An Annotated Key to

CRABS AND LOBSTERS
(Decapoda, Reptantia)

FROM COASTAL WATERS OF THE NORTHWESTERN GULF OF MEXICO

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by

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INTRODUCTION

This key is designed for use in identifying crabs and lobsters (Decapoda, Reptantia) from coastal waters of the northwestern Gulf of Mexico. I define this geographical area to include marine and brackish waters inside 35 fathoms from the Mississippi Delta to the mouth of the Rio Grande. The decapod fauna of this area resembles, in composition, that of the temperate Atlantic or Carolinian Zoogeographic Province treated by Williams (1965) though with a somewhat greater tropical component and very few endemic species (Felder, unpublished; Hedgpeth, 1953).

The key was written to include new records, some of which are previously unpublished, and to reflect currently accepted taxonomy. Its writing was prompted, in part, by the difficulty of obtaining and using other commonly employed keys such as Rathbun's series, Wass (1955), or Williams (1965), and by their not being designed particularly for the northwestern Gulf of Mexico. Although many aspects of this work are original, much was compiled from zoogeographic works, ecological surveys, checklists, and systematic studies restricted to certain groups of reptants. Major works proving most useful include Crane (1943a, 1943b), Guinot (1967a, 1967b, 1967c, 1969), Holthuis (1959), Provenzano (1959), Rathbun (1918, 1925, 1930, 1933, 1937), Williams (1965), and Wass (1955). Checklists consulted include Behre (1950), Dawson (1966), Felder (unpublished), Gunter (1950), Hedgpeth, (1950), Hildebrand (1954, 1955), Leary 1967), Pequegnat (1970), Pequegnat and Pequegnat (1970), Smalley (unpublished), Chace (1956), Trott (unpublished), and Whitten, Rosene, and Hedgpeth (1950).

Additionally, several records and useful distributional data were derived from material in the following collections (cited in text as shown in parentheses):

> Invertebrate Collection, Department of Biology, University of Southwestern Louisiana, Lafayette, Louisiana (USL Collections)
>
> Invertebrate Collection, Department of Biology, Texas A and I University, Kingsville, Texas (TXAI Collections)
>
> Main Collection, University of Texas Institute of Marine Science, Port Aransas, Texas (UT Collections)

Biological Collection, Freeport Sulphur Company, Research and Development, Belle Chase, Louisiana (Freeport Sulphur Collections)

Marine Geological Collections, U.S. Geological Survey, Corpus Christi, Texas (USGS, Corpus Christi, TX)

Decapod Crustacean Collection (by author), Department of Zoology and Physiology, Louisiana State University, Baton Rouge, Louisiana (Author's Collections)

At present, study of reptant decapods continues in the northwestern Gulf of Mexico; many areas have yet to be investigated and distributions are often poorly understood. A number of systematic problems also remain to be resolved. As this group becomes better known, new distribution records will be established, new species likely described, and taxonomic revisions very likely necessitated. Periodically, therefore, this work will be revised and broadened in scope, thereby updating future editions as knowledge of reptant decapods is expanded.

USING THE KEY

In this author's opinion, there can be no good "field key" to the reptant decapods of any large geographical area. Using this key requires examination of materials in the laboratory with access to a dissecting scope, especially when keying small specimens; probes, forceps, calipers, and dividers may also prove necessary. The characters chosen for use in the key are hopefully definitive and reasonably obvious for each species. It is usually essential, however, that specimens be intact and of adult form; when possible, it may also help to obtain both male and female specimens.

For those unfamiliar with decapod anatomy, dorsal and ventral schematic drawings of a generalized brachyuran crab are provided on Plate 1 (page 14). Anatomical features peculiar to several families are schematically illustrated as the first figures of the respective family plates. The remaining figures are referred to in particular key couplets and depict part, all, or some key feature of each species included in the key. A glossary of terms is provided on pages 6-13.

Each species name in the key is accompanied by a short ecological note giving (when known) general habitat and documentation of occurrence in the northwestern Gulf of Mexico. Although synonomies are not provided

for all species in the key, a few of the more common synonyms are included with ecological notes; a list of these is provided below.

It should be noted that, for convenience, this key is in many respects "artificial"; that is, the order and nature of the characters used to distinguish certain families or species do not always reflect the quality, order, or proximity of phylogenetic relationships. Also, secondary contrasting characters are provided in most couplets. The key was so designed since "the primary purpose of a key is utilitarian" (Mayr, 1969). Phylogeny is for the most part, however, reflected in the order or succession in which families are presented in the key.

COMMON SYNONYMS AND QUESTIONABLE RECORDS

Because of recent taxonomic revisions and various errors in the literature, some common and lesser-known species from the northwestern Gulf of Mexico are now recognized under different names than those used a few years ago. Although synonomies are not provided for all species in the key, the following list includes some names commonly used in the past (SYNONYM), their presently preferred synonyms as used in the key (IN KEY), and a citation of literature concerning each revision (REFERENCE):

SYNONYM	IN KEY	REFERENCE
Calappa springeri	= Calappa sulcata	Holthuis (1958)
Callianassa jamaicense louisianensis	= Callianassa jamaicense	Rodrigues (1971)
Callinectes danae*	= Callinectes similis	Williams (1966)
Callinectes ornatus*	= Callinectes similis	Williams (1966)
Hepatus princeps	= Hepatus pudibundus	Holthuis (1959)
Lepidopa scutellata**	= Lepidopa benedicti	Holthuis (1960a)
Leptodius agassizii	= Pseudomedaeus agassizi	Guinot (1967c)
Ocypode albicans	= Ocypode quadrata	Holthuis (1959)
Ovalipes ocellatus guadulpensis	= Ovalipes guadulpensis	Williams (1962)

*Remains a valid name but not known to occur in the northwestern Gulf of Mexico.

**Present status nomen dubium.

SYNONYM	IN KEY	REFERENCE
Paguristes rectifrons	= Paguristes sericeus	Provenzano (1961)
Pagurus floridanus	= Pagurus pollicaris	Provenzano (1959)
Persephona punctata aquilonaris	= Persephona aquilonaris	Guinot-Dumortier (1959)
Petrochirus bahamensis	= Petrochirus diogenes	Holthuis (1959)
Petrolisthes sexspinosus	= Petrolisthes galathinus	Haig (1956)
Platypodia spectabilis	= Platypodiella spectabilis	Guinot (1967b)
Polyonyx macrocheles	= Polyonyx gibbesi	Haig (1960)
Porcellana soriata	= Megalobrachium soriatum	Haig (1960)
Speocarcinus carolinensis*	= Speocarcinus lobatus	Guinot (1969)
Uca pugnax rapax	= Uca rapax	Tashian and Vernberg (1958)

Additionally, literature review produced records of several species whose occurrence in the northwestern Gulf of Mexico seems questionable or which are of doubtful taxonomic status. The following of these were judged to be of such uncertain status that they are excluded from this key:

Callianassa stimpsoni Smith, 1873, is reported from Texas by Leary (1967); this species was renamed Callianassa atlantica Rathbun, 1926. The distribution of C. atlantica, as given by Williams (1965), is confined to the Atlantic coast and the Florida Gulf coast. As Leary (1967) mentions neither C. islagrande nor C. major, both of which are common in the northwestern Gulf, the record of C. stimpsoni likely refers to one of these.

Eurypanopeus crenatus "Rathbun"? is discussed under Eurypanopeus abbreviatus, page 68.

Menippe nodifrons Stimpson, 1859, is discussed in the ecological note for Menippe mercenaria, page 64. Interestingly, Rathbun's (1930) questionable record of this species from "Cameron, Louisiana" is based on material (USNM catalogue no. 30566) contributed by R. P. Cowles who also contributed the material (USNM catalogue no. 30570) for Rathbun's (1918) equally questionable record of Uca mordax from "Cameron, Louisiana." This coincidence may suggest that Cowles' specimens actually came from a more tropical area in which ranges of Menippe nodifrons and Uca mordax overlap, and that Rathbun's records of these species from Louisiana are therefore based on mislabelled material.

*Remains a valid name but not known to occur in the northwestern Gulf of Mexico.

Neopanope texana sayi (Smith, 1869) and Neopanope texana texana (Stimpson, 1859) are discussed under Neopanope texana, page 68.

Panopeus occidentalis Saussure, 1857, is discussed under Panopeus herbstii, page 69.

Sesarma tampicense Rathbun, 1914, was listed by Behre (1950) who noted personal communication from Chace stating he "would be inclined to strike out the records of S. (H.) tampicense from Louisiana and Mississippi."

Uca longisignalis Salmon and Atsaides, 1968, is discussed under Uca pugnax, page 84.

Uca mordax (Smith, 1870) is discussed under Uca rapax, page 84.

Uca virens Salmon and Atsaides, 1968, is discussed under Uca pugnax, page 84.

Despite unclear or uncertain records for several other species, they are included in this key in hope of generating additional material for use in eventually resolving their questionable status among northwestern Gulf fauna. These include Callinectes exasperatus (Gerstaecker, 1856), Ovalipes ocellatus (Herbst, 1799), Panopeus bermudensis Benedict and Rathbun, 1891, Portunus ventralis (A. Milne Edwards, 1879), and Scyllarus chacei Holthuis, 1960; records of each are briefly discussed in the respective ecological notes. Additionally, there is evidence that some records of Pilumnus sayi and Pilumnus dasypodus cited in this work actually refer to a new species of Pilumnus, the description of which is forthcoming.

GLOSSARY

Abdominal trunk.--The abdomen, excluding the terminal segment (in non-brachyurans, the terminal segment is the telson which forms the center part of a tail fan).

Acuminate.--Tapering to a point; pointed.

Afferent branchial opening.--An opening through which water passes to the gills.

Antenna.--See Plate 1, fig. 2a, page 14.

Antennule.--See Plate 1, fig. 2c, page 14.

Antero-lateral border (teeth).--See Plate 1, fig. 1a, page 14.

Areolation.--Marking or delineation of the various dorsal areas or regions of the carapace by furrows, grooves, ridges, or other ornamentation and offsets in contour.

Bidentate.--With or forming two teeth.

Bifid.--Divided into two equal lobes or parts by a median cleft.

Biramous.--Consisting of two branches.

Branchial region (of carapace).--See Plate 1, fig. 1, page 14.

Buccal cavity.--The cavity on the ventral surface of the body in which the mouthparts are located.

Calcareous.--Composed of opaque, calcium carbonate material; usually whitish though often with other superficial color.

Carapace.--The usually hardened, predominantly dorsal covering of the thorax.

Cardiac region (of carapace).--See Plate 1, fig. 1, page 14.

Carina.--A keel-like ridge or prominence.

Carpal cavity.--(As in major chela of Uca). Depression on proximal inside of palm where carpus fits when cheliped retracts.

Carpus.--The third article from the distal end of a thoracic leg (Plate 1, fig. 1k, page 14).

Cervical groove.--See Plate 1, fig. 1, page 14.

Chela.--An arrangement of the two distal articles of a leg so that the terminal article opposes the subterminal article and forms "pincers" for grasping (Plate 1, fig. 1g-i, page 14).

Chelate.--Forming a true chela in which a process of the subterminal article (propodus) extends distally to form immovable finger opposing terminal article (dactylus) (Plate 1, fig. 1g-i, page 14) (See "Subchelate").

Chelipeds.--The first pair of thoracic legs (first thoracic appendages behind third maxillipeds) when they bear chelae (Plate 1, fig. 1, page 14).

Ciliated.--With very fine hairs.

Condyles.--Knob-like articulating surfaces.

Corneous.--Composed of horn-like material, usually of translucent brown, tan, or yellow-brown color.

Coxa (coxal article).--(For thoracic legs). The proximal article; the article articulating with the thoracic sternum.

Dactylus (dactyl).--The distalmost or terminal article of a thoracic leg (Plate 1, fig. 1g and 1m, page 14).

Deciduous.--Easily removed.

Dentate.--With a toothed margin.

Denticulated.--With small teeth or tooth-like projections.

Dentiform.--Tooth-shaped.

Dilated cornea.--With a lobe of the eyestalk continued distally onto the darkly pigmented bulb (cornea) (as left eye in Plate 1, fig. 1, page 14).

Distal.--Farthest from the center of the body; remote from the point of attachment (opposite of proximal).

Dorsal view of carapace.--View of the carapace from above. When checking eyebrows of Uca, the posterior of the carapace must be raised sufficiently to expose the first two abdominal segments in dorsal view, thereby focusing one's eye on a plane tangent to a point slightly behind the middle of the carapace.

Dorsum.--The dorsal surface of the carapace.

Endognath.--The inner or major branch of a maxilliped (Plate 1, fig. 2e, page 14).

Endopod (of uropod).--The innermost branch of a biramous uropod (Plate 2, fig. 1b, page 22).

Endostome.--The plate forming the palate in the mouthframe of brachyurans (Plate 1, fig. 2e, page 14).

Epigastric region (of carapace).--The anteriormost part of the gastric region, just behind front of carapace; see Plate 1, fig. 1, page 14.

Epimeral.--Above the meri of the legs.

Epistome.--See Plate 1, fig. 2k, page 14.

Exognath of third maxilliped.--See Plate 1, fig. 2h, page 14.

Eyebrow.--Area of the carapace between the double upper margin of the orbit in Uca (Plate 12, fig. 13, page 80).

Eyescales.--Scale-like structures visible dorsally near the bases of the eyestalks (Plate 3, fig. 6, page 28).

Eyestalks.--The movable stalk bearing (or so located as for bearing) the pigmented light-receptive portion (cornea) of the compound eye. Length of eyestalk includes cornea (entire eye) in measurement.

Fingers.--See "movable finger" and "immovable finger."

Flagellum (of antenna).--The long narrow terminal part consisting of numerous short segments.

Front (of carapace).--The anterior margin of carapace between the orbits (Plate 1, fig. 1c, page 14).

Frontal teeth.--The teeth on the front of the carapace (Plate 8, fig. 1a-b, page 56) (not including those at the inner corners of the orbits).

Fronto-orbital width (frontal border of carapace).--The anterior margin of carapace including the orbits (Plate 1, fig. 1b, page 14).

Gastric region (of carapace).--See Plate 1, fig. 1, page 14.

Granulate.--Composed of or covered with granules.

Head appendages.--Usually includes the eyestalks, antennae, and antennules.

Hepatic region (of carapace).--See Plate 1, fig. 1, page 14.

Hiatus (orbital).--A gap in the lower inner margin of the orbit which may allow the antenna to enter the orbit.

Immovable finger.--A distally produced extension of the propodus which opposes the terminal article (dactylus) to form pincher or chela (Plate 1, fig. 1h, page 14).

Inner frontal teeth.--The pair of teeth nearest the center of the front of carapace (Plate 8, fig. 1a, page 56).

Inner orbital teeth.--The teeth forming the inner corners of the orbits on either side of the front of carapace (Plate 8, fig. 1c, page 56).

Interantennular spine.--A spine just beneath the front of the carapace, situated between the antennules.

Intermedial region (of carapace).--See Plate 1, fig. 1, page 14.

Interocular.--Between the eyes.

Interorbital.--Between the orbits.

Intestinal region (of carapace).--See Plate 1, fig. 1, page 14.

Ischium (of third maxilliped).--The fifth article from the distal end of a thoracic appendage (i.e. the article just proximal to the merus). Ischium of third maxilliped shown in Plate 1, fig. 2l, page 14). The ischium of the third maxilliped may be greatly reduced, absent, or fused with the merus in the Pinnotheridae.

Lanceolate.--Lance-shaped.

Lateral angle.- The point where antero-lateral margin bends to become the postero-lateral margin; usually the point of maximum lateral extent

of the carapace and often marked with a spine or tooth.

Lateral spine.--The lateral angle when it is produced to form a spine; often same as the last or posteriormost antero-lateral spine or tooth.

Lunate.--Crescent-shaped or sickle-shaped.

Major cheliped (or chela).--The larger of the two when they are of different size.

Mandible.--The innermost (anteriormost) of the mouth appendages (Plate 1, fig. 2i, page 14).

Manus.--A name used for the propodus (article second from the distal end) when it, by opposing the dactylus, forms pincher or chela (Plate 1, fig. 1h-i, page 14).

Maxillipeds.--The three outermost pairs of mouth appendages (see "second maxillipeds" and "third maxillipeds" in Glossary).

Merus.--The fourth article from the distal end of a thoracic appendage. Meri of thoracic legs shown in Plate 1, fig. 1j, page 14; merus of third maxilliped shown in Plate 1, fig. 2m, page 14, though it may be relatively larger or fused with ischium in the Pinnotheridae.

Minor cheliped (or chela).--The smaller of the two when they are of differ- size.

Mouthframe.--In brachyurans, the cavity or depressed area containing the mouth appendages (maxillipeds, mandibles, etc.) and including the endo- stome; usually bounded anteriorly by the epistome, posteriorly by the thoracic sternum, and laterally by margins of the underside of the cara- pace (see large shaded area in Plate 1, fig. 2, page 14).

Movable finger.--Another name for the dactylus when it opposes the propodus to form pincher or chela (Plate 1, fig. 1g, page 14).

Non-ovigerous.--Not carrying eggs on the abdomen or abdominal appendages (check concealed surface of abdomen).

Obsolescent.--Reduced to insignificant size; vestigial.

Orbit.--Eye socket; cavity in carapace to contain the eye.

Orbital fossa (lobe of).--See Plate 1, fig. 2d, page 14.

Outer frontal teeth.--The pair of teeth flanking the inner frontal teeth (Plate 8, fig. 1b, page 56).

Ovigerous.--Carrying eggs on the abdomen or abdominal appendages (check concealed surface of abdomen).

Palm.--The propodus (subterminal segment) of the cheliped exclusive of the immovable finger.

Palp (of third maxilliped).--All articles of the maxilliped distal to the merus; the three distal articles (Plate 1, fig. 2j, page 14).

Postocular.--Behind the eye.

Process.--Any marked prominence or projecting part; an outgrowth or extension.

Propodus.--The second article from the distal end of a thoracic leg (Plate 1, fig. 1l, page 14).

Protogastric region (of carapace).--See Plate 1, fig. 1, page 14.

Proximal.--Nearest the center of the body; nearest the point of attachment (opposite of "distal").

Pubescence.--A downy or soft, fine mat of short hair.

Punctate.--Marked with minute depressions.

Rostrum.--The front of the carapace (between the eyes) in those cases in which it is produced or projecting anteriorly (as to greater or lesser degree in all figures of Plate 7, page 50).

Rugae.--Folds or wrinkles often appearing as low crests or ridges.

Rugose.--Covered with rugae or wrinkles.

Second maxillipeds.--The pair of mouth appendages lying just beneath the third maxillipeds (Plate 1, fig. 2f-g, page 14).

Setae.--Hair-like projections; as used here, usually referring to stiff hairs or bristles.

Setose.--Covered with stiff hairs or bristles.

Simple (leg).--As opposed to chelate and subchelate legs, simple legs do not

have the terminal and subterminal articles arranged in opposition to form pincers.

Sinuous.--Bending in and out in a wavy fashion.

Spatulate.--Broad, flat and thin.

Spine.--A sharply pointed process.

Spiniform.--Spine-shaped.

Spinous.--With spines; spiny.

Spinule.--A very small spine or sharp granule.

Subchelate.--An imperfect chela in which pincher is formed by the dactylus folding back against a broadened propodus rather than opposing a distally produced immovable finger (as in Plate 4, fig. 5, page 34). (Also see "Chelate.")

Subhepatic (area of carapace).--See Plate 1, fig. 2, page 14.

Superhepatic (spines).--Spines projecting dorsally from the middle of the hepatic region.

Suture.--A nonflexible or slightly flexible joint or seam.

Swimming leg.--(As in reference to the Portunidae). The fifth thoracic leg in those cases in which the dactylus is paddle shaped.

Telson.--In nonbrachyurans, the terminal segment on the abdomen which sometimes forms the center part of a tail fan.

Third maxillipeds.--The outermost pair of mouth appendages (Plate 1, fig. 2h, j, l, m, page 14).

Thoracic legs.--The five pairs of thoracic appendages posterior to the third maxillipeds (Plate 1, fig. 1, page 14); this includes the cheliped and four walking legs.

Thoracic sternum.--See Plate 1, fig. 2, page 14.

Tooth.--A hardened projecting process, usually somewhat flattened and more robust than a "spine."

Truncate.--With a chopped-off or lobed-off appearance.

Tubercle.--A knoblike prominence or excrescence; a nodule.

Tuberculate.--Composed of or covered with tubercles.

Uropods.--(When present) a pair of usually biramous abdominal appendages that, together with the terminal segment(s) of the abdomen, form a tail fan; may be present only as vestiges on the margins or concealed surface of the terminal segment(s) of abdomen (Plate 2, fig. 1b-c, page 22), (Plate 3, fig. 1f, page 28),(Plate 4, fig. 1d, page 34).

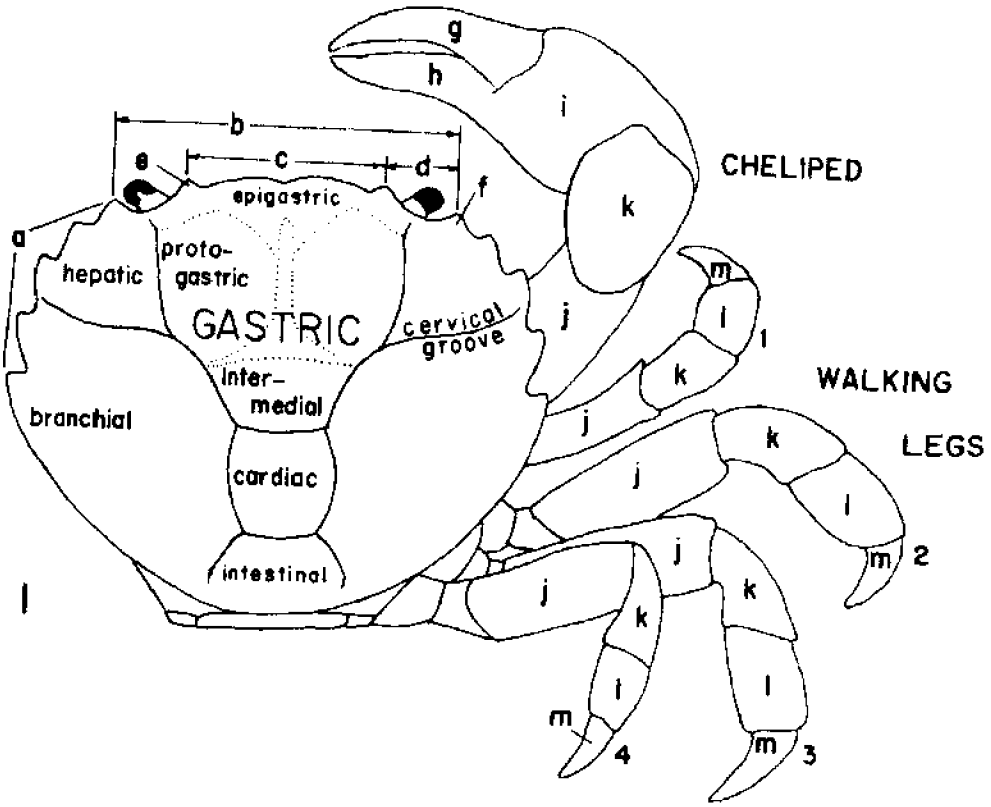
Plate 1

SCHEMATIC CRAB

Fig. 1. Schematic drawing of a brachyuran crab in dorsal view showing only the right legs; dorsal regions of carapace indicated; symbols refer to the following: a. antero-lateral teeth, b. fronto-orbital width of carapace, c. front = frontal width of carapace, d. orbit = orbital width, e. inner orbital tooth, f. outer orbital tooth = post-orbital angle, g. movable finger = dactylus of cheliped, h. immovable finger, i. palm, g-i. chela, h-i. manus = propodus of cheliped, j. merus, k. carpus, l. propodus, m. dactylus = dactyl

Fig. 2. Schematic drawing of a brachyuran crab in ventral view; legs not shown and left third maxilliped removed to expose underlying parts; ventral areas indicated and symbols refer to the following: a. antenna, b. front, c. antennule, d. lobe of inner orbital fossa, e. endostome of buccal cavity, f. endognath of second maxilliped (see also Plate 12, fig. 9, page 80)

PLATE I



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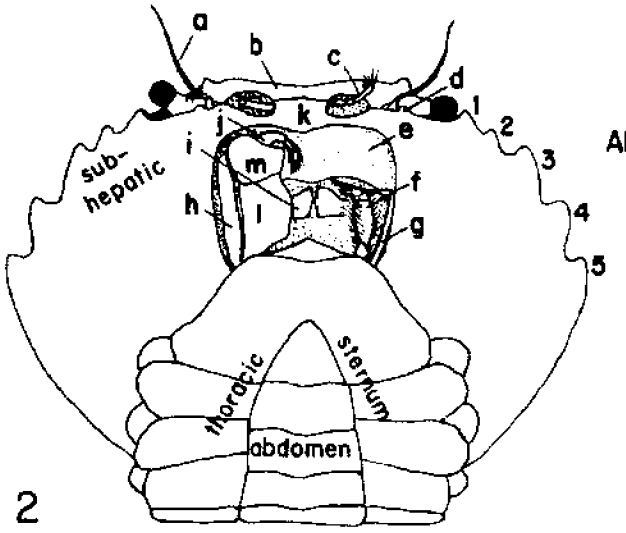


ANTERO-LATERAL

TEETH

2

AN ANNOTATED KEY TO CRABS AND LOBSTERS (DECAPODA, REPTANTIA) FROM COASTAL WATERS OF THE NORTHWESTERN GULF OF MEXICO

Key to Families

1. Abdomen symmetrical, with segmented exoskeletal covering 2

- Abdomen asymmetrically twisted, without segmented exoskeletal covering (live in gastropod shells) 6

2. Abdomen large, extended posteriorly with lobster-like flexure; median length of abdominal trunk, excluding terminal segment (telson), usually greater than median length of carapace 3

- Abdomen reduced, flexed either against itself or against thoracic sternum beneath carapace; median length of abdominal trunk, excluding terminal segment, equal to or less than median length of carapace . . . 7

3. First thoracic legs chelate 4

- First thoracic legs simple, not chelate 5

4. Carapace with longitudinal, mid-dorsal carina

   AXIIDAE (Plate 2, fig. 16) . . . . . page 21

- Carapace without longitudinal, mid-dorsal carina

   CALLIANASSIDAE (Plate 2, figs. 1-14) . . . . . page 21

5. Antennae elongate, whip-like, and spinous; length of antennae more than 3 times length of carapace

   PALINURIDAE (Plate 2, fig. 15) . . . . . page 24

- Antennae short, very broad, flattened; length of antennae less than length of carapace

   SCYLLARIDAE (Plate 2, figs. 17-20) . . . . . page 25

6. Third maxillipeds widely separated at base by sternum (Plate 3, fig. 2, page 28)

PAGURIDAE (Plate 3, figs. 2, 4-9, and 11-13) . . . . . page 26

- Third maxillipeds approximately together at base (Plate 3, fig. 3, page 28)

DIOGENIDAE (Plate 3, figs. 3, 10, and 14-21) . . . . . page 30

7. Abdomen with biramous uropods (often small or somewhat hidden) flanking base of telson; insertion of antenna lateral to area occupied by eye or orbit 8

- Abdomen never with biramous uropods (usually with no uropods, rarely in Dromiidae with vestigial uniramous uropods between terminal and next abdominal segment); insertion of antenna, if exposed, ventral or medial to area occupied by orbit or eye 10

8. First thoracic legs fully chelate with movable fingers opposing well-developed immovable fingers; exoskeletal covering of terminal segment of abdomen subdivided into 5-7 pieces

PORCELLANIDAE (Plate 4, figs. 10-16) . . . . . page 32

- First thoracic legs simple (Plate 4, figs. 2-3, page 34) or subchelate (Plate 4, fig. 5, page 34); exoskeletal covering of terminal segment of abdomen entire 9

9. First thoracic legs simple (Plate 4, figs. 2-3, page 34); abdomen terminated with elongate, lanceolate telson (Plate 4, fig. 1e, page 34)

HIPPIDAE (Plate 4, figs. 1-4) . . . . . page 36

- First thoracic legs subchelate (Plate 4, fig. 5, page 34); abdomen with round, oval, or heart-shaped terminal segment

ALBUNEIDAE (Plate 4, figs. 5 and 7-9) . . . . . page 37

10. Distal articles of second, third, and fourth legs very broadly spatulate; immovable finger of chela protrudes at distinct right angle to axis of palm (see Plate 4, fig. 6, page 34)

RANINIDAE (Plate 4, fig. 6) . . . . . page 38

- Distal articles of second, third, and fourth legs not broadly spatulate; immovable finger of chela not protruding at distinct right angle to axis of palm, though sometimes oblique or greatly reduced 11

11. Outline of mouthframe distinctly narrowed anteriorly, either abruptly constricted to form short longitudinal gutter or tapering to form roughly triangular mouthframe; mean width of mouthframe in anterior quarter about 1/2 or less greatest width in posterior portion 12

- Outline of mouthframe roughly square or quadrate, not distinctly narrowed anteriorly; mean width of mouthframe in anterior quarter distinctly exceeds 1/2 greatest width in posterior portion 13

12. Ventral surface of carapace contacts (and forms suture with) thoracic sternum at narrow region between base of cheliped and third maxilliped; exognath of third maxilliped covers distinct shallow gutter or channel paralleling either side of mouthframe for full length

LEUCOSIIDAE (Plate 5, figs. 1-5) . . . . . page 39

- Ventral surface of carapace not contacting thoracic sternum between cheliped and third maxilliped (separated by gap which is usually filled or covered by third maxilliped or laterally directed branch of third maxilliped); no distinct shallow channel for full length of mouthframe beneath exopod of third maxilliped

CALAPPIDAE (Plate 5, figs. 6-14) . . . . . page 42

13. Last walking legs (fifth thoracic legs) carried against postero-dorsal area of carapace (much as in Plate 6, fig. 1, page 46); dactyl of last legs prehensile, either hooked and opposing propodal spine to form small, sharp pincers or with sharp, vertically-directed spike on upper side (never paddle shaped)

DROMIIDAE (Plate 6, figs. 1-5) . . . . . page 44

- Last walking legs carried much as other walking legs, not against postero-dorsal carapace; dactyl of last neither forming sharp pincers with propodus nor with sharp, vertically directed spike on upper side (dactyl sometimes paddle shaped; rarely subchelate as in Plate 7, fig. 4, page 50) 14

14. Body roughly triangular, drop shaped, or (less often) hexagonal in shape, usually narrowing toward front; carapace either with front produced to form rostrum (single or bifurcate) or with 1-several spines (or large protruding tubercles) on posterior or postero-lateral margins 15

- Body roughly round, oval, square, or hexagonal in shape, front not produced to form rostrum though sometimes with several teeth or lobes; carapace never with spines on posterior or postero-lateral margins . 16

15. Chelipeds distinctly longer and more massive than other legs; never with hooked hairs on carapace or rostrum; greatest width of carapace more than greatest length

PARTHENOPIDAE (Plate 6, figs. 6-9) . . . . . page 45

- Chelipeds not distinctly longer and more massive than other legs; coarse hooked hairs often (though not always) present on carapace or rostrum; greatest width of carapace usually less than or equal to greatest length (including rostrum in length)

MAJIDAE (Plate 7) . . . . . page 48

16. Palp of third maxilliped articulates at or very near antero-internal corner of merus; antero-lateral margin of carapace often with more than 4 teeth, spines, or lobes; sometimes with 4, 3, or none 17

- Palp of third maxilliped articulates near either middle anterior margin or antero-lateral corner of merus of third maxilliped (merus sometimes oval; merus and ischium may be fused in Pinnotheridae); antero-lateral margin of carapace never with more than 4 teeth or spines; either 4, 2, 1, or none 19

17. Legs adapted for swimming; posterior pair of legs with terminal segment paddle shaped (Plate 8, fig. 1i, page 56)

PORTUNIDAE (Plate 8) . . . . . page 54

- Legs not adapted for swimming; no paddle-shaped terminal segment on posterior legs 18

18. Carapace always near oval or hexagonal in dorsal view; fronto-orbital width never more than 4/5 greatest width of carapace

XANTHIDAE (Plate 9) . . . . . page 60

- Carapace near quadrate in dorsal view; fronto-orbital width may range from about 1/2 to more than 9/10 greatest width of carapace

GONEPLACIDAE (Plate 10, figs. 1-3) . . . . . page 70

19. Palp of third maxilliped distally branched (appears biramous as terminal article of palp articulates near midlength or on proximal 1/2 of subterminal article, Plate 10, figs. 9a, 11a, 12a, page 72); carapace usually soft or membranous; fronto-orbital width often less than 1/2 greatest width of carapace; small, usually commensal or parasitic

PINNOTHERIDAE (Plate 10, figs. 4-14) . . . . . page 71

- Palp of third maxilliped distally single, terminal article articulates at or near distal end of subterminal article (much as in Plate 11, fig. 2, page 76; Plate 12, figs. 1 and 2, page 80); carapace not membranous (except during brief post-molt period); fronto-orbital width equal to or greater than 1/2 greatest width of carapace; usually free-living . . . 20

20. Frontal width of carapace greater than 1/2 fronto-orbital width; carapace with 1-4 antero-lateral teeth (including postorbital angle)

GRAPSIDAE (Plate 11) . . . . . page 75

- Frontal width of carapace less than 1/2 fronto-orbital width; carapace with 1 or no antero-lateral teeth (including postorbital angle) 21

21. Fronto-orbital width 1/2 to 2/3 width of carapace

GECARCINIDAE (Plate 12, figs. 1-4) . . . . . page 79

- Fronto-orbital width as great or almost as great as width of carapace

OCYPODIDAE (Plate 12, figs. 5-14) . . . . . page 82

SECTION: MACRURA

Family: AXIIDAE (Plate 2, fig. 16)

Calocaris hirsutimana Boesch and Smalley, 1972. Known from shallow shelf waters of the open Gulf off the Mississippi Delta; found on bottoms 11-50 meters in depth, probably as a burrower (Boesch and Smalley, 1972).

Family: CALLIANASSIDAE (Plate 2, figs. 1-14)

1. Rostrum large, broader (at midlength) than eyestalk and exceeding eyestalk anteriorly; chelipeds similar and subequal in size (figs. 2-3)
   Upogebia affinis (Say, 1818). Burrows in muddy substrates of intertidal, estuarine mudflats and shallow bays; occasionally found on open Gulf bottoms to over 17 fathoms. Reported from Texas and Louisiana (Behre, 1950; Hedgpeth, 1950; Felder, unpublished).

- Rostrum, if present, either distinctly shorter than or distinctly narrower than eyestalk; chelipeds dissimilar, unequal in size 2

2. Endopod of uropod 1-2 times longer than broad; rostrum extending more than 1/4 length of eyestalk 3

- Endopod of uropod 3-4 times longer than broad; rostrum extending less than 1/4 length of eyestalk 4

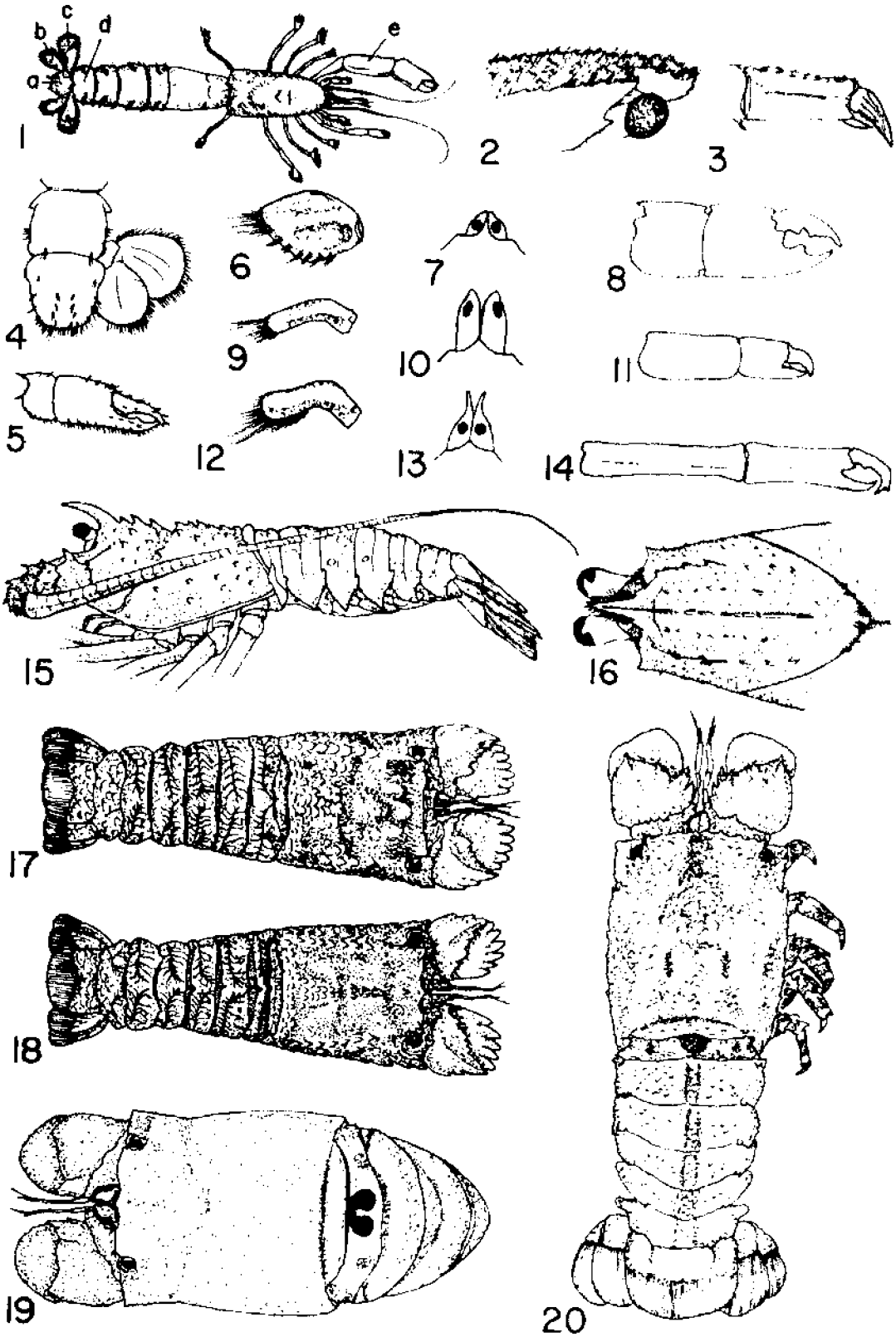
3. Telson approximately as long as endopod of uropod; sixth abdominal segment with antero-lateral margin expanded to form short keel (most conspicuous in males) (figs. 4-5)
   Callianassa latispina Dawson, 1967. Type locality 7 1/2 fathoms off Grand Isle, LA where it was dredged from soft mud bottom (Dawson, 1967). Records other than in NW Gulf from marine offshore bottoms 20-28 fathoms, sometimes found in muddy passageways of coral fragments (Biffar, 1971).

Plate 2

CALLIANASSIDAE, PALINURIDAE, AXIIDAE, SCYLLARIDAE

Fig. 1. Schematic drawing of a callianassid: a. telson, b. endopod of uropod, c. exopod of uropod, d. sixth abdominal segment, e. carpus of major cheliped
2. Rostral area of Upogebia affinis in lateral view (after de Mann, 1927)
3. Cheliped of Upogebia affinis (after de Mann, 1927)
4. Sixth abdominal segment, telson, and uropods of Callianassa latispina drawn as composite after Dawson (1967) and Biffar (1971)
5. Major cheliped of Callianassa latispina (after Biffar, 1971)
6. Endopod of left uropod from Callianassa jamaicense
7. Rostrum and eyes of Callianassa jamaicense
8. Major chela and carpus of male Callianassa jamaicense
9. Endopod of left uropod from Callianassa major
10. Rostrum and eyes of Callianassa major
11. Major chela and carpus of male Callianassa major
12. Endopod of left uropod of Callianassa islagrande
13. Rostrum and eyes of Callianassa islagrande
14. Major chela and carpus of male Callianassa islagrande
15. Panulirus argus from left side without legs; drawn after Williams (1965) and specimens at hand
16. Eyes and anterior carapace of Calocaris hirsutimana (after Boesch and Smalley, 1972)
17. Dorsal view of Scyllarus chacei
18. Dorsal view of Scyllarus nearctus
19. Dorsal view of Scyllarides aequinoctialis with abdomen flexed to expose first abdominal segment (after Verrill, 1922)
20. Dorsal view of Scyllarides nodifer showing right legs

PLATE 2



- Telson distinctly shorter than endopod of uropod; no antero-lateral keel on sixth abdominal segment (figs. 6-8)

  Callianassa jamaicense Schmitt, 1935. Formerly known as Callianassa jamaicense louisianensis; the subspecies was rejected by Rodrigues (1971). Burrows in mud-sand substrates on beaches, mud flats, bottoms of bays, and near river mouths, with overlying waters from 3 ppt to near-marine; burrows less than 1 meter to over 2 meters into sediment. Found in suitable habitat throughout NW Gulf coast; reported by Willis (1942), Hedgpeth (1950), and Leary (1967).

4. Eyestalk flattened most of length, bluntly pointed distally, terminal 1/3 not slender spine; endopod of uropod with setae confined to distal margin; males with carpus of major cheliped 2 1/2-3 times longer than wide (figs. 9-11)

  Callianassa major Say, 1818. Burrows about 2-5 feet (Lunz, 1937) in sandy Gulf beaches bordering marine and near-marine waters, intertidal to 1 fathom; occasionally in lower salinity waters (Rodrigues, 1971). Records from Grand Isle and Timbalier Island, LA (Willis, 1942). Listed by Trott (unpublished) from vicinity of Port Aransas, TX.

- Eyestalk with terminal 1/3-2/5 drawn out into slender, slightly up-curved spine; endopod of uropod with setae on distal margin and continued onto distal 1/2 of inner margin; males with carpus of major cheliped about 4 (or more) times longer than wide (figs. 12-14)

  Callianassa islagrande Schmitt, 1935. Burrows in clean sand beaches especially on open barrier islands in NW Gulf. Known from Grand Isle, the type locality (Schmitt, 1935), Timbalier Island (Willis, 1942), and Isles Dernieres (Author's Collections) on the Louisiana coast and barrier islands including Padre and Mustang on Texas coast (USGS, Corpus Christi, TX).

Family: PALINURIDAE (Plate 2, fig. 15)

Panulirus argus (Latreille, 1804). Most often on reefs where rocks and fouling material afford concealment; reported by Williams (1965) from low tide to 50 fathoms, though probably confined to marine waters well offshore in NW Gulf. Recorded from vicinity of Ship Shoal, south of Wine Island, LA and at 32 fathoms east of Mississippi River (Moore, 1962).

Family: SCYLLARIDAE (Plate 2, figs. 17-20)

1. Terminal article of antenna with distal edge cut into 6-7 distinct, anteriorly projecting lobes 2

- Terminal article of antenna with distal edge crenulate or minutely lobate and either evenly or irregularly rounded 3

2. Prominences on carapace blunt; distal articles of antennae close together, their inner margins usually are separated by less than 1/3 width of antenna (fig. 17)

   Scyllarus chacei Holthuis, 1960. In offshore marine waters, 9-100 fathoms; reported "through Gulf of Mexico" by Williams (1965). Franks et al (1972) reported specimens of Scyllarus sp. in 30-50 fathoms off the Mississippi Delta.

- Prominences on carapace not all blunt, 1 gastric and all lateral prominences sharp; distal articles of antennae apart, divergent distally, their inner margins separated by at least 1/3 width of antenna (fig. 18)

   Scyllarus nearctus Holthuis, 1960. In offshore marine waters, 30-100 fathoms. Formerly confused with S. arctus Linnaeus, a European species (Holthuis, 1960b). Chace (1956) reported it (as S. arctus) from 50 fathoms off Mississippi Delta; reported "through Gulf of Mexico" by Williams (1965).

3. First abdominal segment (segment partially concealed by posterior of carapace) with medial pair of purplish- or reddish-brown spots, sometimes connected anteriorly to form horseshoe-shaped mark (may have lighter spots to either side); second-fourth segments, though highest medially, never distinctly carinate (fig. 19)

   Scyllarides aequinoctialis (Lund, 1793). Found in offshore marine waters 5-100 fathoms; Bermuda specimens taken from vicinity of reefs (Verrill, 1922). Reported by Hildebrand (1954) from 17 fathoms off S. Texas coast.

- First abdominal segment marked medially with single purplish- or reddish-brown spot (may have lighter spots to either side); second-fourth segments with distinct, abruptly raised, median carinae (fig. 20)

   Scyllarides nodifer (Stimpson, 1866). Known from mud, shell, coral, and sandy bottoms, 8-40 fathoms; reported from 30 and 40 fathoms off east side of Mississippi Delta (Franks et al, 1972). Specimens have also been taken from vicinity of Stetson Banks and 90 miles south of Pecan Island, LA (USL Collections) and off Port Mansfield, TX (TXAI Collections).

SECTION: ANOMURA

Family: PAGURIDAE (Plate 3, figs. 2, 4-9, and 11-13)

1. Eyescales unarmed or armed with 1-2 subterminal spines 2

- Eyescales armed with 3-6 spines along antero-medial margin (fig. 6) Pagurus brevidactylus (Stimpson, 1859). Found in marine waters on hard substrate, 1-125 fathoms. Reported from reef off S. Texas coast near Port Mansfield (Felder, unpublished).

2. Length of eyestalk not more than 3 1/2 times its greatest width; eyestalk with cornea dilated though only slightly so in some 4

- Length of eyestalk at least 4 times its greatest width; eyestalk with cornea not dilated 3

3. Antennal setae 4-5 antennal segments in length (fig. 4) Pagurus annulipes (Stimpson, 1862). In marine and near-marine waters, typically on soft sand or rubble substrates, low tide to 23 fathoms. Known from vicinity of Grand Isle, LA (Behre, 1950), Lake Pelto, LA (Freeport Sulphur Collections), off Galveston, TX (Leary, 1967), and, tentatively, off S. Texas near Port Mansfield (Author's Collections).

- Antennal setae 1-2 antennal segments in length (fig. 5) Pagurus bonairensis Schmitt, 1936. Most common in warm shallow marine waters, typically associated with grass beds (Rouse, 1970). Specimens taken from the Chandeleur Islands, LA (USL Collections).

4. Width of major chela equal to or less than 1/2 length 5

- Width of major chela more than 1/2 length 6

5. Inner margin of major chela (posterior to movable finger) with longitudinal row of 12-15 sharp tubercles larger than those on outside margin of immovable finger; sharp, curved, lateral spine at base of antennal peduncle (fig. 11)

Pagurus bullisi Wass, 1963. In offshore marine waters from 25-125 fathoms. Largest species of Pagurus in the Gulf of Mexico,

body up to 4 inches long; known from a number of areas in the Gulf off both Louisiana and Texas (Wass, 1963; Harry, unpublished).

- Inner margin of major chela with, at most, small tubercles or granules, which are never as large as tubercles on outside margin of immovable finger; no lateral spine at base of antennal peduncle (fig. 7)
  Pagurus longicarpus Say, 1817. Common along Gulf beaches and near-marine bay shores, from shallow water to near 30 fathoms. Found throughout NW Gulf coast (Behre, 1950; Whitten, Rosene, and Hedgpeth, 1950; Williams, 1965).

6. Fingers of chelae swing open and closed in horizontal plane; about 4-10 strong, sharp tubercles (about as strong as or stronger than any on chela) on inner margin of minor manus, posterior to movable finger 7

- Fingers of chelae swing open and closed in oblique plane; at most a few small tubercles on inner margin of minor manus 8

7. Dactyl of major chela with sharply produced angle on outer margin; no depressed spot at base of immovable finger of either chela (fig. 8)
  Pagurus pollicaris Say, 1817. Provenzano (1959) concluded that P. floridanus (Benedict) is not specifically distinct from P. pollicaris. Behre (1950) reported both species from Grand Isle, LA; both have also been reported from various areas along the Texas coast (Gunter, 1950; Whitten, Rosene and Hedgpeth, 1950; Provenzano, 1959). Often found in near-marine bays, especially harbor channels, and open Gulf waters, from shallow-sublittoral to 25 fathoms.

- Dactyl of major chela with no produced angle on outer margin; depressed spot (or spots) on dorsal surface of chela at base of immovable finger (fig. 9)
  Pagurus impressus (Benedict, 1892). Occurs in water 6-18 fathoms on sandy bottoms according to Williams (1965), who included Port Aransas, TX in known range. However, specimens have also been taken from shallow surf waters at Fisherman's Jetties on Mustang Island near Corpus Christi, TX (TXAI Collections) and on Padre Island, TX (Author's Collections).

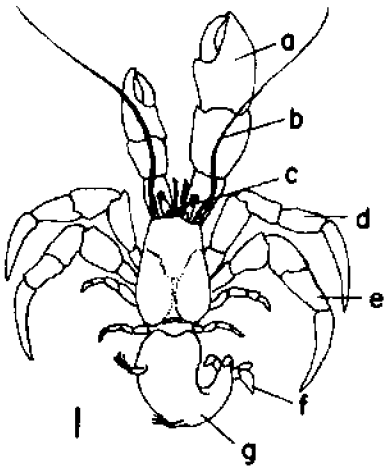
8. Width of major chela equal to or less than 2/3 length; antennal peduncle long, extending far beyond cornea of eyestalk (fig. 12)
  Pylopagurus corallinus (Benedict, 1892). Usually associated with tunicates, corals, and bryozoans in offshore marine waters

Plate 3

PAGURIDAE, DIOGENIDAE

Fig. 1. Schematic illustration of a pagurid crab: a. chela, b. antenna, c. eyestalk, d. first walking leg, e. second walking leg, f. uropod, g. abdomen
2. Third maxillipeds separated at base (after Provenzano, 1959)
3. Third maxillipeds together at base (after Provenzano, 1959)
4. Antennal setae of Pagurus annulipes
5. Antennal setae of Pagurus bonairensis
6. Eyestalks and eyescales of Pagurus brevidactylus
7. Outer surface of major chela from Pagurus longicarpus
8. Outer surface of major chela from Pagurus pollicaris
9. Outer surface of major chela from Pagurus impressus
10. Outer surface of major chela from Calcinus tibicen
11. Outer surface of major chela from Pagurus bullisi (after Wass, 1963)
12. Outer surface of major chela from Pylopagurus corallinus (after Williams, 1965)
13. Outer surface of major chela from Pylopagurus holthuisi (after Provenzano, 1961)
14. Outer surface of major chela from Petrochirus diogenes
15. Anterior of Paguristes hewatti
16. Merus of cheliped from Paguristes hummi
17. Propodus and dactylus of second left walking leg from Dardanus fucosus
18. Propodus and dactylus of second left walking leg from Dardanus insignis
19. Anterior of Paguristes sericeus (after Williams, 1965)
20. a. Outer surface of right chela from Clibanarius vittatus
b. Antennal setae of Clibanarius vittatus
21. a. Outer surface of right chela from Isocheles wurdemanni
b. Antennal setae of Isocheles wurdemanni

PLATE 3



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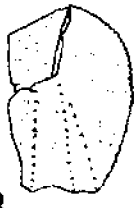
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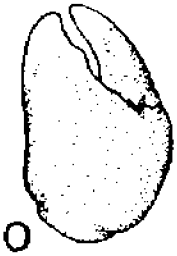
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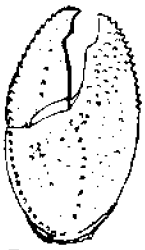
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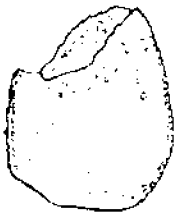
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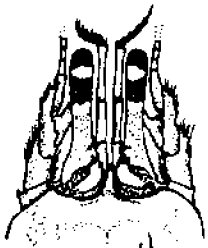
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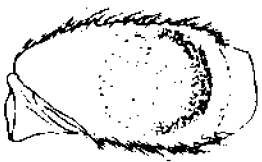
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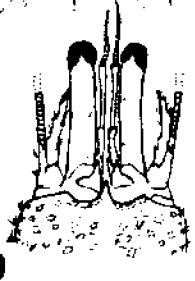
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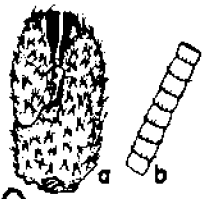

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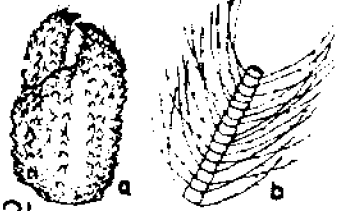

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21-56 fathoms depth. Known from vicinity of Mississippi Delta (Williams, 1965) and from 35 fathoms in NW Gulf "exact locality lacking" (Harry, unpublished).

- Width of major chela more than 3/4 length; antennal peduncle extends about as far as cornea of eyestalk (fig. 13)
  Pylopagurus holthuisi Provenzano, 1961. In marine waters, approximately 2-25 fathoms, often on coral or shell rubble with hard mud or sand (Provenzano, 1961). Specimen identified by Provenzano from 25 fathoms in NW Gulf, "exact locality lacking" (Harry, unpublished).

Family: DIOGENIDAE (Plate 3, figs. 3, 10, and 14-21)

1. Paired appendages (1 or 2 pairs, usually small) on ventral area of abdomen immediately posterior to fifth (posteriormost) pair of thoracic legs 6

- Paired appendages absent from ventral area of abdomen immediately posterior to fifth pair of thoracic legs 2

2. Chelipeds obviously unequal, left larger than right 4

- Chelipeds very nearly equal or right slightly larger than left 3

3. Finger tips calcareous (whitish, not corneous) on right chela, corneous on left chela; fingers of chelae swing open and closed in oblique plane (to observe, hold chelipeds with meri against thorax and chelae pointing anteriorly) (fig. 14)
  Petrochirus diogenes (Linnaeus, 1758). Found in marine waters from just off Gulf beach to 50 fathoms (Williams, 1965). Reported from brown shrimp grounds (Hildebrand, 1954) and vicinity of Texas coastal jetties (Whitten, Rosene, and Hedgpeth, 1950), becoming most common to south near Port Isabel, TX (Hedgpeth, 1953).

- Finger tips corneous on both right and left chelae; fingers of chelae swing open and closed in horizontal plane (when observed as described above) 8

4. Outer surface of major chela covered with ciliated rugae or tubercles fringed with short setae; greatest width of cornea more than 1/3 total length of eyestalk 5

- Outer surface of major chela nearly smooth, at most paved with very flattened granules which are not fringed by cilia or setae; greatest width of cornea less than 1/4 total length of eyestalk (fig. 10)
  Calcinus tibicen (Herbst, 1791). Most often in rocky or coral marine habitats from intertidal to 18 fathoms. In the NW Gulf, this species is probably confined to shallower prominences in the more tropical waters of the middle and outer continental shelf; specimens have been taken from Stetson Banks near $28^{o}9.6'$N., $94^{o}17.5'$W. (USL Collections).

5. Propodus of second left walking leg conspicuously hairy; chelae covered with groups of blunt and spine-tipped tubercles which are purple or blue in color bordered with red or maroon (fig. 17)
   Dardanus fucosus Biffar and Provenzano, 1972. Common on Seven and One-Half Fathom Reef off the S. Texas coast (Author's Collections). Closely resembles Dardanus venosus (H. Milne Edwards, 1848) with which it was formerly confused (Biffar and Provenzano, 1972).

- Propodus of second left walking leg with few hairs; chelae covered with ciliated tuberculate rugae, tan or maroon in color (fig. 18)
  Dardanus insignis (Saussure, 1858). Known in marine waters from 15-124 fathoms; records from 15 fathoms off Grand Isle, LA (Dawson, 1966) and from Port Aransas, TX (Williams, 1965).

6. Rostrum obsolescent, broadly rounded; fresh specimens with conspicuous blue spot bordered distally with black, white, and yellow bands on medial surface of merus of cheliped (colors fade in alcohol) (fig. 16)
   Paguristes hummi Wass, 1955. Found in marine waters from intertidal to 8 fathoms. Reported off Galveston, TX (Leary, 1967) and from Seven and One-Half Fathom Reef off S. Texas (Felder, unpublished) where species is restricted to shell-fragment substrates.

- Rostrum small but triangular or pointed; conspicuous blue spot absent from merus of cheliped 7

7. Head appendages (especially eyestalks) whitish, each ringed with single band of black or dark red; eyescales armed anteriorly with 2-4 spines (fig. 15)
   Paguristes hewatti Wass, 1963. Specimens have been taken from marine waters of 5-10 fathoms depth. Known from Heald Bank off Sabine, TX where the type specimens were taken (Wass, 1963); also taken from Seven and One-Half Fathom Reef off S. Texas (Felder, unpublished) and in vicinity of oil platform at 8-9 fathoms off Vermilion Bay, LA (USL Collections).

- Head appendages not ringed with black or dark red; eyescales terminated anteriorly with single point or spine (fig. 19)
  Paguristes sericeus A. Milne Edwards, 1880. In offshore marine waters from 5-36 fathoms usually on rubble and sand (Provenzano, 1961). Reported from Heald Bank (Sabine), TX by Provenzano (1959, p. 386) as Paguristes rectifrons, which was later determined to be a junior synonym of P. sericeus (Provenzano, 1961). Specimens also taken from vicinity of oil platform off Galveston, TX (USL Collections).

8. Finger tips of chelae spooned; antennal flagella long and sparsely setose; propodus of walking legs with about 8 (or 4 pairs) light, longitudinal stripes, continuous with similar stripes on dactyl and carpus (fig. 20)
   Clibanarius vittatus (Bosc, 1802). Very common throughout the NW Gulf coast, especially near shallow areas and margins of bays, from water line to several feeth depth (Whitten, Rosene, and Hedgpeth, 1950; Behre, 1950; Williams, 1965).

- Finger tips tapering to slender point; antennal flagella short and densely setose; legs not marked with light, longitudinal stripes (fig. 21)
  Isocheles wurdemanni Stimpson, 1862. Typically found in shallow nearshore marine waters on sandy substrates; often associated with sand bars just off Gulf beaches. Reported from both Louisiana and Texas (Behre, 1950; Provenzano, 1959), the type locality being off the mouth of the Rio Grande.

Family: PORCELLANIDAE (Plate 4, figs. 10-16)

1. Length of carapace at least 2 times width (fig. 11)
   Euceramus praelongus Stimpson, 1860. Found on sand and broken-shell bottoms adjacent to Gulf beach, from low-water line to 21 fathoms; a rarely collected species, it has been reported from the Aransas area of the Texas coast (Williams, 1965).

- Length of carapace less than 2 times width 2

2. Carapace and chelipeds with numerous tuberculate elevations; 3-4 small sharp teeth on lateral border of carapace; carpus of cheliped with 1 elongate, blunt tooth and several minute spines on anterior border (fig. 12)
   Megalobrachium soriatum (Say, 1818). Formerly known as Porcellana soriata; revised by Haig (1960). Free living on

rocky rubble or among corals, sponges, and bryozoans fouling hard substrates; in marine waters from low-water mark to 37 fathoms. Records from Texas (Leary, 1967), specifically from Port Aransas, TX (Williams, 1965) and reef in 7 1/2 fathoms off Port Mansfield, TX (Felder, unpublished).

- Carapace and chelipeds either smooth or with transverse ciliated rugae; 0-2 teeth on lateral border of carapace; carpus of cheliped either with no teeth, 1 small spiniform tooth, a broad lobe, or several near-equal teeth on anterior border 3

3. Carpus of cheliped with 3 or more teeth on anterior border, excluding antero-external angle 4

- Carpus of cheliped with, at most, a single tooth or lobe on anterior border 5

4. Carapace with small spine on antero-lateral margin just above eyestalk (may be indistinct if carapace width <10 mm); carpi of both chelipeds each with 4 broad serrate teeth on anterior margin (not including antero-distal corner); rugae of carpi strong, most are entire (continuous) for more than 1/2 carpal breadth (fig. 14)

   Petrolisthes galathinus (Bosc, 1802). Often in hard areas under rocks, on hard surfaces fouled with sponges, ascidians, anemones, and bryozoans, or on sand-shell bottoms; in marine waters from low-water mark to 27 fathoms. Leary (1967) reported P. galathinus from Port Aransas, TX along with P. sexspinosus Gibbes, a junior synonym of the former (Haig, 1956, 1960), from an unspecified area of the Texas coast; P. galathinus also known from reef in 7 1/2 fathoms off Port Mansfield, TX (Felder, unpublished).

- Carapace without spine above eyestalk; carpi of chelipeds with low, spine-tipped teeth on anterior margin, usually both with 3 or 3 on one and 4 on other (rarely both with 4); rugae on carpus low, broken, few if any entire for 1/2 carpal breadth (fig. 13)

   Petrolisthes armatus (Gibbes, 1850). Found where shelter is available in lower estuaries, bays, and inlets; commonly on oyster reefs, barnacle-fouled pilings, shell bottoms, and jetties in estuarine to marine waters; depths from water line to (off West Africa) over 16 fathoms (Haig, 1960). Records cited from coastal areas throughout NW Gulf (Behre, 1950; Whitten, Rosene, and Hedgpeth, 1950; Parker, 1959; Leary, 1967).

5. Carapace broader than long and colored grayish-white or light brown without pattern (fig. 10)

   Polyonyx gibbesi Haig, 1956. Known as Polyonyx macrocheles

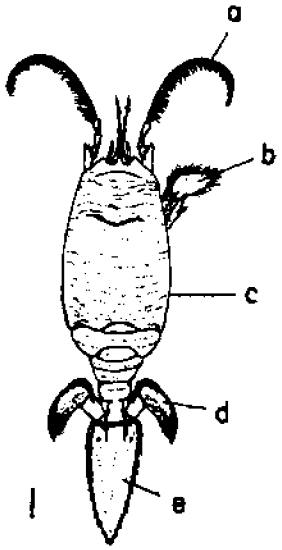
Plate 4

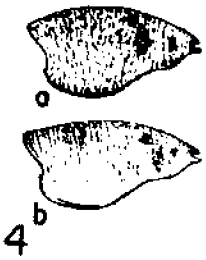
HIPPIDAE, RANINIDAE, ALBUNEIDAE, PORCELLANIDAE

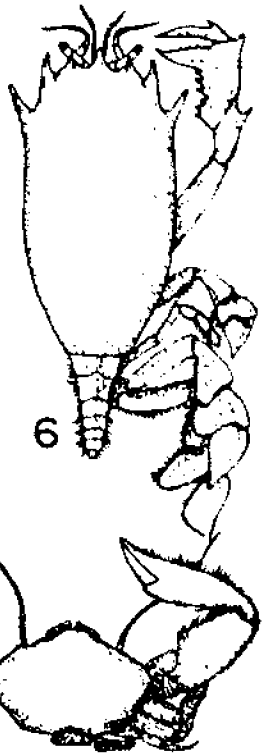
Fig. 1. Schematic drawing of Emerita: a. antenna, b. first thoracic leg, c. area of lateral epimeral expansion of carapace, d. uropod, e. telson

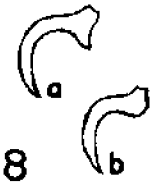
2. Right dactylus of first thoracic leg of Emerita talpoida in outside view
3. Outside view of an acute dactylus of first thoracic leg as in Emerita portoricensis and Emerita benedicti
4. a. Carapace of Emerita benedicti viewed from right side
   b. Carapace of Emerita portoricensis viewed from right side
5. Subchelate first thoracic leg of Lepidopa
6. Raninoides louisianensis, left legs not shown
7. Dorso-anterior carapace and eyes of Albunea
8. a. Dactylus of third thoracic leg of Albunea gibbesii
   b. Dactylus of third thoracic leg of Albunea paretii.
9. a. Dorso-anterior part of carapace and eyestalks of Lepidopa benedicti
   b. Dorso-anterior part of carapace and eyestalks of Lepidopa websteri
10. Polyonyx gibbesi
11. Euceramus praelongus, left legs not shown (after Williams, 1965)
12. Megalobrachium soriatum, left legs not shown
13. Right cheliped of Petrolisthes armatus
14. Right cheliped of Petrolisthes galathinus
15. Carapace, eyes, and right cheliped of Porcellana sayana
16. Right cheliped of Porcellana sigsbeiana (after Williams, 1965)

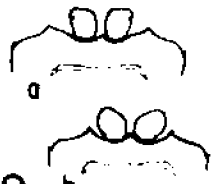
PLATE 4

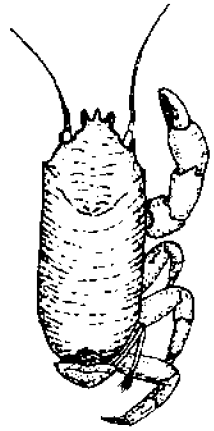


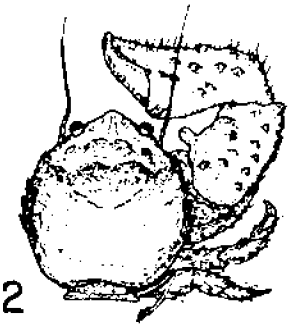


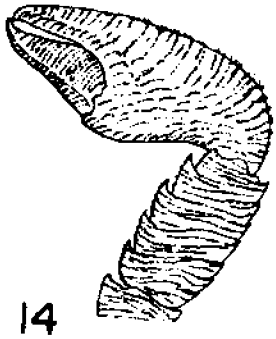


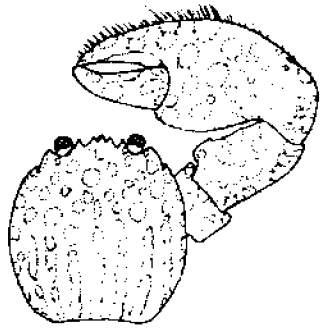


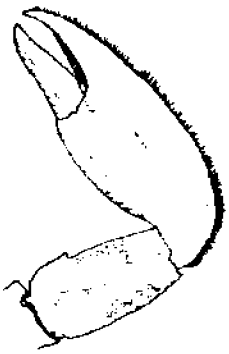












before revision by Haig (1956), and cited as such by Behre (1950) from vicinity of Grand Isle, LA. Commensal with annelids of genus Chaetopterus in marine waters, intertidal to 8 fathoms.

- Carapace slightly longer than broad and with irregular pattern of reddish-brown and off-white (fading after extended preservation) . . 6

6. Carpus of cheliped with proximal anterior margin produced to form massive lobe; cervical groove terminated antero-laterally in shallow marginal indentation at edge of carapace (fig. 15)
   Porcellana sayana (Leach, 1820). Found in marine waters of open Gulf, in harbors or inlets among rocks or shells, or as commensals in shells with the hermit crabs Pagurus pollicaris, Petrochirus diogenes, and Dardanus sp.; Hildebrand (1954) reported 6 specimens attached to decorator crabs, Stenocionops furcata, taken off St. Joseph Island, TX, and noted Porcellana sayana was common throughout brown shrimp grounds off Texas and Louisiana coasts, confirming earlier reports by Behre (1950) and Hedgpeth (1953). Found from shallow water to 48 fathoms.

- Carpus of cheliped with only a small spiniform tooth on anterior margin; cervical groove terminated antero-laterally in distinct longitudinal cleft at edge of carapace (fig. 16)
   Porcellana sigsbeiana A. Milne Edwards, 1880. Known to occur on deeper offshore marine bottoms than P. sayana; 20-215 fathoms. Records from NW Gulf off Mississippi Delta at 118 fathoms (Haig, 1956), off Grand Isle, LA at 20 fathoms (Dawson, 1966), and off S. Texas at 150 fathoms (Pequegnat and Pequegnat, 1970).

Family: HIPPIDAE (Plate 4, figs. 1-4)

1. Dactyls of first thoracic legs rounded or obtuse distally (fig. 2)
   Emerita talpoida (Say, 1817). A shallow burrower in sandy beaches bordering open marine water; usually found in swash zone but in winter to 2 fathoms. Reported from Grand Isle, LA (Williams, 1965) and an unspecified area of the Texas coast (Leary, 1967).

- Dactyls of first legs subacute or sharply pointed distally (fig. 3) . . 2

2. Lateral epimeral expansion of carapace (lower postero-lateral area) marked to inferior margin with transverse lines continued from posterior dorsum of carapace (fig. 4a)

   Emerita benedicti Schmitt, 1935. A shallow burrower in sand or sand-shell-fragment beaches and shallow bottoms, especially bordering open Gulf marine waters, from swash zone to 2 fathoms. Reported from Texas Gulf coast (Williams, 1965); also taken from Grand Isle and Isles Dernieres, LA (Author's Collections).

- Lateral epimeral expansion of carapace smooth and punctate, light traces of transverse lines of dorsum showing only on upper part of epimeral expansion (fig. 4b)

   Emerita portoricensis Schmitt, 1935. A shallow burrower in sandy beaches facing open Gulf marine water, most commonly found in swash zone, probably to about 2 fathoms in winter. Records in NW Gulf from Grand Isle, LA (Behre, 1950), vicinity of Galveston and Aransas Pass on upper and central Texas coast (Schmitt, 1935), and north of Brazos Santiago (inlet) near Port Isabel, TX. It is conceivable that records of E. portoricensis and E. benedicti are confused, as the species are quite similar.

Family: ALBUNEIDAE (Plate 4, figs. 5 and 7-9)

1. Eyestalks narrowly triangular in dorsal view (fig. 7) 2

- Eyestalks broad, rectangular or ovate in dorsal view (fig. 9) 3

2. Dactyls of second and third thoracic legs with rounded or bluntly rectangular lobe at base of anterior border (fig. 8a)

   Albunea gibbesii Stimpson, 1859. A shallow burrower on sandy bottoms such as Gulf beaches and intertidal sand flats fronting marine waters, from extreme low-tide mark to 35 fathoms. Reported from Texas by Williams (1965); specifically on intertidal sand flats by Leary (1967) and from between longshore sand bars near Port Aransas by Hedgpeth (1953).

- Dactyl of second leg with asymmetrical broad spur at base of anterior border; dactyl of third leg with acute spur at base of anterior border (fig. 8b)

   Albunea paretii Guérin, 1853. Found on sandy bottom in marine waters from low tide to 21 fathoms. Reported "to Corpus

Christi, TX" (Williams, 1965) and from vicinity of 7 1/2 fathoms off Port Mansfield, TX (Felder, unpublished).

3. Eyestalks rectangular with rounded corners in dorsal view; distinct, small eyespot on lateral margin of each eyestalk (fig. 9a)
   Lepidopa benedicti Schmitt, 1935. Common shallow burrower in swash zone and surf of sandy Gulf beaches bordering on open marine waters; from swash zone to near 1 fathom. Recorded from Grand Isle, LA by Behre (1950) as Lepidopa scutellata Fabricius, a name now regarded as a nomen dubium (Holthuis, 1960a). Reported as L. benedicti again from Grand Isle, along with Galveston, Mustang Island, and Padre Island, TX (Holthuis, 1960a); specimens from Isles Dernieres, LA (Freeport Sulphur Collections); reported between Point Bolivar and Sabine Pass, TX (Keith and Hulings, 1965).

- Eyestalks roughly ovate in dorsal view; no eyespot evident on lateral margin of eyestalk (fig. 9b)
   Lepidopa websteri Benedict, 1903. Shallow burrower off sandy Gulf beaches predominantly near low-tide mark and on adjacent submerged sand bars. Taken off Cheniere Caminada near Grand Isle, LA together with L. benedicti; L. benedicti was found primarily in the swash area at water's edge while L. websteri was taken only on a shallow submerged bar just off shore (Author's Collections). Not previously reported from west of the Mississippi Delta though taken from Petite Bois Island and Ship Island, Mississippi as well as from the Carolinian area of the Atlantic coast (Williams, 1965; Efford, 1971).

SECTION: BRACHYURA

Family: RANINIDAE (Plate 4, fig. 6)

Raninoides louisianensis Rathbun, 1933. Recorded from 68 fathoms off Mississippi Delta, the type locality; taken by Hildebrand (1954) from 31-37 fathoms on shrimp grounds off northern part of Mexican coast; listed by Chace (1956) from several Oregon stations 30-220 fathoms off Texas and the Mississippi Delta; reported from 100 fathoms off S. Texas by Pequegnat (1970).

Family: LEUCOSIIDAE (Plate 5, figs. 1-5)

1. Carapace polygonal, very uneven, nodular or eroded (fig. 1)
   Ebalia sp. A juvenile male (carapace width 30 mm) was found in sediment from Seven and One-Half Fathom Reef off Port Mansfield, TX; the mutilated specimen was tentatively listed by the author as Speloeophorus sp. (Felder, unpublished) but later corrected to Ebalia sp. by Henry B. Roberts (USNM).

- Carapace round or ovid with smooth or granular surface 2

2. Carapace with 5 spines on posterior margin (fig. 5)
   Myropsis quinquespinosa Stimpson, 1870. Literature consulted indicates this crab to be from water deeper than 35 fathoms (50-572 F); Leary (1967), however, reported it from the Texas coast at unspecified depth; Chace (1956) reported it from 50 fathoms south of Sabine, TX; Pequegnat (1970) reported it again from the NW Gulf, noting the 572-fathom depth to seem excessive and stating that, although his specimens were taken at 100-115 fathoms, the species probably extended farther shoreward over the shelf.

- Carapace with 3 spines on posterior margin 3

3. Fingers of chelae swing open and closed in a vertical plane (fig. 2)
   Iliacantha liodactylus Rathbun, 1898. Offshore marine waters, 4 3/4-34 fathoms. Reported from Texas by Leary (1967) (misspelled I. iiodactylus).

- Fingers of chelae swing open and closed in horizontal plane 4

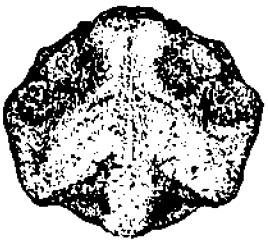
4. Carapace with several tubercles or enlarged granules on each side, 1 at widest part of carapace, another less than halfway from there to hepatic protruberance, and usually 1 on subhepatic protruberance (less obvious in females than males); coarse granules on lateral areas of carapace not arranged in single marginal line; fresh specimens usually with carapace uniform blue-gray color (fig. 3)
   Persephona crinita Rathbun, 1931. Most common in open marine waters of NW Gulf, 3-34 fathoms, frequently found on mud or muddy-sand bottoms. Records from Grand Isle, LA and vicinity (Rathbun, 1937; Behre, 1950) and off Sabine, TX (Hildebrand, 1954); reported by Leary (1967) from Texas.

Plate 5

LEUCOSIIDAE, CALAPPIDAE

Fig. 1. Carapace of Ebalia sp. (juvenile)
2. Carapace of Iliacantha liodactylus (after Rathbun, 1937)
3. Carapace of Persephona crinita
4. Carapace of Persephona aquilonaris
5. Carapace of Myropsis quinquespinosa
6. Third maxillipeds of Hepatella and Hepatus: a. merus, b. exognath, c. ischium
7. Third maxillipeds of Acanthocarpus and Calappa: a. merus, b. exognath, c. ischium, d. palp
8. Carapace of Calappa
9. Carapace of Acanthocarpus alexandri
10. Outside of left chela of Calappa sulcata
11. Outside of left chela of Calappa flammea
12. Carapace of Osachila sp. (juvenile)
13. Carapace of Hepatus pudibundus
14. Carapace of Hepatus epheliticus

PLATE 5



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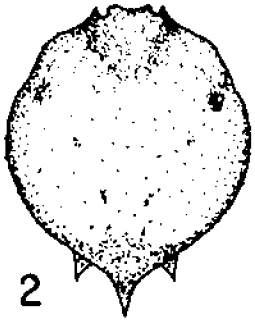

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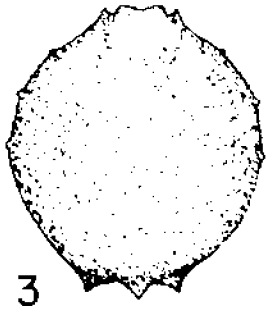

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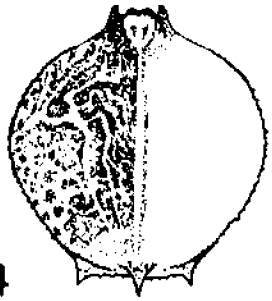

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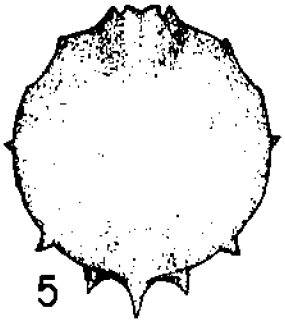

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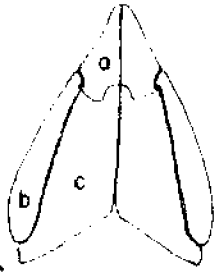

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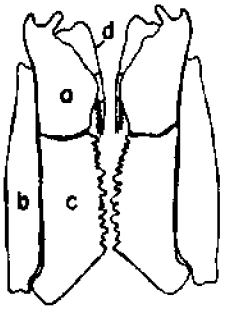

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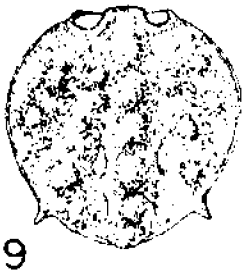

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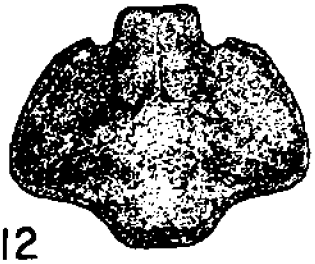

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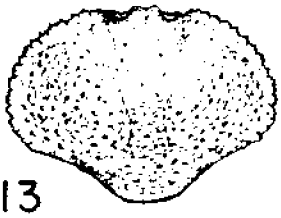


13

14

- Carapace without singularly enlarged granules or tubercles on sides, but with distinct single line of coarse granules defining lateral margin; fresh specimens usually with red blotches and patterns on cream-colored carapace (fig. 4)

  Persephona aquilonaris Rathbun, 1933. This species was formerly known and reported as Persephona punctata aquilonaris; Guinot-Dumortier (1959) separates P. punctata and P. aquilonaris as full species. Most common in marine and near-marine waters 2-30 fathoms, usually on bottoms of shelly or sandy mud. More often in inshore sublittoral waters and passes than P. crinita which is, with exceptions, confined to deeper water off shore (Behre, 1950). Known from suitable areas throughout NW Gulf coast (Rathbun, 1937; Behre, 1950; Hedgpeth, 1953; Hildebrand, 1954; Leary, 1967; Felder unpublished).

Family: CALAPPIDAE (Plate 5, figs. 6-14)

1. Palps of third maxillipeds concealed by elongate triangular merus (fig. 6) 4

- Palps not completely concealed, exposed along inner border of manus which is not distinctly elongate or triangular (often as in fig. 7) . . . 2

2. Carapace widest in anterior half with single spine on postero-lateral margin; merus of cheliped with 2 elongate spines on outer distal surface just posterior to articulation with manus, lower spine longer and greatly extended laterally (fig. 9)

   Acanthocarpus alexandri Stimpson, 1871. Known from offshore marine waters 37-210 fathoms. Reported by Chace (1956) from 65-122 fathoms off Texas coast and Mississippi Delta. Pequegnat (1970) reported it from several locations near 100-150 fathoms off Texas and noted it to be the most abundant deep-water calappid crab in the Gulf.

- Carapace widest in posterior half, with several broad teeth on postero-lateral margin; merus of cheliped without elongate spines on outer distal surface though usually with 4-5 strong broad teeth (fig. 8) 3

3. Chela with smooth area on outside lower half of manus (between granular ridges) narrow proximally, widening and turning obliquely upward distally (fig. 10)

   Calappa sulcata Rathbun, 1898. Common in offshore Gulf waters from about 5-100 fathoms on various bottoms, especially sand-

mud. Revision by Holthuis (1958) determined C. springeri Rathbun, 1931 to be only a growth stage of C. sulcata and therefore a junior synonym. Cited from NW Gulf as C. springeri by Behre (1950), Gunter (1950), Hedgpeth (1953), Hildebrand (1954). Cited as C. sulcata throughout NW Gulf areas from S. Texas to Mississippi Delta (Holthuis, 1958); listed as C. sulcata from Grand Isle, LA by Dawson (1966).

- Chela with smooth area on outside lower half of manus straight or horizontal throughout length, not turning obliquely upward distally (fig. 11)
  Calappa flammea (Herbst, 1794). Usually found on sand-mud bottoms in marine waters, from near shore line to 40 fathoms; rarely to 125 fathoms. Reported in NW Gulf off Mississippi Delta, Grand Isle, LA, and south of Houma, LA, as well as off Galveston, TX and the S. Texas coast (Holthuis, 1958).

4. Dorsal surface of carapace convex overall, well-marked depression below orbit 5

- Dorso-lateral areas of carapace concave; depression below orbit very slight if at all (fig. 12)
  Osachila sp. Known from 2 juvenile males sieved from mud and shell-fragment sediments on Seven and One-Half Fathom Reef off Port Mansfield, TX; these specimens were tentatively listed as Hepatella sp. by the author (Felder, unpublished) and corrected to Osachila sp. by Henry B. Roberts (USNM).

5. Carapace marked with small reddish dots or flecks, sometimes arranged in transverse bands or lines; front slightly bidentate (fig. 13)
  Hepatus pudibundus (Herbst, 1785). Found in marine and near-marine waters, often on sand-mud and shell-mud bottoms (rarely from oyster beds) from beach to about 7 fathoms. Formerly cited by many authors as H. princeps Herbst, 1794, a junior synonym (Holthuis, 1959). Reported from vicinity of Grand Isle, LA (Behre, 1950) and Texas coast (Leary, 1967; Felder, unpublished).

- Carapace marked with large reddish spots edged with dark borders; front truncate (fig. 14)
  Hepatus epheliticus (Linnaeus, 1763). Common in marine waters from near Gulf beach to 25 fathoms and occasionally in passes and inlets. Numerous reports from suitable areas along coasts throughout NW Gulf (Rathbun, 1937; Behre, 1950; Gunter, 1950; Hedgpeth, 1953; Hildebrand, 1954; Parker, 1959).

Family: DROMIIDAE (Plate 6, figs. 1-5)

1. Carapace dorsally firm, hard, and covered with short hairs 2

- Carapace with soft, membranous, naked or sparsely haired mid-dorsal area 3

2. Carapace broader than long; fronto-orbital width in adult 1/3 or less of carapace width (fig. 2)

   Dromia erythropus (George Edwards, 1771). Most often reported from shallow to 25-fathom offshore marine waters, though known to 200 fathoms in some areas. Often found carrying a covering of sponge or compound ascidians. Known from Seven and One-Half Fathom Reef off Port Mansfield, TX (Felder, unpublished) and from vicinity of sublittoral prominence about 90 miles south of Pecan Island, LA (USL Collections).

- Carapace longer than broad; fronto-orbital width in adult 1/2 or more of carapace width (figs. 1 and 3)

   Dromidia antillensis Stimpson, 1858. Most often in marine waters from shore to 170 fathoms, particularly found near rocks, shell, and other hard substrates with associated fouling material; usually found carrying a covering of sponge or compound ascidians. Taken from Aransas Pass (inlet) on Texas coast (Rathbun, 1937) though infrequently (Hildebrand, 1955; Parker, 1959); found frequently on Seven and One-Half Fathom Reef, TX (Felder, unpublished).

3. Ventral surface of carapace (subhepatic area) of each side with 3 granulated nodes or ridges arranged triangularly; lower margin of orbit without distinct spine (fig. 5)

   Hypoconcha sabulosa (Herbst, 1799). Found in marine and near-marine waters from several feet to 49 fathoms; always occupying a valve of some pelecypod shell. Reported from vicinity of Sabine, TX by Williams (1965).

- Ventral surface of carapace on each side with not more than 1 granulated node, which is sometimes surmounted by 1-several spines; lower margin of orbit usually with strong spine (fig. 4)

   Hypoconcha spinosissima Rathbun, 1933. In marine waters from 14-60 fathoms. Always found occupying a valve of some pelecypod shell. Reported from unspecified area of Texas coast (Leary, 1967).

Family: PARTHENOPIDAE (Plate 6, figs. 6-9)

1. Carapace laterally expanded, forming "vault" concealing walking legs; branchial regions with continuous, prominent, granulate ridges paralleling antero-lateral borders and connected by short, transverse, gastric ridge; carapace otherwise generally smooth and with no lateral spines (fig. 6)

   Heterocrypta granulata (Gibbes, 1850). Often found on shell and shell-fragment substrates, sometimes on oyster beds, in marine and near-marine waters from 2-75 fathoms. Reported from vicinity of Grand Isle, LA (Behre, 1930), Sabine, TX (Williams, 1965), Aransas Pass (inlet) and Lydia Ann Channel, TX (Hedgpeth, 1953; Parker, 1959), and from stomach of sheepshead off Port Mansfield, TX (Felder, unpublished).

- Carapace not expanded to form "vault" concealing legs; surface tuberculate, eroded, or with strong spine at lateral angle; dorsal tubercles absent or form, at most, very broken branchial ridges 2

2. Carapace with small tubercles in elevated regions, smooth in depressions; antero-lateral margin obscurely toothed excepting strong spine at lateral angle; orbit nearly as wide as front (fig. 7)

   Leiolambrus nitidus Rathbun, 1901. On mud, muddy sand, and mud-shell bottoms in marine waters 4-40 fathoms. Reported by Chace (1956) off east side of Mississippi Delta, by Dawson (1966) off Grand Isle, LA, and by Hildebrand (1954) off Wine Island Pass, LA, Sabine, TX, Freeport, TX, and "occasionally in 6-24 fathoms along the Texas coast."

- Carapace either roughly tuberculate (especially on elevations but also somewhat in depressions) or pitted and eroded; orbit not more than 3/4 width of front 3

3. Largest lateral tooth at widest part of carapace; merus of cheliped with largest teeth on outer (posterior) margin usually 2 times or more length of largest teeth on inner (anterior) margin; carapace and chelipeds dorsally flattened or depressed (fig. 8)

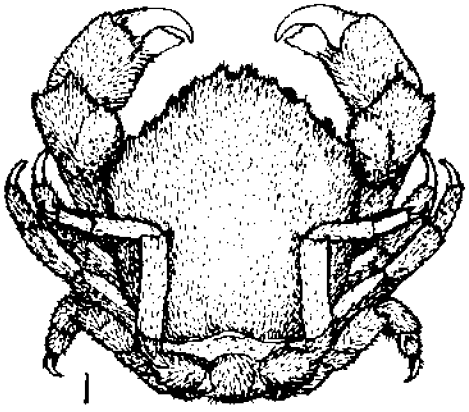
   Parthenope serrata (H. Milne Edwards, 1834). Found predominantly on sand and sand-mud bottoms in open Gulf marine waters from shallow water to 60 fathoms. Listed from unspecified area of Texas coast by Leary (1967); specimen taken from stomach of red snapper off Port Mansfield, TX (Felder, unpublished).

Plate 6

DROMIIDAE, PARTHENOPIDAE
(figs. 2-3 after Rathbun, 1937)

Fig. 1. The dromiid crab, Dromidia antillensis
2. Carapace outline (without pubescence) of Dromia erythropus
3. Carapace outline (without pubescence) of Dromidia antillensis
4. Antero-ventral view of Hypoconcha spinosissima
5. Antero-ventral view of Hypoconcha sabulosa
6. Heterocrypta granulata
7. Leiolambrus nitidus, left walking legs not shown
8. Right cheliped of Parthenope serrata in dorsal view
9. Right cheliped of Parthenope pourtalesii in dorsal view

PLATE 6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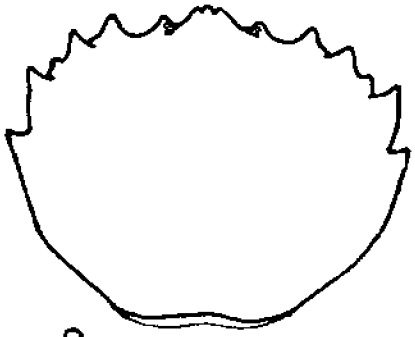
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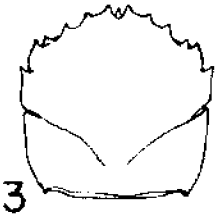
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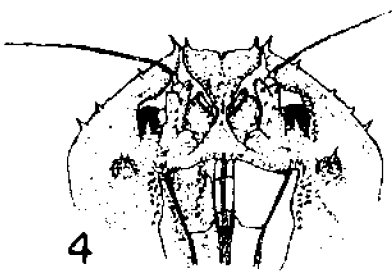
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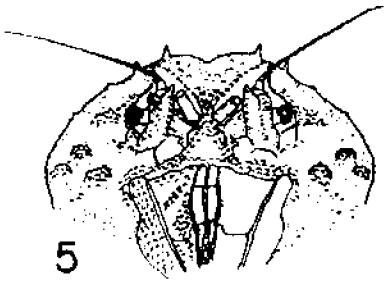
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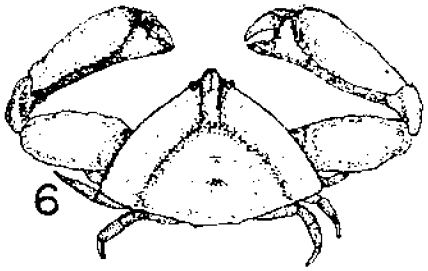
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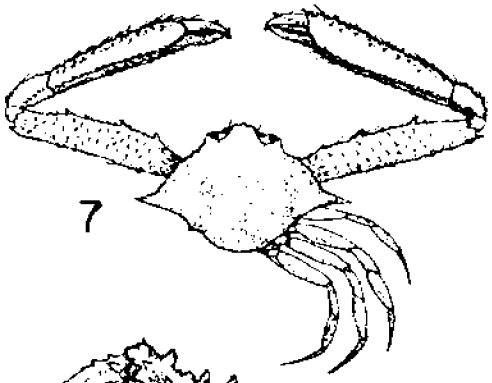
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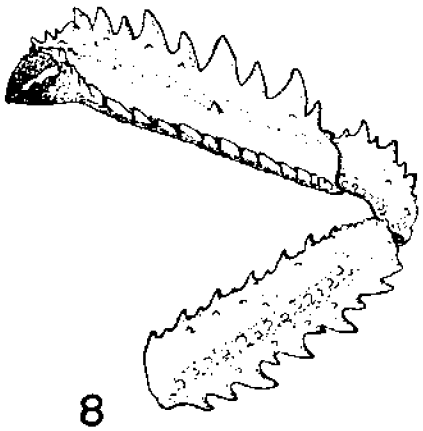
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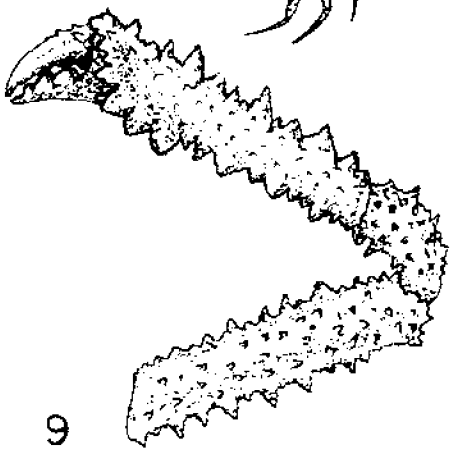
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- Largest lateral tooth posterior to widest part of carapace; merus of cheliped with largest teeth on outer margin less than 2 times length of largest teeth on inner margin; carapace and cheliped dorsally convex (fig. 9)

  Parthenope pourtalesii (Stimpson, 1870). Found predominantly on sand and sand-mud bottoms, marine waters 10-190 fathoms. Listed by Leary (1967) from Texas coast.

Family: MAJIDAE (Plate 7)

1. Length of posteriormost (fifth) walking leg, when extended, equal to or greater than 2 times width of carapace; anteriormost extension of carapace (usually the rostrum though rarely an interantennular spine) single, not bifurcate, and ending in single blunt or pointed tip 2

- Length of posteriormost walking leg distinctly less than 2 times width of carapace; anteriormost extension of carapace (rostrum) either bifurcate for all or portion of length or single for most of length with bidentate or bilobate tip 6

2. Length of rostrum equal to or longer than greatest width of carapace . 3

- Length of rostrum less than 2/3 greatest width of carapace 4

3. Carapace smooth and even above; antennae concealed beneath rostrum; fresh carapace usually reddish with lighter and/or darker stripes (fig. 1)

  Stenorynchus seticornis (Herbst, 1788). Usually taken from areas with some hard substrate such as rocks, pilings, buoys, and shell or coral debris where fouling organisms have accumulated; in marine waters of open Gulf from near shore or near surface to 814 fathoms. Reported in 12-13 fathoms off Wine Island Pass, LA, in 17 fathoms south of Freeport, TX by Hildebrand (1954); specimens also taken off Port Mansfield, TX (Felder, unpublished) and from near 10 fathoms on wreckage south of Eugene Island, LA (USL Collections).

- Carapace uneven above, roughened with tubercles or nodes; antennae long, with flagellum exposed in dorsal view; carapace without stripes (fig. 2)

  Metoporhaphis calcarata (Say, 1818). Known predominantly from marine and near-marine waters, shallow water to 49 fathoms; often among fouling materials on hard substrates, sometimes from oyster reefs. Reported by Behre (1950)

from vicinity of Grand Isle, LA; Breuer (1962) reported Metoporhaphis sp. from near Brazos Santiago jetties at Port Isabel, TX where specimens of M. calcarata were more recently taken (TXAI Collections).

4. Last 2 pairs of walking legs with dactyli longer than propodi; rostrum bifurcate at end but exceeded anteriorly by interantennular spine beneath (fig. 3)
   Collodes leptocheles Rathbun, 1894. Reported from 68-210 fathoms in Gulf, including northwest quadrant (Pequegnat, 1970); reported from 150 fathoms off Port Aransas, TX (Chace, 1956) and from unspecified location off Texas coast by Leary (1967).

- Last 2 pairs of walking legs with propodi longer than dactyli; rostrum single at tip, not exceeded by interantennular spine 5

5. Rostrum broad, rounded at tip; width of carapace in gastric area (just posterior to eyes) about equal to frontal width (fig. 4)
   Podochela sidneyi Rathbun, 1924. Known from offshore marine waters, shallow to 102 fathoms. Reported by Hildebrand (1954) from 12-13 fathoms off Wine Island Pass, LA and from 17 fathoms south of Freeport, TX.

- Rostrum ending in narrow spine; width of carapace in gastric area greater than frontal width (fig. 5)
   Anasimus latus Rathbun, 1894. Known from offshore marine waters on various sand, mud, and shell bottoms from 26-88 fathoms. Reported off Mississippi Delta (Chace, 1956; Franks et al, 1972), off Grand Isle, LA (Dawson, 1966), and from several areas off Texas coast (Chace, 1956; Bullis and Thompson, 1965; Leary, 1967).

6. Lateral margin of carapace with 4 or more spines, pointed tubercles or conical teeth 7

- Lateral margin of carapace with less than 4 spines, pointed tubercles or teeth 12

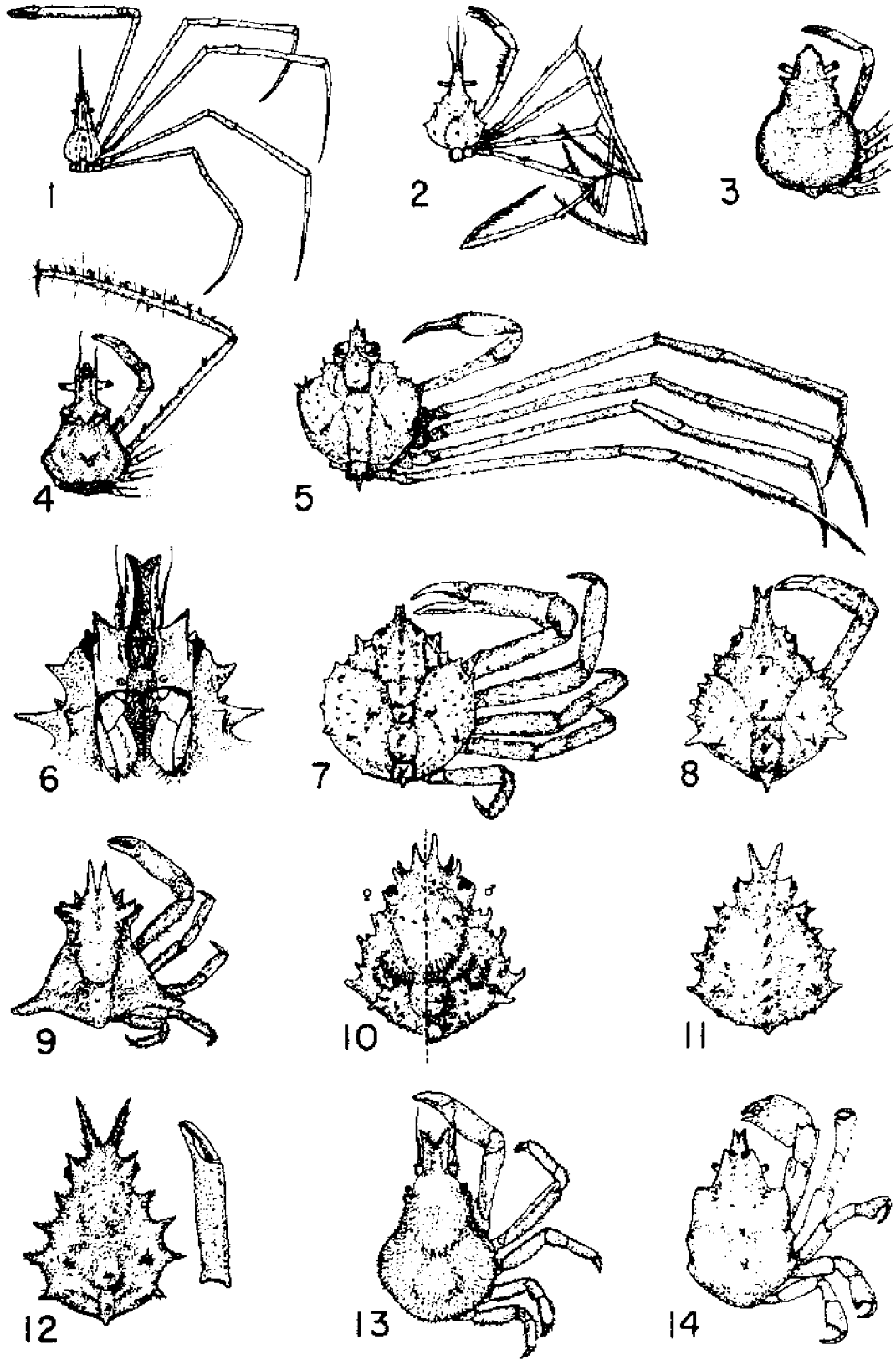
7. Rostrum with lateral margins deflected downward and slightly inward to produce an involuted gutter on ventral side of rostrum (fig. 6)
   Coelocerus spinosus. A. Milne Edwards, 1875. Inhabits bottoms from 13-35 fathoms in offshore marine waters. Reported from sandy bottom in 35 fathoms off Mississippi Delta (Rathbun, 1925).

Plate 7

MAJIDAE
(figs. 5 and 11-12 after Rathbun, 1925;
figs. 2, 7, and 8 after Williams, 1965)

Fig. 1. Carapace, eyes, and right legs of Stenorynchus seticornis
2. Carapace, eyes, antennae, and right legs of Metoporhaphis calcarata
3. Collodes leptocheles, showing cheliped and proximal portion of walking legs on right side only
4. Podochela sidneyi showing cheliped and first walking leg on right side
5. Carapace, eyes, and right legs of Anasimus latus
6. Anterior of Coelocerus spinosus in ventral view (redrawn from Rathbun, 1925)
7. Libinia emarginata, left legs not shown
8. Carapace, eyes, and right cheliped of Libinia dubia (the relative length of the lateral spines may vary with age and sex)
9. Macrocoeloma trispinosum, left legs not shown
10. Carapace and eyes of Mithrax acuticornis; left half mature female, right half mature male
11. Carapace and eyes of Stenocionops spinosissima
12. Carapace, eyes, and chela of Stenocionops furcata (nr. S. f. coelata)
13. Pelia mutica, left legs now shown
14. Carapace, eyes, and right legs of Acanthonyx petiverii

PLATE 7



- Rostrum either branched into 2 spines for most of length or, if entire most of length, without involuted gutter on ventral side 8

8. Eyes concealed by eyestalk pivoting at base to swing eyes into post-orbital cup 9

- Eyes concealed by eyestalk retracting "telescopically" into tubular orbits 11

9. Rostrum forked (bifurcate) for more than 1/2 length; larger spines on carapace usually bent toward anterior (not always obvious in females) (fig. 10)

   Mithrax acuticornis Stimpson, 1870. Known from variety of bottoms but usually on rock, shell, shell fragments, or coral; from 6-163 fathoms. Specimens have been taken off Port Mansfield, TX (Felder, unpublished) and from Stetson Bank off Galveston, TX (USL Collections).

- Rostrum forked less than 1/2 length, often bilobed only at tip; spines on carapace never bent completely toward anterior 10

10. Median line of carapace with more than 7 spines (usually 9), 2 of which are located on intestinal area (fig. 7)

    Libinia emarginata Leach, 1815. Found on various bottoms and, according to Hildebrand (1954), occasionally riding large medusae of the scyphozoan Stomolophus meleagris; in marine waters of open Gulf and near-marine waters of saltier bays and inlets, commonly from shore to 27 fathoms, occasionally to 68 fathoms. Known from off Grand Isle (Behre, 1950) and areas westward on Louisiana coast (Author's Collections); from lower bays, inlets, and offshore waters along Texas coast (Gunter, 1950; Hildebrand, 1954; Parker, 1959).

- Median line of carapace with 7 or less (usually 6) spines, 1 of which is on intestinal area (fig. 8)

  Libinia dubia H. Milne Edwards, 1834. Known from variety of bottoms in marine and near-marine waters from near shore to 25 fathoms; reported by Williams (1965) to ride medusae of Stomolophus meleagris. Reported from vicinity of Grand Isle, LA (Behre, 1950) to S. Texas (Williams, 1965). Records of L. dubia and L. emarginata in NW Gulf may be somewhat confused; Williams (1965) noted the young are difficult to distinguish.

11. Hepatic region of carapace enlarged, produced beyond contour of branchial region and armed with 2 lateral spines (fig. 11)

    Stenocionops spinosissima (Saussure, 1855). Known from marine

waters of open Gulf 25-260 fathoms; reported to occur most commonly at 60-100 fathoms in Gulf by Pequegnat (1970) who found it at 150 fathoms off S. Texas; Chace (1956) reports it from 50 fathoms off Port Aransas, TX; Hildebrand (1954) found it to be common off the Texas coast and took several specimens at 25-26 fathoms off Mustang Island, TX.

- Hepatic region not enlarged or produced beyond general outline of branchial region and armed with 1 large lateral spine (fig. 12)
  Stenocionops furcata (Olivier, 1791). In offshore marine waters, near shore to 50 fathoms with possible deeper occurrences (records confused). Reported from 18 fathoms off St. Joseph Island, TX (Hildebrand, 1954); specimens taken more recently at 10 fathoms on wreckage off Eugene Island, LA (USL Collections) and from Seven and One-Half Fathom Reef off Port Mansfield, TX (TXAI Collections) appear to be near Stenocionops furcata coelata (A. Milne Edwards, 1878) as distinguished from the typical form by Rathbun (1925).

12. Carapace with tubular orbits into which eyes "telescopically" retract; strong conical or flattened spine at lateral angle of carapace (fig. 9)
  Macrocoeloma trispinosum (Latreille, 1825). Known from shallow to 45-fathom marine waters; has been taken from floating Sargassum and various substrates including rocks, coral, sand-shell, and broken shell. Reported from reef off Port Mansfield, TX (Felder, unpublished); Behre (1950) reported Macrocoeloma sp. from southwest of Timbalier Island, LA.

- Carapace without tubular orbits; no strong spine at lateral angle of carapace 13

13. Eye with slightly cupped, tooth-like, postocular process into which eye may be retracted; carapace "drop-shaped," laterally smooth with no marginal teeth or lobes other than single postocular process (fig. 13)
  Pelia mutica (Gibbes, 1850). In shallow to 28-fathom marine and near-marine waters usually on shell or rock rubble, especially where heavily fouled. Reported from oyster reefs near Grand Isle, LA (Behre, 1950); specimens taken from Lake Pelto, LA (Freeport Sulphur Collections); common on reef off Port Mansfield, TX (Felder, unpublished).

- Eye without cupped, tooth-like, postocular process; carapace with rounded lobe on hepatic margin and 2 subdued teeth or tubercles on branchial margin (fig. 14)
  Acanthonyx petiverii H. Milne Edwards, 1834. Found most commonly among fouling materials on hard substrates in marine

waters, shallow to 6 fathoms. Reported by Leary (1967) from Texas coast; taken by Felder (unpublished) from sublittoral reef off Port Mansfield, TX; specimens also taken from jetties at Port Isabel, TX (USL Collections) and jetties at Mansfield Channel (inlet), TX (TXAI Collections).

Family: PORTUNIDAE (Plate 8)

1. Carapace with 5 antero-lateral teeth or spines and 3 interocular teeth (fig. 2) 2

- Carapace with 9 antero-lateral teeth or spines and 4, 6, or 8 interocular teeth (fig. 1) 3

2. Carapace with fine granulation and band of slightly enlarged granules in median line; fresh carapace yellow-gray speckled overall with small annular spots of reddish-purple and usually with irridescent spots, near equal in size, between antero-lateral teeth
   Ovalipes ocellatus (Herbst, 1799). Found especially on sand, in marine waters from near surface or shore to about 18 fathoms. Records from the NW Gulf are unclear, probably confused with O. ocellatus guadulpensis (= O. guadulpensis) prior to Williams' (1962) revision. Williams (1965) cites Whitten, Rosene, and Hedgpeth (1950) for record from Port Aransas, TX, but that record was listed as O. ocellatus without indication of subspecies or author of name. Stephenson and Rees (1968) include no clear record for the NW Gulf.

- Carapace with fine granulation overall; no median band of enlarged granules; fresh carapace uniformly yellow-gray without reddish-purple spots; usually with irridescent spots between antero-lateral teeth, but spot between fourth and fifth teeth larger and near semicircular in shape
   Ovalipes guadulpensis (Saussure, 1858). Found predominantly on sandy bottoms in open Gulf and in inlet marine waters from near shore or surface to 49 fathoms; rarely deeper. Prior to Williams' (1962) revision this species was recognized as the subspecies Ovalipes ocellatus guadulpensis, with a variety of misspellings of "guadulpensis." Reported by Behre (1950) from vicinity of Grand Isle, LA; by Hildebrand (1954) off Grand Isle, LA; by Gunter (1950) off Aransas Pass (inlet), TX. Two forms of this species are distinguished by Stephenson and Rees (1968).

3. Movable portion of antenna excluded from orbit by prolongation of basal (fused) article; successive antero-lateral teeth distinctly alternate larger and smaller with ninth (posteriormost) always less than 2 times length of seventh (fig. 3)

   Cronius ruber (Lamarck, 1818). Found in marine waters from near low tide to 40 fathoms; most commonly associated with reefs, rocks, or shell rubble which afford concealment, though also taken from sandy areas. Reported by Leary (1967) from Port Aransas, TX; by Felder (unpublished) from sublittoral reef off Port Mansfield, TX.

- Movable portion of antenna free to enter orbit; successive antero-lateral teeth not usually alternately large and small; if somewhat alternating, then ninth tooth at least 2 times length of seventh 4

4. Endostome of buccal cavity produced medially forming short longitudinal ridge; color of mature carapace either uniform, blotchy, or with irregular lighter and darker areas, not with dense covering of rounded white spots 5

- Endostome of buccal cavity nearly smooth, without medial ridge; mature carapace brown with dense covering of rounded white spots (fig. 4)

   Arenaeus cribrarius (Lamarck, 1818). Found in marine waters, shore to 37 fathoms; most common within swash or surf zone or on shallow sandy bottoms just off Gulf beaches. Known from suitable sandy Gulf beaches in both Louisiana (Behre, 1950) and Texas (Gunter, 1950) as well as from open Gulf waters farther offshore (Hildebrand, 1954).

5. Carpus of cheliped with strong spine on inner distal margin, its length near equal to or exceeding length of spine on upper proximal end of manus; abdomen of male triangular (as in fig. 6) 10

- Carpus of cheliped without strong spine on inner distal margin or with at most a rudimentary tubercle or small spine less than 1/2 length of spine on upper proximal end of manus; abdomen of male "T-shaped" (as in fig. 5) 6

6. Frontal teeth ("frontal" not including inner orbitals) 2 in number (fig. 7)

   Callinectes sapidus Rathbun, 1895. Found on variety of bottoms, especially mud and sand; predominantly in brackish, estuarine, bay, or near-marine waters; less common in offshore marine waters of Gulf where some (usually females) may be found to 20 fathoms. Occasionally moving up freshwater streams. Very common and commercially harvested

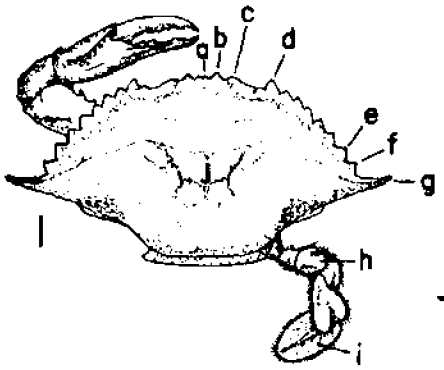
Plate 8

PORTUNIDAE
(figs. 12-16 in part after Williams, 1965)

Fig. 1. Carapace, left cheliped, and right swimming leg of Callinectes similis with anatomy of portunid crab indicated as follows: a. right inner frontal tooth, b. right outer frontal tooth, c. right inner orbital tooth, a-c. right interocular teeth, d. right outer orbital tooth, angle, or first antero-lateral tooth, e. seventh antero-lateral tooth, f. eighth antero-lateral tooth or tooth preceding lateral spine, g. lateral spine or tooth = ninth antero-lateral tooth, h. merus

2. Carapace outline of Ovalipes
3. Carapace of Cronius ruber, right half showing pubescence
4. Carapace of Arenaeus cribrarius, right half showing color pattern
5. Mature male abdomen of genus Callinectes
6. Mature male abdomen of genus Portunus
7. Carapace of Callinectes sapidus
8. Carapace of Callinectes exasperatus
9. Carapace of Callinectes marginatus
10. Carapace of Callinectes rathbunae as a composite from illustrations by Contreras (1930) and Taissoun (1972)
11. Carapace of Portunus ventralis
12. Carapace of Portunus sayi
13. Carapace of Portunus spinicarpus
14. Cheliped of adult male Portunus spinicarpus in dorsal view
15. Carapace of Portunus spinimanus
16. Carapace of Portunus gibbesii

PLATE 8



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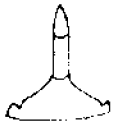
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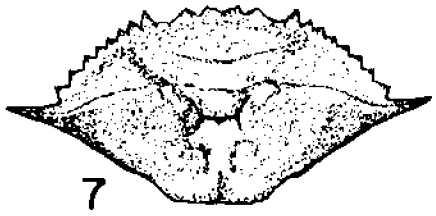
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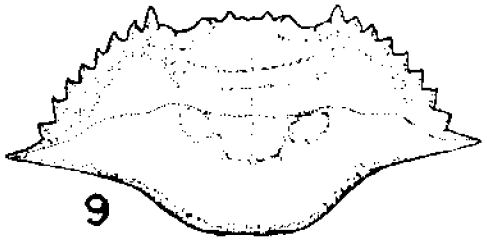
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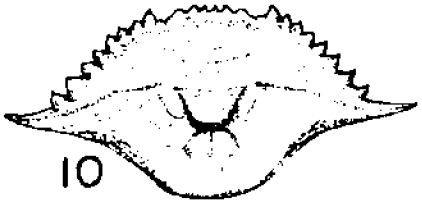
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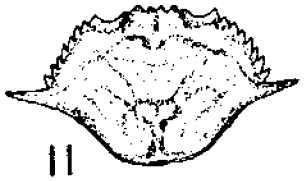
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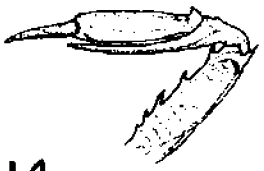
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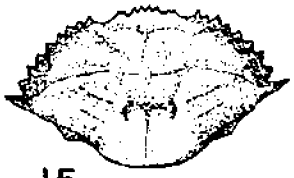
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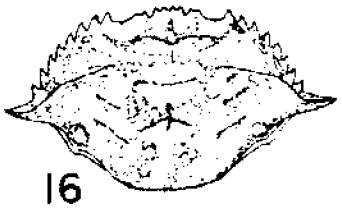
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along entire coast of NW Gulf; numerous records from both Louisiana and Texas (Rathbun, 1930; Behre, 1950; Gunter, 1950; Leary, 1967).

- Frontal teeth 4 in number 7

7. Anterior margin of lateral spine (posteriormost antero-lateral tooth) less than 2 times length of posterior margin of preceding tooth (fig. 8)
   Callinectes exasperatus (Gerstaecker, 1856). Usually in river mouths, bays, and coastal marine waters. Occurrence in NW Gulf rare, probably limited to S. Texas coast; a single specimen was tentatively identified from Lydia Ann Channel near Port Aransas, TX (Gunter, 1950). Species is known to occur more commonly to south near Veracruz, Mexico (Contreras, 1930).

- Anterior margin of lateral spine equal to or longer than 2 times length of posterior margin of preceding tooth 8

8. Inner and outer pairs of frontal teeth extend about equally as far anteriorly (fig. 10)
   Callinectes rathbunae Contreras, 1930. Reported taken at mouth of Rio Grande, extreme S. Texas, by H. H. Hildebrand (Leary, 1967), though seldom occurring that far north. Much more common to the south along coasts of Tamaulipas and Veracruz, Mexico, where it has also been reported from river mouths (Contreras, 1930). Redescribed by Taissoun (1972) who reported it to occur in shallow coastal bays of both high and low salinity as well as in littoral areas of the Gulf of Mexico.

- Inner frontal teeth extend 3/4 or less as far anteriorly as outer frontal pair 9

9. Anterior margin of lateral spine more than 2 1/2 times length of posterior margin of preceding antero-lateral tooth (fig. 1)
   Callinectes similis Williams, 1966. Found predominantly in marine and near-marine waters of open Gulf, inlets, and lower bays; near shore to about 40 fathoms. As suggested by Williams (1966), previous records of C. ornatus and C. danae from the NW Gulf all apparently refer to C. similis; ranges of C. ornatus and C. danae were found to not include the NW Gulf. Records as C. danae or C. ornatus are from throughout NW Gulf in both Louisiana and Texas waters (Rathbun, 1930; Behre, 1950; Gunter, 1960; Daugherty, 1952; Hildebrand, 1954), as are more recent reports as C. similis (Dawson, 1966; Williams, 1966; Hoese et al, 1968).

- Anterior margin of lateral spine equal to or less than 2 1/2 times length of posterior margin of preceding tooth (fig. 9)

  Callinectes marginatus (A. Milne Edwards, 1861). This species was reported by Behre (1950) from Grand Isle, LA as "the sargassum crab commonly found on sargassum windrows along the beach . . . and always in the tide rip sargassum drift, at sea"; this observation is more fitting for Portunus sayi and suggests that Behre may have confused the two species. C. marginatus is most abundant in more southerly tropical Caribbean waters and is by no means "common" in the NW Gulf. However, Rathbun (1930) lists a specimen from Cameron, LA.

10. Carapace smoothly convex, surface appearing glossy (when dry) but finely granulate under magnification; pubescence confined to margins of carapace; dorsum marked by 4 lines or very low ridges of granules (fig. 12)

  Portunus sayi (Gibbes, 1850). Normally pelagic, living among floating Sargassum (gulfweed) in marine Gulf waters. Found seasonally throughout NW Gulf wherever concentrations of drifting Sargassum are carried along coast of Texas (Leary, 1967) and Louisiana (Rathbun, 1930; Behre, 1950).

- Carapace irregular in contour, dorsal surface with more than 4 coarsely granulate ridges separated by finely granulate, pubescent surfaces . . 11

11. Postero-distal margin of merus of swimming leg (fifth thoracic leg, fig. 1h) armed with short spine or several spinules; inner pair of frontal teeth usually advanced very slightly beyond outer pair 12

- Postero-distal margin of merus of swimming leg unarmed; inner and outer pairs of frontal teeth about equally advanced (fig. 11)

  Portunus ventralis (A. Milne Edwards, 1879). Usually found in shallow water near shore or surface; occurrence rare, if ever, in NW Gulf. Reports (questionable) from Aransas Pass (inlet) and Gulf near Port Aransas, TX (Parker, 1959; Trott, unpublished).

12. Greatest width of carapace distinctly less than 2 times length; postero-distal margin of merus of swimming leg armed with single short spine and usually several much smaller, inconspicuous spinules (less than 1/2 length of spine); in adults, length of anterior margin of lateral spine (posteriormost antero-lateral tooth) less than 2 times posterior margin of preceding antero-lateral tooth (fig. 15)

  Portunus spinimanus (Latreille, 1819). Found in offshore marine waters of Gulf, passes or inlets, and deeper channels of near-marine bays; surface to 50 fathoms. Reported from vicinity of

Grand Isle, LA (Behre, 1950); recorded from Matagorda Bay and Pass "Cabello," TX (Rathbun, 1930), off shore and in pass at Port Aransas, TX (Hildebrand, 1954; Parker, 1959); also taken from Intercoastal Canal in Aransas Bay, TX (Author's Collections). Often found together with P. gibbesii.

- Greatest width of carapace approximately equal to or slightly greater than 2 times length; postero-distal margin of merus of swimming leg with several spinules, or small spines, none of which is singularly much larger than all others; length of anterior margin of lateral spine more than 2 times posterior margin of preceding antero-lateral tooth . . . 13

13. Carapace with 1 or more small, distinct, naked, whitish or irridescent patches near antero-lateral margin at base of teeth; inner spine on carpus of cheliped never reaching beyond proximal half of palm (fig. 16)
Portunus gibbesii (Stimpson, 1859). Found in offshore marine waters of Gulf, surface to 48 fathoms and in deeper inlets, passes, and channels in near-marine bays. Known from off Grand Isle, LA (Dawson, 1966) and Isles Dernieres, LA (Freeport Sulphur Collections); from off Pass Cavallo and Freeport, TX (Hildebrand, 1954); from Matagorda Bay, TX (Rathbun, 1930); from off shore, inlets, and bay channels near Port Aransas, TX (Gunter, 1950; Parker, 1959). Often found together with P. spinimanus.

- Carapace without distinct, whitish or irridescent patches near base of antero-lateral teeth; inner spine on carpus of cheliped usually reaching to or beyond distal half of palm (figs. 13 and 14)
Portunus spinicarpus (Stimpson, 1871). Found in open marine waters from 5-300 fathoms; most common in NW Gulf from 5-40 fathoms. Reported from off Mississippi Delta, LA (Rathbun, 1930), off Grand Isle, LA (Dawson, 1966), along seaward edge of brown shrimp grounds, TX and LA (Hildebrand, 1954), off Texas coast (Chace, 1956; Leary, 1967).

Family: XANTHIDAE (Plate 9)

1. Carapace and legs deeply and intricately eroded; antero-lateral borders rough or irregular without distinct teeth, spines, or lobes (fig. 9)
Glyptoxanthus erosus (Stimpson, 1859). Taken from rocky reefs, coarse sand, and rock or shell bottom rubble in marine waters from near shore to 37 fathoms. Though uncommon in the NW Gulf, there are records from Grand Isle, LA "washed up on beach with debris" (Rathbun, 1930; Behre, 1950),

unspecified area of Texas coast (Leary, 1967), and sublittoral reef in Gulf off Port Mansfield, TX (Felder, unpublished).

- Carapace not deeply eroded, either smooth, hairy, granulate, tuberculate, or lobulate; antero-lateral margin either marked with several teeth or spines or divided into several broad, smoothly margined lobes 2

2. Dorsum of carapace either "shaggy" with many long, erect hairs (some club-shaped) and shorter stiff bristles or with dense pubescence completely concealing most of surface beneath 3

- Dorsum of carapace either without hair, with few lines of inconspicuous short or unerect hairs, short pubescence confined to margins of furrows and ridges, or very short hairs sparsely scattered over surface . . 6

3. Hair long and not covering whole carapace or not so thick as to conceal surface beneath; upper margin of orbit with 2-4 spines (obscure in very small specimens) 4

- Hair forming short dense coat over most of carapace and concealing much of surface beneath (though easily rubbed off and often absent or very sparse on worn spots, tubercles, or posterior part of carapace); upper margin of orbit either unarmed, or with 3 blunt (truncate) teeth or tubercles 5

4. Carapace with 2 or more superhepatic spines (fig. 6)
   Pilumnus sayi (Say, 1818). Found on shelly bottom or among fouling organisms on various hard substrates including jetties, reefs, pilings, and buoys; in marine waters from near shore to 49 fathoms. Known from sublittoral reef off Port Mansfield, TX (Felder, unpublished), from jetties at Port Aransas, TX (Trott, unpublished), and from oil platform in 8-9 fathoms south of Vermilion Bay, LA (USL Collections).

- Carapace without superhepatic spines (fig. 7)
   Pilumnus dasypodus Kingsley, 1879. Taken with fouling materials from reefs, pilings, buoys, and jetties in marine waters from near shore to 16 fathoms. Reported from jetties at Port Aransas, TX (Leary, 1967) and sublittoral reef off Port Mansfield, TX (Felder, unpublished).

5. Upper margin of orbit unarmed (remove pubescence to observe); chelae spinous above, outer surface of major palm usually with upper 1/2 or more spinous or tuberculate (fig. 8)
   Pilumnus floridanus Stimpson, 1871. Found on variety of

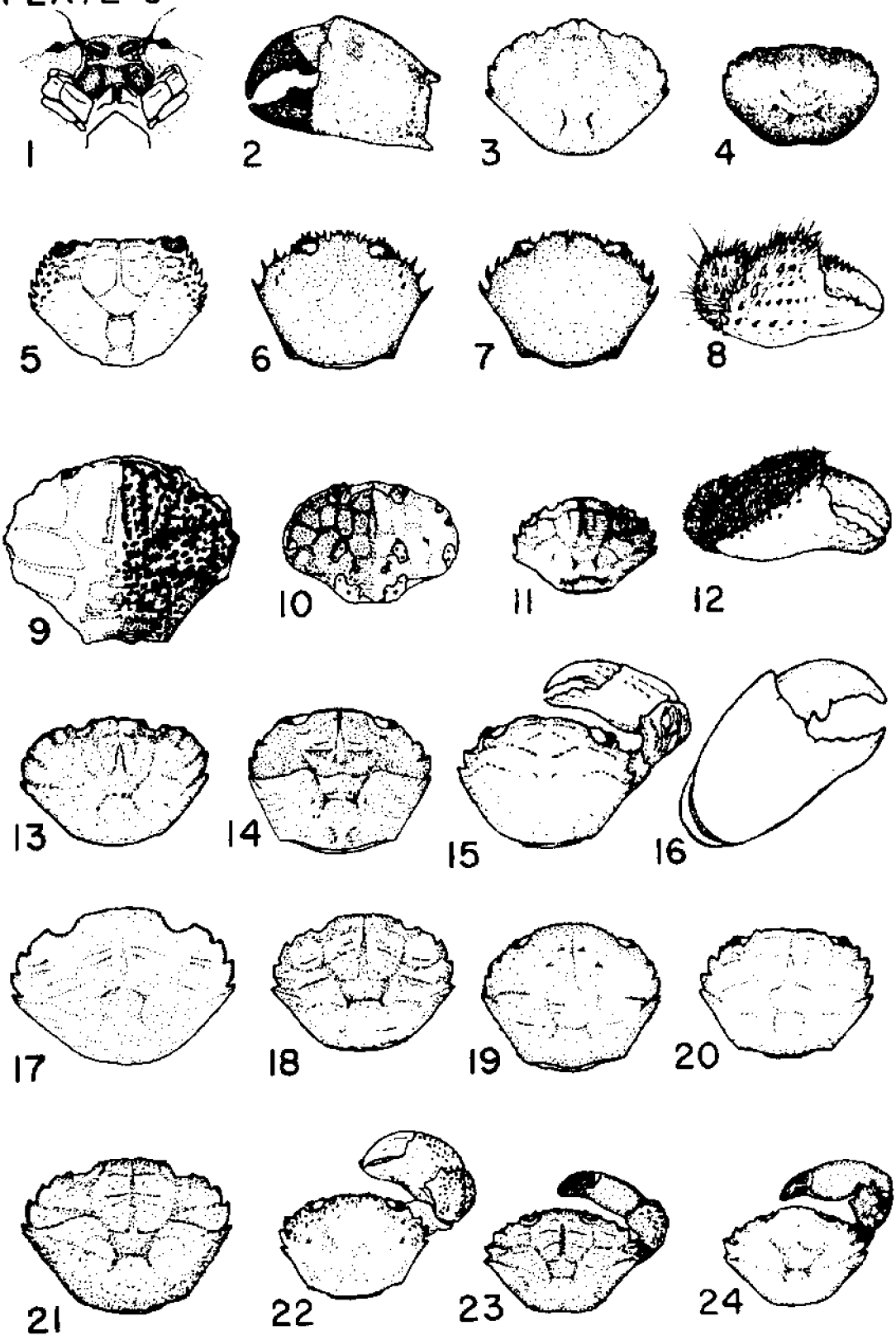
Plate 9

XANTHIDAE

(Composite figs. from specimens, Williams, 1965, and Rathbun, 1930)

Fig. 1. Antero-ventral view of xanthid crab, third maxillipeds spread to expose sharp ridges on endostome
2. Major chela of Menippe mercenaria showing approximate location of stridulating ridges on inner surface
3. Carapace of Menippe mercenaria
4. Carapace and eyes of Eurytium limosum
5. Carapace and eyes of Eriphia gonagra
6. Carapace and eyes of Pilumnus sayi (hair removed)
7. Carapace and eyes of Pilumnus dasypodus (hair removed)
8. Right chela of Pilumnus floridanus in outside view
9. Carapace and eyes of Glyptoxanthus erosus, eroded surface shown on right side only
10. Carapace of Platypodiella spectabilis showing typical color pattern, areolation shown on left side only
11. Carapace of Pseudomedaeus agassizi, areolation shown on right side only
12. Major chela of Pilumnus pannosus in outside view
13. Carapace of Eurypanopeus abbreviatus
14. Carapace and eyes of Rhithropanopeus harrisii
15. Carapace, eyes, and major cheliped of Micropanope sculptipes
16. Outside view of generalized major chela with enlarged basal tooth present on dactylus
17. Carapace of Eurypanopeus depressus
18. Carapace of Panopeus turgidus
19. Carapace and eyes of Neopanope texana texana
20. Carapace and eyes of Panopeus bermudensis? (juvenile)
21. Typical carapace of Panopeus herbstii (carapace and teeth somewhat variable in this species)
22. Carapace, eyes, and major cheliped of Micropanope nuttingii
23. Carapace, eyes, and major cheliped of Hexapanopeus paulensis
24. Carapace, eyes, and major cheliped of Hexapanopeus angustifrons

PLATE 9



bottoms though commonly on hard substrates with fouling material; in marine waters from near shore to 80 fathoms. No published record from NW Gulf, though listed by Trott (unpublished) on basis of collection made by J. W. Hedgpeth; specimens have also been taken from Stetson Banks at 28°9.6'N., 94°17.5'W. (USL Collections).

- Upper margin of orbit with 3 tubercles or truncate teeth; chelae tuberculate above, often with less than 1/2 outer surface of major palm tuberculate (fig. 12)

  Pilumnus pannosus Rathbun, 1897. Found on submerged hard substrates, especially rocky reefs or jetties with fouling material; in marine waters from a few feet to 9 fathoms. Reported from Port Aransas, TX (Williams, 1965) and sublittoral reef in Gulf off Port Mansfield, TX (Felder, unpublished).

6. Gap open between base of antenna and inner margin of orbit; proximal, movable segments of antenna can enter orbit by way of gap 7

- Gap closed between antenna and orbit, leaving "S-shaped" suture; proximal segments of antenna completely excluded and widely separated from orbit (fig. 5)

  Eriphia gonagra (Fabricius, 1781). Known from a variety of habitats including under rocks above water, in seaweed, among sponges, and from brackish ponds and tidepools (Williams, 1965); found in brackish to marine waters of uncertain depth limits, though usually taken near shore. Specimens taken from quarry "bore-holes" in granite blocks of jetties at Brazos Santiago inlet near Port Isabel, TX (TXAI Collections).

7. Movable finger of major chela black or dark brown with dark color not on proximal 1/4 or more of upper edge; upper, distal, inner surface of major palm (area proximal to movable finger) with granulation modified to form patch of fine, oblique, fingerprint-like stridulating ridges* (obscure in specimens of less than 10 mm carapace width) (figs. 2-3)

  Menippe mercenaria (Say, 1818). Common in saltier estuaries and near-marine bays; also known from marine waters near shore to 28 fathoms. Young most common on or among oyster shells, rocks, and pilings; large adults burrow just below low-tide mark often at base of jetties, oyster reefs, and shoal areas; other observations are detailed by Powell and Gunter (1968). Very common throughout NW Gulf coast; numerous records from Louisiana (Rathbun, 1930; Behre, 1950; Menzel and Hopkins,

*For small specimens, dry inner surface of palm and magnify.

1956) and Texas coast (Rathbun, 1930; Gunter, 1950; Whitten, Rosene, and Hedgpeth, 1950; Hedgpeth, 1953; Simmons, 1957; Parker, 1959). Rathbun's (1930) record of Menippe nodifrons Stimpson, 1859 from Cameron, LA is questionable, possibly based on mislabelled material, since extensive collecting there and in other areas of NW Gulf has produced no further specimens.

- Movable finger of major chela either brown (light or dark), gray, tan, or white; if dark, then with dark color on all but proximal 1/6 or less of upper edge; upper, distal, inner surface of major palm smooth or granulate without oblique, stridulating ridges* 8

8. Manus (palm) of either cheliped surmounted by single, tall, sharp but smoothly edged longitudinal crest; carapace with antero-lateral margin thin, cristiform, and very broadly trilobate; fresh carapace with darkly bordered patches of yellow dorsally (fig. 10)
   Platypodiella spectabilis (Herbst, 1794). Found on reefs in marine waters. Specimen taken from under sponge on Seven and One-Half Fathom Reef off Port Mansfield, TX (Felder, unpublished). Known as Platypodia spectabilis prior to revision by Guinot (1967b).

- Manus (palm) of cheliped without single, tall, longitudinal crest; sometimes with low, rounded longitudinal ridges or paired ridges of granules or tubercles; antero-lateral margins of carapace with 3-5 teeth or 4 distinct lobes; no distinct darkly bordered yellow patches dorsally . . 9

9. Fingers of chelae white; movable finger with persistent pink or purple color confined to upper surface of proximal half; ridges on endostome of buccal cavity (anterior to mandibles, much as in fig. 1) about as strong anteriorly as posteriorly and extend to anterior boundary of endostome (fig. 4)
   Eurytium limosum (Say, 1818). Burrows in muddy banks, among mangrove roots, or under stones in muddy sand from above high tide to shallow depths near shore predominantly in estuarine and bay waters. Reported from vicinity of Grand Isle, LA (Rathbun, 1930; Behre, 1950) but not recorded from Texas coast.

- Fingers of chelae either white, horn, tan, or darker; if movable finger white, then without distinct proximal color or with brown or orangish color proximally and not confined to upper surface; endostomal ridges

*For small specimens, dry inner surface of palm and magnify.

either absent, present only posteriorly or much diminished anteriorly and not reaching anterior boundary of endostome 10

10. Antero-lateral border of carapace with at least 4 discernable teeth or lobes (including outer orbital angle as anteriormost); fronto-orbital width either more or less than 2/3 carapace width 11

- Antero-lateral border never with more than 3 distinct, usually spine-tipped, teeth, though sometimes with much smaller tubercles between or following teeth; fronto-orbital width never less than 2/3 carapace width (fig. 15)

  Micropanope sculptipes Stimpson, 1871. On offshore bottom 5-101 fathoms; found "to Port Aransas" (Williams, 1965) and off Port Mansfield, TX (Author's Collections).

11. Movable finger of major chela with much enlarged, terminally rounded, basal tooth on lower margin (much as in fig. 16) 12

- Movable finger of major chela without much enlarged basal tooth; basal tooth, if present, is low and either pointed, not much larger than other teeth on finger, or with length 1/4 or less depth of movable finger (measured immediately distal to basal tooth) 13

12. Antero-lateral margin with 4 teeth (including outer orbital angle as first); never with raised red or orange spot on inner surface of ischium of third maxilliped (fig. 22)

  Micropanope nuttingii Rathbun, 1898. Known from rocky substrates in marine waters from shore to 100 fathoms. Taken from Seven and One-Half Fathom Reef off Port Mansfield, TX (Felder, unpublished). Recent revision of the genus Micropanope by Guinot (1967a) will probably necessitate placement of this species in a different genus, judging from the male first pleopods.

- Antero-lateral margin either with 5 teeth (though second may be small, blunt, or low and distally rounded) or 4 lobes; distinct red or orange spot may or may not be present on inner surface of ischium of third maxilliped 16

13. Extreme edge of frontal margin with shallow transverse groove; margin on either side of median notch appearing double under magnification . 14

- Extreme edge of frontal margin not transversely grooved; margin on either side of median notch with single, though sometimes thickened, edge 15

14. Width of adult carapace at least 1 1/2 times length; carapace rough in contour, furrowed between elevations; elevations and teeth with clumps of coarse granules (fig. 11)

    Pseudomedaeus agassizi (A. Milne Edwards, 1880). Occasionally taken on sandy bottom but primarily from rock and other hard substrate with fouling growth of sponges, bryozoans, etc.; from marine waters 4-45 fathoms depth; taken from reef off Port Mansfield, TX at 4-7 fathoms (Felder, unpublished); also taken from 2 locations at 8-10 fathoms south of Vermilion Bay, LA (USL Collections). Known as Leptodius agassizii prior to revision by Guinot (1967c).

- Width of carapace less than 1 1/2 times length; carapace finely granulate and smooth in contour except for distinct transverse pubescent lines of raised granules (fig. 14)

    Rhithropanopeus harrisii (Gould, 1841). Commonly found on oyster reefs, living and decaying vegetation, and other debris in fresh, estuarine, and bay waters seldom exceeding 20 ppt salinity; most common from 0-5 fathoms, though known to 20 fathoms. Found in suitable areas throughout NW Gulf coast and sometimes several miles up rivers; reported from vicinity of Grand Isle and upper Barataria Bay, LA (Rathbun, 1930; Behre, 1950) and from unspecified areas of Texas coast (Hedgepeth, 1953; Leary, 1967). Specimens taken specifically from lower Nueces River and brackish areas of several bays on Texas coast (UT Collections; Author's Collections).

15. Ischium of third maxilliped with raised, oval, red or orange spot on internal surface in mature individuals of both sexes; carapace slightly convex in anterior half, flattened posteriorly (fig. 17)

    Eurypanopeus depressus (Smith, 1869). Commonly associated with oyster reefs in estuarine and bay waters below 25 ppt salinity; usually from shore to several fathoms, though known to 26 fathoms. Often taken from oysters and shell debris along Louisiana coast (Rathbun, 1930; Behre, 1950); also known from many areas along the Texas coast with reports and collections from Galveston to the lower Laguna Madre (Rathbun, 1930; Author's Collections; TXAI Collections).

- Ischium of third maxilliped without raised, oval, red or orange spot on internal surface; carapace convex in both anterior and posterior halves, though usually less so posteriorly 17

16. Antero-lateral margin divided into 4 lobes by 3 notches; first 2 lobes broad and flat, third with longer anterior margin, fourth subtriangular,

or bluntly pointed (fig. 13)

Eurypanopeus abbreviatus Stimpson, 1860. Found on oyster reefs, rocks, and among fouling growth primarily in bay and near-marine waters from near shore to unknown depth. Seems to inhabit somewhat higher salinity waters than E. depressus. Reported from Brazos Santiago near Port Isabel, TX (Leary, 1967); numerous specimens taken from Tarpon Hole in same vicinity (TXAI Collections). Behre (1950) reported tentative determination of E. crenatus "Rathbun"? from Grand Isle, LA; it is possible this specimen was an aberrant E. abbreviatus, as the species are quite similar and E. crenatus (Milne Edwards and Lucas, 1844) is primarily a South American Pacific coast species.

- Antero-lateral margin with 5 teeth (including outer orbital angle as first), the 3 posteriormost usually pointed (triangular or spine tipped 18

17. Greatest length of adult carapace at least 3/4 greatest width; protogastric lines, if present, are low, short, and not oblique; fingers of chelae whitish, horn, or light brown in color (fig. 19)

Neopanope texana (Stimpson, 1859). Common in shallow grass (Thalassia) flats and debris over soft bottoms; known from bay, near-marine, and marine waters, low tide to 28 fathoms. Records from St. Joseph Island, TX, the type locality, Corpus Christi Bay, TX, and Chandeleur Islands, LA (Rathbun, 1930); other records from beaches, bays, and Laguna Madre on Texas coast (Simmons, 1957; Parker, 1959; Breuer, 1962; Keith and Hulings, 1965), though some confused with N. texana sayi (= N. sayi) which, according to Abele (1972), does not occur in the NW Gulf. Abele (1972) elevated N. texana texana and N. texana sayi to distinct species.

- Greatest length of adult carapace slightly less than 3/4 greatest width; often 1 or 2 slightly raised, granulated, protogastric lines obliquely inclined backward and outward on either side of midline of carapace; fingers of chelae dark brown (fig. 18)

Panopeus turgidus Rathbun, 1930. Taken from bay and near-marine waters from near shore to unknown depth; usually found associated with shell, rocks, vegetation, or other debris. Reported from Chandeleur Islands, LA, the type locality (Rathbun, 1930), and vicinity of Grand Isle, LA (Behre, 1950); also known from vicinity of Port Isabel, TX and other localities throughout Laguna Madre and Aransas Bay, TX (TXAI Collections; Author's Collections).

18. Carpus of major cheliped finely rugose or granulate in texture, near uniformly rounded in dorso-lateral contour, not knobbed or extensively roughened, and without distinct distal dorso-lateral groove (though sometimes gentle depression in place of groove); males and some females with conspicuous raised red or orange spot on inner surface of ischium of third maxilliped (fig. 21)

    Panopeus herbstii H. Milne Edwards, 1834. A very common bay and estuarine crab, found where bottom is muddy with shells or stones and especially common on oyster reefs; found predominantly in estuarine, bay, and near-marine waters from intertidal to 12 fathoms. This species is very common in Texas and Louisiana coastal waters (Rathbun, 1930; Behre, 1950; Leary, 1967). P. herbstii is variable in body form; Rathbun (1930) has described and named several common forms. Behre (1950) listed most of the forms from Grand Isle, LA along with, tentatively, 2 forms of the very similar species P. occidentalis Saussure, 1857. As P. herbstii and P. occidentalis are easily confused, and determinations of the Grand Isle material were tentative (not confirmed by specialists), there is reason to doubt the presence of P. occidentalis in the NW Gulf, at least for the present. Examination of a large series of Panopeus from the Grand Isle area has produced no certain specimens of P. occidentalis.

- Carpus of major cheliped granulate in texture and knobbed or roughened in contour, usually with distinct distal dorso-lateral groove; never with conspicuous, raised, red or orange spot on inner surface of ischium of third maxilliped 19

19. Extreme edge of frontal margin transversely grooved, appearing double under magnification; strong, short ridge on either half of epigastric region composed of single line of enlarged granules about same size as granules of hepatic or branchial ridges (fig. 20)

    Panopeus bermudensis Benedict and Rathbun, 1891. Found on rocks or among other debris, commonly among fouling organisms; taken from bay and near-marine waters near shore to unknown depths. Known from jetties at Port Aransas, TX on basis of tentative identification (Author's Collections).

- Extreme frontal margin single, not transversely grooved; short ridges either absent from epigastric region or present but low, indistinct and usually several granules in width, ridges weaker and granules smaller than in hepatic or branchial ridges 20

20. Carpus of cheliped with about 10-15 irregular, coarsely granulate tubercles; at least 8 distinct granulated lines on gastric, cardiac, and branchial

regions of carapace (fig. 23)

Hexapanopeus paulensis Rathbun, 1930. Known from offshore marine waters on hard substrates among fouling sponges, ascidians, and bryozoans; also on rocks, sand, and shell-fragment substrates. Numerous small specimens taken from Seven and One-Half Fathom Reef off Port Mansfield, TX (Felder, unpublished); larger specimens taken from sand bottom in several fathoms off Padre Island, TX in South Bird Island Quadrangle (USGS, Corpus Christi, TX).

- Carpus of cheliped roughened and irregular in contour but not with distinct knob-like tubercles; less than 8 granulated lines on gastric, cardiac, and branchial regions of carapace (fig. 24)

Hexapanopeus angustifrons Benedict and Rathbun, 1891. Known from marine waters of Gulf and near-marine waters of lower bays from near shore to 76 fathoms; usually around shell or other debris, though not found primarily in shallower waters. Reported off mouth of Mississippi River (Rathbun, 1930); uncommonly found in vicinity of Grand Isle, LA, (Behre, 1950); specimens also known from Lake Pelto, LA (Freeport Sulphur Collections). Reported from Lydia Ann Channel near Port Aransas, TX (Hedgpeth, 1953).

Family: GONEPLACIDAE (Plate 10, figs. 1-3)

1. Fronto-orbital width less than 3/4 greatest width of carapace 2

- Fronto-orbital width more than 3/4 greatest width of carapace (fig. 1)

Euryplax nitida Stimpson, 1859. Taken in marine waters, shallow to 49 fathoms. Reported by Rathbun (1918) from "New Orleans"? and Williams (1965) "to Texas."

2. Carapace widest posteriorly; with antero-lateral crest but no antero-lateral teeth (fig. 2)

Chasmocarcinus mississippiensis Rathbun, 1931. Known from marine waters of open Gulf, on sand and mud bottoms from 2-20 fathoms. Type specimen taken from Mississippi Sound near Horn Island (Rathbun, 1931); reported off Grand Isle, LA (Dawson, 1966); specimens also taken off Padre Island, TX (USGS, Corpus Christi, TX).

- Carapace widest in anterior half; 4-5 antero-lateral teeth (fig. 3)

Speocarcinus lobatus Guinot, 1969. In marine and near-marine

Gulf waters from near shore to over 20 fathoms; probably in burrows of other crustaceans and large polychaets as reported for S. carolinensis Stimpson, 1859 (Williams, 1965) with which it was confused prior to revisions by Guinot (1969). Report of S. carolinensis from 7 1/2-20 fathoms off Grand Isle, LA (Dawson, 1966); later specimens from same area identified as S. lobatus (Freeport Sulphur Collections); also known from Sabine Pass, TX, the type locality.

Family: PINNOTHERIDAE (Plate 10, figs. 4-14)

1. Third walking leg little, if any, longer than others; width of carapace less than 2 times length 7

- Third walking leg much longer and broader than others; width of carapace at least 2 times length 2

2. Merus of third walking leg with deep, pubescent concavity on upper surface near posterior edge (fig. 4)
   Pinnixa lunzi Glassell, 1937. Known from near shore to about 12 fathoms; believed to be facultatively commensal with burrowing animals (Boesch, 1971). A specimen was taken from stomach of red snapper collected on reef near 26°51'N., 97°18'W. off Port Mansfield, TX (Felder, 1973); others taken more recently off Mississippi Delta.

- Merus of third walking leg without deep, pubescent concavity on upper surface 3

3. Carapace with sharp, transverse, posterior carina across entire width, behind which carapace slopes more steeply to join abdomen 4

- Carapace without transverse, posterior carina or with carina on cardiac area only and diminished at midline 5

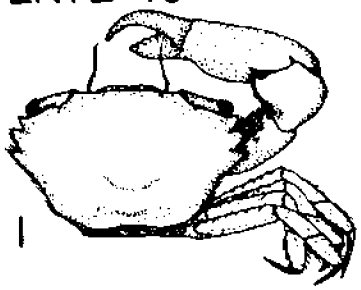
4. Chelae with pubescent tuft in gape of fingers and fringe of hair on lower margin of palms; width of carapace about 2.5 times length (fig. 5)
   Pinnixa chacei Wass, 1955. Found as commensal with Callianassa islagrande in intertidal zone of sandy Gulf beaches. Reported from Grand Isle, LA as Pinnixa sp. (Behre, 1950) and later as P. chacei by Wass (1955); also taken from Isles Dernieres, LA (Freeport Sulphur Collections). Listed from Texas

Plate 10

GONEPLACIDAE, PINNOTHERIDAE
(figs. 6-13 redrawn after Williams, 1965)

Fig. 1. Euryplax nitida, left legs not shown
2. Carapace and right cheliped of Chasmocarcinus mississippiensis
3. Carapace and right cheliped of Speocarcinus lobatus drawn as composite after Williams (1965) and Guinot (1969)
4. Left third walking leg of Pinnixa lunzi
5. Carapace and right cheliped of male Pinnixa chacei (after Wass, 1955)
6. Carapace and right cheliped of male Pinnixa cristata
7. Carapace, cheliped, and first walking leg of female Pinnixa retinens and enlargement of male left chela
8. Carapace and first leg of male Pinnixa chaetopterana and frontal views of male and female chelipeds
9. a. External view of left third maxilliped of Pinnixa sayana
   b. Carapace, cheliped, and first walking leg of male Pinnixa sayana
10. Carapace of and right legs hard-stage male Pinnotheres maculatus
11. a. External view of left third maxilliped of Pinnotheres maculatus
    b. Carapace and right cheliped of mature post-hard female Pinnotheres maculatus
12. a. External view of left third maxilliped of Pinnotheres ostreum
    b. Carapace and right cheliped of mature post-hard female Pinnotheres ostreum
13. Carapace and right cheliped of male Pinnotheres ostreum
14. Dorsal view of hard-stage female Pinnotheres ostreum showing location of light areas on posterior half of carapace (after Stauber, 1945)

PLATE 10



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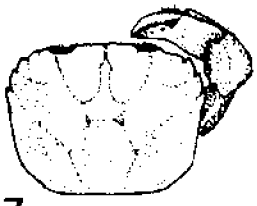

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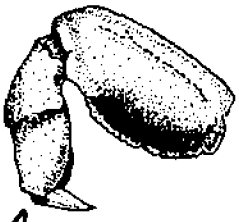

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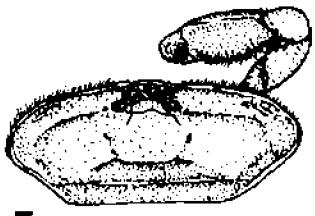

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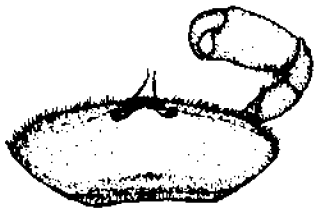

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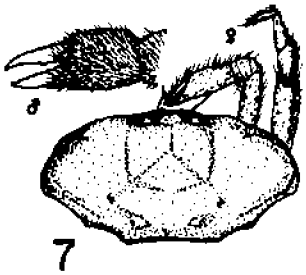

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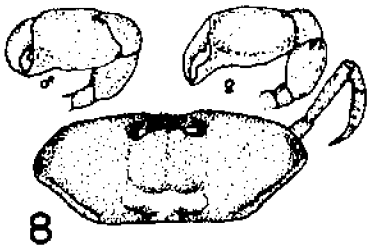

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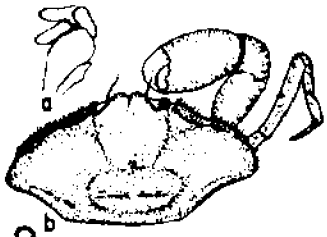

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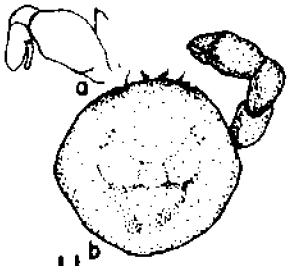

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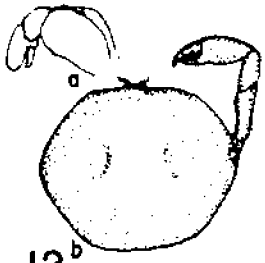

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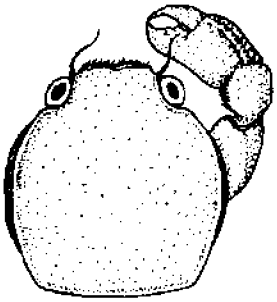

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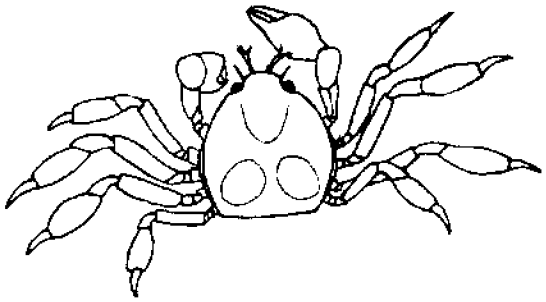


14

by Leary (1967); taken specifically from Padre and Mustang Island, TX (Author's Collections).

- Chelae nearly bare without distinct tuft in gape of fingers and without distinct fringe on palm; width of carapace about 2.85 times length (fig. 6)
  Pinnixa cristata Rathbun, 1900. Known from intertidal beaches and shallow sand and sandy-mud bottoms in brackish to marine waters; usually commensal with callianassids or other burrowers. Records from Grand Isle, LA (Behre, 1950) and Aransas County, TX (Hedgpeth, 1950; Williams, 1965).

5. Chelipeds about as heavy as first walking legs; immovable finger of chela nearly straight, not bent downward; no transverse carina on cardiac area in males or females (fig. 7)
   Pinnixa retinens Rathbun, 1918. Found on mud bottoms in estuarine to marine waters from near low tide mark to 20 fathoms; some have been taken specifically from burrows of Upogebia affinis (Wass, 1955). Known from Aransas area of Texas coast (Williams, 1965).

- Chelipeds stout, much heavier than first walking legs; immovable finger of chela bent downward; transverse carina on cardiac area of carapace in males, though obscure or absent in females 6

6. Propodus of third walking leg broad, length less than 2 times breadth (fig. 8)
   Pinnixa chaetopterana Stimpson, 1860. Found in marine and near-marine waters, from intertidal to 8 1/2 fathoms, predominantly as a commensal with burrowing worms or crustaceans. Reported from Chandeleur Islands, LA (Rathbun, 1918) and Galveston, TX (Williams, 1965).

- Propodus of third walking leg narrow, length at least 2 times breadth (fig. 9)
  Pinnixa sayana Stimpson, 1860. This species has been found free in water, in beach drift sand, in mud, and in tubes of burrowing worms; known from marine to near-marine waters, shore to 26 fathoms. Reported from Grand Isle, LA (Behre, 1950).

7. Carapace dorsally with striking pattern of light spots on dark background of pubescence in hard stage (carapace rigid); post-hard (membranous) carapace covered with short, drab brown, deciduous pubescence (figs. 10-11)
   Pinnotheres maculatus Say, 1818. Known to exhibit free-swimming or vagrant stages as well as commensal or parasitic stages; found from surface and shallow bay waters to 25 fathoms.

Commensal predominantly with pelecypod molluscs, particularly the genus Atrina in NW Gulf. Listed from Texas by Leary (1967); specimens taken particularly from vicinity of Port Isabel, TX (TXAI Collections) and in 7-12 fathoms off Padre Island, TX (USGS, Corpus Christi, TX).

- Carapace with dorsal color pattern in hard stage (carapace rigid) limited to, at most, pale spot on each branchial region; post-hard (membranous) carapace nearly naked (figs. 12-14)

  Pinnotheres ostreum Say, 1817. Parasitic or commensal primarily with the oyster Crassostrea virginica and therefore found primarily in shallow bay waters. Commensal or parasitic in all stages excepting a brief period of the first crab "invasive stage" which is free swimming (Williams, 1965). Reported from Cedar Bayou, TX (Hedgpeth, 1953), tentatively from Port Aransas, TX (Menzel, 1955), and from Port Isabel, TX (Breuer, 1962).

Family: GRAPSIDAE (Plate 11)

1. Carapace with 4 teeth on either antero-lateral margin (outer orbital angle included as tooth); antennules visible dorsally in deep clefts in anterior margin of carapace; carapace with large rounded tubercles dorsally (fig. 13)

   Plagusia depressa (Fabricius, 1775). Found around rocks, jetties, and shallow reefs in marine waters near surface. Listed from vicinity of Port Aransas, TX by Trott (unpublished); specimens taken on jetties at Mansfield Channel (inlet), TX (TXAI Collections).

- Carapace with less than 4 teeth on each antero-lateral margin; antennules, when folded, are concealed beneath front of carapace; carapace smooth, finely granulate, or with transverse ridges dorsally 2

2. Third maxillipeds with oblique hairy ridge crossing outer face of ischium and merus (fig. 2) 3

- Third maxillipeds without oblique hairy ridge 5

3. Width of frontal border less than 1/2 greatest width of carapace; lateral borders of carapace convex (figs. 12 and 14)

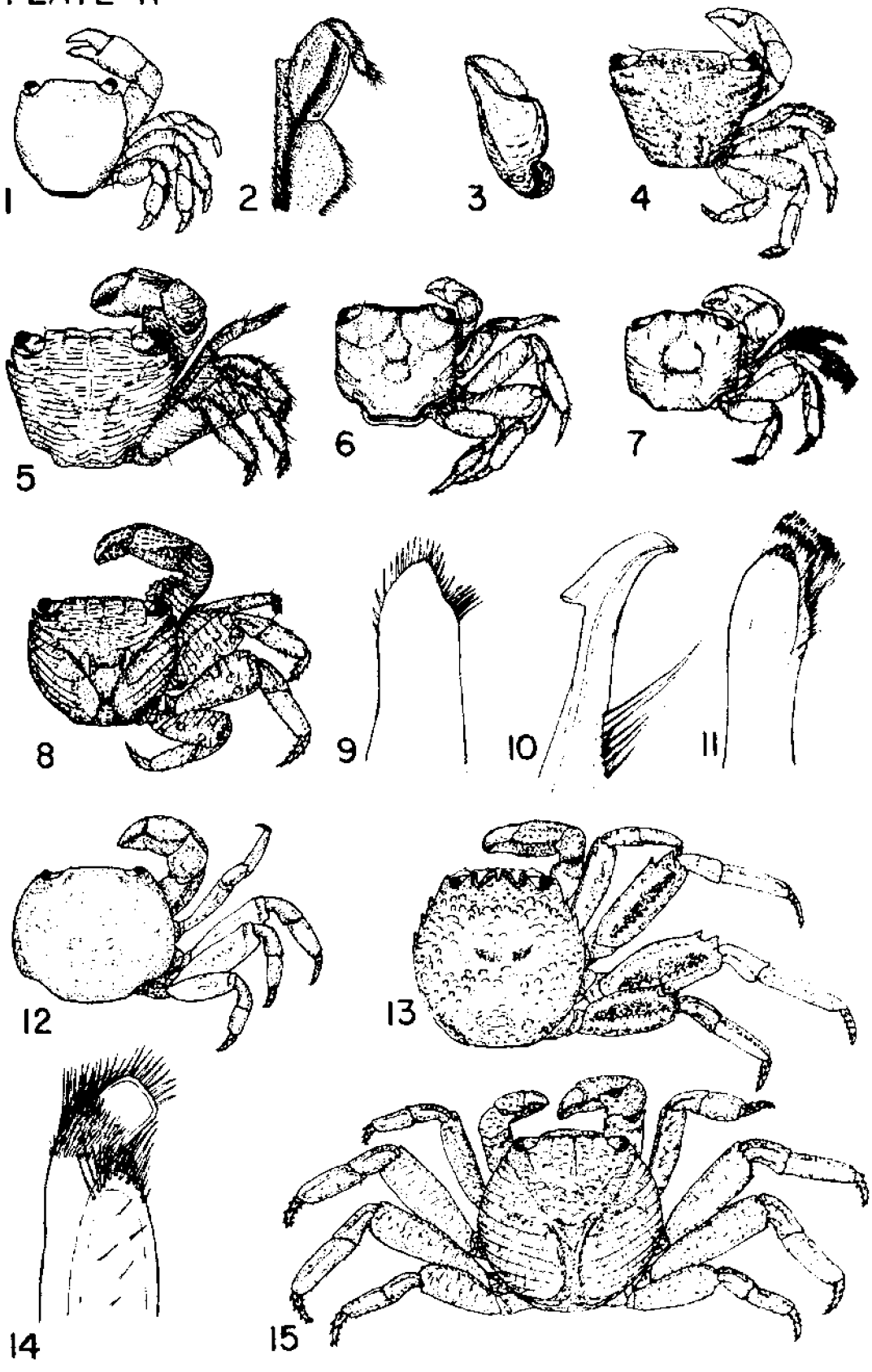
   Cyclograpsus integer H. Milne Edwards, 1837. Found among rocks and dead seaweed near high tide, on reefs, or burrowing in marshy areas near sea; known from above waterline to

Plate 11

GRAPSIDAE
(figs. 9-11 and 14 redrawn after Monod, 1956)

Fig. 1. Planes cyaneus, left legs not shown
2. Example of third maxilliped with oblique hairy ridge crossing outer face of ischium and merus
3. Outside of left cheliped from Pachygrapsus gracilis
4. Pachygrapsus gracilis, left legs not shown
5. Pachygrapsus transversus, left legs not shown
6. Sesarma cinereum, left legs not shown
7. Sesarma reticulatum, left legs not shown
8. Goniopsis cruentata, left legs not shown
9. Tip of first pleopod from male Goniopsis cruentata
10. Tip of first pleopod from male Pachygrapsus transversus
11. Tip of first pleopod from male Pachygrapsus gracilis
12. Cyclograpsus integer, left legs not shown
13. Plagusia depressa, left legs not shown
14. Tip of first pleopod from male Cyclograpsus integer
15. Grapsus grapsus

PLATE II



undetermined depths in marine and near-marine waters. Specimens taken from jetties at Aransas Pass (inlet) and Mansfield Channel (inlet), TX (TXAI Collections).

- Width of frontal border equals or exceeds 1/2 carapace width; lateral borders of carapace slightly sinuous or nearly straight 4

4. Carapace with very small lateral tooth posterior to outer orbital tooth; distal articles of first 3 walking legs densely pubescent (fig. 7)
   Sesarma reticulatum (Say, 1817). Burrows in muddy salt marshes and intertidal areas of shallow bays where waters are estuarine to near marine. Records from throughout most of NW Gulf coast, from vicinity of Grand Isle, LA (Behre, 1950) to Corpus Christi Bay, TX (Hedgpeth, 1953).

- Carapace without tooth posterior to orbital tooth; distal articles of first 3 walking legs with long hairs but not densely pubescent (fig. 6)
   Sesarma cinereum (Bosc, 1801 or 1802). Shallow burrower intertidally or above tide mark in mud and muddy-sand areas in near-estuarine (near-fresh) to near-marine waters. Abundant throughout NW Gulf coast (Author's Collections; Behre, 1950; Hedgpeth, 1953).

5. Width of frontal border less than 1/2 greatest carapace width (fig. 15)
   Grapsus grapsus (Linnaeus, 1758). Usually on intertidal rocky areas of marine shores; particularly on marine jetties in NW Gulf. Reported from jetties at Port Aransas, TX (Leary, 1967) and observed on jetties at Mansfield Channel (inlet), TX.

- Width of frontal border equals or exceeds 1/2 carapace width 6

6. Antennae excluded from orbits by lobe of inner orbital fossa (Plate 1, fig. 2d) blocking orbital hiatus; deep groove defines anterior border of branchial region on carapace (figs. 8-9)
   Goniopsis cruentata (Latreille, 1803). Found primarily in intertidal areas around roots of mangroves or on muddy beaches near inlets. Reported by Leary (1967) from Port Aransas, TX.

- Antennae free to enter orbits as orbital hiatus not completely blocked; branchial region not well defined by groove 7

7. Greatest width of carapace approximately equal to greatest length; carapace dorsally convex and smooth except for faint oblique lines on lateral area of branchial regions (fig. 1)
   Planes cyaneus Dana, 1852. Pelagic, found predominantly on floating gulfweed, logs, or other debris; formerly regarded as

entirely Pacific in distribution (Chace, 1951) but since reported in the Atlantic from St. Helena Island (Chace, 1966) and the west coast of Africa (Crosnier, 1967). Several specimens have been taken from flotsam washed onto the Gulf beach of Padre Island, TX (Thomas C. Shirley, personal communication, publication in press).

- Greatest width of carapace distinctly more than greatest length; length about 3/4-5/6 greatest width; carapace depressed dorsally with transverse striae anteriorly and oblique striae on branchial regions . . . 8

8. Upper surface of movable finger of chela with spiniform tubercles; edge of front simply convex (figs. 3-4 and 11)
   Pachygrapsus gracilis (Saussure, 1858). Habitat similar to P. transversus. Specimens taken from Aransas Bay, TX, jetties at Port Aransas, TX, and fish pass jetties on Gulf beach at Corpus Christi, TX (Author's Collections); also from jetties near Port Mansfield and Port Isabel, TX (TXAI Collections).

- Upper surface of movable finger of chela smooth without spiniform tubercles; fine, even granulation evident under magnification; carapace with edge of front sinuous and granulate (figs. 5 and 10)
   Pachygrapsus transversus (Gibbes, 1850). Found among rocks, on pilings, on roots of mangroves, and occasionally on sandy beaches; occurs particularly along intertidal areas of Gulf beaches, inlets, and lower bays in NW Gulf. Known throughout NW Gulf coast; reported by Behre (1930) from vicinity of Grand Isle, LA and by Whitten, Rosene, and Hedgpeth (1950) from Texas coast jetties; specimens also taken on Isles Dernieres, LA (Author's Collections).

Family: GECARCINIDAE (Plate 12, figs. 1-4)

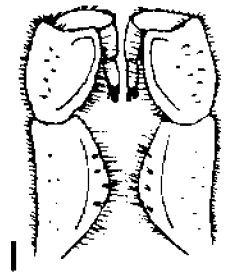
- Palp of third maxilliped about as long as or exceeding length of merus and mostly exposed; large adults with fronto-orbital width near 2/3 or more of carapace width (figs. 1 and 4)
   Cardisoma guanhumi Latreille, 1825. Terrestrial burrower in mud and muddy-sand areas well above tide mark though usually in vicinity of fresh, brackish, or marine water near coasts. Records from Grand Isle, LA (Behre, 1950) and Port Isabel, TX near Brazos Santiago (inlet) (Rathbun, 1918). Also taken from

Plate 12

GECARCINIDAE, OCYPODIDAE

Fig. 1. Third maxillipeds of Cardisoma guanhumi
2. Third maxillipeds of Gecarcinus lateralis
3. Female Gecarcinus lateralis
4. Male Cardisoma guanhumi
5. Ocypode quadrata, left legs not shown
6. Major chela of Uca without tuberculate ridge on inner surface of palm
7. Major chela of Uca with tuberculate ridge on inner surface of palm
8. Outer surface of right chela from Ocypode quadrata
9. Left second maxilliped of Uca showing spoon-tipped hairs on inner surface of merus
10. Ventral view of mature male Uca subcylindrica, distal segments of abdomen removed to expose first pleopods (abdominal appendages)
11. Male Uca spinicarpa
12. Cheliped of male Uca minax showing outside surface; dark areas represent red color, and lightly stippled represent orange
13. Front view of female Uca showing: a. eyebrow, b. width of front at base
14. Ventral view of female Uca with abdomen removed to expose gonopores on sternum

PLATE 12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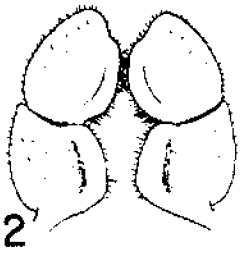
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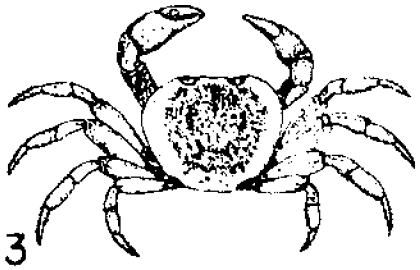
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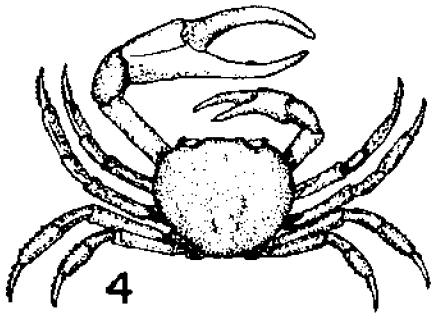
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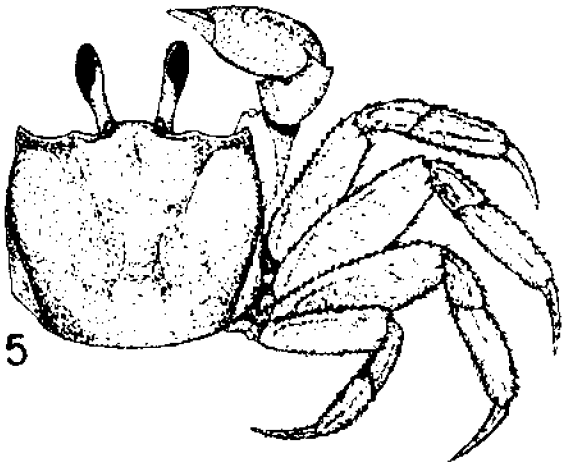
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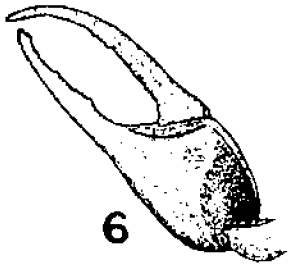
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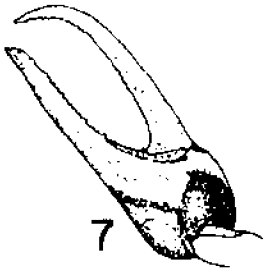
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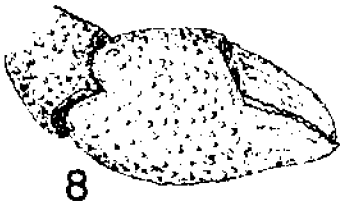
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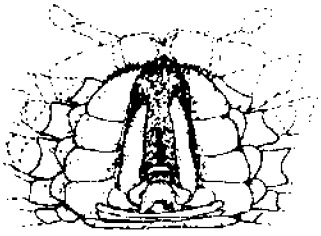
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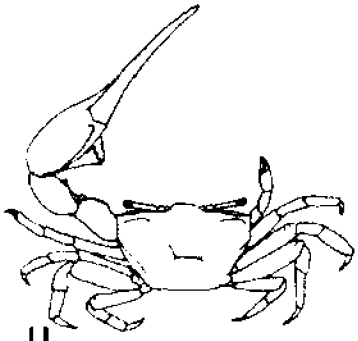
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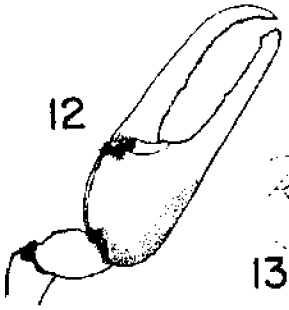
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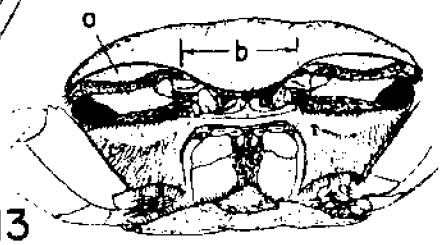

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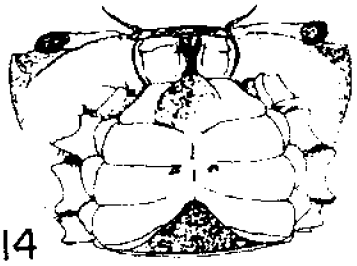
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island in Lake Pelto, LA (Freeport Sulphur Collections) and observed in several areas on upper Padre Island, TX.

- Palp of third maxilliped much shorter than merus and either completely or for most part concealed by merus; large adults with fronto-orbital width about 1/2 carapace width (figs. 2-3)
  Gecarcinus lateralis (Freminville, 1835). Terrestrial burrower in mud and mud-sand areas well above tide mark and often at some distance from shore; sometimes under logs or other debris. Found in general vicinity of fresh, brackish, or marine waters in coastal areas. Specimens taken from Boca Chica near Port Isabel, TX (Ray, 1967) and northward along Padre Island, TX (TXAI Collections).

Family: OCYPODIDAE (Plate 12, figs. 5-14)

1. Cornea of eye large, extending (on ventral surface of eyestalk) more than 1/2 total length of eyestalk (figs. 5 and 8)
   Ocypode quadrata (Fabricius, 1787). Very common burrower on sandy Gulf beaches and dunes, both near high tide mark and above, often at some distance from shore; numerous reports from such areas throughout NW Gulf coast (Rathbun, 1918; Behre, 1950; Hedgepeth, 1953), though cited as Ocypode albicans Bosc prior to revision by Holthuis (1959).

- Cornea of eye small, terminal on long, slender eyestalks, extending less than 1/2 total length of eyestalk 2

2. Chela of one side much larger than chela of other (males)* 3

- Chelae about equal in size (females)* 8

3. Major palm with tuberculate ridge extending obliquely upward from lower margin to carpal cavity on inner surface (fig. 7) 5

- Major palm without oblique tuberculate ridge on inner surface (fig. 6) 4

4. First abdominal appendages (pleopods) about 4-5 times longer than wide, not distinctly tapering or bent laterally in distal 1/4; less than 50 spoon-

*For mutilated males missing major chela, continue with couplet 8.

tipped hairs on merus of second maxilliped (fig. 10)

Uca subcylindrica (Stimpson, 1859). Predominantly a burrower in banks of fresh-water streams, in muddy areas adjacent to brackish water, or on upper mud flats of bays; often found several miles upstream from mouths of creeks and rivers in S. Texas. Reported from Corpus Christi to the Rio Grande, TX (Rathbun, 1918); also known from vicinity of Aransas Bay, TX (Author's Collections).

- First abdominal appendages narrow, length much more than 5 times width and distal 1/4 tapering to point and trending laterally near tip; more than 100 spoon-tipped hairs on merus of second maxilliped

Uca pugilator (Bosc, 1802). A burrowing species in sand and sand-mud beaches of bays, marshes, and tidal creeks; sometimes found intermingled with U. pugnax (Smith, 1870), though usually on sandier substrates. Reported from suitable areas throughout NW Gulf coast, including Grand Isle, LA (Behre, 1950), vicinity of passes and jetties on Texas coast (Whitten, Rosene, and Hedgpeth, 1950), and margins of Texas marshes and bays (Rathbun, 1918; Hedgpeth, 1950; Simmons, 1957).

5. Carpus of major cheliped with enlarged tubercle forming spine or tooth near middle of inner surface; anterior 1/3 of both lateral margins straight, margin continued posteriorly following angular bend; oblique ridge on inner surface of major palm angles at junction with carpal cavity and continues upward along distal edge of carpal cavity as single row of uniform tubercles (fig. 11)

Uca spinicarpa Rathbun, 1900. A burrowing species found, often in dense concentrations, on muddy banks of coastal fresh-water ponds and streams, grassy mud flats adjacent to bays, and muddy, lower-salinity Gulf beaches. Reported by Rathbun (1918) from Galveston, TX and fresh water near Matagorda Bay, TX; also collected in vicinity of Port Isabel, TX (TXAI Collections). Specimens taken in Louisiana from California Bay, mud lumps at mouth of Mississippi River South Pass, East Cote Blanche Bay, and grassy mud flats on beach at Cameron (Author's Collections).

- Carpus of major cheliped without enlarged spine or tooth (though often with several small tubercles) on inner surface; at least one of lateral margins slightly convex in anterior 1/3 and continued posteriorly with gradual curve (side with large chela usually has straighter, more angularly bent margin); oblique ridge on major palm not continued as single row of uniform tubercles along distal edge of carpal cavity 6

6. Width of front at base (measured precisely between points where upper and lower margins of eyebrows join; fig. 13) greater than 1/3 fronto-

orbital width of carapace; inner surface of second maxilliped (fig. 9) usually with 0-60 spoon-tipped hairs (occasionally as many as 75) 7

- Width of front at base less than 1/3 fronto-orbital width of carapace; inner surface of second maxilliped (fig. 9) usually with 60-120 spoon-tipped hairs (though rarely as few as 25)

  Uca rapax (Smith, 1870). Burrowing in sand or sand-mud areas at or just above high tide line, often with grass or mangrove cover; on margins of bays, marshes, and tidal streams bordering fresh to near-marine waters; usually on higher or sandier areas than U. pugnax. Regarded as Uca pugnax rapax before restoration to full specific status by Tashian and Vernberg (1958) and so cited from Matagorda Bay, TX (Rathbun, 1918) and unspecified area of Texas coast (Leary, 1967). Specimens are known from many other areas of the Texas and Louisiana coasts. Reports of U. mordax (Smith, 1870), from Grand Isle (Behre, 1950) and Cameron, LA (Rathbun, 1918) may refer to atypical specimens of U. rapax; Holthuis (1959) notes the only certain records of U. mordax are from Suriname, Venezuela, and Brazil; Hagen (1970) notes the range of U. mordax to include parts of Florida but not the NW Gulf coast.

7. Joints of major cheliped bordered by yellow or yellow-brown coloration (in fresh specimens); spoon-tipped hairs on inner surface of second maxilliped 0-75, usually 15-60; merus of second walking leg with patch, row, or paired rows of short, dense, velvety pubescence on ventral edge, expecially in distal half (most obvious when dry)

   Uca pugnax (Smith, 1870). Burrowing in intertidal mud flats, often among roots of Spartina or adjacent to surface debris on margins of bays, marshes, and brackish tidal streams; usually on muddier substrates though sometimes overlapping the sandier habitat of U. pugilator. Known from Grande Isle, LA (Rathbun, 1918; Behre, 1950) and other suitable areas along entire Louisiana coast (Author's Collections); known from Aransas Bay, TX (Hedgpeth, 1950) and observed and collected in other suitable areas along Texas coast (Leary, 1967; Author's Collections). Salmon and Atsaides (1968) propose that U. pugnax does not occur in the NW Gulf and that NW Gulf material referred to in literature (and in this key) as U. pugnax actually comprises two new species, Uca longisignalis and Uca virens, which are distinguished largely on basis of behavior. For the present, however, at least until further morphological studies are made, I choose to retain usage of U. pugnax for description of this (these) population(s) as was done by Hagen (1970).

- Joints of major cheliped bordered by distinct red patches (in fresh specimens), especially near condyles of carpus and merus (fig. 12); spoon-tipped hairs on inner surface of second maxilliped 0-20, usually 0-15; merus of second walking leg (third thoracic leg) without area of dense, velvety pubescence on ventral edge, though usually with several sparse rows of stiff hairs or bristles

  Uca minax (LeConte, 1855). Found primarily along upper estuaries, marshes, swamps, and stream mouths or deltas; apparently restricted to fresh or brackish waters at some distance from high-salinity areas and occasionally found at edges of fields or woodlands. Usually burrowing above high tide, with burrows reaching to ground water. Reported from Matagorda Bay, TX (Rathbun, 1918), near Sabine, TX (Whitten, Rosene, and Hedgpeth, 1950), and Grand Isle, LA (Behre, 1950). Also very abundant in the Mississippi Delta and on margins of Atchafalaya Bay and East Cote Blanche Bay, LA (Author's Collections).

8. Merus of second maxilliped (fig. 9) with more than 140 spoon-tipped hairs on inner surface

   Uca pugilator (Bosc, 1802). See couplet 4 for note.

- Merus of second maxilliped (fig. 9) with 0-120 spoon-tipped hairs on inner surface 9

9. Lateral margins of carapace straight for anterior 1/3 and continued posteriorly after angular bend (i.e. carapace as in fig. 11); female without tubercle at gonopore (fig. 14) on either side of sternum, though occasionally with slight swelling of gonopore margin

   Uca spinicarpa Rathbun, 1900. See couplet 5 for note.

- Lateral margins of carapace becoming slightly convex in anterior 1/3 near widest part of carapace and continued posteriorly after gradual curve rather than angular bend; female with distinct tubercle at gonopore (fig. 14) on either side of sternum (except in some ovigerous specimens) 10

10. Tubercle at gonopore (fig. 14) of mature, non-ovigerous female projects beyond contour of sternum and forward, overlapping posterior edge of sternal segment immediately anterior to one on which it is located; carapace transversely subcylindrical, convexity of posterior equals convexity of anterior (when held at eye level and viewed from side)

    Uca subcylindrica (Stimpson, 1859). See couplet 4 for note.

- Tubercle at gonopore (fig. 14) of mature, non-ovigerous female not projecting beyond contour of sternum forward over posterior edge of sternal

segment anterior to one on which it is located; carapace convex though not transversely subcylindrical, more convex anteriorly than posteriorly 11

11. Width of front at base (measured precisely between points where upper and lower margins of eyebrows join; fig. 13b) less than 1/3 fronto-orbital width of carapace; eyebrow (fig. 13a) oblique, visible in dorsal view of carapace*

    Uca rapax (Smith, 1870). See couplet 6 for note.

- Width of front at base greater than 1/3 fronto-orbital width of carapace; eyebrow nearly vertical, only lower margin, at most, visible in dorsal view of carapace* 12

12. Merus of second walking leg (third thoracic leg) with patch, row, or paired rows of dense, velvety pubescence (as well as sparse rows of stiff hairs or bristles) on ventral edge, especially in distal half (most obvious when dry); spoon-tipped hairs on inner surface of second maxilliped 0-75 usually 15-60

    Uca pugnax (Smith, 1870). See couplet 7 for note.

- Merus of second walking leg without pubescence on ventral edge, though usually with several sparse rows of stiff hairs or bristles; spoon-tipped hairs on inner surface of second maxilliped 0-20, usually 0-15

    Uca minax (Le Conte, 1955). See couplet 7 for note.

*See Glossary for strict definition of "dorsal view of carapace."

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