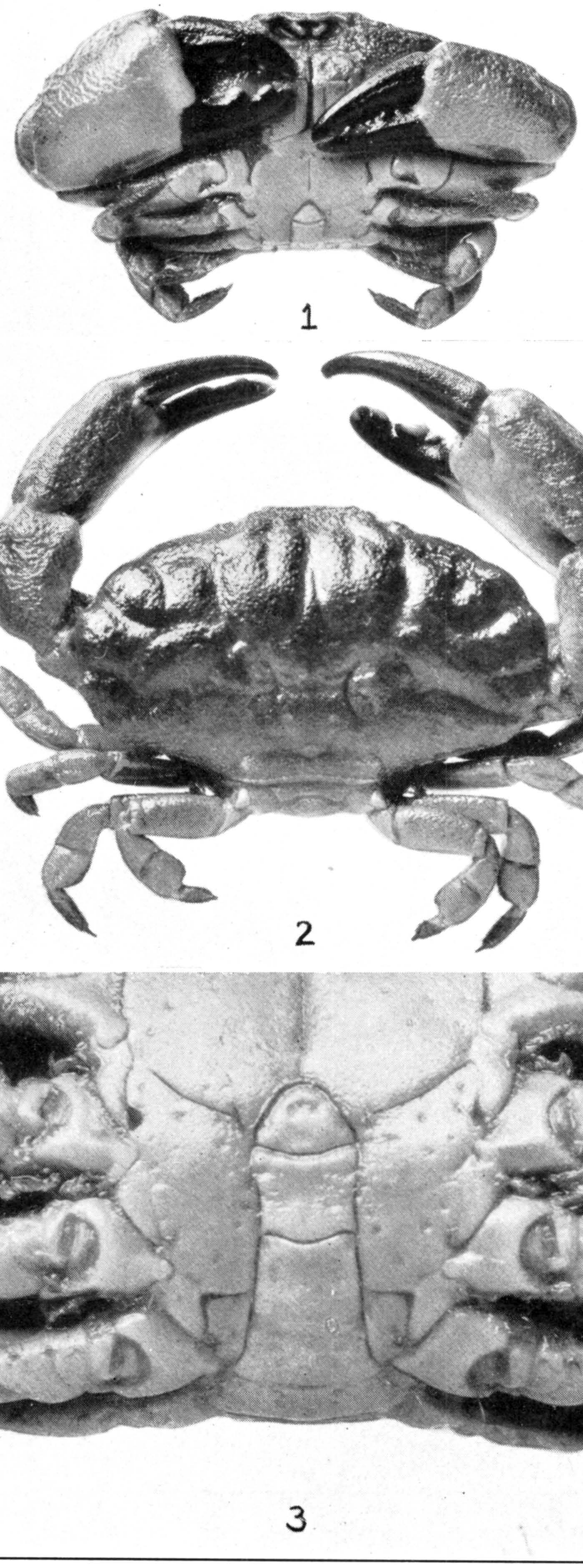
1. XANTHODIUS DENTICULATUS (P. 314). 2. X. STERNBERGHII (P. 311)

FOR EXPLANATION OF PLATE SEE PAGE 580.



XANTHODIUS DENTICULATUS (P. 314)

FOR EXPLANATION OF PLATE SEE PAGE 580.



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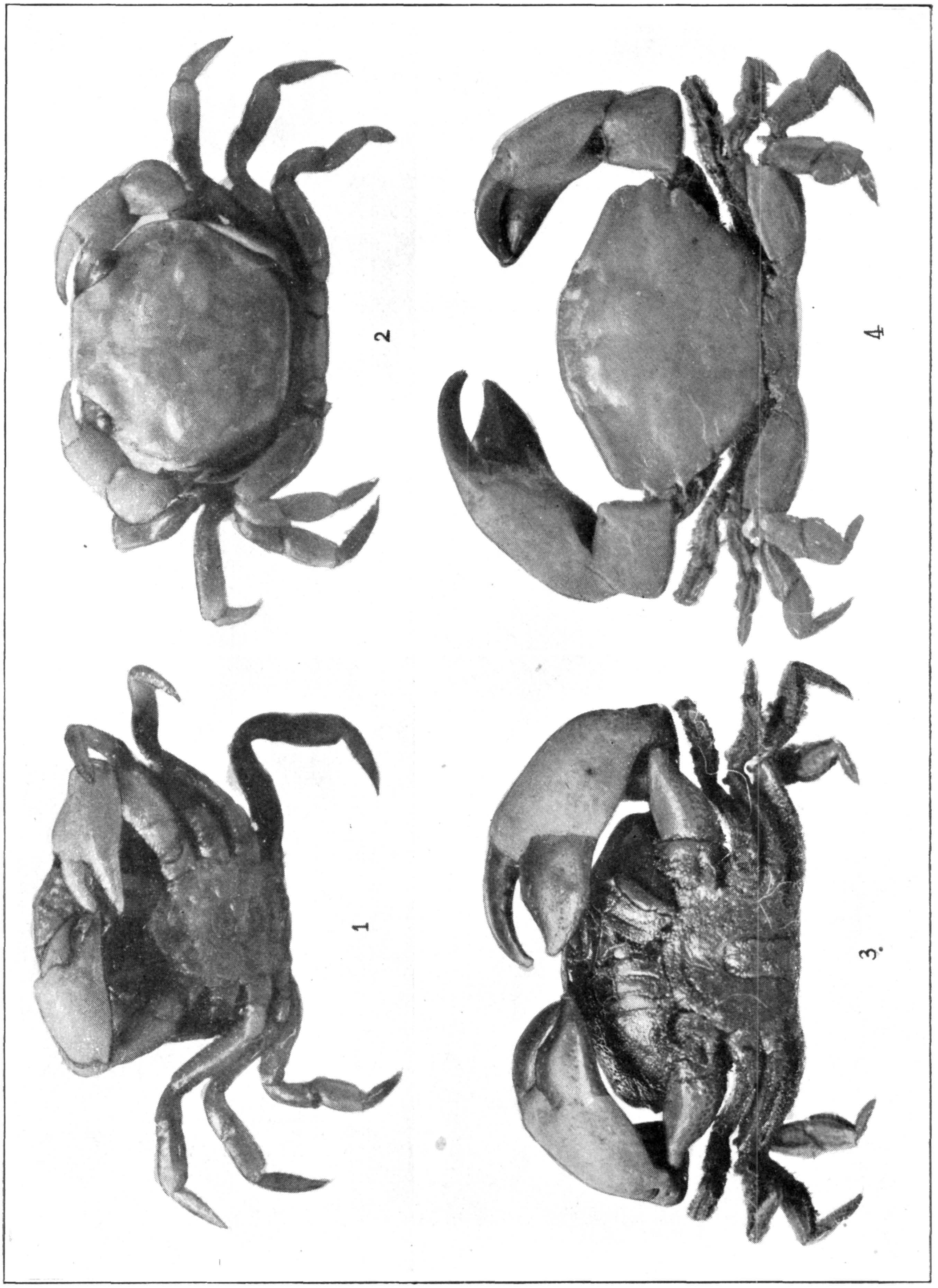
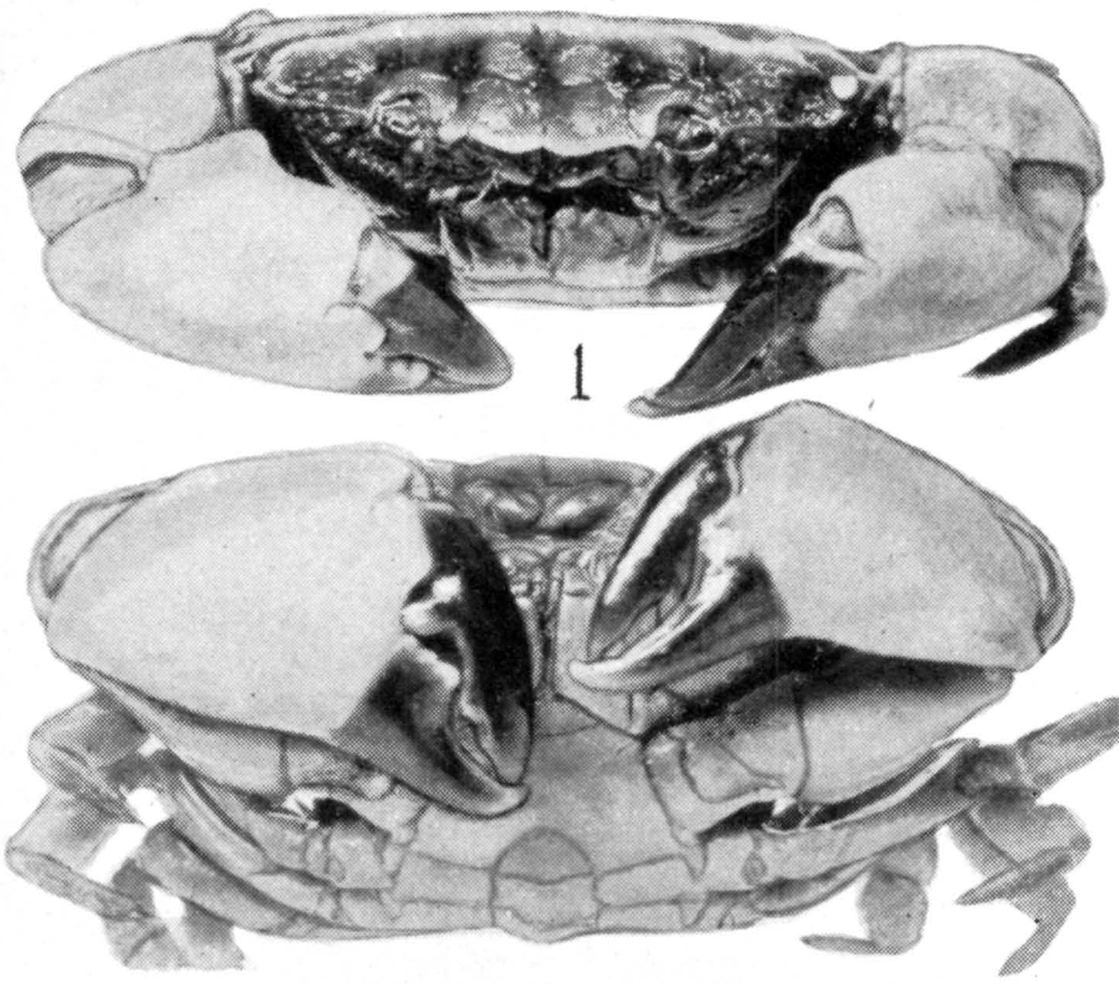
XANTHODIUS HEBES (P. 313)

FOR EXPLANATION OF PLATE SEE PAGE 580.



1, 2. METOPOCARCINUS TRUNCATUS (P. 318). 3, 4. LOPHOXANTHUS LAMELLIPES (P. 317)

FOR EXPLANATION OF PLATE SEE PAGE 580.



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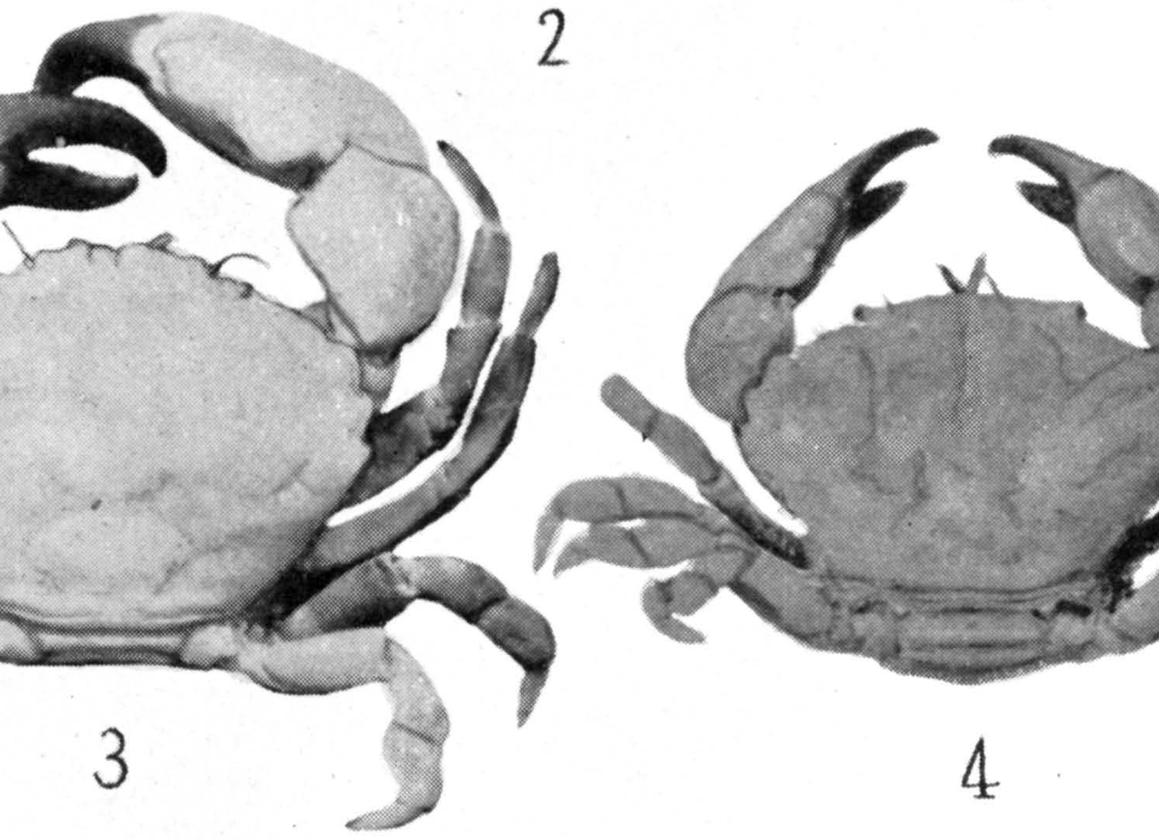

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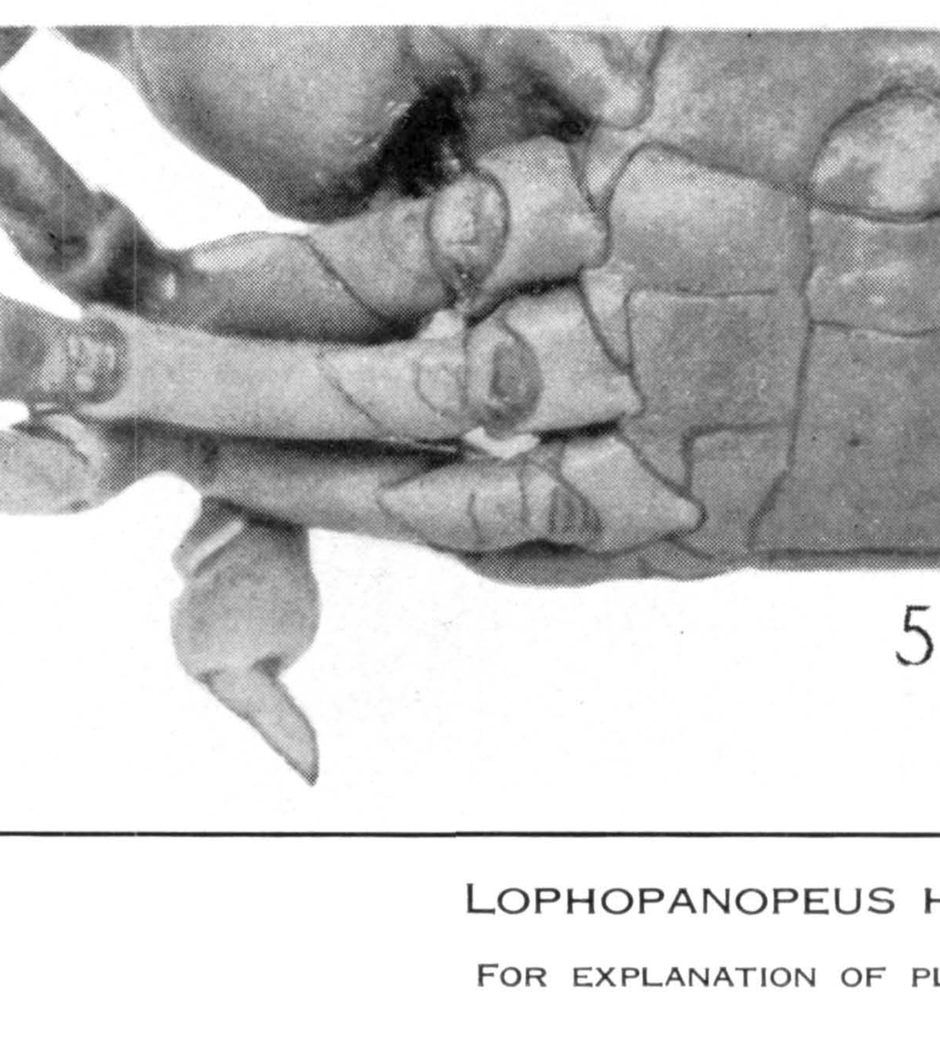

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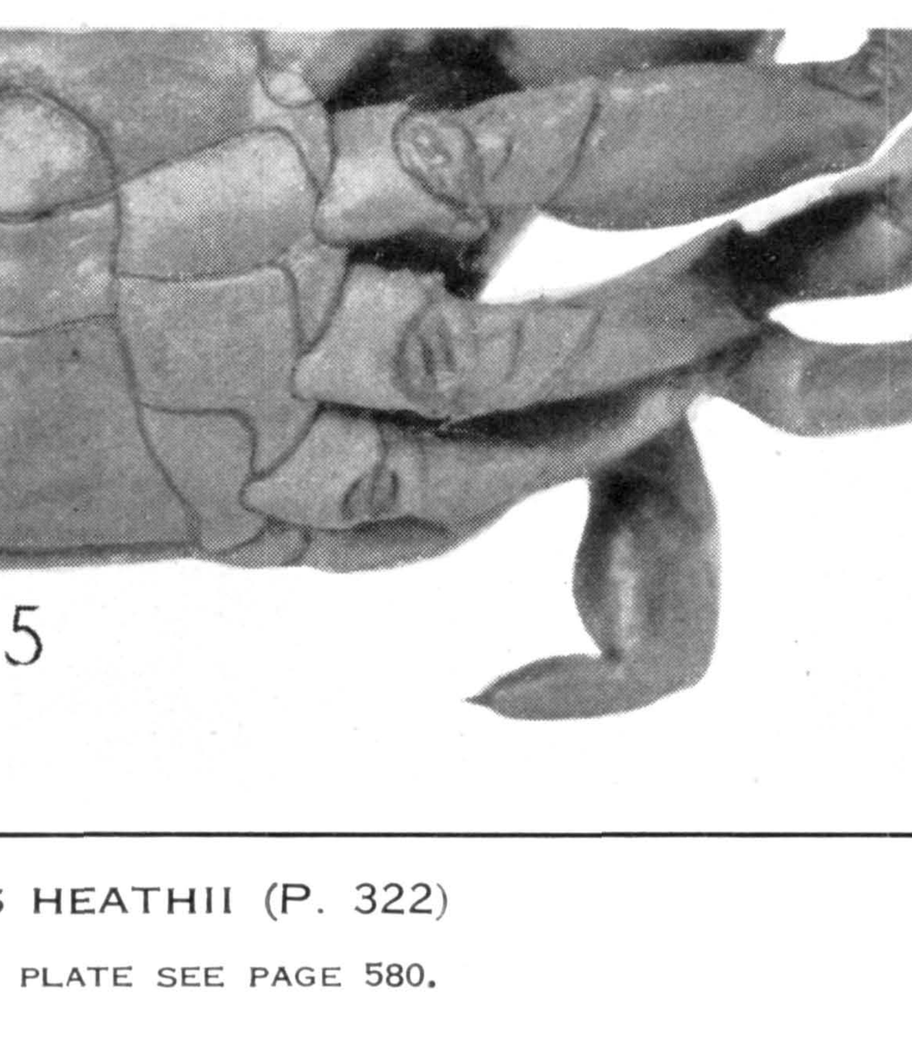

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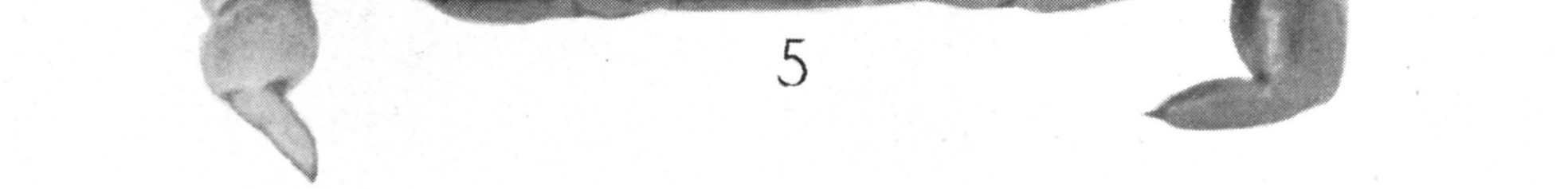

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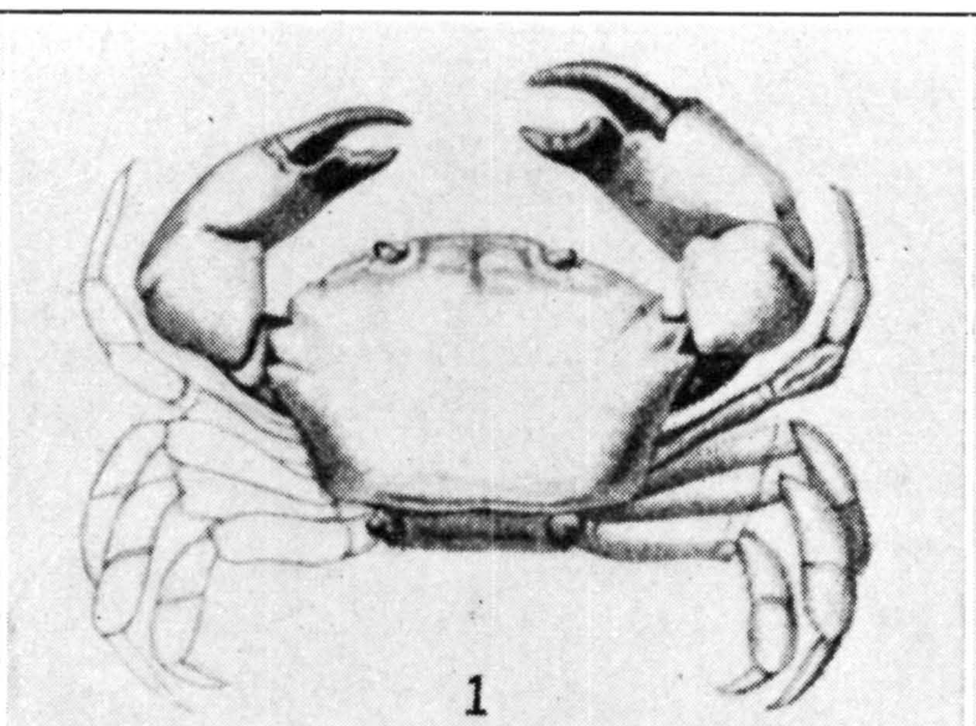
LOPHOPANOPEUS HEATHII (P. 322)

FOR EXPLANATION OF PLATE SEE PAGE 580.



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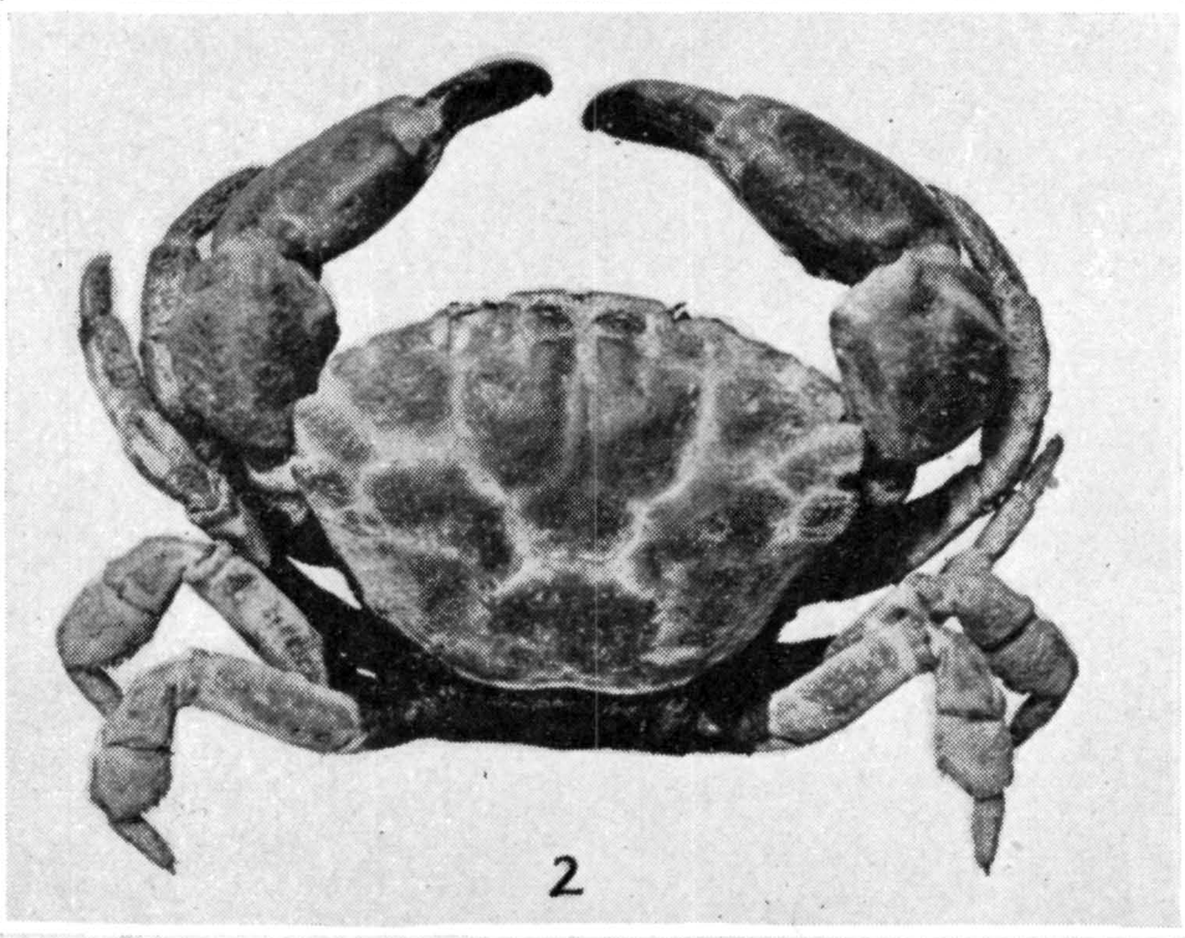

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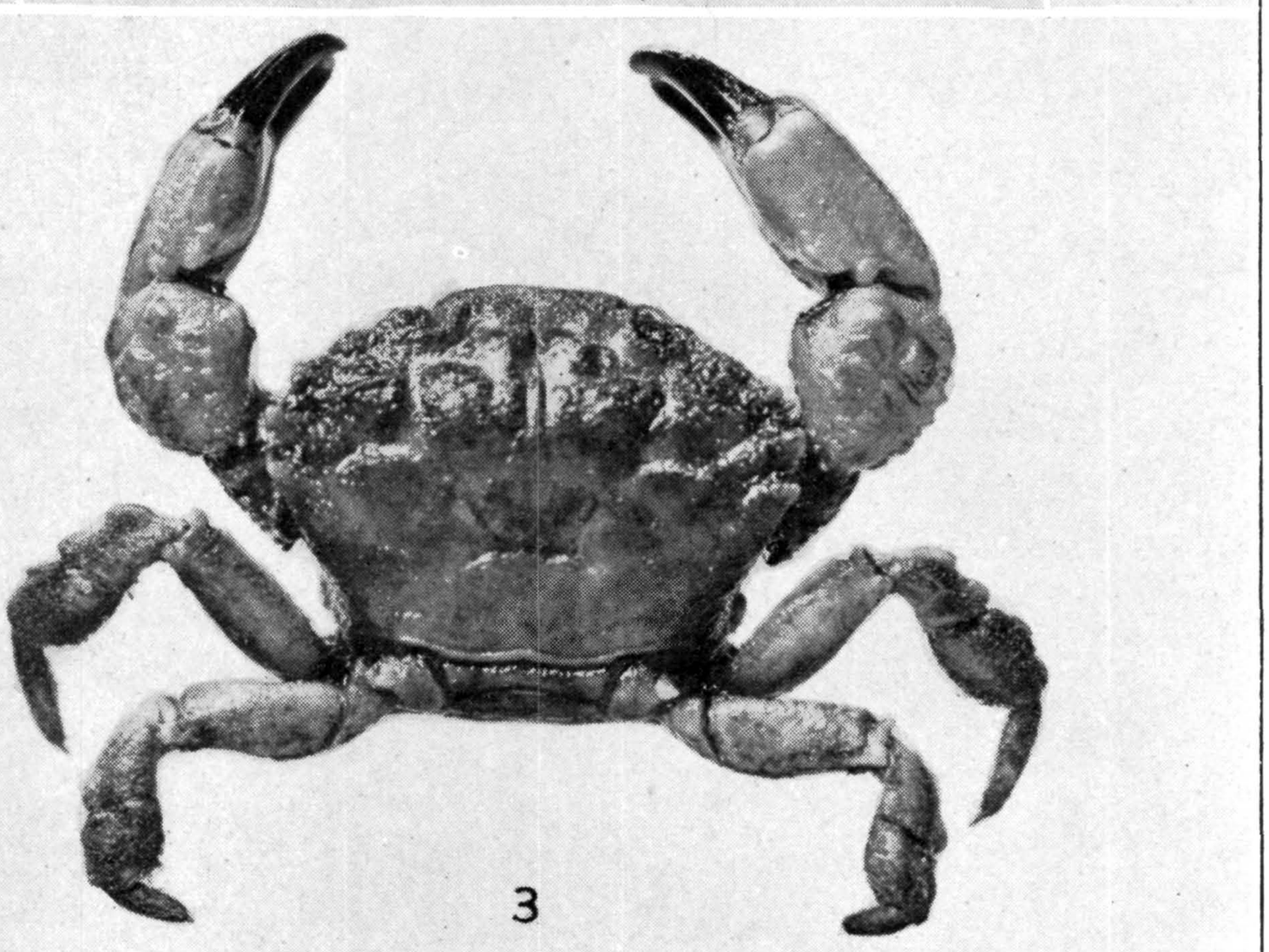

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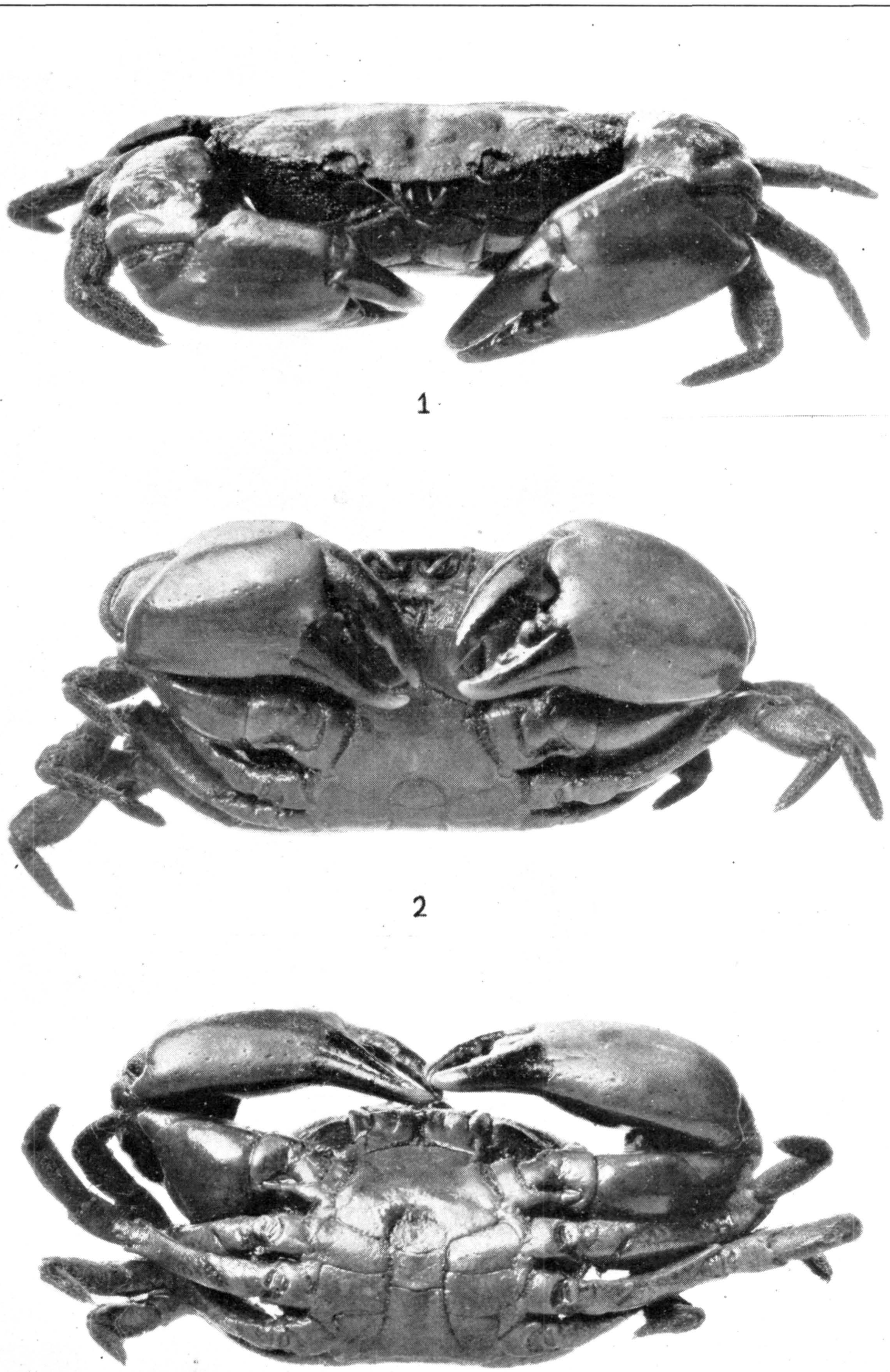
LOPHOPANOPEUS BELLUS (P. 320)

FOR EXPLANATION OF PLATE SEE PAGE 580.



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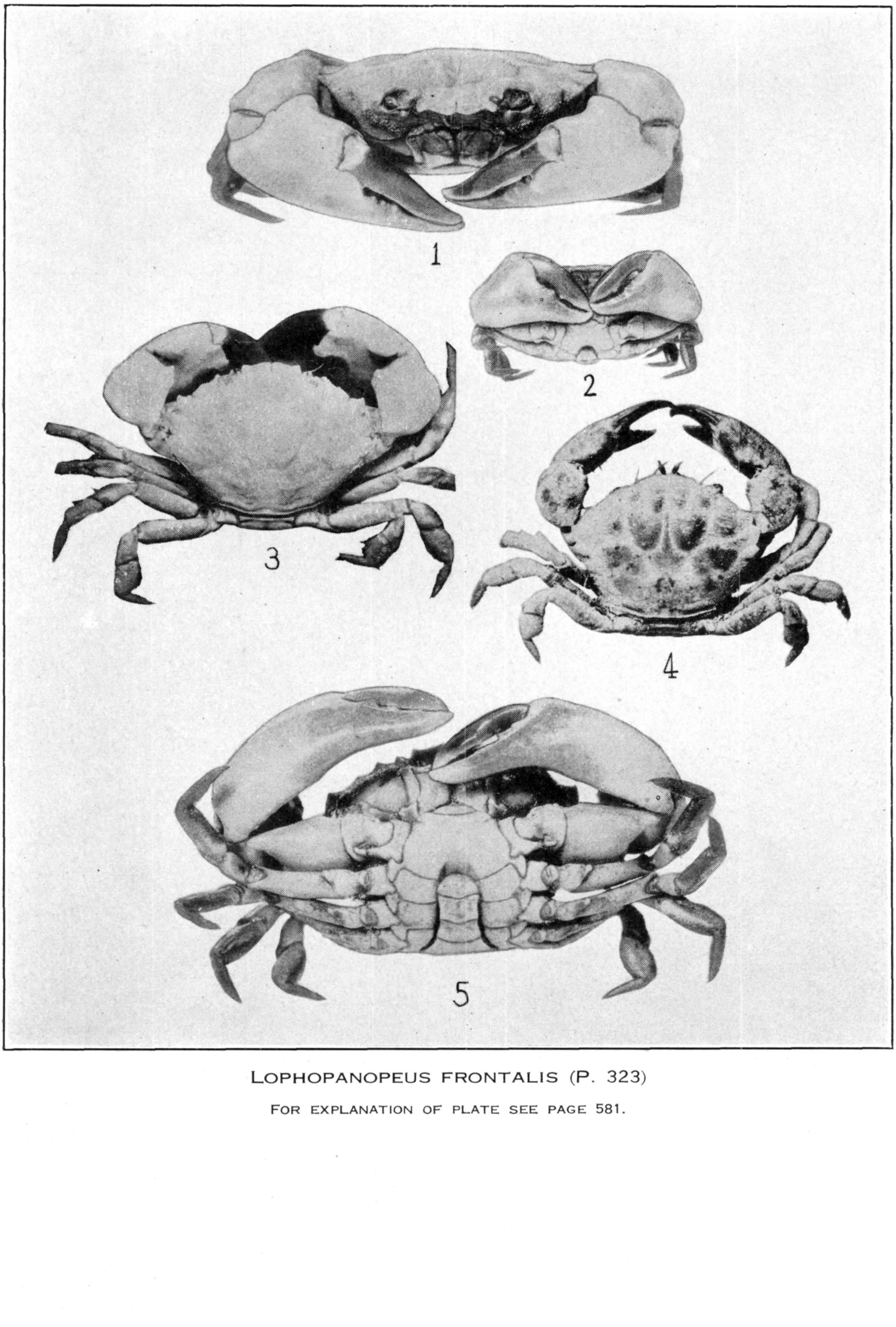
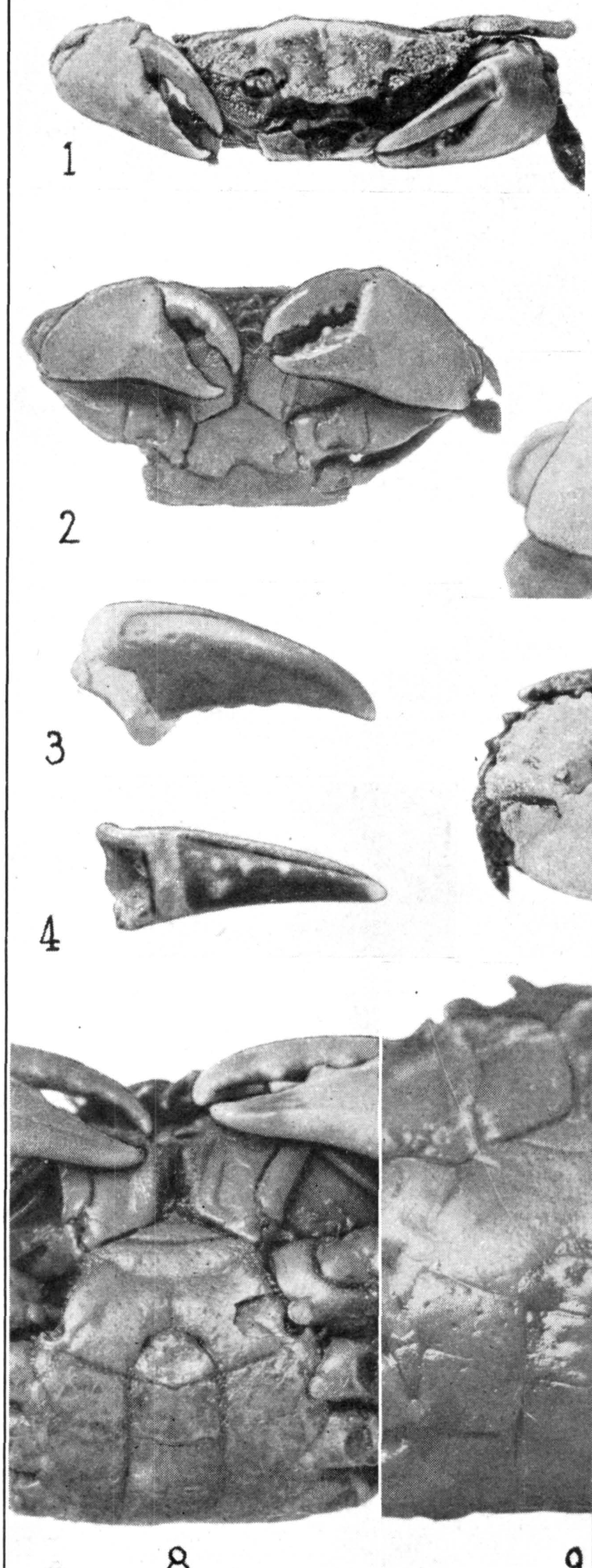
LOPHOPANOPEUS BELLUS (P. 320)

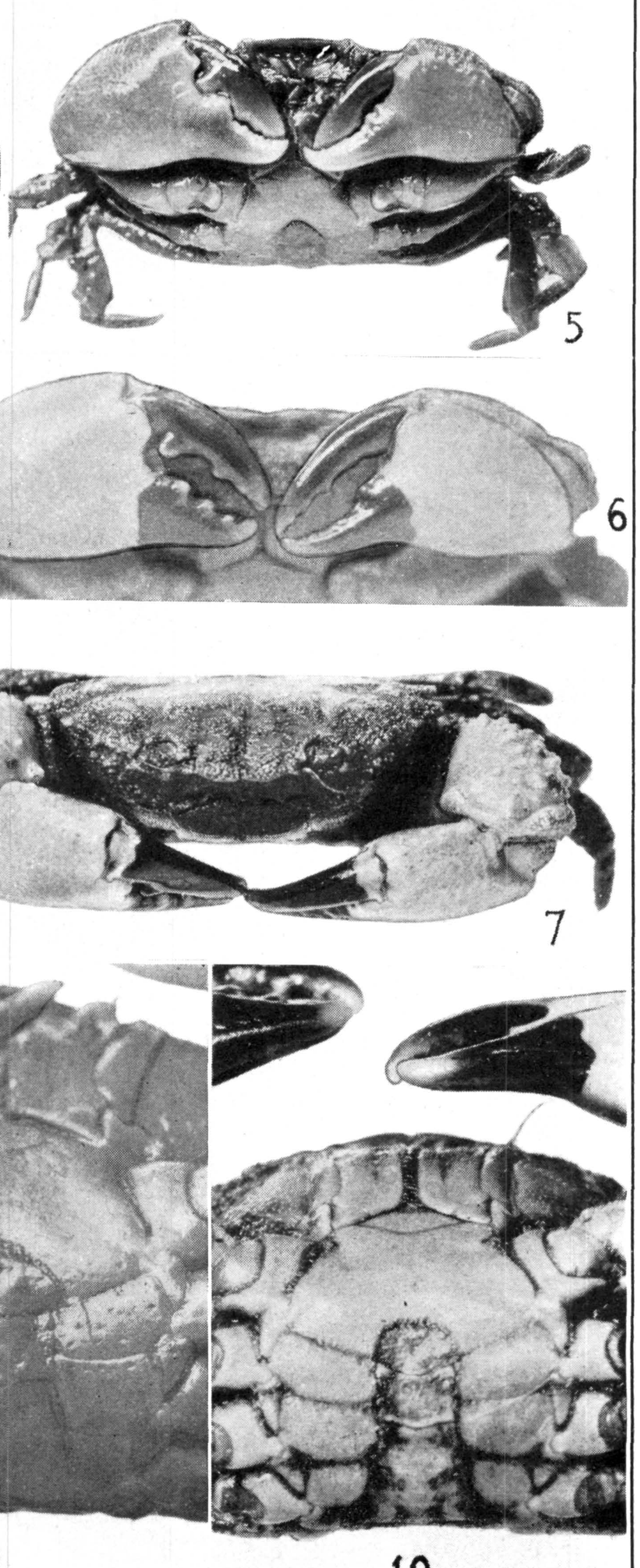
FOR EXPLANATION OF PLATE SEE PAGE 581.

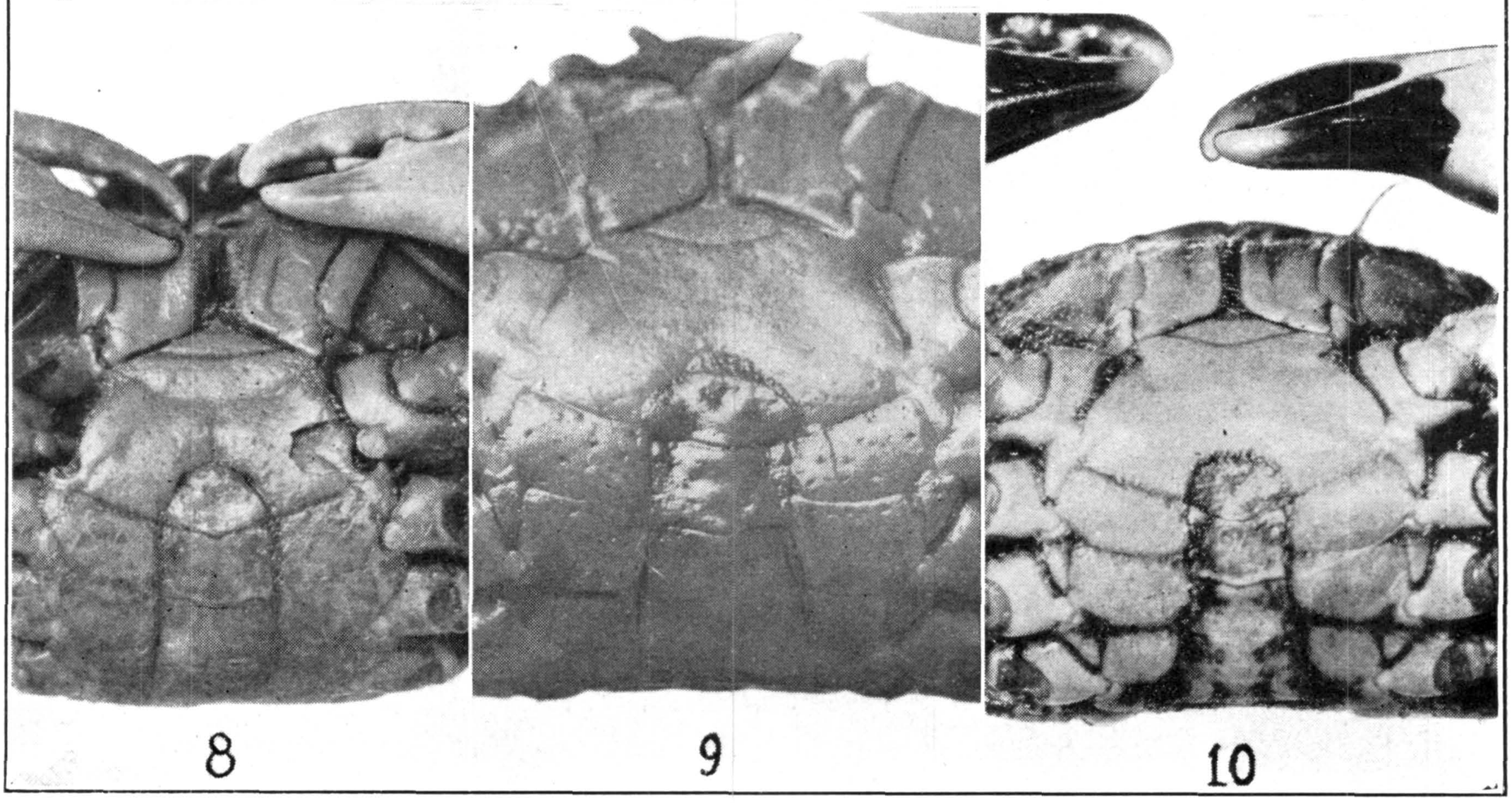


LOPHOPANOPEUS FRONTALIS (P. 323)

FOR EXPLANATION OF PLATE SEE PAGE 581.

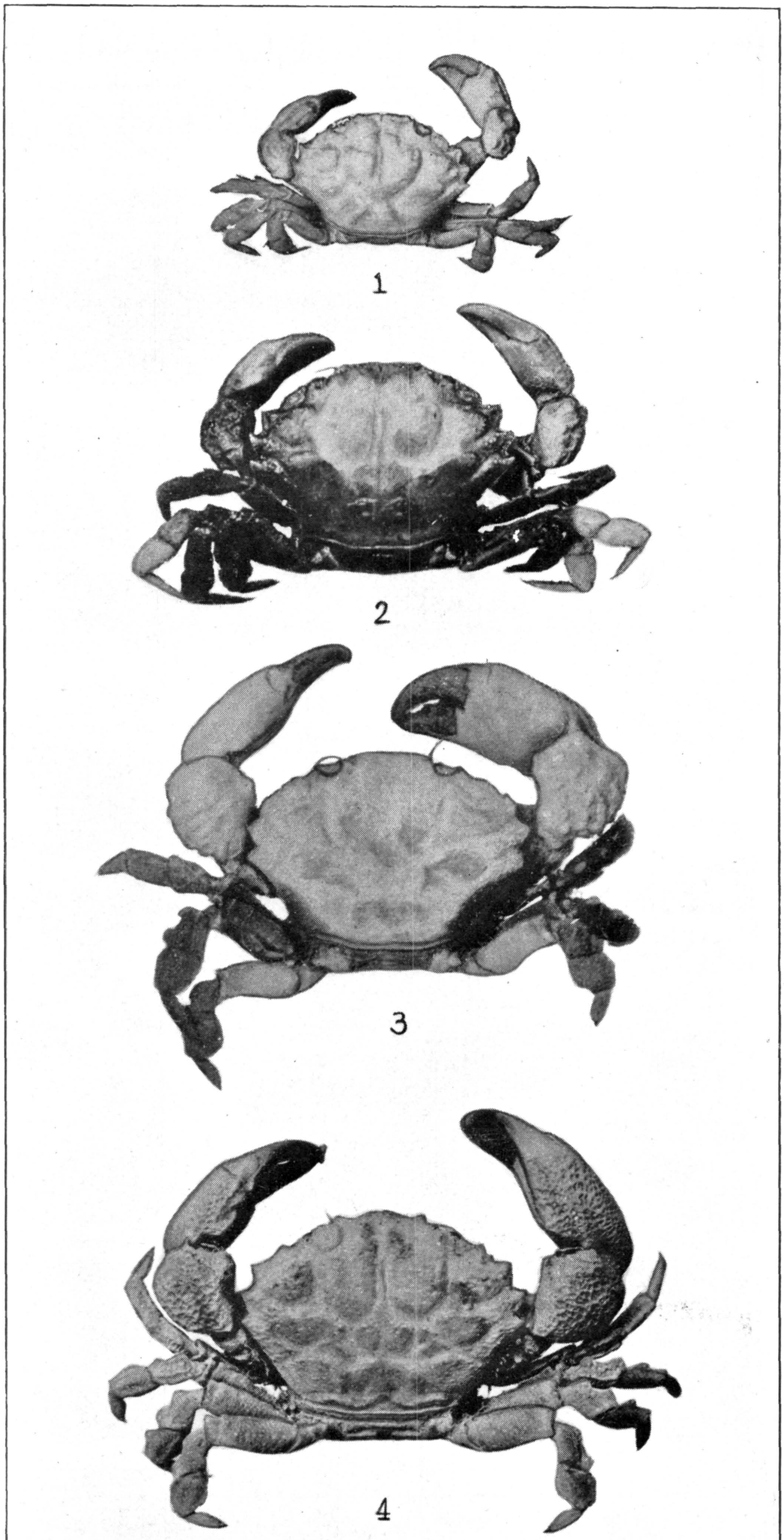






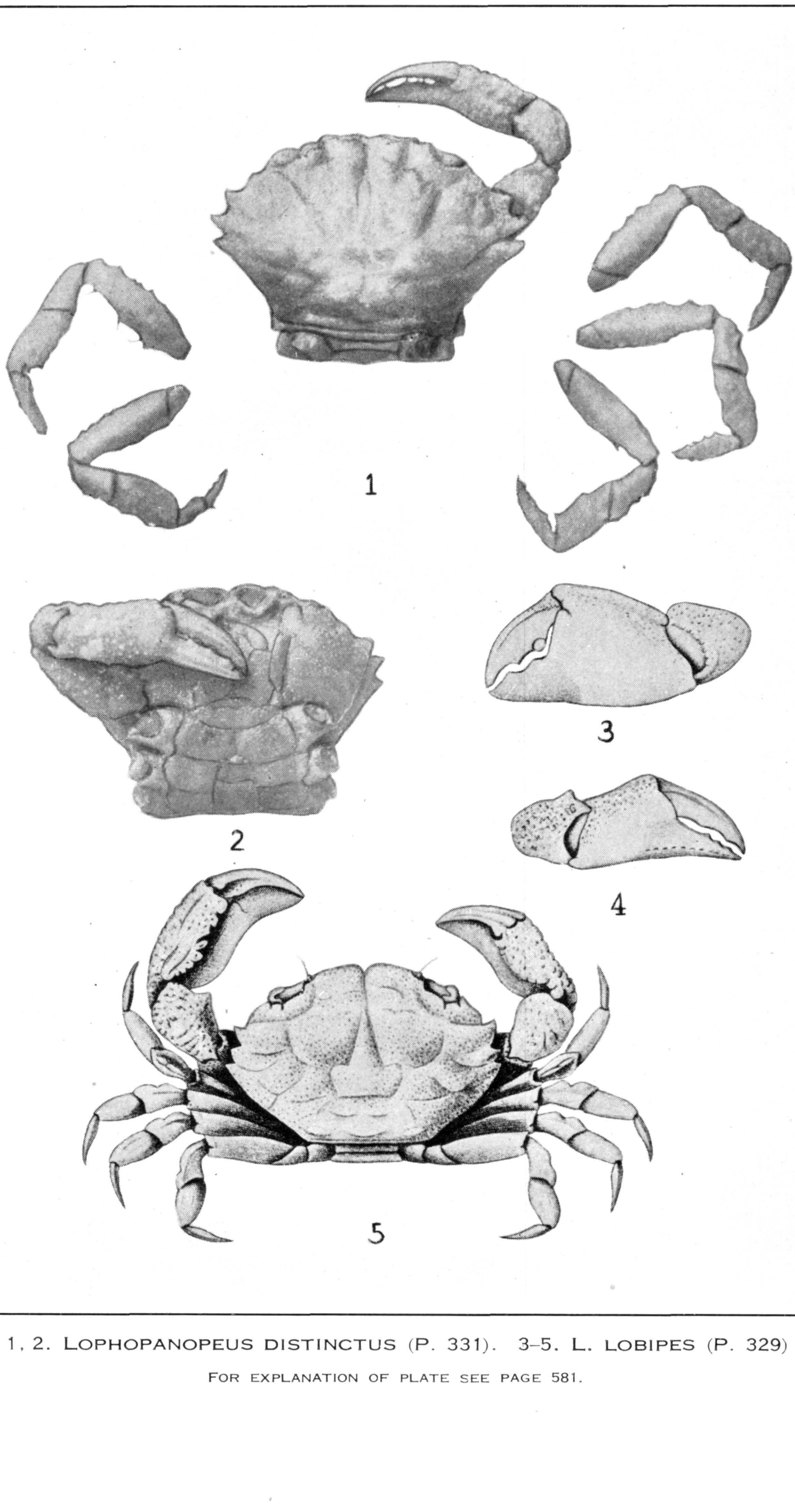
1, 2, 8. LOPHOPANOPEUS LOCKINGTONI (P. 325). 3, 4. L. SOMATERIANUS (P. 332). 5, 9. L. LEUCOMANUS (P. 324). 6, 7, 10. L. DIEGENSIS (P. 327)

FOR EXPLANATION OF PLATE SEE PAGE 581.



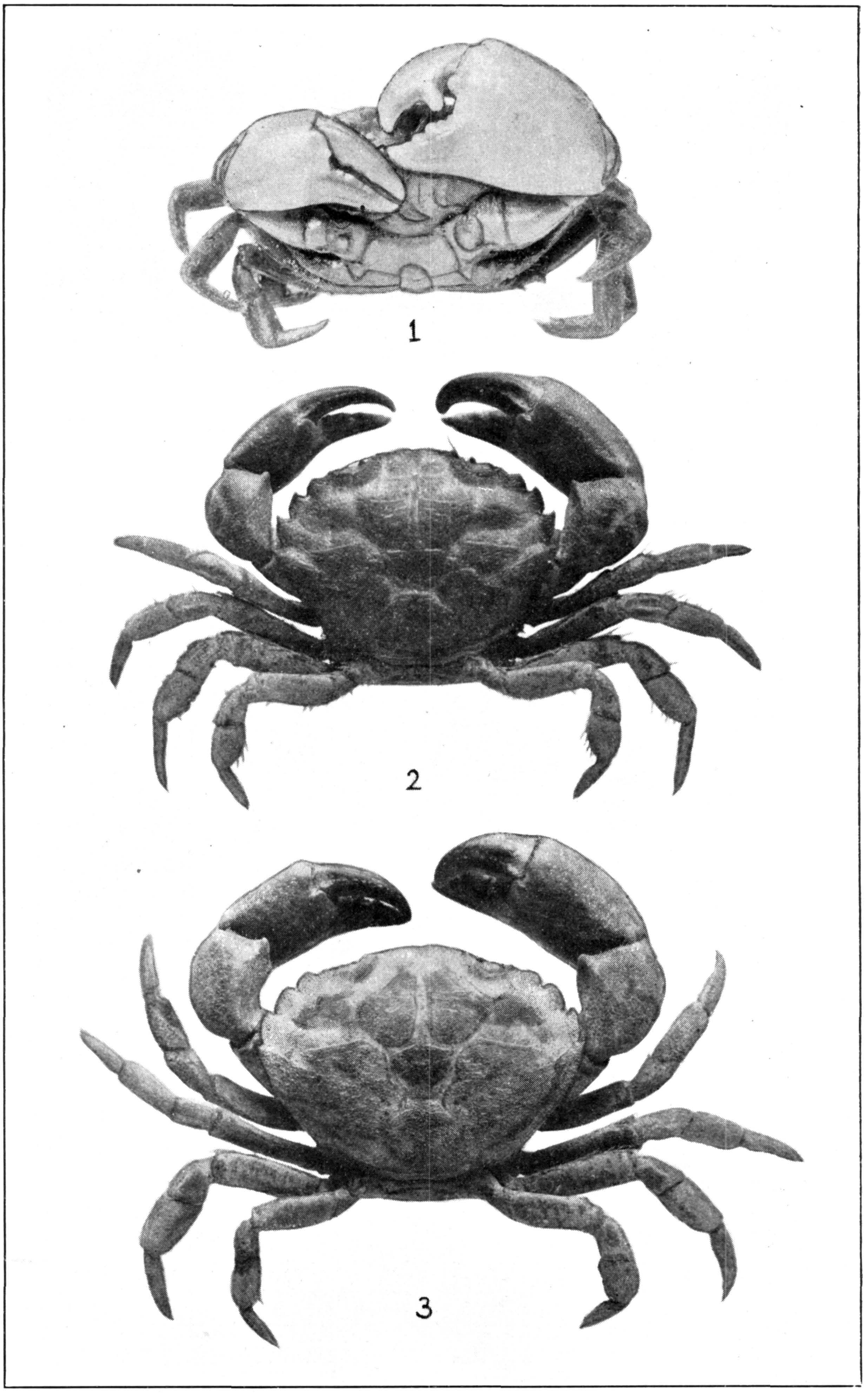
1–3. LOPHOPANOPEUS LOCKINGTONI (P. 325). 4. L. LEUCOMANUS (P. 324)

FOR EXPLANATION OF PLATE SEE PAGE 581.



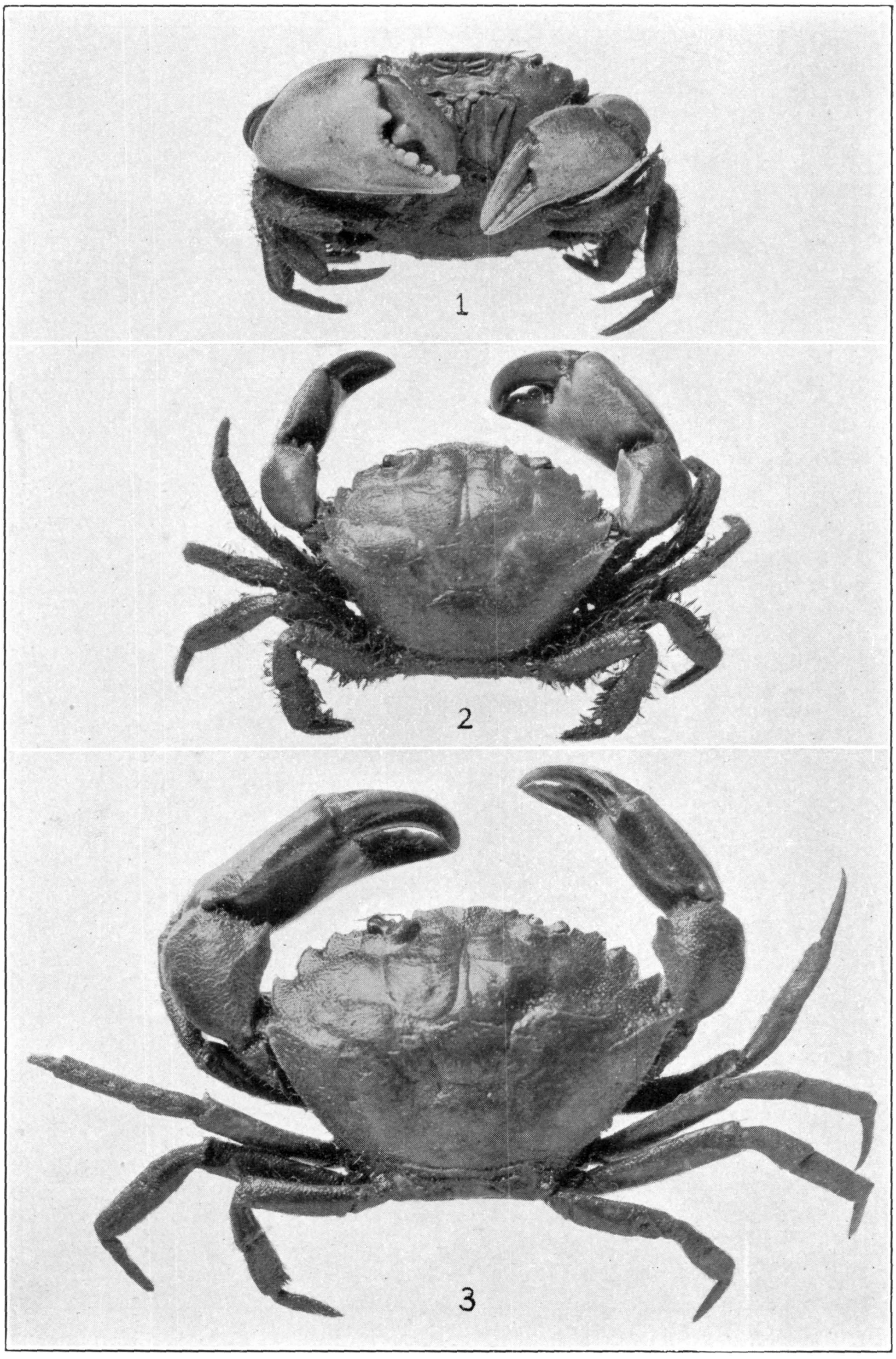
1, 2. LOPHOPANOPEUS DISTINCTUS (P. 331). 3–5. L. LOBIPES (P. 329)

FOR EXPLANATION OF PLATE SEE PAGE 581.



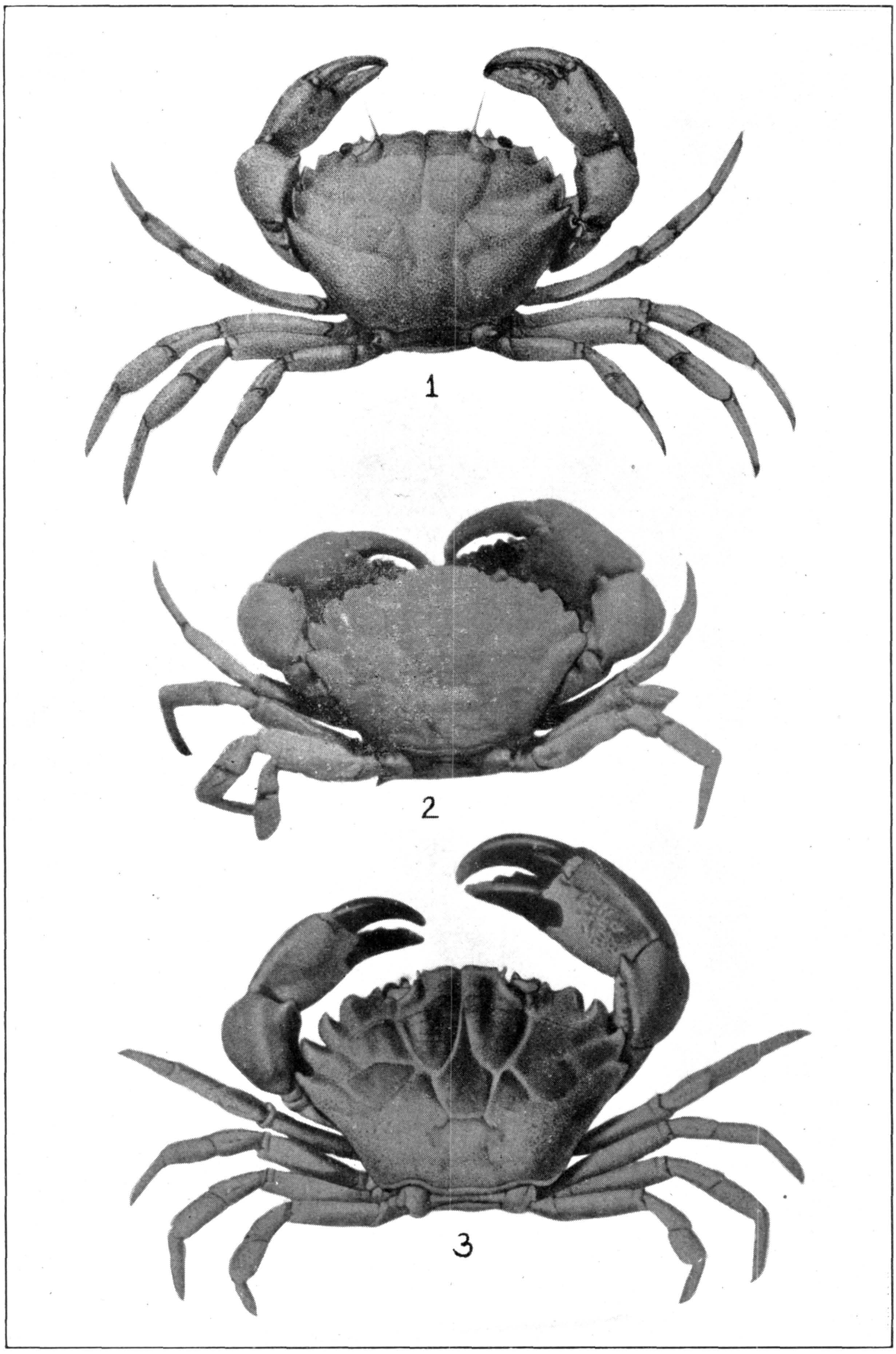
PANOPEUS HERBSTII. 1, 2. FORMA TYPICA (P. 335). 3. FORMA OBESA (P. 336)

FOR EXPLANATION OF PLATE SEE PAGE 582



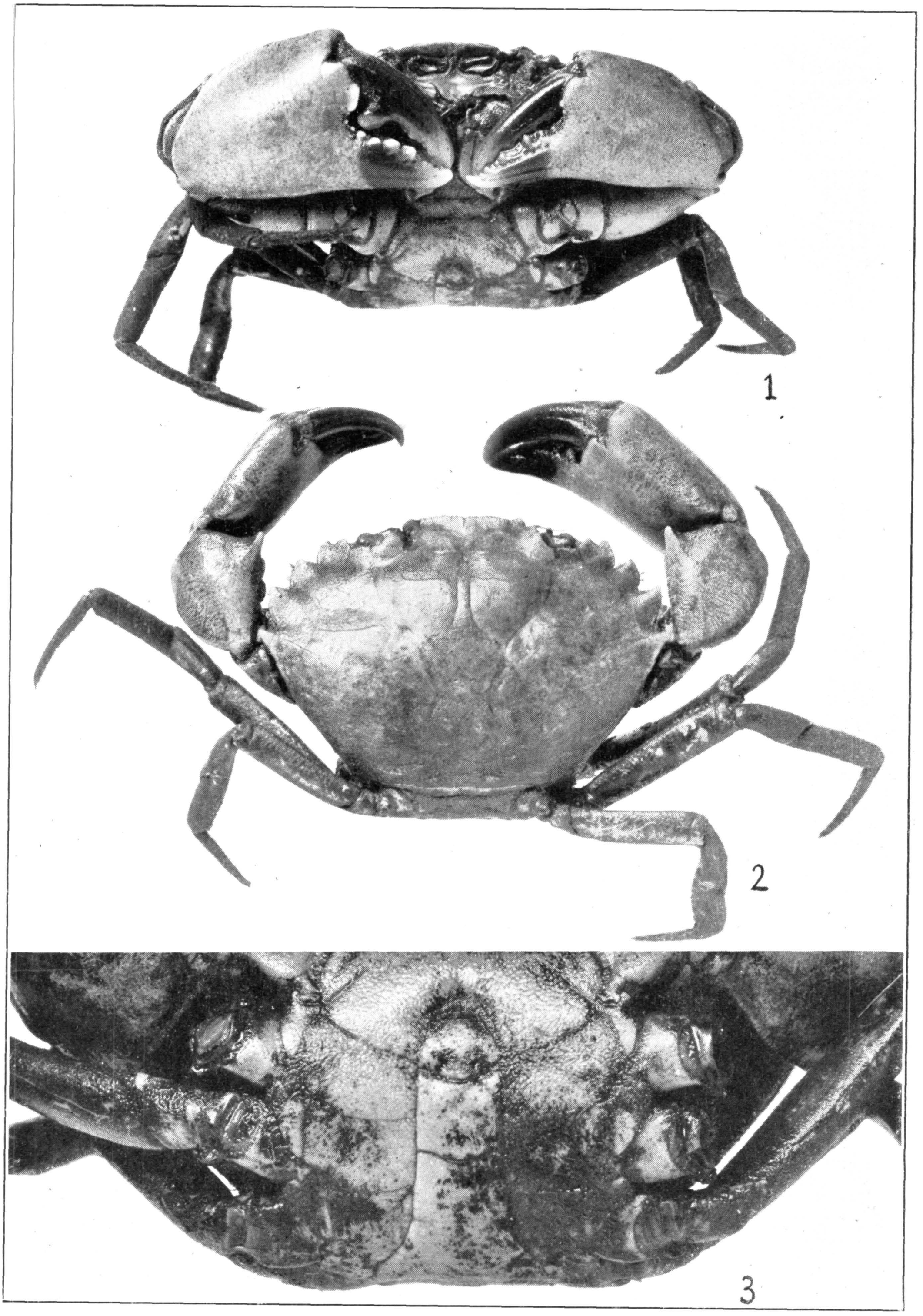
PANOPEUS HERBSTII. 1, 2. FORMA SIMPSONI (P. 337). 3. FORMA CRASSA (P. 336)

FOR EXPLANATION OF PLATE SEE PAGE 582.



1. PANOPEUS PURPUREUS (P. 344). 2. P. CONVEXUS (P. 352). 3. P. CHILENSIS (P. 346)

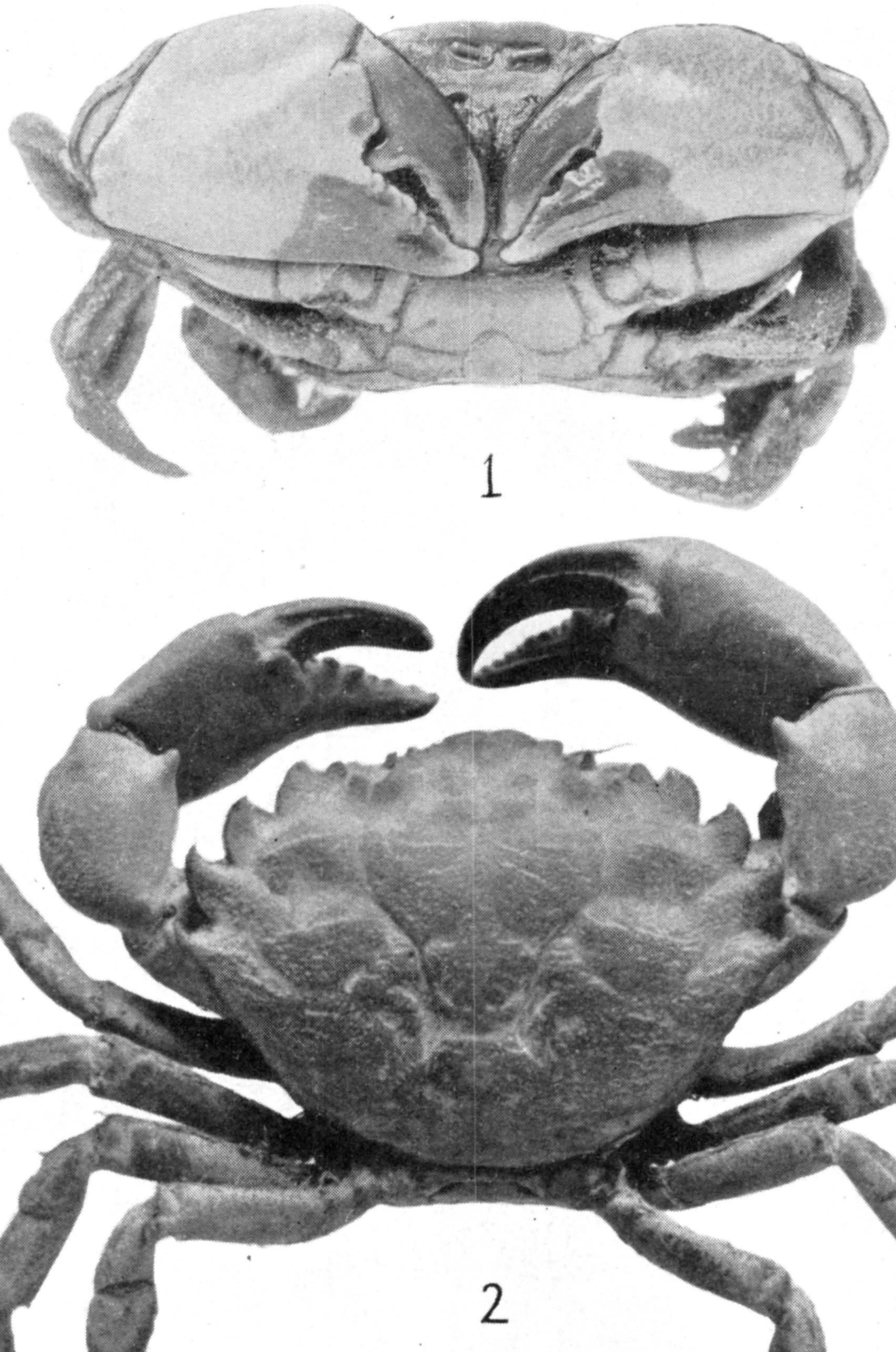
FOR EXPLANATION OF PLATE SEE PAGE 582.



PANOPEUS PURPUREUS (P. 344)

FOR EXPLANATION OF PLATE SEE PAGE 582.

79856—30——49



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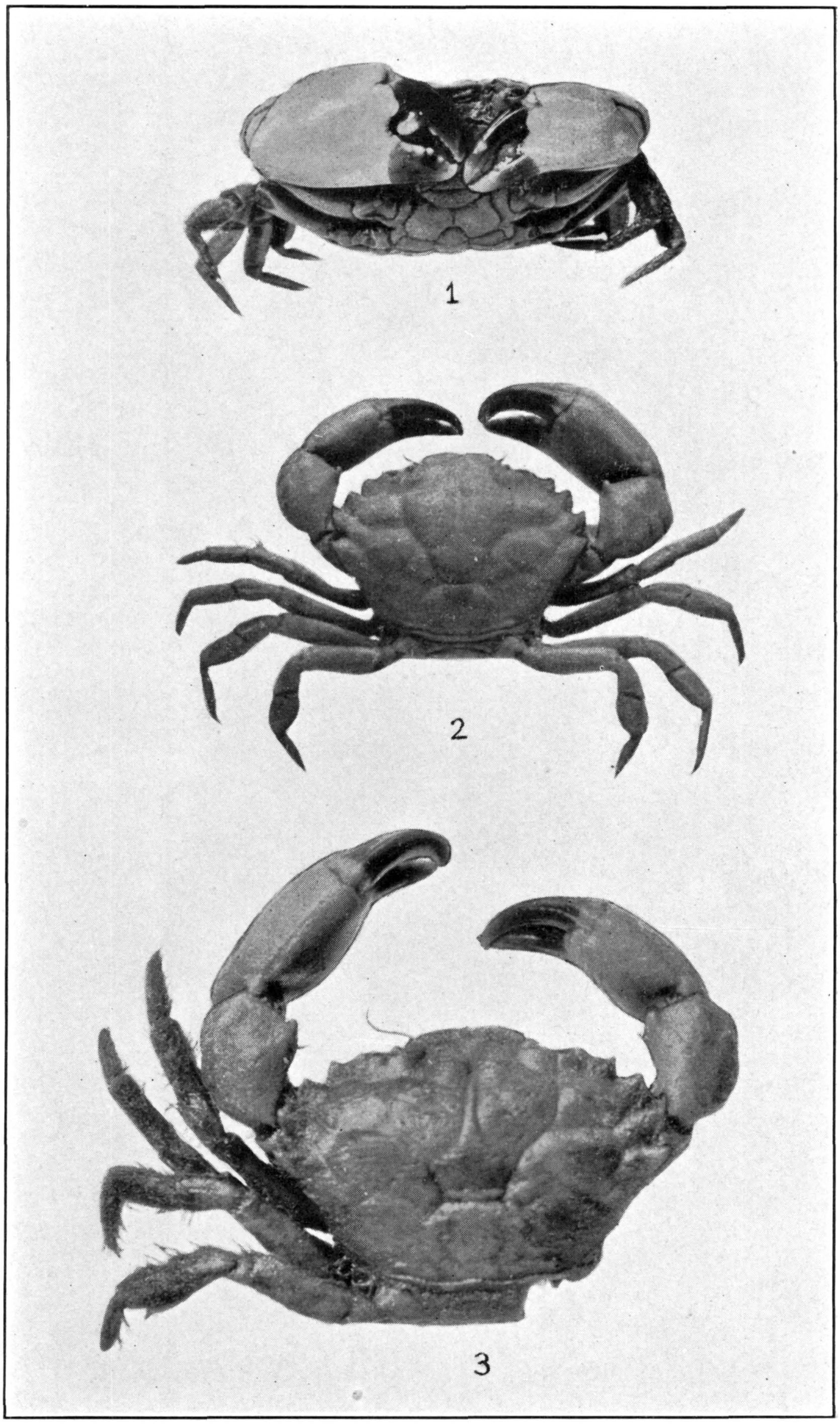
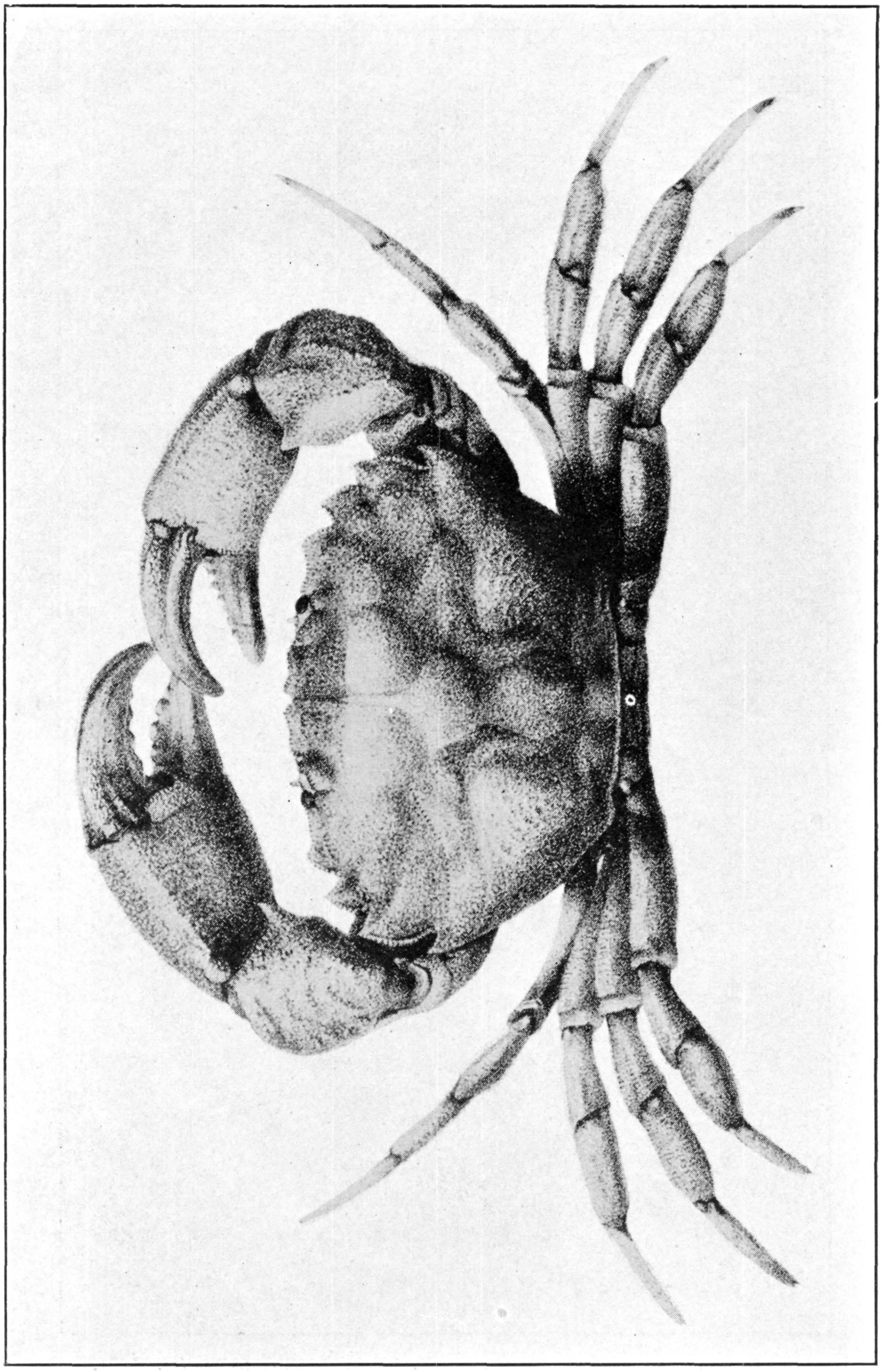
PANOPEUS CHILENSIS (P. 346)

FOR EXPLANATION OF PLATE SEE PAGE 582.



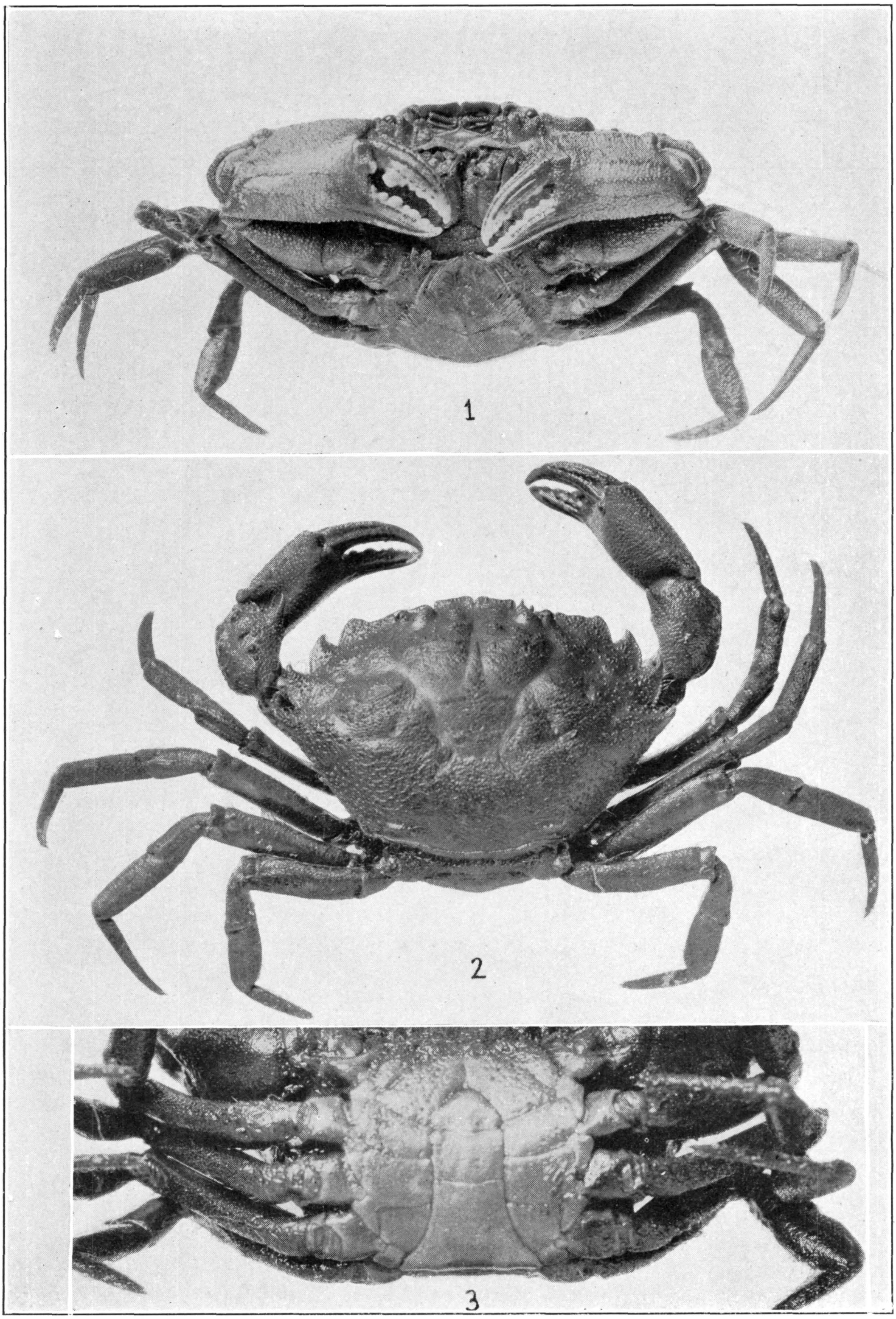
PANOPEUS OCCIDENTALIS. 1, 3. FORMA SERRATA (P. 349).
2. FORMA TYPICA (P. 348)

FOR EXPLANATION OF PLATE SEE PAGE 582.



PANOPEUS RUGOSUS (P. 353)

FOR EXPLANATION OF PLATE SEE PAGE 582.



PANOPEUS RUGOSUS (P. 353)

FOR EXPLANATION OF PLATE SEE PAGE 582

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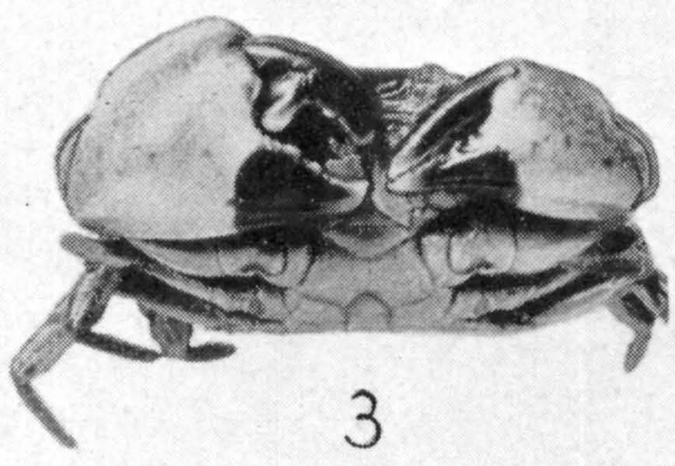

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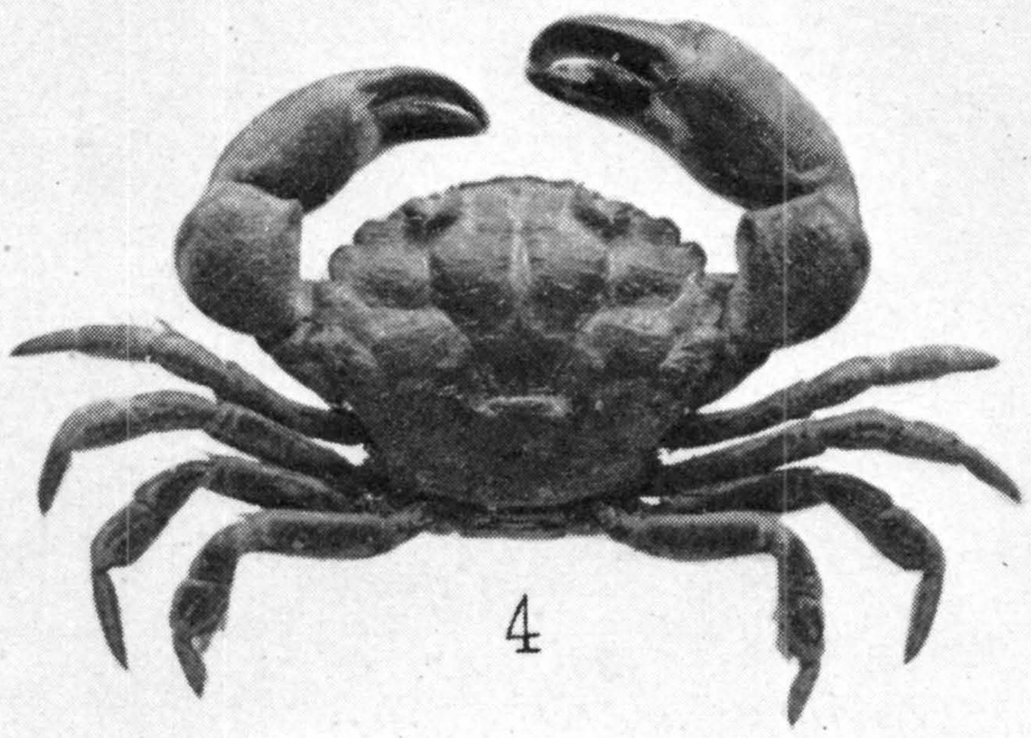

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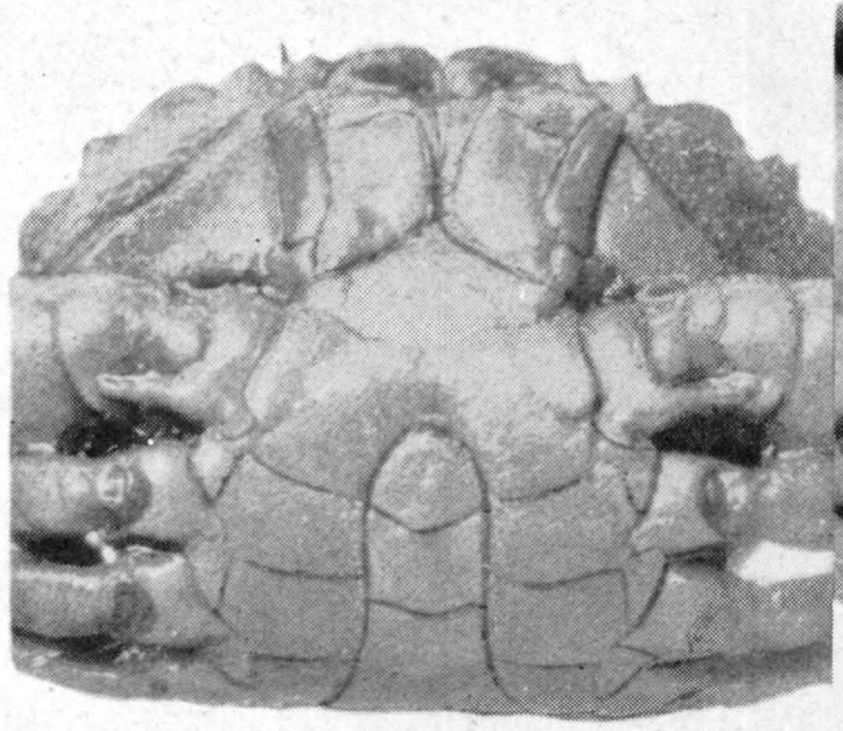

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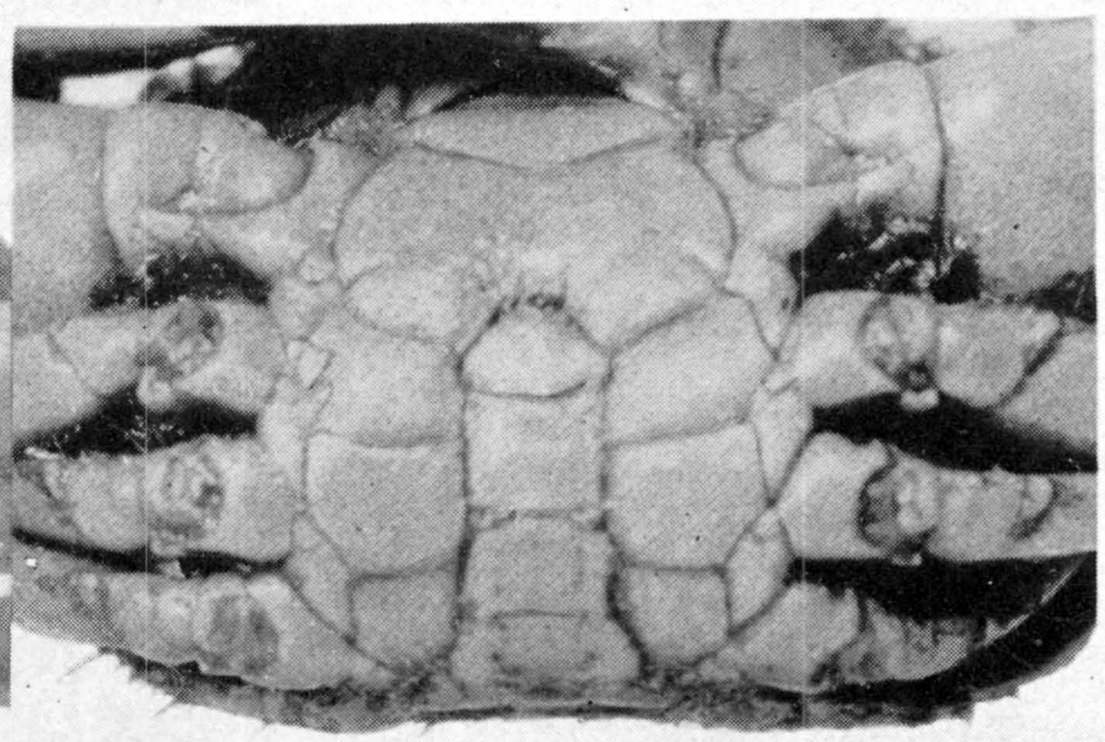
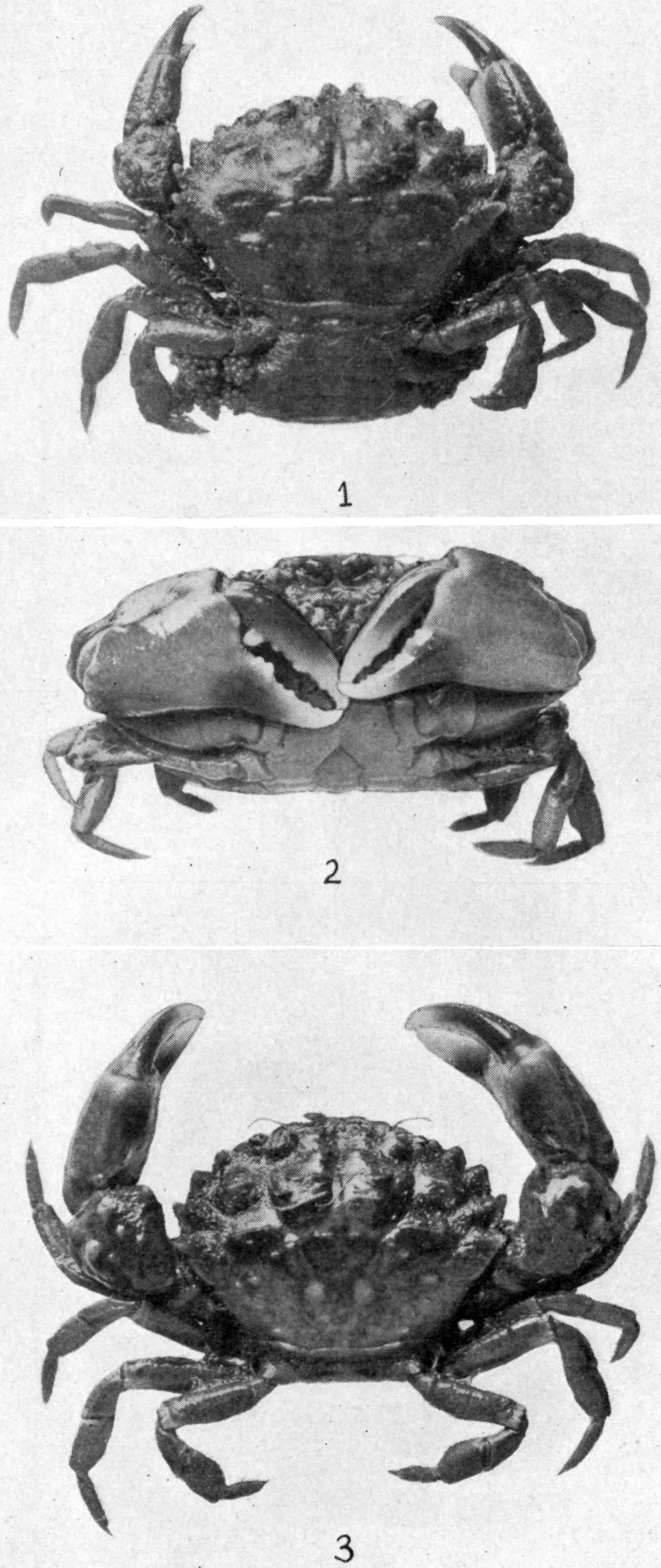


6

1, 2, 5. PANOPEUS HARTTII (P. 355). 3, 4, 6. P. AMERICANUS (P. 357)

FOR EXPLANATION OF PLATE SEE PAGE 583.



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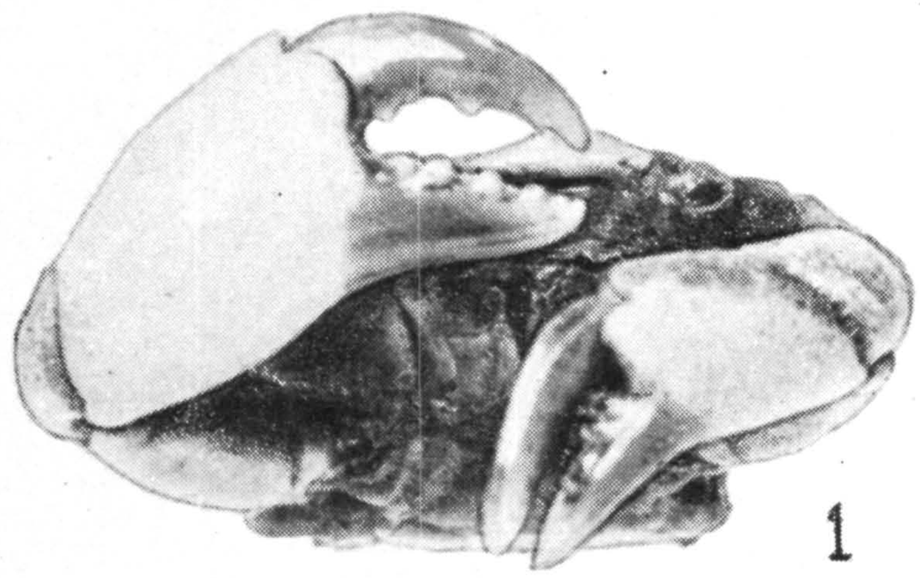
PANOPEUS BERMUDENSIS (P. 360)

FOR EXPLANATION OF PLATE SEE PAGE 583.



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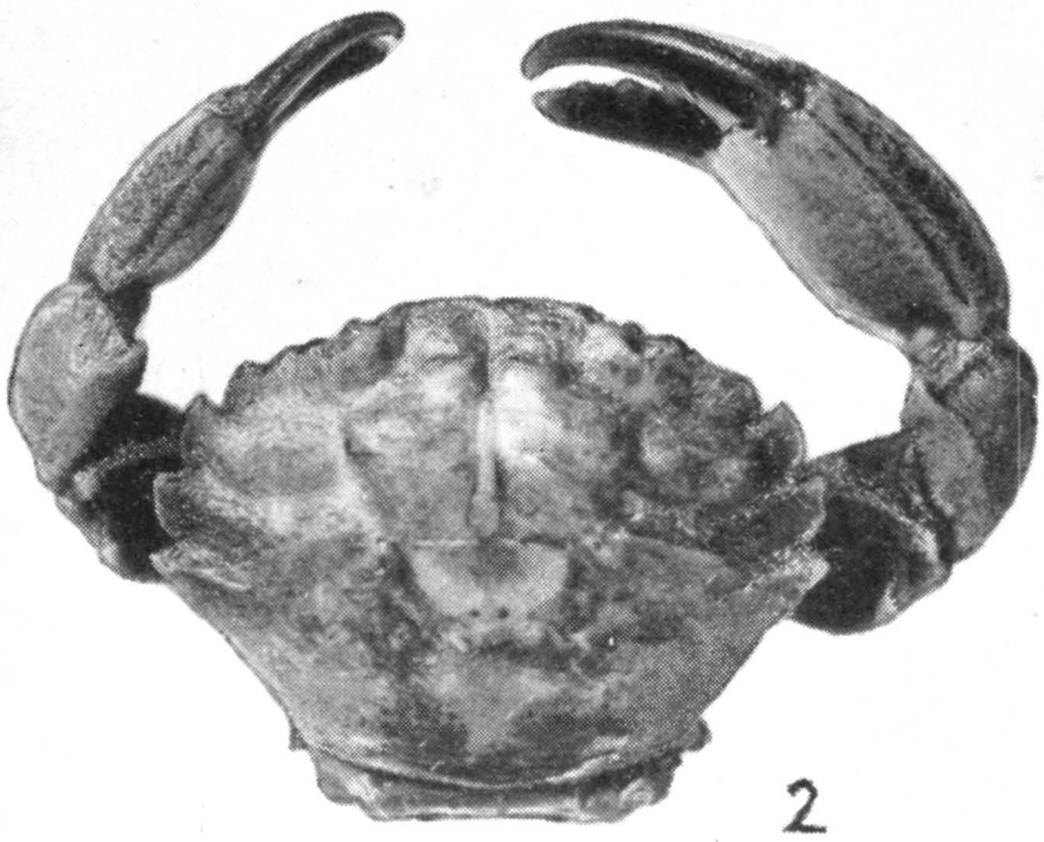

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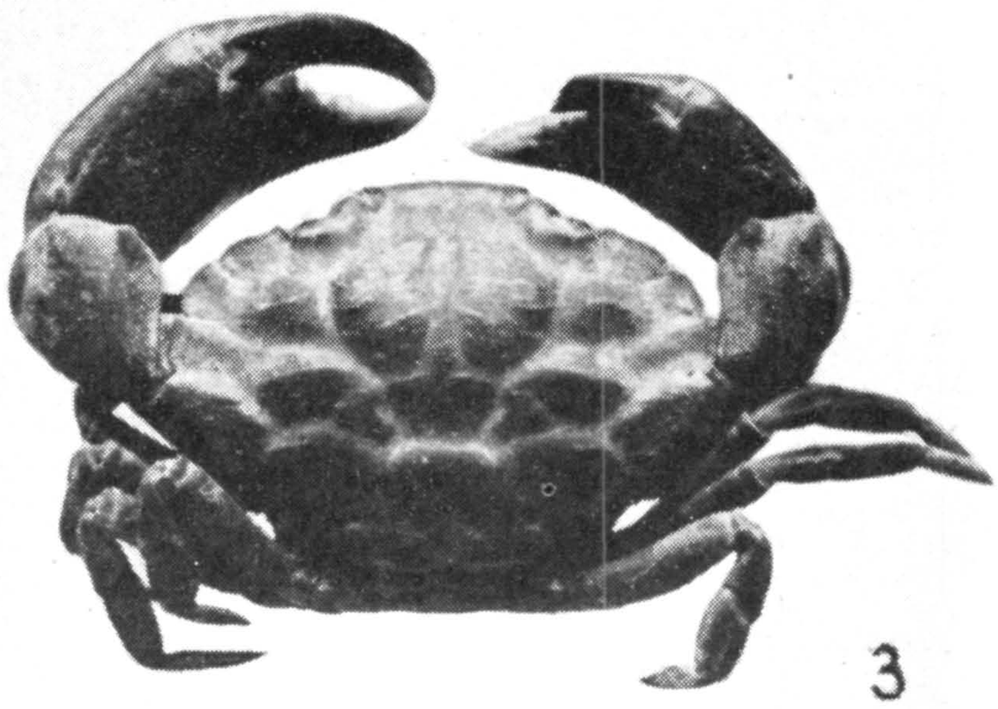

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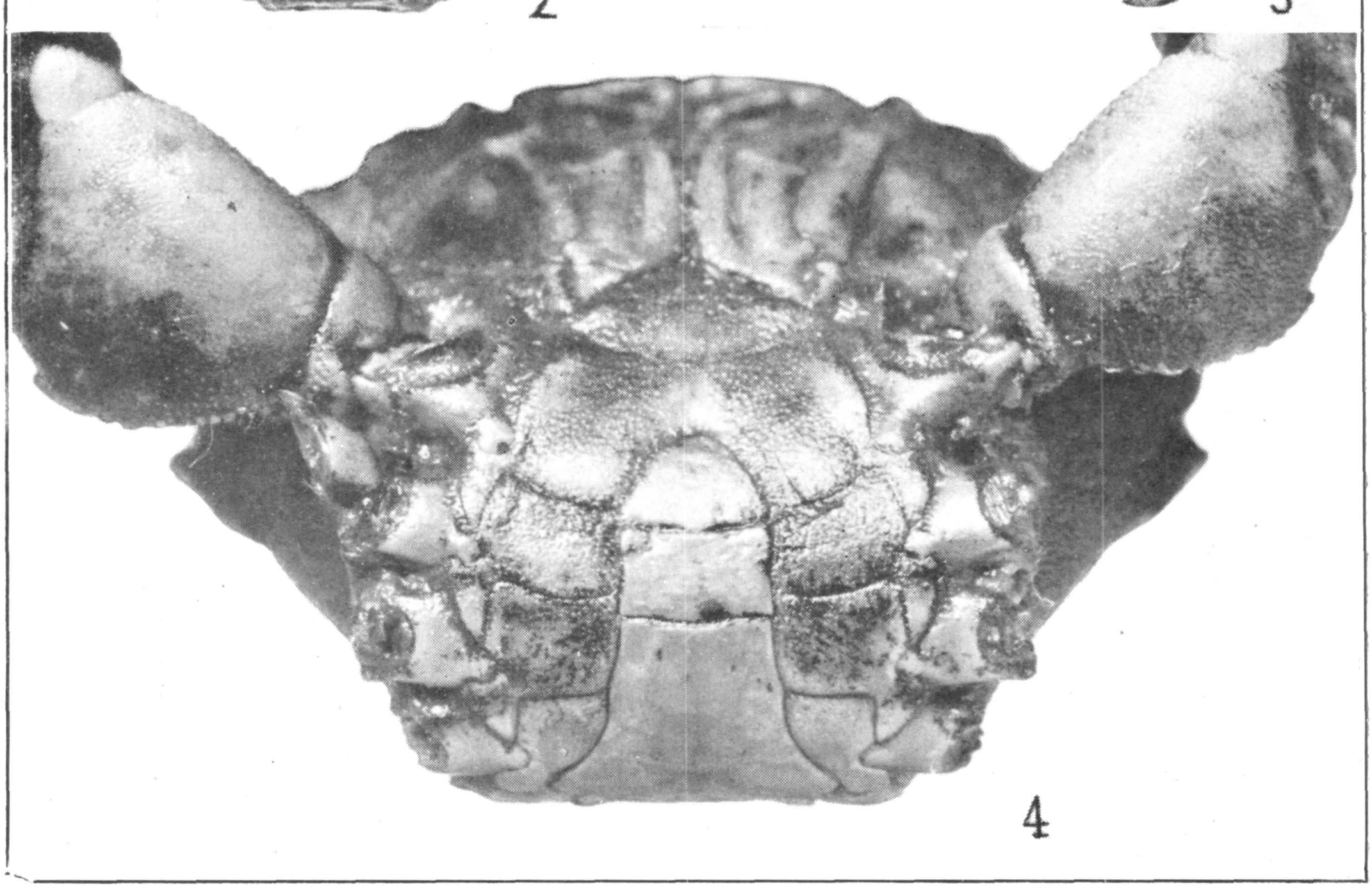

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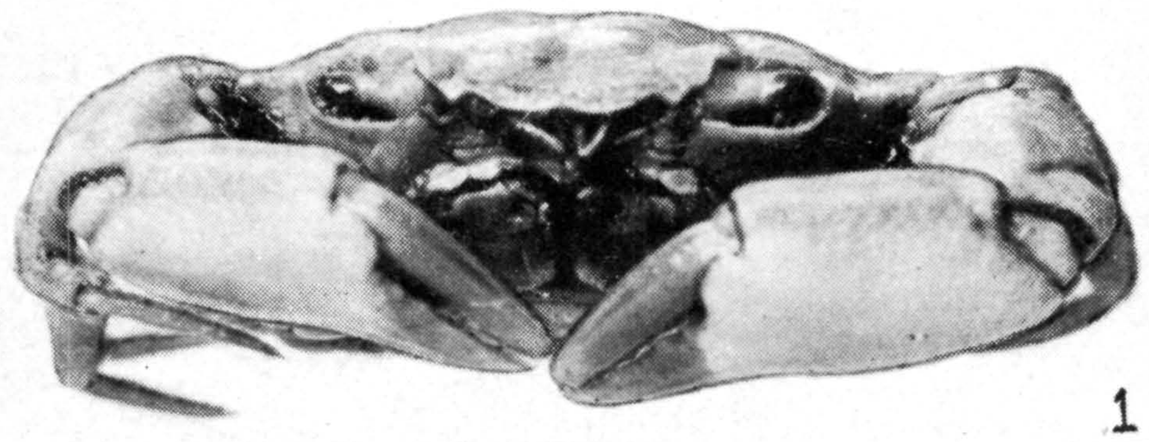
PANOPEUS TURGIDUS (P. 364)

FOR EXPLANATION OF PLATE SEE PAGE 583



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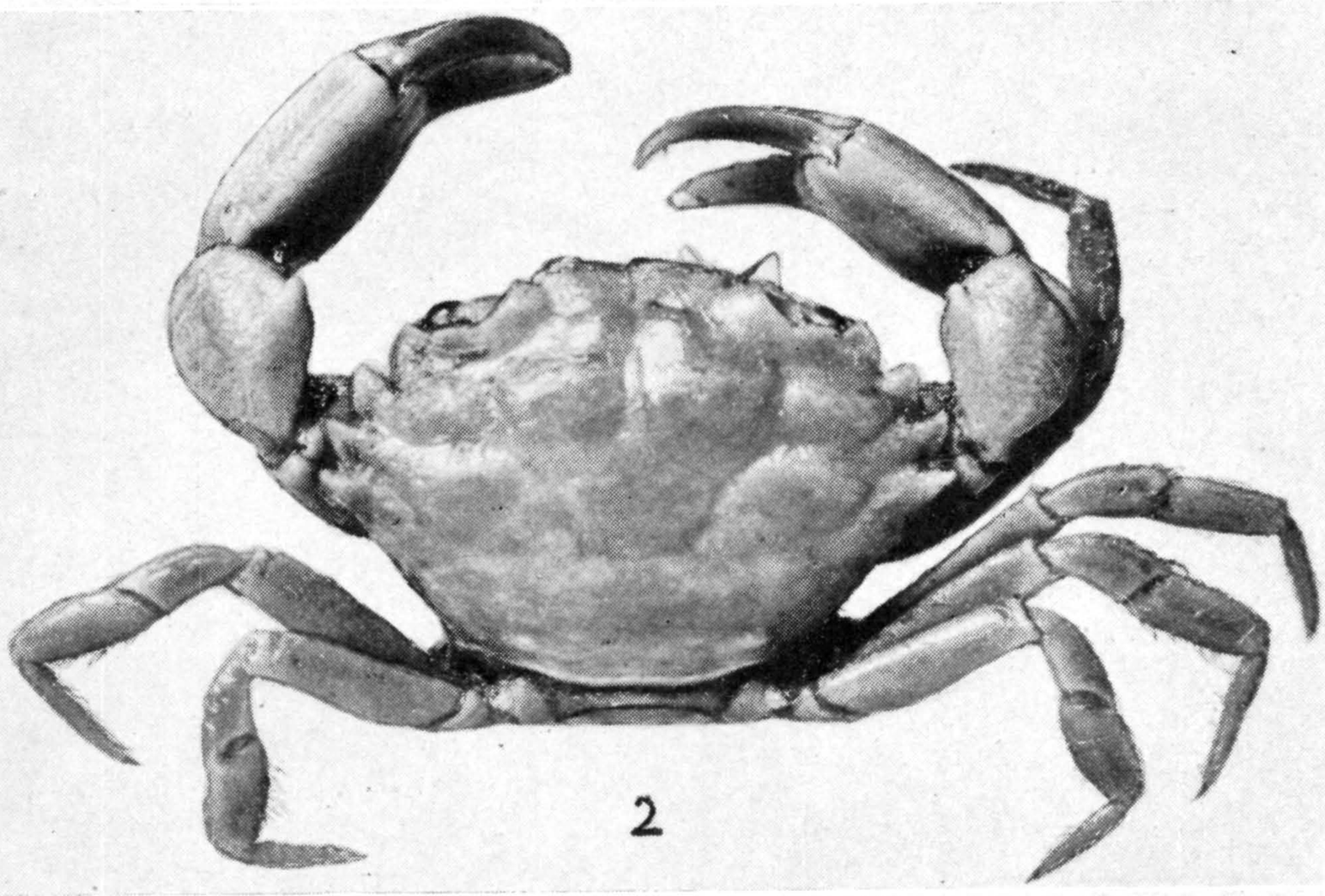

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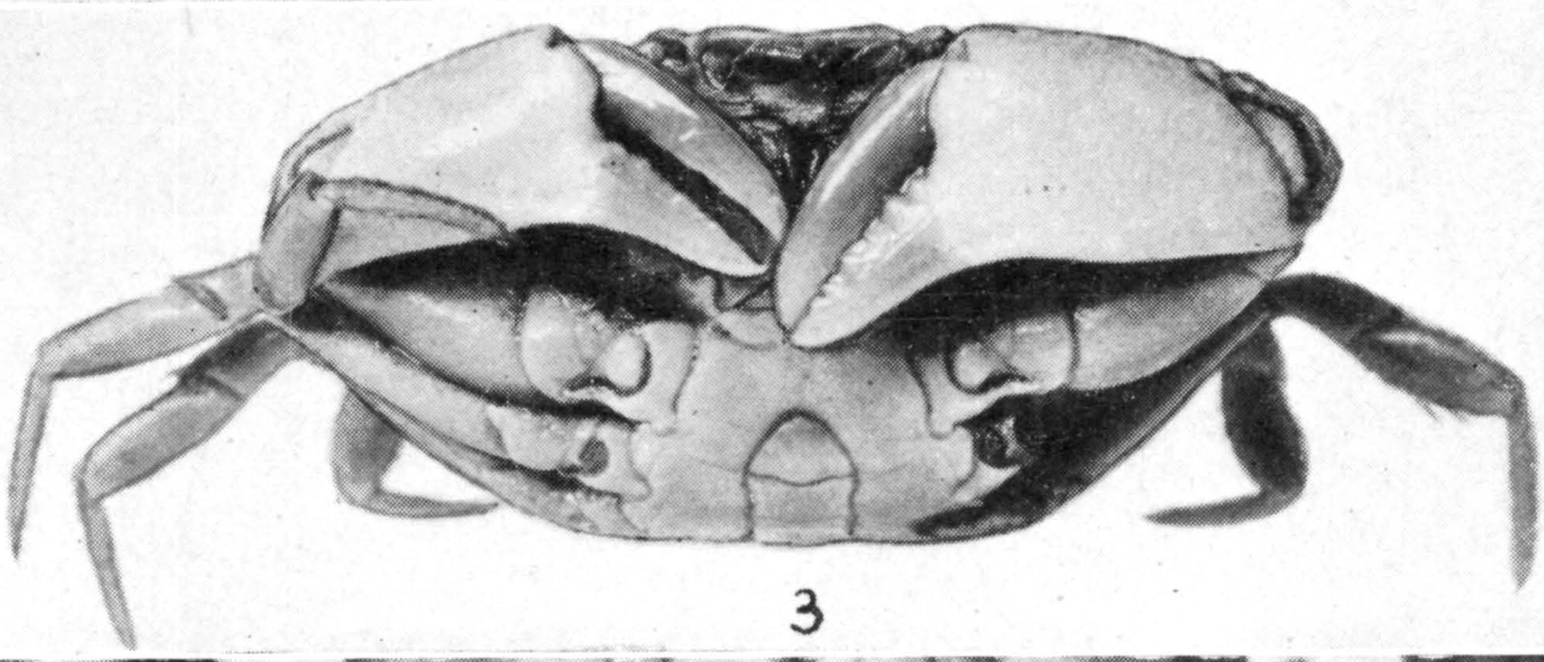

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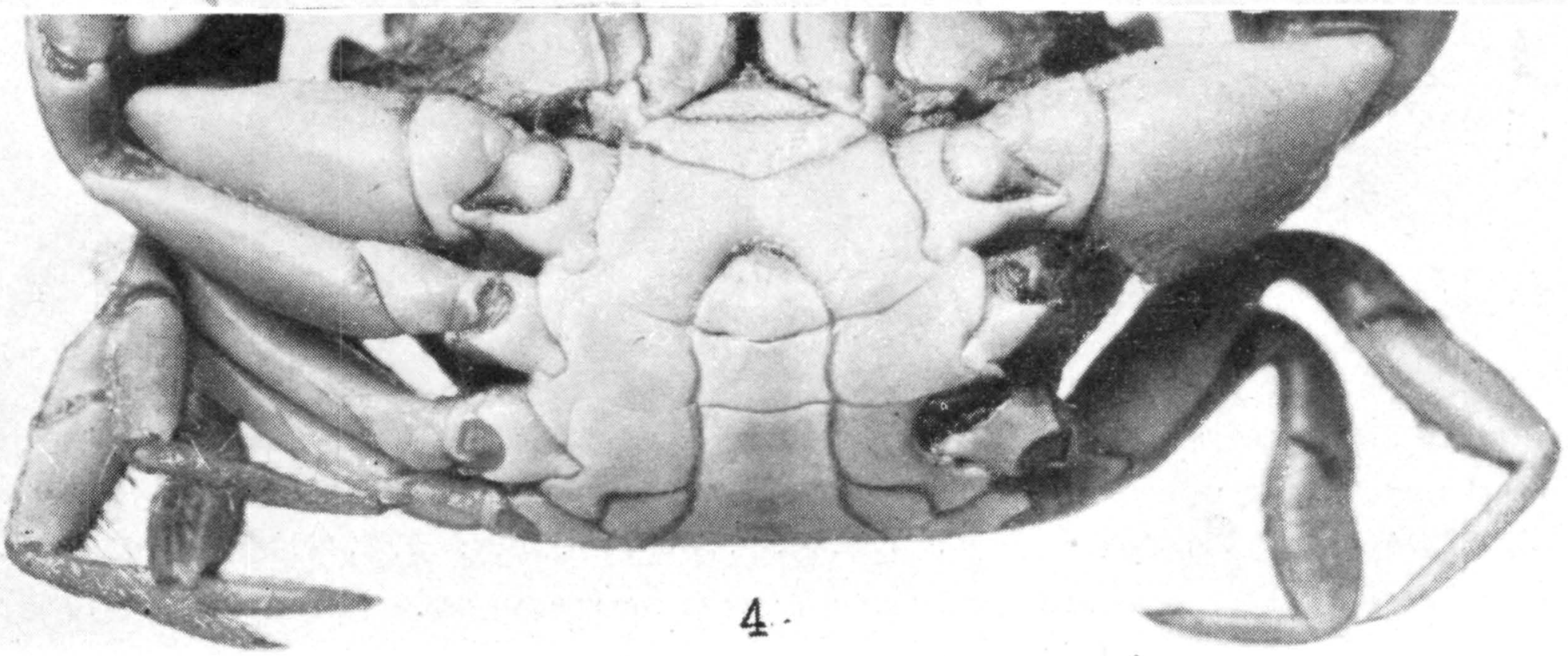

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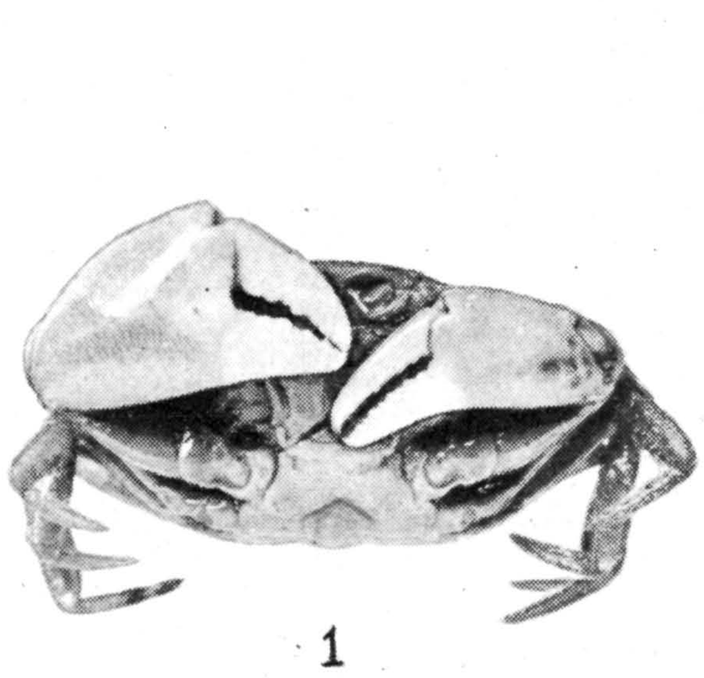
PANOPEUS BOEKEI (P. 365)

FOR EXPLANATION OF PLATE SEE PAGE 583



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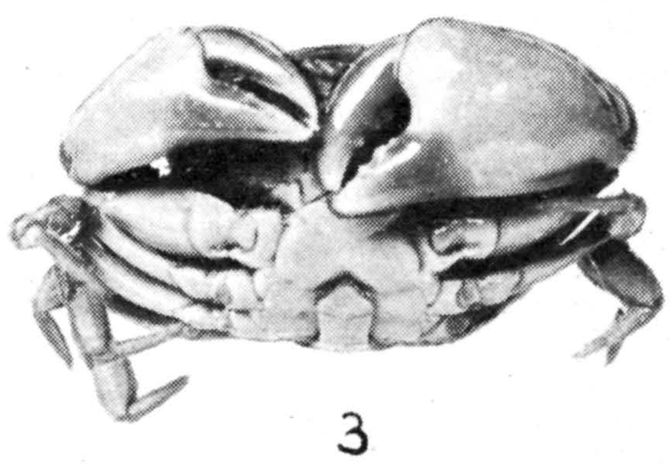

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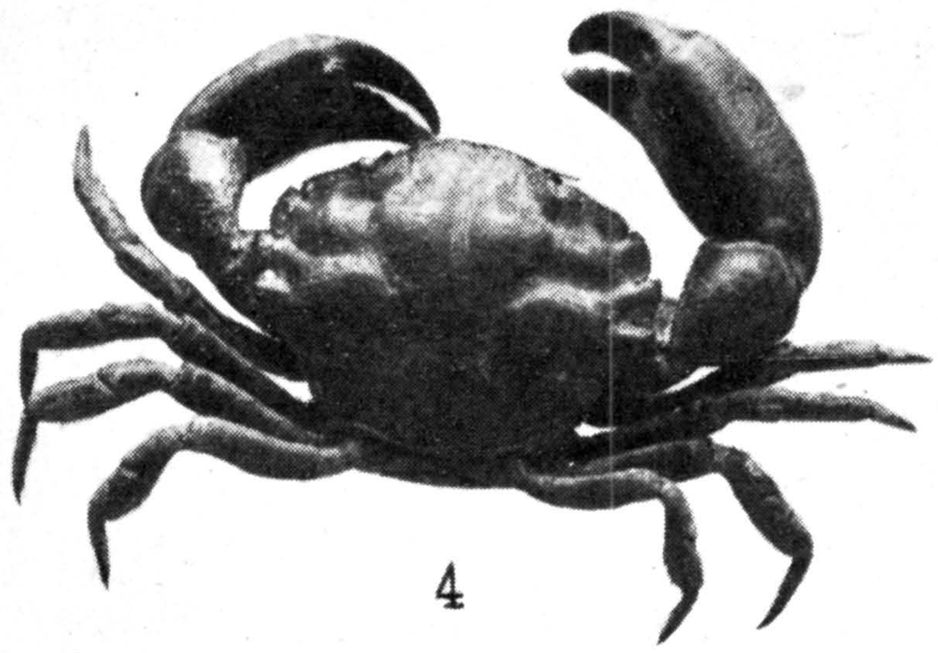

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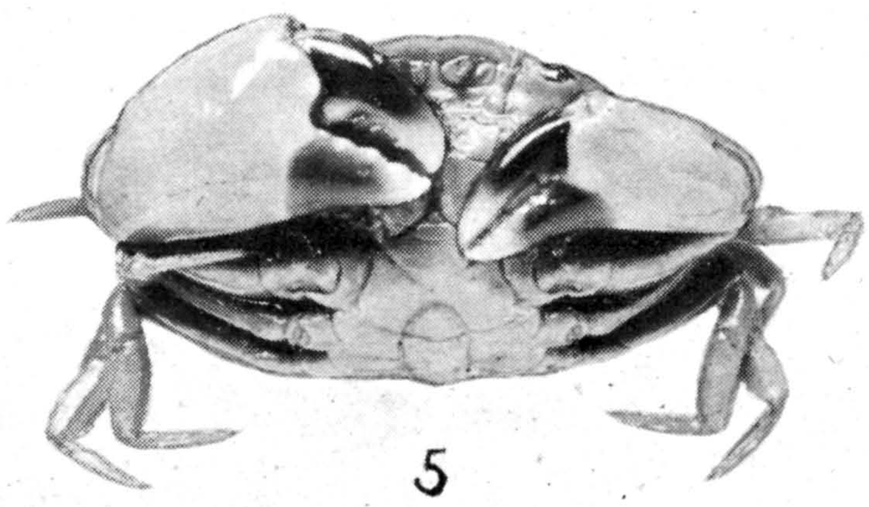

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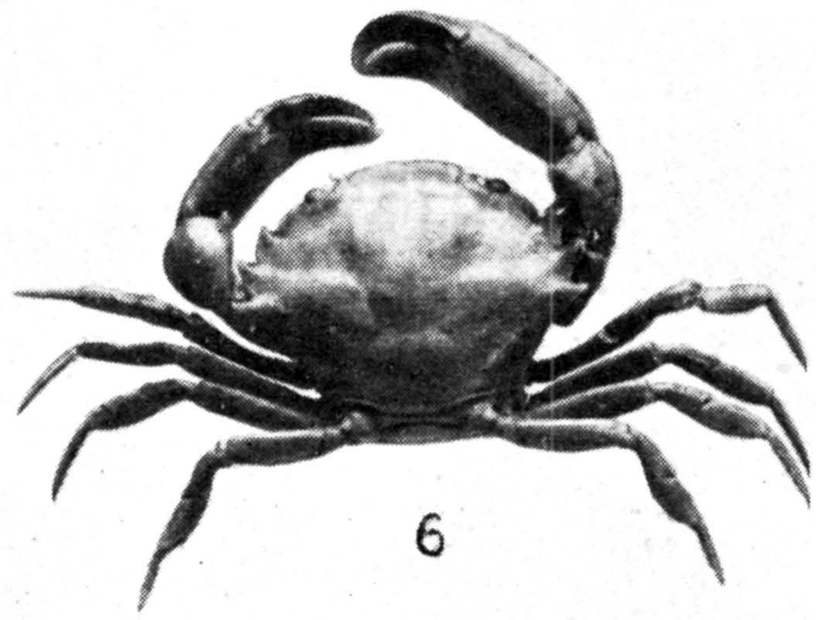

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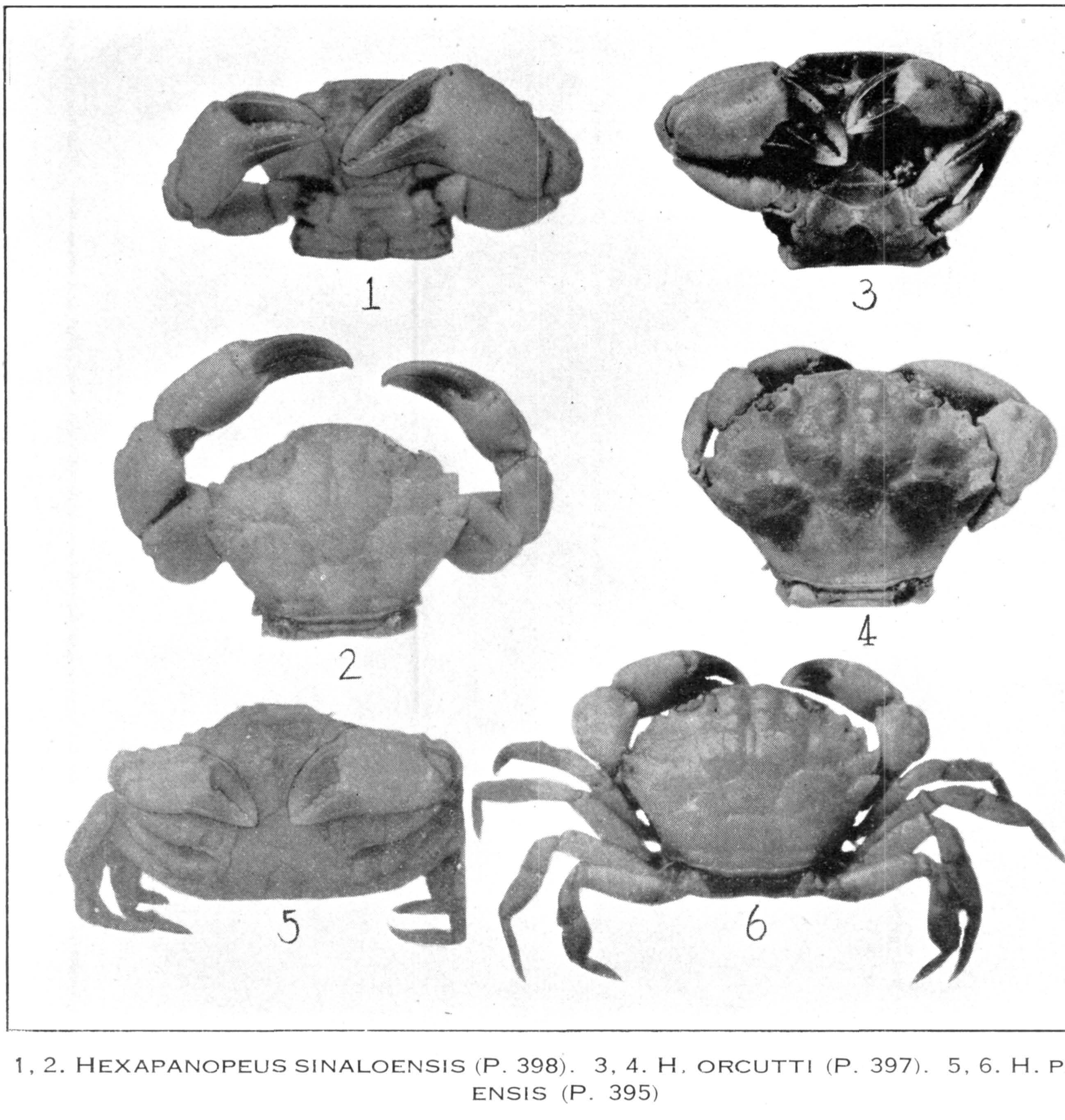
1, 2. NEOPANOPE TEXANA (P. 367). 3, 4. N. T. SAYI (P. 369). 5, 6. N. PACKARDII (P. 380)

FOR EXPLANATION OF PLATE SEE PAGE 583.

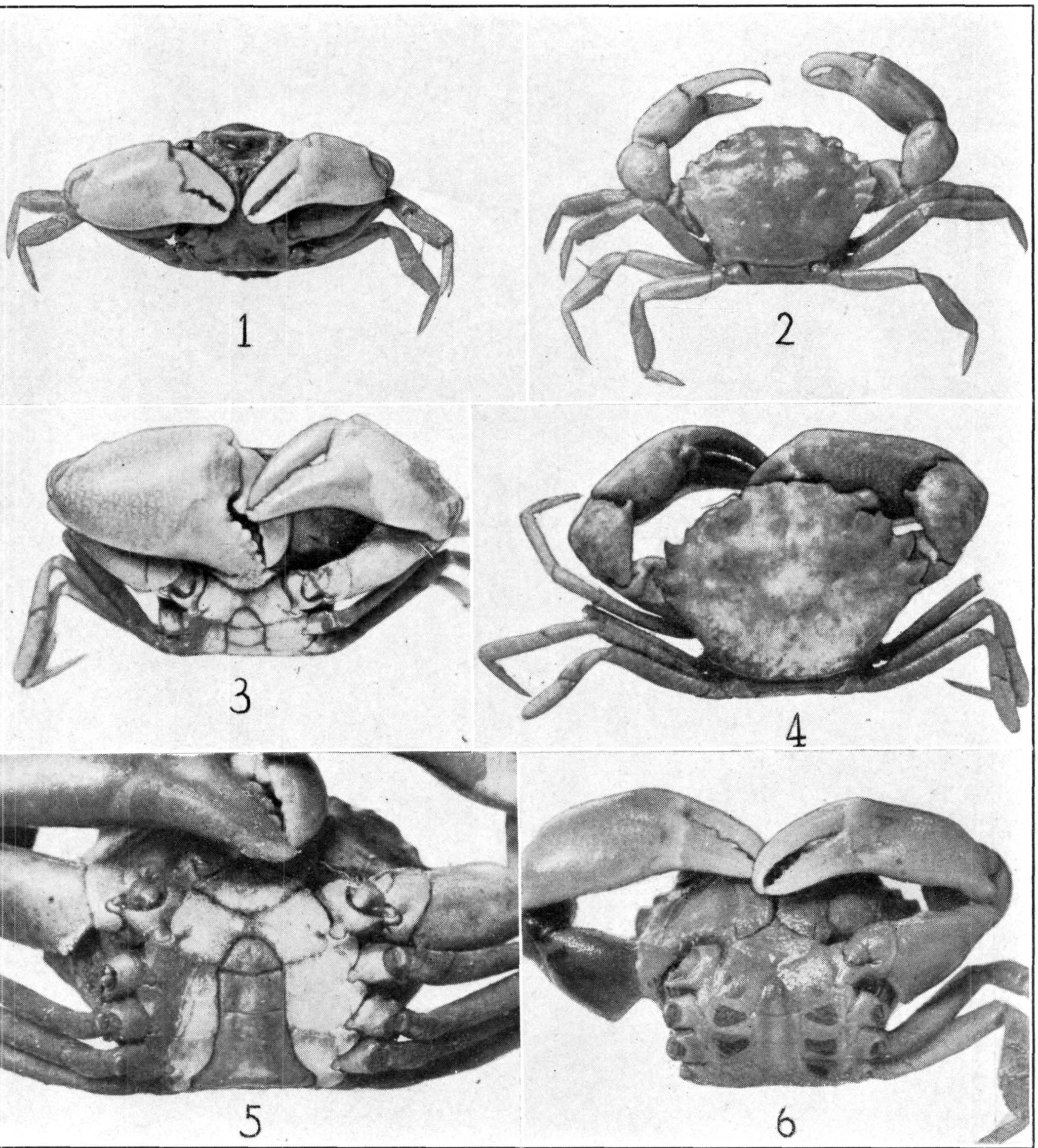
1, 2. HEXAPANOPEUS ANGUSTIFRONS (P. 384). 3–5. H. SCHMITTI (P. 393)

FOR EXPLANATION OF PLATE SEE PAGE 583.



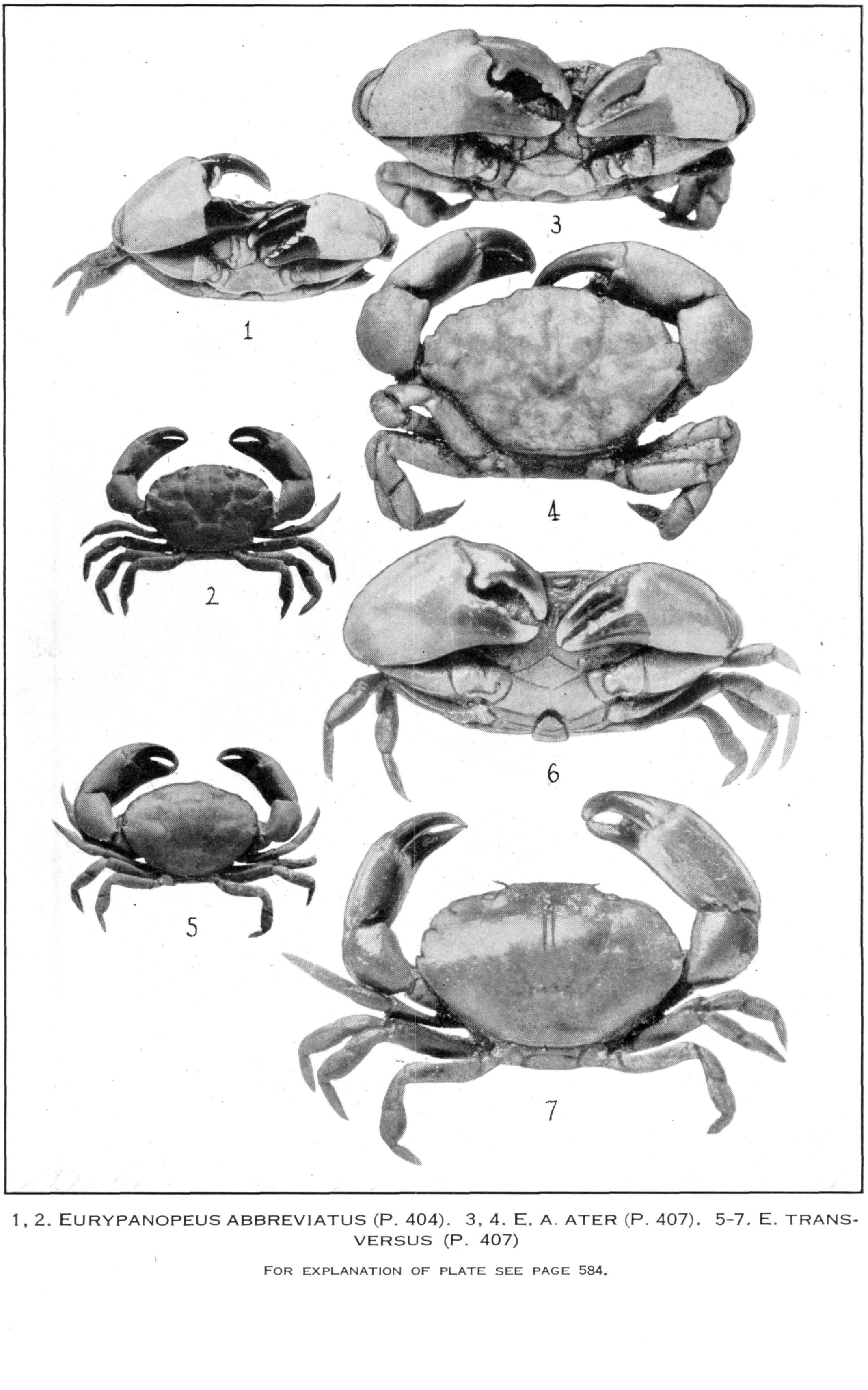
1, 2. HEXAPANOPEUS SINALOENSIS (P. 398). 3, 4. H. ORCUTTI (P. 397). 5, 6. H. PAULENSIS (P. 395)

FOR EXPLANATION OF PLATE SEE PAGE 584.



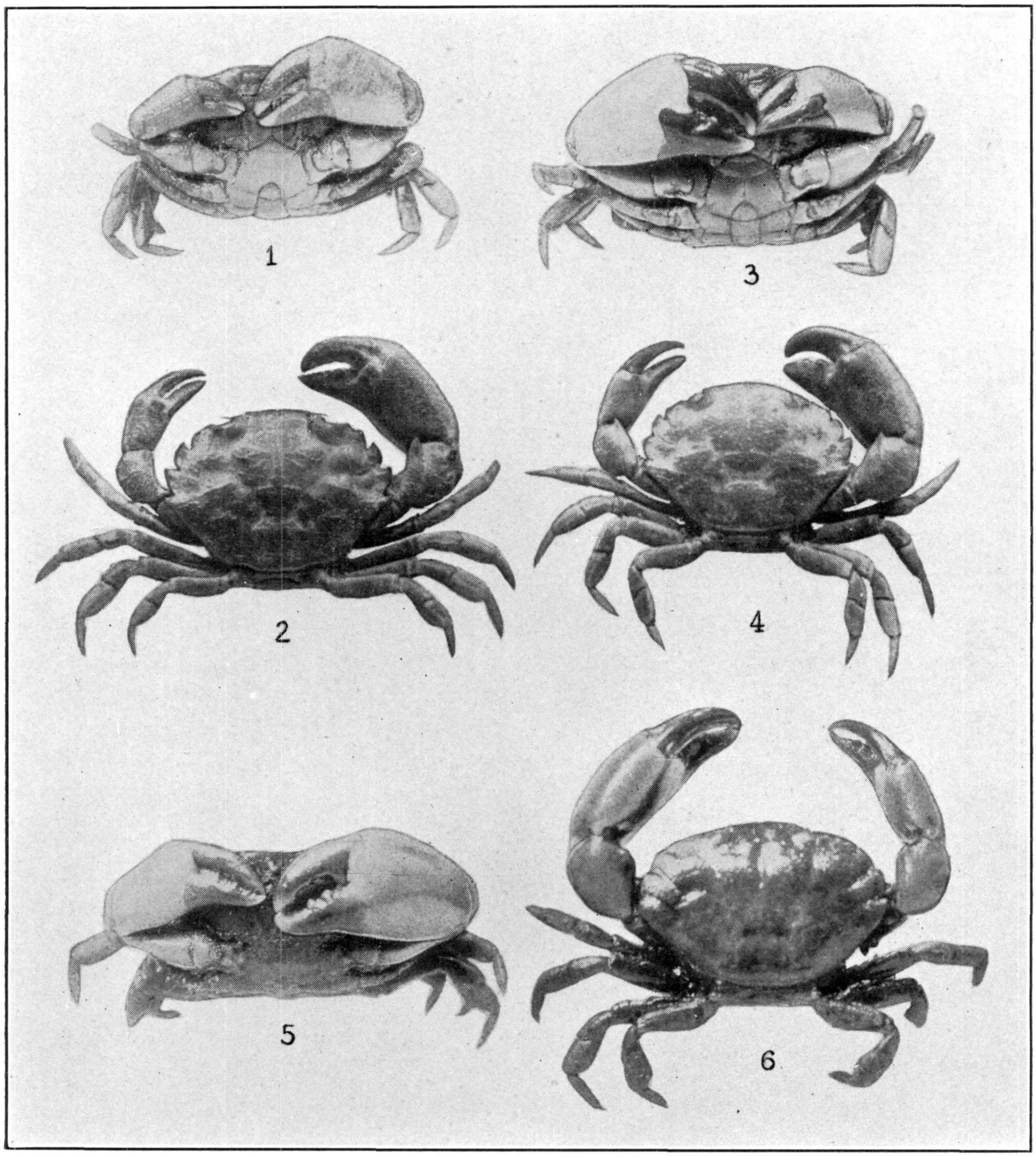
1, 2, 6. HEXAPANOPEUS HEMPHILLII (P. 400). 3-5. H. CARIBBAEUS (P. 399)

FOR EXPLANATION OF PLATE SEE PAGE 584.



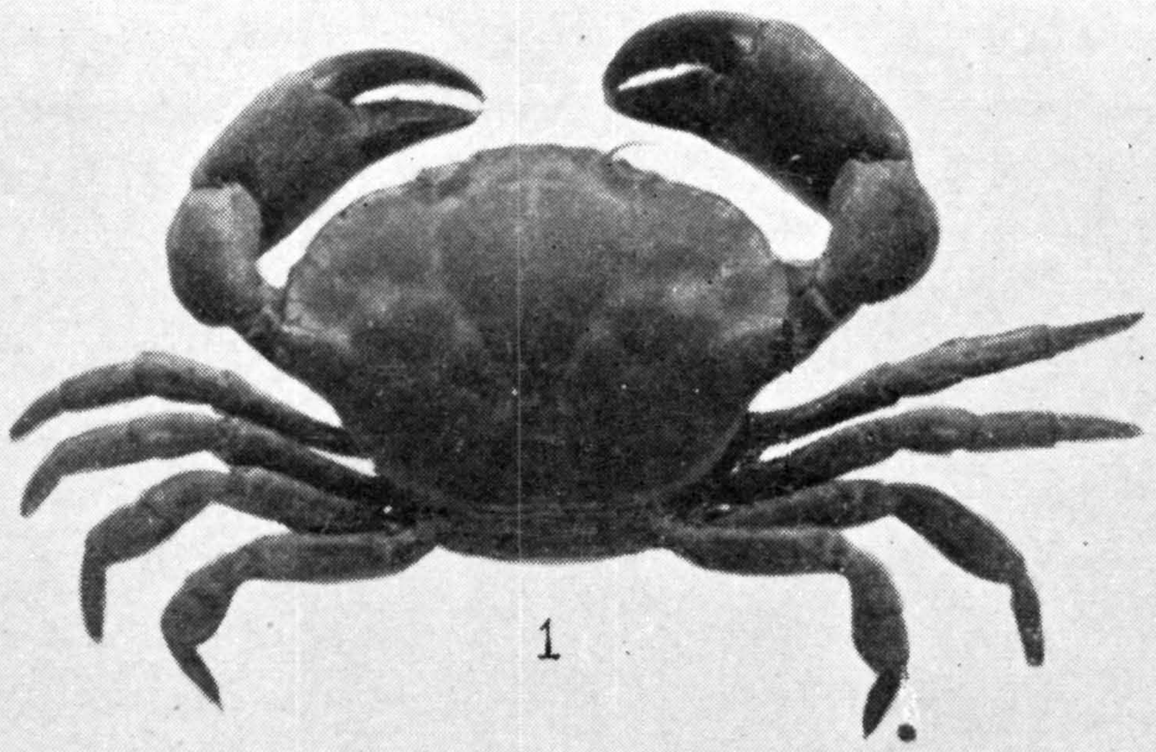
1, 2. EURYPANOPEUS ABBREVIATUS (P. 404). 3, 4. E. A. ATER (P. 407). 5-7. E. TRANSVERSUS (P. 407)

FOR EXPLANATION OF PLATE SEE PAGE 584.



1, 2. EURYPANOPEUS DISSIMILIS (P. 411). 3, 4. E. DEPRESSUS (P. 410). 5, 6. E. OVATUS (P. 409)

FOR EXPLANATION OF PLATE SEE PAGE 584.



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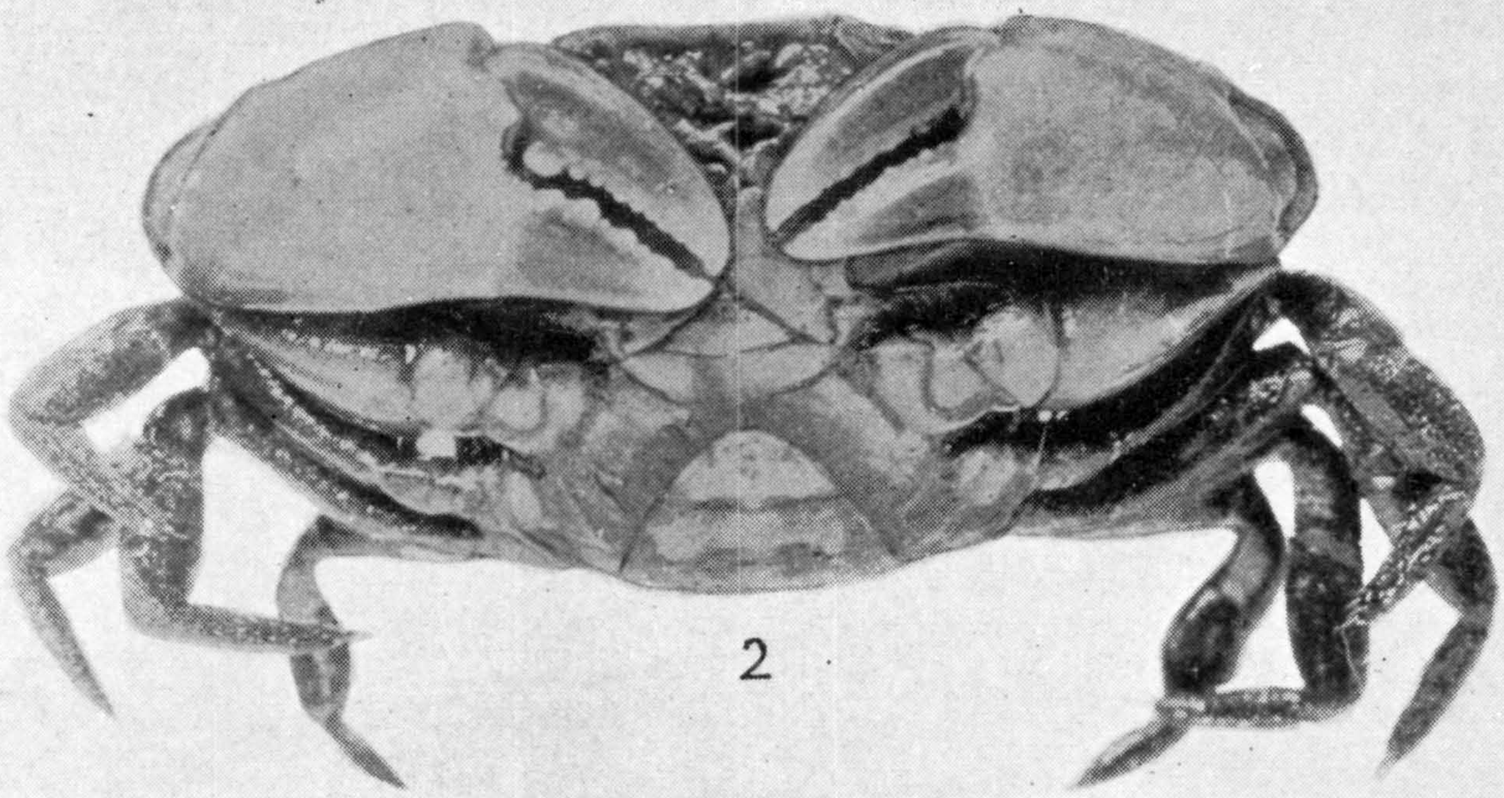

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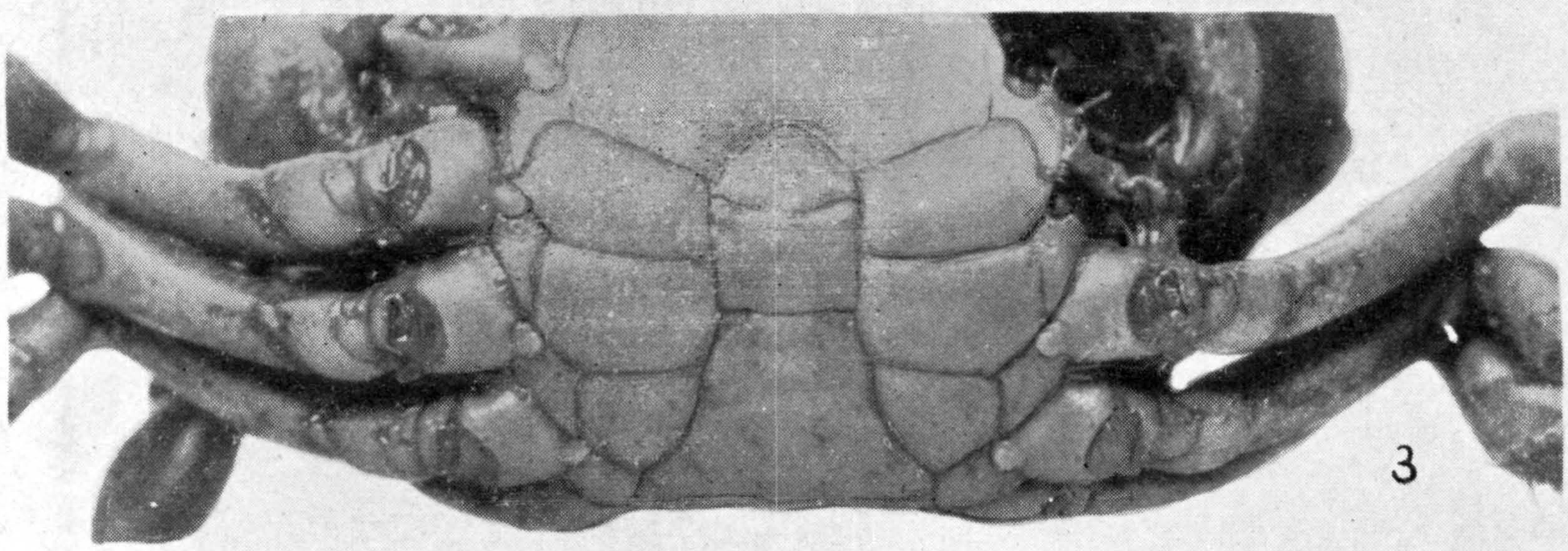

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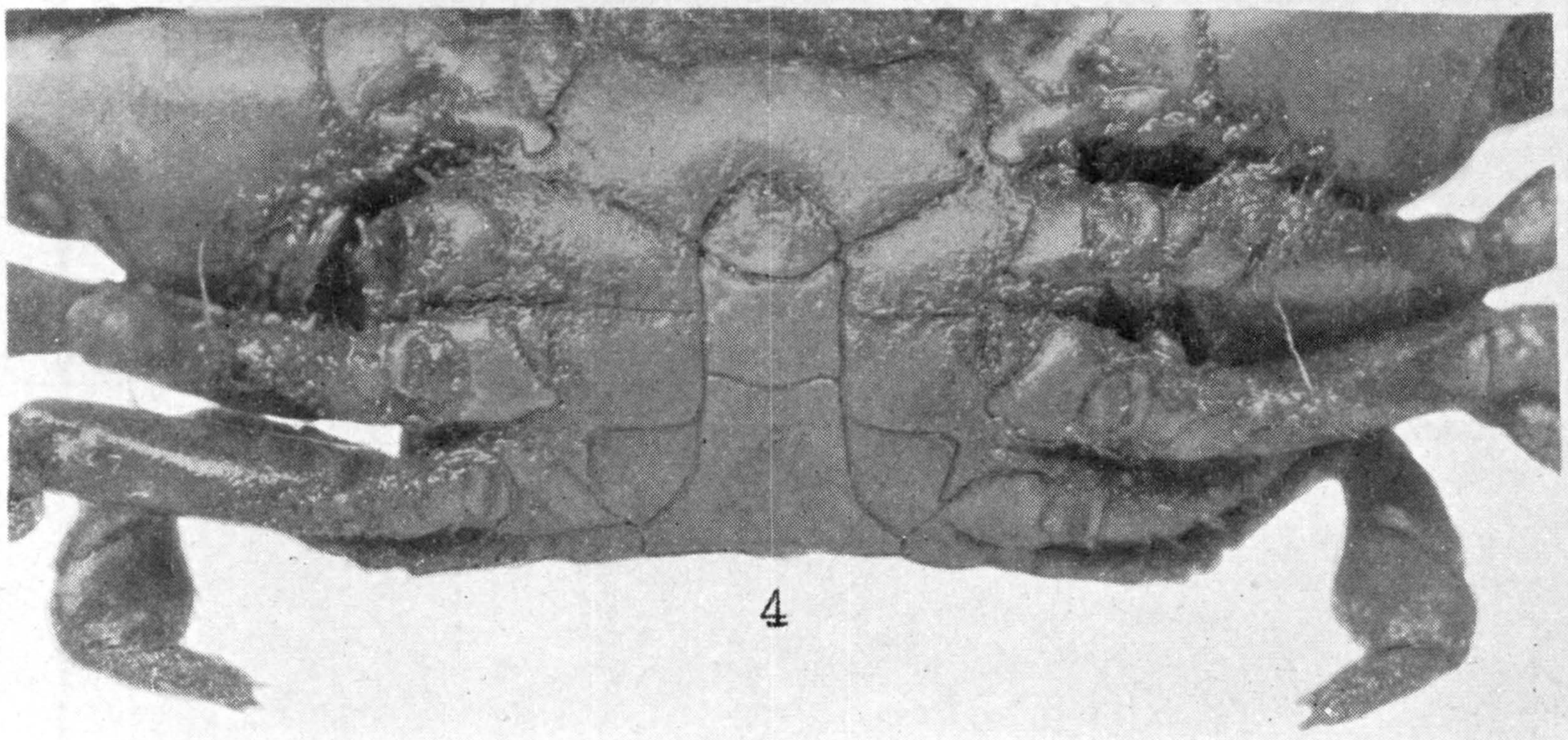

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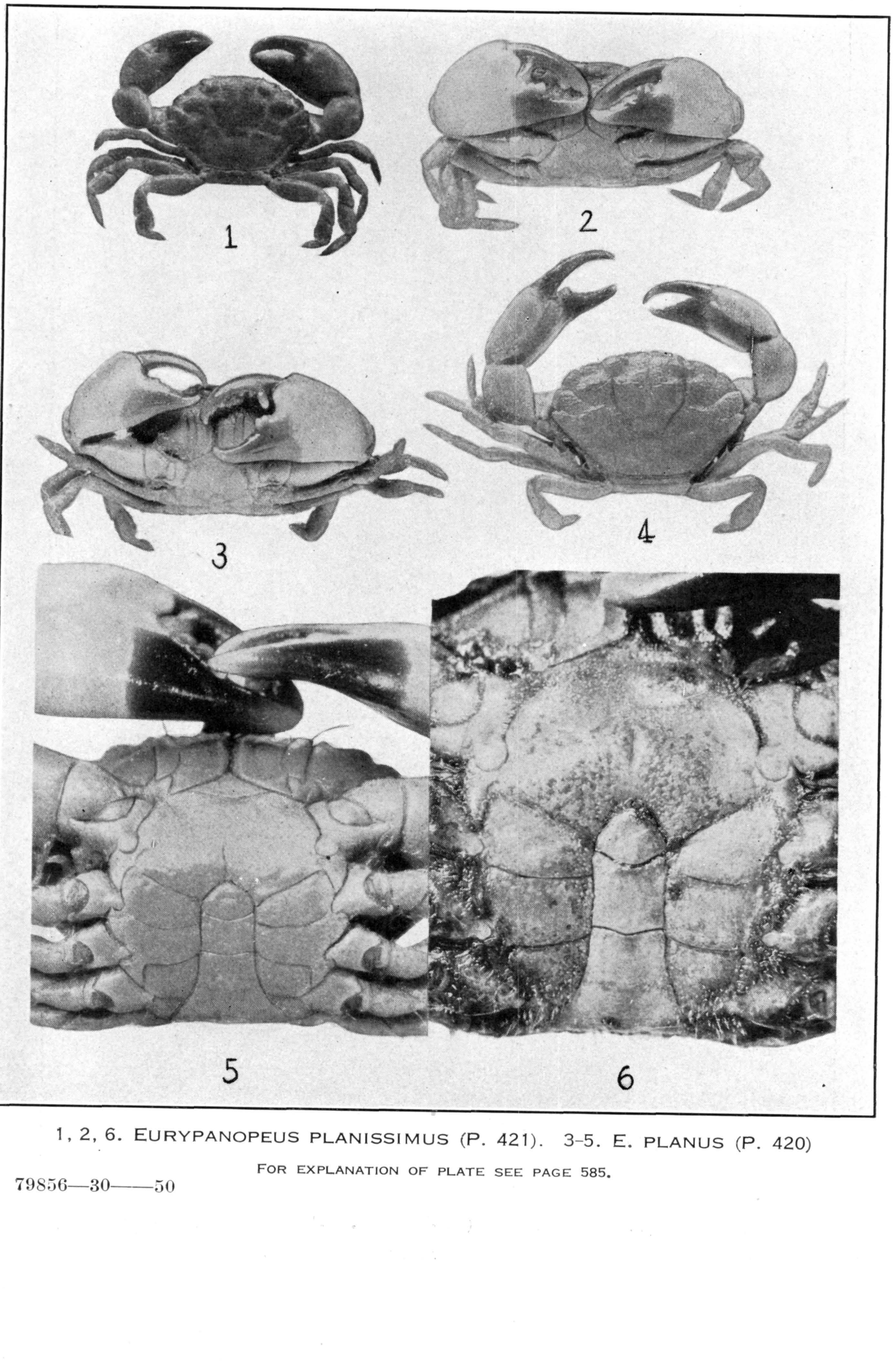
1–3. EURYPANOPEUS CRENATUS (P. 418). 4. E. OVATUS (P. 409)

FOR EXPLANATION OF PLATE SEE PAGE 584.



1, 2, 6. EURYPANOPEUS PLANISSIMUS (P. 421). 3-5. E. PLANUS (P. 420)

FOR EXPLANATION OF PLATE SEE PAGE 585.

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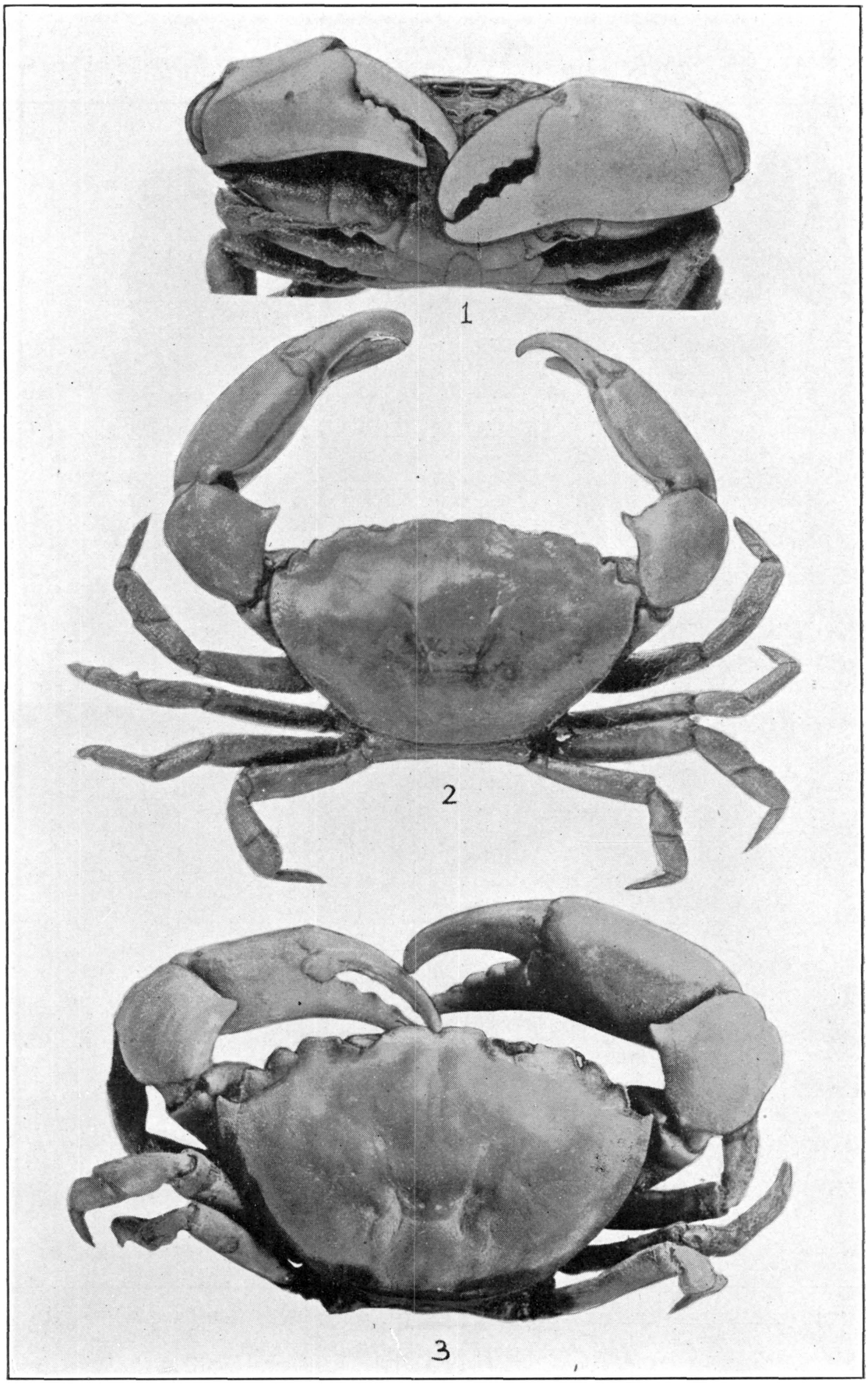
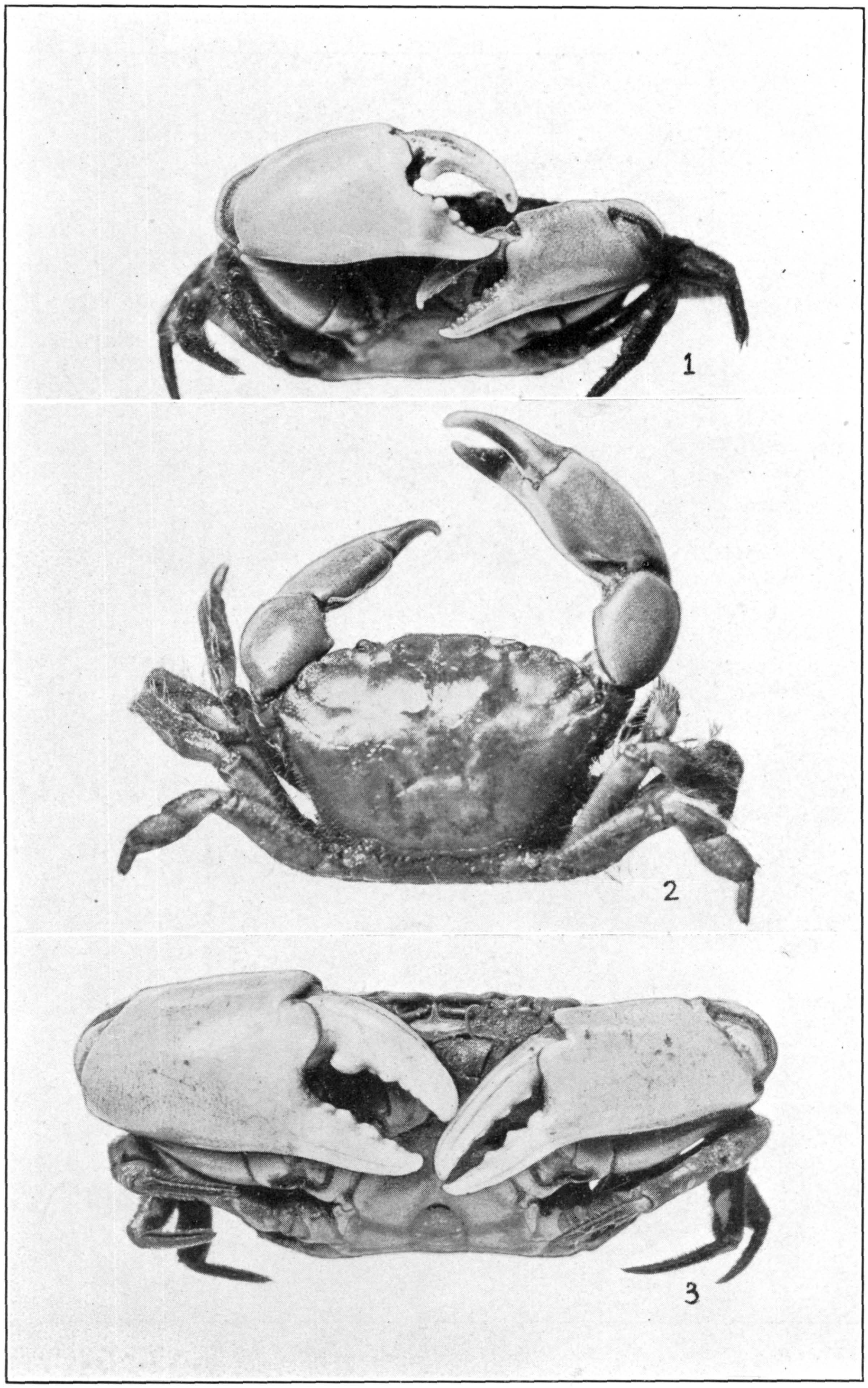


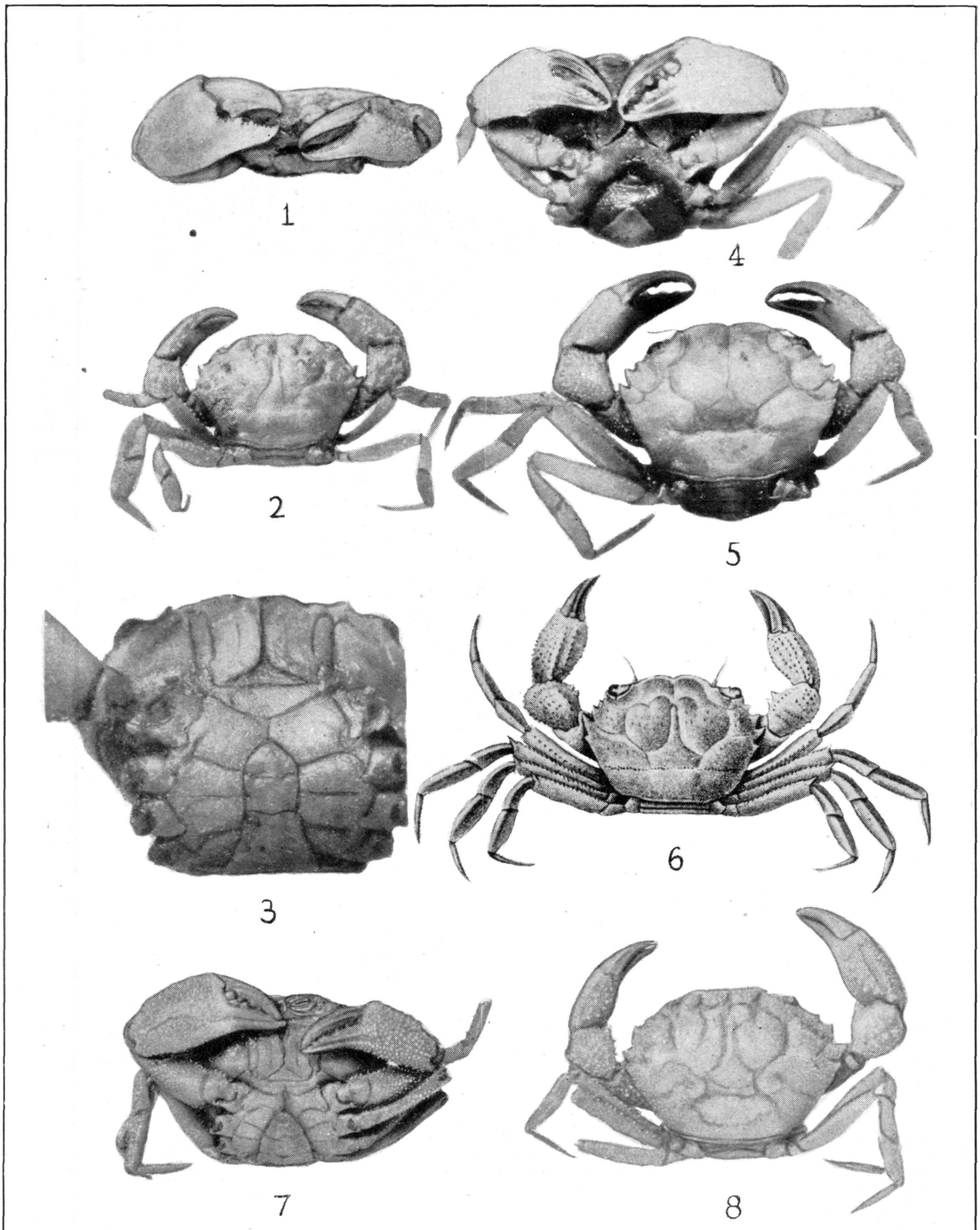
1, 2. EURYTIUM LIMOSUM (P. 423). 3. E. TRISTANI (P. 425)

FOR EXPLANATION OF PLATE SEE PAGE 585.



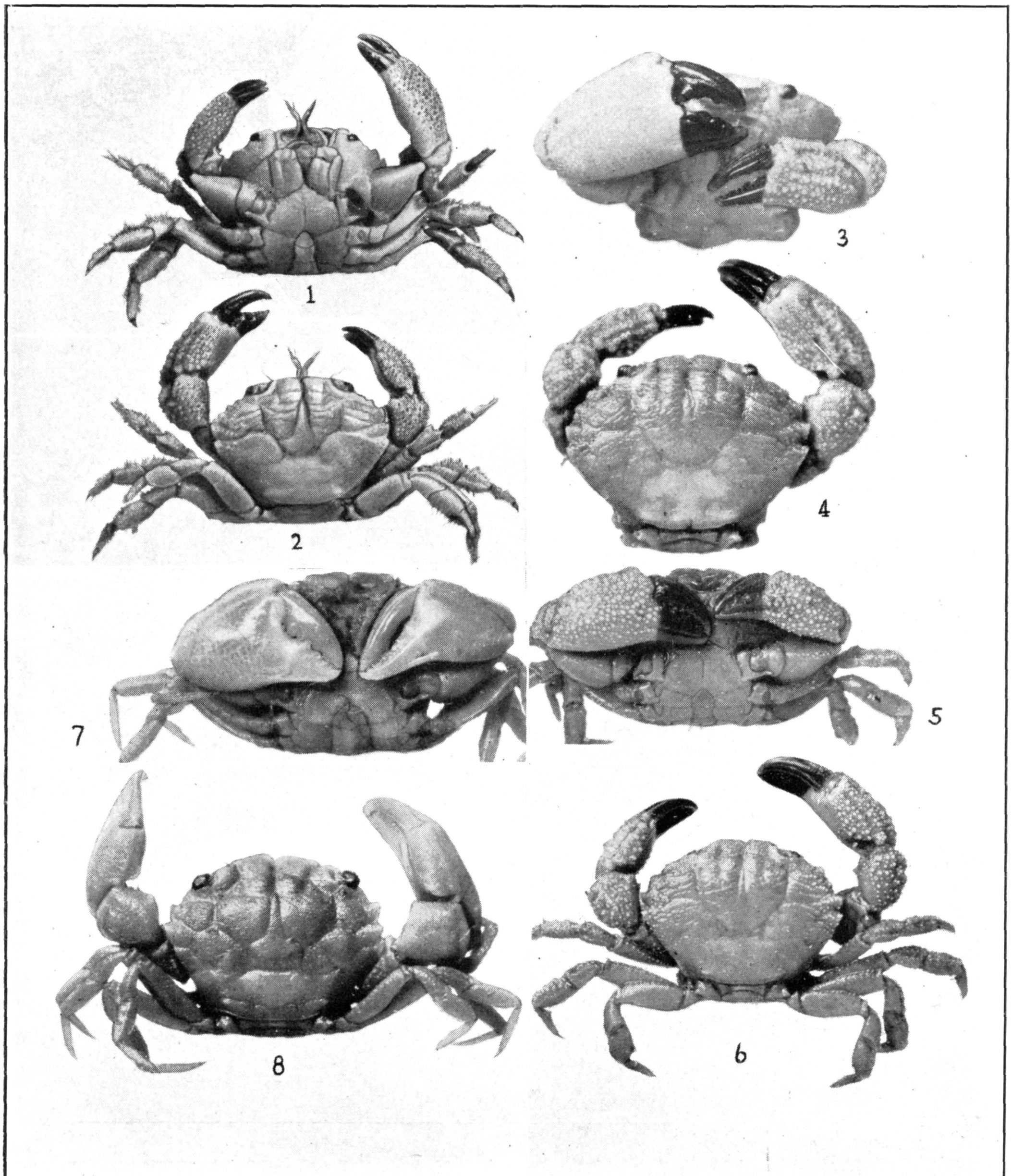
1, 2. EURYTIUM AFFINE (P. 425). 3. E. TRISTANI (P. 425)

FOR EXPLANATION OF PLATE SEE PAGE 585.



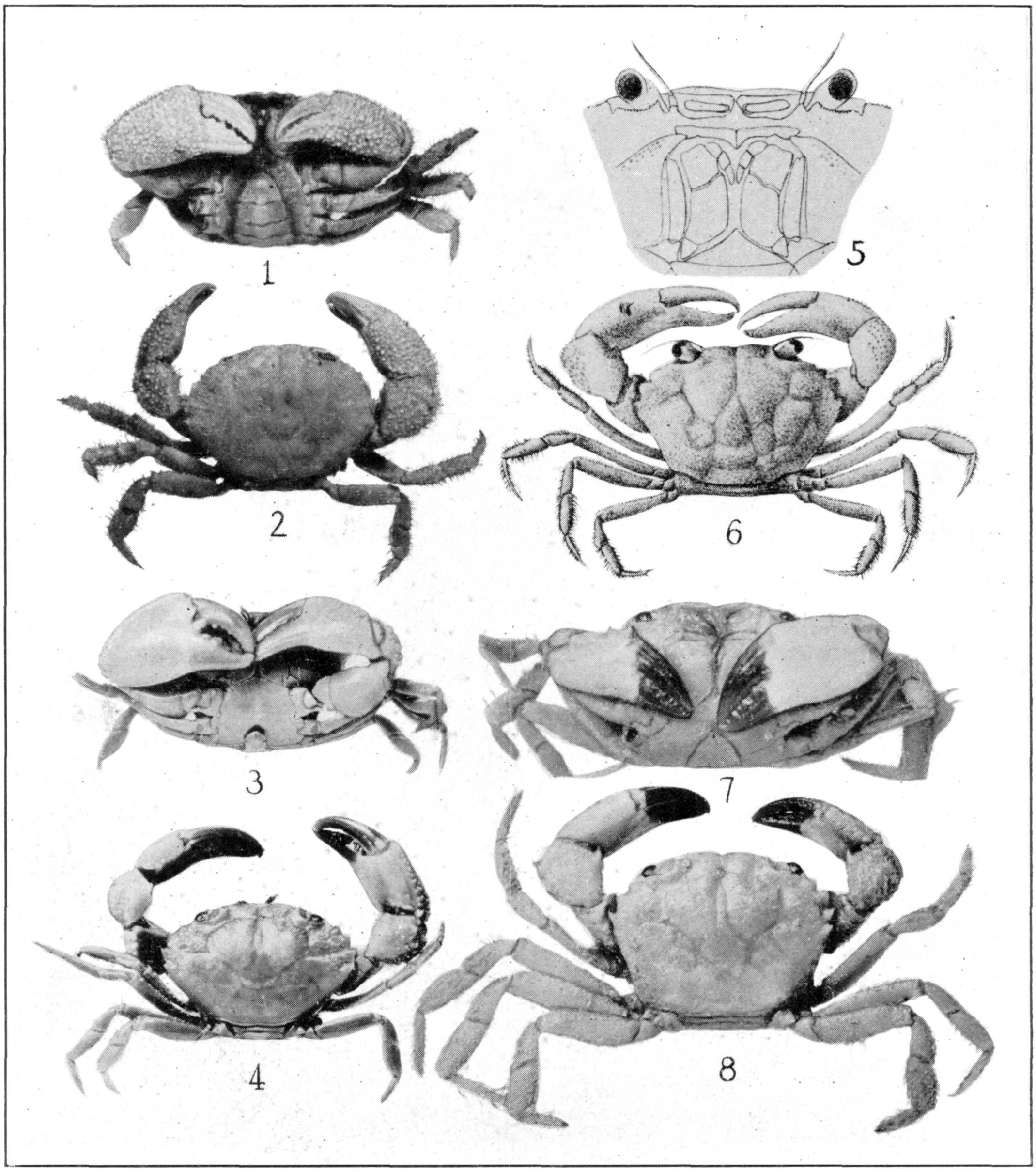
1–3. MICROPANOPE SCULPTIPES (P. 428). 4–6. M. LOBIFRONS (P. 429). 7, 8. M. TRUNCATIFRONS (P. 433)

FOR EXPLANATION OF PLATE SEE PAGE 585.



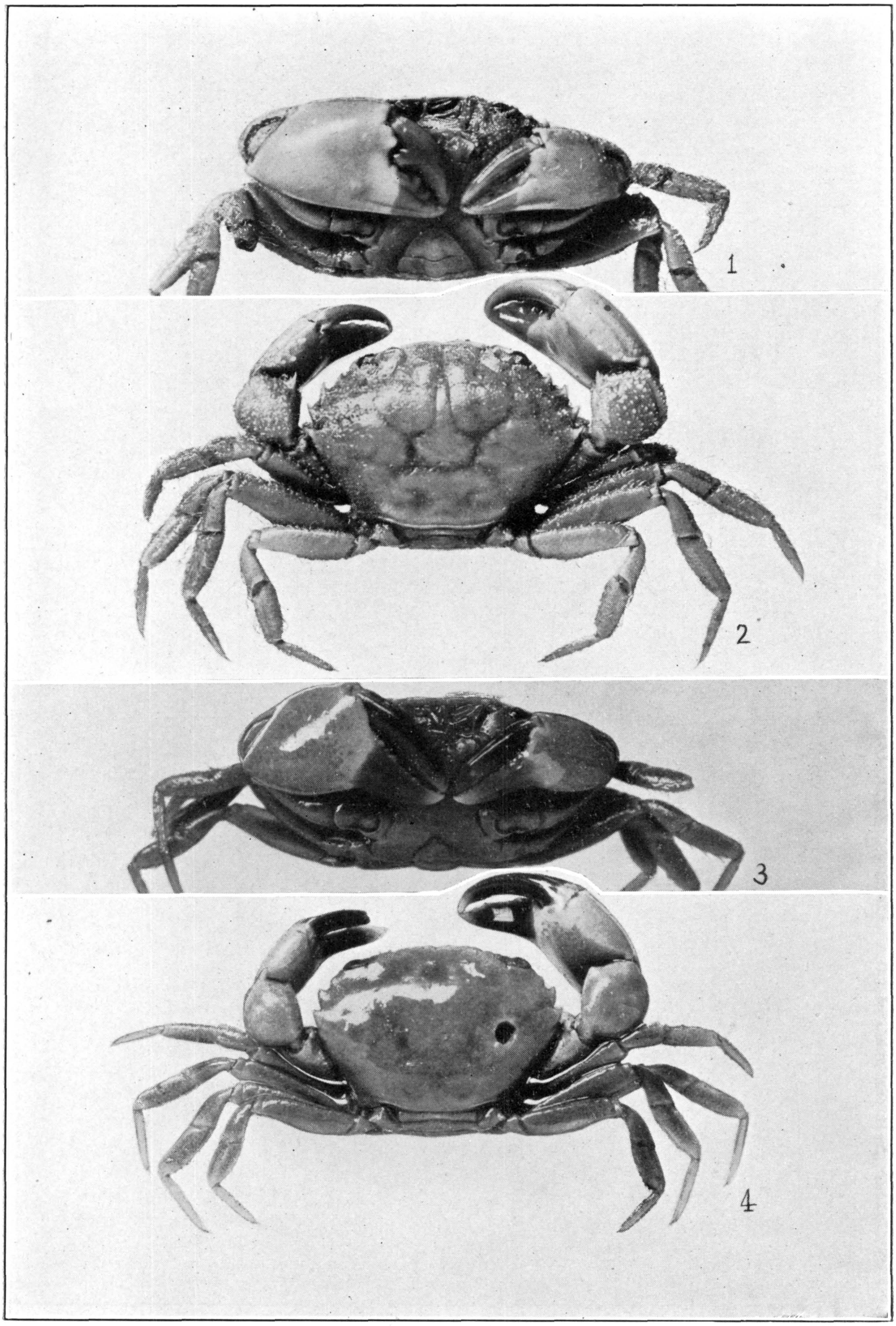
1–4. MICROPANOPE XANTUSII (P. 438). 5, 6. M. X. TABOGUILLENSIS (P. 439). 7, 8. M. PUSILLA (P. 431)

FOR EXPLANATION OF PLATE SEE PAGE 585.



1, 2. MICROPANOPE GRANULIMANUS (P. 439). 3, 4. M. POLITA (P. 440). 5, 6. M. LATA (P. 441). 7, 8. M. XANTHIFORMIS (P. 442)

FOR EXPLANATION OF PLATE SEE PAGE 586.



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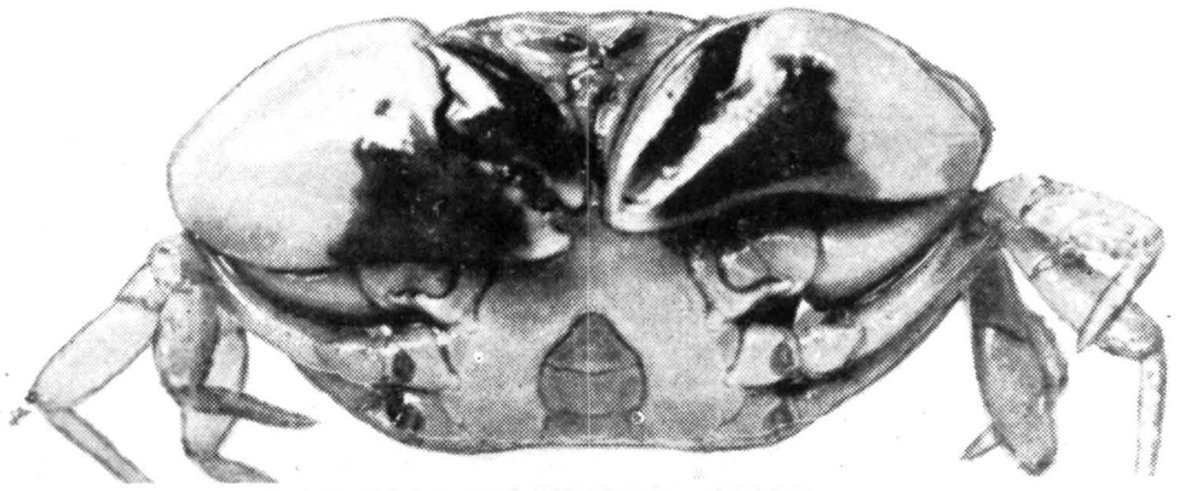
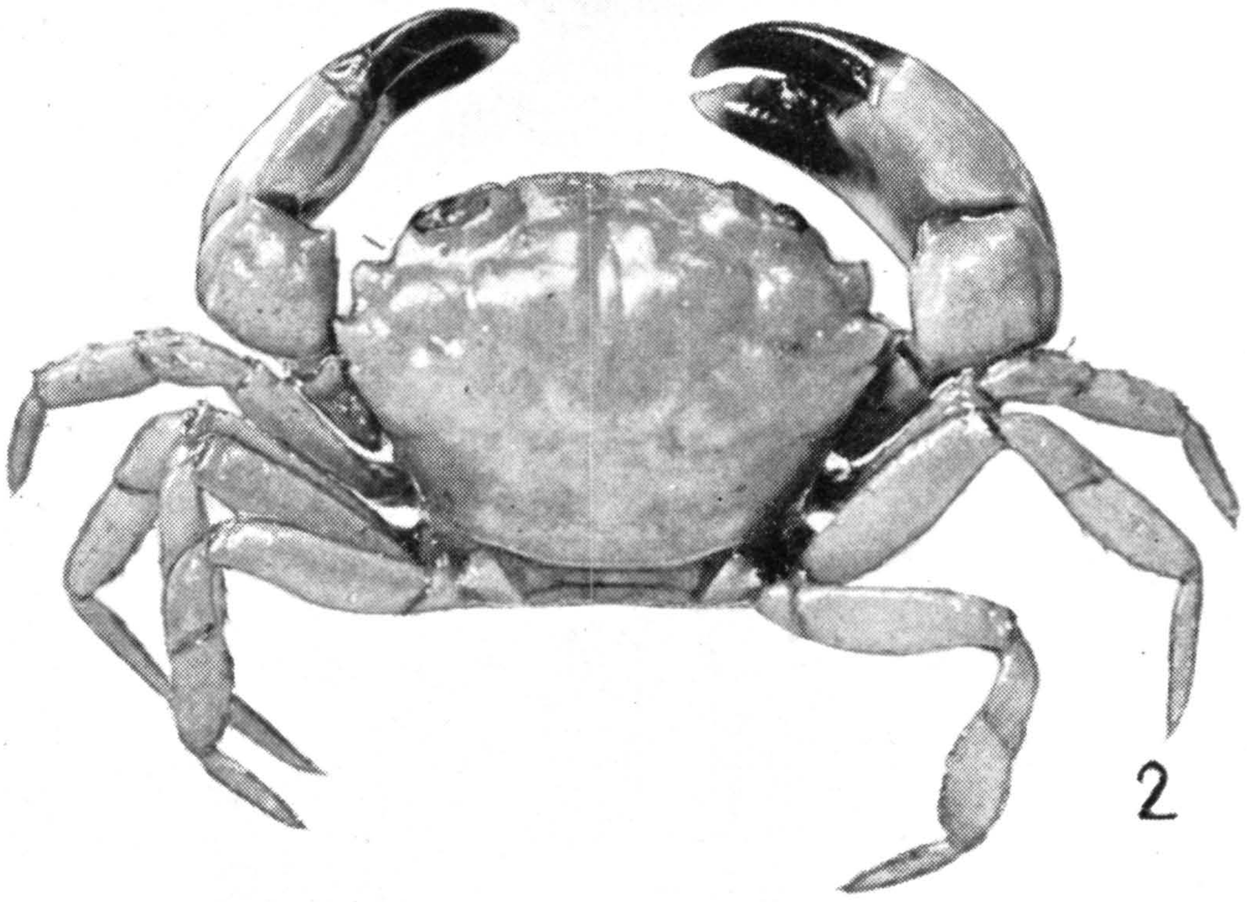
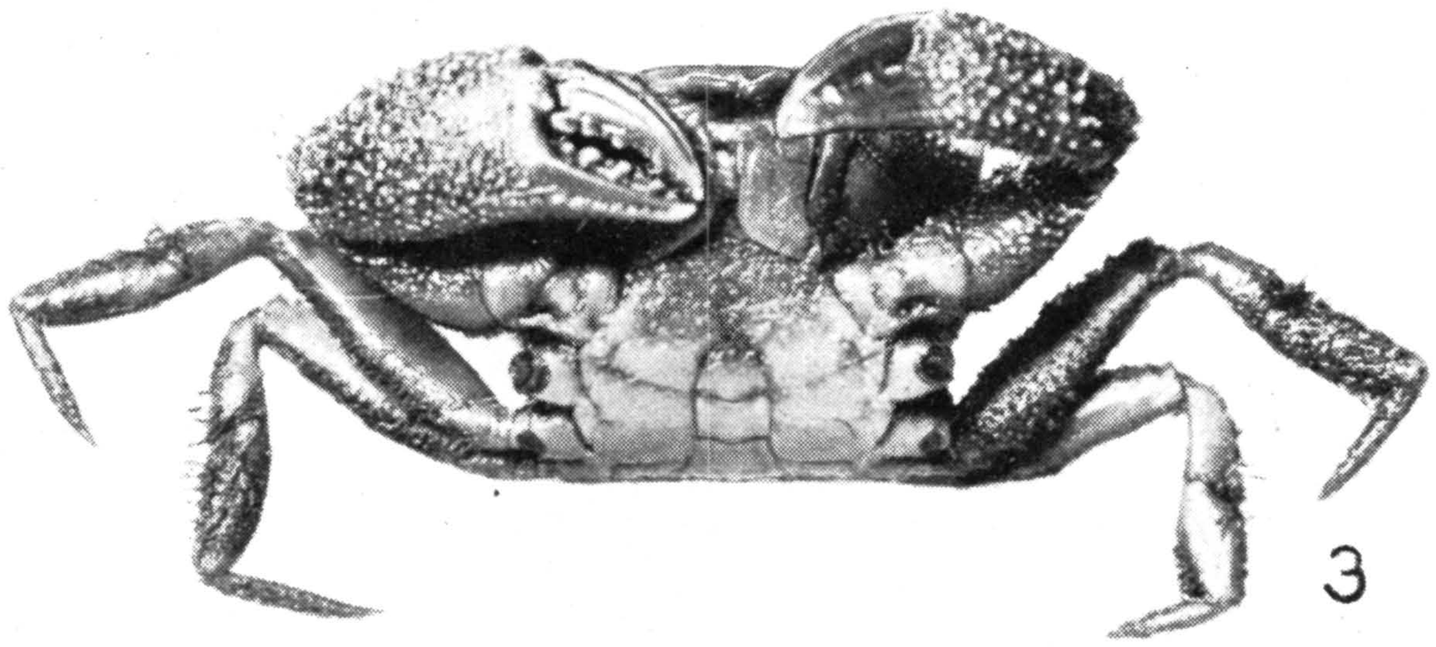
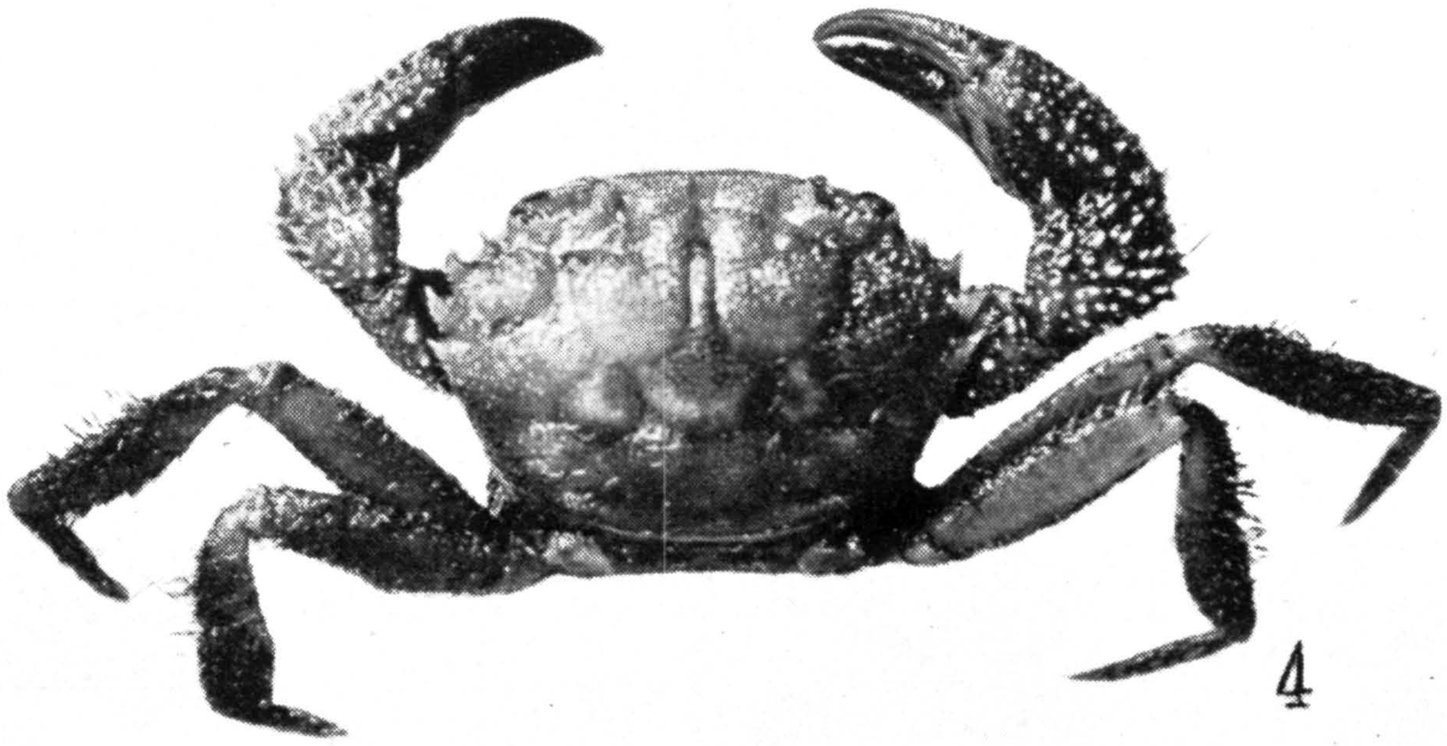
FOR EXPLANATION OF PLATE SEE PAGE 586.



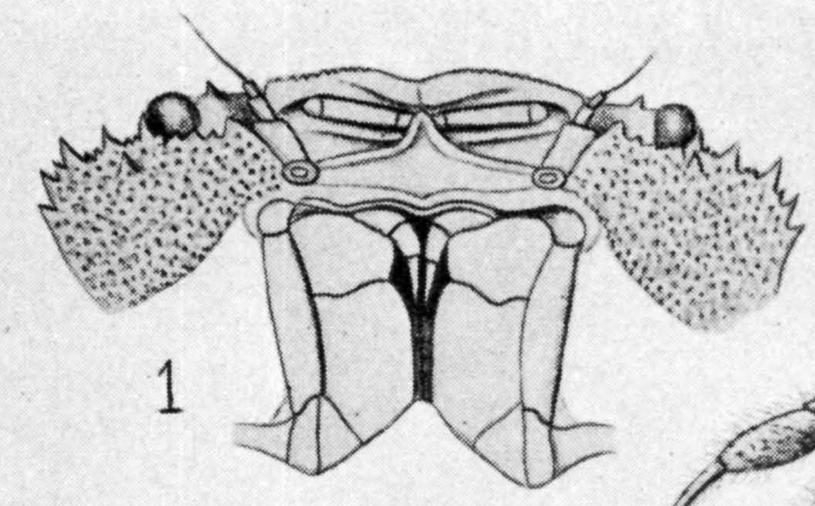






1, 2. MICROPANOPE AREOLATA (P. 450). 3, 4. M. URINATOR (P. 451)

FOR EXPLANATION OF PLATE SEE PAGE 586.



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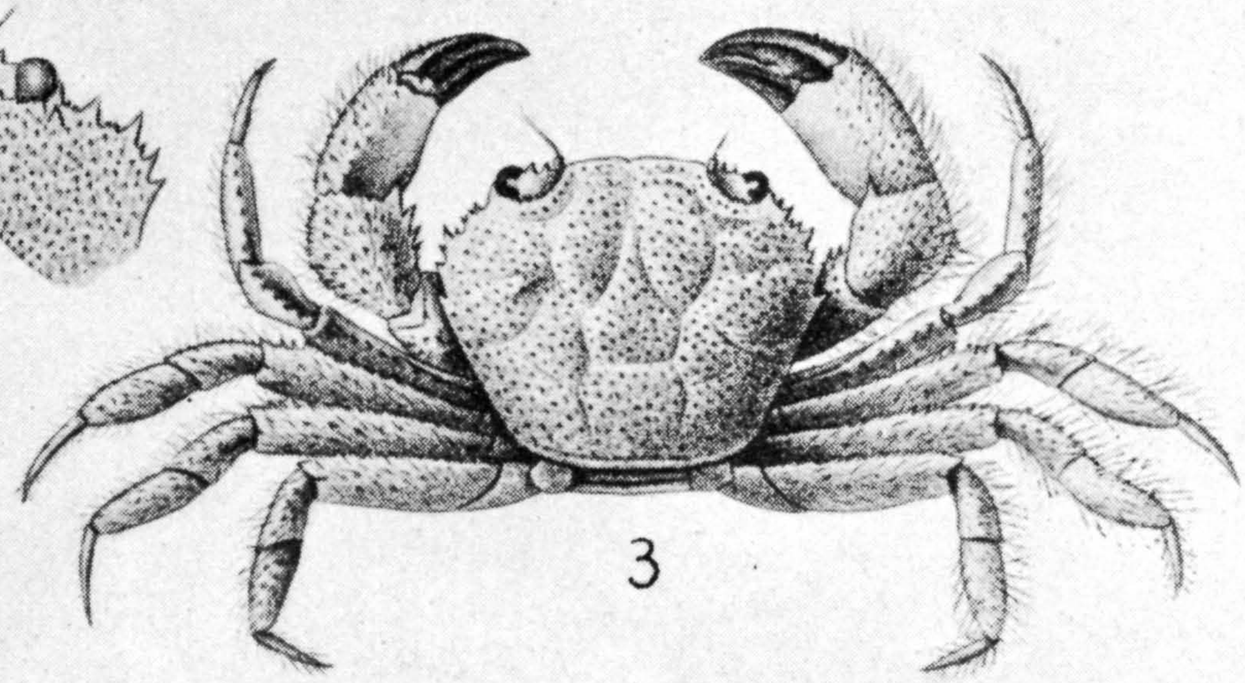

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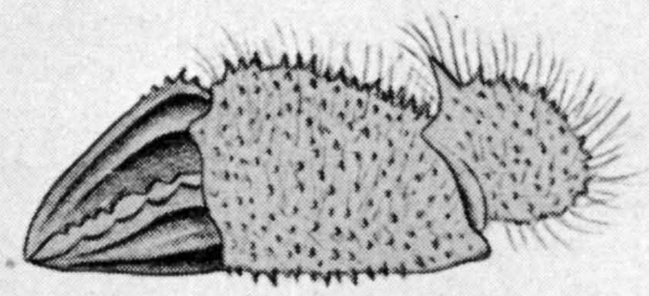

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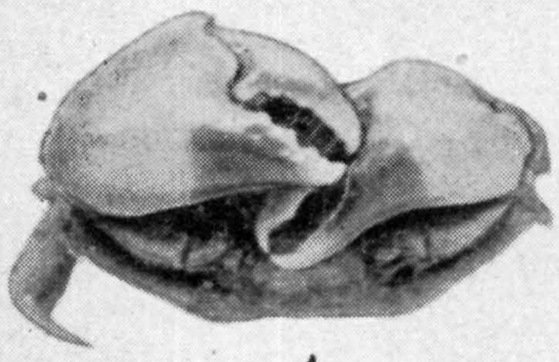

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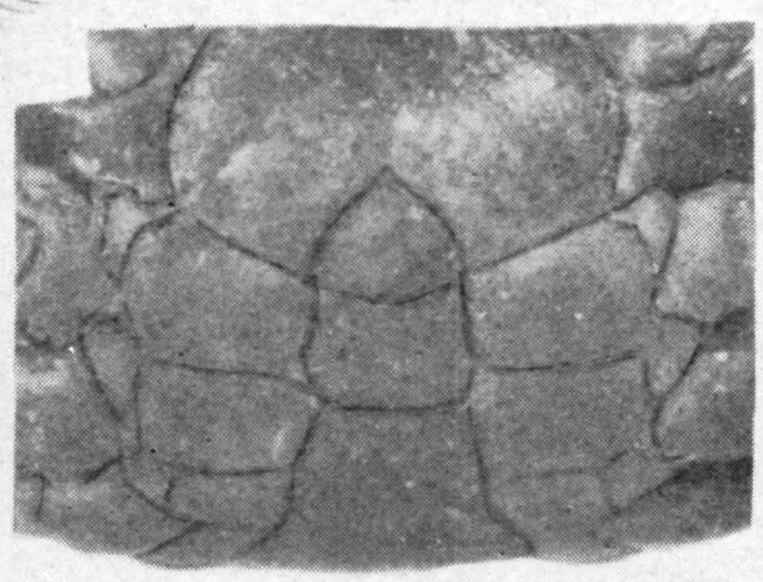

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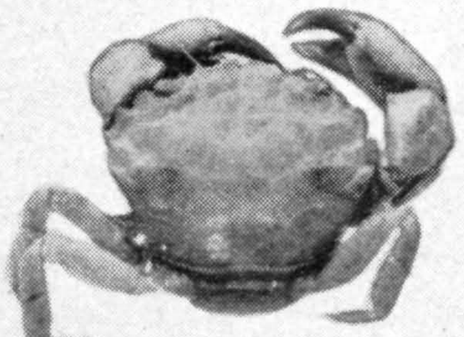

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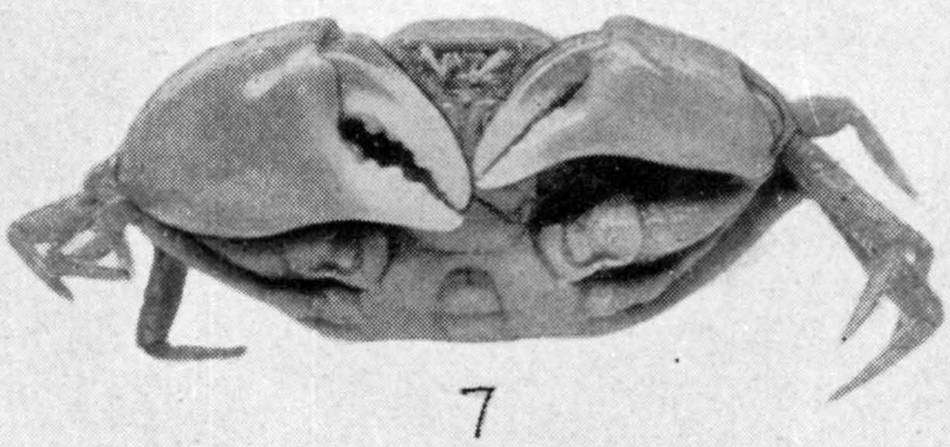

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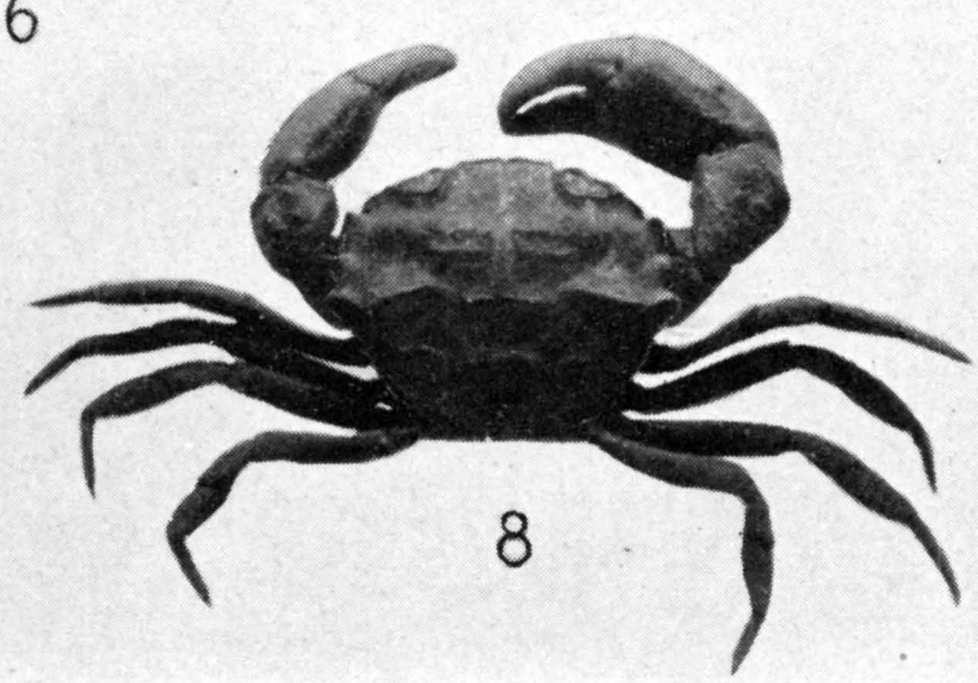
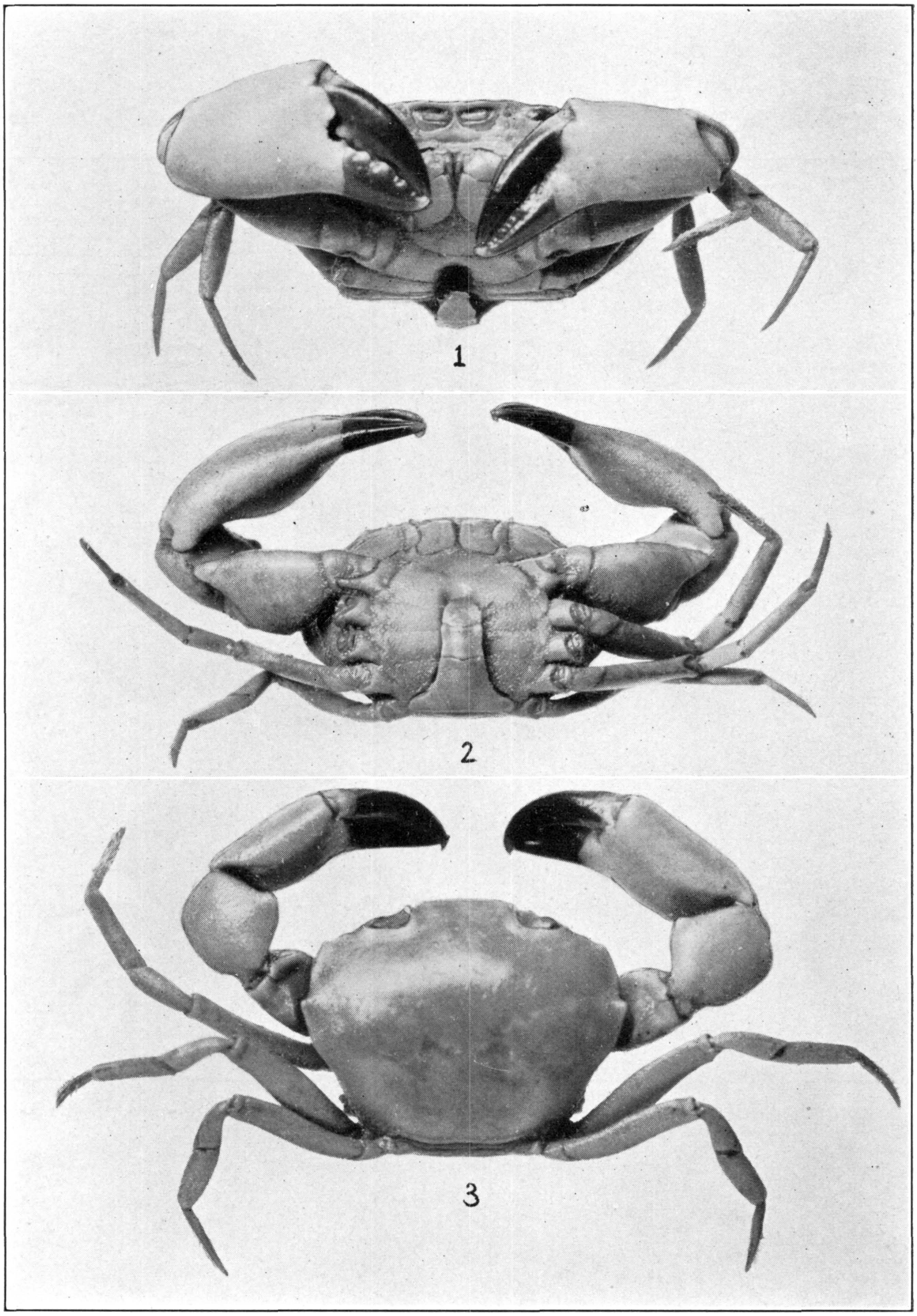


8

1–3. MICROPANOPE URINATOR (P. 451). 4–6. M. CRISTIMANUS (P. 454). 7–8. RHITHROPANOPEUS HARRISII (P. 456)

FOR EXPLANATION OF PLATE SEE PAGE 586.



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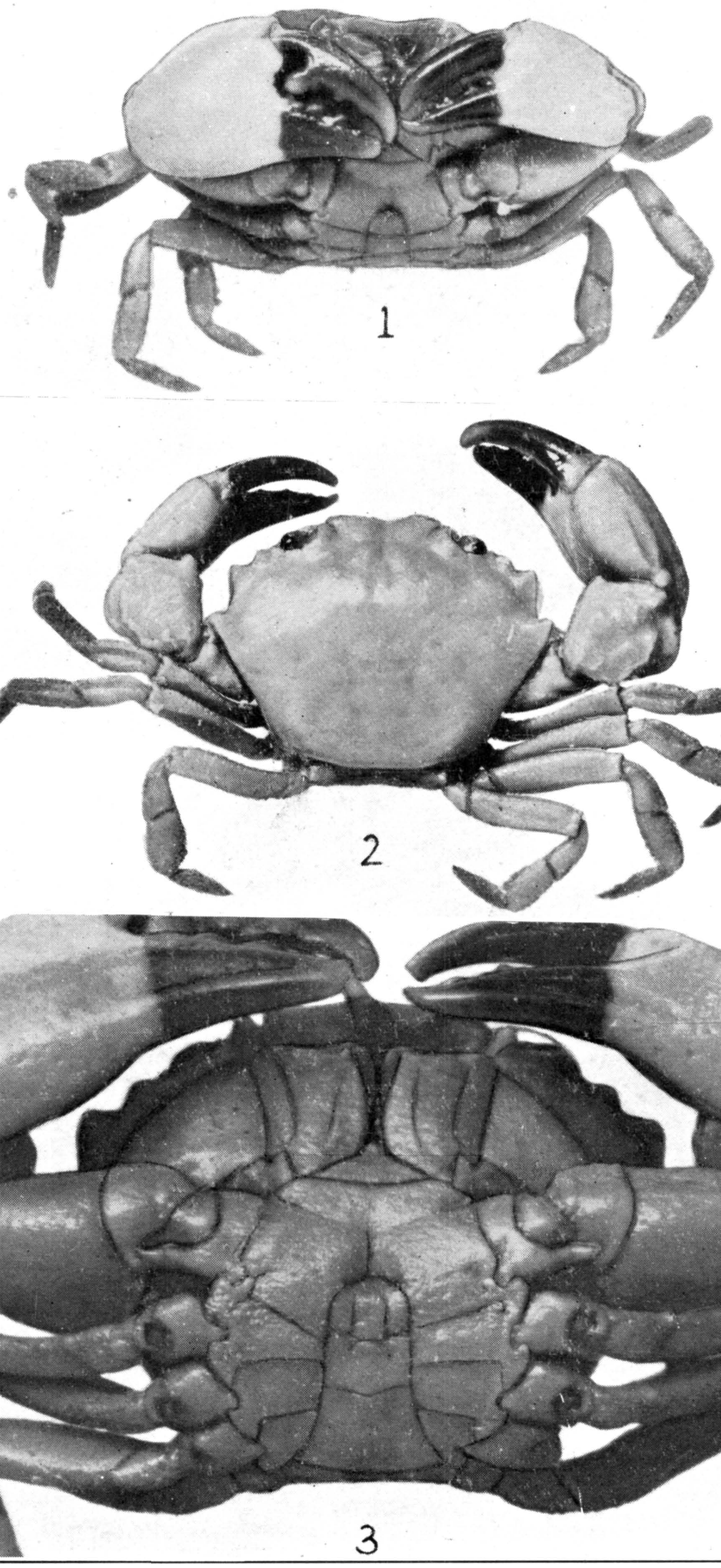
3

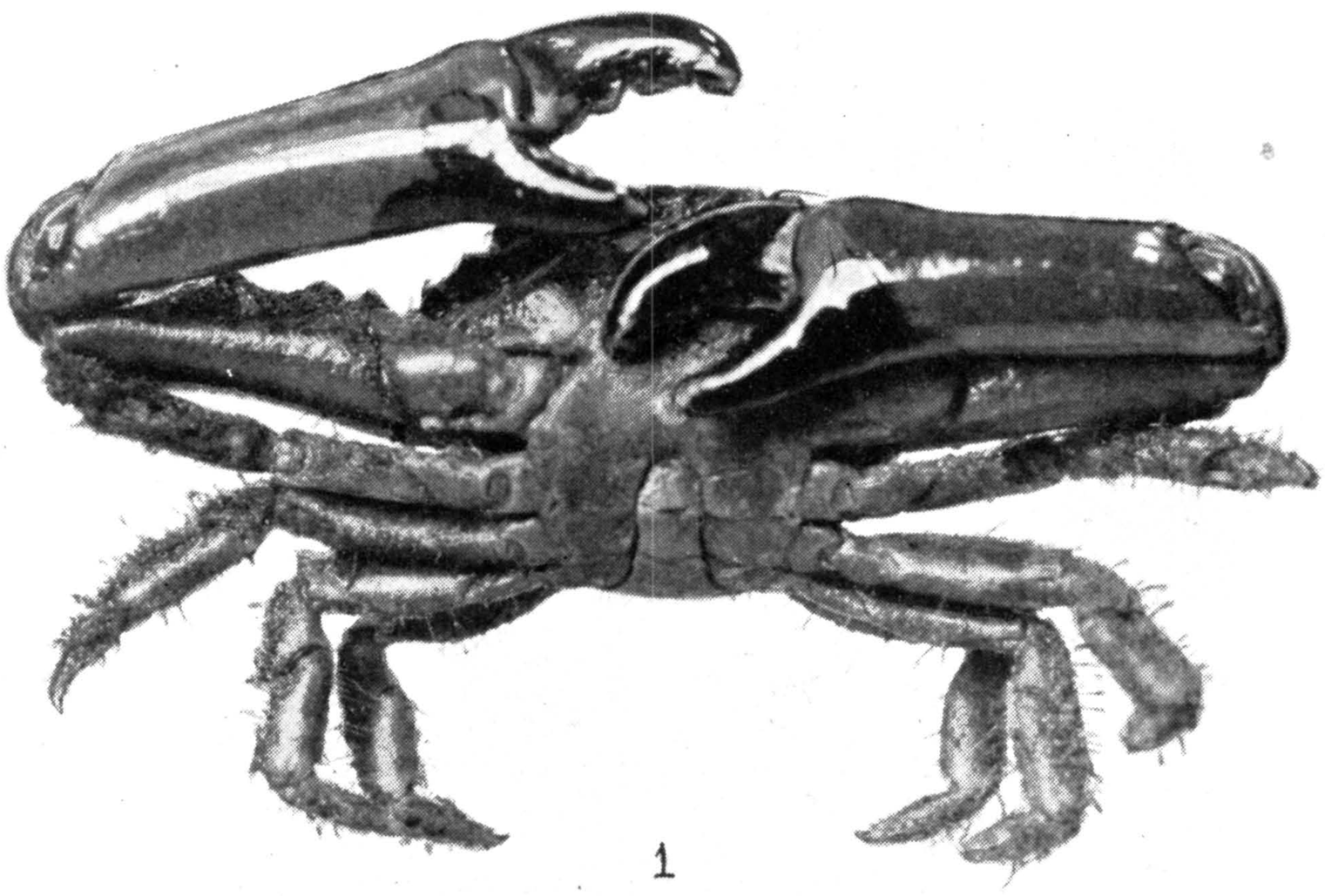
TETRAXANTHUS BIDENTATUS (P. 458)

FOR EXPLANATION OF PLATE SEE PAGE 586.



TETRAXANTHUS RUGOSUS (P. 459)

FOR EXPLANATION OF PLATE SEE PAGE 586.



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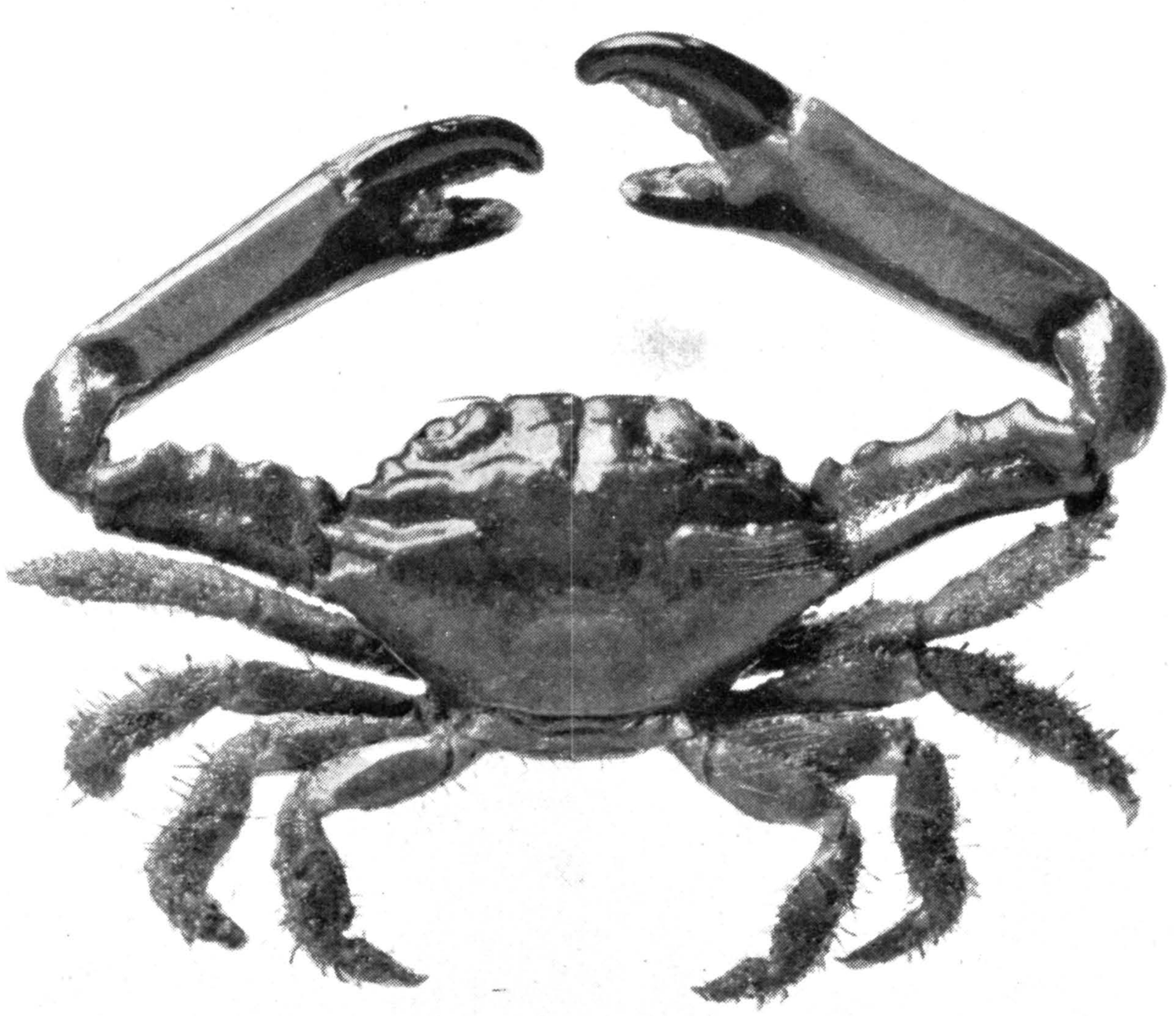

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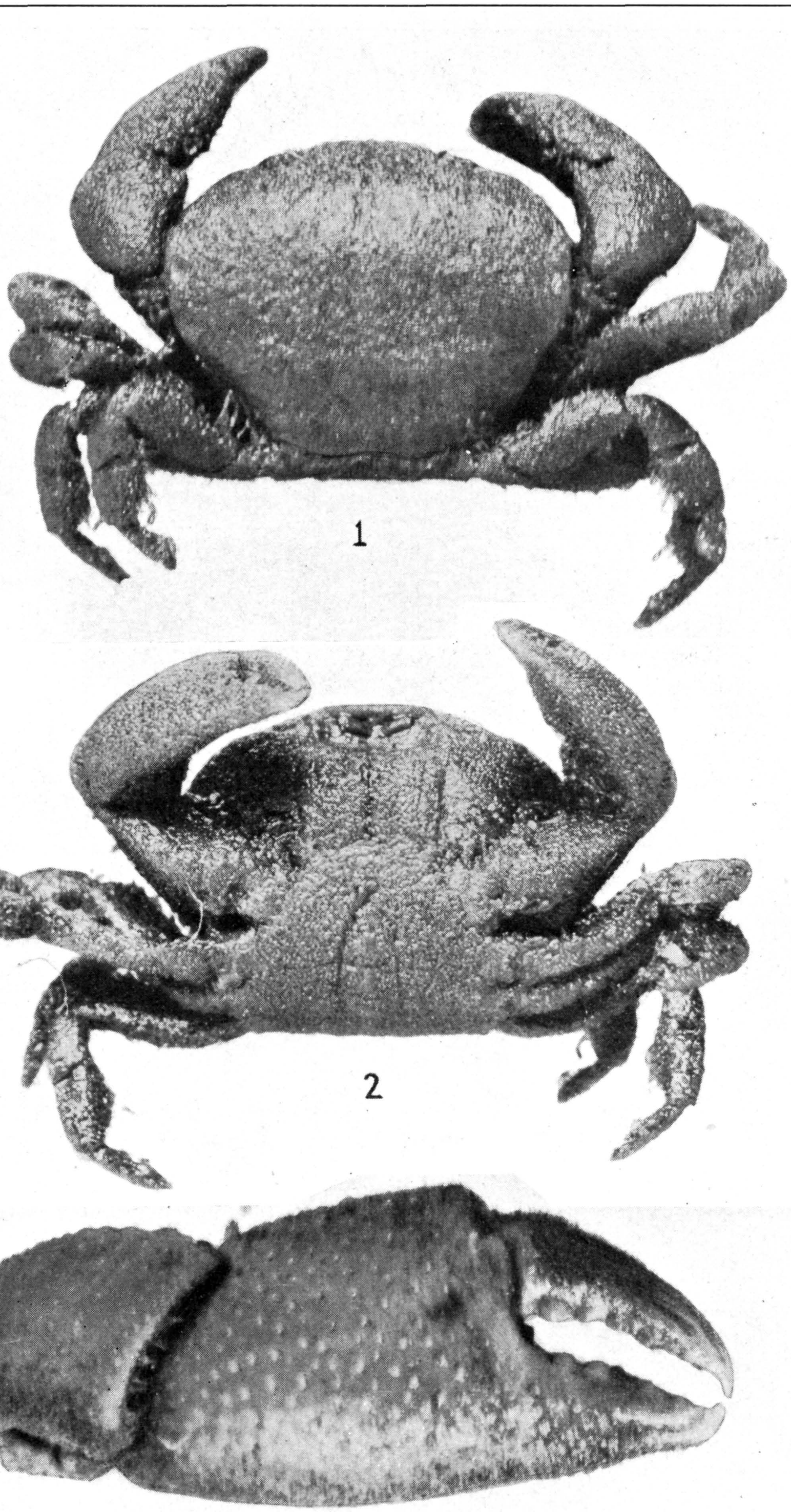
CHLORODIELLA LONGIMANA (P. 462)

FOR EXPLANATION OF PLATE SEE PAGE 587.



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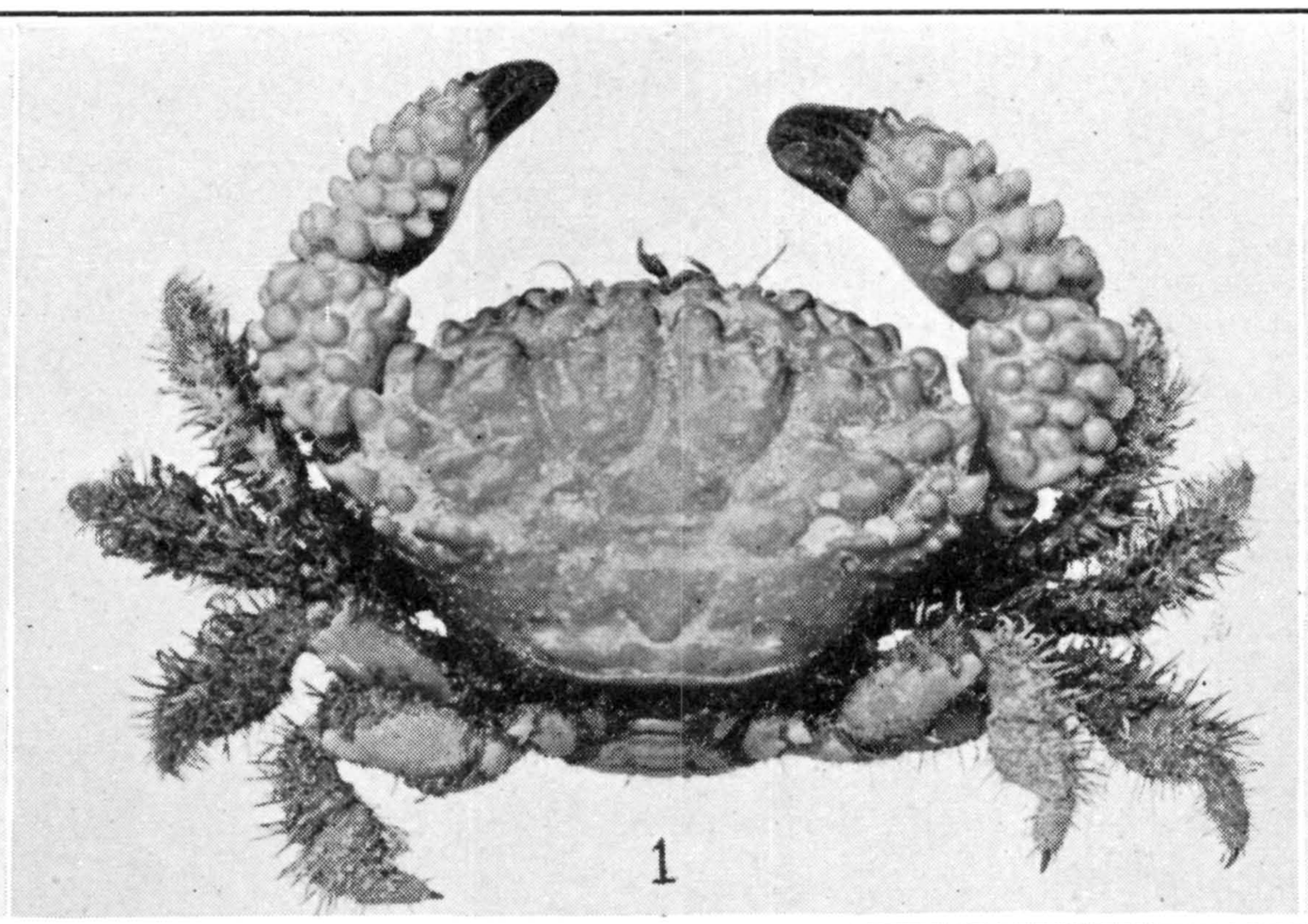
XANTHIAS INORNATUS (P. 464)

FOR EXPLANATION OF PLATE SEE PAGE 587.



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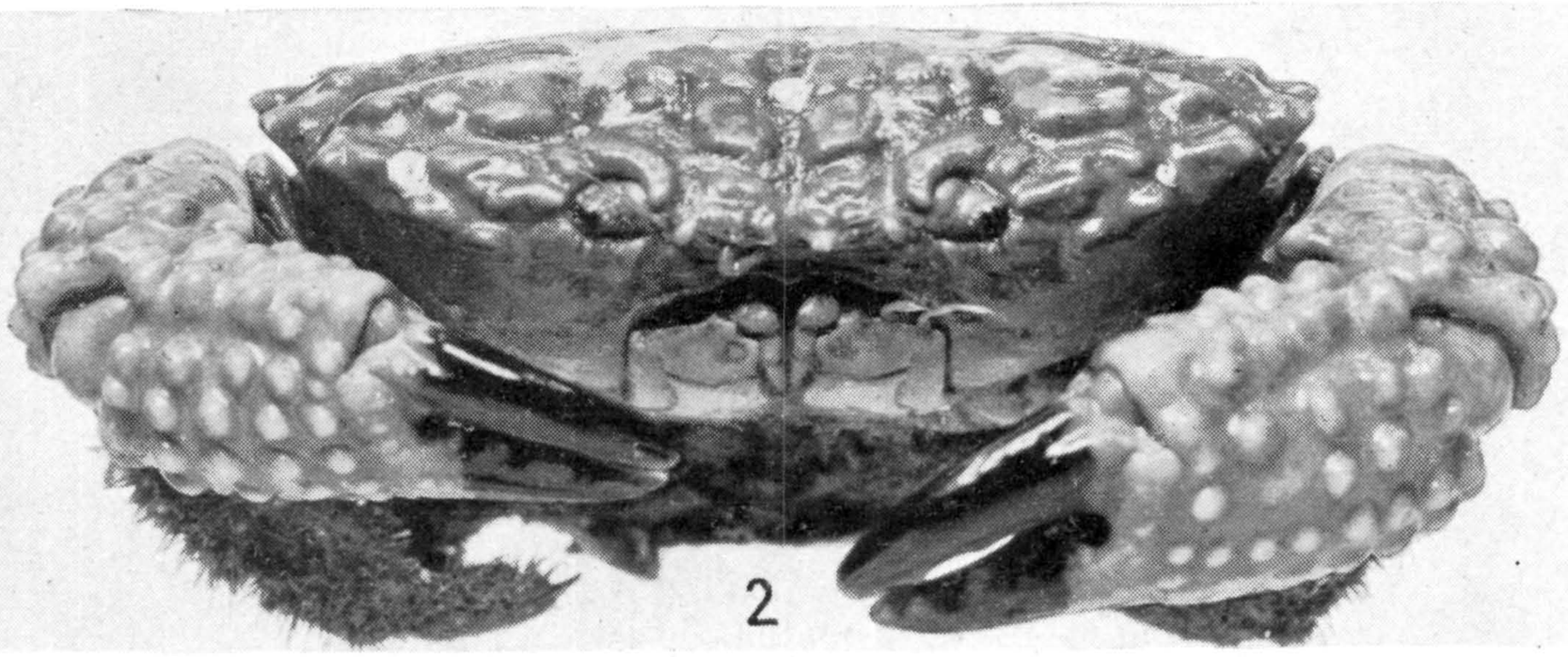

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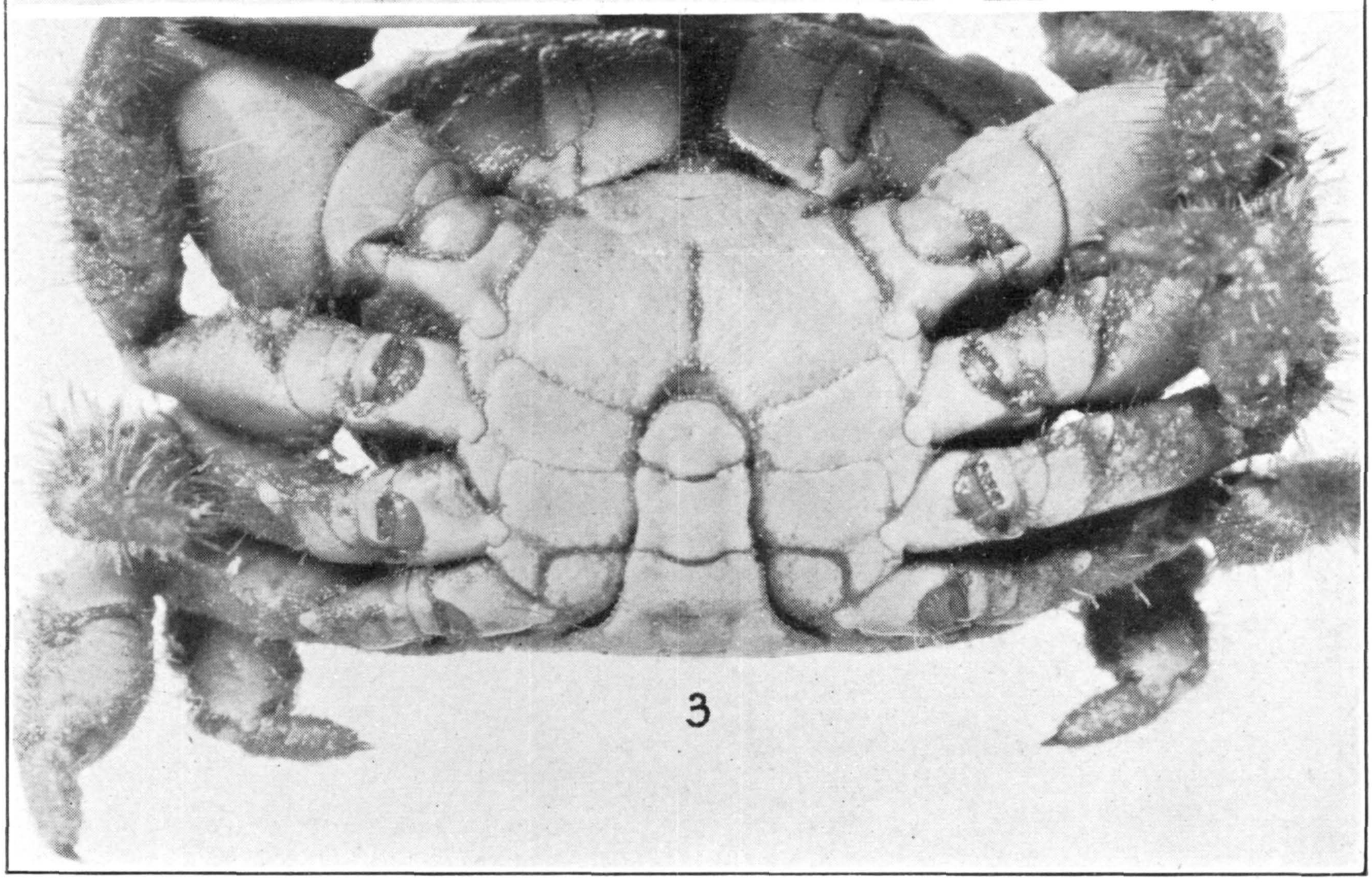

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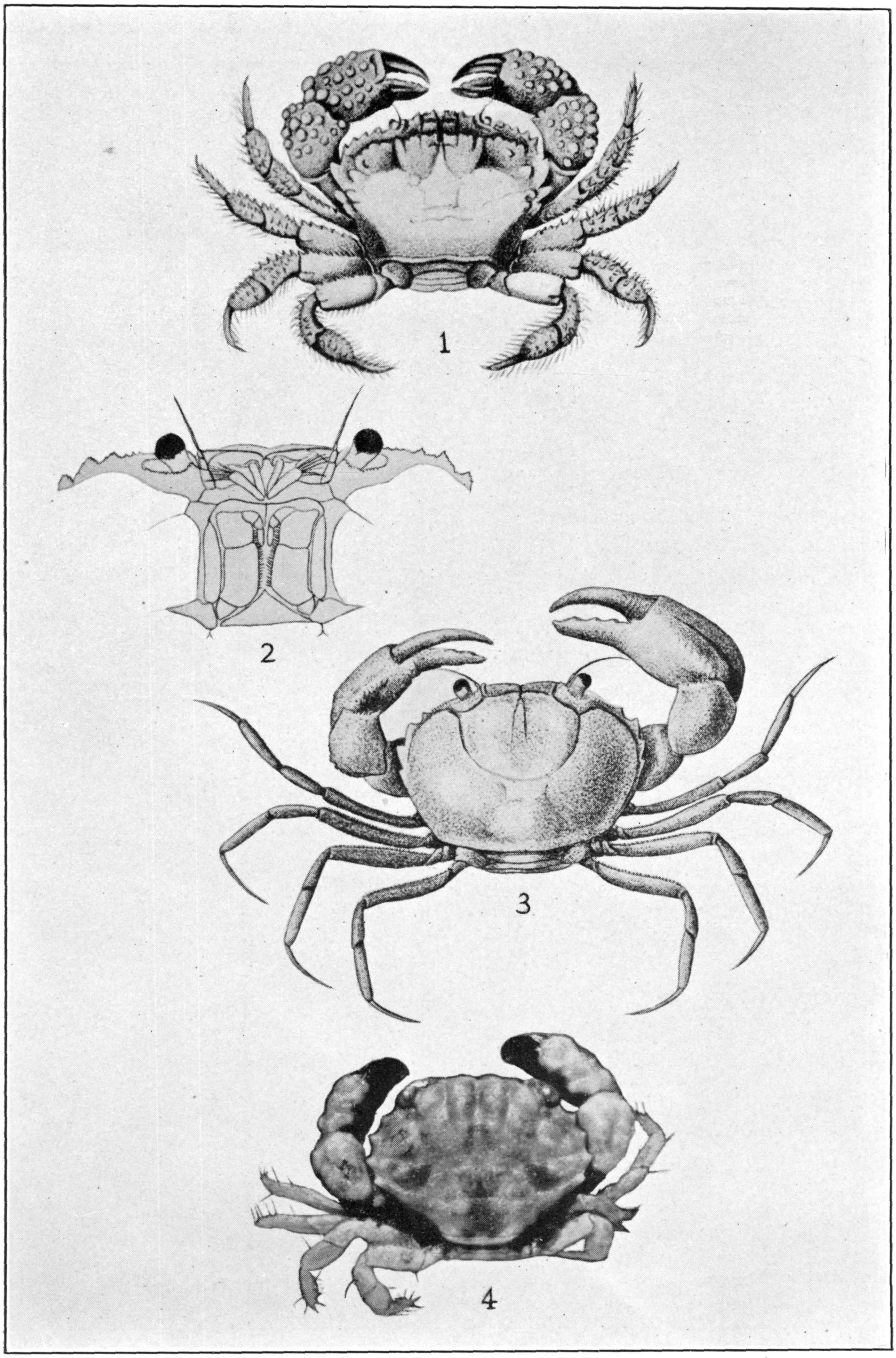
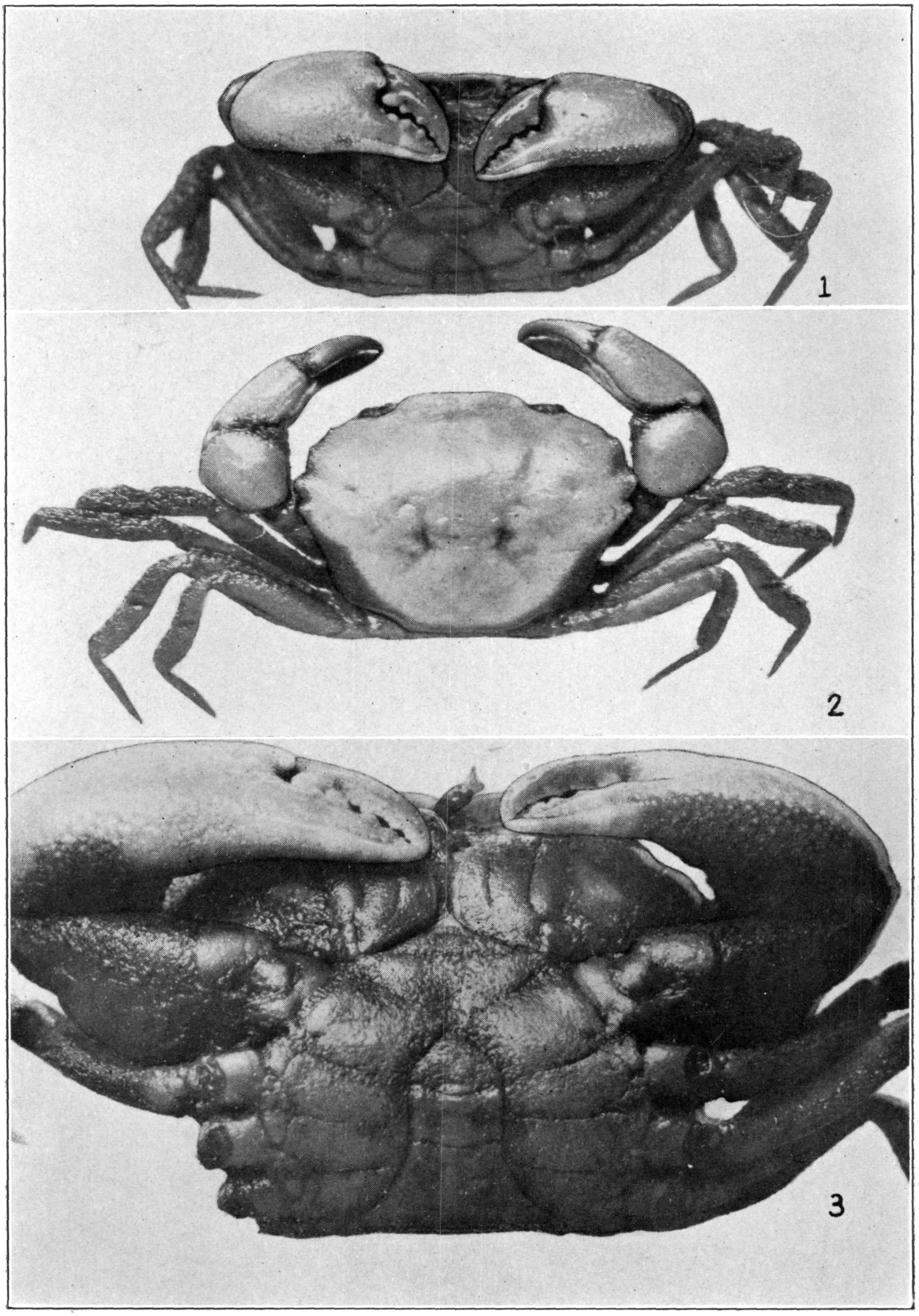
PARAXANTHIAS TAYLORI (P. 466)

FOR EXPLANATION OF PLATE SEE PAGE 587.



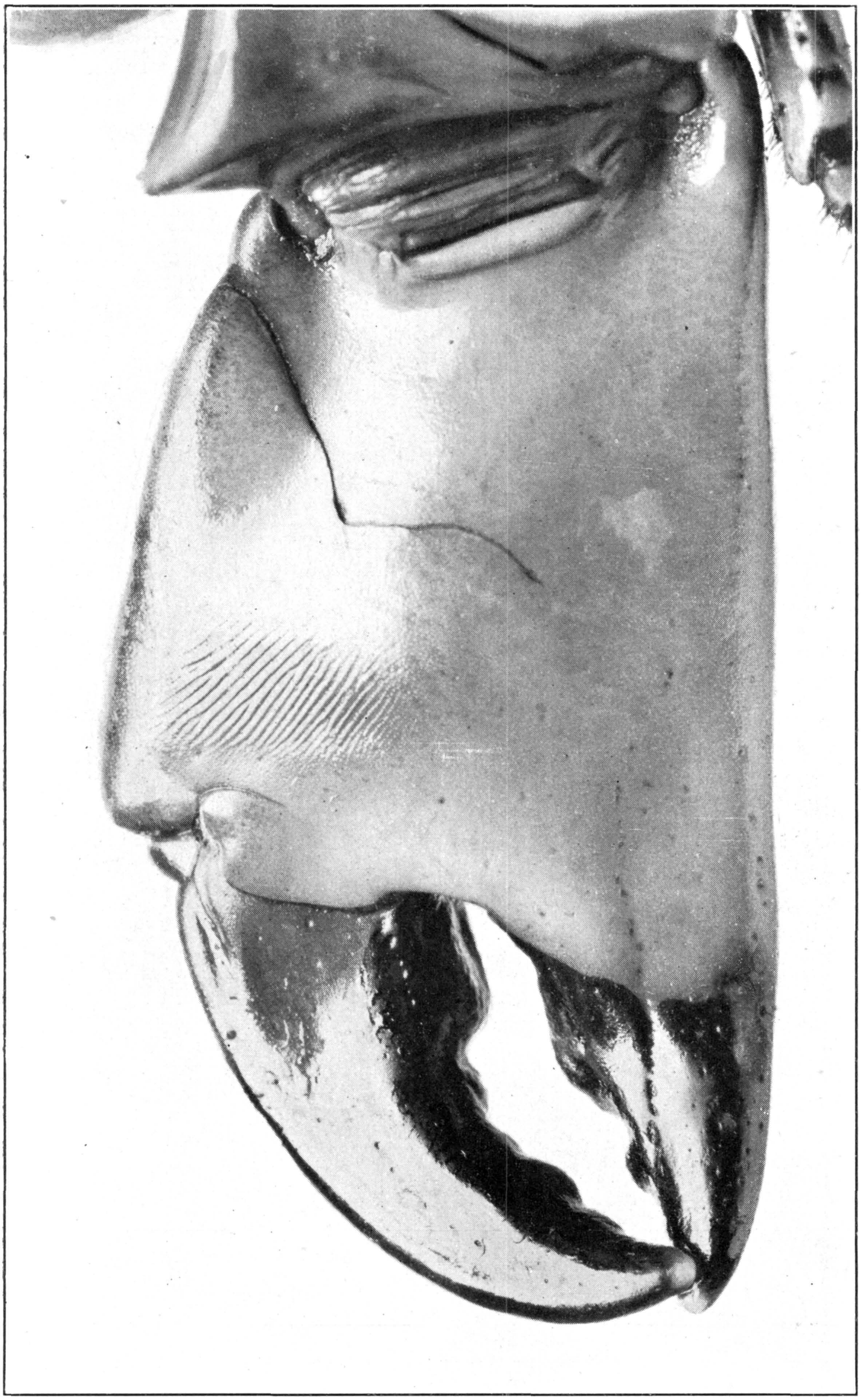
1. PARAXANTHIAS TAYLORI (P. 466). 2, 3. P. SULCATUS (P. 469). 4. P. INSCULPTUS (P. 468)

FOR EXPLANATION OF PLATE SEE PAGE 587.



EUCRATODES AGASSIZII (P. 471)

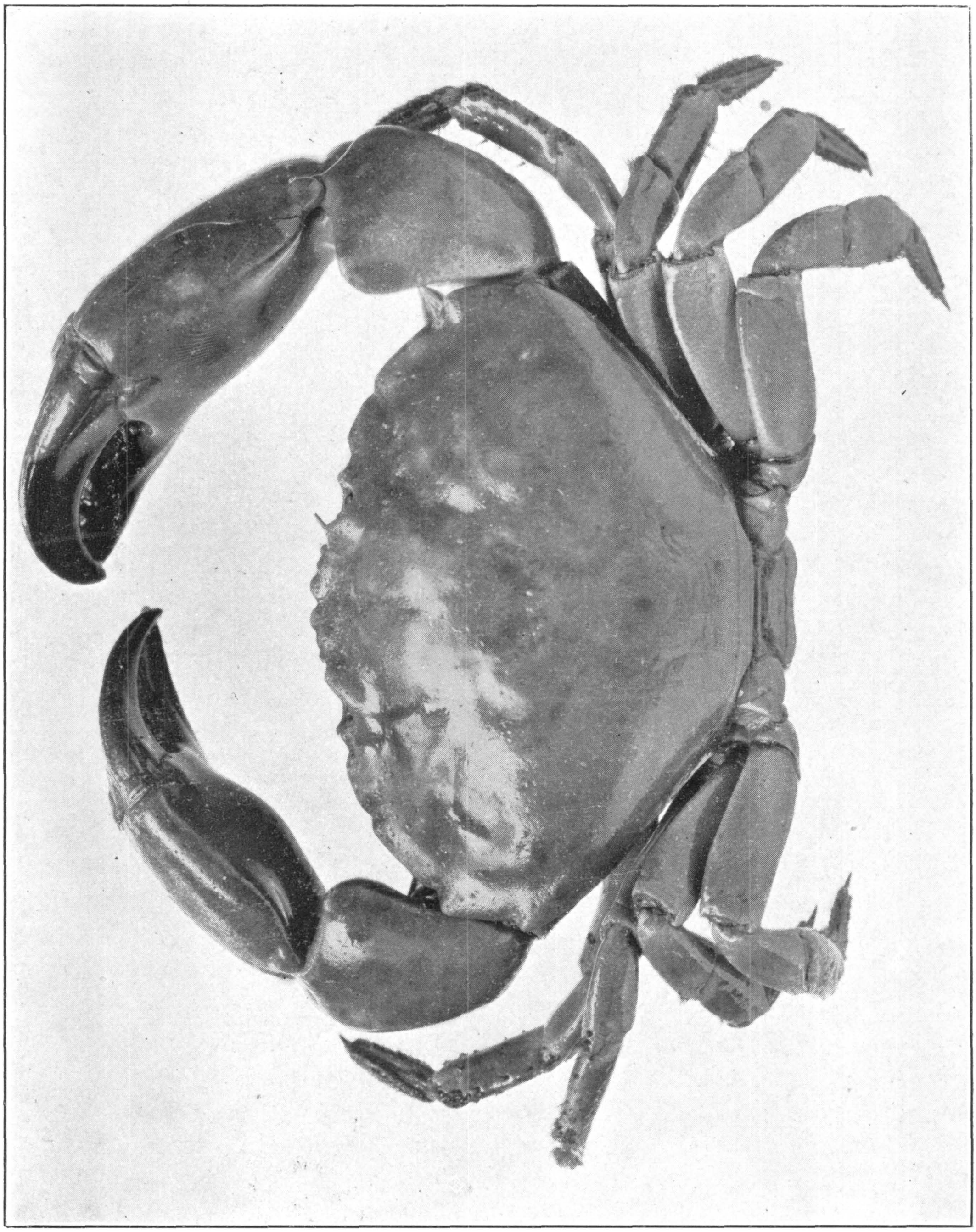
FOR EXPLANATION OF PLATE SEE PAGE 587



MENIPPE MERCENARIA (P. 472)

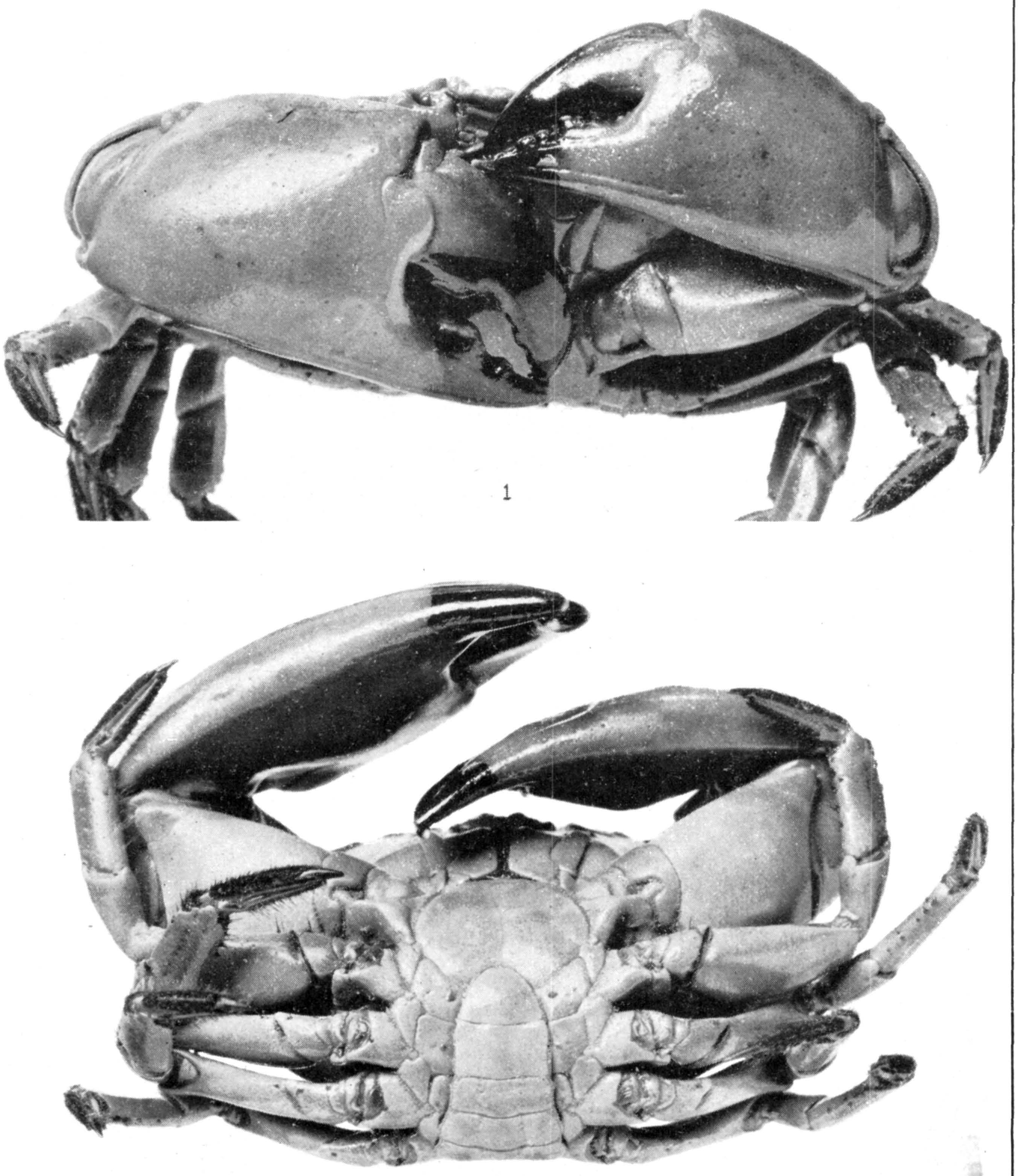
FOR EXPLANATION OF PLATE SEE PAGE 587.

79856—30——51



MENIPPE MERCENARIA (P. 472)

FOR EXPLANATION OF PLATE SEE PAGE 587



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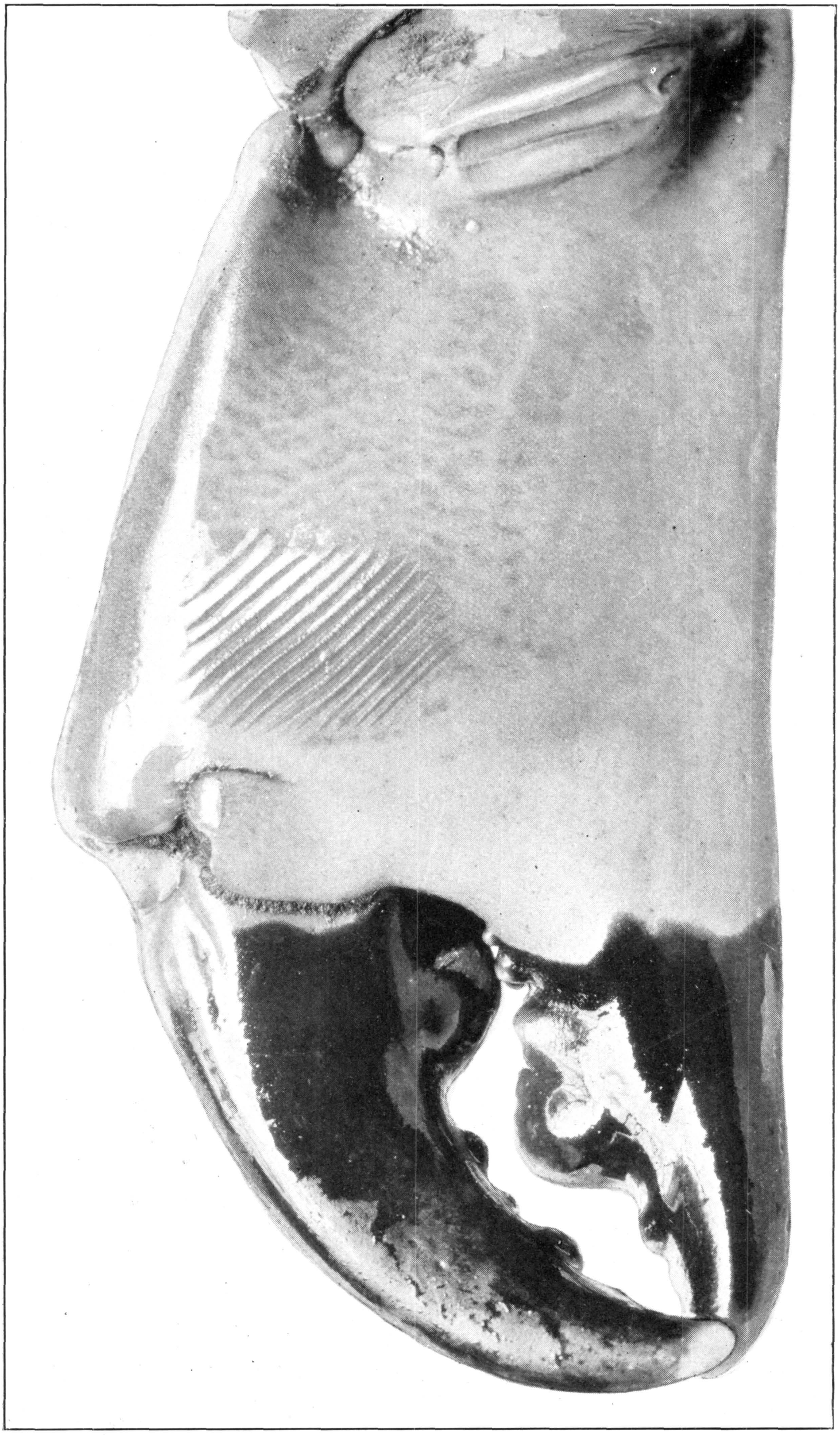
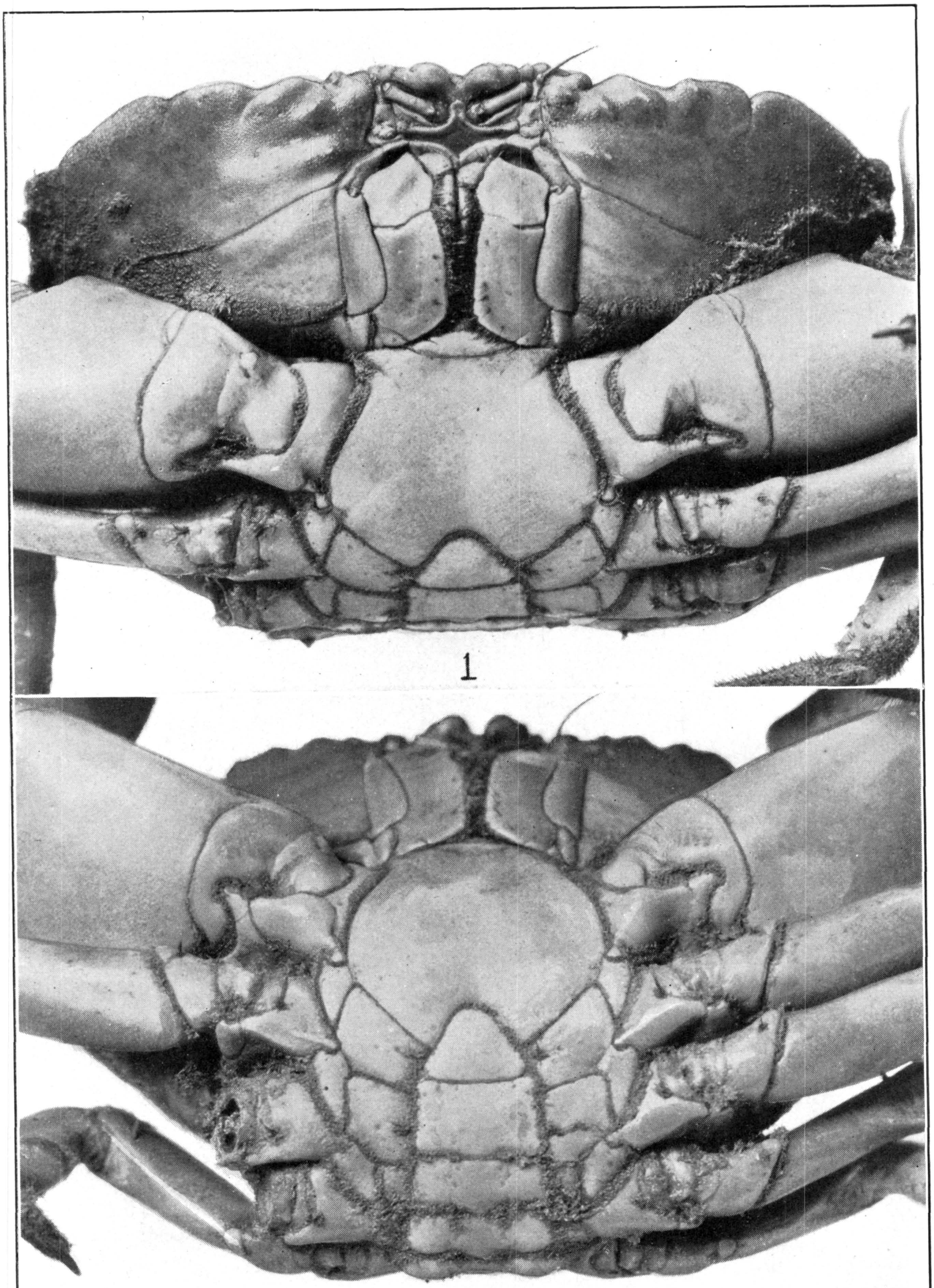
MENIPPE MERCENARIA (P. 472)

FOR EXPLANATION OF PLATE SEE PAGE 587.



MENIPPE FRONTALIS (P. 477)

FOR EXPLANATION OF PLATE SEE PAGE 587.



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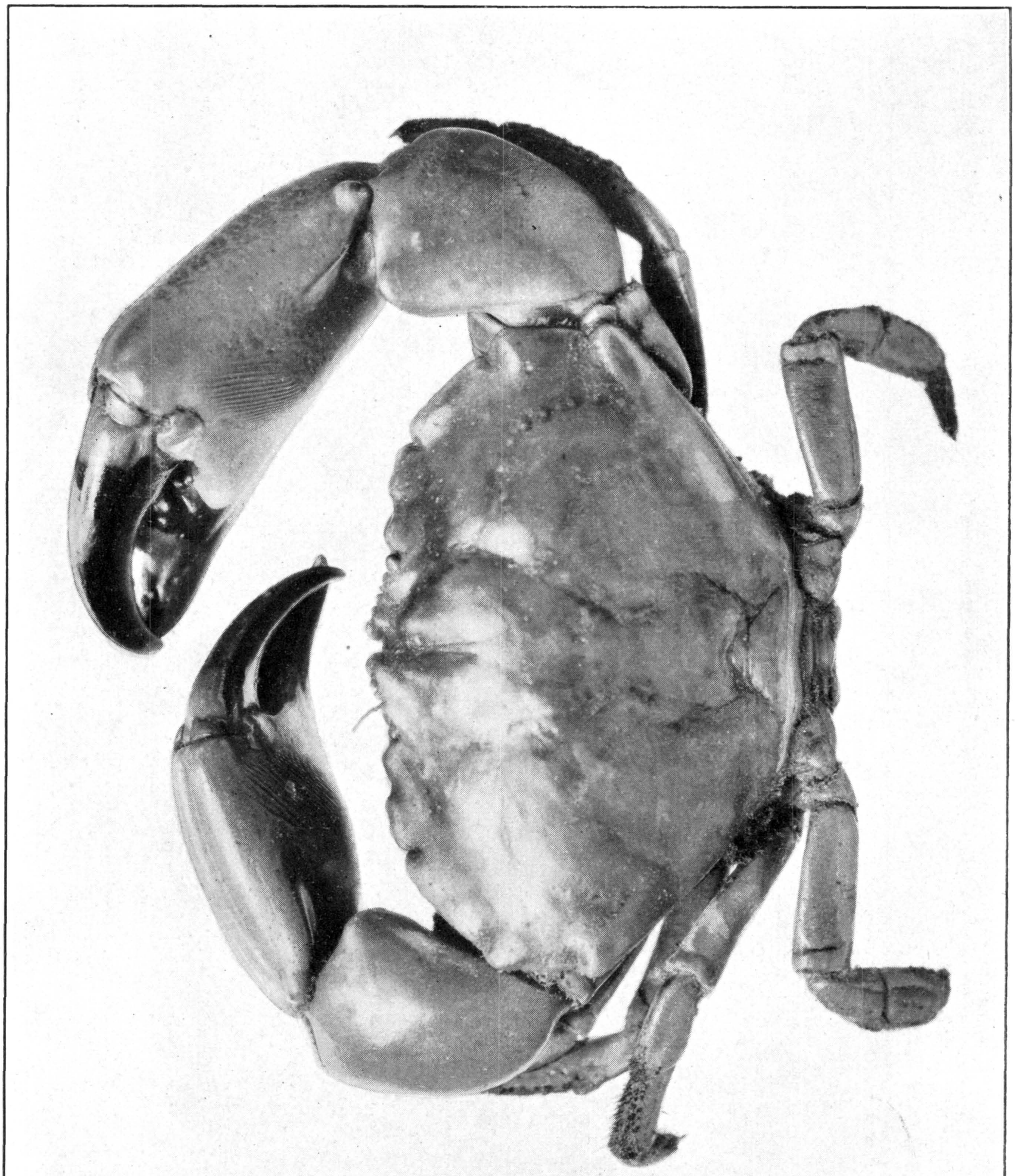
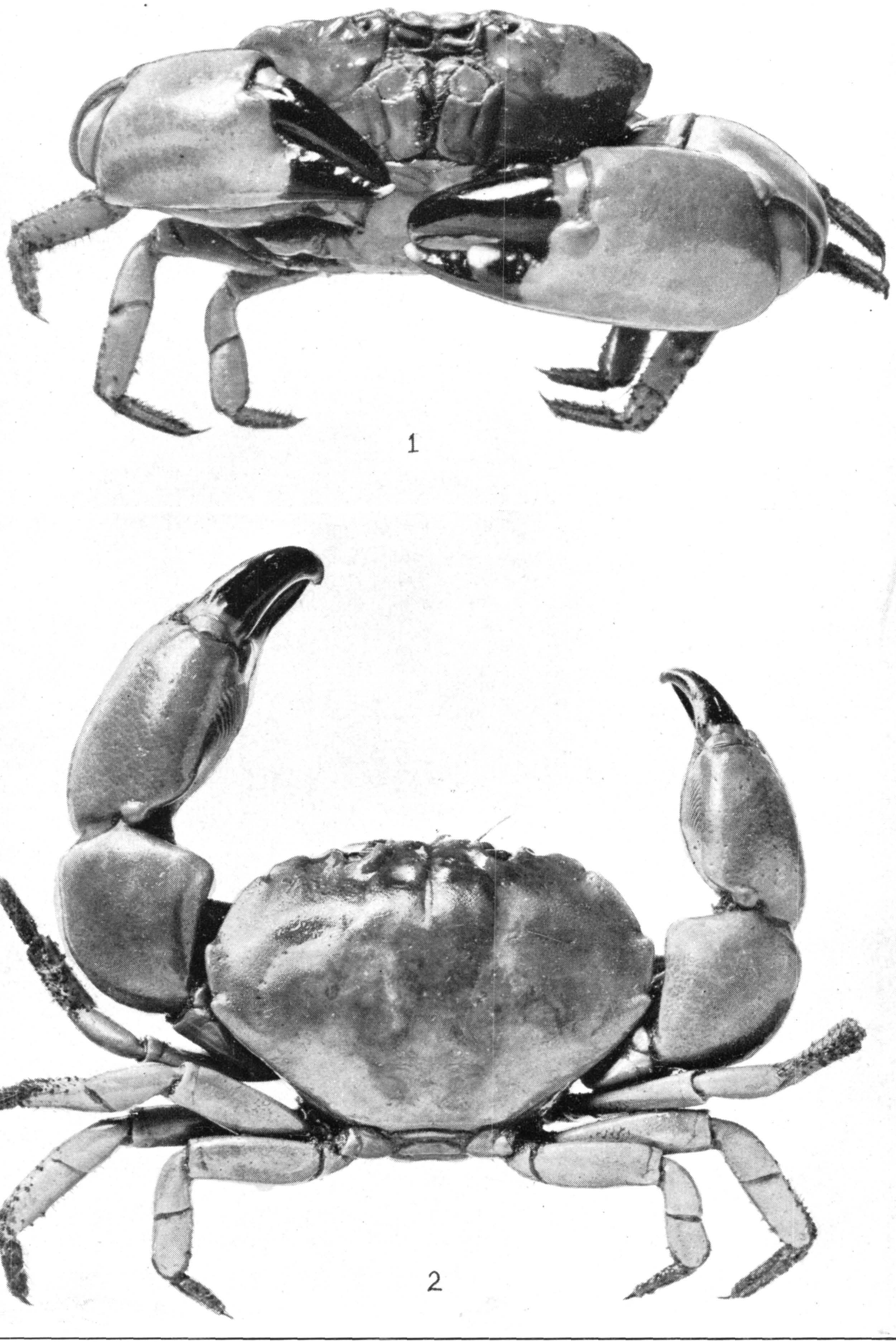
MENIPPE FRONTALIS (P. 477)

FOR EXPLANATION OF PLATE SEE PAGE 588.



MENIPPE FRONTALIS (P. 477)

FOR EXPLANATION OF PLATE SEE PAGE 588.



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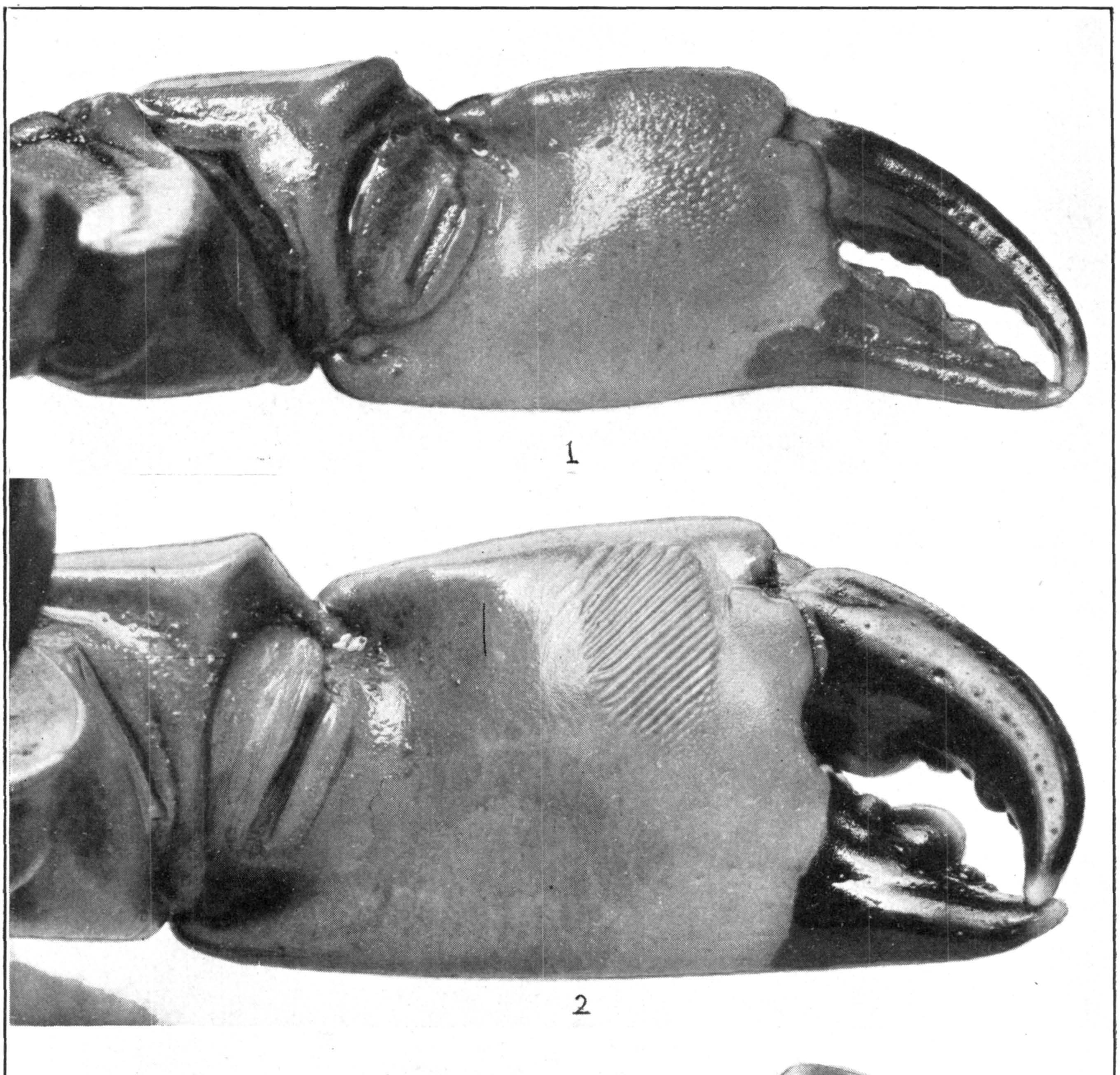
MENIPPE OBTUSA (P. 478)

FOR EXPLANATION OF PLATE SEE PAGE 588.



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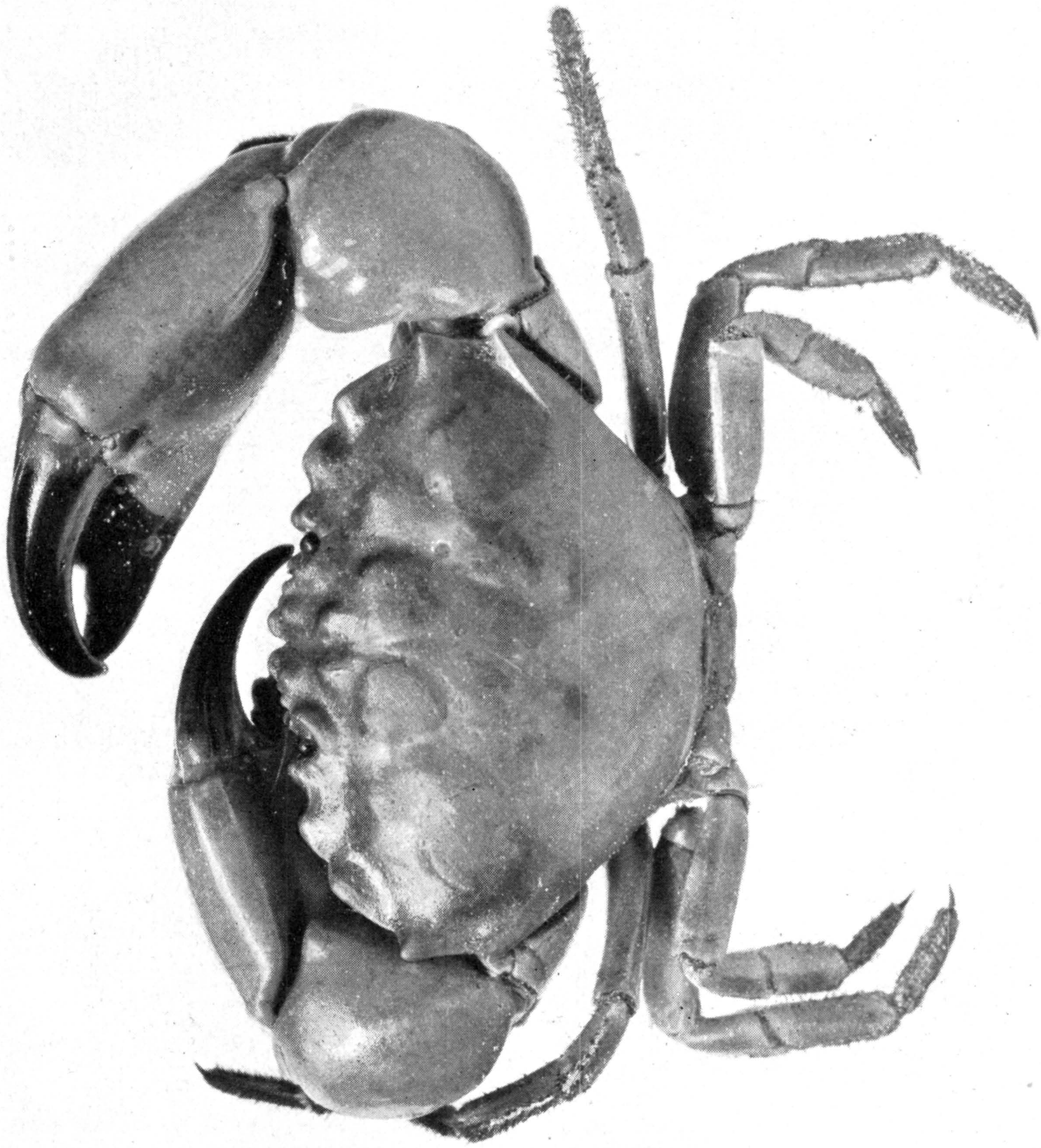
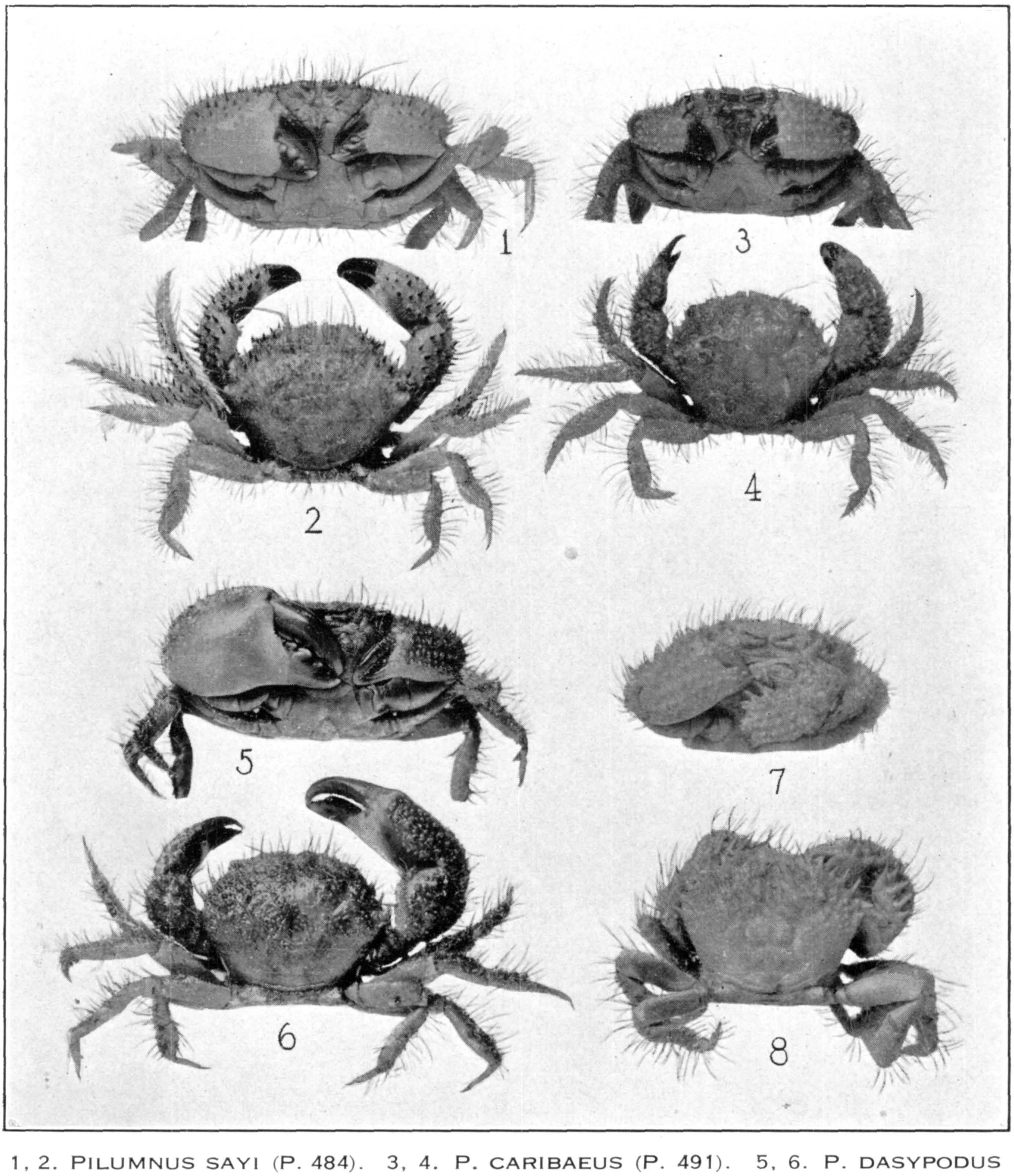
1, 2. MENIPPE OBTUSA (P. 478). 3. M. NODIFRONS (P. 479)

FOR EXPLANATION OF PLATE SEE PAGE 588.



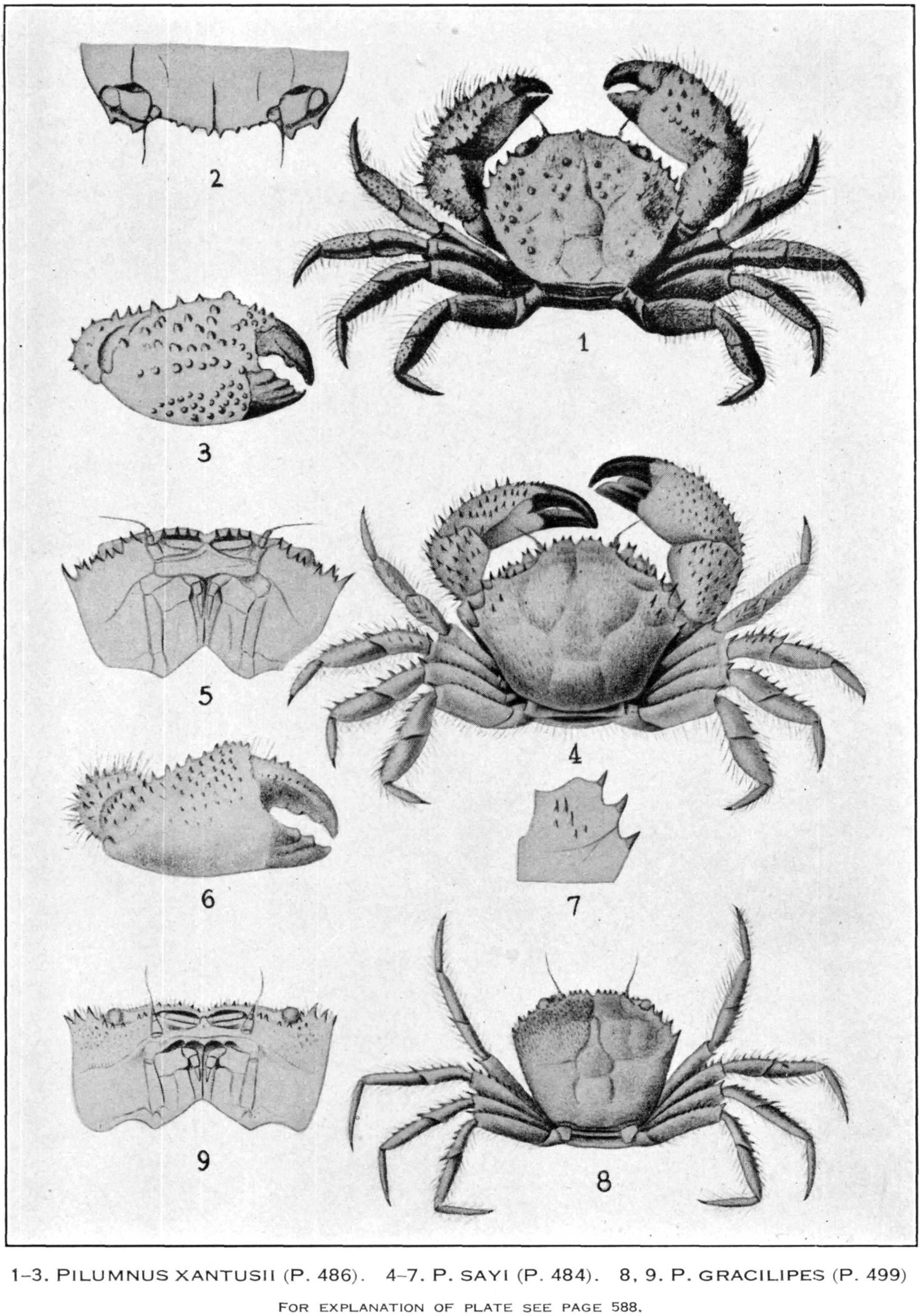
MENIPPE NODIFRONS (P. 479)

FOR EXPLANATION OF PLATE SEE PAGE 588.



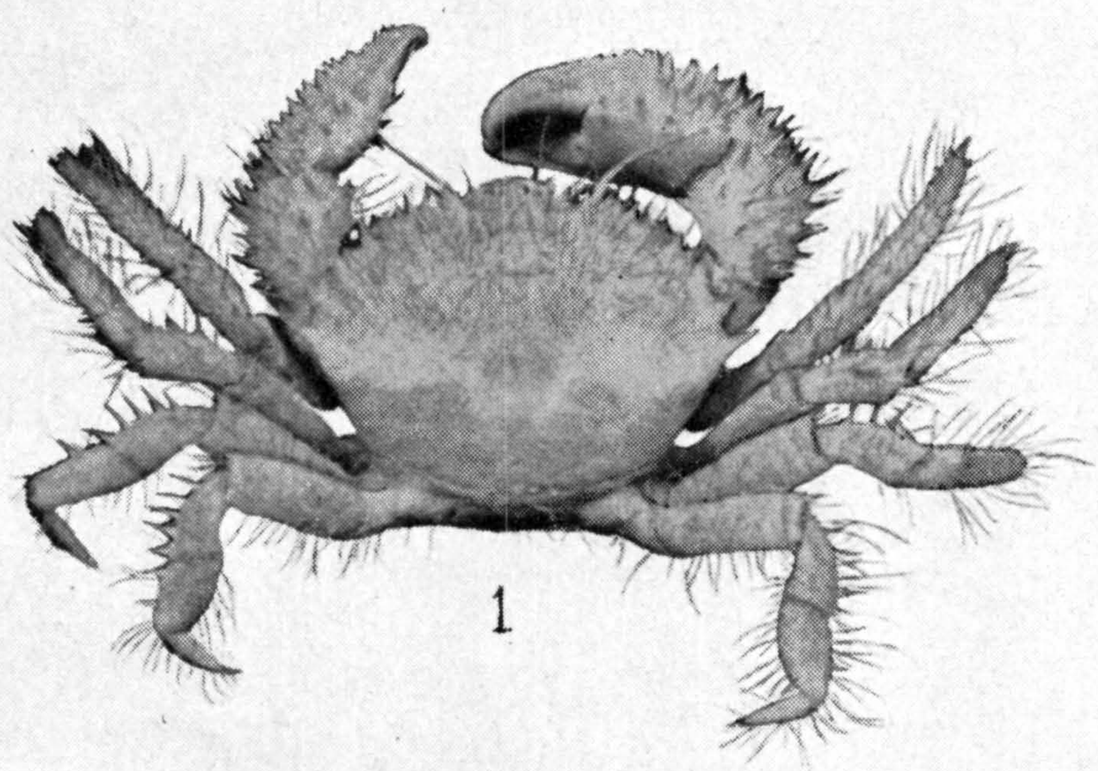
1, 2. PILUMNUS SAYI (P. 484). 3, 4. P. CARIBAEUS (P. 491). 5, 6. P. DASYPODUS (P. 493). 7, 8. P. SPINOSISSIMUS (P. 494)

FOR EXPLANATION OF PLATE SEE PAGE 588.



1–3. PILUMNUS XANTUSII (P. 486). 4–7. P. SAYI (P. 484). 8, 9. P. GRACILIPES (P. 499)

FOR EXPLANATION OF PLATE SEE PAGE 588.



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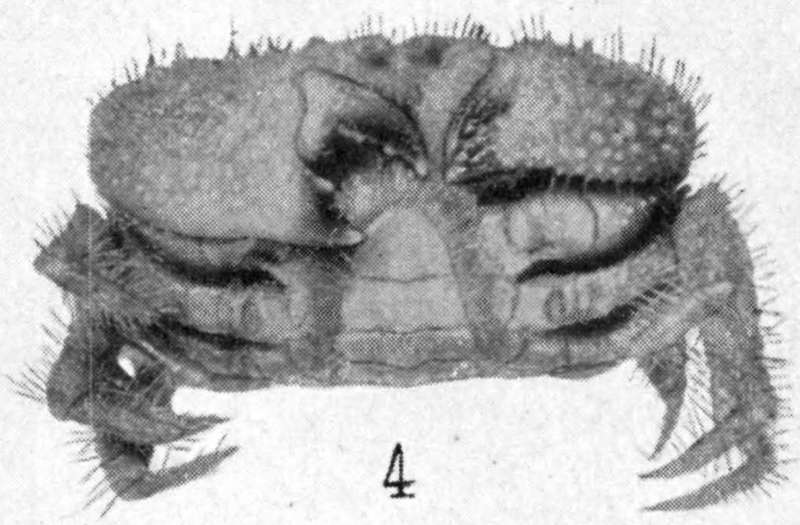

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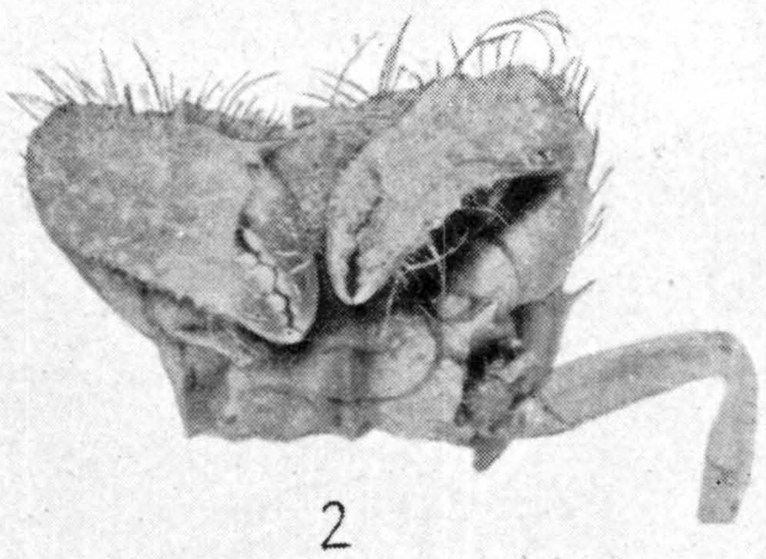

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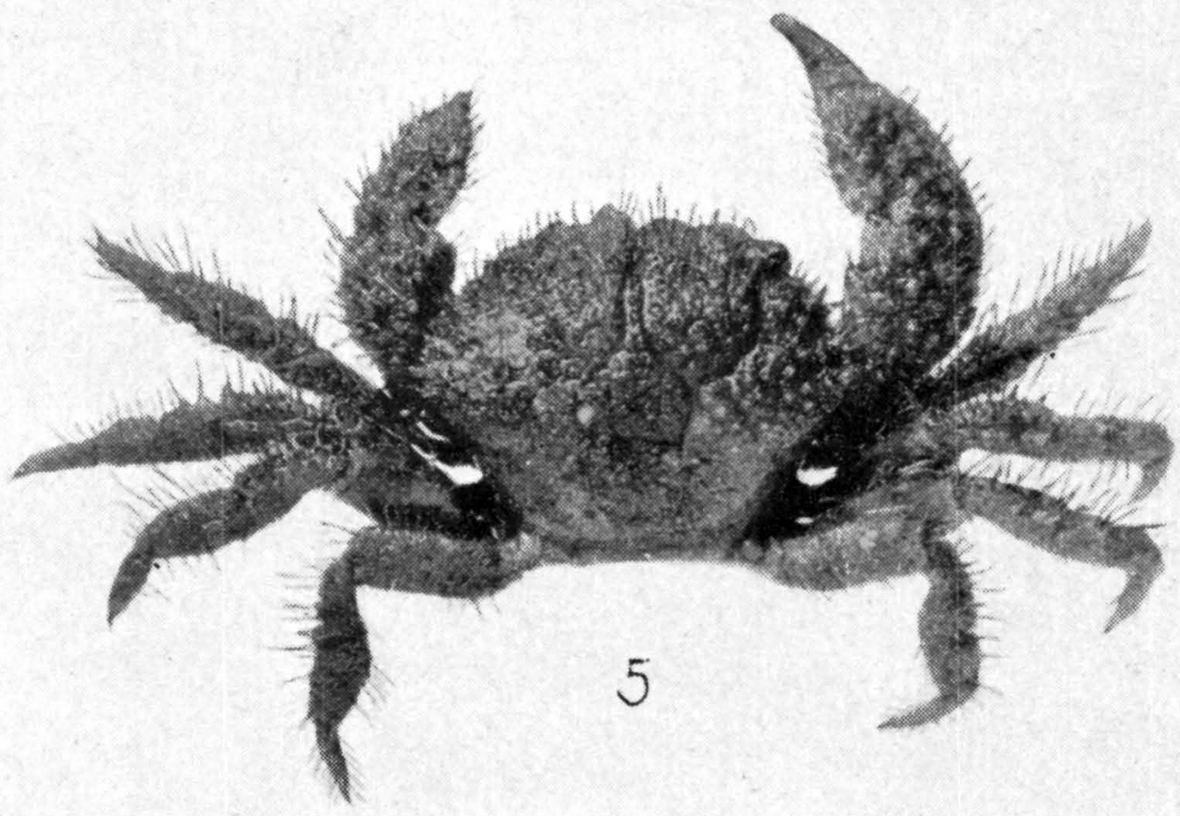

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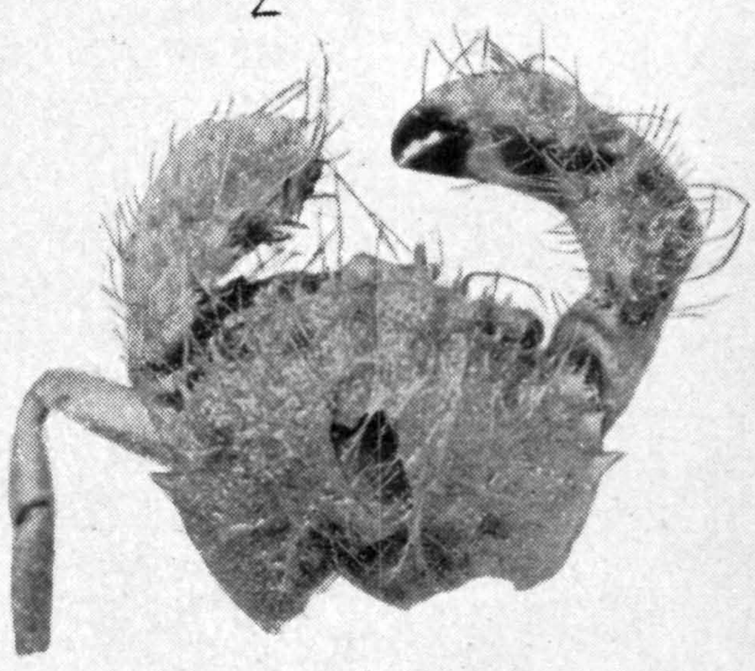
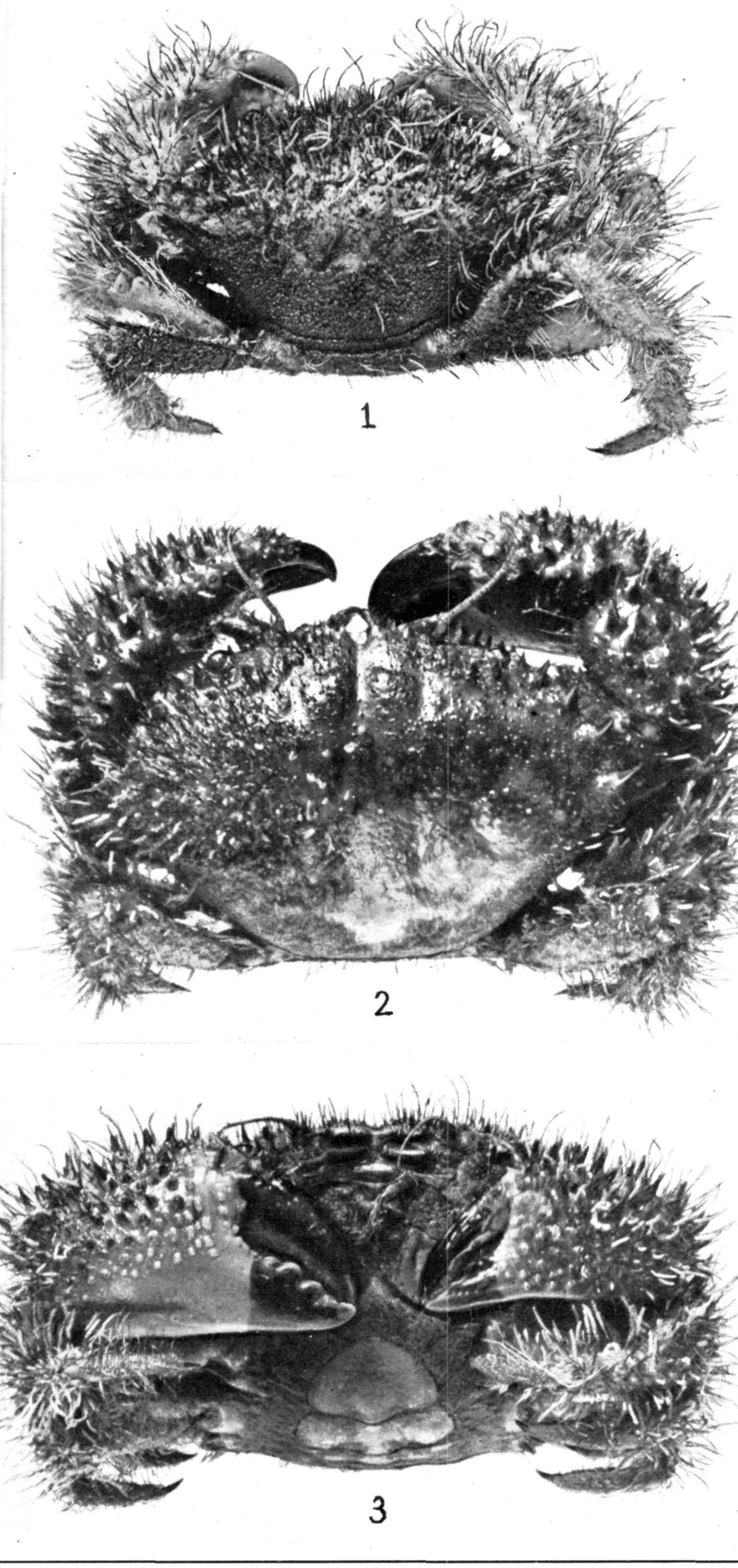


3

1. PILUMNUS TOWNSENDI (P. 504). 2, 3. P. DIOMEDEAE (P. 501). 4, 5. P. LONGLEYI (P. 502)

FOR EXPLANATION OF PLATE SEE PAGE 589.



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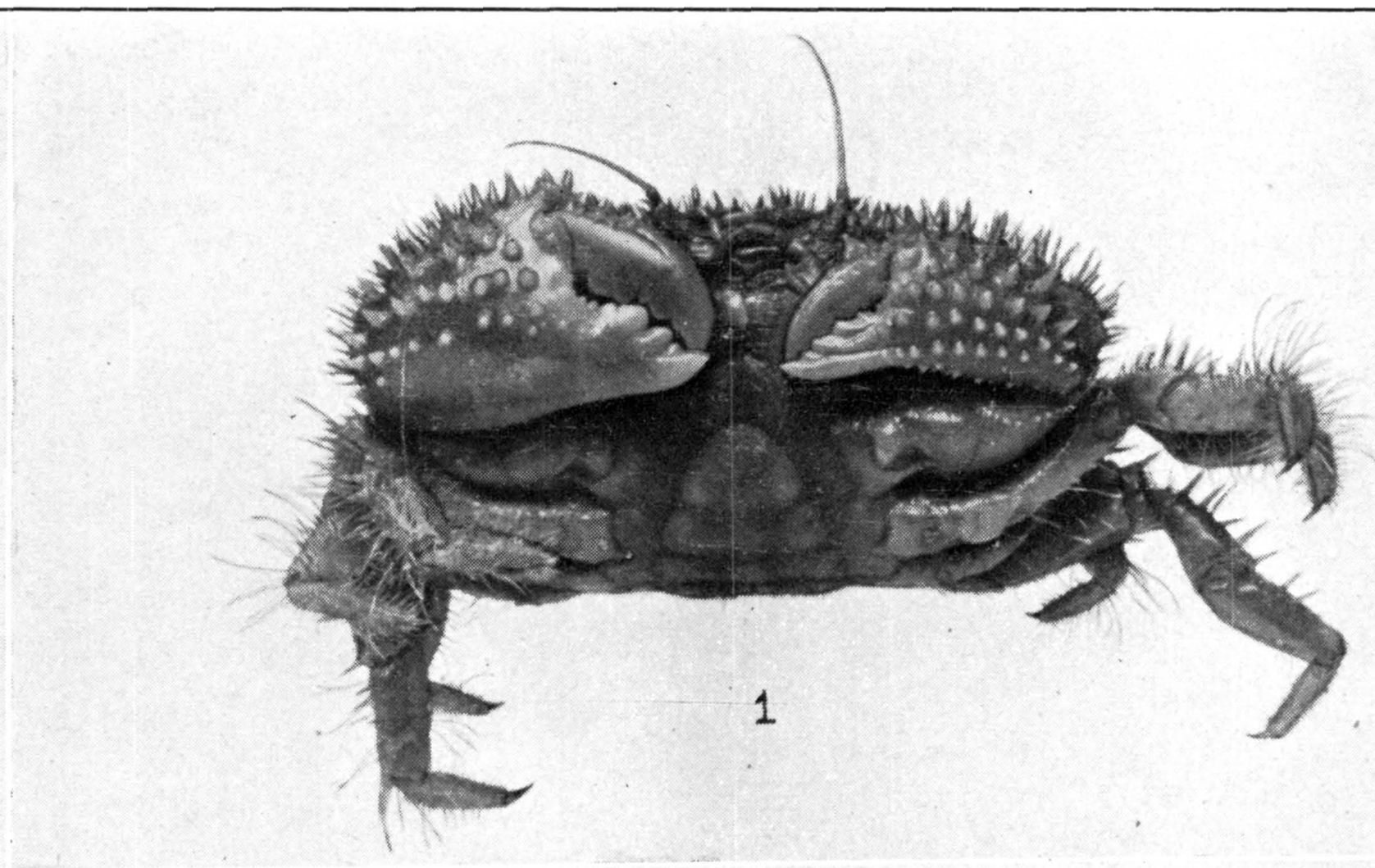
PILUMNUS SPINOHIRSUTUS (P. 503)

FOR EXPLANATION OF PLATE SEE PAGE 589.



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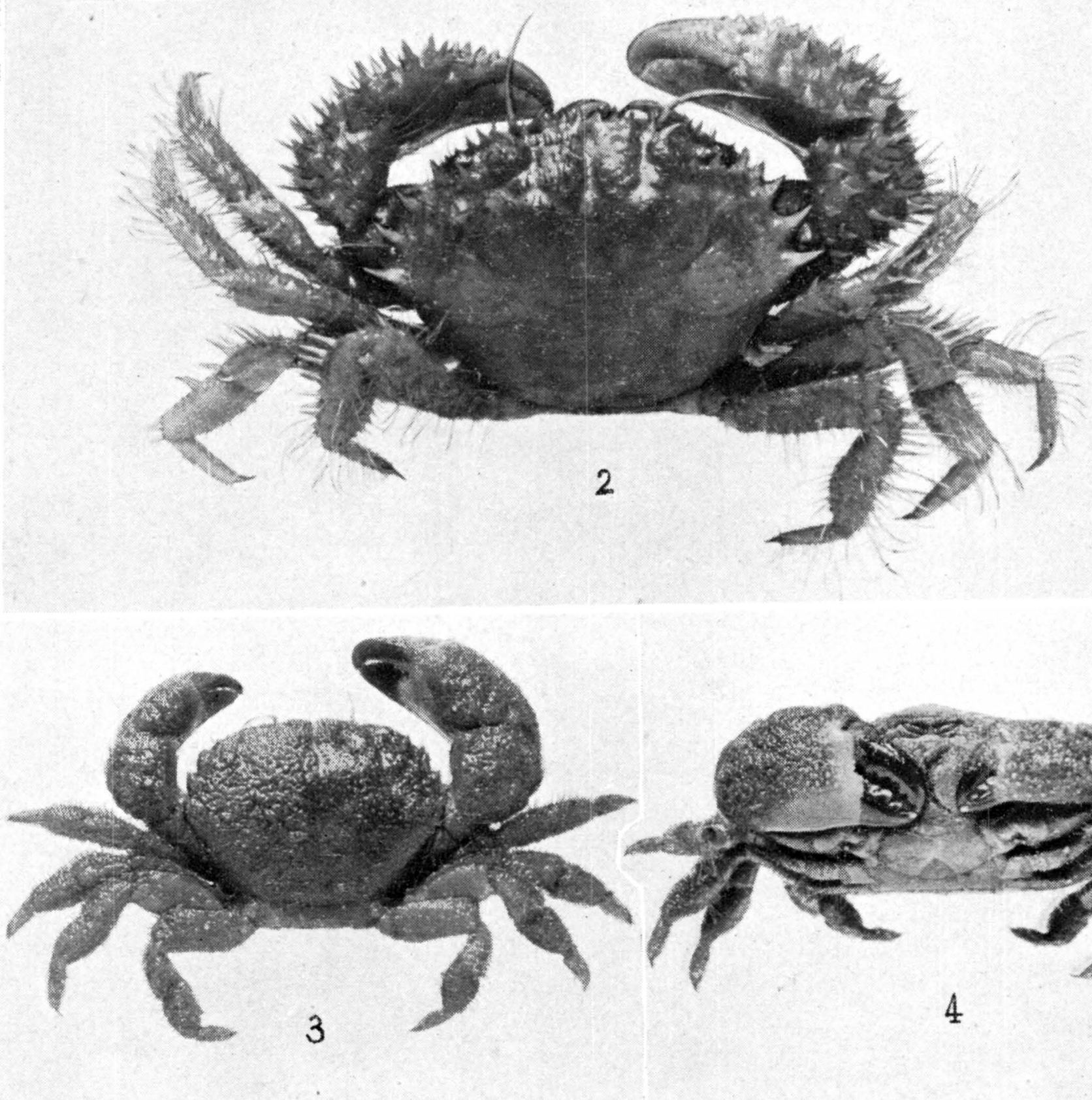

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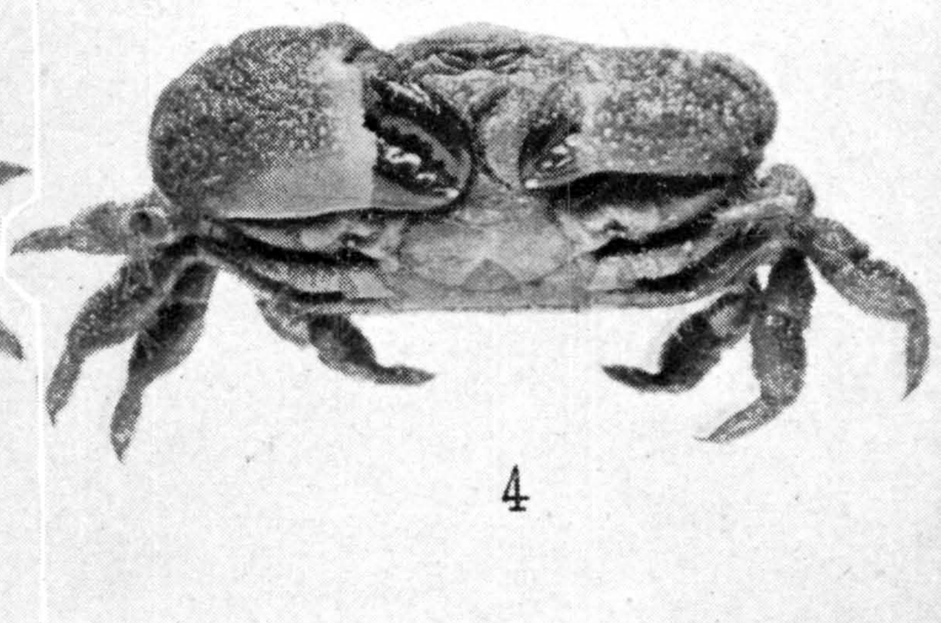

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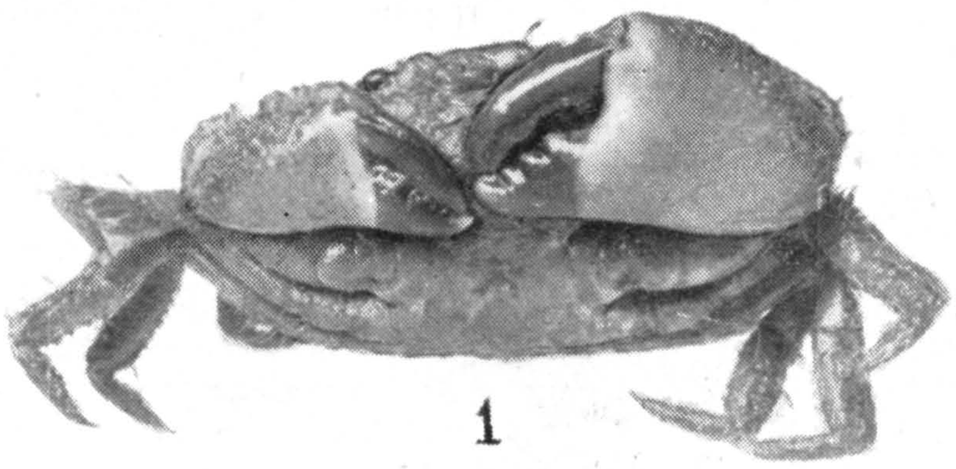
1. 2. PILUMNUS TOWNSENDI (P. 504). 3, 4. P. GONZALENSIS (P. 505)

FOR EXPLANATION OF PLATE SEE PAGE 589.



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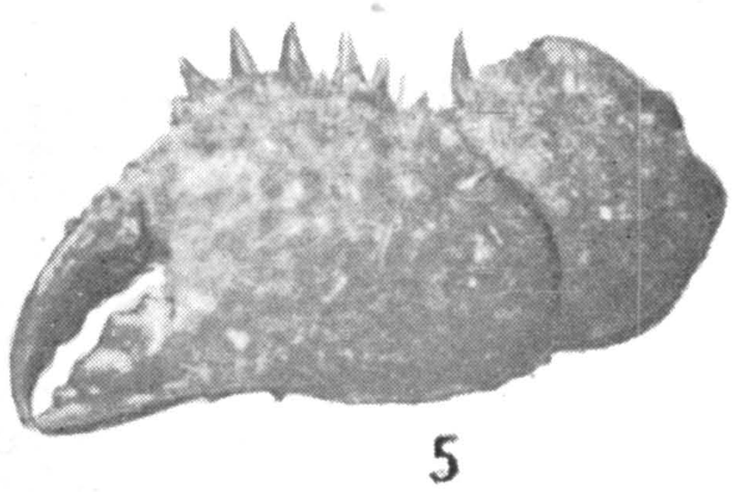

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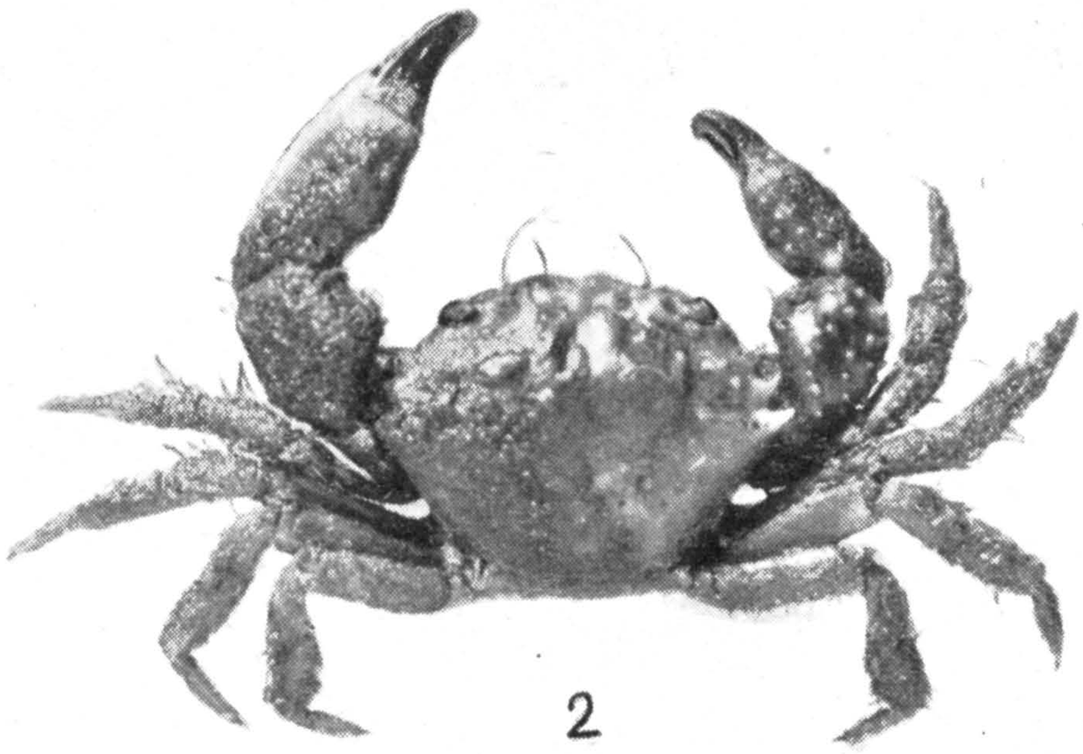

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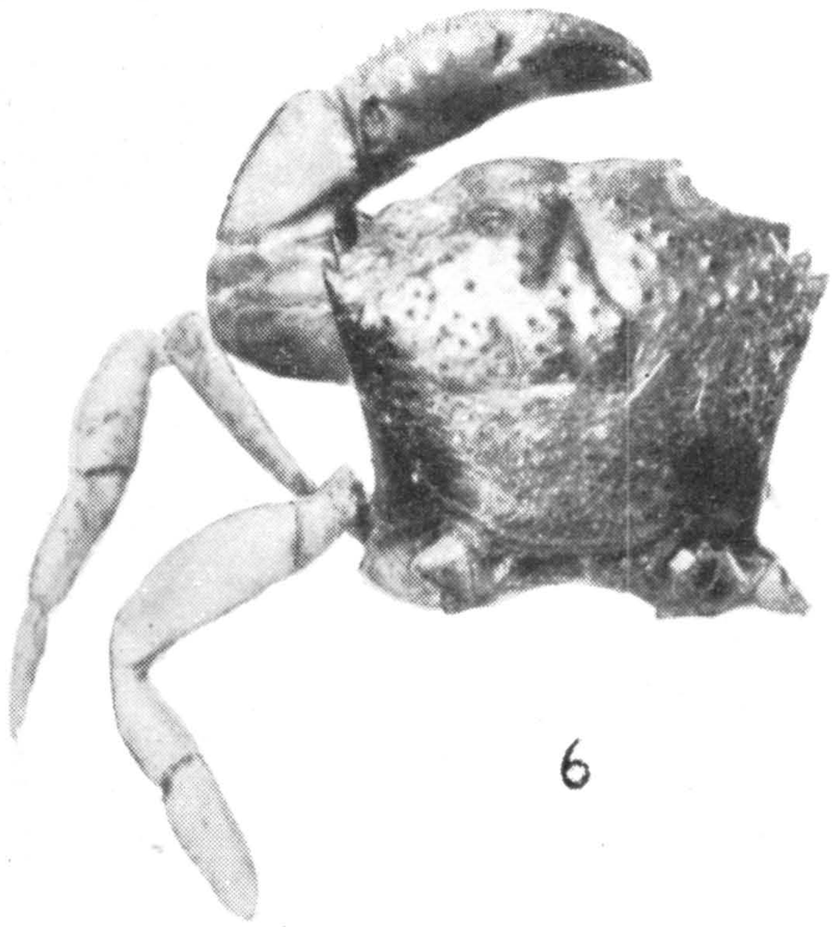

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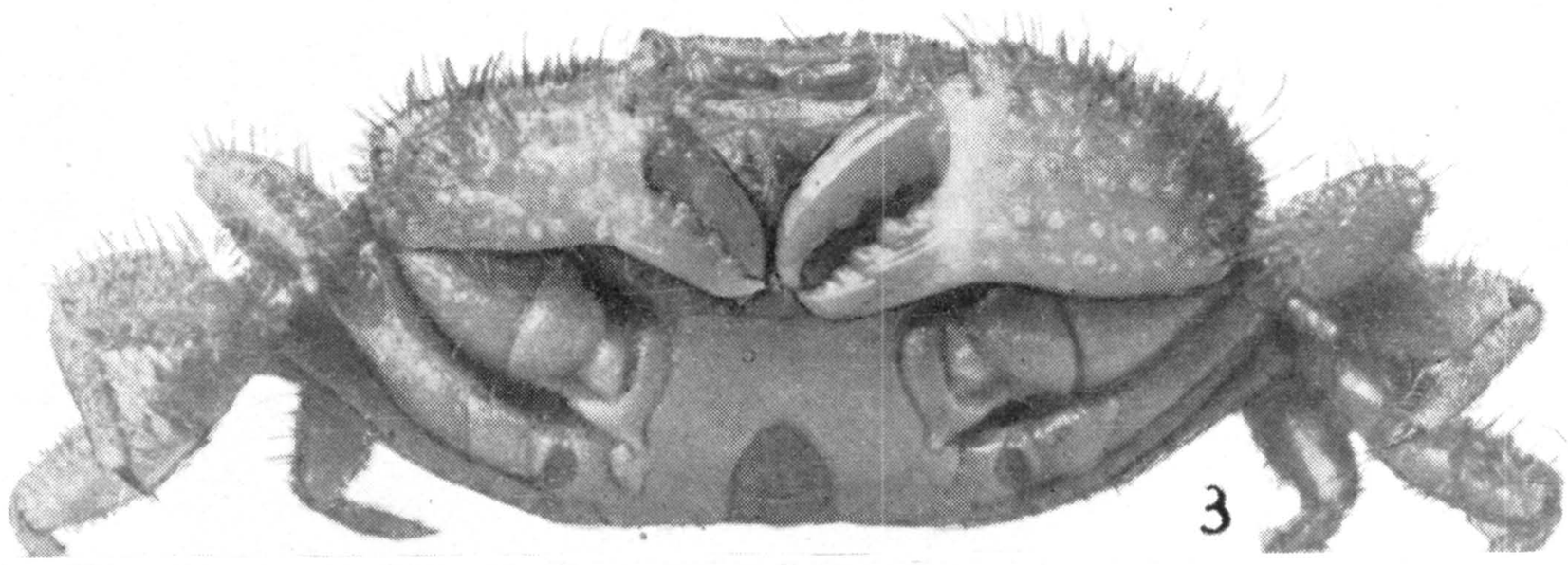

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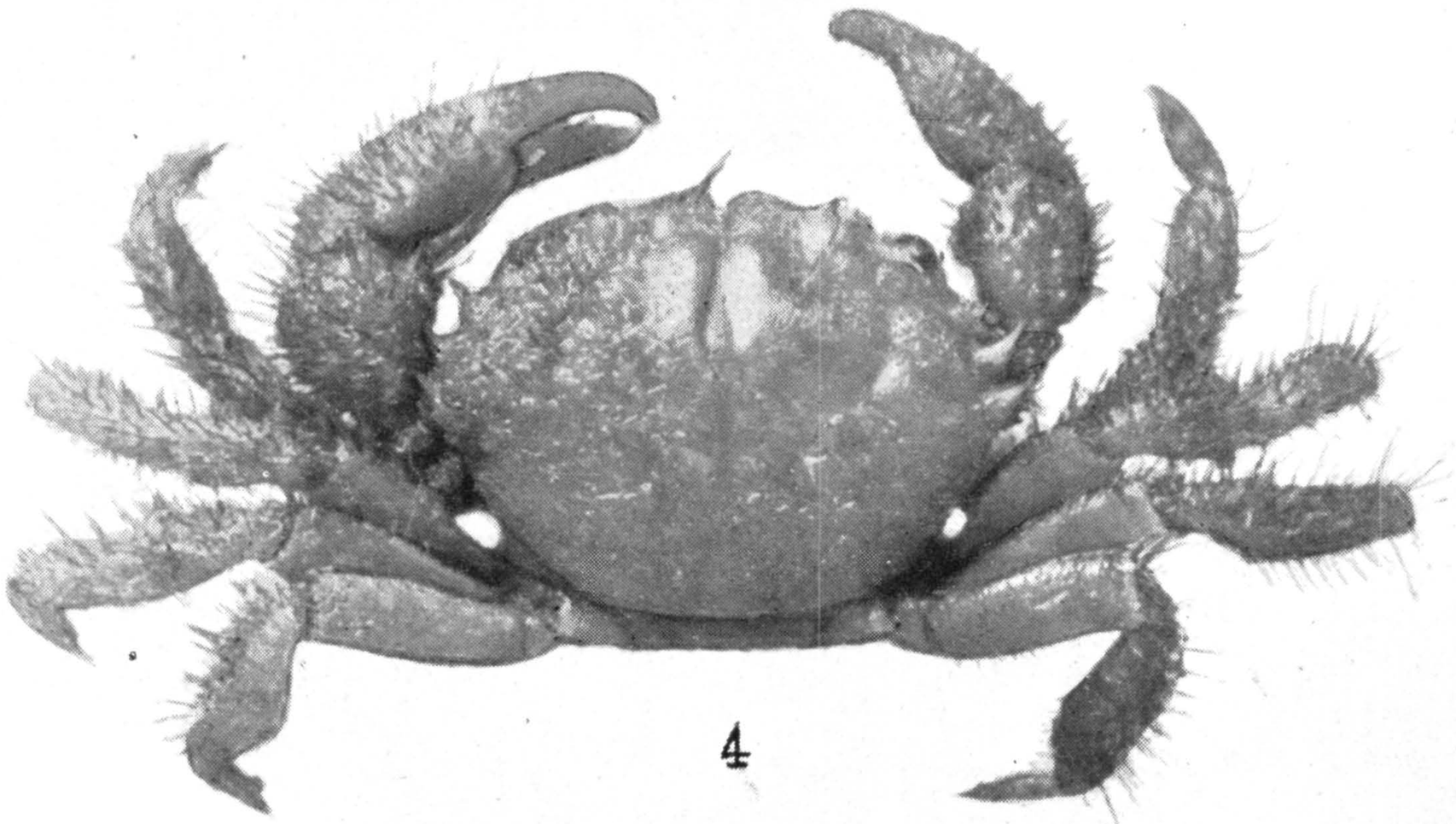
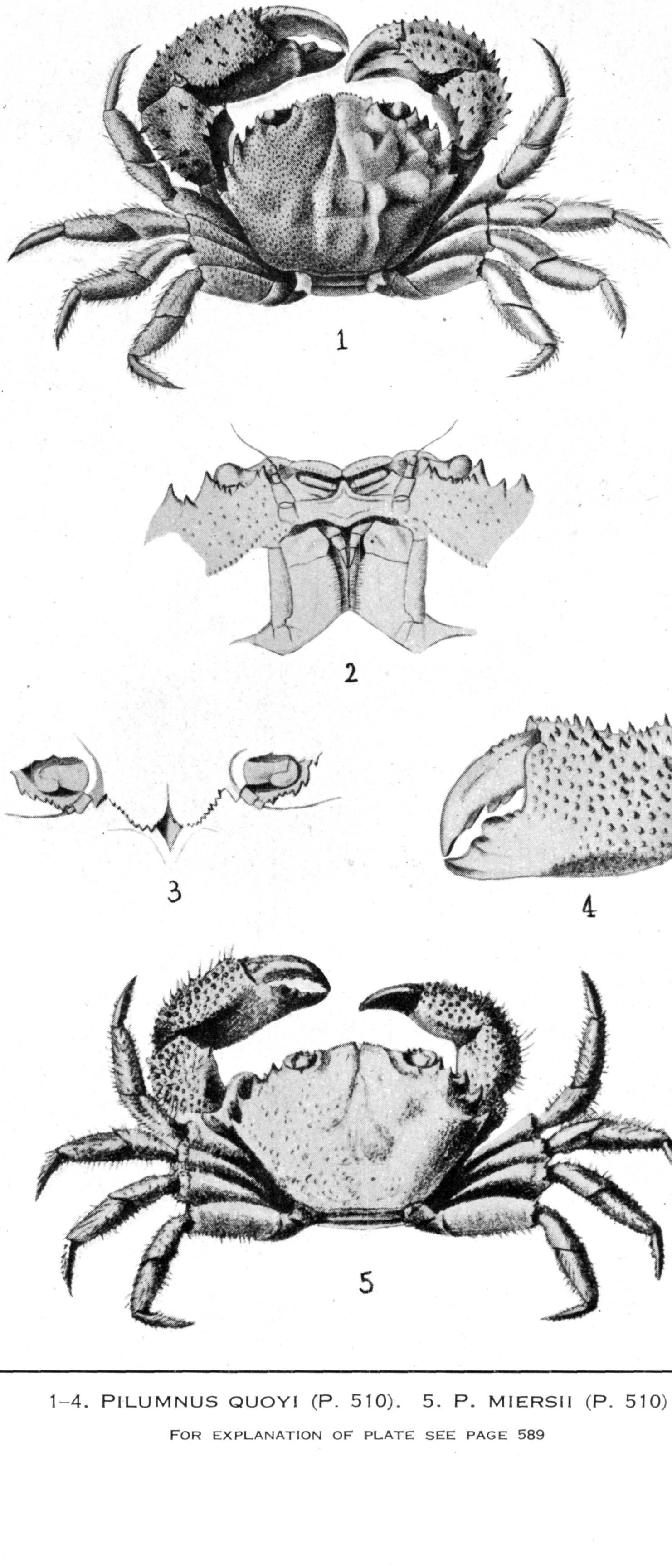


4

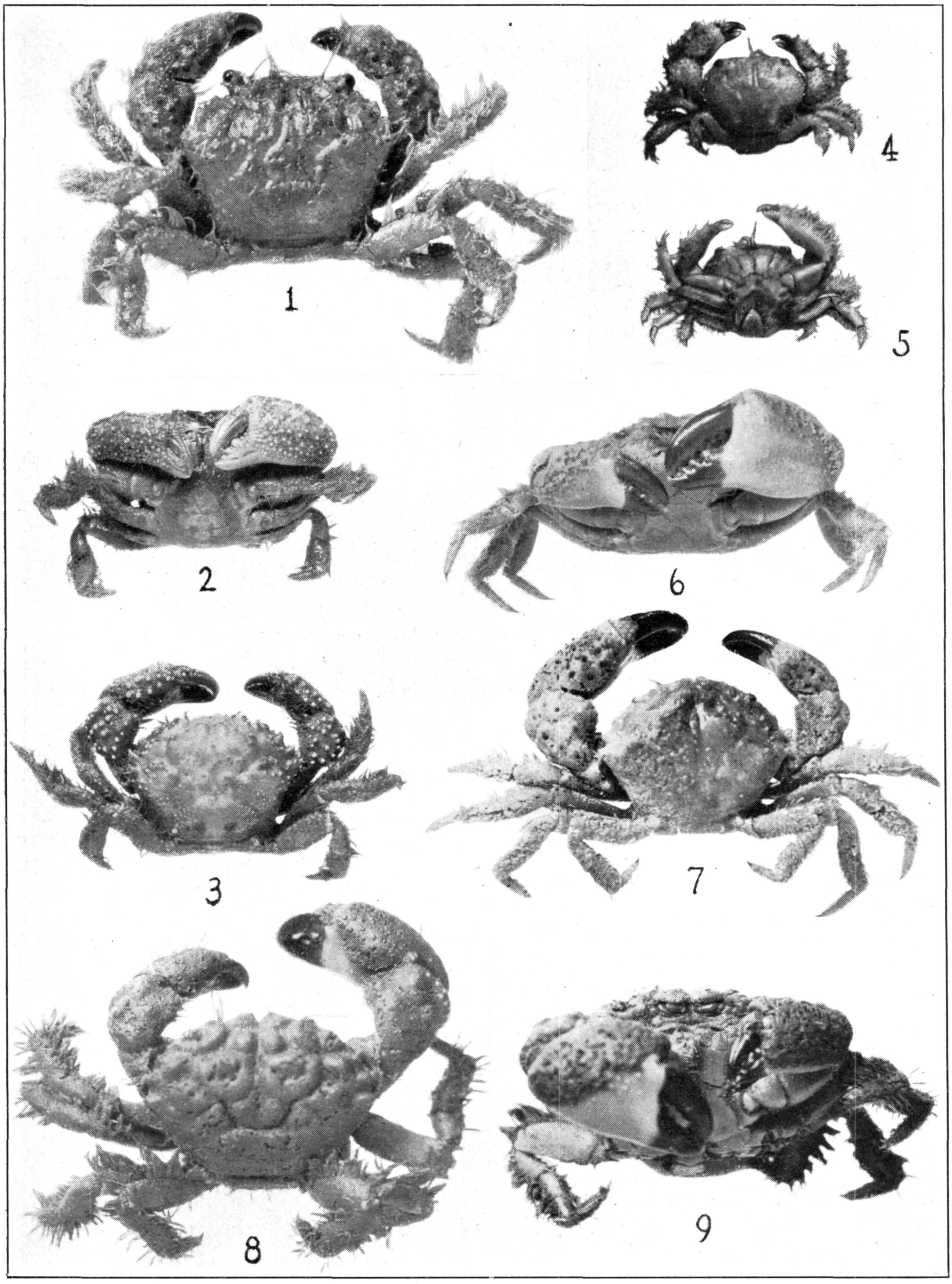
1, 2. PILUMNUS LACTEUS (P. 511). 3, 4. P. FLORIDANUS (P. 507). 5, 6. P. STIMPSONII (P. 524)

FOR EXPLANATION OF PLATE SEE PAGE 589.



1–4. PILUMNUS QUOYI (P. 510). 5. P. MIERSII (P. 510)

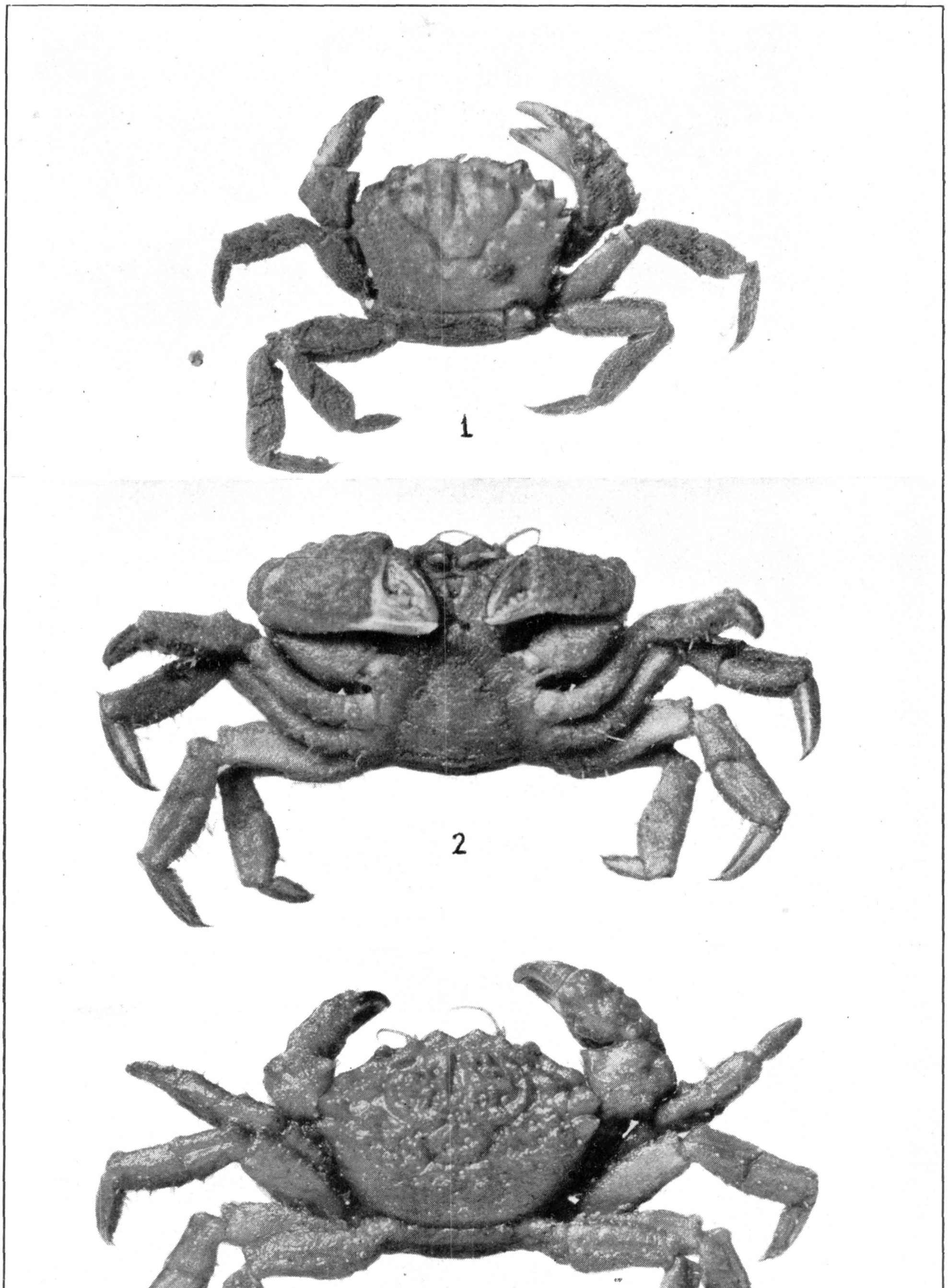
FOR EXPLANATION OF PLATE SEE PAGE 589



1–3. PILUMNUS GEMMATUS (P. 513). 4, 5. P. PYGMAEUS (P. 515). 6, 7. P. PANNOSUS (P. 514). 8, 9. P. HOLOSERICUS (P. 519)

FOR EXPLANATION OF PLATE SEE PAGE 589.

79856—30——52

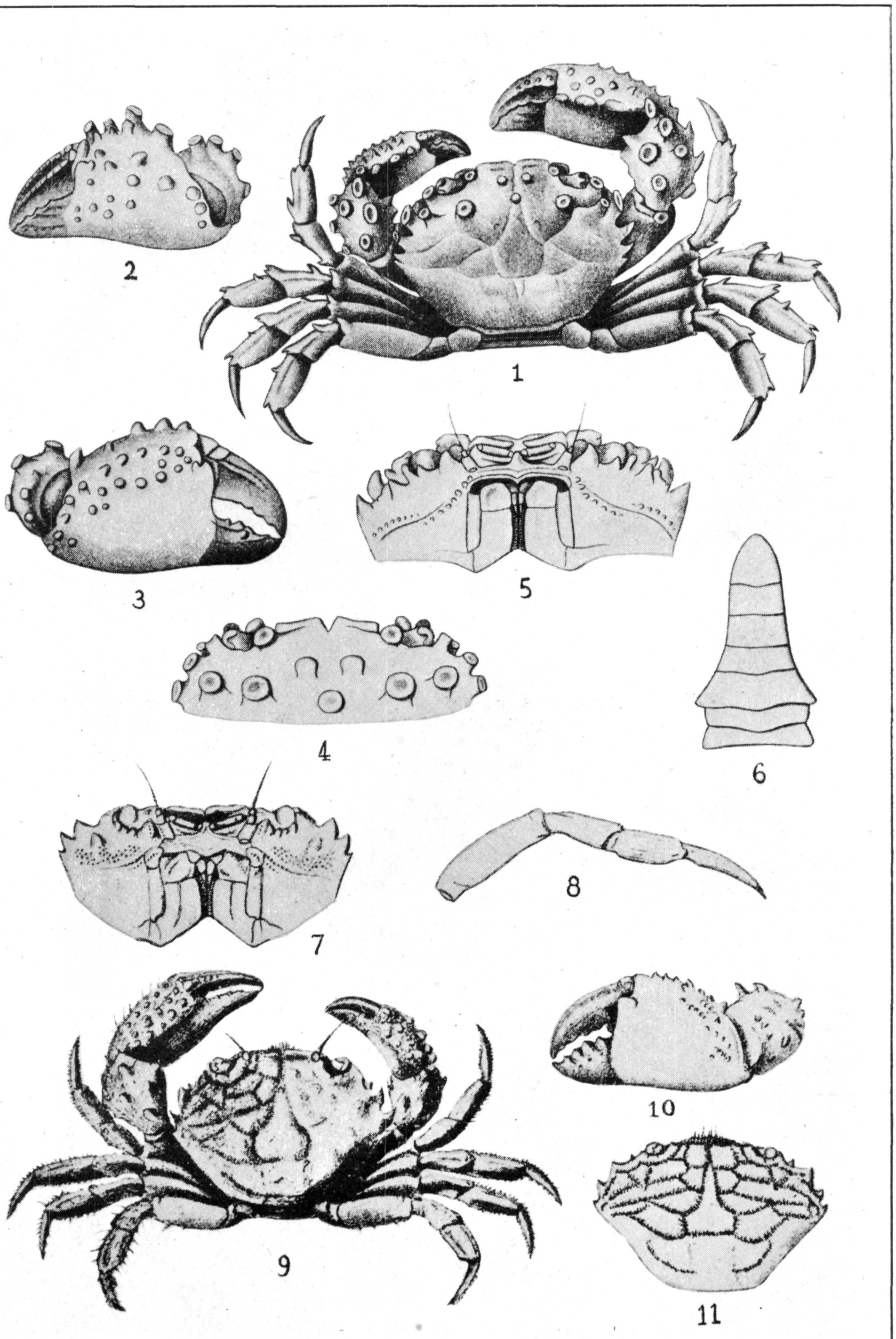


PILUMNUS LIMOSUS (P. 518)

FOR EXPLANATION OF PLATE SEE PAGE 590.

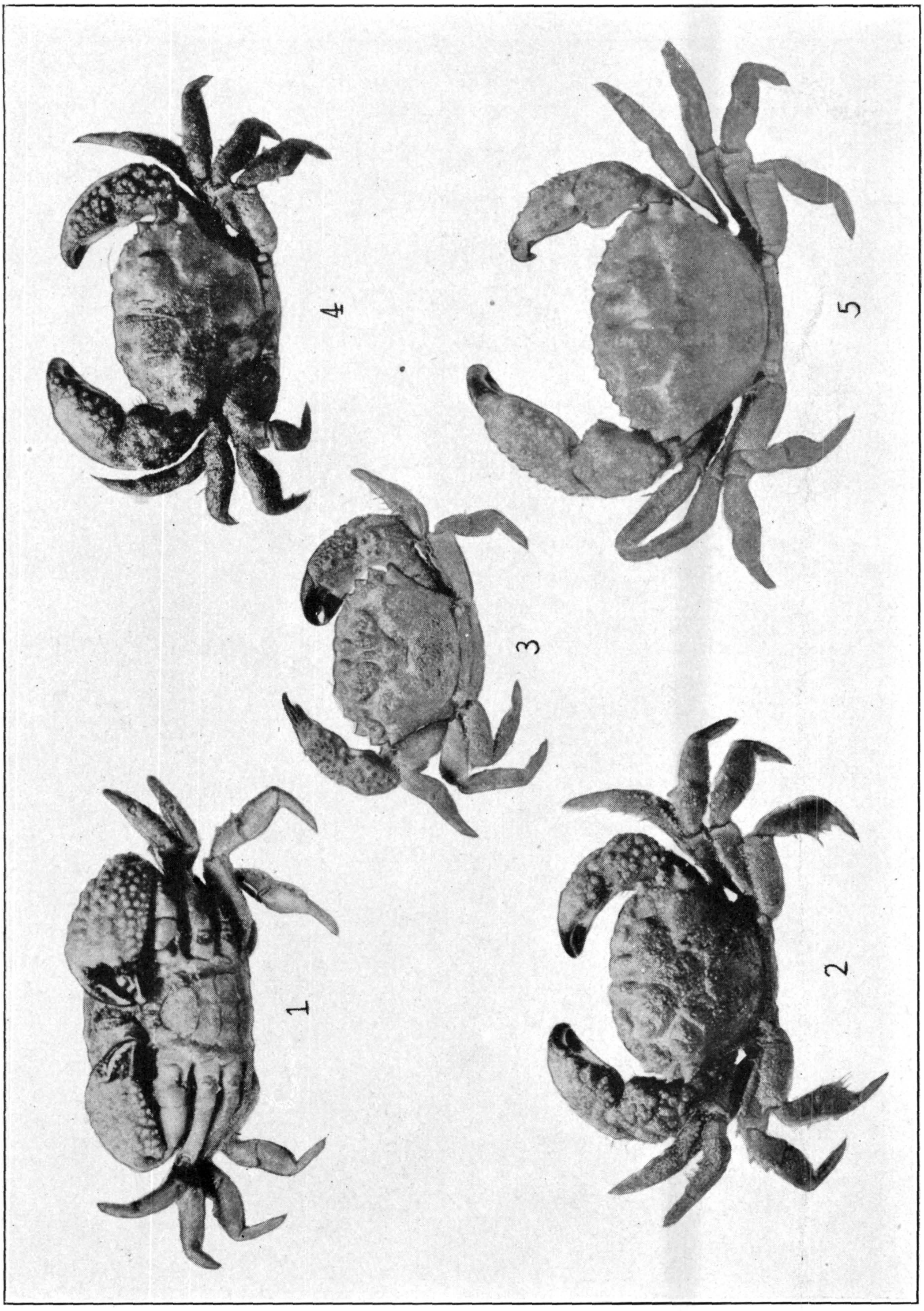
1–3. PILUMNUS LIMOSUS (P. 518). 4, 5. P. RETICULATUS (P. 521)

FOR EXPLANATION OF PLATE SEE PAGE 590.



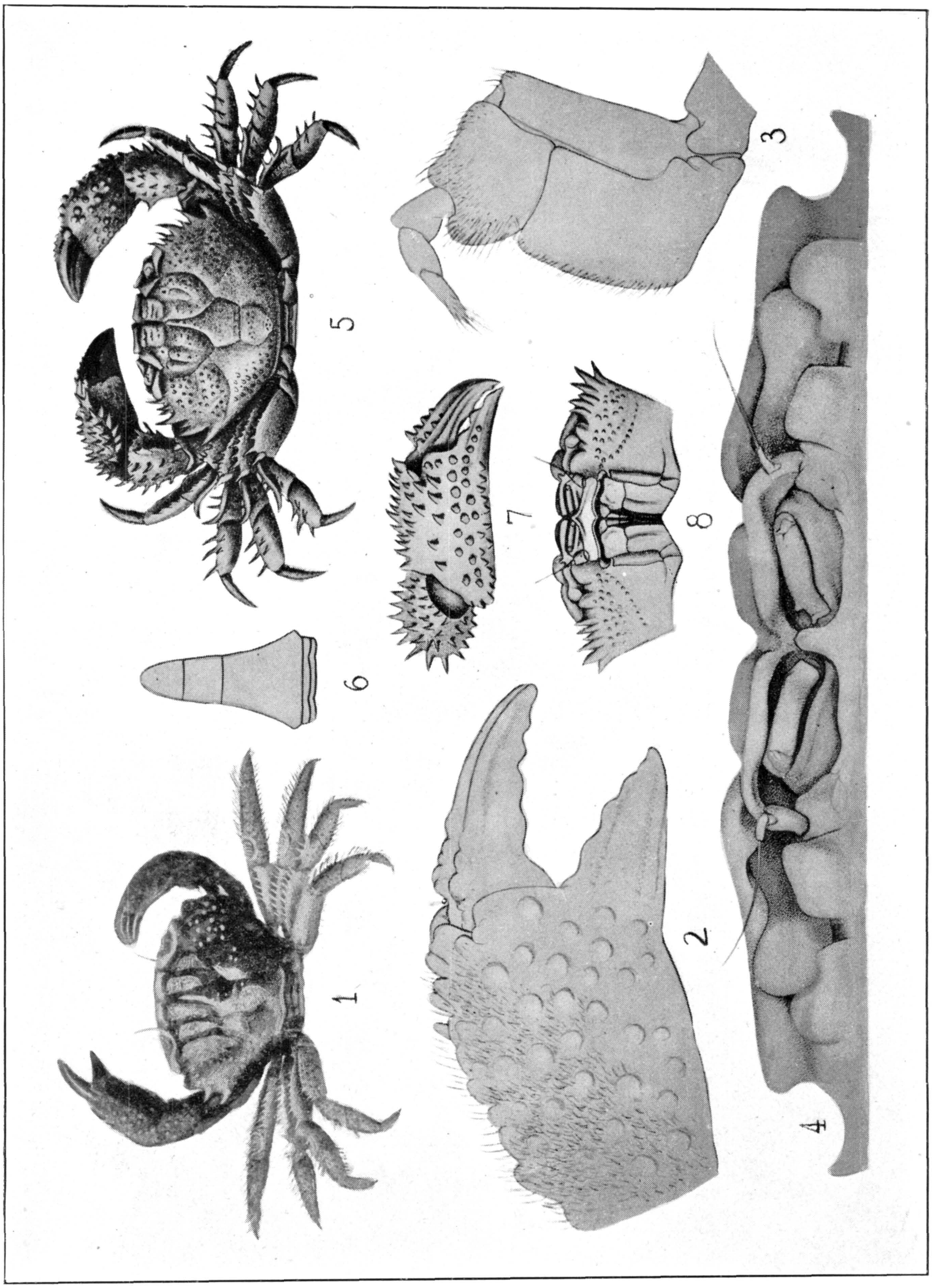
1-6. PILUMNUS RETICULATUS FORMA FRAGOSA (P. 522). 7-11. P. R. FORMA TESSELLATA (P. 522)

FOR EXPLANATION OF PLATE SEE PAGE 590.



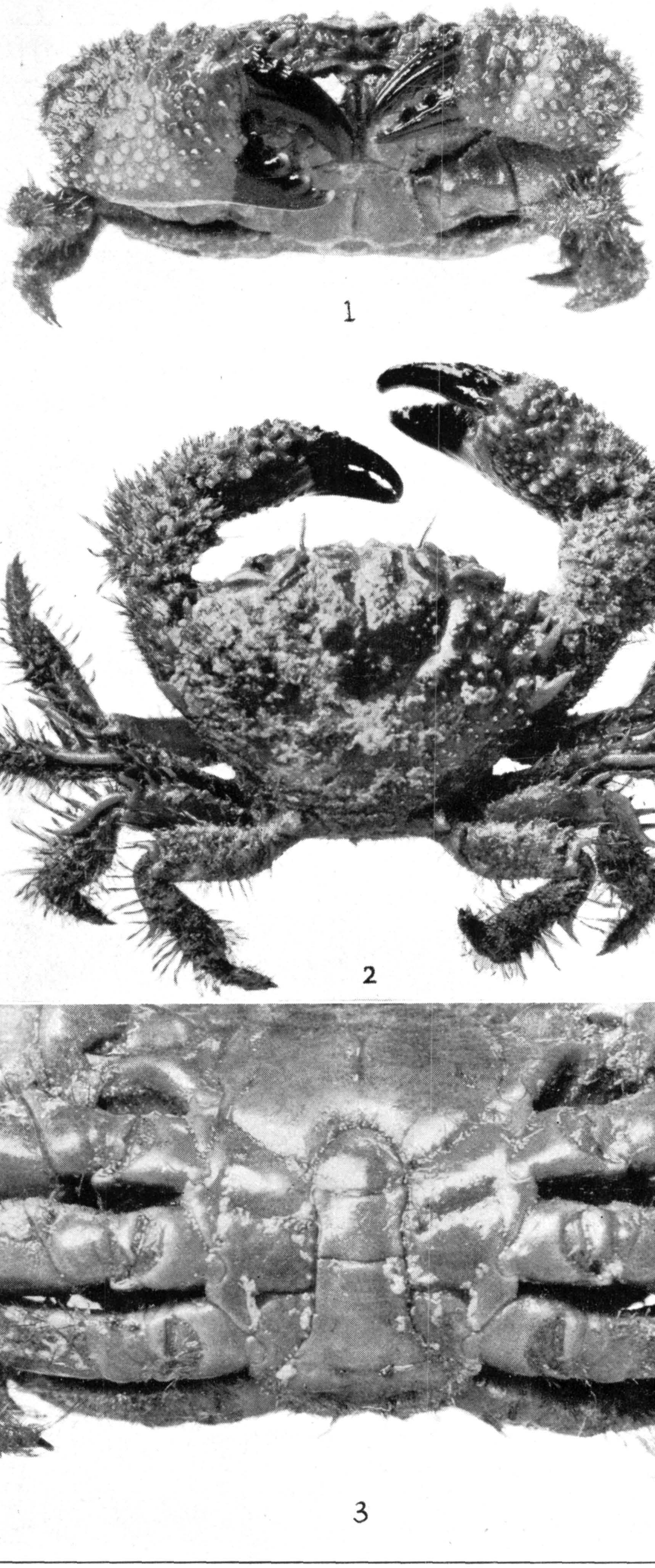
LOBOPILUMNUS AGASSIZII. 1, 2. FORMA TYPICA (P. 526). 3. FORMA PULCHELLA (P. 526). 4. FORMA TRINIDADENSIS (P. 526). 5. FORMA BERMUDENSIS (P. 526)

FOR EXPLANATION OF PLATE SEE PAGE 590.



1–4. HETERACTAEA LUNATA (P. 532). 5–8. H. CERATOPUS (P. 530)

FOR EXPLANATION OF PLATE SEE PAGES 590-591.



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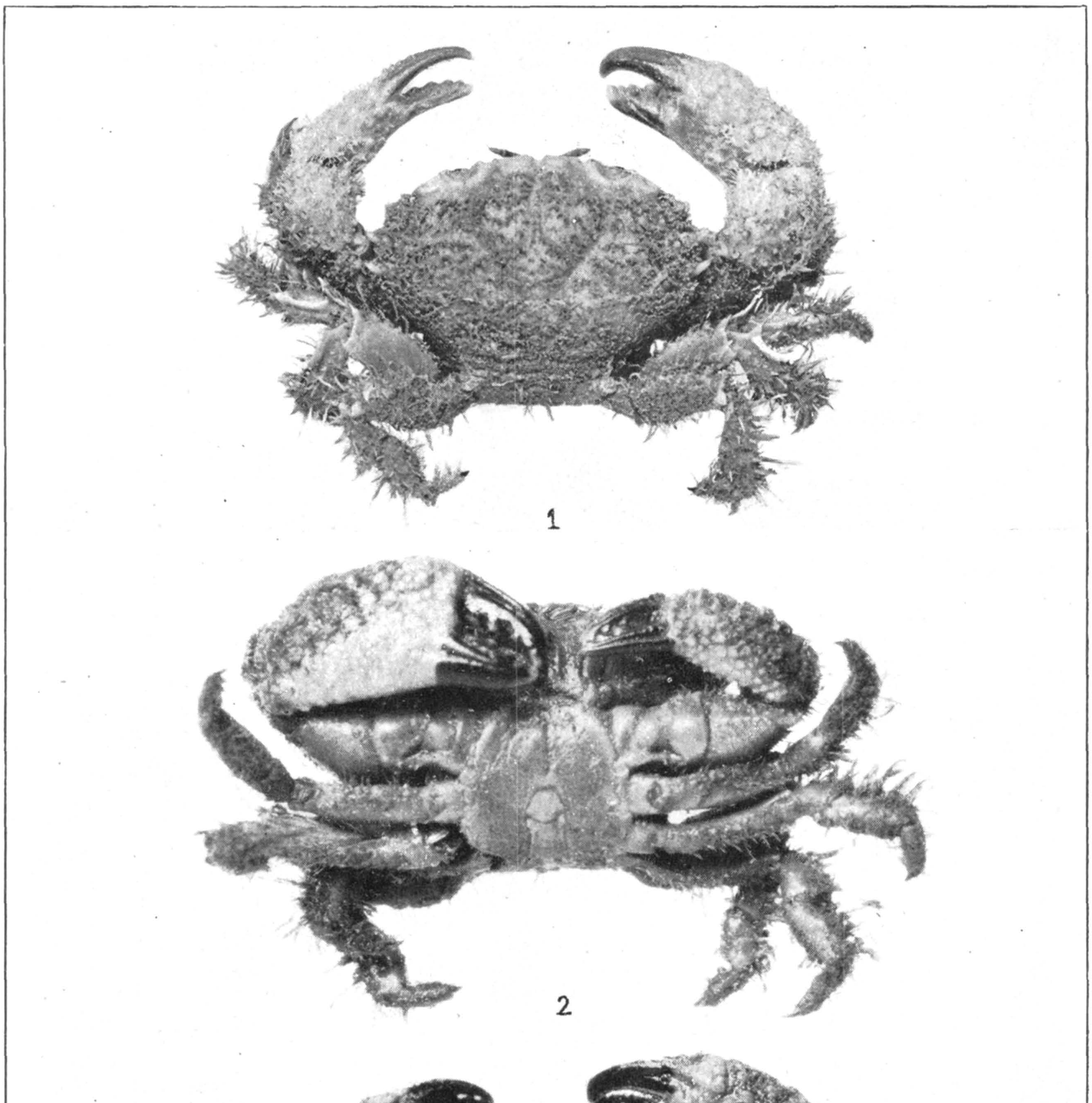
HETERACTAEA CERATOPUS (P. 530)

FOR EXPLANATION OF PLATE SEE PAGE 591.



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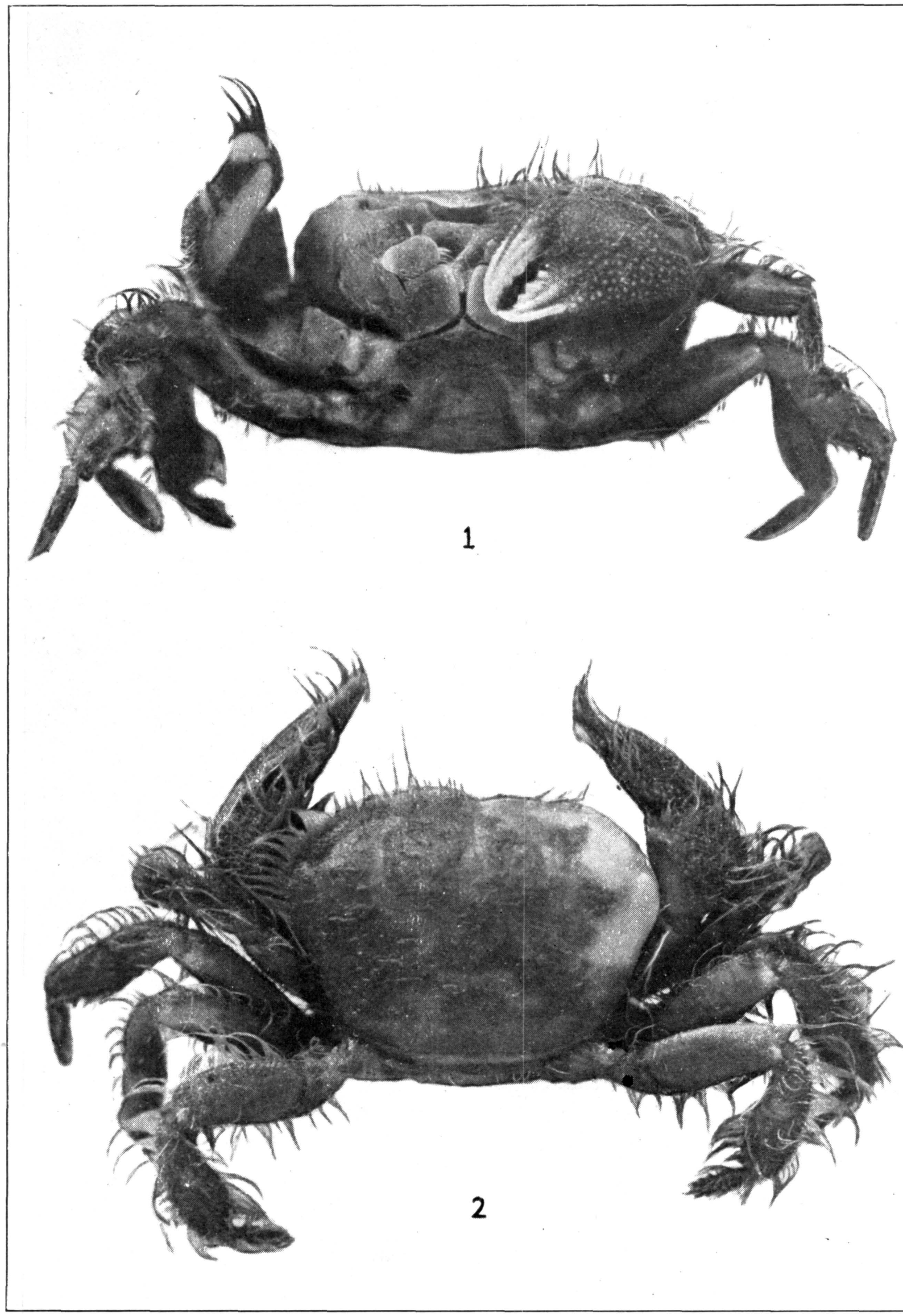
HETERACTAEA LUNATA (P. 532)

FOR EXPLANATION OF PLATE SEE PAGE 591



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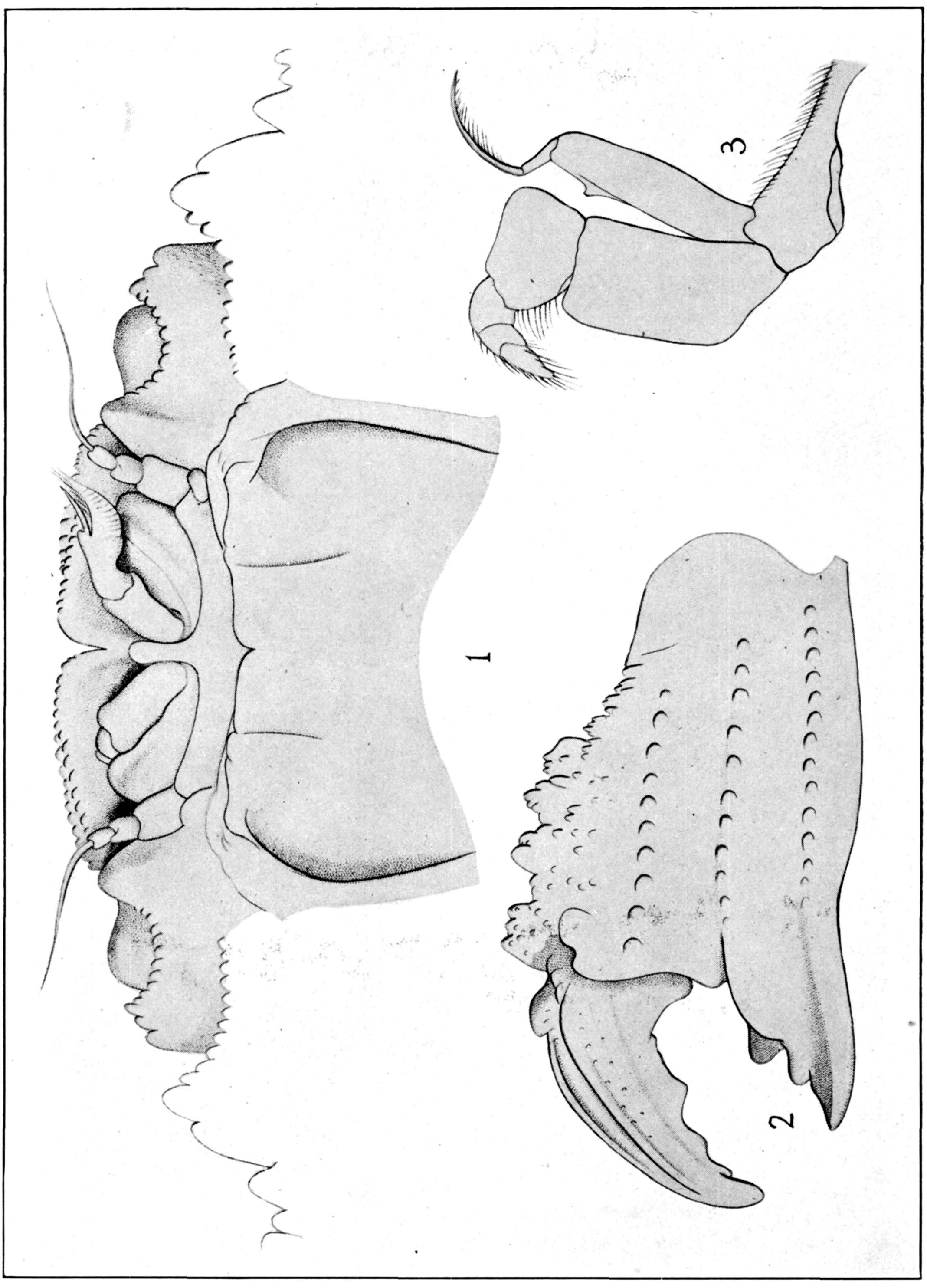
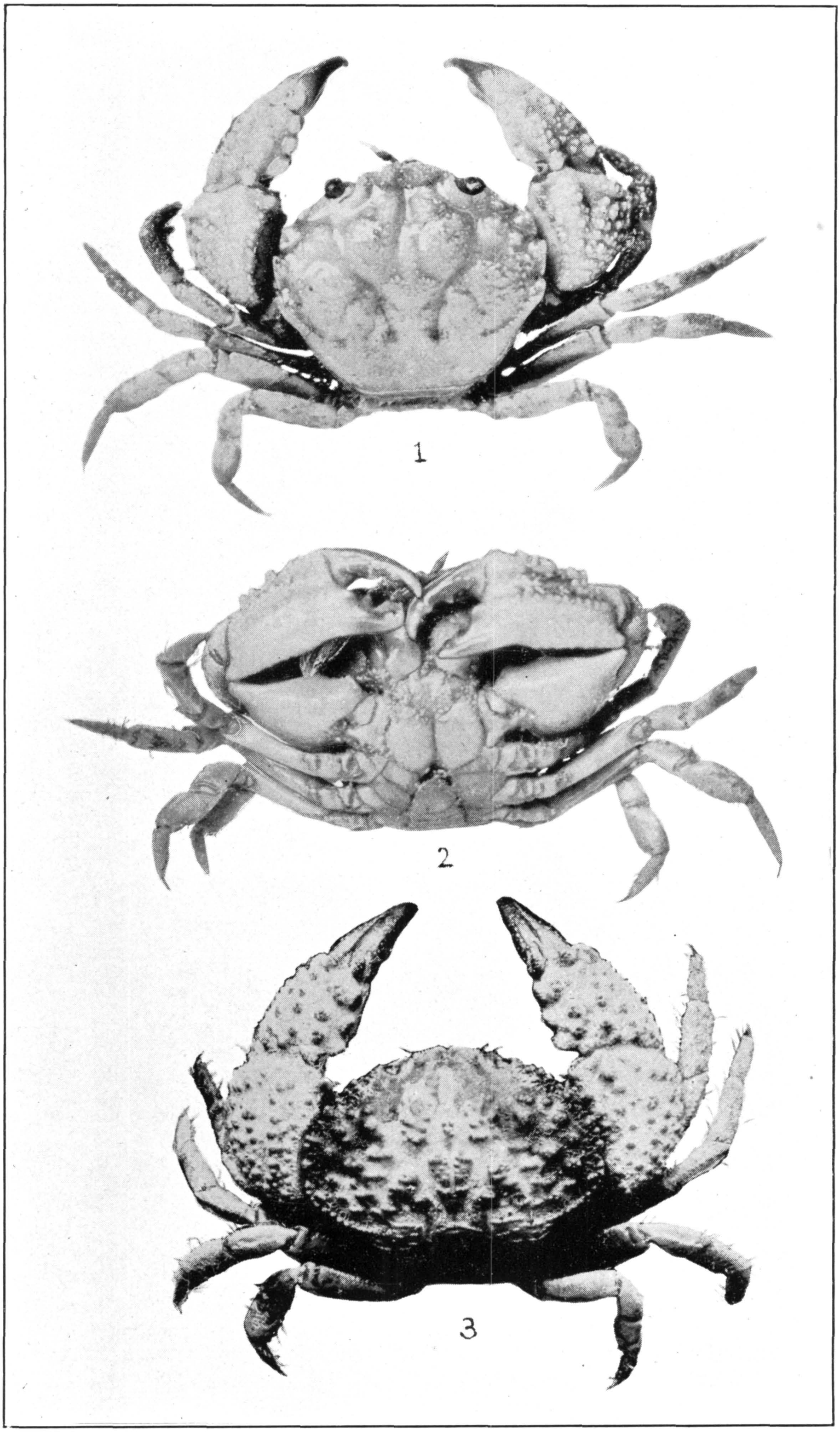
ACIDOPS FIMBRIATUS (P. 534)

FOR EXPLANATION OF PLATE SEE PAGE 591.



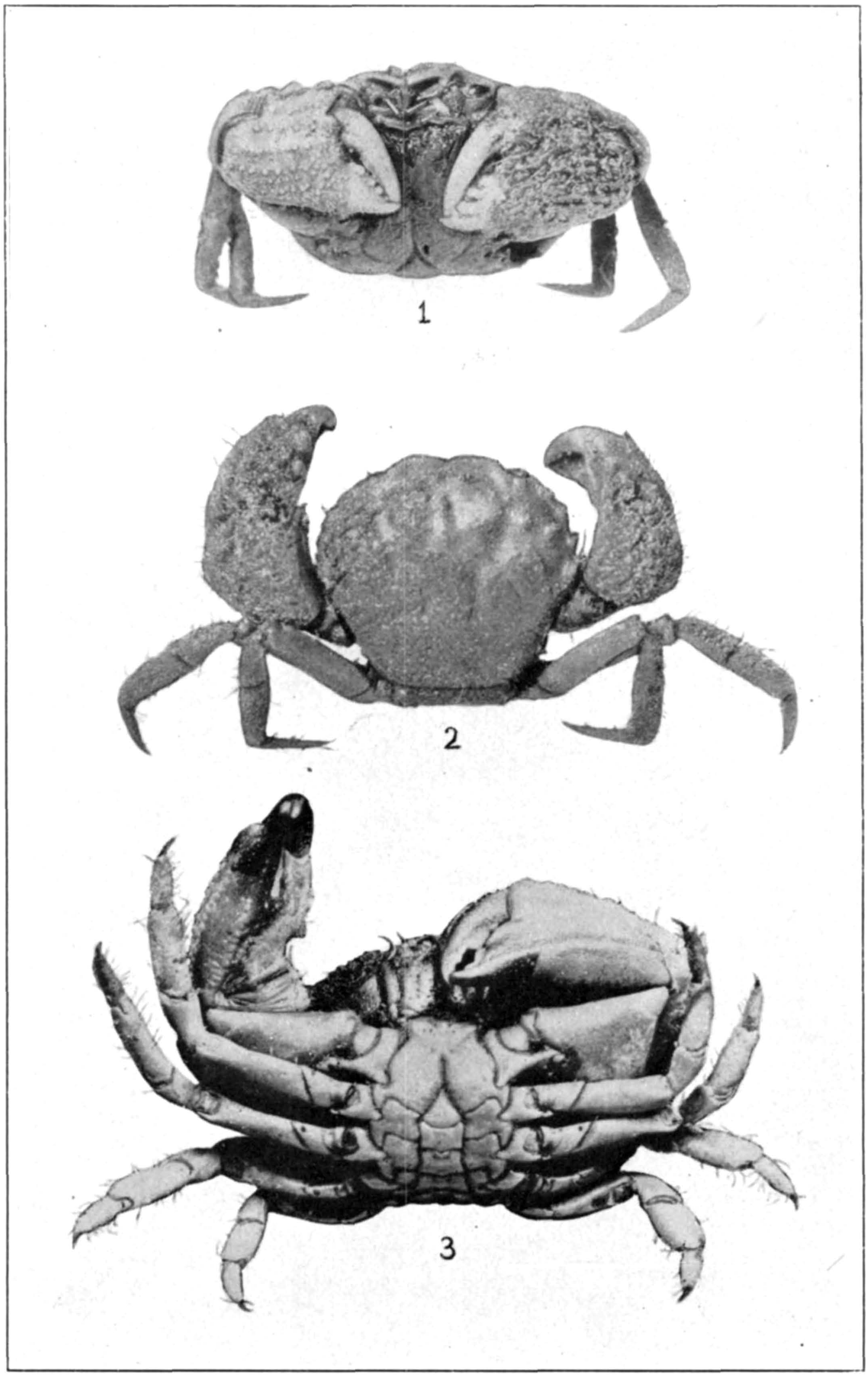
PILUMNOIDES PERLATUS (P. 535)

FOR EXPLANATION OF PLATE SEE PAGE 591.



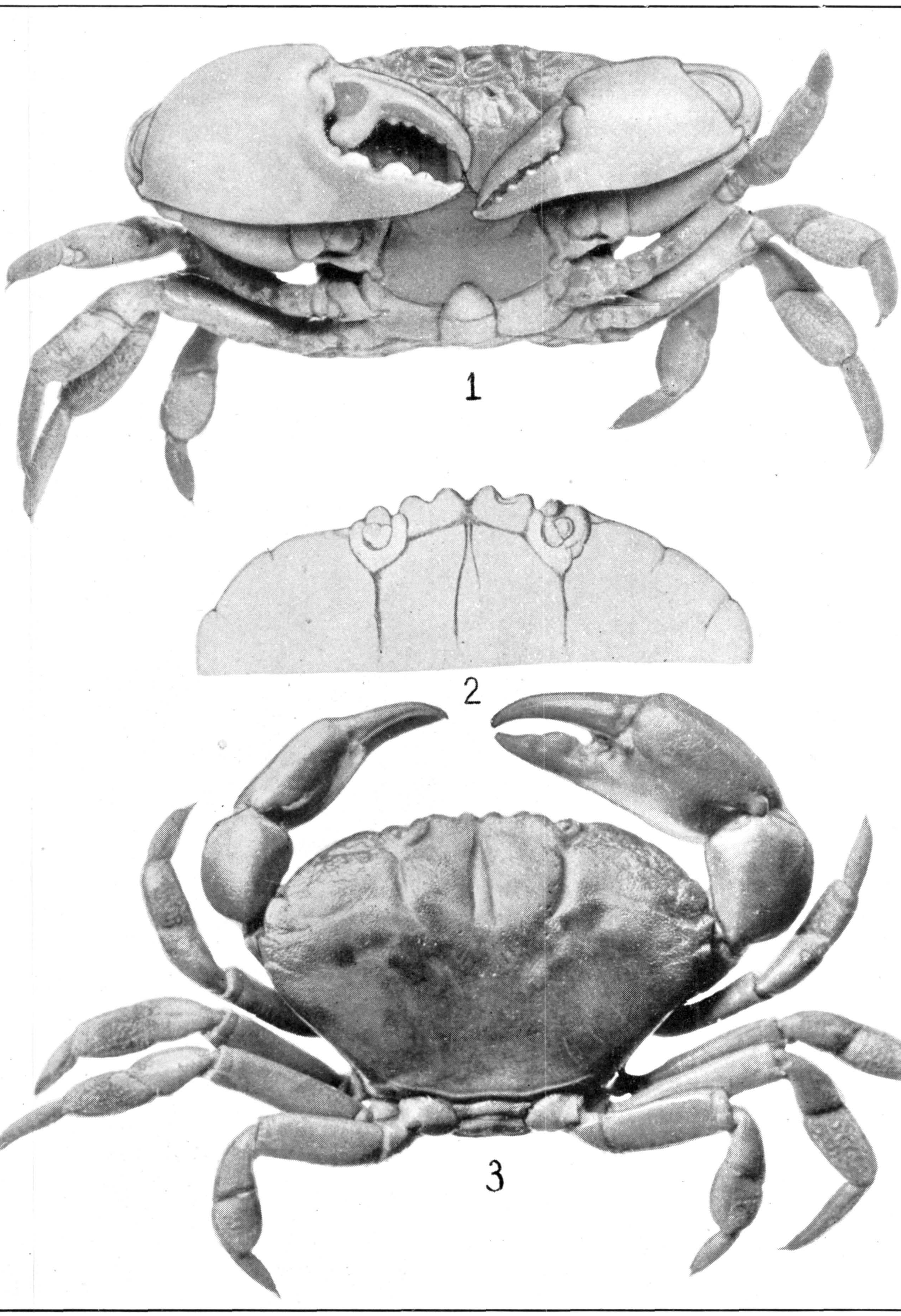
1, 2. PILUMNOIDES HASSLERI (P. 537). 3. P. PERLATUS (P. 535)

FOR EXPLANATION OF PLATE SEE PAGE 591.



1, 2. PILUMNOIDES NUDIFRONS (P. 538). 3. P. PERLATUS (P. 535)

FOR EXPLANATION OF PLATE SEE PAGE 591.



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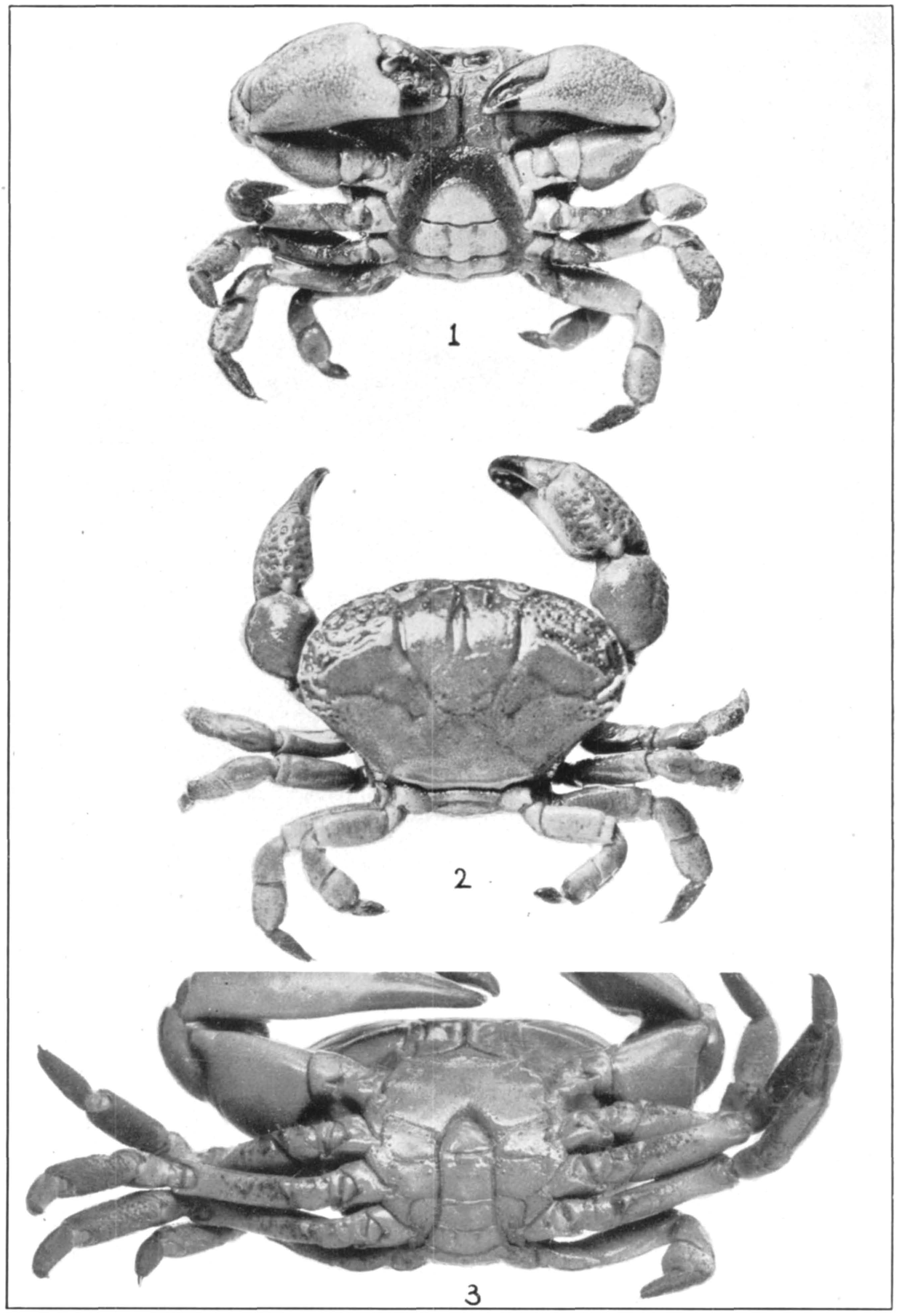
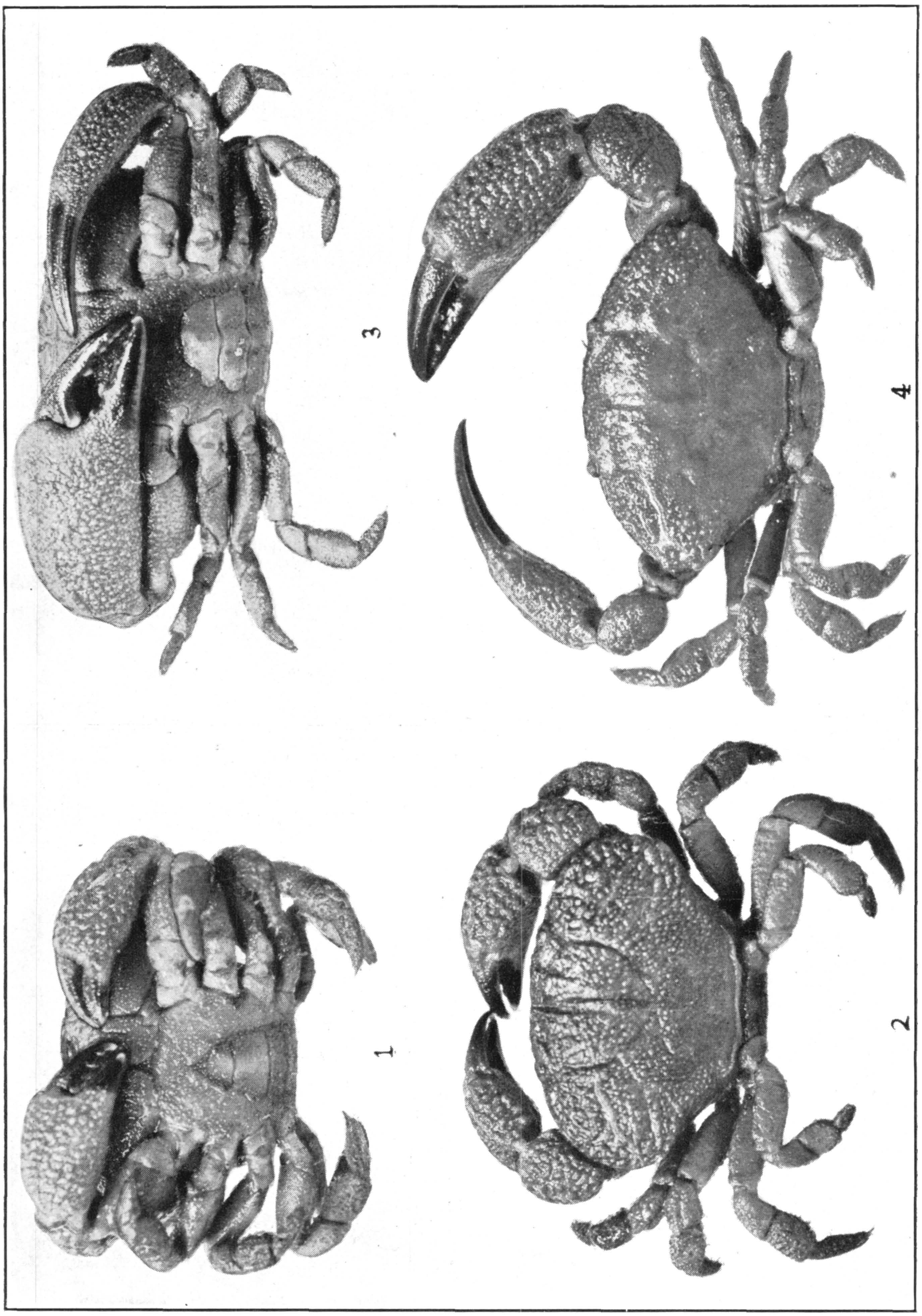
OZIUS VERREAUXII (P. 540)

FOR EXPLANATION OF PLATE SEE PAGE 591.



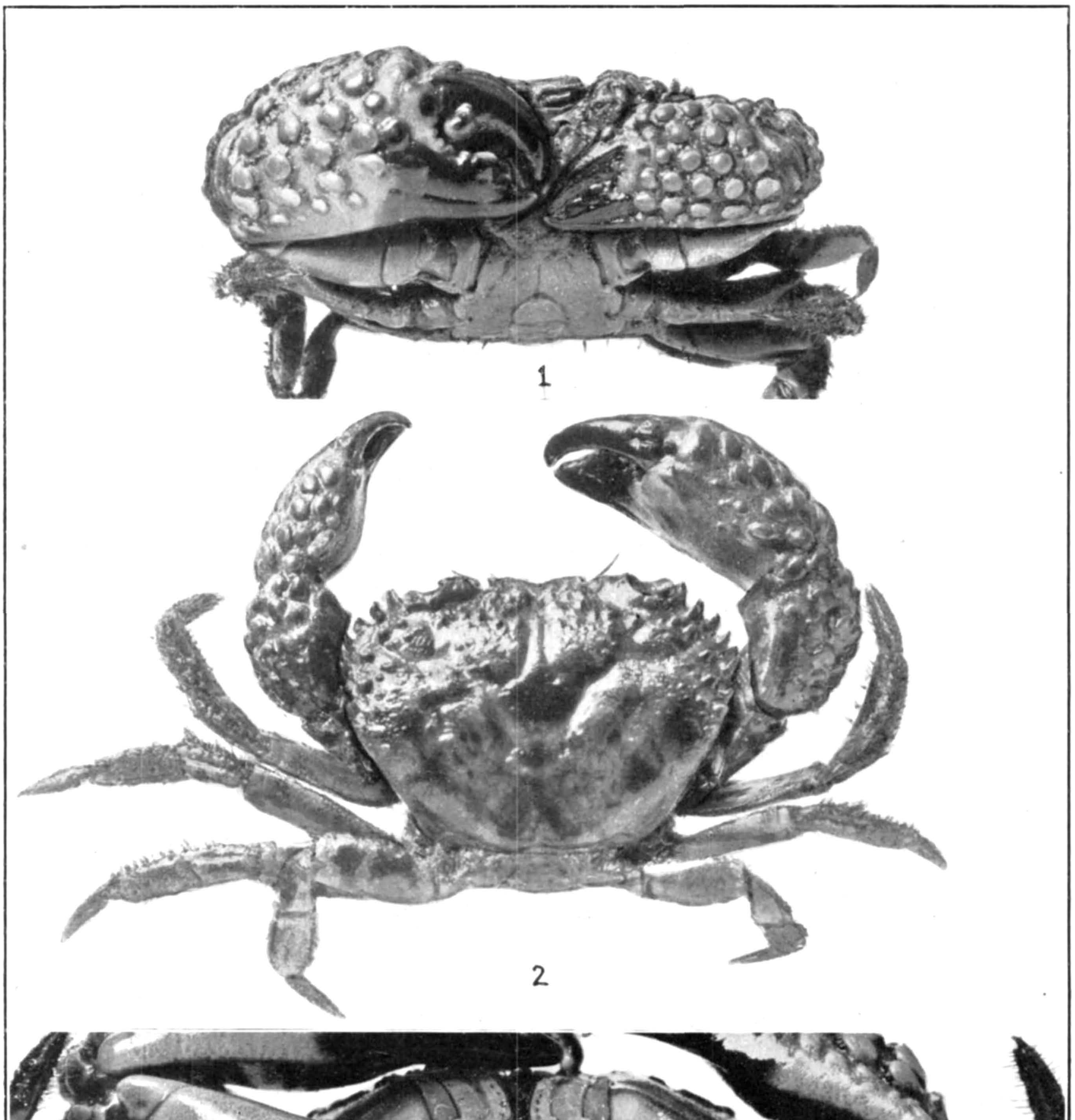
1, 2. OZIUS RETICULATUS (P. 542). 3. O. VERREAUXII (P. 540)

FOR EXPLANATION OF PLATE SEE PAGE 591.



1, 2. OZIUS PERLATUS (P. 543). 3, 4. O. AGASSIZII (P. 544)

FOR EXPLANATION OF PLATE SEE PAGE 592.



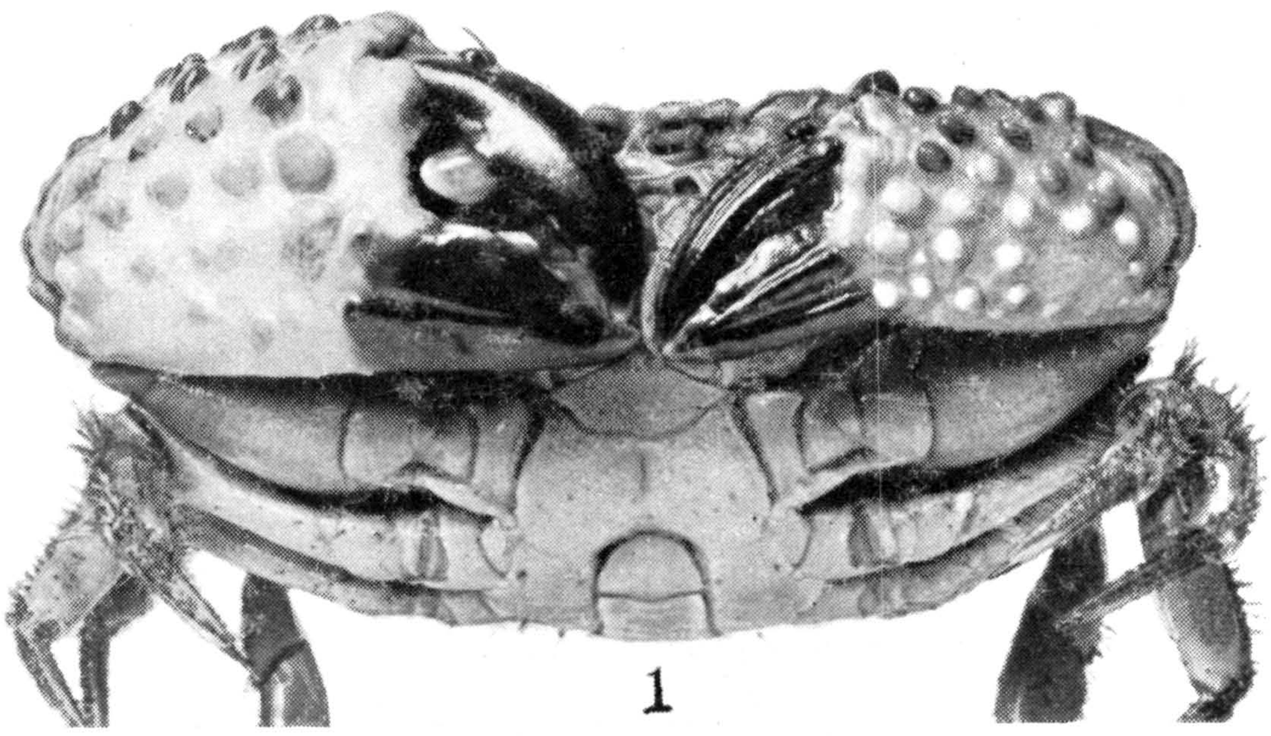
1

2

3

ERIPHIA GONAGRA (P. 545)

FOR EXPLANATION OF PLATE SEE PAGE 592.



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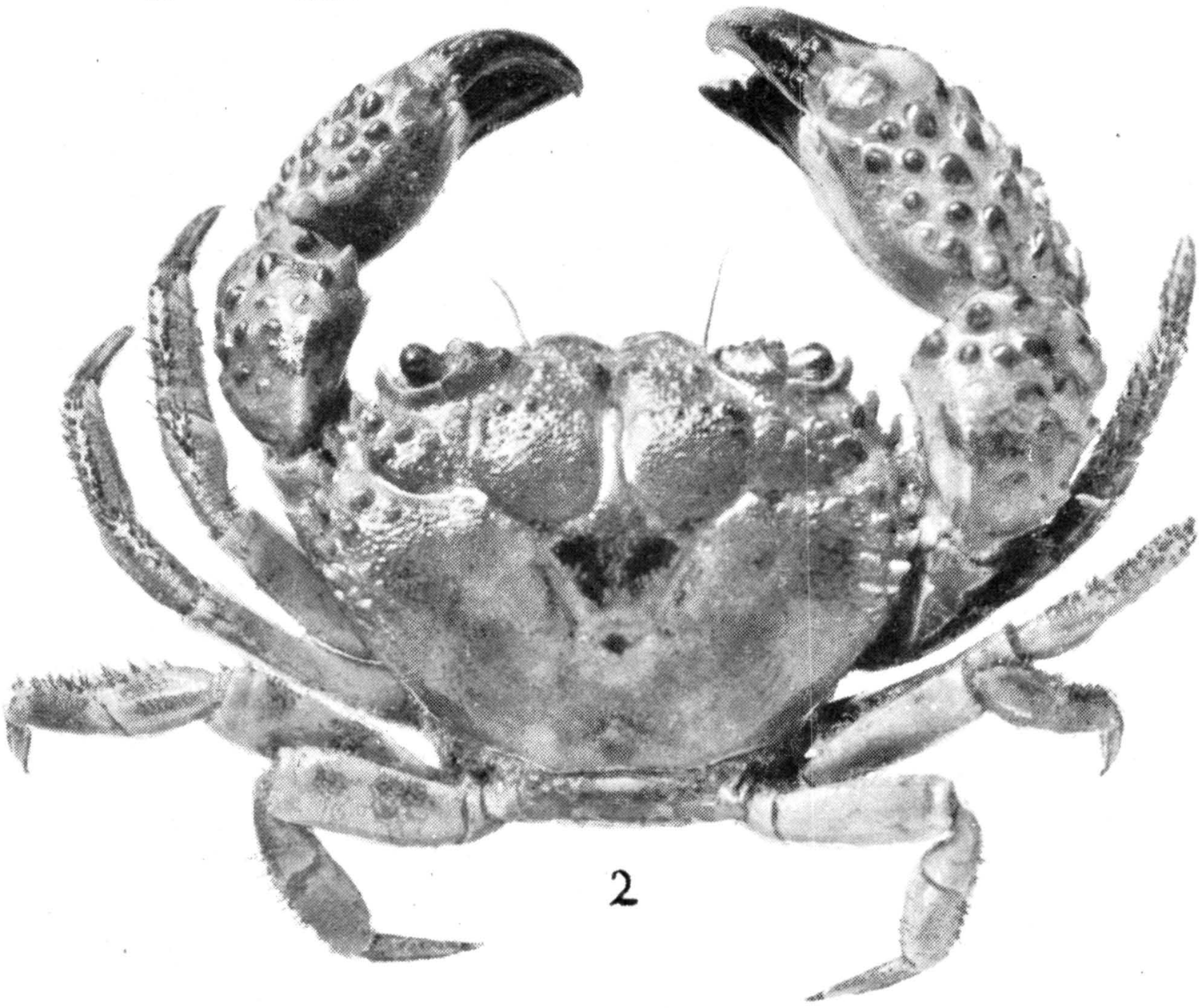

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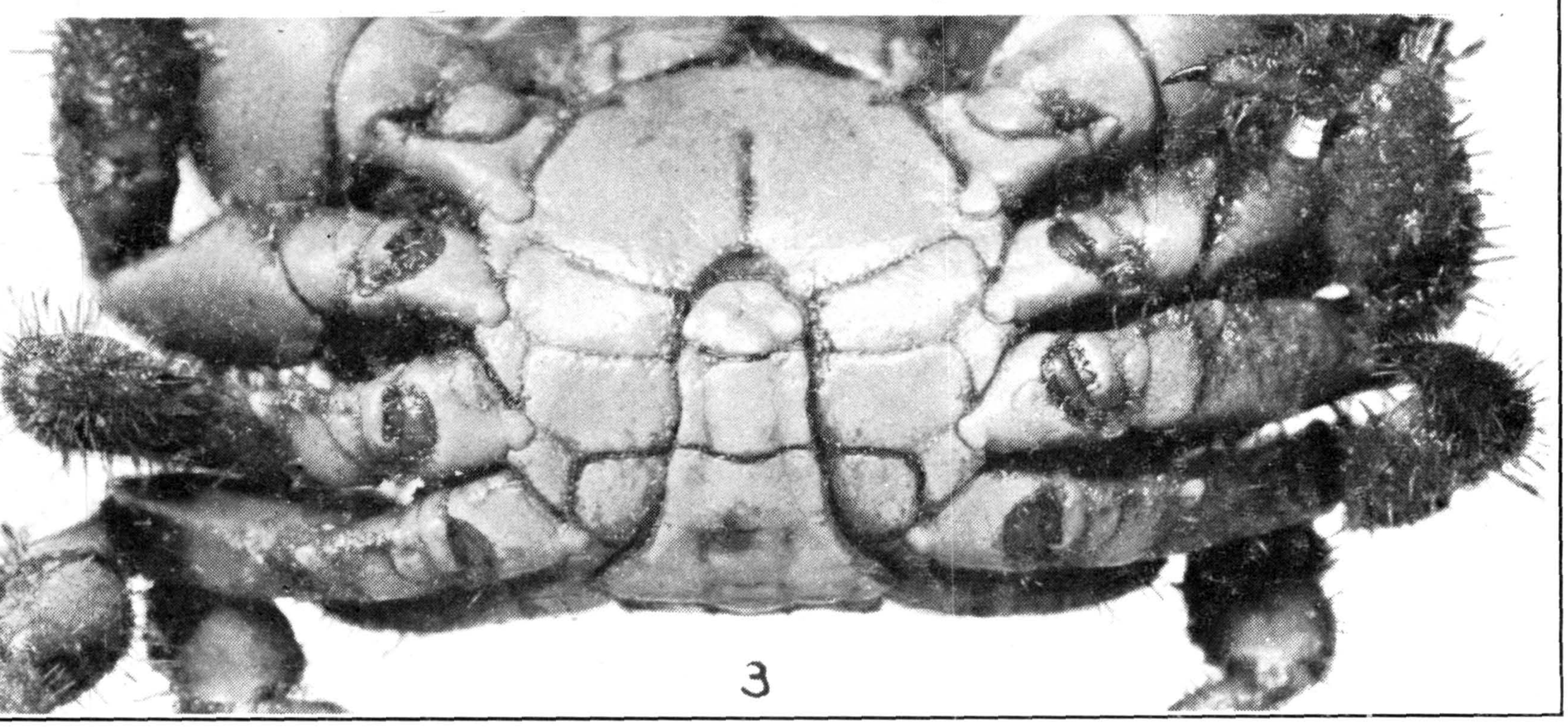
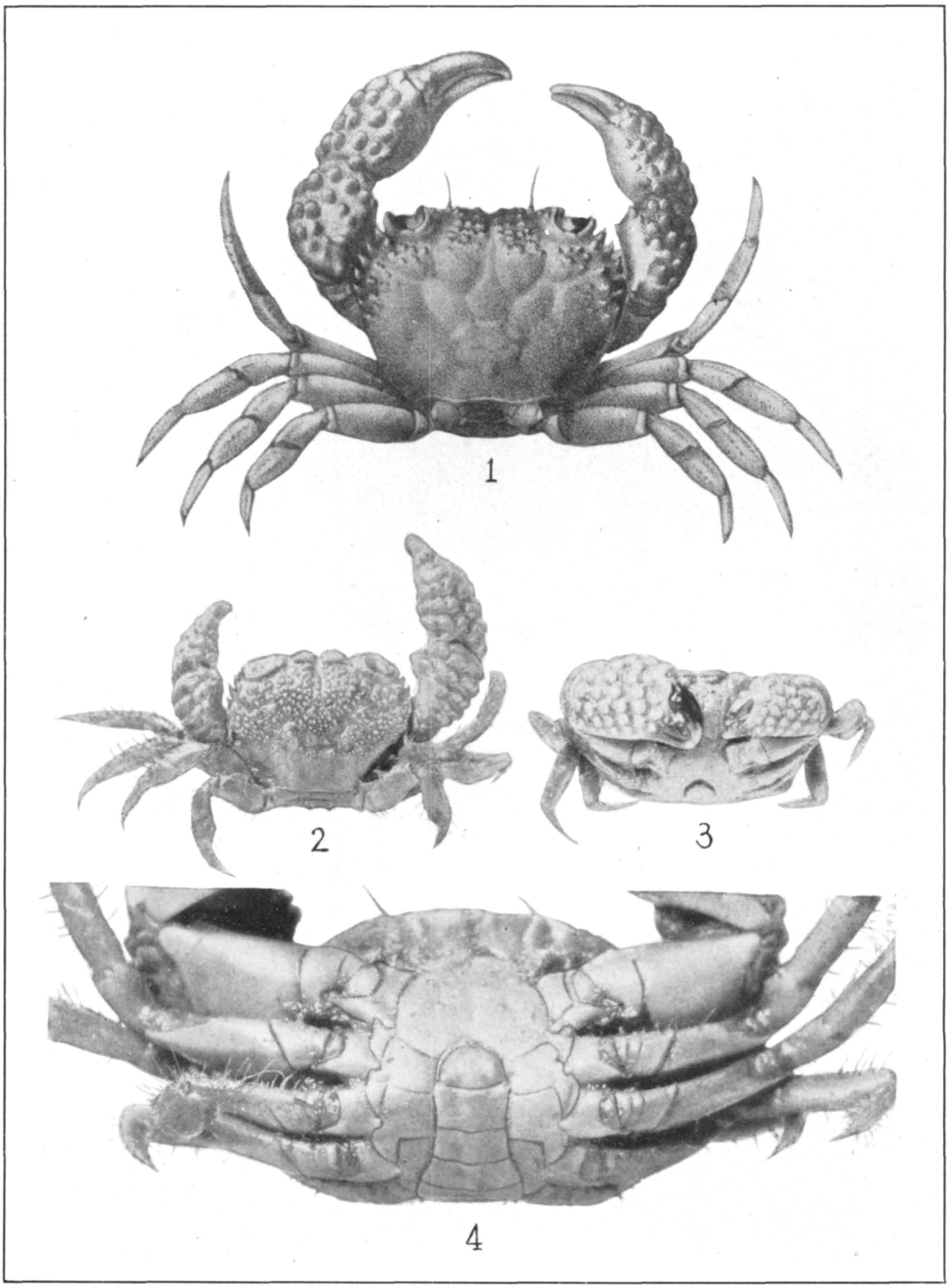


3

ERIPHIA SQUAMATA (P. 550)

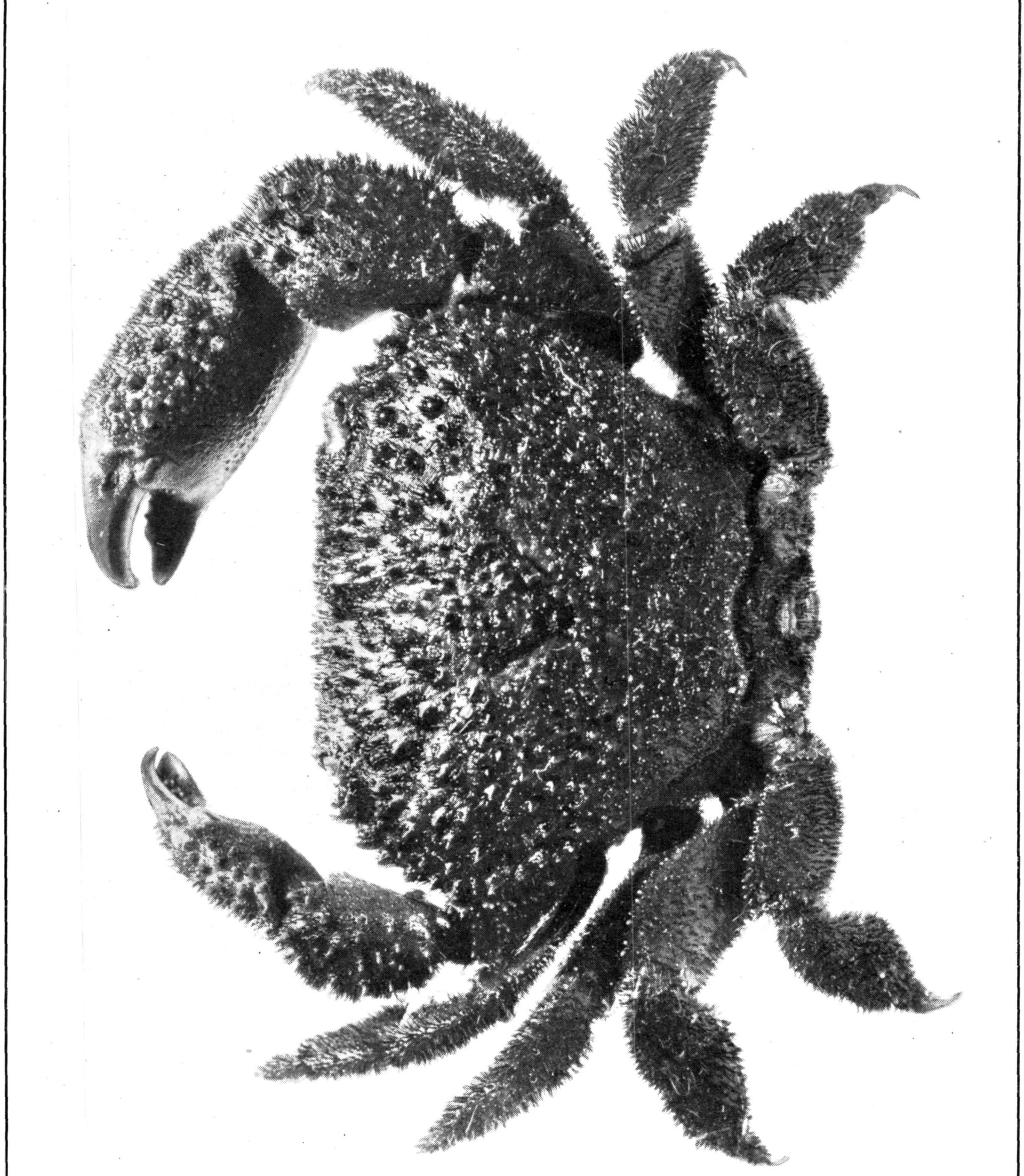
FOR EXPLANATION OF PLATE SEE PAGE 592.

79856—30———53



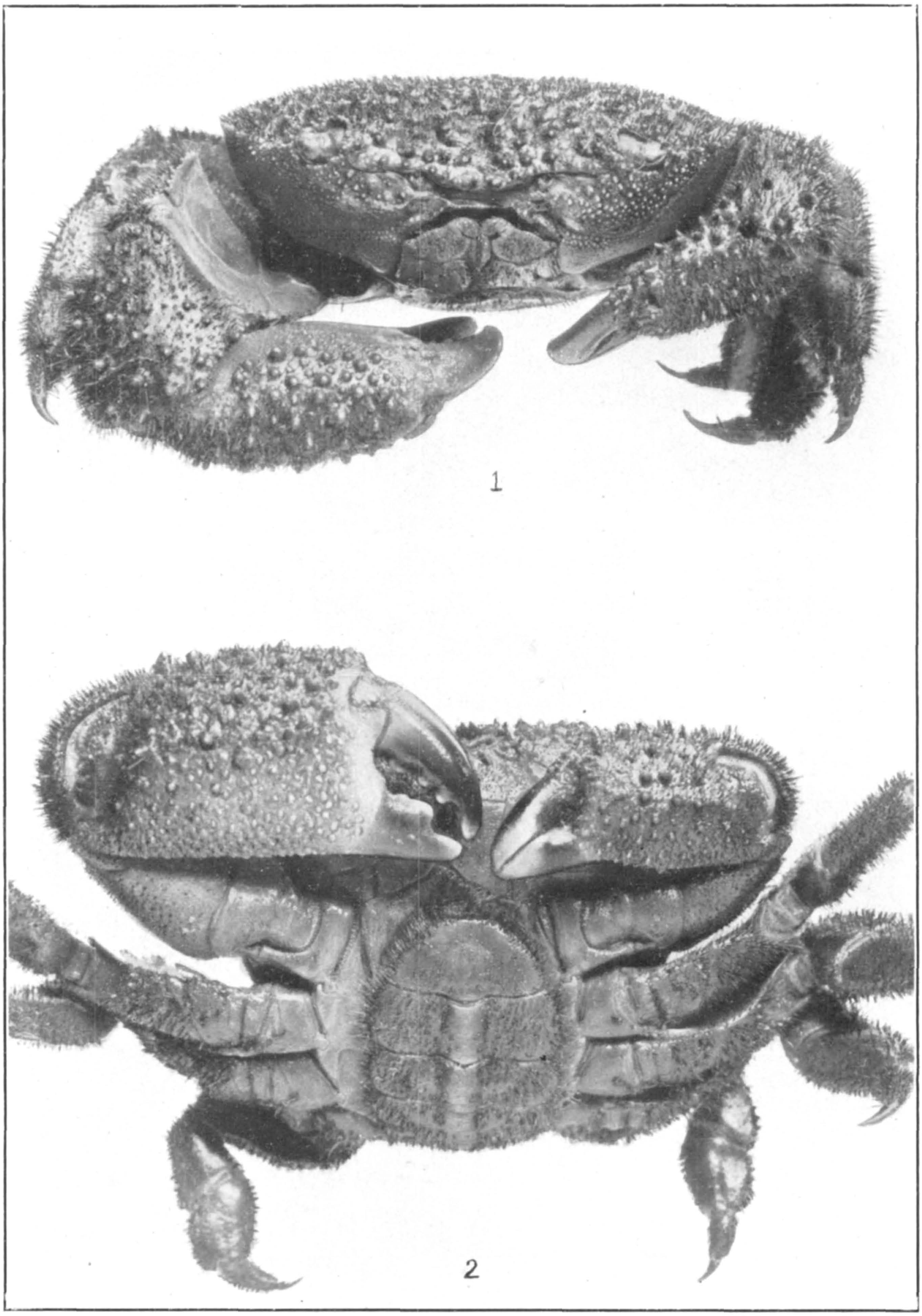
1. ERIPHIA SQUAMATA (P. 550). 2–4. E. GRANULOSA (P. 551)

FOR EXPLANATION OF PLATE SEE PAGE 592.



ERIPHIDES HISPIDA (P. 552)

FOR EXPLANATION OF PLATE SEE PAGE 592.

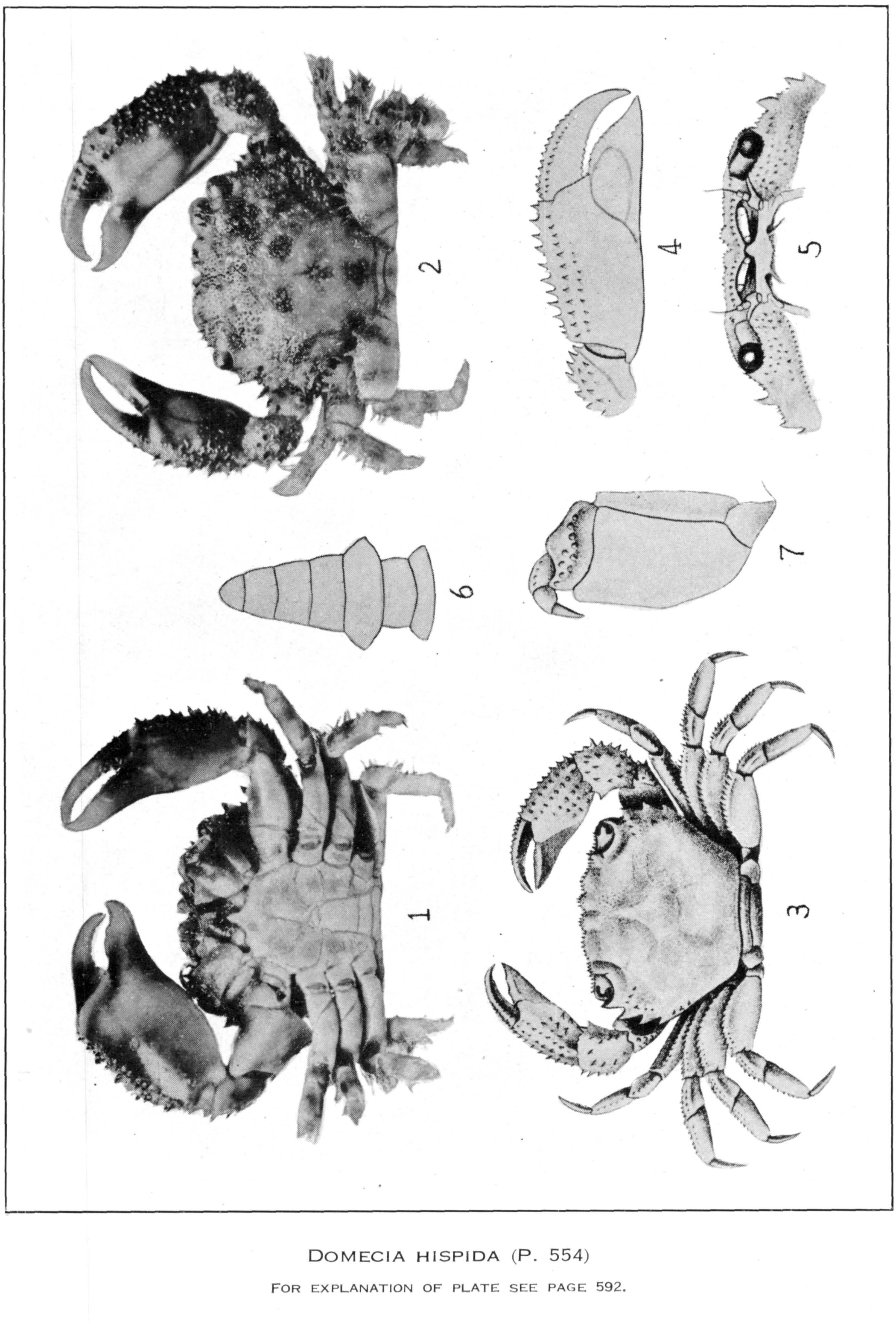


1

2

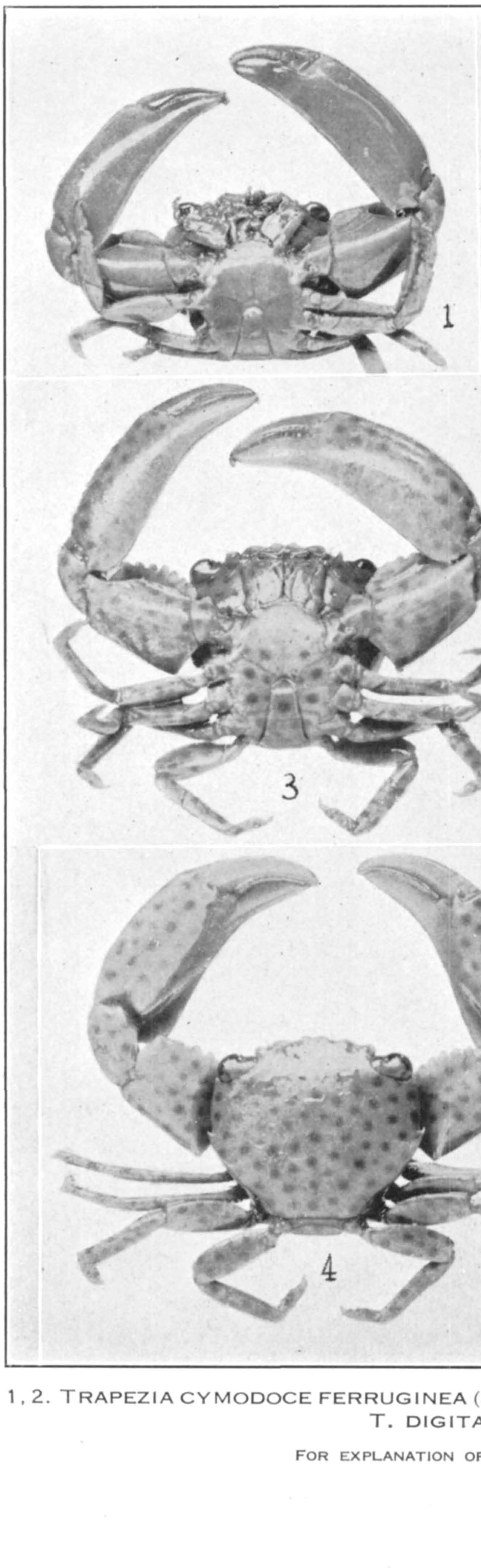
ERIPHIDES HISPIDA (P. 552)

FOR EXPLANATION OF PLATE SEE PAGE 592.



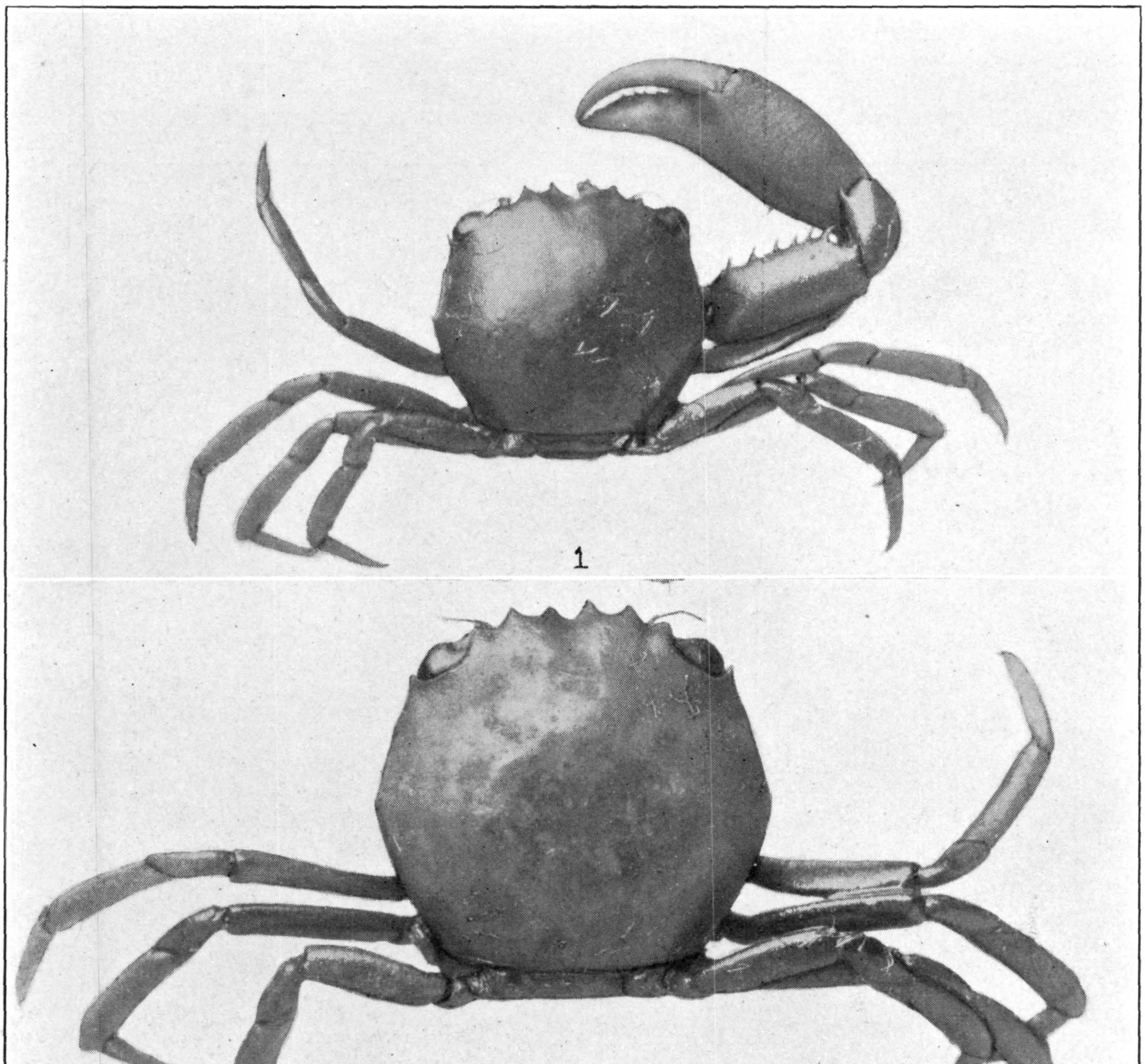
DOMECIA HISPIDA (P. 554)

FOR EXPLANATION OF PLATE SEE PAGE 592.



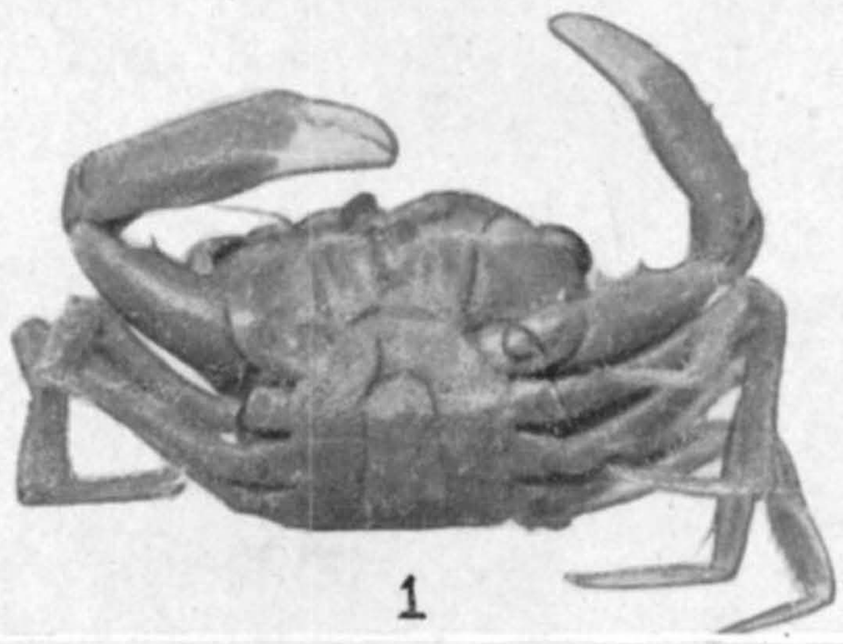
1, 2. TRAPEZIA CYMODOCE FERRUGINEA (P. 557). 3, 4. T. C. MACULATA (P. 558). 5. 6. T. DIGITALIS (P. 559)

FOR EXPLANATION OF PLATE SEE PAGE 592.



QUADRELLA NITIDA (P. 561)

FOR EXPLANATION OF PLATE SEE PAGE 593.



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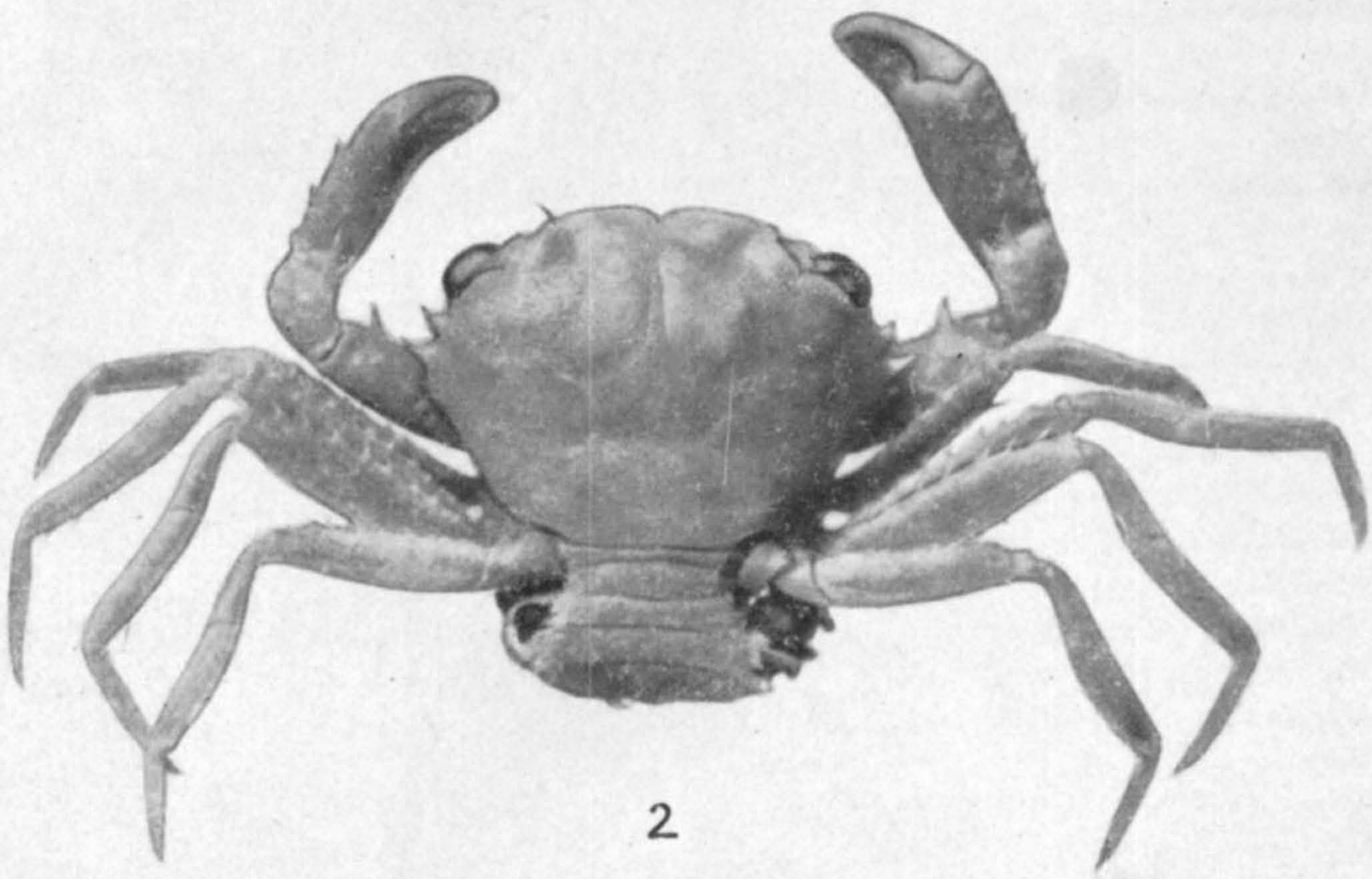

2

MELYBIA THALAMITA (P. 562)

FOR EXPLANATION OF PLATE SEE PAGE 593.