FENNER A. CHACE, JR.

The Shrimps of the Smithsonian-Bredin Caribbean Expeditions with a Summary of the West Indian Shallow-water Species (Crustacea: Decapoda: Natantia)

SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY NUMBER 98

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ABSTRACT

Chace, Fenner A., Jr. The Shrimps of the Smithsonian-Bredin Caribbean Expeditions, with a Summary of the West Indian Shallow-water Species (Crustacea: Decapoda: Natantia). *Smithsonian Contributions to Zoology*, number 98, 179 pages, 61 figures, 1972.—The collections made by the Smithsonian-Bredin Expeditions to the Lesser Antilles and Virgin Islands in 1956, 1958, and 1959 and to Yucatan in 1960 contain 111 species of penaeidean, caridean, and stenopodidean shrimps, including 20 previously undescribed species. Diagnostic keys are offered to assist in the identification of the 170 shallow-water marine and fresh-water shrimps now known from the West Indian islands, as well as 48 species from adjoining geographic and bathymetric areas. References, type-localities, and distribution records are given for each of the 218 species treated, and habitat preferences are indicated for the species represented in the Smithsonian-Bredin collections. It is postulated that there is no endemic marine natantian fauna in the West Indies and that there are no natural barriers, except the local absence of suitable habitats, to the free distribution of most of the species in the region between the Florida Keys and Brazil; only 6 of the 70 marine species recorded from the Yucatan area have not yet been found at any of the islands in the West Indies.

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The Shrimps of the Smithsonian-Bredin Caribbean Expeditions with a Summary of the West Indian Shallow-water Species (Crustacea: Decapoda: Natantia)

Introduction

THE EXPEDITIONS.—The four Caribbean expeditions sponsored by Mr. and Mrs. J. Bruce Bredin of Wilmington, Delaware, and led by Waldo L. Schmitt (then Head Curator of the Department of Zoology and now Zoologist Emeritus in the Department of Invertebrate Zoology, Smithsonian Institution), had as their primary objective the collection of study material for the national collections. The first Smithsonian-Bredin Caribbean Expedition (9 March to 17 April 1956) visited 15 islands in the Lesser Antilles between Trinidad and Barbuda, as well as Virgin Gorda and Tortola in the British Virgin Islands. The second Expedition (25 March to 3 May 1958) visited nine of the United States and British Virgin Islands and six of the northernmost Leeward Islands. Narratives of these two cruises have been published by Schmitt (1957, 1959). The third Expedition (2 April to 4 May 1959) collected at eight of the Lesser Antillean islands between Trinidad and Barbuda. The fourth Expedition (26 March to 3 May 1960) concentrated on the Yucatan Peninsula, chiefly along the east coast and islands of Quintana Roo, and a brief stop was made at Grand Cayman. The localities of the collecting operations during the four expeditions are depicted in Figure 1. A complete list of the marine stations occupied is on file in the Department of Invertebrate Zoology, Smithsonian Institution.

CURRENT KNOWLEDGE OF THE FAUNA.—The marine decapod shrimps of the western tropical Atlantic, deplorably, are little known except for the commercial penaeideans that have been studied intensively by Burkenroad, Pérez Farfante, and others. General works on the Caribbean natantians are limited to Young (1900), Verrill (1922), Schmitt (1935), and Holthuis (1959). Of the 13 families represented in littoral and sublittoral zones of the West Indies, the Penaeidae were summarized by Anderson and Lindner (1945), the Atyidae have been reviewed by Chace and Hobbs (1969), the Palaemonidae by Holthuis (1951b, 1952), the Gnathophyllidae by Manning (1963), some of the Alpheidae by Coutière (1909) and Zimmer (1913), the Processidae by Manning and Chace (1971), and the Stenopodidae by Holthuis (1946). The remaining literature on the fauna is widely scattered.

PURPOSE AND SCOPE OF THIS REPORT.—As indi-

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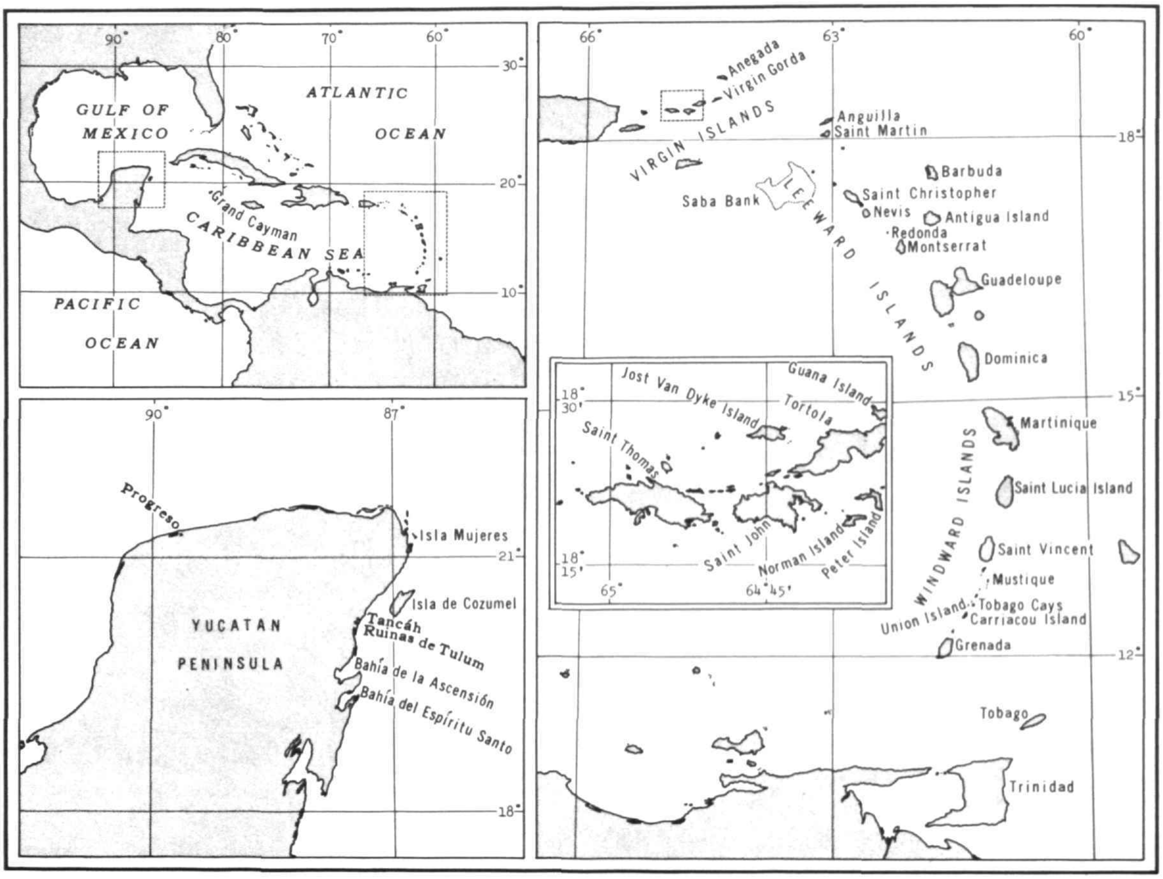


Figure 1.—Primary localities at which collections were made during the Smithsonian-Bredin Caribbean Expeditions.

cated above, the collections of the Smithsonian-Bredin Expeditions were intended to improve the representation of the Caribbean fauna in the national collections; no extensive series of formal reports on them is contemplated. This does not imply agreement with the opinion that such expedition and faunistic reports "are no longer looked at with favor" and "are among the most inefficient kinds of taxonomic papers" (Mayr 1969: 262). For some of the lesser known faunas, such reports still form an effective medium for the gradual, cooperative accumulation of systematic knowledge at the primary level, which is essential to reliable biogeographic and ecologic investigation.

The 846 lots, 7,103 specimens, of natantians collected during the Smithsonian-Bredin Expeditions added 20 previously undescribed species to the 150 shallow-water species known heretofore from the West Indies and Yucatan. Also, two new genera and nine additional new West Indian species have been described from other sources during the course of the study, bringing the total increase in known species to nearly 20 percent. On the other hand, 59 species, or nearly 40 percent of those previously recorded from the region, are not represented in the Smithsonian-Bredin collections. This evidence that many more taxa will be discovered when improved collecting techniques are employed discouraged any thoughts of attempting more definitive revisionary studies for the time being and suggested a report of this kind as the best means of making current information available to biologists interested in the Caribbean fauna as well as a means of establishing a basis for future monographs or revisions.

With these objectives in mind, I have tried to provide clues to the identification and distribution of all of the decapod shrimps (Natantia) now known from waters, both marine and fresh, immediately adjacent to the islands of the West Indies. Included in this account are a few extraterritorial species that may be expected to occur within the suggested geographic and bathymetric boundaries.

The lack of conformity in the headings to the keys is intentional, resulting from an attempt to utilize currently available knowledge as broadly as practicable. In order to facilitate identification, however, the characters used in keys to families and genera relate to the species included in this report and do not necessarily apply to species of these taxa occurring elsewhere. Genera and species are arranged alphabetically. The species have been assigned consecutive numbers to facilitate reference between keys and discussion of the species in the text. Taxa marked with an asterisk (*) are represented in the Smithsonian-Bredin collections. The references cited for each species are limited to the original description and, usually, to one or more subsequent published records, including at least one reference to illustrations whenever possible. The lack of synonymies in the systematic account is partially compensated for in the index, where synonyms not mentioned elsewhere are cross-referenced to the taxonomic names herein considered to be valid. Inasmuch as the principal objective of the four Smithsonian-Bredin Caribbean Expeditions was the enhancement of the reference collections of the Smithsonian Institution and the collecting of as much study material as possible during the five or six weeks that were devoted to field work during each of those cruises, the time available for ecologic observations was, perforce, limited; the information on habitat preferences of each of the species is not, therefore, always as exact or complete as might be desired.

In regard to natantian morphological terminology, it is hoped that Figure 2 will be helpful to general biologists and collectors.

ZOOGEOGRAPHY OF THE MARINE SPECIES.—A detailed analysis of the distribution of the Caribbean shallow-water natantian shrimps is not practical at the present time; no fewer than 40 of the 192 species from unrestricted marine waters included in this report are still known only from the type-localities, and available collections of many of the remaining 152 species are not sufficiently extensive to justify more than some very general conclusions.

Barriers to the distribution of species with pelagic larvae are virtually nonexistent throughout the region. The presence or absence of a species on any Caribbean coast is largely dependent on the availability of habitats there, rather than on more direct isolating factors. It is noteworthy that no fewer than 31 species (30 percent of the 103 marine species collected during all four expeditions) were taken in a single afternoon at one station (73–56) in English Harbour, Antigua Island, and 17 additional species were taken at other stations in that historic port. In general, however, the larger of the West Indian islands have the more varied habitats and, hence, the greater diversity of species.

It is probably not surprising that 63 marine species are common to the Lesser Antilles and to Yucatan or a neighboring part of the Mexican coast; many more of the 144 species known from the easternmost islands of the area undoubtedly will be discovered in Yucatan when that region is investigated more intensively. On the other hand, only 6 of the 70 marine species now known from the Yucatan area have not yet been recorded from any of the West Indian Islands. Two of these 6, *Palaemonetes intermedius* and *Thor floridanus*, probably have their centers of distribution farther north or are confined to continental shores. The remaining 4, *Periclimenaeus bredini*, *Synalpheus anasimus*, *S. obtusifrons*, and *Lysmata rathbunae*, have been described during the course of this study; the latter species may be confined to subtropical waters off the south and east coasts of the United States, but the other 3 are known thus far only from Yucatan.

Two of the West Indian islands, Cuba and Trinidad, seem to have transitional faunas. A few species that are known otherwise only from North American shores have been recorded from the northern and southwestern coasts of Cuba. Similarly, a few South American species have reached Trinidad but seem not to have progressed farther northward.

The following tabulation of the range limitations of the 153 marine species now known from the West Indies and/or Yucatan is of questionable significance because of the meager data available, but it tends to confirm the belief that there is probably no endemic natantian marine fauna in the Caribbean.

Number of species extending northward	
Beyond Cape Hatteras, North Carolina	12
To the southeastern United States south of Cape Hatteras	31
To the Bermudas, but not to the continental United States	25
To the Gulf of Mexico, but not to the east coast of the United States	12
To the Florida Keys only	21
To Yucatan only	15
Number of species not extending northward beyond the northernmost islands of the West Indies (not including the Bermudas)	36
Number of species not extending southward beyond the southernmost islands of the West Indies	102
Number of species extending southward	
To Colombia and Venezuela only	5
To the Guianas only	4
To Brazil	39

Five of the 12 species that extend northward beyond Cape Hatteras have also been recorded from Brazil, and at least 14 of the 31 species that reach the southeastern coast of the United States south of Cape Hatteras also occur in Brazil.

Although 30 of the species are known thus far only from the West Indies (not including the Bermudas), most of them are known only from the original specimens. It seems likely that few, if any, of the marine species are confined to the West Indies, as additional collecting, especially in northeastern South America, will probably demonstrate.

Of the marine species from the West Indies or Yucatan, 79 percent are known only from the western Atlantic, but the remaining 31 species are more widely distributed eastward or westward, as follows:

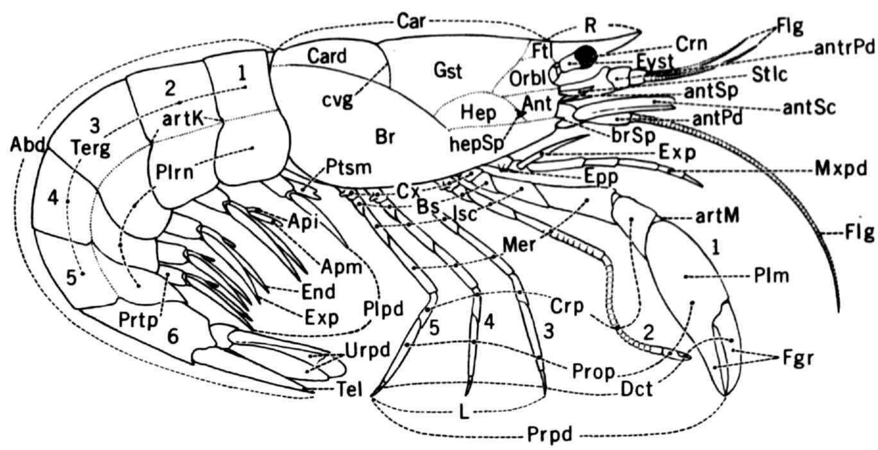


FIGURE 2.—Diagrammatic shrimp showing the terms used in description. (After Chace and Hobbs, 1969.)

Abd = abdomen
Ant = antennal region
antPd = antennal peduncle
antrPd = antennular peduncle
antSc = antennal scale
antSp = antennal spine
Api = appendix interna
Apm = appendix masculina
artK = articular knob
artM = articular membrane
Br = branchial region
brSp = branchiostegal spine
Bs = basis
Car = carapace
Card = cardiac region
Crn = cornea
Crp = carpus
cvg = cervical groove
Cx = coxa
Dct = dactyl
End = endopod
Epp = epipod
Exp = exopod
Eyst = eyestalk
Fgr = finger
Flg = flagellum
Ftl = frontal region
Gst = gastric region
Hep = hepatic region
hepSp = hepatic spine
Isc = ischium
L = walking leg
Mer = merus
Mxpd = third maxilliped
Orbl = orbital region
Plm = palm
Plpd = pleopod
Plrn = pleuron
Prop = propodus
Prpd = pereiopod
Prtp = protopodite
Ptsm = petasma
R = rostrum
Stlc = stylocerite
Tel = telson
Terg = tergum
Urpd = uropod

Number of species known from the

Eastern Atlantic only	14
Eastern Pacific only	4
Indo-West Pacific only	3
Eastern Atlantic and eastern Pacific	4
Eastern Atlantic and Indo-West Pacific	3
Eastern Pacific and Indo-West Pacific	0
Entire pantropical region	3

These data are certainly insufficient to justify any conclusions, but the absence of species common to the western Atlantic, eastern Pacific, and Indo-West Pacific (but not the eastern Atlantic) tends to support the postulate that the unbroken expanse of deep water between the eastern Pacific and the Indo-West Pacific regions forms an effective barrier to the pantropical distribution of marine species.

ACKNOWLEDGMENTS.—The Smithsonian Institution, particularly the Department of Invertebrate Zoology of the National Museum of Natural History, is immeasurably indebted to Mr. and Mrs. J. Bruce Bredin for the extensive collections of Crustacea and other marine life that have resulted from their interest in the sea and its inhabitants and from their support of the Institution's scientific expeditions. I am personally grateful to them for the opportunity to participate in the first of the Caribbean cruises. I hope that this report may demonstrate, in a small way, how much individuals with an interest in the world they live in can contribute to man's still insignificant knowledge of the forms of life with which he shares this planet.

Many of my Smithsonian colleagues should share the by-line of this study. Thomas E. Bowman contributed information on distributions and associations of certain of the species. Maureen E. Downey furnished identifications of echinoderm hosts. Horton H. Hobbs, Jr., offered suggestions on distributional problems. Raymond B. Manning, who was prevented from officially coauthoring the report by the pressure of administrative commitments, provided important information on carideans from southern Florida and Puerto Rico; he also reviewed the manuscript. Isabel Pérez Farfante made the penaeid section of the paper much more authoritative and useful than it would otherwise have been by checking and correcting my identifications and manuscript and by granting permission to extract the species key from her exemplary review of the genus *Metapenaeopsis;* she also located and transported caridean type-material from the Museum of Comparative Zoology at Harvard, thereby greatly facilitating the solution of a major taxonomic problem. Henry B. Roberts helped with numerous bibliographic questions. Albert L. Ruffin, Jr., editor, exposed more than a few errors of commission and omission while preparing the manuscript for publication. Waldo L. Schmitt, as leader of the Smithsonian-Bredin Expeditions, was the dominant force behind the entire report and its conversion into its ultimate format.

Invaluable assistance also was received from biologists in other institutions. Dorothy E. Bliss of the American Museum of Natural History kindly examined caridean material in that museum. Ailsa M. Clark of the British Museum (Natural History) furnished identifications of crinoid hosts. Sheldon Dobkin of Florida Atlantic University graciously relinquished his prior claim to revision of the caridean genus *Thor* and made his notes available to me. Gary Hendrix of the School of Marine and Atmospheric Sciences at the University of Miami generously offered important specimens and observations on new and rare alpheids from the Florida Keys. L. B. Holthuis of the Rijksmuseum van Natuurlijke Historie in Leiden furnished valuable notes and specimens from his personal collections, especially from Curaçao; also, his incomparable manuscript synonymies of carideans was a constant source of important information. Herbert W. Levi of the Museum of Comparative Zoology at Harvard cooperated by lending type-material housed in that institution. Finally, Conrad Mahnken permitted inclusion in this report of an analysis of an unusually large and well-preserved series of commensal shrimps collected during Operation Tektite I (the 1969 underwater exploration off St. John in the Virgin Islands).

To all of these goes my sincere gratitude. May the legitimate resentment of those others who contributed to the undertaking over a three-year period, but whose names have been inexcusably omitted, be tempered by freedom from public censure for the shortcomings of the study!

Key to West Indian Shallow-water Families of Natantian Decapods

1. Pleura of second abdominal somite not overlapping those of first somite; third pereiopod usually chelate 2

Key to West Indian Shallow-water Families of Natantian Decapods—Continued

Pleura of second abdominal somite overlapping those of first and third somites; third pereiopod not chelate. *Section Caridea 4

2.(1) Third pereiopod much longer and more robust than first and second; males without petasma. *Section Stenopodidea .... ***Stenopodidae**

Third pereiopod usually longer but never more robust than first and second; males with petasma. *Section Penaeidea 3

3.(2) Fourth and fifth pereiopods well developed .... ***Penaeidae**

Fourth and fifth pereiopods greatly reduced or absent .... ***Sergestidae**

4.(1) Second pereiopod with undivided carpus 5

Second pereiopod with carpus subdivided into 2 or more articles 10

5.(4) First and second pereiopods with fingers of chela pectinate on opposable margins ***Pasiphaeidae**

First and second pereiopods with fingers not pectinate 6

6.(5) First pereiopod with movable finger compressed, semicircular, deeply recessed in slit in propodus when flexed .... **Disciadidae**

First pereiopod with normal chela 7

7.(6) First and second pereiopods with fingers usually bearing conspicuous terminal brushes of long hairs; if not, all pereiopods bearing exopods .... ***Atyidae**

First and second pereiopods with fingers not bearing conspicuous brushes of long hairs; pereiopods without exopods 8

8.(7) Rostrum articulated with carapace, movable .... ***Rhynchocinetidae**

Rostrum immovably fused with carapace 9

9.(8) Third maxillipeds greatly expanded, forming operculum covering other mouth parts ***Gnathophyllidae**

Third maxillipeds not unusually broad .... ***Palaemonidae**

10.(4) Eyes borne on extremely long stalks, reaching nearly to end of antennular peduncle **Ogyrididae**

Eyestalks not unusually long 11

11.(10) Eyes usually partially or entirely covered by carapace, incapable of free lateral movement; if not, rostrum lacking or represented by barely visible tooth .... ***Alpheidae**

Eyes exposed and freely movable; rostrum well developed 12

12.(11) Rostrum usually distinctly dentate; if not, not as below .... ***Hippolytidae**

Rostrum short, unarmed except for subdistal dorsal tooth forming asymmetrically bifid, setose tip .... ***Processidae**

*Section Penaeidea

Family PENAEIDAE

Key to West Indian Shallow-water Genera

1. Carapace with at least one strong tooth in posterior half of dorsal midline; pereiopods without exopods. *Subfamily Sicyoniinae .... ****Sicyonia***

Carapace unarmed in posterior two-thirds of dorsal midline; pereiopods with exopods. *Subfamily Penaeinae 2

2.(1) Rostrum with one or more teeth on ventral margin .... ****Penaeus***

Rostrum with ventral margin unarmed 3

3.(2) Telson with posterior pair of lateral spines fixed, not movable; basal segment of antennular peduncle with small spine on ventromedian margin .... ****Metapenaeopsis***

Telson with posterior pair of lateral spines movable or lacking; basal segment of antennular peduncle unarmed on ventromedian margin 4

4.(3) Rostrum unarmed in distal half; fourth and fifth pereiopods distally filiform, much longer than third pair .... ***Xiphopenaeus***

Rostrum dentate nearly to tip; fourth and fifth pereiopods not unusually elongate 5

5.(4) Carapace with longitudinal lateral suture .... ****Trachypenaeus***

Carapace without lateral suture .... ****Trachypeneopsis***

*Subfamily PENAEINAE

*Genus *Metapenaeopsis* Bouvier, 1905a

Key to Western Atlantic Species

(From Pérez Farfante, 1971)

1. Thelycum with median plate bearing horseshoe-shaped marginal strip and coiled lateral strips. Petasma with distoventral projection cleft by deep sinus into 2 long, subequal lobes .... *5. ***M. smithi***
   Thelycum with median plate lacking marginal and coiled strips. Petasma with distoventral projection simple, forming single lobe or cleft by shallow sinus into 2 subequal or unequal lobes 2

2.(1) Thelycum with anteromedian portion of transverse plate strongly depressed; median plate bearing prominent bosses with posterolateral angles produced. Petasma with distoventral projection forming single lobe .... 3. ***M. hobbsi***
   Thelycum with anteromedian portion of transverse plate elevated; median plate bearing bosses with posterolateral angles not produced. Petasma with distoventral projection cleft by shallow sinus forming 2 lobes 3

3.(2) Thelycum with anterior part of median plate convex, bearing 2 large pits. Petasma with distoventral projection mittenlike in outline, large left lobe extending distally far beyond small right lobule .... 1. ***M. gerardoi***
   Thelycum with anterior part of median plate concave, bearing 2 small pits. Petasma with distoventral projection distally cleft into 2 subequal or unequal lobes, if unequal, larger lobe not extending much beyond smaller lobe 4

4.(3) Thelycum with anterior part of median plate long, half or more as long as median plate. Petasma with distoventral projection cleft into 2 unequal lobes, right lobe sensibly larger than left .... *2. ***M. goodei***
   Thelycum with anterior part of median plate short, less than half as long as median plate. Petasma with distoventral projection cleft into 2 subequal lobes or left lobe slightly larger than right .... *4. ***M. martinella***

1. *Metapenaeopsis gerardoi* Pérez Farfante

Metapenaeopsis gerardoi Pérez Farfante, 1971:20, figs. 11, 12, 13c.

TYPE-LOCALITY.—Off Mayagüez, Puerto Rico, 18°08.5′N, 67°23′W.

DISTRIBUTION.—Bahamas, Florida Keys, West Indies, and Caribbean coast of Central and South America; surface to at least 299 meters.

*2. *Metapenaeopsis goodei* (Smith)

Parapenaeus goodei Smith, 1885:176.
Metapenaeopsis goodei.—Pérez Farfante 1971:9, figs. 2–8, 13A.

MATERIAL.—Peter Island (Sta. 18–58: 1 ♀; Sta. 21–58: 2♂).—Virgin Gorda (Sta. 40–58: 1♂).—Barbuda (Sta. 99–59: 1 ♀).—Mustique (Sta. 34–56: 2y♂).—Isla Mujeres (Sta. 26–60: 1♂).

HABITAT.—Most of the specimens were dredged on sand or shell bottoms in 4½ to 20 meters, but the immature males from Mustique were found in the sublittoral zone off a coral reef.

TYPE-LOCALITY.—Bermudas.

DISTRIBUTION.—North Carolina and Bermudas to Estado da Bahía, Brazil; surface to 329 meters.

3. *Metapenaeopsis hobbsi* Pérez Farfante

Metapenaeopsis hobbsi Pérez Farfante, 1971:24, figs. 13D, 14–17.

TYPE-LOCALITY.—Northwest of Cabo Cordera, Venezuela, between 10°44′N, 66°07′W and 10°45′N, 66°08′W.

DISTRIBUTION.—Bahamas to Estado do Espírito Santo, Brazil, and Caribbean coasts of Central and South America; 12 to 137 meters or more.

*4. *Metapenaeopsis martinella* Pérez Farfante

Metapenaeopsis martinella Pérez Farfante, 1971:16, figs. 9, 10, 13B.

MATERIAL.—Antigua Island (Sta. 93–58: 6♂, 7♀).—Dominica (Sta. 52–56: 1y♂, 1♀).—Tobago (Sta. 20–59: 1♀; Sta. 38–59: 2♀).

HABITAT.—The largest lot of this species was taken at Antigua Island at the surface over a depth of 7 meters with a light at night. The other specimens were obtained by dredging in from 4 to more than 11 meters.

TYPE-LOCALITY.—Off Acaraú, Estado do Ceará, Brazil, 2°10′S, 39°52′W.

DISTRIBUTION.—Cuba to Estado de Pernambuco, Brazil, and the western Caribbean; less than 4 to 137 meters.

*5. *Metapenaeopsis smithi* (Schmitt)

Penaeopsis smithi Schmitt, 1924a:62, figs. 1*b*, *c*, 2*a*, *c*.

Metapenaeopsis smithi.—Pérez Farfante, 1971:29, figs. 13E, 18–22.

MATERIAL.—Virgin Gorda (Sta. 10–58: 1♂, 1y♀).—Barbuda (Sta. 113a–58: 1y♂).—Antigua Island (Sta. 83–56: 1♂).—Isla de Cozumel (Sta. 100–60: 1y♂).—Bahía de la Ascensión (Sta. 67–60: 1y♀; Sta. 85–60: 1y♂, 4y♀; Sta. 91–60: 1♂, 2 juv.; Sta. 95–60: 4 juv.).

HABITAT.—All but one of the lots listed above were collected on sand and turtle-grass flats in less than 2 meters of water. The single exception was taken along a seawall at night with the aid of a flashlight.

TYPE-LOCALITY.—Caracas Baai, Curaçao.

DISTRIBUTION.—Bermudas and southeastern Florida to Curaçao, mostly near islands; sublittoral to more than 366 meters.

*Genus *Penaeus* Fabricius, 1798

Key to Adults of West Indian Species

(See Pérez Farfante (1969) for other western Atlantic species and subspecies.)

1. Lateral rostral grooves extending onto carapace only slightly beyond posterior tooth of rostral series; male with petasma lacking pair of conspicuous hoodlike projections curving around distomedian margin; female with thelycum open, not provided with heavy membranes meeting in midline. Subgenus *Litopenaeus* .... 9. ***P. (L.) schmitti***

   Lateral rostral grooves reaching nearly to posterior margin of carapace; male with petasma bearing conspicuous hoodlike projections curving around distomedian margin; female with thelycum provided with heavy membranes meeting in midline. *Subgenus *Melicertus* 2

2.(1) Petasma of male with pointed tip of stiff marginal strip projecting freely at distomedian end, not attached to surrounding tissue; flaps of thelycum of female produced anteriorly and tightly closed, anterior carina if present not protruding in midline *7. ***P. (M.) brasiliensis***

   Tip of marginal strip of petasma not projecting freely at distomedian end; flaps of thelycum not meeting anteriorly in midline, exposing short longitudinal carina 3

3.(2) Posterior extensions of lateral rostral grooves narrow, each less than three-fourths as wide as median ridge separating them; distal margins of petasma unarmed; anteromedian carina of thelycum bifurcate anteriorly .... *6. ***P. (M.) aztecus subtilis***

   Posterior extensions of lateral rostral grooves broad, each usually more than three-fourths as wide as, and often wider than, median ridge; curved distal edge of stiff marginal strip of petasma bearing 2–12 small spinules; anteromedian carina of thelycum not bifurcate anteriorly .... *8. ***P. (M.) duorarum notialis***

*Subgenus *Melicertus* Rafinesque, 1814

*6. *Penaeus (Melicertus) aztecus subtilis* Pérez Farfante

Penaeus aztecus subtilis Pérez Farfante, 1967:87, figs. 2, 3; 1969:546, figs. 51–59.

MATERIAL.—Antigua Island (Sta. 74–56: 1y♀; Sta. 83–56: 1♂).

HABITAT.—The small female in this collection was taken in a seine haul on mud bottom in very shallow water; the larger male was obtained along a seawall at night with a flashlight.

TYPE-LOCALITY.—Off Punta Gallinas, Comisaría de la Guajira, Republic of Colombia; 12°29′N, 71°5′W.

DISTRIBUTION.—Cuba and Honduras to Estado do Rio de Janeiro, Brazil; to a depth of 192 meters.

*7. *Penaeus (Melicertus) brasiliensis* Latreille

Penaeus brasiliensis Latreille, 1817:156.
Penaeus (Melicertus) brasiliensis.—Pérez Farfante 1969: 562, figs. 68–77.

MATERIAL.—Barbuda (Sta. 105–58: 13♂,12♀).—Antigua Island (Sta. 74–56: 1y♂; Sta. 83–56: 1♂; Sta. 80–58: 1♂,5♀).—Guadeloupe (Sta. 68–56: 1y♂, 2y♀, 1?).—Tobago (Sta. 38–59: 1y♂).—Bahía de la Ascensión (Sta. 62–60; 1y♀; Sta. 64–60: 1y♀; Sta. 65–60: 18y♂, 15y♀; Sta. 89–60: 1y♀; Sta. 93–60: 1♀).—Bahía del Espíritu Santo (Sta. 43–60: 1y♂).

HABITAT.—The specimens listed above were taken in a variety of situations: on mud bottoms in very shallow water (1 or 2 feet), sometimes near mangroves; on sand and turtle-grass flats; in a lagoon; on sand in 13–17 meters; and at the surface at night near a seawall.

TYPE-LOCALITY.—Brazil.

DISTRIBUTION.—North Carolina and Bermudas to Estado do Rio Grande do Sul, Brazil; to a depth of 275 meters.

*8. *Penaeus (Melicertus) duorarum notialis* Pérez Farfante

Penaeus duorarum notialis Pérez Farfante, 1967:94, fig. 4; 1969:520, figs. 32–38.

MATERIAL.—Saint Thomas (Sta. 33–58: 1♀).—Barbuda (from dinghy in lagoon, 25 April 1958: 1y♂).—Bahía de la Ascensión (Sta. 65–60: 2♂).

HABITAT.—The specimen from Saint Thomas was dredged in 4 to 9 meters and those from Yucatan were seined in less than 2 feet.

TYPE-LOCALITY.—Golfo de Venezuela off Las Piedras, 11°44′N, 70°22′W.

DISTRIBUTION.—Cuba and Yucatan to Estado do Rio de Janeiro, Brazil (except between Estado do Maranhão and Estado da Bahía); to a depth of 732 meters.

Subgenus *Litopenaeus* Pérez Farfante, 1969

9. *Penaeus (Litopenaeus) schmitti* Burkenroad

Penaeus schmitti Burkenroad, 1936:315, figs. 1*a*, 2, 3.
Penaeus (Litopenaeus) schmitti.—Pérez Farfante 1969:487, figs. 14–19.

TYPE-LOCALITY.—Kingston, Jamaica.

DISTRIBUTION.—Cuba and British Honduras to Estado de Santa Catarina, Brazil; to a depth of 37 meters.

Genus *Trachypenaeus* Alcock, 1901

Key to Atlantic Species

Female with thelycum pubescent, lips of transverse groove strongly convex; male with sternal elevation between coxae of fifth pereiopods goblet-shaped, constricted posteriorly
10. *T. constrictus*

Female with thelycum naked, lips of transverse groove truncate; male with sternal elevation between coxae of fifth pereiopods triangular, sloping regularly to posterior apex
11. *T. similis similis*

10. *Trachypenaeus constrictus* (Stimpson)

Penaeus constrictus Stimpson, 1871:135.
Trachypenaeus constrictus.—A. Milne-Edwards and Bouvier 1909:232, figs. 60–63, pl. 5: figs. 7–10; pl. 6: figs. 1, 2.
Trachypeneus constrictus.—Williams 1965b:31, fig. 21.

TYPE-LOCALITY.—Beaufort, North Carolina.

DISTRIBUTION.—Chesapeake Bay, Bermudas, and Gulf of Mexico to Estado de Santa Catarina, Brazil; to a depth of 59 meters.

11. *Trachypenaeus similis* (Smith)

Parapenaeus constrictus var. *similis* Smith, 1885:175.
Trachypeneus similis.—Burkenroad 1934b:96, figs. 10, 11.

TYPE-LOCALITY.—Gulf of Paria, Venezuela, 10°37′40″N, 61°42′40″W.

DISTRIBUTION.—Gulf of Mexico to Estado do Pará, Brazil; to a depth of 80 meters.

REMARKS.—The eastern Pacific analogue *T. similis pacificus* Burkenroad, 1934a, was proposed as a subspecies instead of a distinct species because of the nature rather than the constancy of distinguishing characters. If it retains this status, the Atlantic form should be called *T. similis similis.*

*Genus *Trachypeneopsis* Burkenroad, 1934a

Only one Atlantic species is known.

*12. *Trachypeneopsis mobilispinis* (Rathbun)

Metapenaeus mobilispinis Rathbun, 1920:320, figs. 1, 2*a-c*.
Trachypeneopsis mobilispinis.—Burkenroad 1934a:41.

MATERIAL.—Barbuda (Sta. 99-59: 1♂).—Saint Christopher (Sta. 104-56: 1♀).

HABITAT.—The male specimen was dredged in 8 meters; the female was attracted to a light at the surface over a depth of 7 meters.

TYPE-LOCALITY.—Cave Round Bay, Saba.

DISTRIBUTION.—Bermudas and Bay of Campeche eastward to Cuba, Cay Sal Bank, Turks Islands, Saba, Barbuda, and Saint Christopher; the few available depth records indicate that the species occurs in about 7 meters.

Genus *Xiphopenaeus* Smith, 1869a

Only one Atlantic species is known.

13. *Xiphopenaeus kroyeri* (Heller)

Penaeus Kroyeri Heller, 1862:425, pl. 2: fig. 51.
Xiphopeneus kroyeri.—Chace and Hobbs 1969:55, figs. 6, 7*e*.

TYPE-LOCALITY.—Rio de Janeiro, Brazil.

DISTRIBUTION.—North Carolina and Gulf of Mexico to Estado de Santa Catarina, Brazil; in estuaries and offshore to a depth of 44 meters.

*Subfamily SICYONIINAE

*Genus *Sicyonia* H. Milne Edwards, 1830

Key to Western Atlantic Species

(Adapted in part from Anderson and Lindner, 1945)

1. Antennal angle nearly or quite unarmed, without buttressed spine; second abdominal somite with narrow notch or perpendicular incision in anterior half of dorsal carina; first pereiopod with short distal spine on basis and ischium 2
   Antennal angle armed with buttressed spine; second abdominal somite with dorsal carina entire, not incised; first pereiopod with basis and ischium unarmed 3

2.(1) Carapace armed dorsally with 3 unequal teeth, anterior one smallest; first abdominal somite with 2 vertical furrows on pleuron, anterior one indistinct .... *16. ***S. laevigata***
   Carapace armed dorsally with 3 subequal teeth; first abdominal somite with 3 vertical furrows on pleuron, posterior one less distinct than other two .... *17. ***S. parri***

3.(1) Carapace armed dorsally with 3 or 4 teeth, of which 3 are large and placed far posterior to orbital margin .... 14. ***S. brevirostris***
   Carapace armed dorsally with 2 or 3 teeth, of which only 1 or 2 are large 4

4.(3) Carapace armed dorsally with 2 or 3 teeth, of which 2 are large and placed far posterior to orbital margin .... 19. ***S. typica***
   Carapace armed dorsally with 2 teeth, of which only 1 is large and placed far posterior to orbital margin 5

5.(4) First abdominal somite with tooth at anterior end of dorsal carina bifurcate; fifth abdominal somite without tooth or sharp angle in midline at posterior end of dorsal carina .... 20. ***S. wheeleri***
   First abdominal somite with tooth at anterior end of dorsal carina simple, not bifurcate; fifth abdominal somite with tooth or sharp angle in midline at posterior end of dorsal carina 6

6.(5) Rostrum nearly horizontal; first abdominal somite with anteroventral margin of pleuron concave or straight; third, fourth, and fifth abdominal somites terminating posteriorly in long slender spines either side of midline .... 15. ***S. dorsalis***
   Rostrum directed dorsally at distinct angle above horizontal; first abdominal somite with anteroventral margin of pleuron convex; third, fourth, and fifth abdominal somites terminating posteriorly only in short angular projections either side of midline .... 18. ***S. stimpsoni****

*And *S. burkenroadi* Cobb, 1971 (*Crustaceana*, 20(1):105).

14. *Sicyonia brevirostris* Stimpson

Sicyonia brevirostris Stimpson, 1871:132.—A. Milne-Edwards and Bouvier 1909:245, figs. 72–83, pl. 7.—Williams 1965b:35, figs. 25, 26.

TYPE-LOCALITY.—"S. Florida Coast."

DISTRIBUTION.—Off Chesapeake Bay to Bahamas, Cuba, and Gulf of Mexico as far as northeastern Yucatan Peninsula, to a depth of 330 meters; also Pacific coast of southern Mexico.

15. *Sicyonia dorsalis* Kingsley

Sicyonia dorsalis Kingsley, 1878:97.—Williams 1965b:37, fig. 28.

TYPE-LOCALITY.—Fort Jefferson, Dry Tortugas, Florida.

DISTRIBUTION.—North Carolina and Gulf of Mexico to French Guiana; to a depth of 420 meters. Apparently this species has not yet been reliably recorded from any of the West Indian islands; the West Indian specimens that have been verified are referable to *S. stimpsoni*.

*16. *Sicyonia laevigata* Stimpson

Sicyonia laevigata Stimpson, 1871:131.—Williams 1965b:33, figs. 22, 23.

MATERIAL.—Bahía de la Ascensión (Sta. 85–60: 1♀).

HABITAT.—The single specimen presumably came from a tide pool or from rocks near low-tide level.

TYPE-LOCALITY.—Charleston, South Carolina.

DISTRIBUTION.—North Carolina and Gulf of Mexico to Brazil; to a depth of 90 meters. Also Pacific coast of Panama.

*17. *Sicyonia parri* (Burkenroad)

Eusicyonia parri Burkenroad, 1934a:80, fig. 22.
Sicyonia parri.—Williams 1965b:34, fig. 24.

MATERIAL.—Tortola (Sta. 23–58: 1♂).—Barbuda (Sta. 108–58: 1♀).—Dominica (Sta. 52–56: 1♀; Sta. 75–59: 1y♀).—Saint Lucia Island (Sta. 64–59; 1♀).—Tobago (Sta. 20–59: 1♂).

HABITAT.—One of the specimens listed above was found among boulders and dead coral heads just offshore in little more than 1 foot of water, but most of the material was seined or dredged in from less than 1 to 20 meters, especially on bottoms of sand and mud with turtle grass.

TYPE-LOCALITY.—Crooked Island, Bahamas.

DISTRIBUTION.—North Carolina, Florida, and West Indies to Brazil; to a depth of 30 meters.

18. *Sicyonia stimpsoni* Bouvier

Sicyonia Stimpsoni Bouvier, 1905b:748.
Sicyonia dorsalis.—A. Milne-Edwards and Bouvier 1909:253, figs. 86–88, pl. 8: figs. 4–13. [Not *S. dorsalis* Kingsley.]
Sicyonia stimpsoni.—Williams 1965b:38, fig. 29.

TYPE-LOCALITY.—Off Barbados; 13°03′05″N, 59°36′18″W. [Restricted by lectotype selection of Holthuis, 1959:76.]

DISTRIBUTION.—North Carolina and Gulf of Mexico to French Guiana; to a depth of 420 meters.

19. *Sicyonia typica* (Boeck)

Synhimantites typicus Boeck, 1864:189.
Sicyonia Edwardsi.—A. Milne-Edwards and Bouvier 1909:251, pl. 8: figs. 1–3.
Sicyonia typica.—Williams 1965b:36, fig. 27.

TYPE-LOCALITY.—Molde Fjord, west coast of Norway [presumably erroneous].

DISTRIBUTION.—North Carolina to Rio de Janeiro, Brazil; to a depth of 68 meters.

20. *Sicyonia wheeleri* Gurney

Sicyonia wheeleri Gurney, 1943:1, figs. 1–31 [larval stages].—Burkenroad 1945:5, figs. 5–8 [adult].

TYPE-LOCALITY.—Bermudas.

DISTRIBUTION.—Bermudas, Virgin Islands, and Leeward Islands as far south as Sint Eustatius; to a depth of 42 meters.

REMARKS.—The authorship of this species demonstrates how the best of intentions may sometimes be thwarted by the well-intentioned rules of the *International Code of Zoological Nomenclature*. Gurney would certainly have been deeply grieved to learn that his description of the larval stages was the original valid description of a species that he credited to Burkenroad and that had been identified for him by Burkenroad. Very possibly, Gurney thought that the species had previously been described and that only the deficient means of communication during the war years prevented him from citing the reference to the description of the adult form. According to Articles 17(4) and 50 of the *Code,* however, there seems to be no alternative except to follow the precedent set by Holthuis (1959:75) and accept Gurney as the author of *S. wheeleri.* I hoped at one time that Gurney's description might be invalidated by recourse to Article 13(a)(i), which specifies that "a name published after 1930 must be . . . accompanied by a statement that purports to give characters differentiating the taxon . . . ," but Curtis W. Sabrosky, an active member of the Editorial Committee for the *Code* and currently a member of the International Commission on Zoological Nomenclature, informs me that the verb "purports" was not selected to emphasize intent in a situation of this kind. Perhaps unfortunately, there is no provision of the *Code* to support the contention of Burkenroad (1945:9, ftn.) that Gurney's description "may be regarded as having no taxonomic significance" because it "is not accompanied by a diagnosis or an indication that the species is new."

*Family SERGESTIDAE

Key to Genera Occurring in Atlantic Coastal Waters

Body not extraordinarily compressed; head not unusually elongate; gills present. Subfamily Sergestinae .... ***Acetes***

Body extraordinarily compressed, several times broader dorsoventrally than laterally; head forming long slender "neck" between eyes and mouth; gills absent. *Subfamily Luciferinae .... ****Lucifer***

Subfamily SERGESTINAE

Genus *Acetes* H. Milne Edwards, 1830

Only one variable species is currently recognized from the northwestern Atlantic.

21. *Acetes americanus* Ortmann

Acetes americanus Ortmann, 1893:39, pl. 2: fig. 2.

Acetes americanus carolinae.—Williams 1965b:39, figs. 30, 31.

Type-locality.—Baía de Marajó (mouth of Rio Tocantins), Estado do Pará, Brazil.

Distribution.—North Carolina and Gulf of Mexico to Estado do Pará, Brazil; to a depth of 42 meters.

*Subfamily LUCIFERINAE

*Genus *Lucifer* Thompson, 1829

Key to Atlantic Species

Eye and eyestalk slightly if at all more than half as long as "neck" between orbit and anterior margin of mouth field; posterior ventral process on sixth abdominal somite of adult males tapering to slender tip .... ***22. *L. faxoni***

Eye and eyestalk nearly as long as "neck" between orbit and anterior margin of mouth field; posterior ventral process on sixth abdominal somite of adult males with tip bulbous in outline .... **23. *L. typus***

*22. *Lucifer faxoni* Borradaile

Lucifer faxoni Borradaile, 1915b:228, 230.—Bowman 1967: figs. 2*c–k,* 3*d, e.*—Bowman and McCain 1967:660–670, figs. 1*c, d,* 2–6, 8.

Material.—Tortola (Sta. 115–56: 1y♂). Virgin Gorda (Sta. 36b–58: 1♀).—Barbuda (Sta. 84–56: 5♂, 13♀ [1 ovig.]).—Antigua (Sta. 80–58: 32♂, 31♀).—Dominica (Sta. 70–59: 3♂, 8♀).—Martinique (Sta. 50–56: 2♀).—Saint Lucia Island (Sta. 49–59: 190♂, 248♀ [1 ovig.]).—Tobago (Sta. 25–59: 1♂, 7♀).

Habitat.—The material listed above was collected both at the surface at night beneath a light over depths of 6–20 meters and by plankton nets towed below the surface in bays in daylight and at night.

TYPE-LOCALITY.—Hampton Roads, Virginia. By selecting the specimen figured by Faxon (1878) as the lectotype of *L. faxoni*, Holthuis (1959:54) fixed the type-locality of the species, but apparently he erred slightly in referring to the locality as "off Chesapeake Bay." Faxon noted that his specimen was taken "in the vicinity of Fort Wool," which is situated in the outer part of Hampton Roads, about 17 miles inside the mouth of Chesapeake Bay.

DISTRIBUTION.—From off Nova Scotia to Rio de Janeiro, Brazil; also central and eastern Atlantic. Although this planktonic species may be found in the open ocean, together with *L. typus*, it seems to be especially prevalent in inshore areas, where the latter species does not normally occur. The Indo-Pacific form previously considered to be conspecific with *L. faxoni* is now recognized as a distinct species (see Bowman 1967).

REMARKS.—Examination of the numerous specimens taken at Port Castries, Saint Lucia Island (Sta. 49–59), disclosed what seems to be a considerable size range at which this species attains maturity. Some of the smallest specimens, with a postorbital carapace length of about 1.5 mm, show a developing petasma, and the single female with what appear to be eggs attached to the third pereiopods has a carapace length of only 1.8 mm. On the other hand, the petasma is still rudimentary in some males with a carapace as long as 2.2 mm. The characteristic ventral processes on the sixth abdominal somite of the male are not apparent until the petasma is reasonably well formed. Here again, however, the processes may be prominent in males noticeably smaller than others in which the processes are not yet evident. Further study is needed to determine whether this variation in size is characteristic of the species or whether it is indicative of genetic differences that might suggest the presence of a second species.

These collections do not show the preponderance of males over females noted in Louisiana populations by Burkenroad (1934b:132, 134).

23. *Lucifer typus* H. Milne Edwards

Leucifer typus H. Milne Edwards, 1837a:469.
Lucifer typus.—Hansen 1919:53, pl. 4: figs. 6*a*–*k*.—Bowman and McCain 1967:660–670, figs. 1*a*, *b*, 2–7.

TYPE-LOCALITY.—Tropical North Atlantic.

DISTRIBUTION.—Warmer open waters of the North and South Atlantic oceans approximately between the 40° parallels. Unlike *L. faxoni*, this species is not usually found in inshore waters.

*Section Caridea

*Family ATYIDAE

Key to West Indian Genera

(The only other eastern American genus, *Palaemonias* Hay, 1901, occurs in subterranean waters in Kentucky and Alabama.)

1. Pereiopods with exopods 2
   Pereiopods without exopods 3

2.(1) Rostrum short and unarmed; eyes reduced, with little or no pigment; chelae of first and second pereiopods terminating in tufts of long hairs ..... ***Typhlatya***
   Rostrum long, multidentate dorsally and ventrally; eyes large and well pigmented; chelae of first and second pereiopods not terminating in tufts of long hairs ..... ***Xiphocaris***

3.(1) Carpus of second pereiopod crescent-shaped, appearing broader than long 4
   Carpus of second pereiopod elongate, at least three times as long as broad 5

4.(3) Rostrum dorsally dentate ..... ***Micratya***
   Rostrum dorsally unarmed (in western Atlantic species) ..... ***Atya***

5.(3) Orbital margin armed with minute denticles ..... ***Jonga***
   Orbital margin unarmed ..... ***Potimirim***

Genus *Atya* Leach, 1816

Key to Eastern American Species

1. Rostrum with lateral margins at most faintly sinuous; third pereiopod only slightly more robust than fourth and not bearing horny scales or tubercles .... 25. ***A. lanipes***
   Rostrum with distinct lateral lobe or tooth on each side in adults; third pereiopod noticeably larger and more robust than fourth and bearing prominent horny scales or tubercles 2

2.(1) Rostrum with lateral lobes obtuse; body not transversely banded in life .. 24. ***A. innocous***
   Rostrum with lateral lobes acute and directed anteriorly; transverse bands of dark color at juncture of carapace and abdomen and in anterior part of sixth abdominal somite .... 26. ***A. scabra***

24. *Atya innocous* (Herbst)

Cancer (Astacus) Innocous Herbst, 1792:62, pl. 28: fig. 3.
Atya innocous.—Chace and Hobbs 1969:57, figs. 8, 10*a–c*, 14*a, b*.

TYPE-LOCALITY.—Martinique.

DISTRIBUTION.—Nicaragua to Panama and the West Indies; freshwater streams.

25. *Atya lanipes* Holthuis

Atya lanipes Holthuis, 1963a:61, figs. 1, 2.—Chace and Hobbs 1969:62, fig. 14*c*.

TYPE-LOCALITY.—Saint Thomas.

DISTRIBUTION.—Puerto Rico and Saint Thomas; freshwater streams.

26. *Atya scabra* (Leach)

Atys scaber Leach, 1815:345.
Atya scabra.—Chace and Hobbs 1969:63, figs. 9, 10*d–f*, 14*d, e*.

TYPE-LOCALITY.—Vicinity of Veracruz, Mexico.

DISTRIBUTION.—Mexico and the West Indies to Estado de Pernambuco, Brazil; freshwater streams.

*Genus *Jonga* Hart, 1961

Only one species is known.

*27. *Jonga serrei* (Bouvier)

Ortmannia Serrei Bouvier, 1909:332.
Jonga serrei.—Chace and Hobbs 1969:66, figs. 11, 14*f, g*.

MATERIAL.—Dominica (Sta. 73–59: 96♂, 75♀ [59 ovig.], 118 juv.).

HABITAT.—In estuarine and sluggish portions of freshwater streams, especially among vegetation and debris.

TYPE-LOCALITY.—Near Havana, Cuba.

DISTRIBUTION.—West Indies and Costa Rica; freshwater streams.

*Genus *Micratya* Bouvier, 1913

Only one species is known.

*28. *Micratya poeyi* (Guérin-Méneville)

Atya Poeyi Guérin-Méneville, 1855: pl. 2: figs. 7, 7*a–c*.
Micratya poeyi.—Chace and Hobbs 1969:70, figs. 12, 13, 14*h, i*.

MATERIAL.—Dominica (Sta. 73–59: 1 juv.).

HABITAT.—In rapidly flowing streams among small rocks and vegetation.

TYPE-LOCALITY.—Cuba.

DISTRIBUTION.—West Indies and Costa Rica; freshwater streams.

*Genus *Potimirim* Holthuis, 1954

Key to West Indian Species

(A fourth species, *P. potimirim* (Müller, 1881) is known only from Estado de Pernambuco and Estado de Santa Catarina, Brazil.)

1. Appendix masculina widening distally, about three-fourths as wide as long, posterior margin slightly and evenly convex .... 29. ***P. americana***

Key to West Indian Species—Continued

Appendix masculina widest proximally, not more than half as wide as long, posterior margin sinuous 2

2.(1) Dorsal margin of rostrum convex distally; appendix masculina with deep, unarmed sinus in posterior margin .... ***30. *P. glabra***

Dorsal margin of rostrum nearly straight; no deep, unarmed sinus in posterior margin of appendix masculina .... **31. *P. mexicana***

29. *Potimirim americana* (Guérin-Méneville)

Caridina americana Guérin-Méneville, 1855: pl. 2: figs. 13, 13*a*.
Potimirim americana.—Smalley 1963:178, 179, fig. 2.

TYPE-LOCALITY.—Cuba.

DISTRIBUTION.—Cuba, Jamaica, and Trinidad; freshwater streams.

*30. *Potimirim glabra* (Kingsley)

Atyoida glabra Kingsley, 1878a:93.
Potimirim glabra.—Chace and Hobbs 1969:76, figs. 15, 19*b*, *c*.

MATERIAL.—Tobago (Sta. 27–59: 1♀).—Trinidad (Sta. 2–56: 5♂, 4♀).

HABITAT.—On rubble beds of moderately swift portions of freshwater streams.

TYPE-LOCALITY.—Pacific drainage of Nicaragua.

DISTRIBUTION.—El Salvador, Nicaragua, and Costa Rica, Lesser Antilles, and Rio de Janeiro and São Paulo states, Brazil; freshwater streams.

31. *Potimirim mexicana* (De Saussure)

Caridina mexicana De Saussure, 1857:505.
Potimirim mexicana.—Villalobos 1960:295, pls. 6–9.

TYPE-LOCALITY.—Veracruz, Mexico.

DISTRIBUTION.—Northeastern Mexico to Costa Rica and Cuba, Jamaica, and Puerto Rico; freshwater streams.

*Genus *Typhlatya* Creaser, 1936

Key to Species

1. Rostrum reaching anteriorly about twice as far as eyes; eyes without pigment .... **34. *T. pearsei***

Rostrum not reaching anteriorly as far as eyes; eyes with small but distinct pigment spots 2

2.(1) Exopod on fifth pereiopod nearly as well developed as those on preceding ones .... **32. *T. garciai***

Exopod on fifth pereiopods greatly reduced, barely discernible .... ***33. *T. monae***

32. *Typhlatya garciai* Chace

Typhlatya garciai Chace, 1942b:99, pl. 29.

TYPE-LOCALITY.—Cave at Banes, Provincia de Oriente, Cuba.

DISTRIBUTION.—Known only from a subterranean freshwater stream at the type-locality.

*33. *Typhlatya monae* Chace

Typhlatya monae Chace, 1954:318, fig. 1.—Chace and Hobbs 1969:80, fig. 16.

MATERIAL.—Barbuda (Sta. 100–58: 3♀.—Sta. 90–59: 4♀).

HABITAT.—Subterranean fresh water.

TYPE-LOCALITY.—Well near Sardinera, Isla Mona.

DISTRIBUTION.—Isla Mona and Barbuda; subterranean fresh water.

34. *Typhlatya pearsei* Creaser

Typhlatya pearsei Creaser, 1936:128, figs. 31–41.

TYPE-LOCALITY.—Balam Canche Cave, east southeast of Chichén Itzá, Estado de Yucatán, Mexico.

DISTRIBUTION.—Caves in Estado de Yucatán, Mexico; subterranean fresh water.

*Genus *Xiphocaris* Von Martens, 1872

Only one species is known.

*35. *Xiphocaris elongata* (Guérin-Méneville)

Hippolyte elongatus Guérin-Méneville, 1855: pl. 2: figs. 16, 16*a*.
Xiphocaris elongata.—Chace and Hobbs 1969:81, figs. 17, 18, 19*e*, *f*.

MATERIAL.—Dominica (Sta. 73–59: 3y♂, 6y♀, 70 juv.).

HABITAT.—Juveniles in estuarine portions of freshwater streams, adults in upper reaches, sometimes at considerable altitudes.

TYPE-LOCALITY.—Havana, Cuba.

DISTRIBUTION.—Confined to the West Indian islands; freshwater streams.

*Family PASIPHAEIDAE

Only one shallow-water genus is known.

*Genus *Leptochela* Stimpson, 1860

Key to Atlantic Species

1. Fifth abdominal somite grossly dentate in dorsal midline; sixth somite armed with single, proximal, dorsomedian, spinelike tooth .... 37. ***L. carinata***
   Fifth and sixth abdominal somites unarmed 2
2.(1) Orbital margin finely serrate or spinulose; telson armed with 1 dorsal and 2 lateral pairs of spines .... *38. ***L. serratorbita***
   Orbital margin entire; telson armed with 1 dorsal and 1 lateral pair of spines .... *36. ***L. bermudensis***

*36. *Leptochela bermudensis* Gurney

Leptochela bermudensis Gurney, 1939b:427, figs. 1–10.—Chace 1940:131, fig. 10.

MATERIAL.—Barbuda (Sta. 84–56: 2♂, 1 ovig. ♀).—Dominica (Sta. 64–56: 1♂).

HABITAT.—Unlike the two following inshore species, *L. bermudensis* has been collected heretofore only in the open sea, where it occurs at or near the surface at night and at considerable depths during the day. The present material indicates that it may move into shallow coastal waters at night.

TYPE-LOCALITY.—Off the Bermudas.

DISTRIBUTION.—Off North Carolina and the Bermudas to the Bay of Campeche and Dominica; over depths to 1,280 meters.

37. *Leptochela carinata* Ortmann

Leptochela carinata Ortmann, 1893:41, pl. 4: fig. 1.

TYPE-LOCALITY.—Off Baía de Marajó, Estado do Pará, Brazil, 50–100 meters.

DISTRIBUTION.—Bahamas to Estado do Pará, Brazil; in depths of at least 51 meters.

*38. *Leptochela serratorbita* Bate

Leptochela serratorbita Bate, 1888:859, pl. 139: fig. 1.—Williams 1965b:41, fig. 33.

MATERIAL.—Barbuda (Sta. 84–56: 222♂; 200♀ [8 ovig.]).—Antigua Island (Sta. 93–58: 1♂).

HABITAT.—Coastal and inshore waters.

TYPE-LOCALITY.—Saint Thomas.

DISTRIBUTION.—North Carolina to Bay of Campeche and Antigua Island; possibly to 60 meters.

Family DISCIADIDAE

Only one genus is known.

Genus *Discias* Rathbun, 1902

Key to Atlantic Species

Rostrum narrow with subparallel margins; sixth abdominal somite nearly twice as long as fifth, slightly longer than telson .... 39. ***D. atlanticus***
Rostrum broadly triangular; sixth abdominal somite little longer than fifth, about half as long as telson .... 40. ***D. serratirostris***

39. *Discias atlanticus* Gurney

Discias atlanticus Gurney, 1939a:388, figs. 1–13.—Holthuis 1951a:35, fig. 4.

TYPE-LOCALITY.—The Reach, Bermuda Islands.

DISTRIBUTION.—Bermudas, Guadeloupe, Cape Verde Islands, and off Gabon; to a depth of 50 meters.

40. *Discias serratirostris* Lebour

Discias serratirostris Lebour, 1949:1107, figs. 1, 2.

TYPE-LOCALITY.—Off Castle Roads, Bermuda Islands.

DISTRIBUTION.—Known only from the ovigerous female holotype from the Bermudas; in a depth of about 30 meters.

*Family RHYNCHOCINETIDAE

Only one genus is known.

*Genus *Rhynchocinetes* H. Milne Edwards, 1837b

Only one species is known from the Atlantic.

*41. *Rhynchocinetes rigens* Gordon

Rhynchocinetes rigens Gordon, 1936:76, figs. 1–4, 5*e*.—Manning 1961b:1, figs. 1, 2.

MATERIAL.—Barbuda (Sta. 102–59: 1 ovig. ♀).

HABITAT.—Crevices in rock and coral.

TYPE-LOCALITY.—Madeira.

DISTRIBUTION.—Bermudas, Florida Keys, Barbuda, and Madeira; littoral and sublittoral.

*Family PALAEMONIDAE

In an attempt to enhance the practicability of the following key, readily observable and not necessarily fundamental characters have been used for the most part. Disregard of the subfamilies in the key should not be construed as lack of agreement with the generally accepted classification of the family.

Key to West Indian Genera of Palaemonidae

(The only other eastern American genera are *Creaseria* Holthuis, 1950b, from Yucatan caves, and *Pseudopalaemon* Sollaud, 1911, from fresh water in Uruguay and Argentina.)

1. Third maxilliped with well-developed exopod 2
   Third maxilliped without exopod 12

2.(1) Eyes without pigment. (Restricted to subterranean fresh water.) .... ***Troglocubanus***
   Eyes pigmented 3

3.(2) Rostrum armed dorsally with series of prominent teeth 4
   Rostrum usually unarmed dorsally, at most with 1 or 2 subapical denticles 11

4.(3) Carapace with hepatic spine on lateral surface far posterior to anterior margin 5
   Carapace without hepatic spine 8

5.(4) Telson bearing 2 pairs of terminal spines and usually 1 or 2 pairs of setae 6
   Telson bearing 3 pairs of terminal spines 7

6.(5) Three posterior pereiopods with biunguiculate dactyls .... ****Brachycarpus***
   Three posterior pereiopods with dactyls simple, without accessory tooth on flexor margin .... ****Macrobrachium***

7.(5) Rostrum without lateral flange; carapace with antennal spine on anterior margin; 3 posterior pereiopods 7-segmented, ischium and merus distinct .... ****Periclimenes***
   Rostrum with lateral flange; carapace without antennal spine on anterior margin; 3 posterior pereiopods 6-segmented, ischium and merus indistinguishably fused .... ***Tuleariocaris***

8.(4) Carapace with antennal but without branchiostegal spine on or near anterior margin; telson with 3 pairs of terminal spines; second pereiopods massive, unequal .... ****Periclimenaeus***
   Carapace with both antennal and branchiostegal spines on or near anterior margin; telson with 2 pairs of terminal spines and 1 or 2 pairs of setae; second pereiopods elongate, subequal 9

9.(8) Carapace without branchiostegal groove ventral to antennal spine; endopod of first pleopod of male with accessory appendix .... ****Leander***
   Carapace with branchiostegal groove; endopod of first pleopod of male entire, without accessory appendix 10

Key to West Indian Genera—Continued

10.(9) Mandible with palp .... ***Palaemon**
Mandible without palp .... ***Palaemonetes**
11.(3) Rostrum much larger than antennal spines, usually broad and flat; antennal scale well developed .... ***Pontonia**
Rostrum small, spinelike, similar to lateral (antennal?) spines; antennal scale vestigial ***Typton**
12.(1) Rostrum not expanded laterally in basal portion; strongly dentate both dorsally and ventrally .... ***Anchistioides**
Rostrum with eavelike expansions over orbits; unarmed ventrally 13
13.(12) Carapace with hepatic spine on lateral surface far posterior to anterior margin 14
Carapace without hepatic spine 15
14.(13) Carapace with very strong antennal spine, with branchiostegal sinus, and with longitudinal groove or ridge extending over entire length near lateral margin .... ***Coutierea***
Carapace with very weak and inconspicuous antennal spine, without branchiostegal sinus or longitudinal groove or ridge near lateral margin .... ***Lipkebe***
15.(13) Basal expansions of rostrum anteriorly acuminate; carapace with longitudinal groove extending almost entire length near lateral margin; abdomen with pleura of at least fourth and fifth somites posterolaterally acuminate .... ***Pseudocoutierea**
Basal expansions of rostrum evenly convex, not acuminate; carapace without longitudinal groove near lateral margin; abdomen with pleura of all 5 anterior somites rounded .... ***Neopontonides**

*Subfamily PALAEMONINAE

*Genus *Brachycarpus* Bate, 1888

Key to Species

Rostrum nearly straight dorsally; dorsal spines of telson not submarginal, directed posteriorly; anterolateral tooth of basal segment of antennular peduncle overreaching second segment; mandibular palp not reduced, reaching at least to distal third of incisor process; carpus of first pereiopod slightly longer than chela .... ***42. *B. biunguiculatus***
Rostrum convex dorsally; dorsal spines of telson submarginal, directed obliquely laterad; anterolateral tooth of basal segment of antennular peduncle not overreaching second segment; mandibular palp reduced, not reaching midlength of incisor process; carpus of first pereiopod about half as long as chela .... **43. *B. holthuisi***

*42. *Brachycarpus biunguiculatus* (Lucas)

Palaemon biunguiculatus Lucas, 1846:45, pl. 4: fig. *e*.
Brachycarpus biunguiculatus.—Holthuis 1952:3, pl. 1.

MATERIAL.—Tortola (Sta. 115–56: 1y♀).—Barbuda (Sta. 85–56: 1 ovig.♀; Sta. 111–58: 2♀ [1 ovig.]).—Saba Bank (Sta. 106–56: 1♀).—Nevis (Sta. 67–58: 1y♀; Sta. 70–58: 1y♀).—Antigua Island (Sta. 73–56: 1♀; Sta. 77–56: 1♀; Sta. 83–56: 3♂; Sta. 112–59: 1♀).—Bahía de la Ascensión (Sta. 52–60: 1♂, 1♀; Sta. 72–60: 2♂).—Bahía del Espíritu Santo (Sta. 41–60: 1 ovig.♀).

HABITAT.—This species was collected in most habitats surveyed by the expeditions: eroded coral and reefs; rock-studded sandy shore; *Porites* flats; weed-covered seawall at night; and turtle-grass flats in 2–13 meters. Immature specimens were taken in a mollusk trap set in 48 meters and at a surface light at night over a depth of 11 meters.

TYPE-LOCALITIES.—Oran and Bône, Algeria.

DISTRIBUTION.—Probably pantropical; littoral and sublittoral.

43. *Brachycarpus holthuisi* Fausto Filho

Brachycarpus holthuisi Fausto Filho, 1966:123, figs. 1–11.

TYPE-LOCALITY.—Off coast of Estado do Ceará, Brazil.

DISTRIBUTION.—Known only from the type-series; in 30–60 meters.

*Genus *Leander* E. Desmarest, 1849

Probably only one species is known from the West Indies. The species from Florida Bay tentatively identifiied as *L. paulensis* Ortmann, 1897, by Manning (1961c) is easily distinguished from *L. tenuicornis*, especially by the strong mesial lobe on the lateral extension of the first segment of the antennular peduncle (apparently Manning's figures 2*d* and 2*e* are transposed), but I have seen specimens of this species only from the west coast of Florida. Its identity with Ortmann's species from São Paulo, Brazil, remains to be verified.

*44. *Leander tenuicornis* (Say)

Palaemon tenuicornis Say, 1818:249.
Leander tenuicornis.—Holthuis 1952:155, pls. 41, 42.

MATERIAL.—Tortola (Sta. 23–58: 1♂).—Between Tortola and Guana Island (Sta. 7–58: 3♂, 4♀ [1 ovig.]).—Virgin Gorda (Sta. 37–58: 1♀; Stas. 37, 38, 39–58: 1♂).—Anegada (Sta. 42–58: 1♂). —Barbuda (Sta. 108–58: 4♀ [3 ovig.]; Sta. 96–59: 1 ovig.♀; Sta. 98–59; 1♀; Sta. 102–59: 3♂, 2♀ [1 ovig.]; Sta. 103–59: 1♀).—Antigua Island (Sta. 75–56: 1♂; Sta. 104–59: 1y♀; Sta. 109–59: 8♂, 2 ovig.♀).—Saint Lucia Island (Sta. 64–59: 1♀).—Bahía de la Ascensión (Sta. 66–60: 2♂).—Bahía del Espíritu Santo (Sta. 42–60: 1♂, 1♀).

HABITAT.—Probably all of the specimens listed above were associated with vegetation, either on grass or *Porites* flats in shallow water or in clumps of *Sargassum* floating in the open sea.

TYPE-LOCALITY.—Grand Banks.

DISTRIBUTION.—Pantropical except for the extreme eastern Pacific; shallow water and pelagic.

*Genus *Macrobrachium* Bate, 1868

Key to West Indian Species

(See Holthuis (1952) for other eastern American species.)

1. Rostrum long, usually overreaching antennal scale, with 5–11 dorsal teeth, including 1 or 2 on carapace posterior to level of orbital margin; second pereiopods of adult male slender, chela more than eight times as long as broad 2
   Rostrum short, reaching at most slightly beyond antennular peduncle, with 10–15 dorsal teeth, including at least 4 on carapace posterior to level of orbital margin; second pereiopods of adult male robust, chela less than seven times as long as broad 3

2.(1) Rostrum armed throughout dorsal length, posterior tooth usually separated from second by distance greater than that between second and third; second pereiopod of adult male spinulose, carpus shorter than chela, fingers densely furred .... *45. ***M. acanthurus***
   Rostrum unarmed in distal half or third of dorsal margin except for 2 subapical teeth, proximal teeth subequally spaced; second pereiopod of adult male smooth, carpus longer than chela, fingers naked .... 50. ***M. jelskii***

3.(1) Rostrum with sinuous dorsal margin, tip slightly upturned; second pereiopods of adult male similar in form if not in size, with short pubescence and short spines along outer margin of fixed finger and continued onto palm, but spines not forming distinct crest and not hidden by pubescence 4
   Rostrum with dorsal margin nearly straight, tip not upturned; second pereiopods of adult male unequal in both form and size, with dense long fur partially concealing crestlike row of long spines on margin of palm 5

4.(3) Posterior teeth of dorsal rostral series not especially erect or noticeably more widely spaced than others; second pereiopods of adult male subequal, carpus shorter than merus and about half as long as palm, fingers only slightly shorter than palm, prominent tooth near end of proximal third of opposable margin of fixed finger; abdomen longitudinally striped in life .... *46. ***M. carcinus***
   Three or 4 teeth of dorsal rostral series more erect and more widely spaced than anterior ones; second pereiopods of adult male usually unequal in length, major one with carpus about as long as merus and about three-fourths as long as palm, fingers about two-thirds as long as palm, none of teeth on opposable margin of fixed finger greatly enlarged; abdomen transversely banded in life .... 49. ***M. heterochirus***

Key to West Indian Species—Continued

5.(3) Major second pereiopod of adult male with carpus usually longer than merus and fingers distinctly longer than palm, row of spines along mesial margin of palm and fixed finger rather long on proximal portion of palm, becoming shorter near midlength of palm, longer near base of finger, and decreasing again distally on finger. *48. ***M. faustinum***
Major second pereiopod of adult male with carpus shorter than merus and fingers slightly longer or slightly shorter than palm, row of spines along mesial margin of palm and fixed finger forming regularly graduated series, not decreasing in length along central portion of palm .... *47. ***M. crenulatum***

*45. *Macrobrachium acanthurus* (Wiegmann)

Palaemon acanthurus Wiegmann, 1836:150.
Macrobrachium acanthurus.—Chace and Hobbs 1969:89, figs. 20, 25*a*, *g*.

MATERIAL.—Sugar Factory Pond, Antigua Island; 18 May 1958; William T. Bode: 3♂, 1 ovig. ♀.—Sugar Factory Pond, Antigua Island; 19 May 1958; William T. Bode: 1♂, 3♀ (2 ovig.).

HABITAT.—These specimens were captured in a wire trap set in 2½ feet of water. Sugar Factory Pond has a maximum depth of 11 feet (3½ meters).

TYPE-LOCALITY.—"Brazilian coast."

DISTRIBUTION.—North Carolina to Estado do Rio Grande do Sul, Brazil; chiefly fresh water.

*46. *Macrobrachium carcinus* (Linnaeus)

Cancer Carcinus Linnaeus, 1758:631.
Macrobrachium carcinus.—Chace and Hobbs 1969:93, figs. 21, 25*b*, *h*.

MATERIAL.—Sugar Factory Pond, Antigua Island; 18 May 1958; William T. Bode: 1♂.—Trinidad (Sta. 2–56: 1♂).

HABITAT.—The Antigua Island specimen was captured in a wire trap set in 2½ feet of water in a pond having a maximum depth of 11 feet (3½ meters).

TYPE-LOCALITY.—"*in* Americae *fluviis*" (restricted to Jamaica by Holthuis, 1952).

DISTRIBUTION.—Florida and Texas to Estado de Santa Catarina, Brazil; chiefly fresh water.

*47. *Macrobrachium crenulatum* Holthuis

Macrobrachium crenulatum Holthuis, 1950a:95.—Chace and Hobbs 1969:99, figs. 22, 25*c*, *i*.

MATERIAL.—Tobago (Sta. 44–59: 2♂, 2♀).—Trinidad (Sta. 2–56: 29♂, 24♀, 20 juv.).

HABITAT.—Both lots were taken in the lower reaches of fresh-water streams.

TYPE-LOCALITY.—Río Peje Bobo, Panama.

DISTRIBUTION.—West Indies, Panama, and Venezuela; fresh water.

*48. *Macrobrachium faustinum* (De Saussure)

Palaemon Faustinus De Saussure, 1857:505.
Macrobrachium faustinum.—Chace and Hobbs 1969:102, figs. 23, 25*d*, *j*.

MATERIAL.—Tobago (Sta. 44–59: 1y♂, 6♀). Most of these specimens are immature, and the identification is therefore not certain.

HABITAT.—The above lot was collected one-half mile upstream from the mouth of a fresh-water stream.

TYPE-LOCALITY.—Near Jacmel, Haiti.

DISTRIBUTION.—West Indies; fresh water.

49. *Macrobrachium heterochirus* (Wiegmann)

Palaemon heterochirus Wiegmann, 1836:149.
Macrobrachium heterochirus.—Chace and Hobbs 1969:106, figs. 24, 25*e*, *k*.

TYPE-LOCALITY.—"east coast of Mexico."

DISTRIBUTION.—Estado de Puebla, Mexico, and the West Indies to Estado de São Paulo, Brazil; fresh water.

50. *Macrobrachium jelskii* (Miers)

Palaemon jelskii Miers, 1877:661, pl. 67: fig. 1.
Macrobrachium jelskii.—Holthuis 1952:26, pl. 4: figs. *a–d*.

TYPE-LOCALITY.—Saint-Georges (Oyapock), French Guiana.

DISTRIBUTION.—Costa Rica, Venezuela, and Trinidad to Brazil; fresh water.

*Genus *Palaemon* Weber, 1795

Key to West Indian Species

(See Holthuis (1952) for additional western Atlantic species: *P. (Palaeander) floridanus* Chace, 1942a, from Florida; and *P. (Nematopalaemon) schmitti* Holthuis, 1950a, from Surinam.)

Three (rarely 2) teeth of dorsal rostral series situated on carapace posterior to level of orbital margin; ventral margin of rostrum armed with 3 or 4 teeth; sixth abdominal somite shorter than telson; antennular peduncle with distal margin of basal segment not overreaching distolateral tooth; second pereiopod with carpus about as long as chela
*51. ***P. (Palaeander) northropi***

Only 1 tooth of dorsal rostral series situated on carapace posterior to level of orbital margin; ventral margin of rostrum armed with 5 (rarely 4) to 8 teeth; sixth abdominal somite as long as telson; antennular peduncle with distal margin of basal segment far overreaching distolateral tooth; second pereiopod with carpus nearly twice as long as chela
52. ***P. (Palaemon) pandaliformis***

*Subgenus *Palaeander* Holthuis, 1950b

*51. *Palaemon (Palaeander) northropi* (Rankin)

Leander northropi Rankin, 1898:245, pl. 30: fig. 4.
Palaemon (Palaeander) northropi.—Holthuis 1952:192, pl. 47.

MATERIAL.—Guadeloupe (Sta. 68–56: 72♂, 89♀ [18 ovig.]).—Bahía de la Ascensión (Sta. 60–60: 1♂, 4♀ [3 ovig.]; Sta. 65–60: 113♂, 112♀ [77 ovig., 1♀ with branchial bopyrid parasite]; Sta. 68–60: 1♂; Sta. 70–60: 2♀; Sta. 76–60: 1♂; Sta. 78–60: 1♂, 2 ovig. ♀).

HABITAT.—Virtually all of the specimens listed above occurred on sandy mud flats in 1 or 2 feet of water in the vicinity of mangroves.

TYPE-LOCALITY.—Nassau, New Providence, Bahama Islands.

DISTRIBUTION.—Bermudas and Florida to Estado de São Paulo, Brazil; littoral.

Subgenus *Palaemon* Weber, 1795

52. *Palaemon (Palaemon) pandaliformis* (Stimpson)

Leander pandaliformis Stimpson, 1871:130.
Palaemon (Palaemon) pandaliformis.—Holthuis 1952:187, pl. 46: figs. *g–l*.—Chace and Hobbs 1969:111, figs. 26, 28*a*.

TYPE-LOCALITY.—Barbados or Trinidad.

DISTRIBUTION.—West Indies and Guatemala to Estado de Santa Catarina, Brazil; fresh and brackish water.

*Genus *Palaemonetes* Heller, 1869

*Subgenus *Palaemonetes* Heller, 1869

Key to Caribbean Species

(See Holthuis (1952) for other species from eastern America.)

1. Dorsal margin of rostrum unarmed near apex .... *55 ***P. (P.) octaviae***
   Dorsal margin of rostrum with 1 or 2 subapical teeth 2
2. Branchiostegal spine arising slightly posterior to carapace margin; carpus of second pereiopod longer than chela .... 53. ***P. (P.) carteri***
   Branchiostegal spine arising from carapace margin; carpus of second pereiopod shorter than chela .... *54. ***P. (P.) intermedius***

53. *Palaemonetes (Palaemonetes) carteri* Gordon

Palaemonetes carteri Gordon, 1935:324, fig. 12.
Palaemonetes (Palaemonetes) carteri.—Holthuis 1952:218, pl. 52: figs. *c–o*, pl. 53: figs. *a–c*.

TYPE-LOCALITY.—Upper Cuyuni River, Guyana.

DISTRIBUTION.—Venezuela to French Guiana; fresh water.

*54. *Palaemonetes (Palaemonetes) intermedius* Holthuis

Palaemonetes (Palaemonetes) intermedius Holthuis, 1949a: 94, fig. 2*j–l*; 1952:241, pl. 55: figs. *a–f*.

MATERIAL.—Bahía de la Ascensión (Sta. 78–60: 3♂, 4♀ [1 ovig.]). These specimens vary toward *P. (P.) pugio* Holthuis, 1949.

HABITAT.—The specimens were collected after a small slough or embayment in a mangrove swamp was poisoned with rotenone. They apparently were associated with *Palaemon northropi*.

TYPE-LOCALITY.—Box Iron Bay, Chincoteague Bay, Virginia.

DISTRIBUTION.—The species has been known previously from Massachusetts to Texas; littoral. Apparently this is the first record from beyond the borders of the United States.

*55. *Palaemonetes (Palaemonetes) octaviae*, new species

FIGURES 3, 4

MATERIAL.—Guadeloupe (Sta. 68–56: 44♂, 34♀ [11 ovig.; one ♂ is holotype, USNM 135336]).—Bahía de la Ascensión (Sta. 83–60: 1♂).

DESCRIPTION.—Rostrum (Figures 3*a*, 4) straight, moderately deep, not much, if at all, arched in proximal half, normally extending anteriorly as far as, or farther than, antennal scale; dorsal margin bearing 6–10, usually 8 or 9, teeth, posteriormost alone invariably situated on carapace or, exceptionally, in line with posterior margin of orbit, anteriormost usually placed closer to penultimate tooth than to tip of rostrum; ventral margin normally armed with 2 or 3, rarely 4, teeth. Branchiostegal spine arising from anterior margin of carapace immediately ventral to branchiostegal groove.

Pleuron of fifth abdominal somite (Figure 3*b*) forming acute but sometimes blunt angle. Sixth somite more than one and one-half times as long as fifth. Telson (Figure 3*c*) usually longer than sixth somite; anterior pair of dorsal spinules situated near midlength of telson, posterior pair midway between anterior pair and posterior margin of telson or somewhat closer to anterior pair; posterior margin (Figure 3*d*) with sharp median point flanked by 2 pairs of spines and 2 pairs of plumose setae, mesial pair of spines reaching far beyond median point.

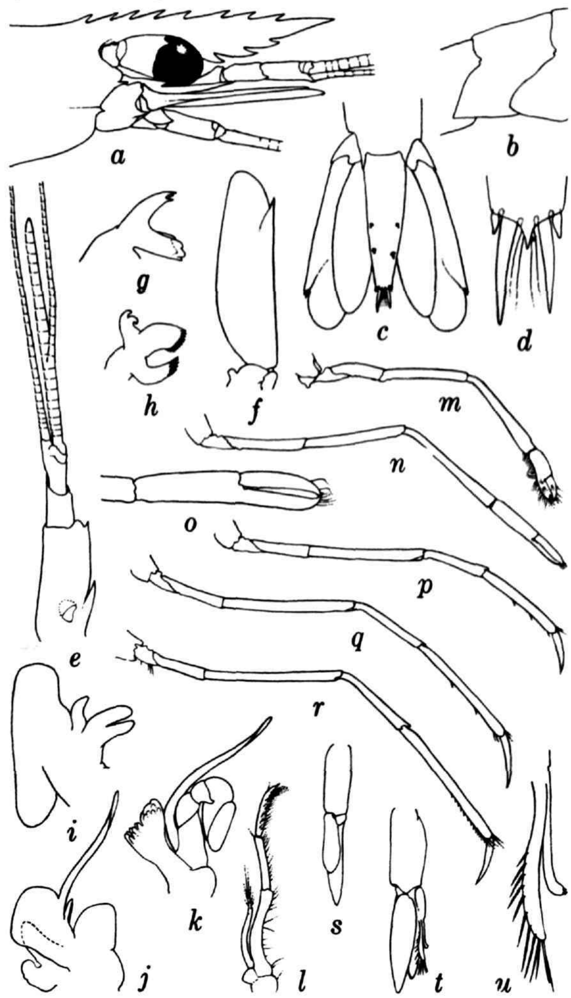


FIGURE 3.—*Palaemonetes octaviae*, new species, holotype, male, carapace length 3.2 mm: *a*, anterior region; *b*, fifth abdominal somite; *c*, telson and uropods; *d*, end of telson; *e*, right antennule; *f*, right antennal scale; *g*, right mandible; *h*, right first maxilla; *i*, right second maxilla; *j*, right first maxilliped; *k*, right second maxilliped; *l*, right third maxilliped; *m*, right first pereiopod; *n*, right second pereiopod; *o*, same, chela; *p*, right third pereiopod; *q*, right fourth pereiopod; *r* right fifth pereiopod; *s*, right first pleopod; *t*, right second pleopod; *u*, appendix masculina. (Magnifications: *a–c*, *e*, *f*, *l–n*, *p–u*, ×9.6; *g–k*, *o*, ×20; *d*, ×40.)

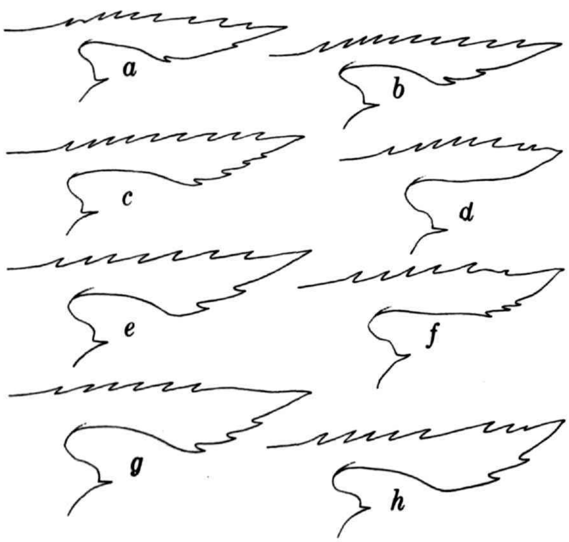


FIGURE 4.—*Palaemonetes octaviae*, new species, variation in rostrum of paratypes (figures in parentheses = carapace lengths in mm): *a*, male (2.9); *b*, male (3.0); *c*, male (3.2); *d*, female (3.8); *e*, ovigerous female (4.1); *f*, ovigerous female (4.1); *g*, female (4.2); *h*, ovigerous female (4.2). (Magnifications: *a–h*, ×9.6.)

Eyes well developed; cornea wider than stalk and pigmented.

Antennular peduncle (Figure 3*e*) with slender stylocerite reaching about to middle of basal segment; anterolateral spine of basal segment reaching about to level of produced anterior margin of segment; second segment subequal in length to, but broader than, third segment. Lateral antennular flagellum with 2 branches fused for 6–9 joints; free part of shorter branch consisting of 7–13 joints and about one and one-half times as long as fused portion.

Antennal scale (Figure 3*f*) more than three times as long as wide, narrowing slightly in distal half; blade reaching far beyond lateral tooth.

Mouth parts as figured (Figures 3*g–l*); epipod of first maxilliped deeply bilobed; third maxilliped reaching anteriorly about to end of antennal peduncle.

First pereiopod (Figure 3*m*) reaching almost as far anteriorly as does antennal scale; fingers about as long as palm; carpus about twice as long as chela and noticeably longer than merus. Second pereiopod (Figure 3*n*) overreaching antennal scale by at least length of fingers; fingers (Figure 3*o*) about three-fourths as long as palm and unarmed on opposable margins; carpus about one and one-third times as long as chela; merus slightly longer than chela but distinctly shorter than carpus; ischium shorter than merus. Third pereiopod (Figure 3*p*) reaching nearly as far as end of antennal scale; propodus about twice as long as dactyl and one-third again as long as carpus, but clearly shorter than merus. Fourth periopod (Figure 3*q*) overreaching antennal scale by most of length of dactyl; propodus more than twice as long as dactyl and nearly one and one-half times as long as carpus, but slightly shorter than merus. Fifth pereiopod (Figure 3*r*) reaching as far as, or just beyond, antennal scale; propodus less than three times as long as dactyl, less than twice as long as carpus, about as long as merus.

Lateral branch of uropod (Figure 3*c*) with movable spine between distolateral tooth and margin of blade.

SIZE.—Males with carapace lengths of 2.5–3.3 mm (holotype, 3.2 mm); females 2.8–4.4 mm; ovigerous specimens, 3.7–4.3 mm.

HABITAT.—Marine sandy mud flats in less than 2 feet of water. The 78 specimens collected at Guadeloupe were apparently associated with twice as many specimens of *Palaemon northropi.*

TYPE-LOCALITY.—Sandy mud flats between Îlet à Monroux and Îlet Rat, Pointe-a-Pitre, Guadeloupe.

DISTRIBUTION.—Known at present only from Guadeloupe, Leeward Islands, and Territorio de Quintana Roo, Mexico.

REMARKS.—*Palaemonetes octaviae* is apparently so closely related to *P. argentinus* Nobili, 1901a, which occurs in freshwater habitats from southern Brazil to Argentina, that difficulty may be encountered in distinguishing some specimens of the latter variable species from the one herein described. In general, *P. octaviae* has the dorsal margin of the rostrum less convex and the teeth of that margin less prominent. The telson is usually longer than the sixth abdominal somite, and the posterior pair of dorsal teeth are placed closer to the anterior pair than to the posterior margin of the telson, as in *P. argentinus*. The carpus of the first and second pereiopods seems to be proportionately a little longer in *P. octaviae*, and the propodus of the fifth pereiopod is relatively longer. The differences in these somewhat variable characters might be considered of less than specific importance were it not for the marked difference in habitat of the two forms.

This, the first species of *Palaemonetes* to be recorded from the West Indies, is named for Octavia M. Bredin in grateful acknowledgment of the interest shown by her and her husband in suggesting and making possible the four expeditions that added so much to our knowledge of the Caribbean fauna.

Genus *Troglocubanus* Holthuis, 1949a

Key to Species

1. Rostrum with 2 or more dorsal teeth 2
   Rostrum with single dorsal tooth or unarmed 3

2.(1) Rostrum reaching at least as far as end of antennal scale, armed with 6–8 dorsal teeth ..... 57. *T. eigenmanni*
   Rostrum not overreaching antennular peduncle, armed with 2 or 3 dorsal teeth ..... 58. *T. gibarensis*

3.(1) Carapace with anterior margin unarmed ..... 59. *T. inermis*
   Carapace armed, sometimes inconspicuously, with antennal spine 4

4.(3) Rostrum with ventral margin straight or concave throughout; third and fourth pereiopods with propodus more than three times as long as dactyl ..... 56. *T. calcis*
   Rostrum with ventral margin convex in proximal two-thirds; third and fourth pereiopods with propodus not more than two and one-half times as long as dactyl ..... 60. *T. jamaicensis*

56. *Troglocubanus calcis* (Rathbun)

Palaemonetes calcis Rathbun, 1912[part]:451, pl. 1: figs. 1–3, 5.
Troglocubanus calcis.—Holthuis 1952:144, pl. 36.

TYPE-LOCALITY.—Cave between Madruga and Aguacate, Provincia de La Habana, Cuba.

DISTRIBUTION.—Known only from the type-locality; subterranean fresh water.

57. *Troglocubanus eigenmanni* (Hay)

Palaemonetes eigenmanni Hay, 1903:431, fig. 2.
Troglocubanus eigenmanni.—Holthuis 1952:146, pl. 37.

TYPE-LOCALITY.—Cave near Ashton, southwest of Alquízar, Provincia de Pinar del Río, Cuba.

DISTRIBUTION.—Provincias de Pinar del Río, La Habana, and Matanzas, Cuba; subterranean fresh water.

58. *Troglocubanus gibarensis* (Chace)

Palaemonetes gibarensis Chace, 1943:28, pl. 7.
Troglocubanus gibarensis.—Holthuis 1952:149, pl. 38.

TYPE-LOCALITY.—Aguada del Montañes, en el Jobal, Barrio de Cupeysillo, Termino de Gibara, Provincia de Oriente, Cuba.

DISTRIBUTION.—Known only from the type-locality; subterranean fresh water.

59. *Troglocubanus inermis* (Chace)

Palaemonetes inermis Chace, 1943:26, pl. 6.
Troglocubanus inermis.—Holthuis 1952:150, pl. 39.

TYPE-LOCALITY.—Cave between Madruga and Aguacate, Provincia de La Habana, Cuba.

DISTRIBUTION.—Known only from the type-locality; subterranean fresh water.

60. *Troglocubanus jamaicensis* Holthuis

Troglocubanus jamaicensis Holthuis, 1963a:67, fig. 3.

TYPE-LOCALITY.—Cave near Lucky Hill Cooperative Farm near Goshen, Jamaica.

DISTRIBUTION.—Known only from the type-locality; subterranean fresh water.

*Subfamily PONTONIINAE

*Genus *Anchistioides* Paulson, 1875

Only one species is known from the Atlantic Ocean.

*61 *Anchistioides antiguensis* (Schmitt)

Periclimenes antiguensis Schmitt, 1924c:84, pls. 3, 4 [as *P. barbadensis*].
Anchistioides antiguensis.—Holthuis 1951b:175, pl. 57 [legend facing pl. 55].

MATERIAL.—Saba Bank (Sta. 108–56: 3♀).

HABITAT.—These three small specimens (maximum carapace length 2.5 mm) were taken at the surface at night around an electric light over a depth of 55 meters.

TYPE-LOCALITY.—English Harbour, Antigua Island.

DISTRIBUTION.—Bermuda Islands and Gulf of Mexico to Antigua Island; to a depth of 49 meters.

Genus *Coutierea* Nobili, 1901b

Only one species is known.

62. *Coutierea agassizi* (Coutière)

Coralliocaris Agassizi Coutière, 1901:115, fig.
Coutierea agassizi.—Holthuis 1951b:179, pl. 56.

TYPE-LOCALITY.—Off Barbados.

DISTRIBUTION.—Known only from the unique specimen collected in 1878 off Barbados; in 172 meters.

Genus *Lipkebe* Chace, 1969

Only one species is known.

63. *Lipkebe holthuisi* Chace

Lipkebe holthuisi Chace, 1969:263, figs. 8, 9.

TYPE-LOCALITY.—Gulf of Mexico west-northwest of Dry Tortugas, 25°13'N, 83°55'W.

DISTRIBUTION.—Known only from the type-locality; in 119 meters.

*Genus *Neopontonides* Holthuis, 1951b

Only one species is known from the Atlantic Ocean.

*64. *Neopontonides beaufortensis* (Borradaile)

Periclimenes beaufortensis Borradaile, 1920:132.
Neopontonides beaufortensis.—Holthuis 1951b:190, pl. 59: figs. *g–k*, pl. 60.—Williams 1965b:49, fig. 41.

MATERIAL.—Saint Lucia Island (Sta. 52–59: 1♂, 4♀ [2 ovig.]).

HABITAT.—Collected from a reef in 12–20 feet of water.

TYPE-LOCALITY.—Beaufort, North Carolina.

DISTRIBUTION.—North Carolina to Panama; subtidal, usually commensal with *Leptogorgia*.

*Genus *Periclimenaeus* Borradaile, 1915a

Key to Western Atlantic Species

1. Telson with anterior pair of dorsal spines arising from anterior fourth of segment 2
   Telson with anterior pair of dorsal spines arising at end of anterior third of segment or posterior thereto 8
2.(1) Telson with 3 pairs of distal spines inserted in continuous line 3
   Telson with lateral pair of distal spines inserted distinctly anterior to intermediate and mesial pairs 5
3.(2) Rostrum with ventral tooth; carapace with small denticle or sharp tubercle posterior to orbit; antennal scale with anterolateral tooth distinctly overreaching blade .... *69. ***P. caraibicus***
   Rostrum unarmed ventrally; carapace without postorbital denticle; antennal scale with anterolateral tooth not overreaching blade 4
4.(3) Third maxilliped with 2 distal segments broad, penultimate about two and one-half times as long as broad; first pereiopod with movable finger tapering to tip, not strongly convex, carpus about one and one-third times as long as chela; minor second pereiopod with movable finger elongate, not semicircular .... *65. ***P. ascidiarum***
   Third maxilliped with 2 distal segments unusually slender, penultimate about five times as long as broad; first pereiopod with movable finger strongly convex, carpus about one and one-half times as long as chela; minor second pereiopod with movable finger short and broad, nearly semicircular .... 71. ***P. pearsei***
5.(2) Major second pereiopod with large tooth on opposable margin of fixed finger fitting into cavity in movable finger; minor second pereiopod with fingers longer than palm .... 67. ***P. bermudensis***
   Major second pereiopod with large tooth on opposable margin of movable finger fitting into cavity in fixed finger; minor second pereiopod with fingers much shorter than palm 6

Key to Western Atlantic Species—Continued

6.(5) First pereiopod unusually long and slender, carpus nearly twice as long as chela ..... 72. ***P. perlatus***
First pereiopod not abnormally long or slender, carpus less than one and one-half times as long as chela 7
7.(6) Rostrum with 7 dorsal teeth; telson with posterior pair of dorsal spines arising from anterior half of segment ..... *68. ***P. bredini***
Rostrum with 10–12 dorsal teeth; telson with posterior pair of dorsal spines arising from posterior half of segment ..... 74. ***P. wilsoni***
8.(1) Antennal scale without anterolateral tooth; third pereiopod with dactyl bifid ..... 73. ***P. schmitti***
Antennal scale with anterolateral tooth; third pereiopod without distinct accessory tooth on flexor margin of dactyl 9
9.(8) Rostrum with 4 dorsal teeth; antennal scale with large anterolateral tooth reaching about to level of distal margin of blade ..... *66. ***P. atlanticus***
Rostrum with 1 or 2 dorsal teeth; antennal scale with small anterolateral tooth falling far short of level of distal margin of blade ..... 70. ***P. maxillulidens***

*65. *Periclimenaeus ascidiarum* Holthuis

Periclimenaeus ascidiarum Holthuis, 1951b:80, pl. 22: figs. *g–l*, pl. 23.

MATERIAL.—Dominica (Sta. 62–56: 1♀ or juv.). This small specimen (carapace length 1.1 mm) is referred to this species with reservations because only the first and third pereiopods are present, there are but 2 dorsal teeth on the rostrum, and the antennal peduncle does not reach as far as the distal margin of the antennal scale; it otherwise agrees, however, with *P. ascidiarum*.

HABITAT.—This specimen was found on coral-encrusted rocks in 5 feet of water.

TYPE-LOCALITY.—Bird Key Reef, Dry Tortugas, Florida.

DISTRIBUTION.—Previously recorded from the Dry Tortugas and off the Caribbean coast of Colombia; to a depth of 73 meters.

*66. *Periclimenaeus atlanticus* (Rathbun)

Coralliocaris atlantica Rathbun, 1901:122, fig. 26.
Periclimenaeus atlanticus.—Holthuis 1951b:83, pl. 24.

MATERIAL.—Isla de Cozumel (Sta. 100–60: 1♀).—Bahía de la Ascensión (Sta. 60–60: 1♀).

HABITAT.—These specimens were taken along shore near or in turtle-grass beds and near a mangrove swamp.

TYPE-LOCALITY.—Off Saint Thomas.

DISTRIBUTION.—Previously known only from the two type-specimens from off Saint Thomas; in 37–42 meters.

67. *Periclimenaeus bermudensis* (Armstrong)

Periclimenes (Periclimenaeus) bermudensis Armstrong, 1940: 4, figs. 2, 3A–F.
Periclimenaeus bermudensis.—Holthuis 1951b:107, pl. 32: figs. *d–g*, pl. 33.

TYPE-LOCALITY.—The Reach, Saint Georges Island, Bermudas.

DISTRIBUTION.—Bermudas, Bahamas, and Dry Tortugas; to a depth of 20 meters.

*68. *Periclimenaeus bredini*, new species

FIGURE 5

MATERIAL.—Isla Mujeres (Sta. 17–60: 2♀ [1 ovig., holotype, USNM 135339]).

DESCRIPTION.—Rostrum (Figures 5*a, b*) directed slightly ventrad, reaching anteriorly about as far as end of basal segment of antennular peduncle; dorsal margin armed with 7 regularly spaced, spinelike teeth, posteriormost placed distinctly anterior to level of posterior margin of orbit; ventral margin sinuous, unarmed. Carapace smooth, without supraorbital spines or tubercles. Strong antennal spine placed close to and concealing acute ventral orbital angle from lateral view. Postorbital ridge rounded and indistinct.

All abdominal pleura rounded. Sixth somite slightly longer than fifth and fully half as long as telson. Both pairs of dorsal spines of telson (Figures 5*c, u*) rather long, especially posterior pair, and originating in anterior third of segment; lateral pair of posterior marginal spines placed distinctly proximal to other

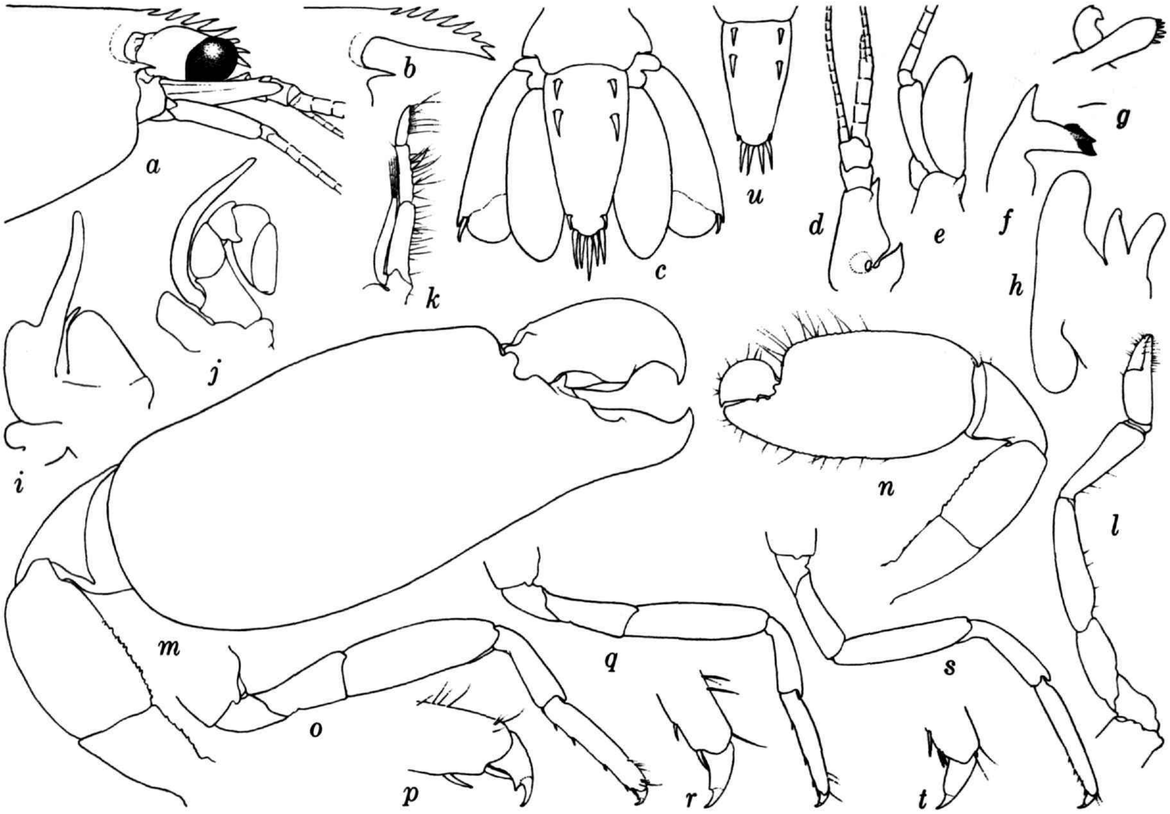


FIGURE 5.—*Periclimenaeus bredini*, new species. Holotype, ovigerous female, carapace length 2.9 mm: ***a***, anterior region; ***b***, rostrum; ***c***, telson and uropods; ***d***, right antennule; ***e***, right antenna; ***f***, right mandible; ***g***, right first maxilla; ***h***, right second maxilla; ***i***, right first maxilliped; ***j***, right second maxilliped; ***k***, right third maxilliped; ***l***, right first pereiopod; ***m***, right second pereiopod; ***n***, left second pereiopod; ***o***, right third pereiopod; ***p***, same, dactyl; ***q***, right fourth pereiopod; ***r***, same, dactyl; ***s***, right fifth pereiopod; ***t***, same, dactyl. Paratype, female, carapace length 2.0 mm: ***u***, telson. (Magnifications: ***a–e***, ***k–o***, ***q***, ***s***, ***u***, ×15.5; ***f–j***, ×31; ***p***, ***r***, ***t***, ×59.)

two pairs, tips reaching to bases of intermediate spines; intermediate and mesial pairs subequal in length (holotype with considerably longer, presumably aberrant, extra spine in midline).

Eyes with cornea as broad as, but shorter than, eyestalk.

Antennular peduncle (Figure 5*d*) with stylocerite very broad, short, and pointed, reaching about to middle of basal segment; outer margin of basal segment with rounded angle near tip of stylocerite and with concave distal portion terminating in strong tooth reaching at least to midlength of second segment of peduncle; third segment slightly longer than second. Lateral antennular flagellum with 2 branches fused for 4 joints; free part of shorter branch consisting of 3 joints and much less than half as long as fused portion.

Antennal scale (Figure 5*e*) not reaching anteriorly as far as end of antennular peduncle, fully two and three-fourths times as long as broad; outer margin slightly concave, distal tooth not reaching nearly as far as rounded distal margin of blade. Antennal peduncle reaching about as far as outer tooth of scale; basal segment without spine or tooth near base of scale.

Mouth parts as figured (Figures 5*f–k*). Mandible with incisor process terminating in pair of extremely minute teeth, molar process with rather sharp terminal lobes. Second maxilla with mesial lacinia uncleft, scaphognathite moderately slender. Third maxilliped reaching about as far as end of antennal scale, exopod reaching slightly beyond end of antepenultimate segment.

First pereiopod (Figure 5*l*) overreaching antennal scale by chela, carpus, and distal fourth of merus; chela with fingers unarmed and shorter than palm; carpus slightly longer than chela but distinctly shorter than merus. Major second pereiopod (Figure 5*m*) overreaching antennal scale by chela and carpus; fingers curved inward, much less than half as long as palm; movable finger with dorsal margin strongly convex and opposable margin provided with large molarlike tooth fitting into socket in fixed finger; fixed finger with strong tooth at basal part of inner margin of socket; palm swollen and roughened by inconspicuous scattered tubercles; carpus about one-fourth as long as palm and bearing prominent acute process; merus less than half as long as palm and bearing row of tubercles on ventral margin. Minor second pereiopod (Figure 5*n*) overreaching antennal scale by chela and half of carpus; fingers about one-third as long as palm; movable finger with blunt basal tooth on opposable margin closing against small tubercle on outer side of fixed finger; fixed finger with similarly placed basal tooth closing on inner side of movable finger; palm roughened by small appressed scattered tubercles; carpus cup shaped, considerably longer than fingers; merus less than half as long as chela. Third pereiopod (Figure 5*o*) overreaching antennal scale by dactyl, propodus, and half of carpus; dactyl (Figure 5*p*) less than one-fifth as long as propodus, with distinct sharp tooth on flexor margin forming bifid tip; carpus about three-fourths as long as propodus; merus about one and one-third times as long as propodus and nearly one and one-half times as long as ischium. Fourth pereiopod (Figure 5*q*) more slender than third, overreaching antennal scale by dactyl and half of propodus; dactyl (Figure 5*r*) with low rectangular tooth on flexor margin but not distinctly bifid. Fifth pereiopod (Figure 5*s*) more slender than fourth, overreaching antennal scale by dactyl and one-fourth of propodus; dactyl (Figure 5*t*) with rounded prominence but no tooth on flexor margin.

Lateral branch of uropod (Figure 5*c*) with movable spine between distolateral tooth and margin of blade.

SIZE.—Ovigerous female holotype with carapace length of 2.9 mm; female paratype, 2.0 mm.

HABITAT.—Calcareous mud grass flats in 1–3 feet of water.

TYPE-LOCALITY.—Bay side of inlet in harbor at Isla Mujeres between larger island with oil tanks south of village and smaller islet to north, Territorio de Quintana Roo, Mexico.

DISTRIBUTION.—Known only from the type-locality.

REMARKS.—Of the American species of *Periclimenaeus*, *P. bredini* seems to be most closely related to *P. wilsoni* from North Carolina and Florida. It is readily distinguished from that species by having only 7, rather than 10–12 rostral teeth and by having the posterior pair of dorsal spines on the telson placed near the anterior pair, in the proximal third rather than in the distal half of the telson.

The species is named for J. Bruce Bredin, who sponsored and participated in the four Caribbean expeditions and who has contributed in numerous other ways to the research collections of the Smithsonian Institution.

*69. *Periclimenaeus caraibicus* Holthuis

Periclimenaeus caraibicus Holthuis, 1951b:110, pl. 32: figs. *h–j*, pl. 34.

MATERIAL.—Barbuda (Sta. 102–59: 1 ovig. ♀).—Antigua Island (Sta. 79–58: 2 ovig. ♀).—Dominica (Sta. 62–56: 1 ovig. ♀).—Saint Lucia Island (Sta. 53–59: 1 ovig. ♀).—Bahía de la Ascensión (Sta. 60–60: 1 ♀).

HABITAT.—This species was found in a variety of habitats: on turtle-grass flats; near a mangrove swamp; in or on a waterlogged stump; and associated with coral encrusted rocks in 5 feet of water.

TYPE-LOCALITY.—Buccoo Reef, Tobago.

DISTRIBUTION.—Known previously only from a single specimen from Tobago.

REMARKS.—Only one of the specimens in the Smithsonian-Bredin collections differs significantly from the unique type-specimen; one of the ovigerous females from Antigua Islands (Sta. 79–58) has 5, rather than 6, dorsal teeth on the rostrum.

70. *Periclimenaeus maxillulidens* (Schmitt)

Percilimenes maxillulidens Schmitt, 1936:371, pl. 13.

Periclimenaeus maxillulidens.—Holthuis 1951b:87, pl. 26.

TYPE-LOCALITY.—Entrance to Lac, Bonaire.

DISTRIBUTION.—Northeastern Gulf of Mexico and Bonaire; to a depth of 46 meters.

71. *Periclimenaeus pearsei* (Schmitt)

Coralliocaris pearsei Schmitt, 1932:123, fig. 1.
Periclimenaeus pearsei.—Holthuis 1951b:93, pl. 28.

TYPE-LOCALITY.—Dry Tortugas, Florida.

DISTRIBUTION.—Known only from Dry Tortugas, Florida, where it lives in the black sponge, *Spongia officinalis;* to a depth of 46 meters.

72. *Periclimenaeus perlatus* (Boone)

Corallocaris perlatus Boone, 1930:45, fig. 8.
Periclimenaeus perlatus.—Holthuis 1951b:99, pl. 30, pl. 32: fig. *a*.

TYPE-LOCALITY.—Baie des Gonaives, Haiti.

DISTRIBUTION.—Dry Tortugas, Florida to Panama; to a depth of 37 meters.

73. *Periclimenaeus schmitti* Holthuis

Periclimenaeus schmitti Holthuis, 1951b:90, pl. 27.—Williams 1965b:45, fig. 37.

TYPE-LOCALITY.—Dry Tortugas, Florida.

DISTRIBUTION.—Bogue Sound, North Carolina, and Dry Tortugas, Florida; shallow water.

74. *Periclimenaeus wilsoni* (Hay)

Coralliocaris wilsoni Hay, 1917:71.
Periclimenaeus wilsoni.—Holthuis 1951b:103, pl. 31, pl. 32: figs. *b*, *c*.—Williams 1965b:46, fig. 38.

TYPE-LOCALITY.—Fishing grounds, 20 miles off Beaufort Inlet, North Carolina.

DISTRIBUTION.—Off Beaufort, North Carolina, Alligator Harbor and Dry Tortugas, Florida, commonly in sponges; to a depth of 73 meters.

*Genus *Periclimenes* Costa, 1844

Subgenera based on the presence *(Periclimenes)* or absence *(Harpilius)* of an accessory denticle on the flexor margin of the dactyls of the three posterior pereiopods are not recognized here. The groups separated by this character do not seem to be otherwise homogeneous, and the character has lost the practical value it may once have had. The species now known display an uninterrupted series from those with no accessory denticle, through those with a denticle that can be discerned only under high magnification, to those with clearly biunguiculate dactyls, and the complete range has been noted (Holthuis 1951b) in at least one single species *(P. iridescens)*.

At the suggestion of A. J. Bruce, I have examined specimens of all of the western Atlantic species of *Periclimenes* (with the exception of *P. pauper)* for the presence of a slender sternal spine between the coxae of the first pereiopods. According to Bruce (in litt.), such a spine is present in several free-living, predatory species in the Indo-Pacific region. Of the western Atlantic species, the sternal spine was found only in *P. americanus,* but there is a median triangular projection on that sternite in *P. rathbunae* and a pair of such projections in *P. paivai.*

Key to Western Atlantic Species

1. Antennular peduncle with only 1 spine at distolateral angle of basal segment (in addition to stylocerite) 2
   Antennular peduncle with 2 or more spines at distolateral angle of basal segment (in addition to stylocerite) 14

2.(1) Carapace with anterior margin unarmed (antennal spine absent) 3
   Carapace armed with antennal spine below suborbital lobe 5

3.(2) Third pereiopod with distinctly biunguiculate dactyl .... *82. ***P. longicaudatus***
   Third pereiopod with dactyl not distinctly biunguiculate, accessory denticle microscopic 4

4.(3) Rostrum with 1 or 2 teeth on ventral margin; distal segment of antennular peduncle more than one and one-half times as long as penultimate segment; accessory branch of lateral antennular flagellum nearly as long as, or longer than, fused portion
   85. ***P. paivai***
   Rostrum with ventral margin unarmed; distal segment of antennular peduncle sub-

Key to Western Atlantic Species—Continued

equal in length to penultimate segment; accessory branch of lateral antennular flagellum not more than half as long as fused portion ..... 87. ***P. pauper***

5.(2) Fifth abdominal pleuron with posteroventral angle pointed; telson with anterior pair of dorsal spines arising about one-third of length from base of segment; antennal scale with distal spine overreaching distal margin of blade ..... *75. ***P. americanus***

Fifth abdominal pleuron with posteroventral angle rounded; telson with anterior pair of dorsal spines arising at, or posterior to, midlength of segment; antennal scale with distal spine rarely reaching as far as distal margin of blade, usually falling far short 6

6.(5) Third abdominal somite strongly produced posteromesially into laterally compressed hump 7

Third abdominal somite sometimes moderately produced posteromesially but never forming laterally compressed hump 9

7.(6) Third pereiopod with dactyl simple and considerably more than one-third as long as propodus ..... 83. ***P. magnus***

Third pereiopod with dactyl distinctly biunguiculate and not more than one-fourth as long as propodus 8

8.(7) Carapace with hepatic spine arising anterior to level of posterior tooth of rostral series; carpus of major second pereiopod less than half as long as chela ..... 76. ***P. anthophilus***

Carapace with hepatic spine usually arising at, or posterior to, level of posterior tooth of rostral series; carpus of major second pereiopod usually more than half as long as chela ..... *88. ***P. pedersoni***

9.(6) Rostrum elongate, more than four times as long as maximum height, one or more of ventral teeth prominent 10

Rostrum subtriangular in lateral view, less than four times as long as maximum height, ventral teeth inconspicuous or absent 12

10.(9) Three to 5 closely spaced teeth of rostral series on carapace posterior to level of orbital margin; first pereiopod with carpus distinctly longer than chela ..... 91. ***P. tenellus***

Two widely spaced teeth of rostral series on carapace posterior to level of orbital margin; first pereiopod with carpus not noticeably longer than chela 11

11.(10) Sixth abdominal somite nearly three times as long as fifth and longer than telson; antennal scale with distal spine reaching nearly to level of distal margin of blade; second pereiopod with fingers longer than palm, carpus more than half as long as chela ..... *79. ***P. finlayi***

Sixth abdominal somite less than twice as long as fifth and shorter than telson; antennal scale with blade far overreaching distal spine; second pereiopod with fingers slightly more than half as long as palm, carpus about one-fifth as long as chela ..... 86. ***P. pandionis***

12.(9) Telson with dorsal spines rather large and distinct; major second pereiopod with fingers no more than one-fourth as long as palm ..... 80. ***P. harringtoni***

Telson with dorsal spines minute and inconspicuous; major second pereiopod with fingers more than half as long as palm 13

13.(12) Sixth abdominal somite about twice as long as fifth and longer than telson; telson with anterior pair of dorsal spines arising at about midlength of segment; major second pereiopod with movable finger not perceptibly stouter than fixed finger ..... *81. ***P. iridescens***

Sixth abdominal somite slightly more than half again as long as fifth and shorter than telson; telson with anterior pair of dorsal spines arising at least two-thirds of length from base of segment; major second pereiopod with movable finger unusually stout, nearly twice as high as fixed finger ..... *90. ***P. rathbunae***

14.(1) Posterior tooth of rostral series far removed from second tooth and from posterior margin of orbit; third pereiopod with dactyl deeply biunguiculate ..... *92. ***P. yucatanicus***

Posterior tooth of rostral series not widely separated from second tooth, situated slightly posterior or anterior to level of orbital margin; third pereiopod with dactyl simple or very obscurely biunguiculate 15

Key to Western Atlantic Species—Continued

15.(14) Antennal scale less than twice as long as broad; major second pereiopod with fingers less than one-fourth as long as palm .... 89. ***P. perryae***

Antennal scale considerably more than twice as long as broad; major second pereiopod with fingers more than half as long as palm 16

16.(15) Abdomen with third somite evenly and weakly convex throughout; antennal scale typically less than two and one-half times as long as broad; mandible with molar process hooflike, without obvious teeth or lobes; third pereiopod with dactyl strongly curved, without indication of accessory denticle or convexity on flexor margin *77. ***P. bowmani***

Abdomen with third somite produced posteriorly into low hump or cap over anterior end of fourth somite; antennal scale nearly or more than three times as long as broad; mandible with molar process dentate or lobate; third pereiopod with dactyl feebly curved in proximal two-thirds of length, flexor margin bearing inconspicuous denticle or convexity surmounted by microscopic denticle 17

17.(16) Rostrum slightly but rather abruptly elevated above level of carapace in basal portion; mandible with incisor process narrower and weaker than molar process; third pereiopod with subdistal convexity surmounted by microscopic denticle on flexor margin 78. ***P. crinoidalis***

Rostrum continuing line of dorsal margin of carapace, not elevated in basal portion; mandible with incisor process much broader and stronger than reduced molar process; third pereiopod with dactyl armed with inconspicuous denticle on flexor margin 84. ***P. meyeri***

*75. *Periclimenes americanus* (Kingsley)

Anchistia americana Kingsley, 1878a:96.

Periclimenes (Harpilius) americanus.—Holthuis 1951b:60, pl. 18, pl. 19: figs. *a–e*.—Williams 1965b:43, fig. 36.

MATERIAL.—Peter Island (Sta. 21–58: 1 ovig. ♀).—Tortola (Sta. 117–56: 1♂; Sta. 23–58: 1♂, 2 ovig. ♀).—Guana Island (Sta. 9–58: 2♂, 1♀).—Virgin Gorda (Sta. 111–56: 3♂; Sta. 112–56: 1♂, 1 ovig. ♀; Sta. 37, 38, 39–58: 1♂).—Anguilla (Sta. 55–58: 1♂).—Barbuda (Sta. 85–56: 1 ovig. ♀; Sta. 92–56: 1 ovig. ♀; Sta. 112a–58: 1 ovig. ♀; Sta. 112c–58: 1♂, 2 ovig ♀; Sta. 98–59: 2♂, 4 ovig. ♀; Sta. 102–59: 1♂, 4 ovig. ♀).—Saint Christopher (Sta. 103–56: 3♂, 4♀ [2 ovig., 1♂, 1♀ associated with sea anemone *Bartholomea annulata*]).—Antigua Island (Sta. 74–56: 1 ovig. ♀; Sta. 78–56: 1♂; Sta. 80–56: 1♂ with abdominal bopyrid parasite; Sta. 81–56: 1♂; Sta. 82–56: 11♂, 20♀ [19 ovig., 1 with abdominal bopyrid parasite]; Sta. 79–58: 1♂, 1 ovig. ♀; Antigua Beach Hotel, 14 June 1958, William T. Bode: 1♂, 1 ovig. ♀; Sta. 110–59: 1 ovig. ♀).—Guadeloupe (Sta. 68–56: 3♂, 3♀ [2 ovig.]).—Saint Lucia Island (Sta. 51–59: 1♂; Sta. 53–59: 1♂ with abdominal bopyrid parasite).—Mustique (Sta. 34–56: 1 ovig. ♀).—Tobago Cays (Sta. 22–56: 1 ovig. ♀; Sta. 24–56: 1♀ with abdominal bopyrid parasite).—Carriacou Island (Sta. 15–56: 11♂, 10♀ [7 ovig.], 2 juv.; Sta. 16–56: 1♂, 1 ovig. ♀; Sta. 17–56: 1♂).—Tobago (Sta. 4–59: 1♂, 1 ovig. ♀; Sta. 8–59: 1♂, 1 juv.; Sta. 31–59: 1♀).—Isla Mujeres (Sta. 26–60: 1♂).—Isla de Cozumel (Sta. 34–60: 1 ovig. ♀; Sta. 47–60: 1 ovig. ♀; Sta. 100–60: 1♂, 1 ovig. ♀, 1 juv.).—Bahía de la Ascensión (Sta. 53–60: 1 ovig. ♀; Sta. 60–60: 1♂, 5 ovig. ♀; Sta. 65–60: 1 ovig. ♀; Sta. 66–60: 1 ovig. ♀; Sta. 72–60: 1 spec.; Sta. 77–60: 2 ovig. ♀; Sta. 81–60: 1♂; Sta. 87–60: 1 juv.; Sta. 91–60: 2♂, 1 ovig. ♀).—Bahía del Espíritu Santo (Sta. 41–60: 1♂).

HABITAT.—This species was taken most often in 1–3 feet of water on mud or sand flats and on coral reefs, associated with turtle grass, dead and living coral, pilings, stumps, and wrecks. It was found once in association with a loggerhead sponge and once with the sea anemone *Bartholomea annulata*. The largest lot was collected from the growth on a boat's hull, and the next largest lot was found on and near submerged timbers from a wrecked ship. It also occured on mud bottoms and coral in depths of 5½–9 meters.

TYPE-LOCALITY.—Key West, Florida.

DISTRIBUTION.—North Carolina and Bermudas to southern and western Florida and throughout the West Indies; to a depth of 73 meters.

76. *Periclimenes anthophilus* Holthuis and Eibl-Eibesfeldt

Periclimenes (Periclimenes) anthophilus Holthuis and Eibl-Eibesfeldt, 1964:185, figs. 1–4.

TYPE-LOCALITY.—Whalebone Bay, Bermudas.

DISTRIBUTION.—Known only from the type-locality, on sea anemones *Actinia bermudensis* and *Condylactis gigantea;* in depths of 2–3 meters.

REMARKS.—This species is very near *P. pedersoni.* Holthuis and Eibl-Eibesfeldt believed that the latter species differed from *P. anthophilus* in having the hepatic spine placed in line with, or posterior to, rather than anterior to, the first tooth of the dorsal rostral series; in having the movable finger of the major second pereiopod normal, rather than triangular in cross section; and in having the carpus of that pereiopod nearly as long as the chela, rather than less than half as long. *Periclimenes pedersoni* seems to be a slightly smaller species and it is almost invariably associated with the sea anemone *Bartholomea annulata,* whereas *P. anthophilus* was found on *Actinia bermudensis* and on *Condylactis gigantea* but not on *Bartholomea.*

The nearly identical color patterns in the two forms led me to review the variability of the supposedly distinguishing characters in *P. pedersoni.* This analysis was based in large part on more than 100 specimens—36 males, 63 females (12 ovigerous), 6 juveniles—kindly made available to me by Conrad Mahnken, who collected them during Operation Tektite I in Lameshur Bay, Saint John, in March and April of 1969. The males in this collection have carapace lengths of 1.8–3.5 mm and the females 1.9–5.4 mm. All were associated with *Bartholomea annulata.* In all of the males and in all females with carapace lengths of less than 3.0 mm, the hepatic spine arises from a point slightly to considerably posterior to the level of the first tooth of the dorsal rostral series; in larger females, on the other hand, the hepatic spine is usually placed in line with, or anterior to, the level of the first rostral tooth. Virtually all of the specimens of both sexes have the movable finger of the major second pereiopod triangular in cross section, as in *P. anthophilus;* this feature, which was inadvertently omitted from the original description of *P. pedersoni,* is not obvious in small specimens, but in at least six of the larger females, the extensor margin of the movable finger is strongly produced laterally to form a sharp carina or flange. The carpus of the major second pereiopod usually varies from 0.7 to 0.88 of the chela length in males and from 0.5 to 0.85 in females; most of the females have the carpus shorter than it is in any of the males, but there seems to be no correlation between carpal length and size in either sex.

The different habits and the proportionately shorter carpus of the major second pereiopod seem to provide adequate justification for considering the Bermudian form specifically distinct, but it would be interesting to determine the limits of variation in that species.

*77. *Periclimenes bowmani,* new species

FIGURES 6, 7

MATERIAL.—Saint Lucia (Sta. 57–59: 1♂, 2♀ [1 ovig., holotype, USNM 135341]).

DESCRIPTION (holotype).—Rostrum (Figures 6*a, b*) inclined slightly ventrad, reaching anteriorly to midlength of distal segment of antennular peduncle; dorsal margin armed with 8 rather low teeth, posteriormost placed on carapace posterior to level of orbital margin; ventral margin armed with 3 rather inconspicuous teeth in distal half; midrib equidistant from dorsal and ventral margins of rostrum, at least in distal portion. Antennal spine subequal to hepatic spine in size and reaching anteriorly nearly as far as bluntly acute ventral orbital angle. Carapace without postorbital ridge.

All abdominal pleura broadly rounded. Sixth somite (Figure 6*c*) nearly twice as long as fifth but slightly shorter than telson. Dorsal spines of telson (Figure 6*d*) rather small, proximal pair situated distinctly distal to midlength of segment, distal pair equidistant between proximal pair and extremity of telson; intermediate marginal spines at posterior end of telson (Figure 6*e*) not quite twice as long as mesial pair.

Eyes with cornea about as broad as, but slightly shorter than, eyestalk.

Antennular peduncle (Figure 6*f*) with stylocerite sharp and slender, reaching about to midlength of basal segment; distolateral margin of basal segment armed with 4 subequal spinelike teeth; second and third segments subequal in length and width. Lateral antennular flagellum with 2 branches fused for about

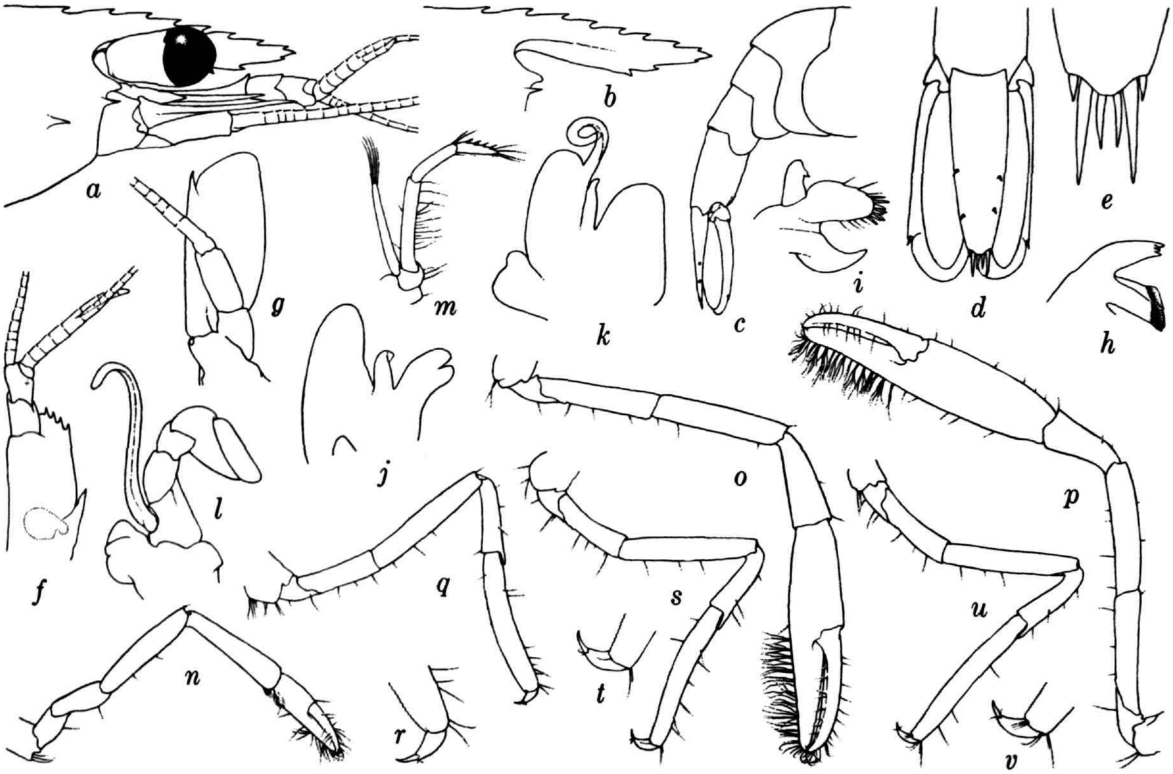


FIGURE 6.—*Periclimenes bowmani*, new species, holotype, ovigerous female, carapace length 2.4 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen, posterior part; *d*, telson and uropods; *e*, end of telson; *f*, right antennule; *g*, right antenna; *h*, right mandible; *i*, right first maxilla; *j*, right second maxilla; *k*, right first maxilliped; *l*, right second maxilliped; *m*, right third maxilliped; *n*, right first pereiopod; *o*, right second pereiopod; *p*, left second pereiopod; *q*, right third pereiopod; *r*, same, dactyl; *s*, right fourth pereiopod; *t*, same, dactyl; *u*, right fifth pereiopod; *v*, same, dactyl. (Magnifications: *c*, ×7.5; *a, b, d, f, g, m–q, s, u*, ×15.5; *h–l, r, t, v*, ×31; *e*, ×56:)

5 joints; free part of shorter branch consisting of about 3 joints and slightly shorter than fused portion.

Antennal scale (Figure 6*g*) not overreaching antennular peduncle, about two and one-third times as long as broad; lateral margin nearly straight, distal tooth falling far short of strongly produced anteromesial angle of blade. Antennal peduncle reaching about to midlength of scale; basal segment without distinct lateral spine near base of scale.

Mouth parts as figured (Figures 6*h–m*). Mandible with incisor process armed with 4 teeth, molar process hooflike, without obvious teeth or angles. Second maxilla with mesial lacinia moderately cleft, scaphognathite rather broad. Third maxilliped reaching nearly to midlength of distal segment of antennular peduncle, exopod falling short of end of antepenultimate segment.

First pereiopod (Figure 6*n*) overreaching antennal scale by length of fingers of chela; fingers unarmed and slightly longer than palm; carpus noticeably longer than chela and subequal to merus. Second pereiopods slightly dissimilar and unequal. Major cheliped (Figure 6*p*) overreaching antennal scale by nearly length of chela; fingers unarmed, distinctly shorter than palm; carpus less than one-third as long as chela and less than two-thirds as long as merus; ischium and merus subequal. Minor cheliped (Figure 6*o*) of second pair (perhaps regenerated) overreaching antennal scale by nearly length of chela but shorter than major cheliped because of smaller chela; fingers unarmed, distinctly longer than palm; carpus about two-fifths as long as chela and about seven-tenths as long as merus; merus and ischium subequal to those of major cheliped. Third pereiopod (Figure 6*q*) just overreaching antennal scale; dactyl (Figure 6*r*) stout, without accessory denticle on flexor margin; propodus nearly five times as long as dactyl, half again as long as carpus, distinctly recurved, extensor margin concave, flexor margin convex and microscopically crenulate; merus about as long as propodus and nearly one and three-foruths times as long as ischium. Fourth pereiopod (Figure 6*s*) reaching about to end of antennular peduncle; dactyl (Figure 6*t*) stout, without accessory denticle; propodus nearly five times as long as dactyl, half again as long as carpus, somewhat recurved, extensor margin slightly concave, flexor margin slightly convex and microscopically crenulate; merus about as long as propodus and about one and three-fourths times as long as ischium. Fifth pereiopod (Figure 6*u*) reaching about to distal end of second segment of antennular peduncle; dactyl (Figure 6*v*) stout, without accessory denticle; propodus more than five times as long as dactyl, more than half again as long as carpus, nearly straight, flexor margin microscopically crenulate; merus shorter than propodus and about one and three-fourths times as long as ischium.

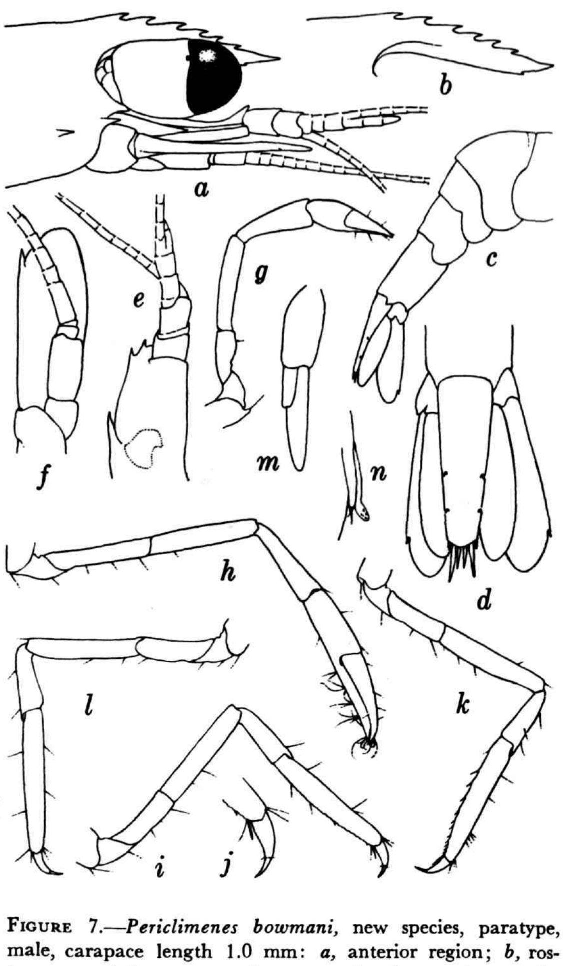


FIGURE 7.—*Periclimenes bowmani*, new species, paratype, male, carapace length 1.0 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen, posterior part; *d*, telson and uropods; *e*, left antennule, *f*, right antenna; *g*, right first pereiopod; *h*, right second pereiopod; *i*, right third pereiopod; *j*, same, dactyl; *k*, right fourth pereiopod; *l*, left fifth pereiopod; *m*, right first pleopod; *n*, right appendix masculina. (Magnifications: *c*, ×15.5; *a*, *b*, *d–i*, *k–m*, ×31; *j*, *n*, ×56.)

Lateral branch of uropod (Figure 6*d*) with inconspicuous movable spine inserted between distolateral angle and margin of blade.

SIZE.—Carapace length of ovigerous female holotype 2.4 mm, of female paratype 1.1 mm, of male paratype 1.0 mm.

HABITAT.—Associated with unstalked crinoids, either *Nemaster rubiginosa* or *Tropiometra carinata*, in 6–10 feet of water.

TYPE-LOCALITY.—Reef south of Marigot Harbour, Saint Lucia, Windward Islands.

DISTRIBUTION.—Known only from the type-locality.

REMARKS.—The possibly immature male paratype differs rather strikingly from the ovigerous female holotype. The rostrum (Figures 7*a*, *b*) is armed with only 6 dorsal and 1 ventral teeth, and the posterior tooth of the dorsal series lies well anterior to the level of the posterior margin of the orbit. The cornea is less broad than the eyestalk. The basal segment of the antennular peduncle (Figure 7*e*) is armed with only 2, rather than 4, distolateral teeth. The antennal scale (Figure 7*f*) is narrower. The carpus of the first pereiopod (Figure 7*g*) is shorter, rather than longer, than the chela. The dactyls of the three posterior pereiopods are more slender and proportionately about twice as long as those of the holotype, and the propodi are not noticeably recurved (Figures 7*i–l*). The endopod of the first pleopod (Figure 7*m*) is almost imperceptibly bilobed terminally, and the appendix masculina on the second pleopod (Figure 7*n*) is shorter than the appendix interna.

That this specimen may be subadult is suggested not only by its small size and the form of the sexual characters of the pleopods, but also by the fact that the only slightly larger female paratype shows some of the same differences, particularly in the form of the eye, antennule, and pereiopods. This small female has only 6 dorsal and 2 ventral teeth on the rostrum, but the posterior tooth of the dorsal series is placed on the carapace. The basal segment of the antennular peduncle has 3 distolateral teeth on the left side and only 2 on the right. It seems very probable, therefore, that some of the differences noted in the smallest specimen are indicative of immaturity, but others, such as the distribution of teeth on the rostrum, may represent sexual characters. I cannot believe that the two small specimens are specifically distinct from the holotype.

Periclimenes bowmani is similar to the other two species of the genus that are known to be associated with crinoids in the western Atlantic: *P. crinoidalis* and *P. meyeri.* It differs from both in having the third abdominal somite less convex posteriorly, the antennal scale broader, the molar process of the mandible hooflike rather than dentate or lobate, and the dactyl of the third pereiopod lacking any trace of a denticle or convexity on the flexor margin.

This species is named for my colleague Thomas E. Bowman, who personally collected the only specimens of the species and whose participation in the Smithsonian-Bredin Expedition of 1959 accounts for the unusually fine representation of interesting smaller crustaceans taken that year.

78. *Periclimenes crinoidalis* Chace

Periclimenes crinoidalis Chace, 1969:251, figs. 1, 2.

TYPE-LOCALITY.—Jan Thiel Beach, Curaçao, Netherlands Antilles.

DISTRIBUTION.—Known only from the type-locality on unstalked crinoids *Nemaster grandis;* 38 meters.

*79. *Periclimenes finlayi,* new species

FIGURE 8

MATERIAL.—Off Dominica (Sta. 72–59: 1 ♀).—Off Saint Lucia (Sta. 55–59: 1 ♂, holotype, USNM 135343).

DESCRIPTION.—Rostrum (Figures 8*a, b*) nearly horizontal, reaching anteriorly almost as far as end of antennular peduncle; dorsal margin armed with 8 or 9 teeth, posterior 2 placed on carapace posterior to orbital margin, posteriormost far removed from rest of series, remaining teeth rather regularly spaced and becoming progressively less prominent anteriorly, causing dorsal margin of rostrum to appear to slope evenly to tip; ventral margin armed with 3 rather inconspicuous teeth in distal half; midrib of rostrum somewhat nearer ventral than dorsal margin, especially in proximal half. Antennal spine overreaching subacute ventral orbital angle and slightly larger than hepatic spine. Carapace without typical postorbital ridge but with orbital and antennal regions depressed anteroventral to laterally convex line, best seen in dorsal view, extending posteroventrally from orbital margin to point well posterodorsal to hepatic spine.

All abdominal pleura rounded. Sixth somite (Figure 8*c*) nearly three times as long as fifth and slightly but distinctly longer than telson. Both pairs of dorsal spines of telson distinct (Figure 8*d*), proximal pair situated near midlength of segment, distal pair equidistant between proximal pair and extremity of telson; intermediate marginal spines at distal end of telson (Figure 8*e*) more than twice as long as mesial pair.

Eyes with cornea fully as broad and about as long as eyestalk.

Antennular peduncle (Figure 8*f*) with stylocerite sharp and slender, reaching about to midlength of basal segment; anterolateral spine of basal segment overreaching convex anterior margin of that segment but not extending beyond midlength of second segment; second segment slightly longer and broader than third. Lateral antennular flagellum with 2 branches fused for 3 or 4 joints; free part of shorter branch consisting of 4–6 joints and slightly longer than fused portion.

Antennal scale (Figure 8*g*) overreaching antennular peduncle, four times as long as broad; outer margin concave proximally, nearly straight distally, distal tooth reaching nearly as far as rounded distal margin of blade. Antennal peduncle reaching about to end of proximal fourth of scale; basal segment with sharp lateral spine near base of scale.

Mouth parts as figured (Figures 8*h–m*). Mandible with incisor process armed with 4 teeth, molar process with rather sharp terminal lobes. Second maxilla with mesial lacinia rather deeply cleft, scaphocerite moderately slender. Third maxilliped slightly over-

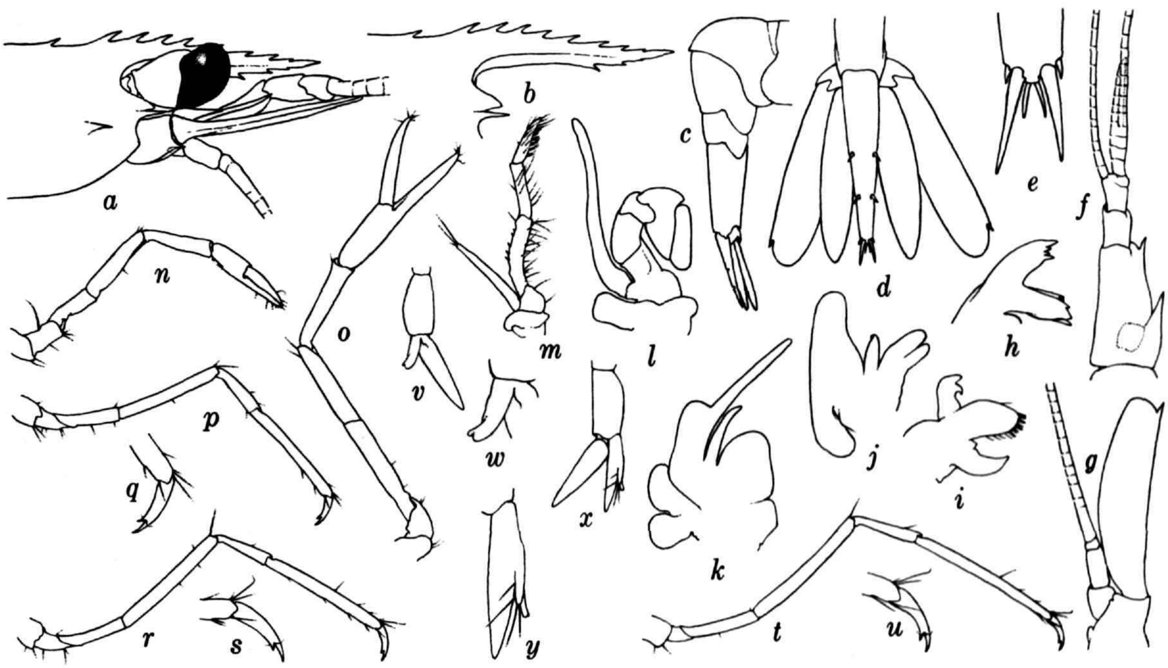


FIGURE 8.—*Periclimenes finlayi*, new species, holotype, male, carapace length 1.7 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen, posterior; *d*, telson and uropods; *e*, end of telson; *f*, right antennule; *g*, right antenna; *h*, right mandible; *i*, right first maxilla; *j*, right second maxilla; *k*, right first maxilliped; *l*, right second maxilliped; *m*, right third maxilliped; *n*, right first pereiopod; *o*, right second pereiopod; *p*, right third pereiopod; *q*, same, dactyl; *r*, right fourth pereiopod; *s*, same, dactyl; *t*, right fifth pereiopod; *u*, same, dactyl; *v*, right first pleopod; *w*, same, endopod; *x*, right second pleopod; *y*, same, endopod bearing appendices interna and masculina. (Magnifications: *c*, ×7.5; *a*, *b*, *d*, *f*, *g*, *m–p*, *r*, *t*, *v*, *x*, ×15.5; *h–l*, *q*, *s*, *u*, *w*, *y*, ×31; *e*, ×56.)

reaching antennal peduncle, exopod reaching about to end of antepenultimate segment.

First pereiopod (Figure 8*n*) reaching about to end of antennular peduncle; chela with fingers unarmed and slightly longer than palm; carpus about three-fourths as long as chela and shorter than merus. Second pereiopods (Figure 8*o*) subequal, overreaching antennal scale by two-thirds of chela; fingers unarmed, nearly one and one-third times as long as palm; carpus slightly more than half as long as chela and subequal to merus; ischium nearly one and one-third times as long as merus. Third pereiopod (Figure 8*p*) reaching about to end of second segment of antennular peduncle; dactyl (Figure 8*q*) distinctly bifid; propodus slightly more than three times as long as dactyl and nearly twice as long as carpus; merus about as long as propodus and one and three-fourths times as long as ischium. Fourth pereiopod (Figure 8*r*) reaching nearly to end of second antennular segment; dactyl (Figure 8*s*) distinctly bifid; propodus nearly three and one-half times as long as dactyl and more than twice as long as carpus; merus slightly shorter than propodus and nearly twice as long as ischium. Fifth pereiopod (Figure 8*t*) reaching about to end of antennal scale; dactyl (Figure 8*u*) distinctly bifid; propodus about four times as long as dactyl and more than twice as long as carpus; merus perceptibly shorter than propodus and nearly twice as long as ischium.

First pleopod of male (Figures 8*v*, *w*) with endopod terminating in 2 unequal lobes. Appendix masculina on endopod of second pleopod (Figures 8*x*, *y*) shorter than appendix interna. Lateral branch of uropod (Figure 8*d*) with inconspicuous movable spine inserted between distolateral angle and margin of blade.

SIZE.—Male holotype and female paratype nearly identical in size, with carapace lengths of 1.7 mm.

HABITAT.—Unknown; captured in mollusk traps set in 165 and 274 meters.

TYPE-LOCALITY.—Off Marigot Harbour, Saint Lucia Island, Windward Islands.

DISTRIBUTION.—Known only from off Dominica and off Saint Lucia Island, Lesser Antilles; 165 and 274 meters.

REMARKS.—Of the American species of *Periclimenes, P. finlayi* seems most closely related to *P. pandionis*, which is known from a single specimen taken in 179 meters off Key West, Florida. Consideration was given to the possibility that the present specimens might represent a growth stage of that species, but the differences seem too great to be dismissed in that way. *Periclimenes pandionis* has the rostrum longer and its dorsal margin nearly horizontal, rather than sloping ventrally from the base to the tip. The sixth somite of the abdomen is less than twice as long as the fifth and shorter than the telson, rather than nearly three times as long as the fifth and longer than the telson. The anterolateral spine of the basal segment of the antennular peduncle is produced farther anteriorly in *P. pandionis*. The antennal scale has the blade much more strongly produced distally, and the antennal peduncle is much longer. Possibly the most significant difference is the proportions of the second pereiopod: *P. pandionis* has the fingers armed with teeth on the opposable margins, and the fingers are much shorter, rather than longer, than the palm; the carpus is very much shorter; and the merus is longer, rather than distinctly shorter, than the ischium.

It is a pleasure to name this species for John Finlay, whose collecting experience and techniques contributed materially to the success of the Smithsonian-Bredin Expeditions of 1958 and 1959 and whose specially designed mollusk trap was directly responsible for the capture of both specimens of this little shrimp.

80. *Periclimenes harringtoni* Lebour

Periclimenes harringtoni Lebour, 1949:1110, fig. 3.
Periclimenes (Periclimenes) harringtoni.—Holthuis 1951b: 35, pl. 9.

TYPE-LOCALITY.—Harrington Sound, Bermudas.

DISTRIBUTION.—Bermudas and Dry Tortugas, Florida; to a depth of 119 meters.

*81. *Periclimenes iridescens* Lebour

Periclimenes iridescens Lebour, 1949:1112, figs. 4, 5.
Periclimenes (Periclimenes) iridescens.—Holthuis 1951b:43, pl. 12, pl. 20: figs. *i, j*.

MATERIAL.—Tobago (Sta. 31–59: 1♂).

HABITAT.—This specimen was collected on a sand flat in shallow water.

TYPE-LOCALITY.—Off Castle Roads, Bermudas.

DISTRIBUTION.—Previously recorded from the Bermudas and Isla Cubagua, Venezuela; to a depth of 146–183 meters.

*82. *Periclimenes longicaudatus* (Stimpson)

Urocaris longicaudatus Stimpson, 1860:39.
Periclimenes (Periclimenes) longicaudatus.—Holthuis 1951b: 26, pl. 6, pl. 8: fig. *m*.—Williams 1965b:42, fig. 35.

MATERIAL.—Virgin Gorda (Sta. 112–56: 1 ovig. ♀).—Tobago (Sta. 20–59: 1♂, 7 juv.).

HABITAT.—The specimen from Virgin Gorda was taken along shore in shallow water among turtle grass and *Porites;* those from Tobago were dredged in 11–20 meters.

TYPE-LOCALITY.—"Coast of Carolina."

DISTRIBUTION.—North Carolina to Estado da Paraíba, Brazil; sublittoral.

83. *Periclimenes magnus* Holthuis

Periclimenes (Harpilius) magnus Holthuis, 1951b:52, pl. 15.

TYPE-LOCALITY.—Off Corpus Christi, Texas, 27° 40′N, 96°34′W.

DISTRIBUTION.—Known only from the unique type-specimen from the Gulf of Mexico; in 50 meters.

84. *Periclimenes meyeri* Chace

Periclimenes meyeri Chace, 1969:255, figs. 3, 4.

TYPE-LOCALITY.—Jan Thiel Beach, Curaçao, Netherlands Antilles.

DISTRIBUTION.—Known only from the type-locality on unstalked crinoids, *Nemaster* species?; in 24 meters.

85. *Periclimenes paivai* Chace

Periclimenes paivai Chace, 1969:259, figs. 5–7.

TYPE-LOCALITY.—Cananéia, Estado de São Paulo, Brazil.

DISTRIBUTION.—Known only from Ubatuba and Cananéia, Estado de São Paulo, Brazil.

86. *Periclimenes pandionis* Holthuis

Periclimenes (Periclimenes) pandionis Holthuis, 1951b:41, pl. 11.

TYPE-LOCALITY.—Off Key West, Florida 24°21′55″N, 81°58′25″W.

DISTRIBUTION.—Known only from the unique type-specimen from off Key West; in 179 meters.

87. *Periclimenes pauper* Holthuis

Periclimenes (Harpilius) pauper Holthuis, 1951b:50, pl. 14.

TYPE-LOCALITY.—Isla Cubagua, Venezuela.

DISTRIBUTION.—Known only from the unique type-specimen from Isla Cubagua; littoral.

*88. *Periclimenes pedersoni* Chace

Periclimenes (Periclimenes) pedersoni Chace, 1958:125, figs. 1–17.—Limbaugh, Pederson, and Chace 1961:242, figs. 3, 4.

MATERIAL.—Tortola (Sta. 26–58: 1 ovig. ♀).—Antigua Island (Sta. 104–59: 1♂, 4♀; Sta. 104a–59: 1♀; Sta. 116–59: 5♀).

HABITAT.—The Tortola specimen was collected by diving around an old wreck. All of the Antigua Island specimens were found in association with the sea anemone *Bartholomea annulata.*

TYPE-LOCALITY.—Simms (Lyford) Cay, New Providence Island, Bahamas.

DISTRIBUTION.—West Florida, Bahamas, Virgin Islands, and Antigua Island, usually associated with the sea anemone *Bartholomea annulata;* in depths of 1½–9 meters.

REMARKS.—See *P. anthophilus.*

89. *Periclimenes perryae* Chace

Periclimenes (Periclimenes) perryae Chace, 1942a:82, pl. 24.—Holthuis 1951b:31, pl. 7.

TYPE-LOCALITY.—Off Sanibel Island, Florida.

DISTRIBUTION.—West Florida and Florida Keys; about 10 meters. There is a specimen of this species in the national collections from Tampa Bay and two from off Alligator Reef light; all three were associated with the basket starfish *Astrophyton muricatum.*

*90. *Periclimenes rathbunae* Schmitt

Periclimenes rathbunae Schmitt, 1924a:58, figs. 5, 6.
Periclimenes (Harpilius) rathbunae.—Holthuis 1951b:58, pl. 17.

MATERIAL.—Antigua Island (Sta. 73–56: 1♀; Sta. 104–59: 1 ovig. ♀; Sta. 113–59: 1♀; Sta. 116–59: 1 ovig. ♀).—Guadeloupe (Sta. 70–56: 1 ovig. ♀).—Saint Lucia Island (Sta. 47–56: 1 ovig. ♀).—Tobago (Sta. ?–59: 1♂, 13♀).—Bahía de la Ascensión (Sta. 52–60: 2♀ [1 ovig.]; Sta. 67–60: 1 ovig. ♀).

HABITAT.—Most of the documented specimens in the collection were taken from coral reefs in 1–5 feet of water; one specimen was found on a dead coral flat and one along a rock-studded sandy beach.

TYPE-LOCALITY.—Spanish Port, Curaçao, Netherlands Antilles.

DISTRIBUTION.—Previously recorded with certainty only from Curaçao and Bonaire, tentatively from the Dry Tortugas, Florida; littoral and sublittoral.

91. *Periclimenes tenellus* (Smith)

Anchistia tenella Smith, 1882:55, pl. 9: figs. 1–1*b*.
Periclimenes (Periclimenes) tenellus.—Holthuis 1951b:32, pl. 8: figs. *a–l*.

TYPE-LOCALITY.—Off South Carolina, 32°07′N, 78°37′05″W.

DISTRIBUTION.—Latitudes of New Jersey and South Carolina; 267–419 meters.

*92. *Periclimenes yucatanicus* (Ives)

Palaemonella Yucatanica Ives, 1891:183, pl. 5: fig. 8.
Periclimenes (Periclimenes) yucatanicus.—Holthuis 1951b: 38, pl. 10.—Limbaugh, Pederson, and Chace 1961:240, fig. 2.

MATERIAL.—Peter Island (Sta. 22–58: 1 ovig. ♀).—Virgin Gorda (Sta. 112–56: 1 ovig. ♀).—Barbuda (Sta. 103–56: 2♀ [1 ovig.]).—Antigua Island (Sta. 73–56: 2♂, 2 ovig. ♀).—Isla de Cozumel (Sta. 34–60: 1 ovig. ♀).

HABITAT.—The Saint Christopher specimens were associated with the sea anemone *Bartholomea annulata*. The Peter Island specimen was found "on the usual anemone"; it has not been possible to determine whether this was *B. annulata* or *Condylactis gigantea*, with which *P. yucatanicus* is also known to associate. All but one of the specimens (the female from Barbuda was collected at a rotenone poisoning station) were taken by diving near reefs, to a maximum depth of 9 meters.

TYPE-LOCALITY.—Off Progreso, Estado de Yucatán, Mexico.

DISTRIBUTION.—Southern Florida to Colombia; to a depth of 24 meters.

*Genus *Pontonia* Latreille, 1829

Key to Western Atlantic Species

1. Carapace pubescent, cervical groove well marked; major second pereiopod with large rounded tooth on movable finger fitting into completely enclosed socket in fixed finger ..... 98. ***P. unidens***
   Carapace not pubescent, without cervical groove; enlarged tooth on movable finger of major second pereiopod, if present, triangular and fitting into shallow, partially open socket in fixed finger 2
2.(1) Carapace unarmed, without antennal spine; antennal scale with distolateral spine large, distinctly overreaching distal margin of blade 3
   Carapace with strong antennal spine; antennal scale with distolateral spine small, not reaching level of distal margin of blade 4
3.(2) Rostrum nearly three times as long as broad in dorsal view, acuminate; telson with dorsal spines very long, anterior pair reaching to bases of posterior pair; first pereiopod with carpus barely as long as chela ..... *96. ***P. miserabilis***
   Rostrum less than twice as long as broad in dorsal view, tip rounded; telson with dorsal spines of moderate length, anterior pair reaching no more than halfway to bases of posterior pair; first pereiopod with carpus longer than chela ..... *97. ***P. quasipusilla***
4.(2) Telson with dorsal spines minute, inconspicuous ..... 93. ***P. domestica***
   Telson with dorsal spines well developed 5
5.(4) Three posterior pereiopods with dactyls stout, flexor margin convex ..... 94. ***P. margarita***
   Three posterior pereiopods with dactyls slender (for the genus), flexor margin nearly straight ..... *95. ***P. mexicana***

93. *Pontonia domestica* Gibbes

Pontonia domestica Gibbes, 1850:196.—Holthuis 1951b: 122, pl. 38.—Williams 1965b:47, fig. 39.

TYPE-LOCALITY.—South Carolina.

DISTRIBUTION.—North Carolina to Louisiana, Bahamas, Madeira, in *Atrina* and *Pecten;* to a depth of 42 meters.

94. *Pontonia margarita* Smith

Pontonia margarita Smith, 1869b:245.—Holthuis 1951b: 137, pls. 43, 44.—Williams 1965b:48, fig. 40.

TYPE-LOCALITY.—Bay of Panama.

DISTRIBUTION.—North Carolina, Florida, Gulf of California to Colombia, Galapagos Islands, in *Aequipecten, Pteria,* and *Pinctada;* to a depth of 60 meters.

*95. *Pontonia mexicana* Guérin-Méneville

Pontonia mexicana Guérin-Méneville, 1855:xix, pl. 2: fig. 12.—Holthuis 1951b:130, pl. 41.

MATERIAL.—Saint Lucia Island (Sta. 56–59: 2♀). —Isla de Cozumel (Sta. 34–60: 1♂, 1 ovig.♀).

HABITAT.—Two of these specimens were found in a "pinna" taken along a sandy shore studded with rocks and coral and partially covered with turtle grass. The remaining two specimens were taken by diving in 25–30 feet of water, but there is no indication of the host.

TYPE-LOCALITY.—Mexico (see Holthuis 1951b: 134).

DISTRIBUTION.—West Indies and east coast of Mexico, in *Atrina* and *Astrophyton;* littoral and sublittoral.

*96. *Pontonia miserabilis* Holthuis

FIGURE 9

Pontonia miserabilis Holthuis, 1951b:148, pl. 47: figs. *d–i*.

MATERIAL.—Antigua Island (Sta. 73–56: 1♂, 1 ovig. ♀; Sta. 105–59: 1♂).

EMENDED DESCRIPTION.—Rostrum (Figures 9*a*, *b*) more than three times as long as broad in males, slightly broader in female; unarmed, flat dorsally, obscurely carinate in ventral midline, reaching anteriorly beyond end of first segment of antennular peduncle; apex obscurely notched at insertion of 1 or 2 terminal setae. Carapace without antennal or other spines. Ventral angle of orbit forming acute lobe directed anteriorly. Anterolateral angle of carapace broadly rounded, produced little beyond level of ventral angle of orbit.

All abdominal pleura broadly rounded. Sixth somite perceptibly longer than fifth, somewhat more than half as long as telson. Dorsal spines of telson

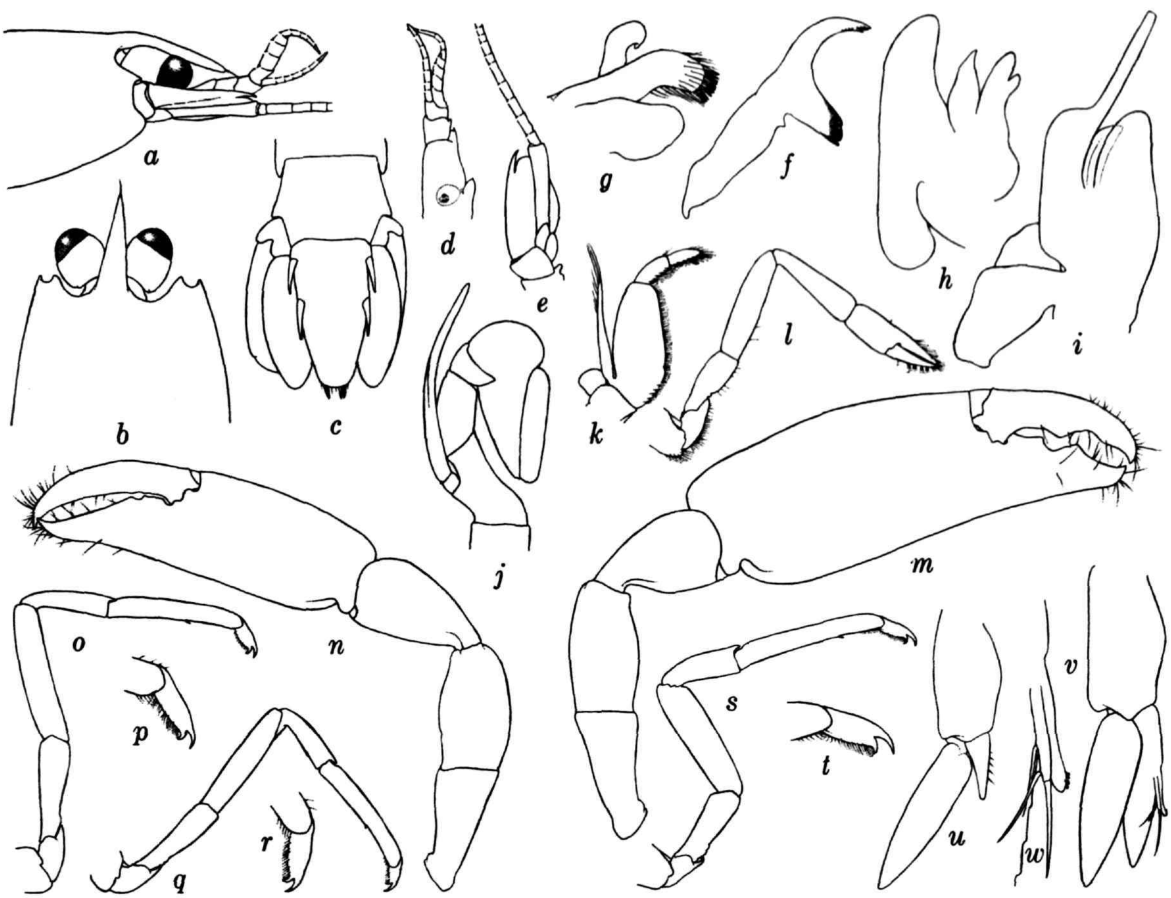


FIGURE 9.—*Pontonia miserabilis* Holthuis, male, carapace length 2.0 mm, from Smithsonian-Bredin Station 105–59: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, telson and uropods; *d*, right antennule; *e*, right antenna; *f*, right mandible; *g*, right first maxilla; *h*, right second maxilla; *i*, right first maxilliped; *j*, right second maxilliped; *k*, right third maxilliped; *l*, right first pereiopod; *m*, right second pereiopod; *n*, left second pereiopod; *o*, right third pereiopod; *p*, same, dactyl; *q*, right fourth pereiopod; *r*, same, dactyl; *s*, right fifth pereiopod; *t*, same, dactyl; *u*, left first pleopod; *v*, right second pleopod; *w*, appendix masculina. (Magnifications: *a–e*, *k–o*, *q*, *s*, ×15.5; *f–j*, *p*, *r*, *t–v*, ×31; *w*, ×78.)

(Figure 9*c*) very large; anterior pair arising at about one-eighth of distance from proximal end and reaching nearly to bases of posterior pair; posterior pair arising slightly anterior to midlength of segment and reaching nearly halfway to distal margin; distal margin armed with 2 pairs of sharp spines, lateral pair represented by setae, mesial pair slightly longer than intermediate pair.

Eyes broad, cornea shorter and narrower than eyestalk.

Antennular peduncle (Figure 9*d*) with stylocerite broadly acute; distolateral angle armed with spine-tipped lobe reaching midlength of second segment or beyond; second and third segments broad, second slightly longer than third. Lateral antennular flagellum slightly longer than median flagellum; fused portion of lateral flagellum consisting of 4 joints; free part of shorter branch reduced to minute lobe; free part of longer branch consisting of 5 joints.

Antennal scale (Figure 9*e*) reaching about as far as end of antennular peduncle, about twice as long as broad; lateral margin convex, distal tooth very large, overeaching distal margin of blade. Antennal peduncle reaching about as far as extremity of scale; basal segment without lateral spine near base of scale.

Mouth parts as figured (Figures 9*f–k*). Mandible with incisor process armed with 1 large and about 8 small teeth proximal to distal tooth; molar process not strongly dentate. Second maxilla with mesial lacinia broadly cleft. Third maxilliped reaching anteriorly about to end of first segment of antennular peduncle, antepenultimate segment very broad and flat, not overreached by exopod.

First pereiopod (Figure 9*l*) overreaching antennal scale by chela and half of carpus; fingers unarmed, nearly as long as palm; carpus barely as long as chela, shorter than merus. Second pereiopods unequal and dissimilar, both overreaching antennal scale by chela and carpus. Major cheliped (Figure 9*m*) with fingers slightly more than half as long as palm, each with 2 broad teeth on opposable margin; carpus less than half as long as palm and nearly as long as merus. Minor cheliped of second pair (Figure 9*n*) with fingers about three-fourths as long as palm, obscurely dentate in basal portions; carpus about two-thirds as long as palm, fully as long as merus. Third pereiopod (Figure 9*o*) overreaching antennal scale by dactyl and two-thirds of propodus; dactyl (Figure 9*p*) with flexor margin faintly convex, setose, and bearing recurved accessory tooth; propodus more than three times as long as dactyl, nearly half again as long as carpus; merus slightly longer than propodus; ischium considerably shorter than propodus. Fourth pereiopod (Figure 9*q*) overreaching antennal scale by dactyl and one-third of propodus; dactyl (Figure 9*r*) and proportions of segments similar to those of third pereiopod. Fifth pereiopod (Figure 9*s*) overreaching antennal scale by dactyl (Figure 9*t*) and two-thirds of propodus; propodus fully three times as long as dactyl, more than half again as long as carpus; merus slightly shorter than propodus; ischium little more than half as long as propodus.

First pleopod of male (Figure 9*u*) with endopod tapering to blunt tip. Appendix masculina on endopod of second pleopod (Figures 9*v, w*) shorter than appendix interna, bearing 3 long setae. Lateral branch of uropod (Figure 9*c*) with distolateral angle obscure, without distinct tooth.

SIZE.—Carapace length of two males 2.0 mm, of ovigerous female 2.6 mm. Eggs about 0.5 mm in major diameter.

HABITAT.—Shallow water among rocks on sandy shore and on weed-covered sea wall.

TYPE-LOCALITY.—Off Isla de Vieques, Puerto Rico.

DISTRIBUTION.—Previously known only from the incomplete ovigerous female holotype from off Isla de Vieques; 29 meters.

*97. ***Pontonia quasipusilla*, new species**

FIGURE 10

MATERIAL.—Antigua Island (Sta. 73–56: 1 ovig. ♀, holotype, USNM 135346).

DESCRIPTION.—Rostrum (Figures 10*a–c*) less than twice as long as broad at base, unarmed, nearly flat dorsally, carinate in ventral midline, curving ventrally anteriorly, reaching end of second segment of antennular peduncle; apex bluntly acute in both dorsal and lateral view. Carapace without antennal or other spines. Ventral angle of orbit in form of bluntly acute lobe directed anteroventrally. Anterolateral angle of carapace broadly rounded and noticeably produced anteriorly.

All abdominal pleura broadly rounded. Sixth somite perceptibly longer than fifth, little more than half as long as telson. Dorsal spines of telson large

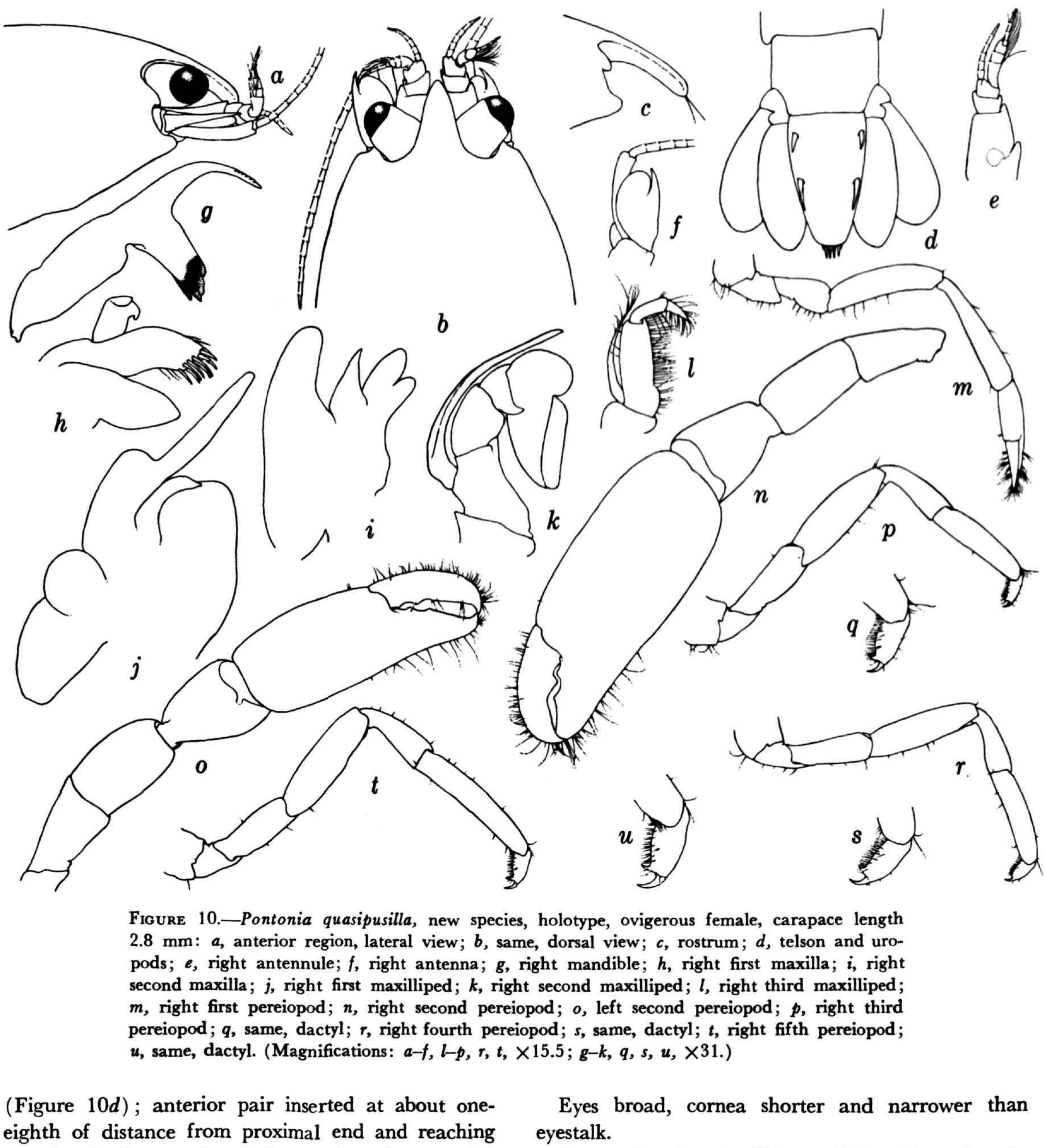


FIGURE 10.—*Pontonia quasipusilla*, new species, holotype, ovigerous female, carapace length 2.8 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, rostrum; *d*, telson and uropods; *e*, right antennule; *f*, right antenna; *g*, right mandible; *h*, right first maxilla; *i*, right second maxilla; *j*, right first maxilliped; *k*, right second maxilliped; *l*, right third maxilliped; *m*, right first pereiopod; *n*, right second pereiopod; *o*, left second pereiopod; *p*, right third pereiopod; *q*, same, dactyl; *r*, right fourth pereiopod; *s*, same, dactyl; *t*, right fifth pereiopod; *u*, same, dactyl. (Magnifications: *a–f*, *l–p*, *r*, *t*, ×15.5; *g–k*, *q*, *s*, *u*, ×31.)

(Figure 10*d*); anterior pair inserted at about one-eighth of distance from proximal end and reaching less than halfway to bases of posterior pair; posterior pair longer, arising at about midlength of segment and reaching nearly halfway to posterior margin; posterior margin armed with 3 pairs of sharp spines, lateral pair barely discernible, mesial and intermediate pairs much longer, subequal.

Eyes broad, cornea shorter and narrower than eyestalk.

Antennal peduncle (Figure 10*e*) with stylocerite blunt, subtruncate; distolateral angle of basal segment bluntly acute, strongly produced distally; second and third segments short and broad, subequal. Lateral antennular flagellum recurved posterodorsally, longer than median flagellum; fused portion of lateral flagellum consisting of 3 joints; free part of shorter branch reduced to lobate extension of third joint; free part of longer branch consisting of 4 joints.

Antennal scale (Figure 10*f*) reaching about as far as end of antennular peduncle, slightly less than twice as long as broad; lateral margin convex, distal tooth very large, overreaching rounded distal margin of blade. Antennal peduncle distinctly overreaching scale; basal segment without lateral spine near base of scale.

Mouth parts as figured (Figures 10*g–l*). Mandible with incisor process subspatulate and twisted, armed with 6 small, close-set teeth in addition to acute lobe at distal angle; molar process bearing several blunt teeth or lobes. Second maxilla with mesial lacinia broadly cleft. Third maxilliped falling short of end of basal joint of antennular peduncle, exopod overreaching antepenultimate joint.

First pereiopod (Figure 10*m*) overreaching antennal peduncle by chela and two-thirds of carpus; fingers unarmed, nearly as long as palm; carpus distinctly longer than chela, slightly longer than merus. Second pereiopods similar, but right chela more robust than left, both overreaching antennal peduncle by chela and half of carpus. Major cheliped (Figure 10*n*) with fingers slightly more than half as long as palm, each with 2 low broad teeth in basal half of opposable margin; carpus nearly half as long as palm and nearly as long as merus; ischium about as long as merus. Minor cheliped of second pair (Figure 10*o*) with fingers about three-fourths as long as palm, otherwise as in major cheliped; carpus much more than half as long as palm, subequal to merus and ischium. Third pereiopod (Figure 10*p*) overreaching antennal peduncle by dactyl and most of propodus; dactyl (Figure 10*q*) with flexor margin slightly convex, setose, and bearing stout recurved accessory tooth; propodus about two and one-half times as long as dactyl, distinctly longer than carpus; merus considerably longer than propodus; ischium subequal to propodus. Fourth pereiopod (Figure 10*r*) barely overreaching antennal peduncle; dactyl (Figure 10*s*) like that of third pereiopod; propodus fully two and one-half times as long as dactyl, one-third again as long as carpus; merus longer than propodus; ischium slightly shorter than propodus. Fifth pereiopod (Figure 10*t*) overreaching antennal peduncle by length of dactyl; dactyl (Figure 10*u*) as of third pereiopod; propodus nearly three times as long as dactyl, three-fourths again as long as carpus; merus noticeably shorter than propodus; ischium but little longer than carpus.

Lateral branch of uropod (Figure 10*d*) with distolateral angle obscure, without distinct tooth.

SIZE.—Carapace length of unique ovigerous female 2.8 mm. Eggs measuring about 0.7 mm in major diameter.

HABITAT.—Shallow water among rocks on sandy shore.

TYPE-LOCALITY.—Charlotte Point, English Harbour, Antigua Island, Leeward Islands.

DISTRIBUTION.—Known only from the type-locality.

REMARKS.—As indicated by the name, this species is obviously the Caribbean analogue of *Pontonia pusilla* Holthuis, 1951b, from the Pacific coast of Panama and Ecuador. Apart from differences in the proportions of the appendages, which may or may not be constant, *P. quasipusilla* differs most noticeably in having the posterior pair of dorsal spines on the telson inserted at about the midlength of the segment rather than near the end of the proximal third. From *P. miserabilis,* the most closely related species in the western Atlantic, *P. quasipusilla* differs in having the rostrum broader, the dorsal telson spines shorter, and the carpus of the second pereiopod longer.

98. *Pontonia unidens* Kingsley

Pontonia unidens Kingsley, 1880:422, pl. 14: fig. 9.—Holthuis 1951b:150, pl. 47: figs. *j, k*.

TYPE-LOCALITY.—Key West, Florida.

DISTRIBUTION.—This species of questionable systematic position is known only from the original type-series from Key West, Florida.

*Genus *Pseudocoutierea* Holthuis, 1951b

Only one Atlantic species is known.

*99. *Pseudocoutierea antillensis,* new species

FIGURE 11

MATERIAL.—Saba Bank (Sta. 106–56: 1 ovig. ♀ holotype, USNM 135347).

DESCRIPTION.—Rostrum (Figures 11*a, b*) nearly horizontal, long and slender, subcylindrical, unarmed

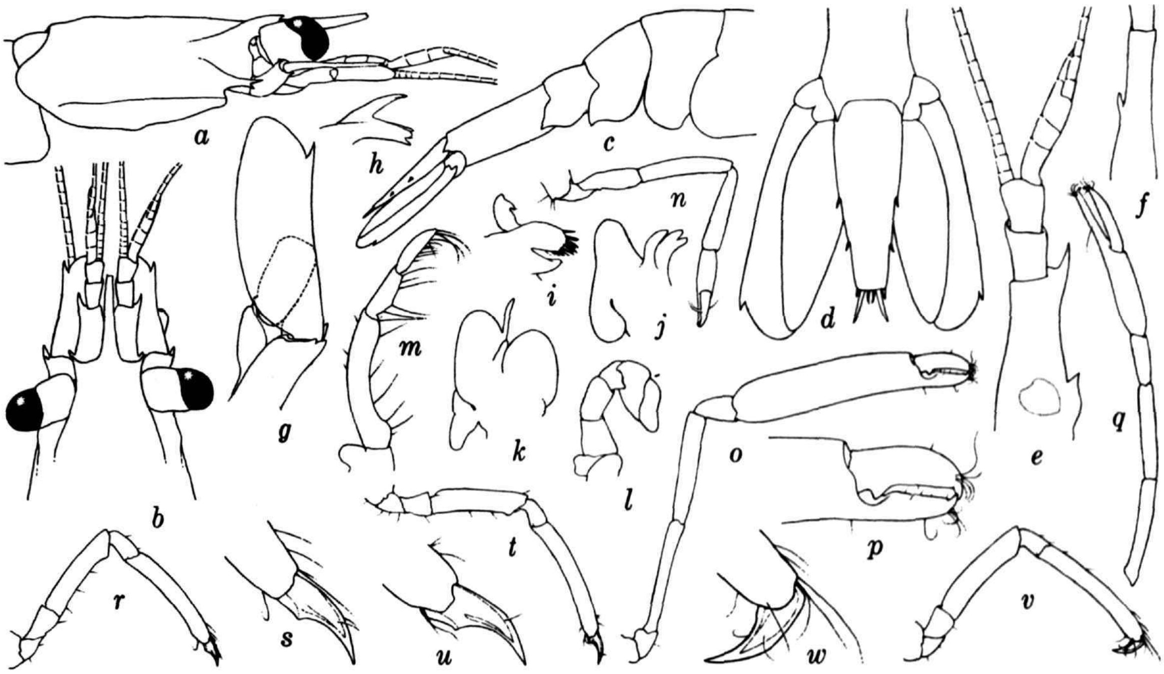


FIGURE 11.—*Pseudocoutierea antillensis*, new species, holotype, ovigerous female, carapace length 1.7 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, abdomen, posterior part; *d*, telson and uropods; *e*, right antennule; *f*, same, first segment, mesial view; *g*, right antenna; *h*, right mandible; *i*, right first maxilla; *j*, right second maxilla; *k*, right first maxilliped; *l*, right second maxilliped; *m*, right third maxilliped; *n*, right first pereiopod; *o*, right second pereiopod; *p*, same, fingers; *q*, left second pereiopod; *r*, right third pereiopod; *s*, same, dactyl; *t*, right fourth pereiopod; *u*, same, dactyl; *v*, right fifth pereiopod; *w*, same, dactyl. (Magnifications: *a–c*, *n*, *o*, *q*, *r*, *t*, *v*, ×15.5; *d–m*, *p*, ×31; *s*, *u*, *w*, ×56.)

dorsally and ventrally; tip missing, intact portion overreaching second segment of antennular peduncle; basal portion expanded abruptly to form broad, anterolaterally acuminate eaves over orbits; median, slightly convex carina between orbits extending short distance onto carapace but not as far posteriorly as ridges extending posterolaterally from supraorbital eaves. Carapace broad and depressed, armed only with strong antennal spine arising from anterior margin considerably ventral to obscure orbital angle. Narrow rounded lobe immediately ventral to antennal spine giving bifid appearance to latter in lateral view. Strong ridge curving posterodorsally from antennal spine delimiting depressed orbital region. True anterolateral angle of carapace rounded and separated from antennal spine and lobe by prominent elongate sinus. Nearly longitudinal groove extending posteriorly from anterior margin dorsal to anterolateral angle nearly to posterolateral margin of carapace.

Pleuron of third abdominal somite rounded, entire in female (Figure 11*c*); pleura of fourth and fifth somites acuminate posteriorly. Sixth somite at least twice as long as fifth and slightly longer than telson, not including terminal spines. Telson (Figure 11*d*) with anterior pair of lateral spines placed near midlength and posterior pair about midway between anterior pair and distal margin of telson. Intermediate pair of terminal spines more than twice as long as lateral and mesial pairs.

Eyes well developed, cornea not much broader than eyestalk.

Antennular peduncle (Figure 11*e*) with sharp stylocerite and strong distolateral spine of basal segment reaching about to level of distal fourth of second segment; anterior margin of basal segment produced between distolateral spine and lateral margin of second segment but not reaching midlength of second segment; blunt spine directed distally from near midlength of ventral surface of basal segment (Figure 11*f*); third segment only slightly longer than second. Lateral antennular flagellum with 2 branches fused for 3 joints; free part of shorter branch consisting of 2 joints.

Antennal scale (Figure 11*g*) slightly overreaching antennular peduncle, slightly less than three times as long as broad; lateral margin slightly concave in distal two-thirds, distal tooth falling far short of distal margin of strongly produced blade. Antennal peduncle reaching about to midlength of scale; basal segment with strong ventrolateral tooth.

Mouth parts as figured (Figures 11*h–m*). Mandible with incisor process armed with subapical row of 3 close-set denticles; molar process bearing about 3 teeth or lobes. Second maxilla with mesial lacinia broadly cleft. First maxilliped with well-developed lash on caridean lobe. Second and third maxillipeds without exopods. Third maxilliped reaching slightly beyond lateral spine on basal segment of antennal peduncle.

First pereiopod (Figure 11*n*) overreaching antennal scale by chela and most of carpus; fingers slightly shorter than palm; carpus slightly longer than chela and shorter than merus. Second pereiopods unequal and dissimilar, right more robust than left. Major cheliped (Figure 11*o*) overreaching antennal scale by nearly entire chela; fingers (Figure 11*p*) less than one-third as long as palm, dactyl with large basal tooth closing into depression in fixed finger; carpus less than one-fourth as long as palm; merus nearly three times as long as carpus and about as long as ischium. Minor cheliped of second pair (Figure 11*q*) overreaching antennal scale by slightly more than chela; fingers not much shorter than palm, unarmed; carpus slightly more than half as long as palm; merus twice as long as carpus and slightly shorter than ischium. Third pereiopod (Figure 11*r*) overreaching antennal scale by length of dactyl; dactyl (Figure 11*s*) with obtuse prominence in proximal half of flexor margin; propodus slightly curved, more than four times as long as dactyl; carpus less than one-third as long as propodus; merus somewhat shorter than propodus and more than twice as long as ischium, with triangular prominence near distal end of flexor margin. Fourth pereiopod (Figures 11*t, u*) reaching about to end of antennal scale; proportionate lengths of podomeres similar to those of third pereiopod, but carpus and ischium slightly shorter. Fifth pereiopod (Figures 11*v, w*) not reaching quite to end of antennal scale; proportions about as in fourth pereiopod.

Lateral branch of uropod (Figure 11*d*) without distinct movable spine between distolateral tooth and blade.

SIZE.—Carapace length of unique ovigerous female 1.7 mm. Few eyed eggs (probably most have been shed) about 0.3 mm long.

HABITAT.—Dredged in 13 meters, together with numerous antipatharians and gorgonians.

TYPE-LOCALITY.—Saba Bank at 17°28′N, 63°13′W.

DISTRIBUTION.—Known only from the type-locality.

REMARKS.—*Pseudocoutierea antillensis* is superficially similar to the only other described species of the genus, *P. elegans* Holthuis, 1951b, from off southern California, Baja California, and the Galapagos Islands. It seems to differ from that species in having the body somewhat more depressed; the median carina at the base of the rostrum not extending as far posteriorly as do the ridges supporting the supraorbital eaves; the sixth abdominal somite proportionately longer; the posterior pair of lateral spines on the telson situated midway between the anterior pair and the distal margin of the telson, rather than farther distally; the anterior margin of the basal segment of the antennular peduncle less strongly produced distally, and the third segment only slightly longer than the second; the antennal scale somewhat narrower; and the pereiopods proportionately longer. Perhaps most unexpected is the presence of a well-developed lash on the caridean lobe of the first maxilliped. This structure is so commonly present in palaemonid shrimps that one of the paratypes of *P. elegans* was examined to make certain that the lash had not been overlooked in that species. It had not. In the paratype examined, the lash is represented by no more than a slight conxevity at the distomesial angle of the caridean lobe.

Other differences between this species and the description of *P. elegans* have not been substantiated by examination of paratypes of that species. Females of *P. elegans* apparently lack the marginal tooth on the pleuron of the third abdominal somite. That species also has a strong ventrolateral tooth on the basal antennal segment lateral to the base of the antennal scale. Finally, no movable spine could be discerned in that species on the lateral branch of the uropod between the distolateral tooth and the blade; the most lateral 1 or 2 marginal setae, however, often could be mistaken for a spine.

Genus *Tuleariocaris* Hipeau-Jacquotte, 1965

Only one species is known from the Atlantic Ocean.

100. *Tuleariocaris neglecta* Chace

Tuleariocaris neglecta Chace, 1969:266, figs. 10, 11.

TYPE-LOCALITY.—St. James, Barbados.

DISTRIBUTION.—Florida Keys, Dominica, Barbados, Curaçao, Madeira, on *Diadema antillarum;* shallow water.

*Genus *Typton* Costa, 1844

Key to Western Atlantic Species

1. Telson with posterior pair of dorsal spines arising anterior to midpoint of segment; lateral branch of uropod with lateral margin serrate in distal portion. 104. ***T. prionurus***
   Telson with posterior pair of dorsal spines arising at, or posterior to, midpoint of segment; lateral branch of uropod with lateral margin entire, not serrate distally 2
2.(1) Antennal spine broad, toothlike in lateral view, not spiniform; both second pereiopods with movable fingers highly arched, nearly semicircular; major second pereiopod with carpus crenulate on proximal portion of angulate margin .... *105. ***T. tortugae***
   Antennal spine strong, spiniform; second pereiopods with movable fingers only moderately convex, not nearly semicircular; major second pereiopod with carpus not crenulate on angulate margin 3
3.(2) Anterior margin of carapace produced anteriorly to level of tip of antennal spine; lateral branch of uropod with lateral margin rather regularly convex throughout 4
   Anterior margin of carapace less produced, not nearly reaching level of tip of antennal spine; lateral branch of uropod with lateral margin nearly straight in distal half 5
4.(3) Rostrum deepest near midlength, ventral margin forming obtuse angle in lateral view; mandible with well-developed incisor process; third pereiopod with dactyl bearing small accessory tooth on flexor margin, not nearly symmetrically bifid. *101. ***T. carneus***
   Rostrum not deepening near midlength, ventral margin straight or convex; mandible without incisor process; third pereiopod with dactyl bearing large accessory tooth on flexor margin, nearly symmetrically bifid .... 103. ***T. gnathophylloides***
5.(3) Mandible with incisor process well developed and distally crenulate, molar process tapering distally; major second pereiopod with movable finger bluntly hammer shaped, not noticeably twisted .... 106. ***T. vulcanus***
   Mandible with incisor process reduced to low angulate unarmed lobe, molar process not tapering distally; major second pereiopod with movable finger forming pointed hook twisted into plane nearly perpendicular to that of palm .... *102. ***T. distinctus***

*101. *Typton carneus* Holthuis

FIGURE 12

Typton carneus Holthuis, 1951b [part]:162, pl. 51: figs. *a, e, k, l.*

MATERIAL.—Saba Bank (Sta. 106–56: 1 ovig. ♀).—Antigua Island (Sta. 73–56: 1♀).—Tobago Cays (Sta. 22–56: 1♂; Sta. 23–56: 1♂, 1 major cheliped).—Tobago (Sta. 31–59: 2♂).

EMENDED DESCRIPTION.—Rostrum (Figures 12*a*, *b*) simple, spinelike, reaching anteriorly to level of center of cornea, deepest at about midlength, ventral margin forming broadly obtuse, rounded angle. Carapace smooth, armed only with antennal spine situated at ventral orbital angle and subequal in length to rostrum; anterolateral margin broadly rounded, produced anteriorly about as far as tips of rostrum and antennal spine.

Pleura of anterior 5 abdominal somites broadly rounded. Sixth somite slightly shorter than fifth and barely half as long as telson, armed posterolaterally with slender spine either side of base of telson and with subrectangular tooth at posterolateral angle of pleuron. Telson (Figure 12*c*) nearly half as broad as long; posterior pair of dorsal spines situated little more than one-third of length from posterior margin, anterior pair at less than one-fourth of length from anterior margin; lateral pair of terminal spines barely discernible, intermediate pair shorter than mesial pair.

Eyes not reaching anteriorly as far as end of basal

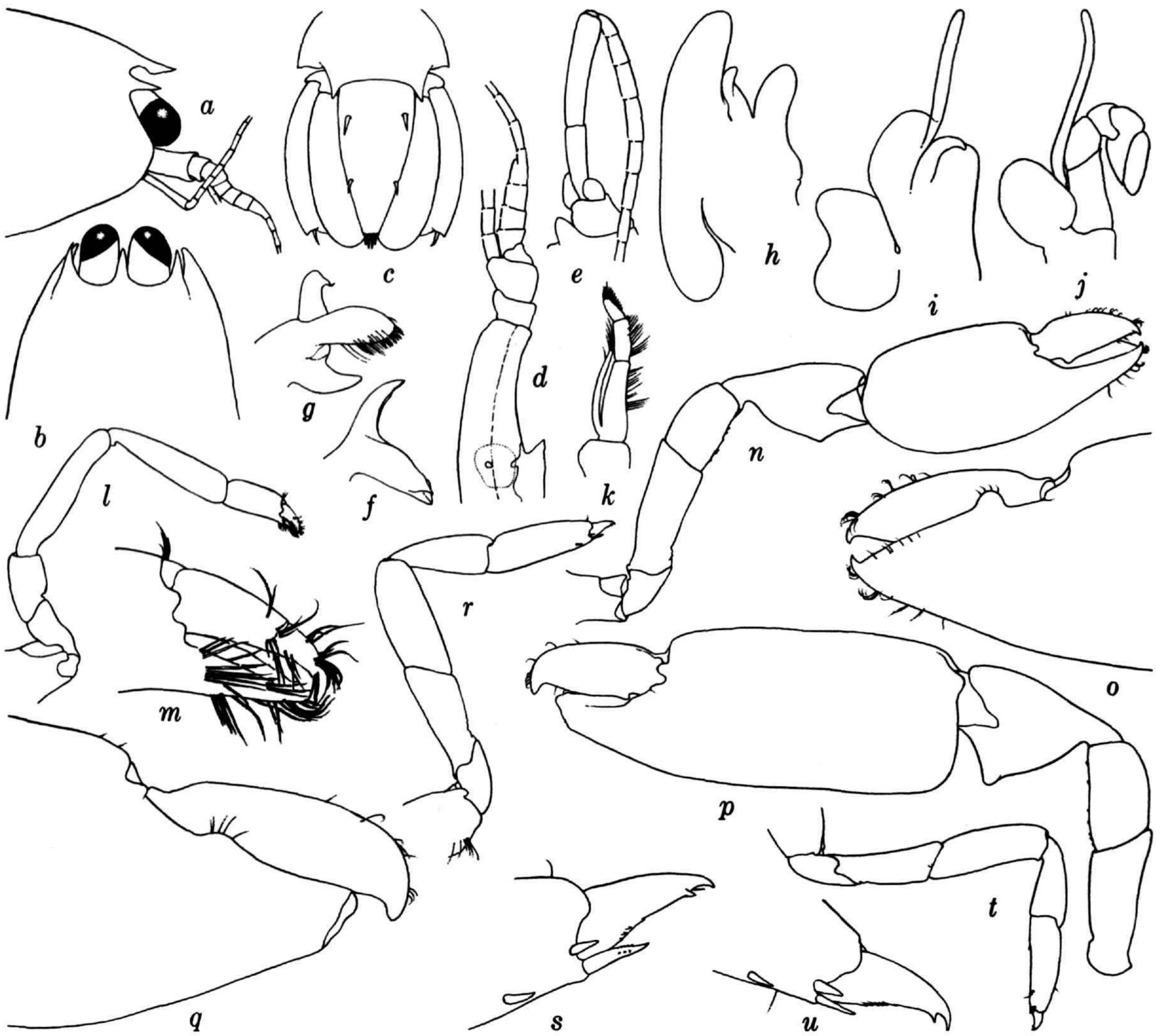


FIGURE 12.—*Typton carneus* Holthuis, ovigerous female, from Bimini Islands, Bahamas, carapace length 2.8 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, telson and uropods; *d*, right antennule; *e*, right antenna; *f*, right mandible; *g*, right first maxilla; *h*, right second maxilla; *i*, right first maxilliped; *j*, right second maxilliped; *k*, right third maxilliped; *l*, right first pereiopod; *m*, same, fingers; *n*, right second pereiopod; *o*, same, fingers; *p*, left second pereiopod; *q*, same, fingers; *r*, right third pereiopod; *s*, same, dactyl; *t*, right fourth pereiopod; *u*, same, dactyl. (Magnifications: *a–c, k, l, n, p, r, t*, ×15.5; *d–j, o, q*, ×31; *m, s, u*, ×87.)

segment of antennular peduncle; cornea subequal in width to, and slightly shorter than, eyestalk.

Antennular peduncle (Figure 12*d*) with short but acute stylocerite falling considerably short of midlength of basal segment. Second segment shorter than third. Lateral antennular flagellum with both branches completely fused except for indication of free tip of shorter branch on fourth joint.

Antennal scale reduced to minute oval lappet visible only under high magnification (Figure 12*e*).

Antennal peduncle slender, barely overreaching second segment of antennular peduncle.

Mouth parts as figured (Figures 12*f–k*). Mandible with well-developed incisor process provided with few faint serrations but no distinct teeth; molar process stout proximally, with sharp distal tooth in addition to truncate process. Second maxilla large, endite not cleft, scaphognathite long and rather narrow. All maxillipeds with exopods. First maxilliped completely fused, without indication of demarcation between coxa and basis; palp large and curved; caridean lobe broad distally, with well-developed lash; epipod shallowly bilobed. Second maxilliped with well-developed exopod and broadly rounded, entire epipod. Third maxilliped reaching anteriorly nearly as far as end of antennular peduncle; exopod slightly overreaching antepenultimate segment.

First pereiopod (Figure 12*l*) overreaching antennular peduncle by chela, carpus, and about one-half of merus; fingers (Figure 12*m*) less than two-thirds as long as palm, rather densely setose; carpus about half again as long as chela in females (not much longer than chela in males) and slightly shorter than merus; ischium distinctly shorter than chela. Second pereiopods rather similar but unequal. Right (minor) second pereiopod (Figure 12*n*) overreaching antennular peduncle by chela and carpus; fingers (Figure 12*o*) about two-thirds as long as palm, movable finger tapering to tip, armed with rounded tooth near proximal end of opposable margin, fixed finger having extensor surface provided with rather deep flange bearing proximal rounded lobe and concealing much of flexed movable finger; carpus broadly triangular, somewhat shorter than palm; merus less than two-thirds as long as carpus, with scattered minute denticles on flexor margin; ischium nearly as long as carpus. Left (major) second pereiopod (Figure 12*p*) overreaching antennular peduncle by chela, carpus, and half of merus; fingers (Figure 12*q*) less than half as long as palm, movable finger tapering, distally somewhat hooked, armed with blunt tooth near proximal end of opposable margin, fixed finger with tip missing in figured specimen, extensor surface with flange bearing low proximal lobe and partially concealing flexed movable finger; carpus distinctly triangular, between one-half and two-thirds as long as palm; merus somewhat more than half as long as carpus, with few minute denticles on flexor margin; ischium about half again as long as merus and somewhat shorter than carpus. Third pereiopod (Figure 12*r*) overreaching antennular peduncle by dactyl, propodus, and most of carpus; dactyl (Figure 12*s*) about one-fourth as long as propodus, accessory tooth small, situated little more than one-seventh of length of flexor margin from tip, flexor margin with few microscopic denticles or serrations in proximal half; propodus stout, tapering, bearing only 1 small spine on flexor margin in addition to those on distal margin; carpus subequal to propodus in length; merus slightly longer than either carpus or propodus and slightly shorter than ischium. Fourth pereiopod (Figure 12*t*) overreaching antennular peduncle by dactyl and propodus; dactyl (Figure 12*u*) about one-fourth as long as propodus, accessory tooth small, situated little more than one-eighth of length of flexor margin of dactyl from tip, flexor margin with few microscopic serrations in proximal half; propodus slightly more slender and less tapered than that of third pereiopod, bearing 2 small spines on flexor margin in addition to those on distal margin; carpus subequal to propodus in length; merus more slender than that of third pereiopod, one-fourth again as long as either carpus or propodus, and nearly as long as ischium. Fifth pereiopod (missing in figured specimen) barely overreaching antennular peduncle; dactyl less than one-fourth as long as propodus, accessory tooth very small, situated near tip, flexor margin with 2 or 3 microscopic denticles in proximal half; propodus tapered, proportionately longer and more distinctly curved toward flexor surface than that of fourth pereiopod, without spines on flexor margin except at distal extremity; carpus about two-thirds as long as propodus; merus slightly longer than propodus and half again as long as ischium.

First pleopod of male with endopod setose and tapering to blunt tip. Appendix masculina on second pleopod reduced to 1 or 2 long setae overreaching appendix interna. Lateral branch of uropod (Figure 12*c*) with lateral margin evenly convex, unarmed except for subrectangular distal tooth; long, movable spine mesial to distolateral tooth.

SIZE.—Males with carapace lengths of 1.2–1.4 mm; females 1.1 and 1.3 mm, smaller ovigerous. Of the type-series, males with carapace lengths of 1.1–1.3 mm; female, 1.8 mm. The figured ovigerous female from Bimini has a carapace length of 2.8 mm.

HABITAT.—Of the specimens from Tobago Cays, one male was extracted from coral rock, another male from a sponge, both in 3 feet of water.

TYPE-LOCALITY.—Dry Tortugas, Florida.

DISTRIBUTION.—South and west coasts of Florida and Bahamas to Tobago; to a depth of 73 meters.

REMARKS.—See "Remarks" under *T. distinctus.*

Figure 12 was prepared from the largest available specimen of *T. carneus,* an ovigerous female from Bimini Islands, Bahamas, collected by A. S. Pearse, 29 October 1948.

In addition, I have examined a fine lot of four females (one ovigerous) collected by L. B. Holthuis along the shore of Bear Cut at the north end of Key Biscayne, Miami, Florida, from an orange-red sponge among elgrass and algae in less than 3 feet of water, 1–7 September 1963. The three specimens without eggs have carapace lengths of 2.0–2.2 mm; the ovigerous specimen has a carapace length of 1.9 mm. In life, the shrimps were uniformly red, slightly redder than the sponge in which they were found. This lot is deposited in the Rijksmuseum van Natuurlijke Historie, Leiden.

*102. *Typton distinctus,* new species

FIGURES 13, 14

Typton carneus Holthuis, 1951b[part]: 162, pl. 51: figs. *b–d, f–j, m–o.*

MATERIAL.—Los Arroyos, Provincia de Pinar del Río, Cuba; in sponge; 20 May 1914; *Tomas Barrera* Expedition Sta. 8: 4♂, 6♀ [4 ovig.]; (1 ovig. ♀ is holotype, USNM 135352; 3♀ [1 ovig.] deposited in Rijksmuseum van Natuurlijke Historie, Leiden).—Bahía de la Ascensión (Sta. 60–60: 2♂, 1 ovig. ♀).

DESCRIPTION.—Rostrum (Figures 13*a-c,* 14*a, b*) simple, spinelike, reaching to base of cornea in females, more elongate in males, ventral margin faintly convex, tapering regularly from near base to apex; largest specimen with rostrum and antennal spines directed anterodorsally (see Holthuis 1951b: pl. 51: fig. b). Carapace smooth, armed only with antennal spine situated at ventral orbital angle and subequal in length to rostrum in females, proportionately shorter in males; anterolateral margin rounded, not noticeably produced anteriorly.

Pleura of anterior 5 abdominal somites broadly rounded. Sixth somite slightly shorter than fifth and barely half as long as telson, armed posteriorly with long sharp spine either side of base of telson and with acute tooth at posterolateral angle of pleuron. Telson (Figure 13*d*) about half as broad as long; posterior pair of dorsal spines situated near, or somewhat posterior to, midlength, anterior pair at less than one-fourth of length from anterior margin; lateral pair of terminal spines small but distinct, intermediate pair usually slightly shorter than mesial pair.

Eyes reaching about to distal third of basal segment of antennular peduncle; cornea subequal in width to, and shorter than, eyestalk.

Antennular peduncle (Figure 13*e*) with short but acute stylocerite falling considerably short of midlength of basal segment. Second segment slightly shorter than third. Lateral antennular flagellum with both branches fused for 3 or 4 joints; free part of shorter branch represented by minute lappet.

Antennal scale (Figure 13*f*) reduced to very small oval lappet. Antennal peduncle very slender, reaching about as far as end of basal segment of antennular peduncle.

Mouth parts as figured (Figures 13*g–l*). Mandible with incisor process reduced and unarmed; molar process broadly and obliquely truncate distally. Second maxilla large, endite not cleft, scaphognathite long and unusually narrow anteriorly. All maxillipeds with exopods. First maxilliped without indication of demarcation between coxa and basis; caridean lobe only moderately convex anteriorly, with well-developed lash. Second maxilliped with well-developed exopod and distally constricted, entire epipod. Third maxilliped reaching anteriorly nearly to stylocerite of antennular peduncle or beyond; exopod distinctly overreaching antepenultimate segment.

First pereiopod (Figure 13*m*) overreaching antennular peduncle by at least chela and nearly all of carpus; fingers about three-fourths as long as palm, rather densely setose; carpus not much, if at all, longer than chela and somewhat shorter than merus; ischium less than two-thirds as long as merus. Second pereiopods dissimilar and unequal. Major second pereiopod (Figure 13*n*) overreaching antennular peduncle by length of chela; movable finger (Figure 13*o*) less than half as long as palm, forming hook twisted into plane at nearly right angles to that of palm; carpus usually not deeply triangular, less than half as long as palm; merus about three-fifths as long as carpus; ischium about as long as carpus. Minor second pereiopod (Figure 13*p*) overreaching antennular peduncle by chela and nearly half of carpus; fingers (Figure 13*q*) less than two-thirds as long

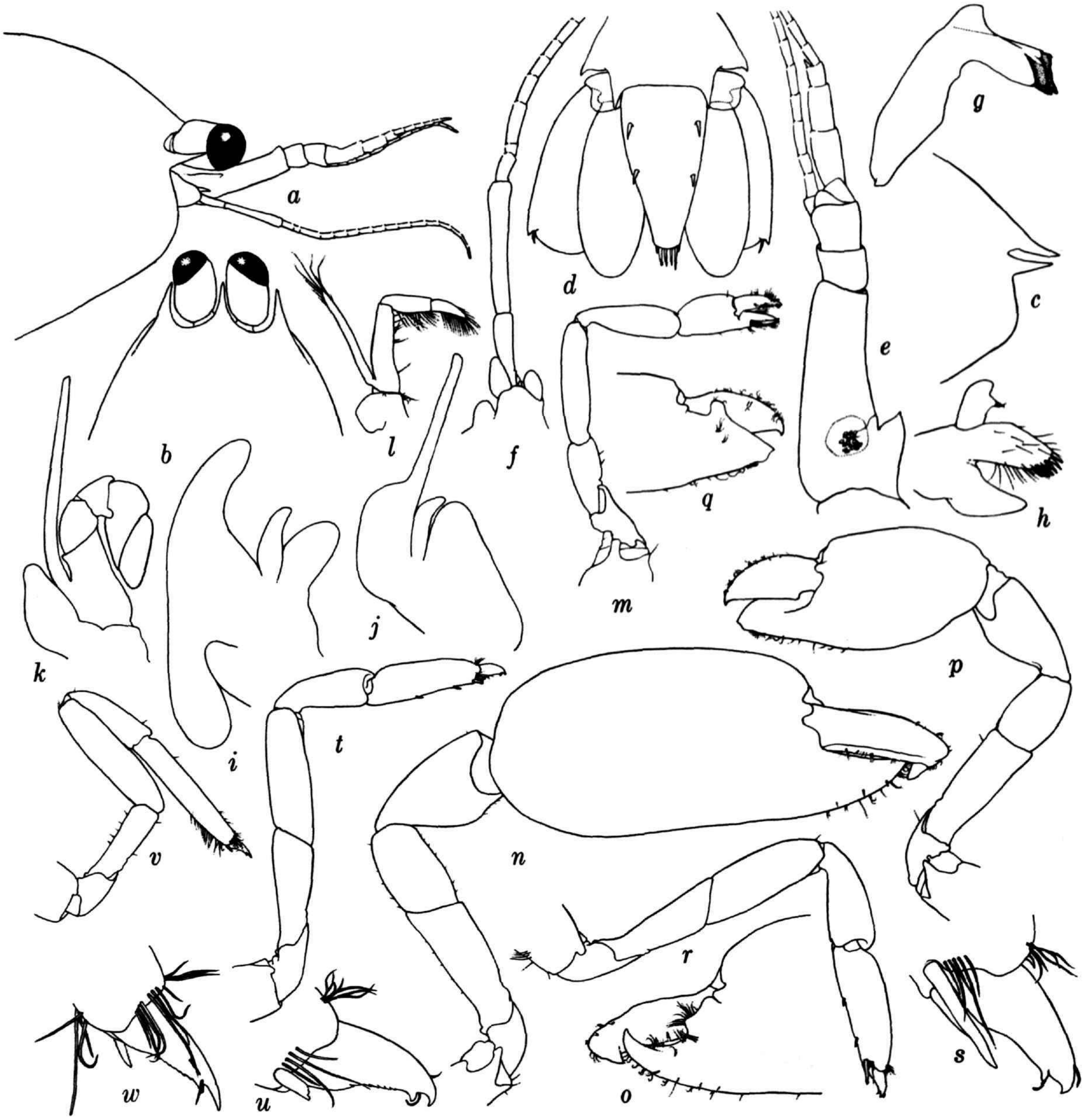


FIGURE 13.—*Typton distinctus*, new species, holotype, ovigerous female, carapace length 3.2 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, rostrum and antennal spine, lateral view; *d*, telson and uropods; *e*, right antennule; *f*, right antenna; *g*, right mandible; *h*, right first maxilla; *i*, right second maxilla; *j*, right first maxilliped; *k*, right second maxilliped; *l*, right third maxilliped; *m*, right first pereiopod; *n*, right second pereiopod; *o*, same, fingers; *p*, left second pereiopod; *q*, same, fingers; *r*, right third pereiopod; *s*, same, dactyl; *t*, right fourth pereiopod; *u*, same, dactyl; *v*, right fifth pereiopod; *w*, same, dactyl. (Magnifications: *a–d*, *l–r*, *t*, *v*, ×15.5; e–k, ×31; *s*, *u*, *w*, ×78.)

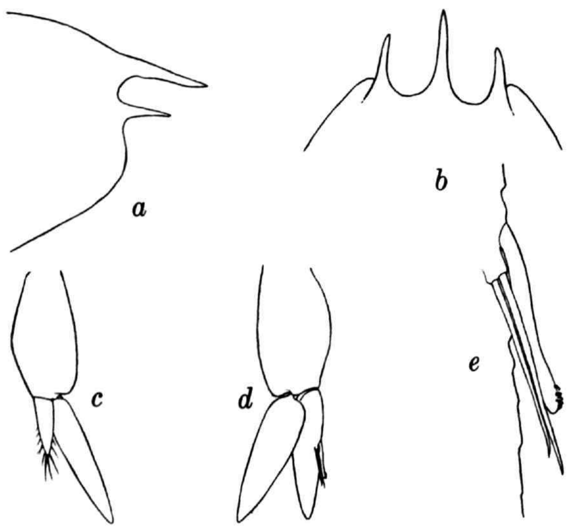


FIGURE 14.—*Typton distinctus*, new species, paratype, male, carapace length 3.2 mm: *a*, rostrum and antennal spine, lateral view; *b*, same, dorsal view; *c*, right first pleopod; *d*, right second pleopod; *e*, appendix masculina and appendix interna. (Magnifications: *a–d*, ×15.5; *e*, ×78.)

as palm, movable finger armed with blunt tooth near proximal end of opposable margin, fixed finger with extensor surface provided with deep flange bearing proximal elongate lobe and concealing much of flexed movable finger; carpus shorter than palm; merus about two-thirds as long as carpus; ischium fully as long as carpus. Third pereiopod (Figure 13*r*) overreaching antennular peduncle by dactyl and most of propodus; dactyl (Figure 13*s*) less than one-fourth as long as propodus, accessory tooth small, situated no more than one-seventh of length of flexor margin from tip; propodus stout, tapering, bearing 2 small spines on flexor margin in addition to distal pair; carpus slightly shorter than propodus; merus subequal to carpus; ischium subequal to propodus. Fourth pereiopod (Figure 13*t*) overreaching antennular peduncle by dactyl and about two-thirds of propodus, similar in form and proportions to third pereiopod but dactyl (Figure 13*u*) with serrations on flexor margin and merus slightly longer. Fifth pereiopod (Figure 13*v*) more slender, barely overreaching antennular peduncle; dactyl (Figure 13*w*) less than one-fourth as long as propodus, with series of microscopic serrations on flexor margin proximal to accessory tooth; propodus elongate with subparallel margins for most part; carpus little more than two-thirds as long as propodus; merus subequal to propodus; ischium subequal to carpus.

First pleopod of male (Figure 14*c*) with endopod setose and tapering to acute tip. Appendix masculina on second pleopod (Figures 14*d, e*) much reduced, represented chiefly by 2 long setae reaching beyond end of appendix interna. Lateral branch of uropod (Figure 13*d*) with lateral margin convex in proximal half, nearly straight or faintly sinuous distally, unarmed except for distal tooth and long movable spine mesial thereto.

SIZE.—Carapace length of ovigerous female holotype, 3.2 mm; of males, 2.1–3.2 mm; of other females, 2.6–5.0 mm.

HABITAT.—The Cuban specimens were found in a sponge. The lot from Bahía de la Ascensión was collected at the margin of a mangrove swamp adjoining a sandy beach; there is no indication that these specimens also came from a sponge, but the possibility cannot be ruled out.

TYPE-LOCALITY.—Los Arroyos, Provincia de Pinar del Río, Cuba.

DISTRIBUTION.—Western Cuba and Yucatan Peninsula, Mexico; sublittoral.

REMARKS.—When Holthuis described *Typton carneus*, he noted differences between the series of Cuban specimens collected by the *Tomas Barrera* Expedition and the three lots of smaller specimens, ranging in carapace length from 1.1 to 1.8 mm, which he referred to as juveniles. An ovigerous female with a carapace length of 2.8 mm, collected by the late A. S. Pearse in the Bimini Islands, Bahamas, 29 October 1948, and apparently not seen by Holthuis, agrees in most particulars with the smaller specimens in the type-series of *T. carneus* (see Figure 12) and leaves little doubt that these specimens are specifically distinct from the Cuban series. Inasmuch as Holthuis selected one of the small males from off Dry Tortugas, Florida (for which color notes were available), as the holotype of *T. carneus,* another name must be assigned to the larger specimens in the original type-series.

Typton distinctus differs from *T. carneus* in having the lower margin of the rostrum faintly but evenly convex from near the base to the tip, rather than forming an obtuse, rounded prominence near midlength; in having the anterior margin of the carapace more nearly vertical, not produced nearly to the level of the tip of the antennal spine; the incisor process of the mandible reduced and unarmed, rather than well-developed and serrate, and the molar process not tapering distally; the anterior portion of the scaphognathite narrower; the caridean lobe of the first maxilliped less convex; the movable finger of the major second pereiopod twisted into a plane at nearly right angles to that of the palm, and the carpus of that appendage much less sharply triangular; and the lateral margin of the lateral branch of the uropod nearly straight or faintly sinuous in its distal half, rather than evenly convex throughout. The ovigerous female of *T. carneus* has the movable finger of the first pereiopod distinctly shorter and the carpus much longer than in those of *T. distinctus,* but these differences are not apparent in males.

103. *Typton gnathophylloides* Holthuis

Typton gnathophylloides Holthuis, 1951b:159, pl. 50.

Type-locality.—Dry Tortugas, Florida.

Distribution.—Known only from the two type-specimens from the Dry Tortugas; 82 meters.

104. *Typton prionurus* Holthuis

Typton prionurus Holthuis, 1951b:165, pl. 52.

Type-locality.—Dry Tortugas, Florida.

Distribution.—Known only from the two type-specimens from the Dry Tortugas; 18 meters.

*105. *Typton tortugae* McClendon

Typton tortugae McClendon, 1911:57–60, pl. 1: fig. 2.—Holthuis 1951b:153, pl. 48.

Material.—Virgin Gorda (Sta. 111–56: 1♀).

Habitat.—This specimen was found in a black sponge in shallow water.

Type-locality.—Dry Tortugas, Florida.

Distribution.—Bermudas, Florida, Dry Tortugas, Virgin Islands, and Gulf of California, usually in sponges or coral rock; to a depth of 18 meters.

106. *Typton vulcanus* Holthuis

Typton volcanus Holthuis, 1951b:157, pl. 49: figs. *a–n.*

Type-locality.—Dry Tortugas, Florida.

Distribution.—Known only from the two type-specimens from the Dry Tortugas; 82 meters.

*Family GNATHOPHYLLIDAE

Key to Atlantic Genera

Anterolateral angle of carapace not reaching beyond level of antennal spine; spines on distal margin of telson not very unequal; third maxilliped with exopod considerably overreaching endopod; second pereiopod with carpus broader than long; 3 posterior pereiopods with dactyls nearly as broad as long, not bifid .... ****Gnathophylloides***

Anterolateral angle of carapace reaching distinctly beyond level of antennal spine; intermediate spines on distal margin of telson nearly twice, or more than twice, as long as median pair; third maxilliped with exopod not overreaching endopod; second pereiopod with carpus distinctly longer than broad; 3 posterior pereiopods with dactyls distinctly longer than broad and bifid .... ****Gnathophyllum***

*Genus *Gnathophylloides* Schmitt, 1933

Only one species is known from the Atlantic.

*107. *Gnathophylloides mineri* Schmitt

Gnathophylloides mineri Schmitt, 1933:7, fig. 3; 1935:167, fig. 31.—Lewis 1956:288, figs. 1, 2.

Material.—Antigua Island (Sta. 116–59: 1♂).—Saint Lucia Island (Sta. 53–59: 1♂).—Tobago Cays (Sta. 21–56: 1♂, 5 ovig. ♀).—Bahía de la Ascensión (Sta. 82–60: 2♂, 6♀ [5 ovig.]).

Habitat.—Most of the specimens mentioned above were found under stones or in coral rock at low tide and on a coral reef in 2–5 feet, but one male was taken from a waterlogged, teredo-ridden stump awash at low tide and another male from a trap baited with a crushed sea urchin. (This shrimp usually occurs on the spines of the sea urchins *Tripneustes esculentus* and *Lytechinus variegatus,* a fact that presumably accounts for its presence in a trap baited with a sea urchin.)

Type-locality.—Ensenada, Puerto Rico.

Distribution.—Southeastern Florida, Yucatan, and Caribbean Sea; littoral and sublittoral.

*Genus *Gnathophyllum* Latreille, 1819

Key to Western Atlantic Species

1. Posterior tooth of dorsal rostral series situated on rostrum anterior to level of orbital margin; color pattern composed of transverse stripes .... *108. ***G. americanum***
   Posterior tooth of rostral series situated on carapace posterior to level of orbital margin; color pattern composed of spots 2
2.(1) Pereiopods slender, propodus of third and fourth pairs 12–15 times as long as wide; color pattern composed of dark rings on slightly lighter background. 109. ***G. circellum***
   Pereiopods not unusually slender, propodus of third and fourth pairs seven to eight times as long as wide; color pattern composed of spots, with or without dark rings .. 3
3.(2) Posterior pair of lateral telson spines separated by distinct gap from series of posterior spines; stylocerite falling short of level of articulation betweeen first and second segments of antennular peduncle; color pattern composed of innumerable light dots on dark background .... 110. ***G. modestum***
   Posterior pair of lateral telson spines not distinctly separated from series of posterior spines; stylocerite reaching considerably beyond level of articulation between first and second segments of antennular peduncle; color pattern composed of large light spots, encircled by dark rings, on relatively dark background .... 111. ***G. splendens***

*108. *Gnathophyllum americanum* Guérin-Méneville

Gnathophyllum americanum Guérin-Méneville, 1855:viii, pl. 2: fig. 14.—Manning 1963:58, figs. 5, 6.

MATERIAL.—Virgin Gorda (Sta. 112–56: 1♂; Sta. 10–58: 1 ovig. ♀).—Antigua Island (Sta. 72–56: 1♀; Sta. 73–56: 1♂).—Guadeloupe (Sta. 69–56: 1♂, 1 ovig. ♀).—Isla de Cozumel (Sta. 106–60: 2♂, 4 ovig. ♀; Sta. 109–60: 1♂).—Bahía de la Ascensión (Sta. 67–60: 2♀ [1 ovig.]; Sta. 72–60: 1♂, 3♀ [2 ovig.]; Sta. 81–60: 1♂, 2♀).

HABITAT.—These specimens came from grass flats and from weed-covered rocks and a seawall, usually in less than 3 feet, but occasionally to 18 feet.

TYPE-LOCALITY.—Cuba.

DISTRIBUTION.—Bermudas, southern Florida, Gulf of Mexico, and Caribbean Sea; Canary Islands; and Indo-Pacific region from the Red Sea to the Tuamotu Archipelago; to a depth of 50 meters.

109. *Gnathophyllum circellum* Manning

Gnathophyllum circellum Manning, 1963:54, figs. 3, 4.

TYPE-LOCALITY.—Alligator Reef, Monroe County, Florida.

DISTRIBUTION.—Florida Keys and Great Exuma Island, Bahamas; to a depth of 6 meters.

110. *Gnathophyllum modestum* Hay

Gnathophyllum modestum Hay, 1917:72.—Manning 1963:48, figs. 1, 2.

TYPE-LOCALITY.—Beaufort, North Carolina.

DISTRIBUTION.—Beaufort, North Carolina, and Biscayne Bay, Florida; to a depth of 27 meters.

111. *Gnathophyllum splendens* Chace and Fuller

Gnathophyllum splendens Chace and Fuller, 1971:493, figs. 1–5.

TYPE-LOCALITY.—Puerto Yabucoa, Puerto Rico.

DISTRIBUTION.—Known only from the unique specimen from the type-locality.

*Family ALPHEIDAE

Key to Western Atlantic Genera

1. Triangular plate or scale movably articulated at posterolateral angle of sixth abdominal somite lateral to basal segment of uropod. (Anterior part of carapace covering eyes dorsally but not anteriorly; posterior margin of carapace with distinct "cardiac notch" at base of branchiostegite; antepenultimate segment of third maxilliped not exceptionally broad; epipods present on at least anterior 2 pairs of pereiopods; movable

Key to Western Atlantic Genera—Continued

finger of major first chela without molar-like tooth fitting into socket in fixed finger; dactyls of 3 posterior pereiopods usually simple, not biunguiculate) 2
No movable plate or scale articulated at posterolateral angle of sixth abdominal somite 4

2.(1) Rostrum lacking; antennular peduncle long and slender, stylocerite closely appressed to basal segment; lateral branch of uropod distally truncate. (Telson with convex distal margin; first chelipeds carried with chela flexed against merus, opposable margins of fingers of major chela dentate.) .... ***Leptalpheus***
Rostral projection present; antennular peduncle short and stout, stylocerite well separated from basal segment; lateral branch of uropod distally rounded 3

3.(2) Telson with terminal margin truncate or convex; first chelipeds carried extended .... ****Alpheopsis***
Telson terminating in acutely triangular tip; first chelipeds carried with chela flexed against merus .... ***Neoalpheopsis***

4.(1) Eyes not concealed from anterior view; movable finger of major first chela without molar-like tooth fitting into socket in fixed finger. (Posterior margin of carapace with distinct "cardiac notch" at base of branchiostegite; antepenultimate segment of third maxilliped not exceptionally broad; epipods present on at least 2 anterior pairs of pereiopods; dactyls of 3 posterior pereiopods simple, not biunguiculate; outer branch of uropod with transverse suture.) 5
Eyes concealed from all but anteroventral view by deflexed frontal margin of carapace; movable finger of major first chela usually provided with large molar-like tooth fitting into socket in fixed finger 6

5.(4) Eyes completely exposed dorsally; rostral projection, if present, not reaching as far as anterolateral margin of carapace .... ****Automate***
Eyes covered dorsally; rostral projection overreaching anterolateral margin of carapace .... ****Salmoneus***

6.(4) Posterior margin of carapace without "cardiac notch" at base of branchiostegite; lateral branch of uropod without transverse suture. (Rostral projection lacking, front unarmed; antepenultimate segment of third maxilliped normal, not unusually expanded; epipods present on at least 2 anterior pairs of pereiopods.) .... ****Thunor***
Posterior margin of carapace with "cardiac notch"; lateral branch of uropod with transverse suture 7

7.(6) Pereiopods without epipods; second pleopod of male without appendix masculina. (Front tridentate; antepenultimate segment of third maxilliped normal, not unusually expanded; dactyls of 3 posterior pereiopods biunguiculate.) .... ****Synalpheus***
Epipods present on at least 2 anterior pairs of pereiopods; second pleopod of male with appendix masculina 8

8.(7) Labrum and mandible not unusually enlarged; antepenultimate segment of third maxilliped not unusually expanded; fourth pereiopod with mastigobranch epipod; appendix masculina normal, not reaching distal ends of either endopod or exopod of male second pleopod .... ****Alpheus***
Labrum greatly swollen and enveloped by expanded incisor process of mandible; antepenultimate segment of third maxilliped broadened to form partial operculum over anterior mouth parts; fourth pereiopod without mastigobranch epipod; appendix masculina greatly enlarged and elongate, overreaching both endopod and exopod of second pleopod .... ****Metalpheus***

*Genus *Alpheopsis* Coutière, 1896

Key to Western Atlantic Species

Carapace smooth, not carinate, without branchiostegal spine; first pereiopods unequal, chelae not triangular in cross section; carpus of second pereiopod with first article about as long as combined lengths of second and third articles .... *112. ***A. labis***
Carapace tricarinate dorsally, with branchiostegal spine; first pereiopods subequal, chelae distinctly triangular in cross section; carpus of second pereiopod with first article about as long as combined lengths of second, third, and fourth articles .... *113. ***A. trigonus***

*112. *Alpheopsis labis*, new species

FIGURE 15

Alpheopsis aequalis.—Armstrong 1941[part]:5, figs. 1D, J, w, w′, w″, x, x′, x″. [Not *A. aequalis* Coutière, 1896.]

MATERIAL.—Antigua Island (Sta. 73–56: 1 ♀ holotype, USNM 135355).

DESCRIPTION.—Rostrum (Figures 15*a–b*) sharply triangular, not reaching as far as end of first segment of antennular peduncle. Carapace smooth, without carinae; anterior margin sloping sinuously but rather regularly posterolaterally from base of rostrum, curving gradually into ventral margin, without branchiostegal spine; posterior margin with deep cardiac notch at base of branchiostegite.

Four anterior abdominal somites without carina in dorsal midline and with rounded pleura, pleuron of fifth somite (Figure 15*c*) rectangular posteriorly. Sixth somite slightly longer than fifth, about two-thirds as long as telson, with sharply triangular articulated plate at base of uropod, and with blunt posterolateral angles either side of base of telson. Telson (Figure 15*d*) nearly two-thirds as broad as long, with pairs of dorsal spines inserted at about midlength and at about three-fourths of distance from base; distal margin convex between very unequal lateral spines and bearing about 7 long setae.

Eyes completely covered by carapace in dorsal view, slightly exposed in lateral view.

Antennular peduncle (Figure 15*e*) with sharp

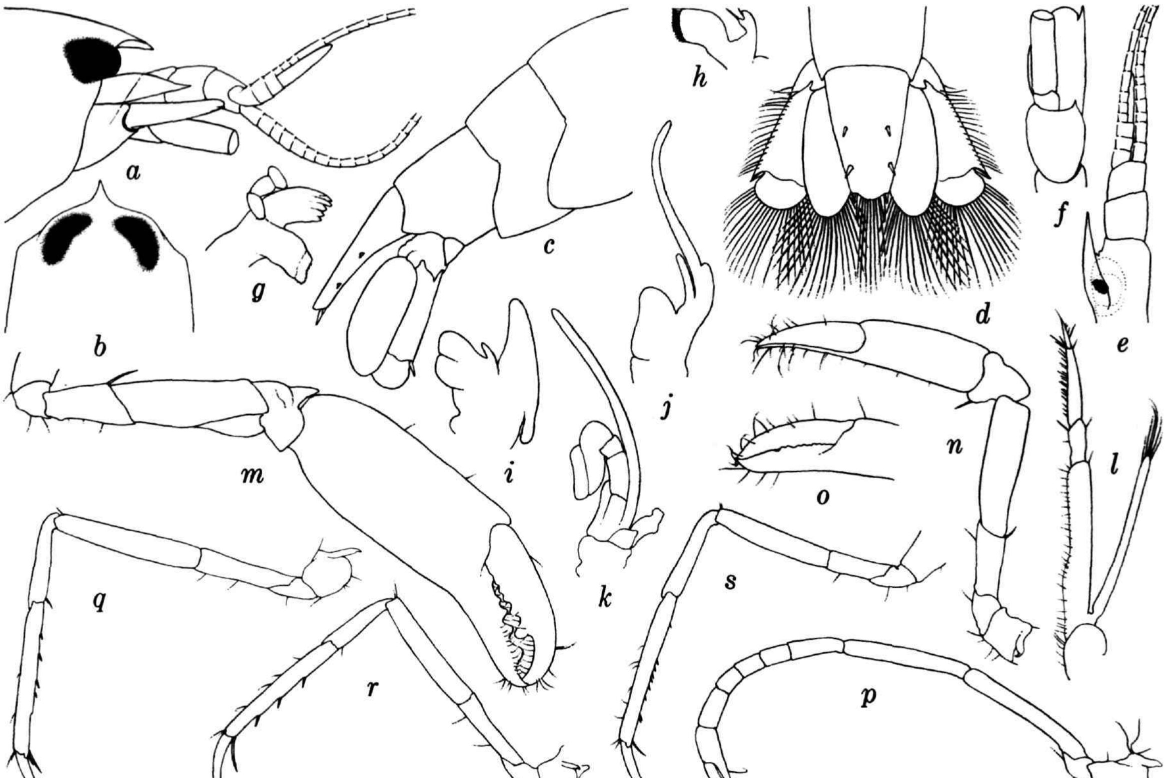


FIGURE 15.—*Alpheopsis labis*, new species, holotype, female, carapace length 2.2 mm: *a*, anterior region, lateral view; *b*, anterior part of carapace, dorsal view; *c*, abdomen, posterior part; *d*, telson and uropods; *e*, left antennule; *f*, left antenna; *g*, left mandible; *h*, left first maxilla, distal part; *i*, left second maxilla; *j*, left first maxilliped; *k*, left second maxilliped; *l*, left third maxilliped; *m*, right first pereiopod; *n*, left first pereiopod; *o*, same, fingers; *p*, left second pereiopod; *q*, left third pereiopod; *r*, left fourth pereiopod; *s*, left fifth pereiopod. (Magnifications: *a–f*, *l–s*, ×25; *g–k*, ×31.)

stylocerite extending slightly beyond midlength of second segment; second segment fully one and one-half times as long as third. Lateral flagellum fused for 3 segments, shorter free branch fully as long as fused portion.

Antennal scale (Figure 15*f*) not quite twice as long as broad, distolateral tooth slightly overreaching distal margin of blade. Basal antennal segment with sharp distal tooth ventral to lateral margin. Antennal peduncle reaching about as far as end of scale.

Mouth parts as figured (Figures 15*g–l*). Mandible with incisor process armed with 6 teeth, palp with broadly rounded distal segment. Second maxilla with scaphognathite narrow distally and proximally. Third maxilliped slightly overreaching antennular peduncle, exopod slightly overreaching antepenultimate segment.

First pereiopods very unequal. Right (major) cheliped (Figure 15*m*) with fingers slightly gaping; armed with bluntly triangular or lobate teeth on opposable margins; distinctly more than half as long as palm. Left first cheliped (Figure 15*n*) much shorter and more slender than right; fingers (Figure 15*o*) not gaping, faintly and irregularly serrate on opposable margins, more than four-fifths as long as palm. Second pereiopods (Figure 15*p*) similar and slender; fingers slightly longer than palm; carpus composed of five articles, proximal article as long as combined lengths of second and third, about half again as long as distal article; merus considerably longer than 3 proximal articles of carpus; ischium slightly longer than merus. Third pereiopod (Figure 15*q*) with dactyl about half as long as propodus; carpus about two-thirds as long as propodus; merus slightly shorter than propodus; ischium subequal to carpus. Fourth pereiopod (Figure 15*r*) shorter than third, but dactyl proportionately longer. Fifth pereiopod (Figure 15*s*) subequal in length to fourth, but carpus and propodus proportionately longer.

Lateral branch of uropod (Figure 15*d*) with straight lateral margin terminating in sharp tooth; prominent movable spine inserted in pronounced notch between distolateral tooth and margin of blade.

SIZE.—Carapace length to base of rostrum 2.2 mm.

HABITAT.—The unique specimen was collected on a boulder-studded sandy beach.

TYPE-LOCALITY.—Charlotte Point, English Harbour, Antigua Island.

DISTRIBUTION.—Bermudas, Cuba, Hispaniola, and Antigua Island.

REMARKS.—Except for the very dissimilar first pereiopods and the unusual dentition on the fingers of the major chela, which suggested the name (labis, G. = tongs), this species could easily be confused with *A. aequalis* Coutière, 1896. The latter species has been shown to be variable, especially as regards the development of a branchiostegal or pterygostomian tooth and marginal teeth on the abdominal pleura (Armstrong 1941:6), but it is unlikely that this variation could encompass a difference as great as that displayed by the major cheliped. Inasmuch as Armstrong failed to mention the first pereiopods in his detailed description of the specimens that he assigned to *A. aequalis* from the Bermudas, Cuba, and the Dominican Republic, it was suspected that those appendages were not intact. Dorothy E. Bliss of the American Museum of Natural History has kindly examined Armstrong's specimens and reported that all three lack the major cheliped and only one of them has the minor cheliped. There is little doubt, therefore, that these specimens are *A. labis* and that Armstrong would have realized that they represented an undescribed species had they been complete.

*113. *Alpheopsis trigonus* (Rathbun), new combination

Jousseaumea trigona Rathbun, 1901:111, fig. 21.

MATERIAL.—Peter Island (Sta. 22–58: 1 ♂, 1 ovig. ♀).—Barbuda (Sta. 112a–58: 1 ♂).—Bahía del Espíritu Santo (Sta. 41–60: 1 ♂).

HABITAT.—The male from Peter Island was found in a tin can, the ovigerous female in a *Strombus*; the documentation does not indicate whether the gastropod was living or merely an empty shell. The smaller males from Barbuda and Bahía del Espíritu Santo were cracked from dead coral. All were taken in less than 3 meters of water.

TYPE-LOCALITY.—Off Isla de Vieques, Puerto Rico; 11 meters.

DISTRIBUTION.—Bermuda to Barbados and westward to the Yucatan Peninsula; to a depth of 11 meters.

REMARKS.—The presence of a movable plate at the posterolateral angle of the sixth abdominal somite excludes this species from *Salmoneus* (= *Jousseaumea*), and the outstretched first chelae, the convex distal margin of the telson, and the presence of an arthrobranch at the base of the third maxilliped leave little doubt that it belongs in *Alpheopsis.*

The male and ovigerous female specimens from Peter Island have carapace lengths, to the base of the rostrum, of 4.75 and 5.25 mm, respectively. They agree in nearly every way with the original description of the species. The smaller males from Barbuda and Bahía del Espíritu Santo, with carapace lengths of 3.8 and 3.9 mm, clearly differ from the large specimens in two respects: the ocular hoods are armed with an elongate tooth distal to the end of the submedian carina on the carapace, and the second and third lateral carinae on the carapace are lacking, only the submedian carina and the carina supporting the branchiostegal spine being present. A male from Bermuda with a carapace length of 4.6 mm also lacks the second and third lateral carinae, and the ocular hoods, although more produced than in the typical form, are not dentate. These differences are so striking as to seem of specific importance, but they probably represent only growth changes.

*Genus *Alpheus* Fabricius, 1798

Key to Western Atlantic Species

1. Rostrum lacking, front emarginate between ocular hoods. (Ocular hoods rounded, unarmed.) .... 136. ***A. simus***
   Rostrum present 2

2.(1) Frontal region evenly convex dorsally, adrostral depressions lacking; fingers of minor first chela strongly curved in vertical plane. (Rostrum short, subrectangular, not elevated in midline; ocular hoods subrectangular, frontal margin broadly tridentate; major first chela subcylindrical, without marginal notches on palm; proximal article of carpus of second pereiopod longer than second article; third and fourth pereiopods with dactyl biunguiculate, merus without distal tooth on flexor margin, ischium without movable spine on lateral surface.) .... *124. ***A. cylindricus***
   Ocular hoods mesially delimited by adrostral depressions or furrows; fingers of minor first chela not noticeably curved in vertical plane 3

3.(2) Rostrum dorsally flat, at least in distal portion; ocular hood armed with spine arising from surface of hood, not from margin, although appearing marginal in *A. malleator* because of receding ventral portion of hood. (Adrostral furrows sharply defined and partially delimited posteriorly; marginal lobe or projection between rostrum and ocular hood; proximal article of carpus of second pereiopod longer than second article.) 4
   Rostrum either rounded or carinate in dorsal midline, not flat; ocular spine, if present, arising from margin of hood 7

4.(3) Spine on ocular hood arising from mesial slope, overhanging adrostral furrow; merus of third and fourth pereiopods armed with distal tooth on flexor margin. (Fingers of minor first chela of male not "balaeniceps-shaped"; third and fourth pereiopods with simple dactyl and movable spine on lateral surface of ischium.) 5
   Spine on ocular hood arising from anterior slope, overhanging frontal margin; merus of third and fourth pereiopods unarmed at distal end of flexor margin. (Fixed finger of major first chela notched on opposable margin distal to socket; distolateral spine on lateral branch of uropod dark colored in male.) 6

5.(4) Small tooth or tubercle in midline of carapace in line with posterior limits of adrostral furrows; palm of major first chela with dorsal and ventral margins entire, not notched, fixed finger notched on opposable margin distal to socket; distolateral spine on lateral branch of uropod dark colored in male .... *115. ***A. armatus***
   No tooth or tubercle in midline of carapace; palm of major first chela notched both dorsally and ventrally, fixed finger not notched distal to socket; distolateral spine on lateral branch of uropod not dark colored .... *128. ***A. intrinsecus***

6.(5) Ventrolateral tooth on basal segment of antennal peduncle not overreaching stylocerite; antennal scale lacking prominent tooth or lobe near proximal end of lateral margin; merus of first pereiopod with distal tooth on mesial flexor margin; palm of major first chela with both dorsal and ventral margins entire, not notched; movable finger of minor first chela laterally and mesially carinate, densely setose ("balaeniceps-shaped") in both males and females; third and fourth pereiopods

Key to Western Atlantic Species—Continued

with dactyl simple, ischium with movable spine on lateral surface; distolateral spine on lateral branch of uropod dark colored in both male and female. *126. ***A. formosus***

Ventrolateral tooth on basal segment of antennal peduncle distinctly overreaching stylocerite; antennal scale with prominent curved tooth or lobate projection near proximal end of lateral margin; merus of first pereiopod without distal tooth on flexor margin; palm of major first chela notched dorsally; minor first chela not "balaeniceps"-shaped in either male or female; third and fourth pereiopods with dactyl biunguiculate, ischium unarmed; distolateral spine on lateral branch of uropod dark colored in male only .... *129. ***A. malleator***

7.(3) Ocular hoods spined. (Adrostral furrows not abruptly delimited posteriorly; antennal scale without large tooth or lobe near proximal end of lateral margin; palm of major first chela notched ventrally, fixed finger not notched on opposable margin distal to socket.) 8

Ocular hoods not spined. (Third and fourth pereiopods with simple dactyls.) 11

8.(7) Ventrolateral tooth on basal segment of antennal peduncle not overreaching stylocerite; merus of first pereiopod with sharp distal tooth on mesial flexor margin; third and fourth pereiopods with dactyl not distinctly biunguiculate (minute tooth on flexor margin of dactyl in *A. ridleyi*). (Merus of third and fourth pereiopods without distal tooth on flexor margin.) 9

Ventrolateral tooth on basal segment of antennal peduncle distinctly overreaching stylocerite; merus of first pereiopod without distinct sharp tooth at distal end of flexor margin; third and fourth pereiopods with dactyl distinctly biunguiculate. (No notch in true dorsal margin of major chela in line with movable finger.) 10

9.(8) Rostrum simply convex in dorsal midline, not carinate; major first chela twisted, not notched in true dorsal margin; third and fourth pereiopods without accessory denticle on flexor margin of dactyl, ischium with movable spine on lateral surface; distolateral spine on lateral branch of uropod not dark colored in male
*114. ***A. amblyonyx***

Rostrum dorsally carinate in midline; major first chela notched dorsally, not noticeably twisted; third and fourth pereiopods with inconspicuous denticle on flexor margin of dactyl, ischium without movable spine on lateral surface; distolateral spine on lateral branch of uropod dark colored in male .... *134. ***A. ridleyi***

10.(8) Third and fourth pereiopods without distal tooth on flexor margin of merus
122. ***A. candei***

Third and fourth pereiopods with distal tooth on flexor margin of merus
*133. ***A. peasei***

11.(7) Antennal scale with prominent curved tooth or lobe near proximal end of lateral margin. (Rostrum carinate in dorsal midline; adrostral furrows abruptly delimited posteriorly; major first chela notched dorsally and ventrally; third and fourth pereiopods without distal tooth on flexor margin of merus.) 12

Antennal scale without prominent tooth or lobe near proximal end of lateral margin 13

12.(11) Second segment of antennular peduncle about three times as long as third segment; proximal article of carpus of second pereiopod longer than second
118. ***A. barbadensis***

Second segment of antennular peduncle less than twice as long as third; proximal article of carpus of second pereiopod two-thirds as long as second .... 120. ***A. belli***

13.(11) Merus of third and fourth pereiopods with prominent acute tooth at distal end of flexor margin. (Merus of first pereiopod with tooth at distal end of mesial flexor margin; fixed finger of major first chela with notch in opposable margin distal to socket; proximal article of carpus of second pereiopod shorter than second article; third and fourth pereiopods with movable spine on lateral surface of ischium.) .. 14

Merus of third and fourth pereiopods with distal end of flexor margin rounded or rectangular, not produced into prominent tooth 15

14.(13) Lobe on frontal margin between rostrum and ocular hood; major first chela subcylindrical, without dorsal or ventral notches .... *123. ***A. cristulifrons***

No lobe on frontal margin between rostrum and ocular hood; major first chela compressed, deeply notched dorsally and ventrally .... *117. ***A. bahamensis***

Key to Western Atlantic Species—Continued

15.(13) Major first chela notched dorsally 16
Major first chela with dorsal and ventral margins entire, not notched. (Major first cheliped with tooth at distal end of mesial flexor margin of merus; fixed finger of major chela with notch in opposable margin distal to socket; minor first chela of male not "balaeniceps"-shaped; third and fourth pereiopods with movable spine on lateral surface of ischium.) 23

16.(15) Major first chela notched ventrally 17
Major first chela not notched ventrally 22

17.(16) Third and fourth pereiopods with movable spine on lateral surface of ischium 18
Third and fourth pereiopods without spine on ischium 20

18.(17) Merus of first pereiopod unarmed at distal end of mesial flexor margin; dactyls of third and fourth pereiopods usually subspatulate .... 127. ***A. heterochaelis***
Merus of first pereiopod armed with sharp tooth at distal end of mesial flexor margin; dactyls of third and fourth pereiopods not subspatulate 19

19.(18) Adrostral furrows *usually* abruptly delimited posteriorly; fixed finger of major first chela without V-shaped notch in opposable margin distal to socket
*116. ***A. armillatus***
Adrostral furrows not abruptly delimited posteriorly; fixed finger of major first chela with sharply V-shaped notch in opposable margin distal to socket
*137. ***A. viridari***

20.(17) Minor first chela with fingers slightly, if at all, more than half as long as palm; proximal article of carpus of second pereiopod much shorter than second article. (Fingers of minor first chela not "balaeniceps"-shaped in male.) *135. ***A. schmitti***
Minor first chela with fingers about as long as palm; proximal article of carpus of second pereiopod longer than second article 21

21.(20) Movable finger of major first chela regularly and highly arched throughout length of extensor margin; fingers of minor first chela "balaeniceps"-shaped in male; second article of carpus of second pereiopod subequal to fifth article in length
*121. ***A. bouvieri***
Movable finger of major first chela not strongly convex in proximal part of extensor margin; fingers of minor first chela not "balaeniceps"-shaped in male; second article of carpus of second pereiopod distinctly longer than fifth article .. *131. ***A. nuttingi***

22.(16) Ocular hoods subtriangularly produced anteriorly; ventral margin of major first chela with shallow sinus at base of fixed finger .... *130. ***A. normanni***
Ocular hoods rounded, not produced anteriorly; ventral margin of major first chela without sinus at base of fixed finger .... 119. ***A. beanii***

23.(15) Rostrum dorsally carinate or subcarinate; proximal article of carpus of second pereiopod shorter than second article; dactyls of third and fourth pereiopods subspatulate
*125. ***A. floridanus***
Rostrum dorsally convex, not subcarinate; proximal article of carpus of second pereiopod longer than second article; dactyls of third and fourth pereiopods not subspatulate .... *132. ***A. paracrinitus***

*114. *Alpheus amblyonyx*, new species

FIGURE 16

Alpheus macrocheles.—Rathbun 1901:105.—Zimmer 1913: 386, fig. F. [Not *A. macrocheles* Hailstone, 1835.]
Crangon macrocheles?—Schmitt 1935:142.

MATERIAL.—Dominica (Sta. 55–56: 1 ovig. ♀).—Bahía de la Ascensión (Sta. 52–60: 1 ovig. ♀ [holotype, USNM 135356]; Sta. 82–60: 1♂; Sta. 83–60: 1♂; Sta. 91–60: 1♂, 1 juv.).

DESCRIPTION.—Rostrum (Figures 16*a, b*) sharply triangular, dorsally rounded, not carinate, reaching nearly as far as anteromesial margin of basal segment of antennular peduncle. Ocular hoods moderately produced, separated from rostrum by shallow indistinct depressions, and armed with sharp tooth directed anteriorly and slightly mesially; anterior margin slanting anterolaterally from base of rostrum to ocular tooth. Anterior margin of carapace almost vertical from ocular hood nearly to ventral margin of basal segment of antennal peduncle. Posterior margin of carapace with pronounced cardiac notch.

Abdominal pleura of 4 anterior somites broadly rounded, of fifth somite subrectangularly rounded.

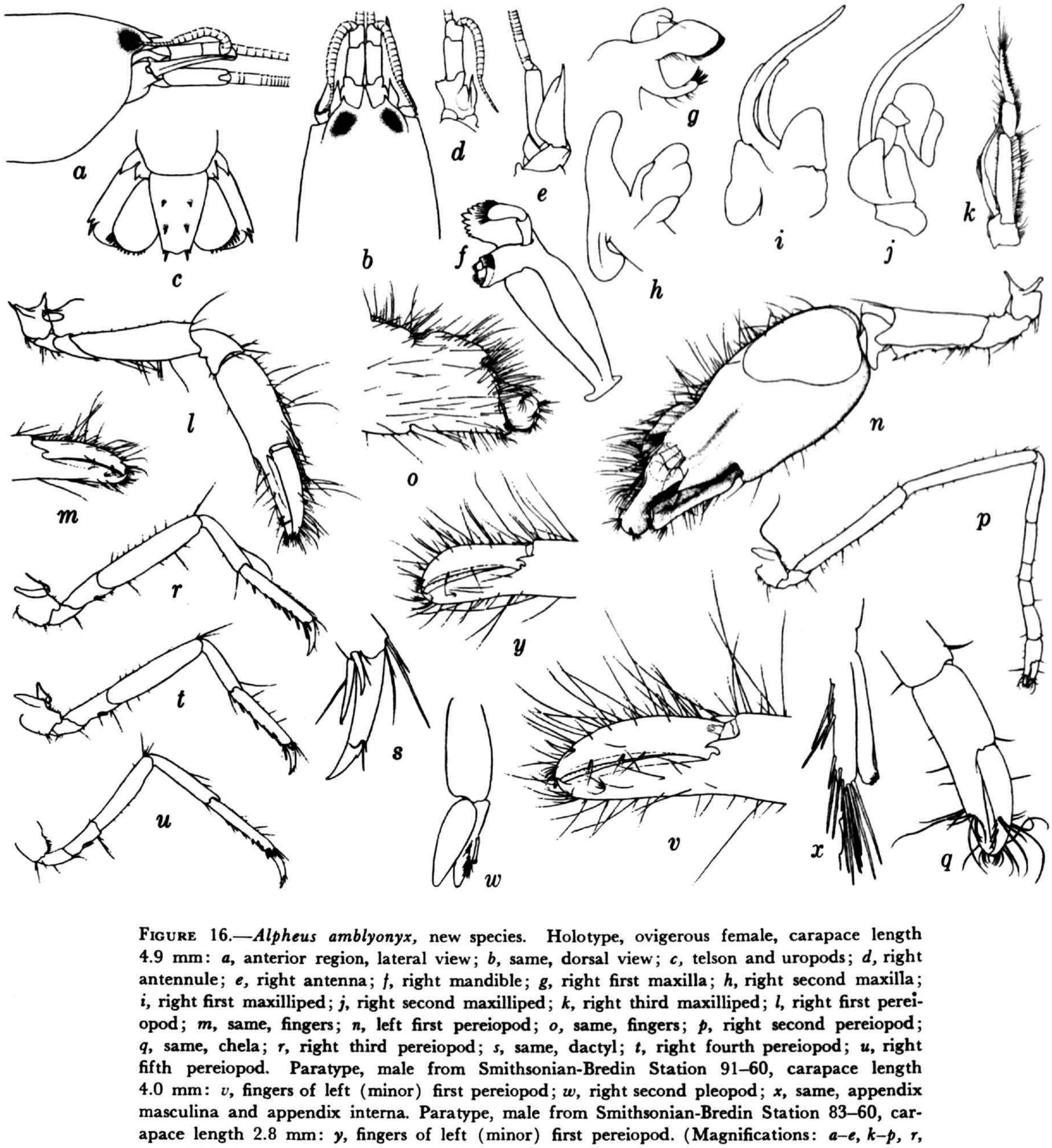


FIGURE 16.—*Alpheus amblyonyx*, new species. Holotype, ovigerous female, carapace length 4.9 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, telson and uropods; *d*, right antennule; *e*, right antenna; *f*, right mandible; *g*, right first maxilla; *h*, right second maxilla; *i*, right first maxilliped; *j*, right second maxilliped; *k*, right third maxilliped; *l*, right first pereiopod; *m*, same, fingers; *n*, left first pereiopod; *o*, same, fingers; *p*, right second pereiopod; *q*, same, chela; *r*, right third pereiopod; *s*, same, dactyl; *t*, right fourth pereiopod; *u*, right fifth pereiopod. Paratype, male from Smithsonian-Bredin Station 91–60, carapace length 4.0 mm: *v*, fingers of left (minor) first pereiopod; *w*, right second pleopod; *x*, same, appendix masculina and appendix interna. Paratype, male from Smithsonian-Bredin Station 83–60, carapace length 2.8 mm: *y*, fingers of left (minor) first pereiopod. (Magnifications: *a–e*, *k–p*, *r*, *t*, *u*, ×7.5; *f–j*, *v*, *w*, *y*, ×15.5; *q*, *s*, ×31; *x*, ×78.)

Sixth somite rather narrowly rounded both dorsal and ventral to insertion of uropod. Telson (Figure 16*c*) fully one-third again as long as broad, posterior margin about half as wide as anterior margin; 2 pairs of dorsal spines, anterior pair inserted distinctly anterior to midlength of telson, posterior pair approximately midway between anterior pair and posterior margin of telson; posterior margin convex mesially, slightly concave laterally, armed with 2 pairs of lateral spines, mesial pair more than twice as long as lateral pair, space between spines bearing double row of long setae.

Eyes entirely concealed by ocular hoods.

Antennular peduncle (Figure 16*d*) with stylocerite convex proximally, narrowing to long sharp point reaching nearly to distal margin of basal segment; basal segment with deep, sharp, distally truncate carina extending from ventral surface. Second segment subequal in length to first, about twice as long as third.

Antennal scale (Figure 16*e*) about three times as long as wide; outer margin faintly sinuous, distal spine stout, reaching slightly beyond end of antennular peduncle; blade very narrow distally, falling far short of tip of spine. Antennal peduncle falling slightly short of end of spine of antennal scale; basal segment with sharp lateral tooth below base of antennal scale.

Mouth parts as figured (Figures 16*f–k*). Mandible with 8 marginal teeth and rudimentary one on incisor process. Third maxilliped reaching as far as end of antennal scale, exopod overreaching antepenultimate segment.

Major first cheliped (Figures 16*n,o*) overreaching antennal scale by most of deeply sculptured and twisted chela. Movable finger opening and closing in nearly horizontal plane; strongly arched, nearly semicircular in profile; compressed proximally, swollen and bluntly rounded distally with pronounced groove either side of midline; opposable margin with bluntly subtriangular tooth in extreme proximal portion fitting into socket in fixed finger. Palm with 2 deep longitudinal grooves on lateral surface, separated by subcylindrical elevation tapering to sharp conical tip reaching distally beyond level of proximal margin of socket in fixed finger; mesial surface with transverse groove delimiting distal elevation, latter with sinuous margin and terminating in compressed downcurved sharp tooth reaching about as far as, or slightly beyond, tip of lateral elevation; true dorsal margin entire (although broad notch on mesial surface appears dorsal); ventral margin with distinct notch. Merus with 5 movable spinules and sharp distal tooth on mesial flexor margin. Minor first cheliped (Figure 16*l*) overreaching antennal scale by length of chela. Movable finger (Figures 16*m,v,y*) slightly shorter than palm, obscurely carinate on mesial extensor margin, lateral surface transversely convex, mesial surface flattened. Palm with low distal mesiodorsal elevation terminating in sharp distal tooth reaching beyond base of movable finger; ventral margin rather abruptly narrowing near base of fixed finger but not notched. Merus with several movable spinules and sharp distal tooth on mesial flexor margin. Second pereiopod (Figure 16*p*) overreaching antennal scale by chela, carpus, and extreme distal portion of merus. Movable finger (Figure 16*q*) slightly longer than palm. Carpus about four times as long as chela, subdivided into 5 articles decreasing in length as follows: 1, 2, 5, 4, 3. Merus as long as proximal 3 and nearly half of fourth articles of carpus and subequal in length to ischium. Third pereipod (Figure 16*r*) overreaching antennal scale by dactyl and half of propodus; dactyl (Figure 16*s*) about two-fifths as long as propodus, with minute denticle on extensor margin at about one-fourth of distance from tip, flexor margin entire; propodus with 8 or 9 slender spines on flexor margin; carpus slightly more than four-fifths as long as propodus; merus unarmed, more than four times as long as wide, as long as carpus and at least half of propodus; ischium with movable spine near ventral margin. Fourth pereiopod (Figure 16*t*) overreaching antennal scale by length of dactyl, similar to, but slightly more slender than, third pereiopod. Fifth pereiopod (Figure 16*u*) reaching to end of antennal scale, more slender than fourth; dactyl about half as long as propodus; propodus with about 6 spines on flexor margin and several transverse rows of setae in distal third; carpus about as long as propodus; merus only slightly longer than carpus.

Second pleopod of male (Figure 16*w*) with appendix masculina (Figure 16*x*) barely overreaching appendix interna. Uropod (Figure 16*c*) with lateral margin of lateral branch terminating in 2 sharp teeth and rather long, uncolored movable spine; mesial branch with series of rather long spines, in addition to setae, on distal margin.

Eggs numerous and small, measuring about 0.5 by 0.6 mm.

SIZE.—Males with carapace lengths, to base of rostrum, of 2.8–5.1 mm; ovigerous females, 4.8 and 4.9 mm (larger is holotype); juvenile, 1.3 mm.

HABITAT.—This species was collected from reef corals in 1–5 feet of water and on grass and *Porites* flats.

TYPE-LOCALITY.—Near center of Arrecife Nicchehabin, Bahía de la Ascensión, Territorio de Quintana Roo, Mexico, on or under coral in 1–5 feet of water.

DISTRIBUTION.—Territorio de Quintana Roo, Mexico; Puerto Rico; Saint Thomas; and Dominica; sublittoral.

REMARKS.—This apparently uncommon species is unquestionably closely related to *A. macrocheles* Hailstone, 1835, from the eastern Atlantic and Mediterranean. I am inclined to believe, however, that some of the differences noted between the specimens in the present collection and a pair of larger British specimens of *A. macrocheles* examined are constant. *Alpheus amblyonyx* seems to have a more prominent rostrum. The movable finger of the major chela seems to be more strikingly bulbous distally; the transverse notch on the mesiodorsal surface of the palm is broader and less sharply defined; and the elevation distal to this notch is sinuous rather than simply convex. The minor chela lacks a high, sharp crest on the extensor margin of the movable finger, and there is no sharply defined notch on the ventral margin of the chela. The lack of a sharp crest on the movable finger of the minor chela seems to be the most obvious difference; hence, the specific name (amblys, G., = blunt + onyx, G., = claw).

*115. *Alpheus armatus* Rathbun

Alpheus armatus Rathbun, 1901:108, fig. 20.—Zimmer 1913:395, figs. W–Z, A[1], B[1].

MATERIAL.—Tortola (Sta. 117–56: 1♂, 3♀ [2 ovig.]; Sta. 23–58: 2♂, 1 ovig.♀).—Virgin Gorda (Sta. 111–56: 1 ovig.♀; Sta. 112–56: 1y♂).—Saint Christopher (Sta. 103–56: 1♀).—Antigua Island (Sta. 73–56: 2♂, 1 ovig.♀; Sta. 75–56: 2♂, 2 ovig. ♀; Sta. 113–59: 2♀ [1 ovig.]).—Saint Lucia Island (Sta. 41–56: 3♂, 2 ovig.♀; Sta. 53–59: 1 ovig.♀; Sta. 60–59: 1♂).—Tobago (Sta. 4–59: 1♂, 1 ovig. ♀; Sta. 15–59; 1♀; Sta. 31–59: 2♂, 1 ovig.♀, 2 juv.).—Isla de Cozumel (Sta. 34–60: 1♂, 1 ovig. ♀).—Bahía de la Ascensión (Sta. 72–60: 1 juv.).

HABITAT.—This large and strikingly colored snapping shrimp is usually associated with the sea anemone *Bartholomea annulata.* A male and a female is often nestled against the base of the column of each anemone. Limbaugh, Pederson, and Chace (1961:246) noted that this shrimp off New Providence, Bahamas, "is apparently dependent upon the anemone for protection and vice versa. The snapping shrimp digs a burrow for both of them. It spends most of its time at the burrow entrance with its banded antennae mixed with the banded tentacles of the anemone. If danger comes near, the shrimp withdraws quickly, causing the anemone to contract and plug the entrance of the burrow."

TYPE-LOCALITY.—Ponce, Puerto Rico.

DISTRIBUTION.—Throughout the West Indian region from the Bahamas and southern Florida to Tobago and westward to the Yucatan Peninsula; sublittoral.

*116. *Alpheus armillatus* H. Milne Edwards

Alpheus armillatus H. Milne Edwards, 1837a:354.—Zimmer 1913:401, figs. K[1]–T[1].—Williams 1965b:67, fig. 55.

MATERIAL.—Guana Island (Sta. 9–58: 1 ovig. ♀).—Virgin Gorda (Sta. 111–56: 1 ovig.♀; Sta. 112–56: 3♂, 1 ovig.♀, 1 juv.; Sta. 37, 38, or 39–58: 1 ovig.♀).—Anguilla (Sta. 55–58: 2♂, 3 ovig.♀).—Barbuda (Sta. 111–58: 1♀; Sta. 112a–58: 1♀; Sta. 98–59: 1♂, 2 ovig.♀; Sta. 102–59: 1♂).—Saint Christopher (Sta. 103–56: 2♀).—Antigua Island (Sta. 73–56: 3♂, 4♀ [3 ovig.]; Sta. 74–56: 1♂, 2 ovig.♀; Sta. 123–58: 1♀ with branchial bopyrid; Sta. 110–59: 2♀ [1 ovig.]; Sta. 112–59: 1♂, 3 juv.).—Guadeloupe (Sta. 68–56: 8♂, 6♀ [3 ovig.]).—Tobago Cays (Sta. 21–56: 1♂).—Tobago (Sta. 4–59: 1♂, 1y♀; Sta. 6–59: 3♀ [2 ovig.]).—Isla de Cozumel (Sta. 34–60: 1 ovig.♀; Sta. 47–60: 2y♂, 2y♀, 7 juv.).—Bahía de la Ascensión (Sta. 72–60: 2 juv.; Sta. 77–60: 6♂, 5 ovig. ♀, 1 juv.; Sta. 82–60: 1 juv.; Sta. 85–60: 4♂, 6 ovig.♀, 2 juv.; Sta. 91–60: 3♂, 3♀; Sta. 93–60: 4♂; Sta. 95–60: 4♀ [1 ovig.], 6 juv.).

HABITAT.—The conditions at the collecting stations listed above suggest that *A. armillatus* occurs, not only under stones and oyster bars and in the interstices of coral rock, but also very frequently on turtle-grass flats from shallow water to a depth of 9 meters. Its occurrence on grass flats seems at variance with the observations of Armstrong (1949:12), who noted that *A. armillatus* was found only among and under stones, whereas the closely related *A. viridari* was confined to grass banks. It is possible, of course, that the present material was found in and under objects on the flats, especially in clumps of living or dead *Porites,* which are common on most of the flats investigated.

TYPE-LOCALITY.—Antilles.

DISTRIBUTION.—North Carolina, Gulf of Mexico, and Bermudas to Estado de São Paulo, Brazil; sublittoral.

*117. *Alpheus bahamensis* Rankin

Alpheus hippothoe var. *bahamensis* Rankin, 1898:247, pl. 30: fig. 5.
Alpheus hippothoe var. *edamensis?*—Zimmer 1913:405, figs. u^1–z^1. [Not *A. hippothoe* var. *edamensis* De Man, 1888.]

MATERIAL.—Tortola (Sta. 117–56: 1♂, 1 ovig. ♀).—Virgin Gorda (Sta. 112–56: 5♂, 2 ovig. ♀).—Anguilla (Sta. 55–58: 2 ovig. ♀).—Barbuda (Sta. 92–56: 1♂, 1 ovig. ♀).—Saint Christopher (Sta. 103–56: 1 juv.).—Antigua Island (Sta. 73–56: 7♂, 6♀ [3 ovig.]; Sta. 77–56: 1 juv.; Sta. 96–58: 1♂; Sta. 110–59: 16♂, 13 ovig. ♀).—Guadeloupe (Sta. 69–56: 12♂, 12♀ [10 ovig.]).—Dominica (Sta. 75–59: 3♂, 1 ovig. ♀, 3 juv.).—Saint Lucia Island (Sta. 60–59: 3♂).—Tobago Cays (Sta. 21–56: 3♂, 2 ovig. ♀).—Carriacou (Sta. 16–56: 13♂, 10 ovig. ♀, 1?; Sta. 17–56: 2♂).—Grenada (Sta. 9–56: 1♂).—Tobago (Sta. 4–59: 1♂, 2 ovig. ♀; Sta. 6–59: 1 ovig. ♀; Sta. 8–59: 4♂, 4♀ [3 ovig.], 2 juv., 1?; Sta. 15–59: 1♂, 1♀; Sta. 31–59: 1♂, 3♀ [1 ovig.], 1 juv.).—Isla de Cozumel (Sta. 47–60: 1♂, 3♀ [1 ovig.]).—Bahía de la Ascensión (Sta. 68–60: 1 ovig. ♀; Sta. 72–60: 1♂; Sta. 85–60: 36♂, 38♀ [35 ovig.], 7 juv.; Sta. 93–60: 1 ovig. ♀; Sta. 95–60: 1 juv., 1 major chela).

HABITAT.—These records seem to indicate that *A. bahamensis* occurs most frequently among, under, or in dead coral, coral rock, and boulders in the intertidal zone or slightly below. Occasional specimens were taken on grass flats, but it is possible that they were associated with clumps of *Porites* or *Pocillopora*.

TYPE-LOCALITY.—New Providence Island, Bahamas.

DISTRIBUTION.—Throughout the West Indies region from the Bermudas and Dry Tortugas to Tobago and westward to the Yucatan Peninsula; sublittoral.

118. *Alpheus barbadensis* (Schmitt)

Crangon barbadensis Schmitt, 1924c:70, pl. 2: figs. 1–3.

TYPE-LOCALITY.—Barbados.

DISTRIBUTION.—Apparently known only from the type-series from Barbados.

119. *Alpheus beanii* Verrill

Alpheus beanii Verrill, 1922:81, fig. 7, pl. 22: fig. 5, pl. 32: figs. 1*a–h*.

TYPE-LOCALITY.—Challenger Bank, Bermudas.

DISTRIBUTION.—Apparently known only from the type-series taken on Challenger Bank in 44 meters.

120. *Alpheus belli* Coutière

Alpheus Belli Coutière, 1898b:149, figs. 1, 1*a*.

TYPE-LOCALITY.—Fernando de Noronha.

DISTRIBUTION.—Apparently known only from the unique type-specimen from Fernando de Noronha.

*121. *Alpheus bouvieri* A. Milne-Edwards

Alpheus bouvieri A. Milne-Edwards, 1878:231.—Crosnier and Forest 1966:273, fig. 22.

MATERIAL.—Antigua Island (Sta. 73–56: 1 cephalothorax).—Guadeloupe (Sta. 70–56: 1♂, 1 ovig. ♀).—Tobago Cays (Sta. 21–56: 6♂, 7♀ [3 ovig]).—Grenada (Sta. 4–56: 2♂; Sta. 8–56: 1♂, 1 ovig. ♀).—Tobago (Sta. 15–59: 1♂, 1 ovig. ♀).

HABITAT.—Most of the specimens were found in and among rocks and dead coral near or above low-tide level.

TYPE-LOCALITY.—Cape Verde Islands.

DISTRIBUTION.—Bermudas and Antigua Island to Tobago and Fernando de Noronha; eastern Atlantic from the Cape Verde Islands and Guinea to São Tomé and Congo; intertidal.

REMARKS.—Banner and Banner (1964:92) synonymized *A. bouvieri* with *A. leviusculus* Dana, 1852. Their description of the latter species, however, reveals differences from the Atlantic form that seem to be of specific significance. The merus of the major first cheliped of *A. leviusculus* has a small tooth at the distal end of the internal flexor margin; in *A. bouvieri,* this angle is evenly rounded. According to the Banners' figure, the palm of the major chela is about 1.90 times as long as high; in 15 specimens of *A. bouvieri* with major chelipeds in the present collection, this ratio ranges from 1.48 to 1.80 and averages 1.66. Apparently the movable finger of the minor first cheliped in males of *A. leviusculus* is rarely carinate laterally ("balaeniceps"-shaped), and then only obscurely so, whereas all but one of the six males of *A. bouvieri* in which the minor cheliped is intact have the finger distinctly of this form, and there is evidence of regeneration in the single exception. The tooth at the articulation of the movable finger is apparently sharp in *A. leviusculus,* whereas it is subrectangular or broadly and bluntly acute in *A. bouvieri.* The Banners indicate that the second article of the carpus of the second pereiopod is shorter than the fifth article. In 20 specimens of *A. bouvieri* in which the second pereiopod is intact, the second carpal article varies from 0.98 to 1.66 times as long as the fifth; the average ratio is 1.13, and in only one specimen is the second article shorter than the fifth. Perhaps of most importance is the presence of a movable spine on the ischium of the third pereiopod in *A. leviusculus* and the complete absence of this spine in *A. bouvieri.*

The pair of specimens from Clipperton Island tentatively identified as *A. bouvieri* by Chace (1962: 610), as well as three males and six females (five ovigerous) of the same form in the Smithsonian collections from Santa María Island, Galapagos, are intermediate between *A. bouvieri* and *A. leviusculus.* They resemble the latter in having the palm of the major chela elongate (1.76 to 1.97 times as long as high) and in having the movable finger of the minor chela rounded, not "balaeniceps"-shaped, but they are more like *A. bouvieri* in having the merus of the major cheliped angularly rounded or subrectangular at the distal angle, in having the tooth on the minor chela at the articulation of the finger subrectangular or broadly and bluntly acute, in having the second article of the carpus of the second pereiopod almost invariably longer than the fifth article, and in lacking a movable spine on the ischium of the third pereiopod. The presence of this intermediate form in the eastern Pacific might be construed as evidence to support the Banners' contention that *A. leviusculus* is a variable pantropical species, possibly with Atlantic and eastern Pacific subspecies, but it seems best for the time being to treat all three forms as separate species.

The specimen from the Galapagos Islands identified as *A. bouvieri* var. *chilensis* by Schmitt (1942b: 162) belongs to this species and not to *A. chilensis* Coutière (in Lenz 1902). There is another, possibly undescribed, species in the Galapagos Islands, however, as indicated by a male and an ovigerous female without major chelipeds in the Smithsonian collections. These specimens differ from the other species from the eastern Pacific in having the rostrum broadly depressed and noncarinate, as in *A. chilensis,* in having the lower margin of the rostrum slanted slightly downward, rather than nearly horizontal or slanting slightly upward, in having the movable finger of the minor chela "balaeniceps"-shaped, and in having a movable spine on the ischium of the third pereiopod, as in *A. leviusculus.*

122. *Alpheus candei* Guérin-Méneville

Alpheus candei Guérin-Méneville, 1855:xix, pl. 2: figs. 9, 9*a*.—Coutière 1910:486, fig. 1.

MATERIAL.—Probably not represented in the Smithsonian-Bredin collections (see below).

TYPE-LOCALITY.—Cuba.

DISTRIBUTION.—Apparently known only from the Dry Tortugas, Florida, and Cuba.

REMARKS.—A single juvenile specimen from Dominica (Sta. 62–56) approaches *A. candei,* but it differs from the descriptions and figures of Guérin-Méneville and Coutière in having a much shorter spine on the basal segment of the antennal peduncle, a more pronounced notch in the ventral margin of the major chela, and the second pereiopod proportionately less elongate.

*123. *Alpheus cristulifrons* Rathbun

Alpheus Obeso-manus.—Pocock 1890:520. [Not *A. obesomanus* Dana, 1852.]

Alpheus cristulifrons Rathbun, 1900:152.—Crosnier and Forest 1966:260, figs. 17, 18.

MATERIAL.—Guana Island (Sta. 9–58: 1♂).—Virgin Gorda (Sta. 111–56: 2♂, 1 ovig. ♀).—Barbuda (Sta. 92–56: 1 ovig. ♀; Sta. 98–59: 1 ovig. ♀).—Saint Christopher (Sta. 103–56: 2♂, 2♀ [1 ovig.]).—Antigua Island (Sta. 73–56: 1♂, 2 ovig. ♀).—Guadeloupe (Sta. 69–56: 5♂, 4♀ [3 ovig.], 1 juv.; Sta. 70–56: 1♂, 1♀).—Dominica (Sta. 62–56: 1y♂, 1y♀; Sta. 75–59: 2♂, 1 ovig. ♀, 3 juv.).—Carriacou Island (Sta. 16–56: 5♂, 5 ovig. ♀).—Tobago (Sta. 8–59: 3♂, 1 ovig. ♀; Sta. 26–59: 2♂).—Isla Mujeres (Sta. 29–60: 1♂, 1 ovig. ♀).—Bahía de la Ascensión (Sta. 52–60: 6♂, 6 ovig. ♀, 2 juv.;

Sta. 67–60: 3♂, 2 ovig. ♀; Sta. 72–60: 1♂; Sta. 95–60: 2♂, 1 ovig. ♀).—Bahía del Espíritu Santo (Sta. 41–60: 1♂).

HABITAT.—This species was found most frequently at reef edges near tide level and associated with rocks and coral, including *Pocillopora* and *Porites*.

TYPE-LOCALITY.—Fernando de Noronha.

DISTRIBUTION.—Western tropical Atlantic from the Dry Tortugas, Florida, to Fernando de Noronha and westward to the Yucatan Peninsula; also the islands of São Tomé and Príncipe in the eastern Atlantic; sublittoral.

*124. *Alpheus cylindricus* Kingsley

Alpheus cylindricus Kingsley, 1878b:196.—Crosnier and Forest 1966:257, fig. 16.

MATERIAL.—Mustique (Sta. 35–56: 4♂, 4 ovig. ♀).—Tobago Cays (Sta. 24–56: 1♂, 1 ovig. ♀).

HABITAT.—All of the above specimens were found in loggerhead sponges taken in no more than 3 feet of water.

TYPE-LOCALITY.—Archipiélago de las Perlas, Gulf of Panama.

DISTRIBUTION.—Bermudas and Florida to Barbados; eastern Atlantic from the islands of Príncipe, São Tomé, and Annobón; eastern Pacific from the Gulf of California, the Gulf of Panama, and the Galapagos Islands; sublittoral.

*125. *Alpheus floridanus* Kingsley

FIGURES 17–20

Alpheus floridanus Kingsley, 1878b:193.
Alpheus floridanus floridanus.—Crosnier and Forest 1966: 267, figs. 20*a*, 21*f–i*.
Alpheus floridanus africanus.—Crosnier and Forest 1966: 269, figs. 20*b*, 21*a–e*.

MATERIAL.—Antigua Island (Sta. 74–56: 1♂; Sta. 79–58: 1 ovig. ♀).—Guadeloupe (Sta. 68–56: 5♂, 3 ovig. ♀).—Bahía de la Ascensión (Sta. 62–60: 1♂; Sta. 65–60: 1♂, 1♀).

HABITAT.—All of the specimens mentioned above were taken on mud or sandy mud bottoms in less than 2 feet of water.

TYPE-LOCALITY.—Fort Jefferson, Dry Tortugas, Florida.

DISTRIBUTION.—Gulf of Mexico to Estado da Bahia, Brazil; eastern Atlantic from Guinea to Congo; to a depth of 37 meters.

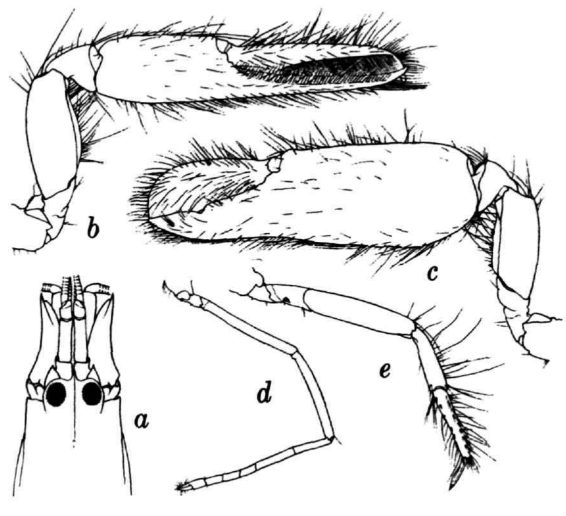


FIGURE 17.—*Alpheus floridanus* Kingsley, male, from Smithsonian-Bredin Station 68–56, carapace length 8.8 mm: *a*, anterior region; *b*, right first pereiopod; *c*, left first pereiopod; *d*, right second pereiopod; *e*, right third pereiopod. (Magnifications: *a–e*, ×3.75.)

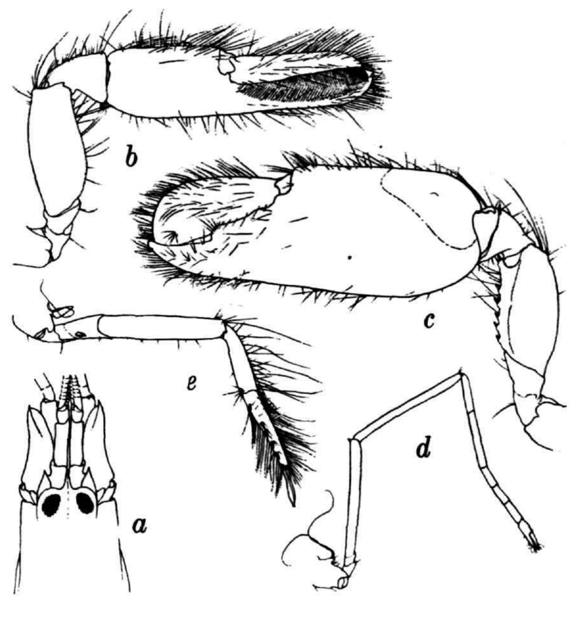


FIGURE 18.—*Alpheus floridanus* Kingsley, male, from Smithsonian-Bredin Station 74–56, carapace length 8.8 mm: *a*, anterior region; *b*, right first pereiopod; *c*, left first pereiopod; *d*, right second pereiopod; *e*, right third pereiopod. (Magnifications: *a–e*, ×3.75.)

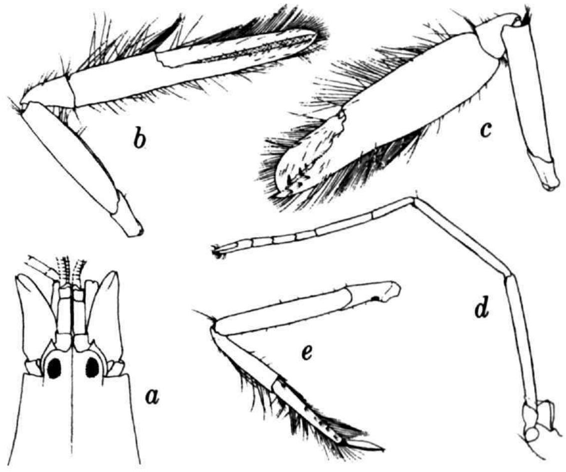


FIGURE 19.—*Alpheus floridanus* Kingsley, ovigerous female, from Bahía de Cárdenas, Provincia de Matanzas, Cuba (USNM 99967), carapace length 10.8 mm: *a*, anterior region; *b*, right first pereiopod; *c*, left first pereiopod; *d*, left second pereiopod; *e*, left third pereiopod. (Magnifications: *a–e*, ×3.75.)

REMARKS.—Several species of the Brevirostris Group, to which *A. floridanus* belongs, are so variable that they should be popular with those biologists who would deny the species concept. The fact that Crosnier and Forest (1966) recorded both *A. floridanus floridanus* and *A. floridanus africanus* Balss, 1916, from off West Africa and from the western Atlantic induced me to re-examine all of the material of the species in the Smithsonian collections.

If only the extreme variants of the western Atlantic form are considered, there is no doubt that two species should be recognized. One of them would be characterized by pronounced marginal sinuses between the rostrum and the ocular hoods (Figure 17*a*); the distolateral spine of the antennal scale extending beyond the blade by more than one-tenth of the total length of the scale (Figure 17*a*); the major first chela less than three times as long as broad (Figure 18*c*); the minor first chela less than four times as long as broad, the dactyl laterally carinate and densely fringed with coarse setae ("balaeniceps") in males (Figure 18*b*); and the propodus of the third

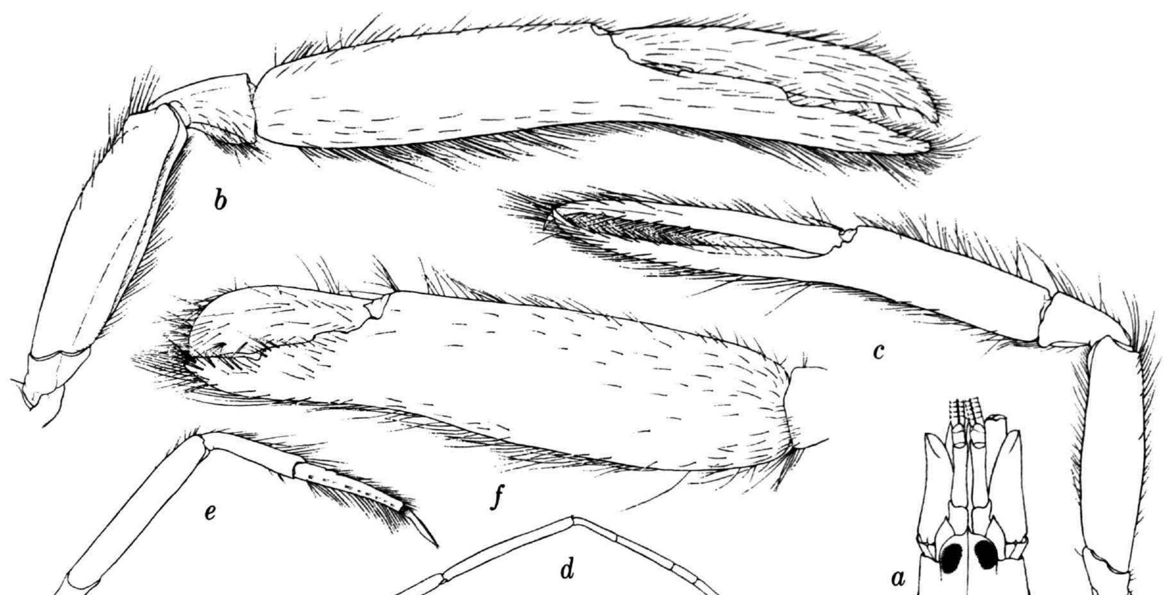


FIGURE 20.—*Alpheus floridanus* Kingsley. Male, from south of Grand Isle, Louisiana, 37 m (USNM 103528), carapace length 10.8 mm: *a*, anterior region; *b*, right first pereiopod; *c*, left first pereiopod; *d*, right second pereiopod; *e*, right third pereiopod. Male, carapace length 11.3 mm, from same lot: *f*, chela of left first pereiopod. (Magnifications: *a–f*, ×3.75.)

pereiopod armed with a row of 5 or 6 distinct spines in addition to those on the distal margin (Figure 18*e*). The other extreme, represented by four large males (carapace lengths 10.7–11.3 mm) trawled in 37 meters in the Gulf of Mexico south of Grand Isle, Louisiana, would be distinguished by the absence of sinuses in the frontal margin either side of the rostrum (Figure 20*a*); the distal spine of the antennal scale overreaching the blade very slightly or not at all (Figure 20*a*); the major first chela up to six times as long as broad (Figure 20*b*); the minor first chela up to ten times as long as broad, the dactyl not laterally carinate or densely setose (Figure 20*c*); and the propodus of the third pereiopod armed at most with 1 or 2 barely visible spines (Figure 20*e*).

As indicated in the accompanying figures, however, there is little consistency in these characters. Although frontal sinuses are usually well marked in the typical form, they may also occur in specimens with elongate chelipeds (Figure 19*a*). The distal spine of the antennal scale may extend not much beyond the blade in the form with robust chelipeds (Figure 18*a*). The major first chela varies from 2.6 to 3.8 times as long as broad in the typical form and from 4.4 to 6.6 in the "*africanus*" form. The minor first chela ranges from 3.7 to 5.9 times as long as broad in the typical form and from 7.6 to 10.0 in the other, and the dactyl is not always "balaeniceps" in otherwise typical males; the propodus of the third pereiopod may be armed with as few as 4 spines in the typical form and as many as 3 spines in the "*africanus*" form.

For the time being, it seems best to treat all of these forms as variants of a single species. If the examination of additional material fails to disclose an overlapping in all these characters, however, it may be necessary to recognize two distinct species in both the western and eastern Atlantic. The species with elongate chelae would presumably be known as *A. africanus* or, if the holotype of that taxon is a specimen of the typical *A. floridanus* (see Crosnier and Forest 1966:270), perhaps *A. platycheirus* Boone, 1927, will prove to be applicable to this form.

Holthuis (1951a:78, fig. 14) has discussed similar variation in *A. glaber* (Olivi, 1792) toward *A. talismani* Coutière, 1898b, but both he and Crosnier and Forest continue to recognize the latter as a distinct species. In view of the variation in these species and the tendency for some variable species to have wide distributions, it may be desirable to re-examine some of the Indo-Pacific species of the Brevirostris Group, such as *A. acutocarinatus* De Man, 1909, *A. lepidus* De Man, 1908, and *A. rapacida* De Man, 1908, to make sure that they do not fall within the limits of variation of *A. floridanus*.

*126. *Alpheus formosus* Gibbes

Alpheus formosus Gibbes, 1850:196.—Williams 1965b:64, fig. 52.

MATERIAL.—Tortola (Sta. 117–56: 3♂, 1♀; Sta. 5–58: 1♂; Sta. 23–58: 1♂, 2♀ [1 ovig.].—Guana Island (Sta. 9–58: 2♂, 3♀ [2 ovig.]).—Virgin Gorda (Sta. 111–56: 2♀, 1?; Sta. 112–56: 2♂).—Anguilla (Sta. 55–58: 1♂).—Barbuda (Sta. 92–56: 1 ovig. ♀; Sta. 111–58: 1♂, 1 ovig. ♀; Sta. 98–59: 2♂, 3 ovig. ♀; Sta. 102–59: 2♂, 1 ovig. ♀).—Saint Christopher (Sta. 103–56: 8♂, 7♀ [6 ovig.]).—Antigua Island (Sta. 73–56: 3♂, 4♀ [1 ovig.]; Sta. 77–56: 1♀; Sta. 78–58: 1 juv.; Sta. 110–59: 1♂, 1?; Sta. ?–59: 1 ovig. ♀, 2 juv.).—Guadeloupe (Sta. 69–56: 1♂, 1 ovig. ♀, 1 juv.).—Dominica (Sta. 62–56: 1y♀).—Saint Lucia Island (Sta. 60–59: 1♀).—Tobago Cays (Sta. 22–56: 1♂, 1 ovig. ♀).—Carriacou Island (Sta. 15–56: 5♂, 4♀ [2 ovig.]; Sta. 16–56: 3♂, 3♀ [2 ovig.]; Sta. 17–56: 2♂, 1 ovig. ♀).—Tobago (Sta. 8–59: 5♂, 8♀ [5 ovig.], 1?; Sta. 15–59: 1 ovig. ♀; Sta. 26–59: 1♂, 2♀, 1 juv.; Sta. 31–59: 1♂, 5♀ [1 ovig.], 1 juv.).—Bahía de la Ascensión (Sta. 52–60: 1♀, 2 juv.; Sta. 67–60: 1♂, 1 ovig. ♀; Sta. 72–60: 2♂, 1 ovig. ♀; Sta. 82–60: 2♀ [1 ovig.]; Sta. 85–60: 1 ovig. ♀ [with abdominal bopyrid parasite], 1 juv.; Sta. 95–60: 2♂, 2 ovig. ♀, 2 juv.).

HABITAT.—This apparently ubiquitous species was found concealed in virtually all environments investigated by the expeditions: sand and mud flats with and without *Pocillopora* and *Porites*, rock-studded beaches, seawalls, wrecks, and exposed and submerged reefs from above low-tide line to 2 meters deep.

TYPE-LOCALITY.—Key West, Florida.

DISTRIBUTION.—North Carolina and the Bermudas to Estado de São Paulo, Brazil; to a depth of 42 meters.

127. *Alpheus heterochaelis* Say

Alpheus heterochaelis Say, 1818:243.—Williams 1965b:66, fig. 54.

TYPE-LOCALITY.—Amelia Island, Nassau County, Florida.

DISTRIBUTION.—North Carolina to Surinam; sublittoral. The true range of this species is not yet well defined. It is common along the southeastern and Gulf coasts of the United States from North Carolina to Texas (including Key West, Florida), but I have seen only two lots from the West Indies—one from Cuba and one from Curaçao—that could be assigned to *A. heterochaelis* with confidence. The specimens recorded by Holthuis (1959) from Surinam undoubtedly belong to this species. There is some question, however, about those recorded by the same author (1956) from Cananeia, Estado de São Paulo, Brazil, because the males of that series do not have the dactyl of the minor first chela "balaeniceps"-shaped. At least some of the lots recorded by Rathbun (1900) from between Estado do Rio Grande do Norte and Estado de Alagoas, Brazil, are assignable to *A. armillatus* and *A. nuttingi,* and some of the material recorded by the same author (1901) from Puerto Rico is *A. armillatus* and *A. viridari.* The two specimens from Isla de Providencia listed by Schmitt (1939) belong to *A. nuttingi.*

*128. *Alpheus intrinsecus* Bate

Alpheus intrinsecus Bate, 1888:557, pl. 100: fig. 1.—Crosnier and Forest 1966:286, fig. 26.

MATERIAL.—Tobago (Sta. 6–59: 1 ♀).

HABITAT.—The single specimen was found on or in the interstices of coral rock covered with algae.

TYPE-LOCALITY.—Off Salvador, Estado da Bahia, Brazil.

DISTRIBUTION.—Puerto Rico to Estado de São Paulo, Brazil; eastern Atlantic from Senegal to Congo; to a depth of 30 meters.

*129. *Alpheus malleator* Dana

Alpheus malleator Dana, 1852:557.—Crosnier and Forest 1966:240, fig. 10.

MATERIAL.—Grenada (Sta. 8–56: 1 ♂).

HABITAT.—The single specimen was concealed in an intertidal conglomerate rock and coral ledge.

TYPE-LOCALITY.—Rio de Janeiro, Brazil?

DISTRIBUTION.—Puerto Rico to Estado de São Paulo, Brazil; eastern Atlantic from Senegal to Congo; eastern Pacific from the Gulf of California, Ecuador, and the Galapagos Islands; littoral and upper sublittoral.

*130. *Alpheus normanni* Kingsley

Alpheus normanni Kingsley, 1878a:93.—Williams 1965b: 65, fig. 53.
Crangon normanni.—Chace 1937:122.

MATERIAL.—Tortola (Sta. 117–56: 1 ♂).—Barbuda (Sta. 85–56: 1 ♂; Sta. 108–58: 1 ♀).—Saint Christopher (Sta. 103–56: 2 ovig. ♀).—Antigua Island (Sta. 74–56: 1 ♂; Sta. 109–59: 8 ♂, 2 ovig. ♀; Sta. 112–59: 1 ♂, 2 ovig. ♀).—Dominica (Sta. 75–59: 1 juv.).—Carriacou Island (Sta. 17–56: 1 ovig. ♀).—Tobago (Sta. 4–59: 1 ♂, 1 ovig. ♀; Sta. 8–59: 1 ♂, 2 ovig. ♀; Sta. 31–59: 5 ♂, 2 ♀ [1 ovig.]).—Isla de Cozumel (Sta. 100–60: 1 spec.).—Bahía de la Ascensión (Sta. 91–60: 1 ♂).

HABITAT.—This species was found most frequently on sand and mud flats covered with turtle-grass and *Porites*. Some specimens were taken on a mud bottom under rocks and oysters and some occurred in and among reef corals.

TYPE-LOCALITY.—Pacific coast of Panama.

DISTRIBUTION.—Virginia and Bermudas to Tobago and westward to the Yucatan Peninsula; eastern Pacific in the Gulf of California and at Panama; to a depth of 73 meters.

*131. *Alpheus nuttingi* (Schmitt)

Crangon nuttingi Schmitt, 1924c:78, pl. 2: figs. 4–6.

MATERIAL.—Barbuda (Sta. 111–58: 2 ♂).—Antigua Island (Sta. 110–59: 2 ♀).—Guadeloupe (Sta. 68–56: 1 ♀; Sta. 69–56: 17 ♂, 10 ♀ [9 ovig.]).—Saint Lucia Island (Sta. 60–59: 1 ♂, 1 ovig. ♀).—Tobago Cays (Sta. 21–56: 6 ♂, 7 ♀ [6 ovig.]).

HABITAT.—Most of the specimens listed above were cracked from coral and coral rock, but a few were found on sandy mud flats studded with boulders or *Porites*.

TYPE-LOCALITY.—Pelican Island, Barbados.

DISTRIBUTION.—Florida Keys to Estado de Alagoas, Brazil, and westward to Isla de Providencia and Panama; sublittoral.

REMARKS.—The distal angle of the inner flexor margin of the merus of the first pereiopods may or may not be armed with a short spine or tooth in this species, but the spine, if present, is seldom as prominent or sharp as it is in *A. armillatus* and *A. viridari.*

*132. *Alpheus paracrinitus* Miers

Alpheus paracrinitus Miers, 1881:365, pl. 16: fig. 6.—Crosnier and Forest 1966:253, fig. 15.
Crangon togatus Armstrong, 1940:2, fig. 1.

MATERIAL.—Tortola (Sta. 23–58: 1♂, 1 ovig. ♀). —Guana Island (Sta. 9–58: 1 ovig. ♀).—Virgin Gorda (Sta. 112–56; 1♂, 1 ovig. ♀).—Anguilla (Sta. 55–58: 1 ovig. ♀).—Barbuda (Sta. 113a–58: 1 ovig. ♀; Sta. 98–59: 1 ovig. ♀; Sta. 102a–59: 1♂). —Antigua Island (Sta. 73–56: 1♂, 1 ovig. ♀; Sta. 112–59: 1♂, 1♀).—Tobago Cays (Sta. 21–56: 1♂).—Tobago (Sta. 8–59: 2♂, 3 ovig. ♀, 1?; Sta. 31–59: 1y♂).

HABITAT.—Many of the specimens were collected on turtle-grass and *Porites* flats; some were probably found under stones and possibly in dead coral.

TYPE-LOCALITY.—Gorée, Senegal.

DISTRIBUTION.—Virtually pantropical; to a depth of 18 meters. In the western Atlantic, from the Bermudas and the northeastern Gulf of Mexico to Tobago.

*133. *Alpheus peasei* (Armstrong)

Alpheus (Dienesia) candei.—Verrill 1922:68, fig. 5*b*, pl. 19: figs. 3*a–d*, pl. 20: fig. 1, pl. 21: figs. 6, 6*a*, pl. 24: figs. 2–4, pl. 29: figs. 1*a–t*. [Not *A. candei* Guérin-Méneville, 1855.]
Crangon peasei Armstrong, 1940:1.

MATERIAL.—Anguilla (Sta. 55–58: 2♂, 2♀ [1 ovig.]).—Barbuda (Sta. 112a–58: 4♂, 2♀).—Saint Christopher (Sta. 103–56: 1♂, 3♀ [2 ovig.]).—Antigua Island (Sta. 73–56: 2♂, 3 ovig. ♀).—Dominica (Sta. 62–56: 1y♂; Sta. 75–59: 1♂, 2 ovig. ♀, 5 juv.).—Saint Lucia Island (Sta. 65–59: 1♂, 1 ovig. ♀).—Tobago Cays (Sta. 23–56: 1♂, 1 ovig. ♀).—Tobago (Sta. 8–59: 5♀ [3 ovig.]).—Isla de Cozumel (Sta. 34–60: 1♂; Sta. 115–60: 2♂, 3 ovig. ♀).—Bahía de la Ascensión (Sta. 52–60: 1♂, 1 ovig. ♀, 2 juv.; Sta. 67–60: 1♂, 1♀; Sta. 85–60: 1 ovig. ♀; Sta. 95–60: 1♂, 1 ovig. ♀, 1 juv.).—Bahía del Espíritu Santo (Sta. 41–60: 1 spec.).

HABITAT.—Most of the specimens listed above were found on, under, or in the interstices of rocks and dead coral from the intertidal zone to a depth of 7 meters. One pair was extracted from a sponge in 3 feet of water.

TYPE-LOCALITY.—Castle Harbour, Bermudas.

DISTRIBUTION.—Bermudas and Florida Keys to Tobago and westward to Isla de Providencia and the Yucatan Peninsula; littoral and sublittoral.

*134. *Alpheus ridleyi* Pocock

Alpheus Ridleyi Pocock, 1890:518.
Alpheus nigro-spinatus Rankin, 1898:249, pl. 30: fig. 6.
Alpheus ridleyi.—Crosnier and Forest 1966:230, 232, 233, 236, 237.

MATERIAL.—Anguilla (Sta. 55–58: 1♂).—Antigua Island (Sta. 73–56: 1♂, 3♀ [2 ovig.]).—Saint Lucia Island (Sta. 47–56: 1y♂; Sta. 60–59: 1♂).—Tobago Cays (Sta. 22–56: 1♂).—Tobago (Sta. 8–59: 2♂, 1 ovig. ♀).—Isla de Cozumel (Sta. 115–60: 1♂).—Bahía de la Ascensión (Sta. 67–60: 1 juv.).

HABITAT.—This species seems to have been collected most frequently under boulders and pieces of coral on sandy beaches, but it was also found in coral rock at depths of 4 feet or more.

TYPE-LOCALITY.—Arquipélago de Fernando de Noronha, Brazil.

DISTRIBUTION.—Bahamas to Fernando de Noronha, Brazil, and westward to the Yucatan Peninsula; littoral and sublittoral.

REMARKS.—The notes on the type-series of *A. ridleyi* provided by Crosnier and Forest (1966) leave little doubt that *A. nigrospinatus* is a junior synonym of Pocock's species. Whether *A. fagei* Crosnier and Forest, 1965, from the eastern Atlantic and *A. arenensis* (Chace 1937) from the Gulf of California also fall within the limits of variation of *A. ridleyi* can be determined only by a comparative study of adequate series of specimens from all three regions. In the western Atlantic material that I have seen, there is a minute tooth on the flexor margin of the dactyls of the third and fourth pereiopods. This tooth has not been mentioned in any of the descriptions of these three species. Presumably it has been overlooked because of its small size, but it is distinct at a magnification of 25 times in specimens of all sizes that I have examined. I cannot agree with Schmitt (1924c:72) that *A. malleator* var. *edentatus* Zimmer, 1913, is a synonym of this species. Except for differences that could easily be associated with immaturity, Zimmer's 10 mm specimen seems to be a reasonably normal example of *A. malleator*.

*135. *Alpheus schmitti*, new species

FIGURES 21, 22

MATERIAL.—Antigua Island (Sta. 110–59: 2 ovig. ♀).—Grenada (Sta. 8–56: 1♂ holotype, USNM 135361).—Tobago (Sta. 15–59: 4♂, 3♀ [2 ovig.]; Sta. 26–59: 1♂).

In addition to the above, I have seen a small male that seems to belong to this species from Cape Florida, Key Biscayne, Florida; it was collected 22 August 1969 by Gary Hendrix.

DESCRIPTION.—Rostrum (Figures 21*a*, *b*) small, triangular, reaching little beyond margins of ocular hoods, marked dorsally by low carina extending posteriorly about as far as posterior margins of ocular hoods. Ocular hoods strongly produced anteriorly, unarmed, bounded mesially by shallow but distinct adrostral depressions and laterally by similarly distinct grooves. Anterolateral margin of carapace nearly vertical for short distance below ocular hood, slanting posteroventrally near lateral midline of basal segment of antennal peduncle. Posterior margin of carapace with cardiac notch.

Pleura of 5 anterior abdominal somites broadly rounded. Sixth somite sharply acute ventral to insertion of uropod, bluntly acute dorsal to insertion. Telson (Figure 21*c*) nearly three-fourths as broad as long, posterior margin slightly more than half as wide as anterior margin; 2 pairs of rather stout dorsal spines, anterior pair inserted slightly anterior to midlength of telson, posterior pair slightly nearer to posterior margin than to anterior pair; posterior margin convex, armed with 2 pairs of stout lateral spines, mesial pair twice, or more than twice, as long as lat-

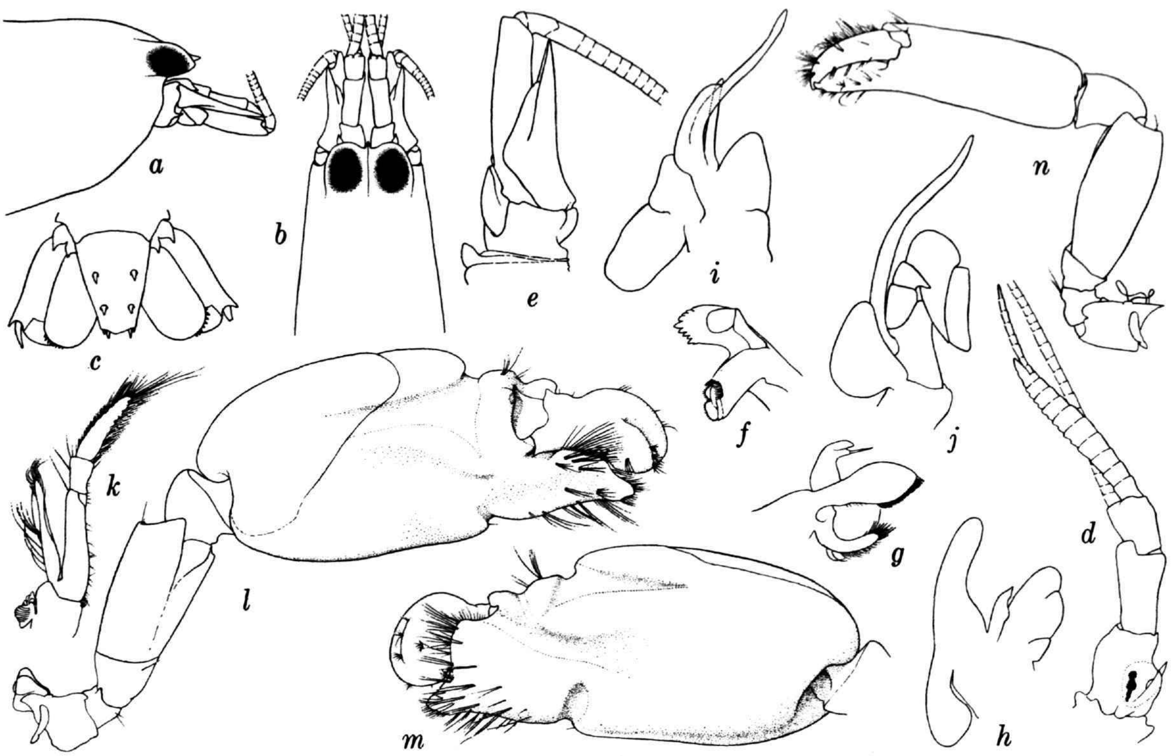


FIGURE 21.—*Alpheus schmitti*, new species, holotype, male, carapace length 6.0 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, telson and uropods; *d*, right antennule; *e*, right antenna; *f*, right mandible; *g*, right first maxilla; *h*, right second maxilla; *i*, right first maxilliped; *j*, right second maxilliped; *k*, right third maxilliped; *l*, right first pereiopod, lateral view; *m*, same, chela, mesial view; *n*, left first pereiopod. (Magnifications: *a–c*, *k–n*, ×7.5; *d–j*, ×15.5.)

eral pair, space between spines bearing double row of long setae.

Eyes entirely concealed by ocular hoods.

Antennular peduncle (Figure 21*d*) with stylocerite short, not nearly reaching distal margin of basal segment. Second segment subequal in length to first, about twice as long as third.

Antennal scale (Figure 21*e*) about three times as long as wide; outer margin strongly concave proximally, faintly convex distally, distal spine very stout, considerably wider than distal portion of blade, not reaching as far as end of antennular peduncle; blade narrowing abruptly with sinuous margin in distal half, falling far short of tip of spine. Antennal peduncle slightly overreaching antennular peduncle; basal segment with sharp slender lateral tooth below base of antennal scale.

Mouth parts as figured (Figures 21*f–k*). Mandible with 9 marginal teeth and vestige of tenth on incisor process. Third maxilliped overreaching antennal scale by two-thirds of terminal segment, exopod barely overreaching antepenultimate segment.

Major first pereiopod (Figure 21*l*) overreaching antennal scale by chela and carpus. Chela (Figure 21*m*) compressed, notched dorsally and ventrally, and grooved on both lateral surfaces. Movable finger opening and closing somewhat obliquely, rather strongly arched, truncately rounded distally, usually with distinct groove in distal part of each lateral surface; opposable margin with large, hooked, blunt-tipped tooth fitting into socket in fixed finger. Palm with well-defined depression on lateral surface spreading from dorsal notch to narrowly acute apex ventrally and continuing proximally as broad groove with subparallel margins disappearing proximal to oblique suture; depression bounded ventrally by rounded ridge delimited ventrally by longitudinal sinuous depression extending distally to near base of movable finger and obscurely joining similar depression on fixed finger; continuation of ventral notch sharply defined proximally, trending distally into depression on fixed finger. Mesial surface of palm with deep, sharply defined, elongate, triangular depression spreading from dorsal notch and bounded ventrally by strong, anteriorly acute boss accentuated by sinuous longitudinal depression extending proximally from articulation with movable finger nearly to midlength of chela; narrow oblique groove running ventrally and proximally from dorsal margin opposite articulation with finger and joining longitudinal depression at apex of boss; ventral notch continued on mesial surface as well-defined, obliquely U-shaped depression. Notches in dorsal and ventral margins distinct and slightly overhung proximally. Merus of major cheliped with flexor margins unarmed distally. Minor first cheliped (Figure 21*n*) overreaching antennal scale by chela and carpus. Movable finger rounded, usually slightly more than half as long as palm in males, often less than half as long as palm in females. Palm not noticeably compressed, without grooves or depressions, distal angle on mesial side of articulation with finger rounded, subrectangular. Merus with flexor margins unarmed distally. Second pereiopod (Figure 22*a*) overreaching antennal scale by chela, carpus, and most of merus. Movable finger considerably shorter than palm (Figure 22*b*). Carpus about three times as long as chela, subdivided into 5 articles decreasing in length as follows: 2, 1, 5, 4, 3. Merus slightly longer than 3 proximal articles of carpus and distinctly longer than ischium. Third pereiopod (Figure 22*c*) overreaching antennal scale by dactyl, propodus, and half of carpus; dactyl (Figure 22*d*) simple and unarmed, somewhat less than half as long as propodus; propodus with row of 6 strong spines on flexor margin and about 4 similar spines in adjacent discontinuous row. Carpus about as long as propodus; merus as long as carpus and fully half of propodus, slightly less than three times as long as wide, with small blunt tooth at distal end of flexor margin; ischium unarmed. Fourth pereiopod (Figures 22*e, f*) overreaching antennal scale by dactyl, propodus, and one-third of carpus, very similar to third pereiopod, but distal tooth on flexor margin of merus usually less distinct or absent. Fifth pereiopod (Figure 22*g*) much smaller than third and fourth, reaching only to midlength of antennal scale; dactyl (Figure 22*h*) not much more than one-third as long as propodus; propodus with spines on flexor margin clustered in distal third of length; carpus slightly longer than propodus; merus very slightly longer than carpus and without tooth at distal end of flexor margin.

Second pleopod of male (Figure 22*i*) with appendix masculina (Figure 22*j*) distinctly overreaching appendix interna. Uropod (Figure 21*c*) with lateral margin of lateral branch terminating in 2 widely separated teeth flanking long, uncolored movable spine; mesial branch of uropod with series of inconspicuous spines, in addition to setae, on distal margin.

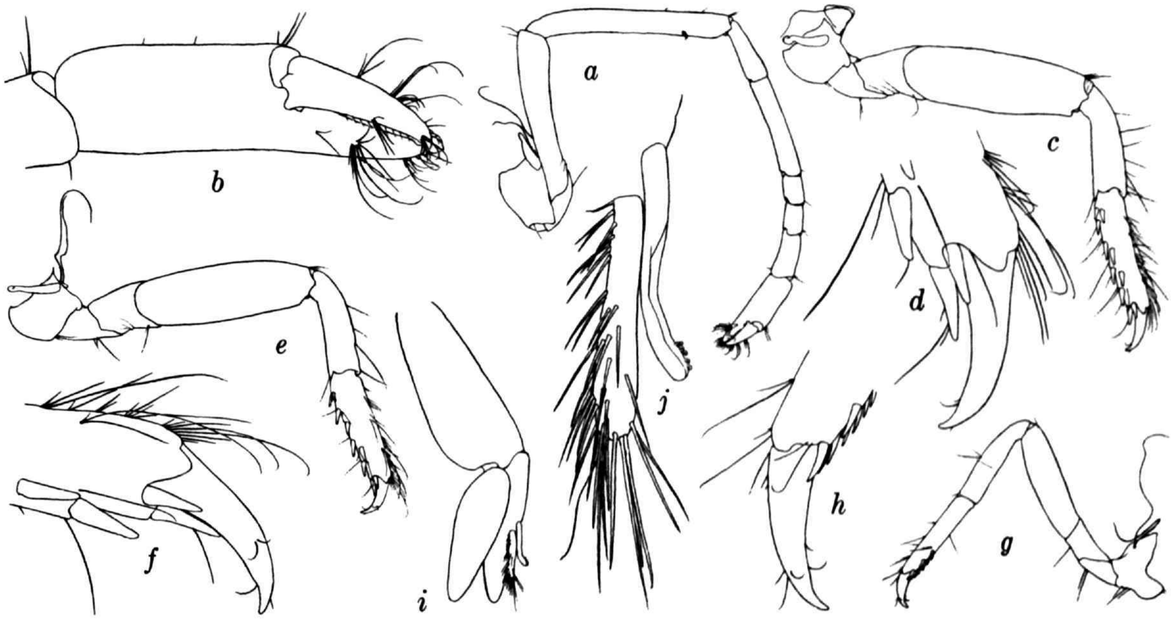


FIGURE 22.—*Alpheus schmitti*, new species, holotype, male, carapace length 6.0 mm: *a*, right second pereiopod; *b*, same, chela; *c*, right third pereiopod; *d*, same, dactyl; *e*, right fourth pereiopod; *f*, same, dactyl; *g*, right fifth pereiopod, anteromesial view; *h*, same, dactyl; *i*, right second pleopod; *j*, appendix masculina and appendix interna. (Magnifications: *a, c, e, g*, ×7.5; *i*, ×15.5; *b, d, f, h*, ×31; *j*, ×78.)

Eggs numerous and small, measuring about 0.5 by 0.7 mm.

COLOR.—Color notes on the small male (carapace length 4.0 mm) from Key Biscayne, Florida, have been kindly contributed by the collector, Gary Hendrix: Carapace and abdomen mostly translucent and colorless. Carapace with band of bluish chromatophores on rostrum and anterior margin of carapace; hepato-pancreas green; cluster of bluish chromatophores in dorsal midline near posterior margin of carapace. Abdomen with bluish-gray to greenish transverse bands (formed by numerous small blue chromatophores surrounding expanded and much sparser red chromatophores) near anterior margin of first somite and along posterior margins of 5 posterior somites; telson with 3 characteristic longitudinal stripes of grayish green. Antennules and antennal scale transparent. Antennal peduncle with scattered blue chromatophores. Major first pereiopod with chela marked by broad, brownish to chocolate-brown band covering most of extensor margin of palm and extending obliquely to distal half of flexor margin of propodus; chela white elsewhere; carpus and merus with few brown spots on white background. Minor first pereiopod with chela mostly brown, except for white proximal half of movable finger; carpus and merus as in major cheliped. Second pereiopods very conspicuously colored with bright blue. Three posterior pairs of pereiopods translucent and colorless. Lateral branch of uropod with subdistal, transverse, grayish-green band; mesial branch with similar oblique or nearly longitudinal band.

POSTURE.—Gary Hendrix noted that this species maintains a rather unusual posture about 90 percent of the time. The major first chela is directed upward at an angle of 45 degrees, the second pereiopods are held high and flexed in an arc, the third and fourth pereiopods are held together and angled forward in a partially flexed attitude, the fifth pereiopods are similarly flexed but lean posteriorly, and the abdomen is flexed under the thorax.

SIZE.—Males with carapace lengths, to base of rostrum, of 3.6–6.8 mm (holotype 6.0 mm); females, 5.2–7.0 mm; ovigerous females, 5.8–7.0 mm.

HABITAT.—In coral and conglomerate rock in the intertidal zone, sometimes exposed at low tide.

TYPE-LOCALITY.—Grand Anse Bay outside Saint Georges Harbour, Grenada, in partially exposed conglomerate rock and coral ledge along shore.

DISTRIBUTION.—Known only from the type-series from the Florida Keys, Antigua Island, Grenada, and Tobago.

REMARKS.—*Alpheus schmitti* seems to be distinguished from most other members of the Edwardsii Group of the genus by the broadly truncate movable finger of the major chela, the unusually short fingers of the minor chela, the intermediate development of the distal tooth on the flexor margin of the merus of the third pereiopod, and the unusually small fifth pereiopod.

It is a pleasure to name this species for Waldo L. Schmitt, who planned and led the four Smithsonian-Bredin Caribbean Expeditions and collected the type-specimen of this species, who has considerably enhanced our knowledge of the alpheid shrimps and other decapod crustaceans during a career of more than 50 years, and to whom I owe a special debt of gratitude for warmhearted friendship, tolerance, and counsel during the more than 35 years of our professional association.

136. *Alpheus simus* Guérin-Méneville

Alpheus simus Guérin-Méneville, 1855:xix, pl. 2: fig. 11.

TYPE-LOCALITY.—Cuba.

DISTRIBUTION.—This species has probably not been found again since it was described from Cuba (see "Remarks").

REMARKS.—Coutière (1899:18) believed that this species was based on an abnormal specimen. It is included here on the chance that it was not.

Verrill (1922:123, pl. 25: fig. 5) transferred Guérin's species to *Amphibetaeus* on the strength of a specimen "apparently of the same species" from Dominica. Verrill's figure, however, indicated as "after Guerin," bears little resemblance to the latter's drawing. As a matter of fact, Verrill's illustration is suggestive of *Leptalpheus,* except for the stylocerites, which do seem to have been copied from Guérin. Also, if the Dominican specimen had assymmetrical, folding pereiopods, like those of *Leptalpheus,* the resemblance to *Amphibetaeus* might well be brought to mind; however, the habitat "among branching corals and sponges," where the Dominican specimen was found, is hardly like the *Upogebia* burrows in estuarine mud flats, where *Leptalpheus forceps* occurs.

*137. *Alpheus viridari* (Armstrong)

Crangon viridari Armstrong, 1949:8, fig. 2.

MATERIAL.—Tortola (Sta. 5–58: 2♀ [1 ovig.] 1 juv.).—Barbuda (Sta. 112a–58: 1 ovig. ♀).—Antigua Island (Sta. 74–56: 3♂, 13♀ [12 ovig.]; Sta. 77–56: 1♂, 5 juv.; Sta. 123–58: 13♂ [3 with branchial bopyrids] 12♀ [11 ovig.]).—Guadeloupe (Sta. 68–56: 2♂, 6♀ [3 ovig.]).— Tobago (Sta. 30–59: 1♂, 2♀ [1 ovig.]).—Isla de Cozumel (Sta. 47–60: 1♂, 1 ovig. ♀; Sta. 106–60: 1♀).—Bahía de la Ascensión (Sta. 53–60: 1♀ and molt; Sta. 65–60: 2♂, 2♀; Sta. 66–60: 1 ovig. ♀; Sta. 70–60: 1♂, 1 ovig. ♀; Sta. 89–60: 4♀; Sta. ?–60: 1♂).

HABITAT.—In general, the material in these collections was found on grass flats, the habitat indicated for the species by Armstrong (1949:12). Several specimens were taken in and near mangroves, and one lot was collected from a seawall. The single specimen cracked from dead coral, at Sta. 112a–58, lacked the major cheliped and may be *A. armillatus.*

TYPE-LOCALITY.—Barahona, Dominican Republic.

DISTRIBUTION.—Florida Keys to Trinidad and westward to Curaçao and the Yucatan Peninsula; littoral and sublittoral.

*Genus *Automate* De Man, 1888

Key to Western Atlantic Species

1. Median frontal projection broadly rounded or subtriangular; propodus of third and fourth pereiopods armed with series of stout movable spines on flexor margin. (First article of carpus of second pereiopod at least half as long as second article; dactyl of third and fourth pereiopods slender, not subspatulate.) .... *139. *A. gardineri*

   Median frontal projection reduced to acute tooth or lacking; propodus of third and fourth pereiopods setose, without stout spines 2

Key to Western Atlantic Species—Continued

2. Median frontal projection a small acute tooth; first article of carpus of second pereiopod much less than half as long as second article; dactyl of third and fourth pereiopods broad, subspatulate .... 138. ***A. evermanni***
Frontal margin transverse, without median projection; first article of carpus of second pereiopod at least half as long as second article; dactyl of third and fourth pereiopods slender, not subspatulate .... *140. ***A. rectifrons***

138. *Automate evermanni* Rathbun

Automate evermanni Rathbun, 1901:112, fig. 22.—Holthuis 1951a:115, fig. 24.

TYPE-LOCALITY.—Off Aguadilla, Puerto Rico.

DISTRIBUTION.—North Carolina (?) to Texas and Puerto Rico; eastern Atlantic from the Cape Verde Islands and Liberia to Nigeria; to a depth of 250 meters.

REMARKS.—Specimens of this species examined from the Dry Tortugas, Florida, Texas, and Puerto Rico display great variation in the form of the antennal scale. The blade varies from a subtruncate form, in which it does not extend distally beyond the base of the distolateral tooth, to a strongly produced condition, in which it overreaches the tooth by an amount at least equal to the length of the tooth.

In view of the occurrence of *A. evermanni* in both the western and eastern Atlantic, it would be interesting to compare Atlantic with eastern Pacific specimens. If they should prove to be identical, *A. evermanni* would presumably become a junior synonym of *A. rugosa* Coutière, 1900, from the Bay of Panama. The type of the latter species has not been found in the Smithsonian collections.

The specimen from Beaufort, North Carolina, illustrated as *A. kingsleyi* by Williams (1965b:63, figs. 51A, B, D—not C) is almost certainly *A. evermanni,* as indicated by the form of the frontal projection and the stylocerites. The misidentification was undoubtedly caused by the misleading figure of *A. kingsleyi* in Hay and Shore (1918:387, fig. 10*b*) and by the fact that the specimen was taken near the type-locality of that species.

*139. *Automate gardineri* Coutière

FIGURE 23

Automate Gardineri Coutière, 1902:337.
Automate kingsleyi Hay, 1917:72.
Automate johnsoni Chace, 1955:13, fig. 7.
Automate gardineri.—Banner and Banner 1966a:150; 1966b:37, fig. 8.

MATERIAL.—Virgin Gorda (Sta. 111-56: 1 ovig. ♀).—Bahía de la Ascensión (Sta. 85-60: 1 ovig. ♀).

HABITAT.—The specimen from Virgin Gorda was found on a shallow grass flat with much *Pocillopora.* The Yucatan specimen was probably collected in a rocky tide pool.

TYPE-LOCALITY.—Maldive and Laccadive Islands.

DISTRIBUTION.—North Carolina, Virgin Islands, Antigua Island, Barbados, and the Yucatan Peninsula; Indo-Pacific region from the Red Sea to Samoa; sublittoral. (See "Remarks.")

REMARKS.—As shown in Figure 23*a*, the illustration of the frontal region of the holotype of *Automate kingsleyi* in Hay and Shore (1918:387, fig. 10*b*) is far from accurate. The frontal projection is large and rounded, not very small and acute as in *A. evermanni,* and the stylocerite distinctly overreaches the distal margin of the first antennular segment. The specimen figured by Williams (1965b:63, figs. 51A, B, and D—not C) is probably *A. evermanni,* as indicated by the reduced frontal projection and the short stylocerites. The remainder of the holotype of *A. kingsleyi* is in rather poor condition, and figures are therefore given here of the ovigerous female from Virgin Gorda (Figures 23*b*–*r*).

Even without considering the amount of variation reported in *A. gardineri* by Banner and Banner (1966a), I have been unable to distinguish the western Atlantic and Indo-Pacific forms, and I have therefore synonymized *A. kingsleyi* with *A. gardineri.* Unless obscure but constant differences are discovered when more material becomes available, this species may eventually prove to have a pantropical distribution. If it does, probably *A. talismani* Coutière, 1902, from the eastern Atlantic, and *A. haightae* Boone, 1931, from the eastern Pacific, will also become synonyms of *A. gardineri,* and the chance is not too remote that all four names may finally fall into the synonymy of *A. dolichognatha* De Man, 1888, as mentioned by Banner and Banner.

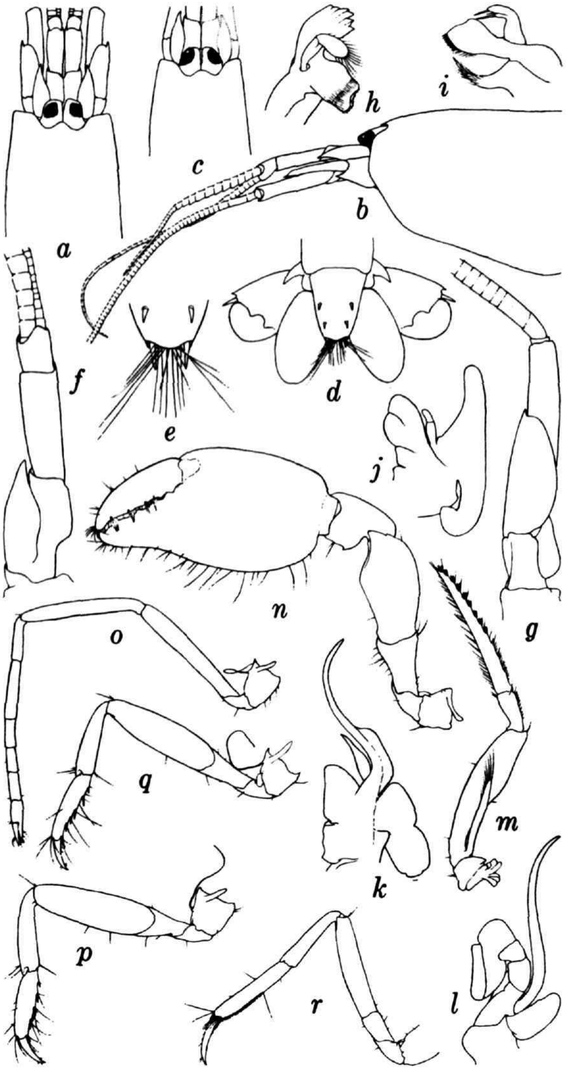


FIGURE 23.—*Automate gardineri* Coutière. Holotype, female, of *A. kingsleyi* Hay, carapace length 3.8 mm: *a*, anterior region, dorsal view. Ovigerous female, carapace length 4.2 mm, from Smithsonian-Bredin Station 111–56: *b*, anterior region, lateral view; *c*, same, dorsal view; *d*, telson and uropods; *e*, end of telson; *f*, left antennule; *g*, left antenna; *h*, left mandible; *i*, left first maxilla; *j*, left second maxilla; *k*, left first maxilliped; *l*, left second maxilliped; *m*, left third maxilliped; *n*, left first pereiopod; *o*, left second pereiopod; *p*, left third pereiopod; *q*, left fourth pereiopod; *r*, left fifth pereiopod. (Magnifications: *a–d*, *m–r*, ×7.5; *e–l*, ×15.5.)

*140. *Automate rectifrons*, new species

FIGURE 24

MATERIAL.—Antigua Island (Sta. 96–58: 1 frag. juv.).—Bahía de la Ascensión (Sta. 91–60: 1 ♀ holotype, USNM 135366).

DESCRIPTION.—Anterior margin of carapace (Figures 24*a*, *b*) deeply recessed posterior to eyes, nearly straight mesially, without rostrum or median lobe. Carapace inflated, smooth, and unarmed; anterolateral angles rounded; posterior margin with distinct cardiac notch at juncture with branchiostegite.

Pleuron of first abdominal somite with faintly convex margin, anterior angle broadly rounded, posterior angle more narrowly so. Pleura of second through fifth somites with long, faintly sinuous margins and broadly rounded angles. Sixth somite about as long as fifth, posterolateral angle narrowly rounded in lateral view. Telson (Figure 24*c*) laterally constricted near base, distal portions of margin convex and converging regularly to narrow posterior margin; dorsal surface armed with 2 pairs of very small spines, anterior pair distinctly proximal to midlength of telson, posterior pair nearer to posterior margin than to anterior pair; posterior margin (Figure 24*d*) transverse, without median projection, armed with pair of stout lateral spines and pair of much longer and more slender mesial spines or stout setae, with pair of fine setae arising submarginally.

Antennular peduncle (Figure 24*e*) with stylocerite broadly convex mesially, sinuous laterally, short apical tooth falling far short of end of basal antennular segment; mesial surface of basal segment without ventral tooth; second segment subequal in length to first and about two and one-half times as long as third; lateral flagellum thickened for about 11 articles.

Antennal peduncle (Figure 24*f*) reaching about as far as antennular peduncle. Antennal scale barely reaching or falling slightly short of midlength of terminal segment of peduncle, lateral margin faintly sinuous, distal tooth short and stout, reaching about as far as distal margin of blade. Basal segment of peduncle without distinct tooth at articulation with scale.

Mouth parts (Figures 24*g–k*) apparently stuck together by preservative and difficult to remove intact. Mandible with 6 marginal teeth on incisor process; distal segment of palp narrow. First maxilla with ob-

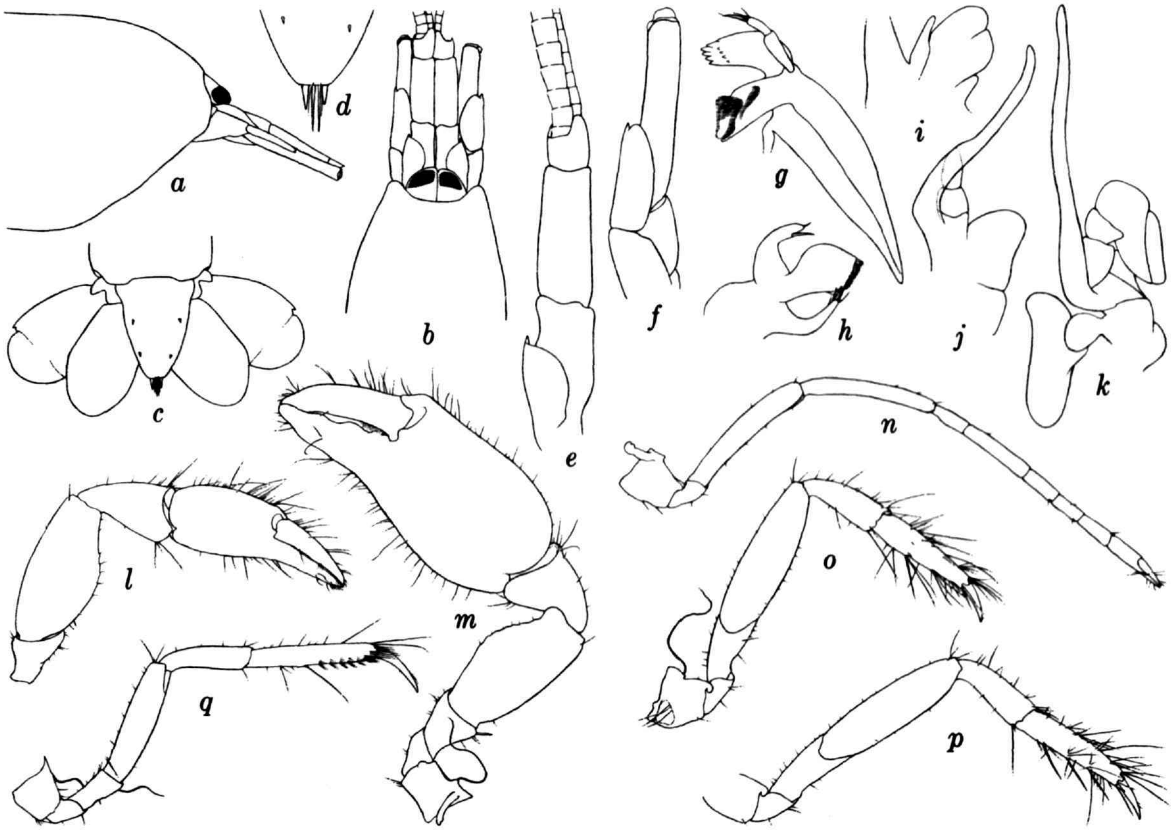


FIGURE 24.—*Automate rectifrons*, new species, holotype, female, carapace length 3.0 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, telson and uropods; *d*, end of telson; *e*, left antennule; *f*, left antenna; *g*, right mandible; *h*, right first maxilla; *i*, right second maxilla, most of scaphognathite missing; *j*, right first maxilliped; *k*, right second maxilliped; *l*, right first pereiopod; *m*, left first pereiopod; *n*, right second pereiopod; *o*, right third pereiopod; *p*, right fourth pereiopod; *q*, right fifth pereiopod. (Magnifications: *a–c*, *l–q* ×15.5; *d–k*, ×31.)

scurely bilobed palp, proximal lobe armed with long, strong spine, larger distal lobe bearing single small spinule or seta. First maxilliped with broad, 3-jointed palp. Second maxilliped with rounded lobe, possibly representing podobranch, at base of epipod. Third maxillipeds lacking in holotype.

First pereiopods very unequal. Major cheliped (Figure 24*m*) overreaching antennal peduncle by about length of chela; fingers much shorter than palm, slightly gaping; movable finger armed with small, blunt proximal tooth on opposable margin, remainder of margin sinuous; fixed finger armed with 2 broad, low, rounded teeth; palm much longer than broad, margins sinuously converging distally; carpus less than half as long as palm; merus about three-fourths as long as palm, flexor margin obscurely crenulate, distal angle nearly semicircular; ischium slightly more than one-third as long as merus, with slender spine near distal end of flexor (dorsal) margin but no spine near extensor margin. Minor cheliped (Figure 24*l*) overreaching antennal peduncle by slightly more than length of chela; fingers slightly shorter than palm, unarmed on opposable margins; carpus about four-fifths as long as palm; merus about half again as long as palm, flexor margin obscurely crenulate; ischium less than one-third as long as merus. Second pereiopod (Figure 24*n*) overreaching antennal peduncle by chela and 4 distal articles of carpus; fingers slightly shorter than palm; carpus 5-jointed, articles decreasing in length 2, 1, 3, 5, 4, second article nearly twice as long as first; merus slightly less than two-thirds as long as carpus; ischium slightly longer than merus. Third pereiopod (Figure 24*o*) overreaching antennal peduncle by dactyl and about one-half of propodus; dactyl simple, slender, not subspatulate, less than half as long as propodus; propodus tapering distally, without spines on flexor margin except at distal angle, but 2 or 3 of long setae stout; carpus slightly shorter than propodus; merus about half again as long as propodus; ischium much less than half as long as merus, unarmed. Fourth pereiopod (Figure 24*p*) overreaching antennal peduncle by about length of dactyl, nearly identical with third but slightly longer and less robust. Fifth pereiopod (Figure 24*q*) overreaching antennal peduncle by nearly length of dactyl; dactyl more than half as long as propodus; propodus with subparallel margins, extensor margin with about 7 transverse rows of setae in distal half and 2 widely separated spines on mesial surface in addition to terminal spine at base of dactyl; carpus about four-fifths as long as propodus; merus very slightly longer than propodus; ischium unarmed, about two-fifths as long as merus.

Lateral branch of uropod (Figure 24*c*) with lateral margin strongly convex, terminating in obscure tooth, but apparently without movable spine in gap between tooth and blade.

SIZE.—Carapace length of holotype in midline 3.0 mm.

HABITAT.—The holotype was collected in shallow water on a bottom covered with turtle-grass, conchs, and *Porites* clumps. The juvenile specimen from Antigua Island tentatively identified with this species came from among, or under, rocks in 1–4 feet of water.

TYPE-LOCALITY.—Inner side of Arrecife Nicchehabin, Bahía de la Ascensión, Territorio de Quintana Roo, Mexico.

DISTRIBUTION.—Thus far known only from the type-locality and possibly Antigua Island.

REMARKS.—As suggested by the name (rectus, L. = straight + frons, L. = brow), this species apparently is distinguished from the 11 species of the genus previously described by the absence of any mesial frontal projection or rostrum and possibly also by the distal armature of the telson. In having the tip of the stylocerite falling short of the distal margin of the first antennular segment, *A. rectifrons* seems to agree with *A. anacanthopus* De Man, 1910, *A. branchialis* Holthuis and Gottlieb, 1958, *A. dolichognatha* De Man, 1888, and *A. evermanni* and to differ from *A. haightae* Boone, 1931, *A. johnsoni* [*A. gardineri*], *A. kingsleyi* [*A. gardineri*], and *A. salomoni* Coutière, 1908. Banner and Banner (1966a:151) noted that in *A. gardineri* the stylocerite may either fall short of, or overreach, the first antennular segment, and the character has not been described for *A. rugosa* Coutière, 1900 (a species closely related to *A. evermanni*) and *A. talismani* Coutière, 1902 (a species that may prove to be identical with *A. gardineri*). Holthuis and Gottlieb (1958:39) mentioned the importance of the relative lengths of the distolateral tooth and the blade of the antennal scale. *Automate rectifrons* agrees with *A. branchialis* and differs from most of the other species in having the blade reaching at least as far as the tip of the tooth. In *A. evermanni*, however, this character seems to be very variable; in some specimens of that species examined, the tooth overreaches the blade by its entire length, whereas in others the blade is produced far beyond the tip of the tooth. In lacking spines on the flexor margin of the propodus of the third and fourth pereiopods, the new species agrees with *A. anacanthopus*, *A. branchialis*, *A. evermanni*, and probably *A. rugosa* and disagrees with the Dolichognatha Group (*A. dolichognatha*, *A. gardineri*, *A. haightae*, *A. johnsoni*, *A. kingsleyi*, *A. salomoni*, and presumably *A. talismani*).

Genus *Leptalpheus* Williams, 1965a

Only one species is known.

141. *Leptalpheus forceps* Williams

Leptalpheus forceps Williams, 1965a:192, figs. 1, 2.—Dawson 1967:224.

TYPE-LOCALITY.—Gallants Point, Newport River, Carteret County, North Carolina.

DISTRIBUTION.—North Carolina and Mississippi; subtidal. (See "Remarks" under 136. *Alpheus simus*.)

*Genus *Metalpheus* Coutière, 1908

Only one western Atlantic species is known.

*142. *Metalpheus rostratipes* (Pocock)

Alpheus rostratipes Pocock, 1890:522.—Crosnier and Forest 1966:246, figs. 12–14.

MATERIAL.—Antigua Island (Sta. 73–56: 1 ♀).—Dominica (Sta. 75–59: 1♂, 3 juv.).—Saint Lucia Island (Sta. 65–59: 1♂, 1 ovig. ♀).—Isla de Cozumel (Sta. 51–60: 1♂, 2♀ [1 ovig.], 1 juv.).—Bahía de la Ascensión (Sta. 52–60: 3♂, 3♀ [2 ovig.]; Sta. 67–60: 3♂, 2 ovig. ♀, 2 juv.; Sta. 85–60: 1 ovig. ♀).—Bahía del Espíritu Santo (Sta. 41–60: 8♂, 6♀ [5 ovig.], 2?).

HABITAT.—All of the specimens mentioned above were probably living in the interstices of eroded coral and coral rock.

TYPE-LOCALITY.—Fernando de Noronha.

DISTRIBUTION.—Puerto Rico and Yucatan Peninsula to Fernando de Noronha; probably pantropical; to a depth of 12 meters.

REMARKS.—Coutière (1908a:213–216) suggested the genus *Metalpheus* for one or more species of *Alpheus* having the antennules and antennae unusually robust; the eyes incompletely protected; the labrum enlarged; the mandible, second and third maxilliped, and first pereiopod atypical; the second pereiopod short; and the pleopods different from those of the other species of *Alpheus*. Holthuis (1955: 91) noted that the type-species was not named in the original publication and that no species had been assigned to the genus by later authors. It seems to me, however, that Shelford (1909:2631) was justified in recognizing *Alpheus rostratipes* as the "type" on the basis of Coutière's statement (p. 215) that "tels sont les caractères que l'on pourrait invoquer pour la séparation de l'*A. rostratipes* et des formes affines. Le nouveau genre pourrait recevoir le nom de *Metalpheus* s'il était conservé."

I believe that Coutière's genus should now be recognized because of the following apparently unique characters: an unusually enlarged labrum enveloped by an expanded mandibular incisor process; modified second and third maxillipeds; the absence of a mastigobranch epipod on the fourth and fifth pereiopods; and, especially, the greatly enlarged and modified appendix masculina on the male second pleopod. Although *Alpheus paragracilis* Coutière, 1897, forms a link between *Metalpheus rostratipes* and the more nearly typical species of *Alpheus,* as noted by Coutière (1908a:215) and Banner and Banner (1964:89, 90), it displays all of the characters of *Metalpheus* in less modified form and should certainly be assigned to the latter genus. Banner and Banner (1964:90) have noted the similarity between these two species and *Pomagnathus corallinus* Chace, 1937. There is no doubt that *Pomagnathus* and *Metalpheus* are closely related, but there seems to be sufficient reason to consider them distinct. *Pomagnathus* agrees with *Metalpheus* in the form of the front and mouth parts (although the incisor process of the mandible is armed with longer and sharper teeth, and the antepenultimate segment of the third maxilliped is even more expanded than in *M. rostratipes),* but it differs in lacking epipods on all of the pereiopods and in having an appendix masculina that is even shorter than the appendix interna rather than abnormally elongate.

Genus *Neoalpheopsis* Banner, 1953

Only one Atlantic species is known.

143. *Neoalpheopsis hummelincki* (Schmitt), new combination

Alpheopsis hummelincki Schmitt, 1936:364, pl. 11: fig. 1.

TYPE-LOCALITY.—Kralendijk, Bonaire.

DISTRIBUTION.—Known only from the male holotype from Bonaire.

REMARKS.—Even though the only recorded specimen lacks the first pair of pereiopods, the form of the telson leaves little doubt that this species belongs in the genus established by Banner (1953:20) for two Pacific species.

*Genus *Salmoneus* Holthuis, 1955

Key to Western Atlantic Species

Rostral projection with lateral margins nearly straight, converging to broad tip, mesiodorsal carina indistinct; third pereiopod with dactyl less than two-fifths as long as propodus, propodus longer than carpus .... 144. ***S. arubae***

Rostral projection with lateral margins sinuous, converging to slender sharp tip, mesiodorsal carina distinct; third pereiopod with dactyl nearly half as long as propodus, propodus shorter than carpus .... *145. ***S. ortmanni***

144. *Salmoneus arubae* (Schmitt)

Jousseaumea arubae Schmitt, 1936:366, pl. 12: figs. 2*a–g*.

TYPE-LOCALITY.—Punta Braboe (Oranjestad), Aruba.

DISTRIBUTION.—Known only from the unique type-specimen from the littoral zone of Aruba.

*145. *Salmoneus ortmanni* (Rankin)

Athanas ortmanni Rankin, 1898:251, pl. 30: fig. 7.
Jousseaumea ortmanni.—Schmitt 1936:367, pl. 12: figs. 2*h*, *i*.

MATERIAL.—Bahía de la Ascensión (Sta. 67–60: 1 juv.; Sta. 72–60: 1 ♀; Sta. 77–60: 1 ♀; Sta. 82–60: 1 ovig. ♀ with bopyrid abdominal parasite; Sta. 85–60: 1 ♂, 2 ovig. ♀; Sta. 87–60: 1 ♂; Sta. 91–60: 2 ♂, 1 ovig. ♀; Sta. 95–60: 1 ♂).—Bahía del Espíritu Santo (Sta. 41–60: 1 ♂).

HABITAT.—Most of the specimens were collected on turtle-grass flats to a depth of 6 feet, but three specimens came from tide pools and rocks near low-tide level and one specimen was apparently taken from much eroded coral standing in 10 feet of water.

TYPE-LOCALITY.—Near Nassau, New Providence Island, Bahamas.

DISTRIBUTION.—Bermudas, Bahamas, and Yucatan Peninsula; littoral and upper sublittoral.

*Genus *Synalpheus* Bate, 1888

Most of the numerous subspecies described by Coutière (1909) are not recognized in this report. Many are sympatric with the typical form of the species concerned, and there seems little doubt that most of them display only varietal differences. Their prevalance, however, emphasizes the amount of variability encountered in the genus and the difficulty in finding specifically stable characters. The following key certainly will be ineffective for identifying the more aberrant varieties, and it should be used with caution, especially on single specimens and small lots.

Key to Western Atlantic Species

1. Stylocerite not overreaching basal segment of antennular peduncle (except in *S. mcclendoni*); movable finger of minor first chela with prominent fringe of long, distally curved hairs on extensor surface (except reduced to single longitudinal row in *S. paraneptunus*). (Ocular teeth not tapering to slender, sharp tips [slender but not sharp in *S. mcclendoni*, sharp but not slender in *S. pectiniger*]; rostrum usually without ventral process preventing contact between corneas of eyes [partial ventral process in *S. rathbunae*].) 2

   Stylocerite distinctly overreaching basal segment of antennular peduncle; movable finger of minor first chela with scattered tufts of straight hairs but without prominent fringe on extensor surface. (Antennal scale with well-developed blade; lateral spine of basal antennal segment [basicerite] not reaching mid-length of antennal scale; lateral branch of uropod with lateral margin unarmed proximal to distal tooth.) 20

2.(1) Both pairs of dorsal spines of telson arising in anterior half of segment. (Carapace not distinctly produced at anteroventral angle; cardiac notch not well marked; basal segment of antennal peduncle [basicerite] not produced dorsally; palm of major first chela armed with sharp distal spine.) 3

   Posterior pair of dorsal spines of telson arising in posterior half of segment 4

3.(2) Carapace carinate anteriorly in dorsal midline; ocular teeth blunt, longer than broad but distinctly broader than rostrum; antennal scale with vestige of blade; major first chela not noticeably twisted, fixed finger not reduced; movable finger of minor first chela subequally bidentate distally .... *146. ***S. anasimus***

   Carapace not carinate in dorsal midline posterior to base of rostrum; ocular teeth acute, as broad as long but not much broader than rostrum; antennal scale without vestige of blade; major first chela twisted, fixed finger short, not reaching nearly as far distally as does movable finger; movable finger of minor first chela strongly tridentate distally in lateral view .... *169. ***S. pectiniger***

4.(2) Carpus of second pereiopod composed of 4 joints. (Antennal scale without blade.) 5

   Carpus of second pereiopod composed of 5 joints 7

Key to Western Atlantic Species—Continued

5.(4) Basal segment of antennal peduncle (basicerite) subrectangular dorsally, lateral spine reaching nearly to tip of antennal scale; movable finger of minor first chela subequally bidentate distally; lateral branch of uropod with single tooth on lateral margin proximal to movable spine .... 149. ***S. barahonensis***

Basal segment of antennal peduncle (basicerite) with strong dorsal spine, lateral spine not nearly reaching tip of antennal scale; movable finger of minor first chela not clearly bidentate distally; lateral branch of uropod with 2 or 3 teeth on lateral margin proximal to movable spine 6

6.(5) Major first chela with tubercle at distal end of palm armed with small, sharp anteroventral tooth; fingers of chela of second pereiopod filiform distally. 156. ***S. filidigitus***

Major first chela with tubercle at distal end of palm unarmed; fingers of chela of second pereiopod not filiform .... *170. ***S. rathbunae***

7.(4) Lateral branch of uropod with 1 fixed tooth on lateral margin, sometimes at distolateral angle just lateral to movable spine, sometimes distinctly removed from distolateral angle. (Basal segment of antennal peduncle [basicerite] not produced dorsally.) 8

Lateral branch of uropod with 2 or more fixed teeth on lateral margin at, and proximal to, distolateral angle 14

8.(7) Antennal scale with well-developed blade. (Fingers of minor first chela not bidentate distally.) 9

Antennal scale without blade. (Ocular teeth distinctly broader than rostrum; stylocerite not reaching as far as end of basal antennular segment.) 10

9.(8) Ocular teeth slender, not much broader than rostrum; first abdominal pleuron of male without hooklike tooth; stylocerite slightly overreaching basal antennal segment; major first chela not noticeably twisted, armed with stout spine at distal end of palm .... *163. ***S. mcclendoni***

Ocular teeth stout, distinctly broader than rostrum; first abdominal pleuron of male armed with hooklike tooth; stylocerite not reaching as far as end of basal antennal segment; major first chela twisted, palm terminating distally in spine-tipped lobe 171. ***S. sanctithomae***

10.(8) Lateral spine of basal antennal segment (basicerite) reaching nearly to, or beyond, tip of antennal scale. (Fingers of minor first chela bidentate distally.) 11

Lateral spine of basal antennal segment (basicerite) not reaching tip of antennal scale 12

11.(10) Ocular teeth with lateral margins straight or slightly concave; telson with lateral margins nearly straight; antennular peduncle stout, overreaching antennal scale by about half of distal segment, stylocerite broad .... *150. ***S. bousfieldi***

Ocular teeth with lateral margins distinctly convex; telson with lateral margins concave in posterior fourth of length; antennular peduncle slender, overreaching antennal scale by distal and half of penultimate segments, stylocerite slender 172. ***S. tanneri***

12.(10) Ocular teeth extremely short and broad, much broader than long; "dorsal" spines of telson arising from margin rather than dorsal surface. (Major first chela strongly twisted, palm ending distally in low, rounded tubercle; fingers of minor first chela subequally bidentate distally.) .... *151. ***S. brevifrons***

Ocular teeth at least as long as broad; dorsal spines of telson arising from dorsal surface 13

13.(12) Major first chela strongly twisted, palm not sharply spinous distally; fingers of minor first chela not bidentate; third pereiopod with abruptly compressed flanges on flexor margins of merus and carpus .... 147. ***D. androsi***

Major first chela not strongly twisted, palm sharply spinous distally; fingers of minor first chela subequally bidentate distally; third pereiopod without flanges on merus and carpus .... *152. ***S. brooksi***

14.(7) Lateral spine of basal segment of antennal peduncle (basicerite) reaching nearly to, or beyond, tip of antennal scale. (Fingers of minor first chela subequally bidentate distally.) 15

Lateral spine of basal segment of antennal peduncle (basicerite) falling considerably

Key to Western Atlantic Species—Continued

short of tip of antennal scale. (Palm of major first chela terminating distally in tubercle armed distally or distoventrally with small, sharp tooth.) 16

15.(14) Ocular teeth subacute, only slightly broader than rostrum; palm of major first chela terminating distally in acute projection ..... 160. ***S. herricki***

Ocular teeth rounded, much broader than rostrum; palm of major first chela terminating distally in tubercle armed distoventrally with small, sharp tooth *167. ***S. pandionis***

16.(14) Basal segment of antennal peduncle (basicerite) rounded or obtuse dorsally 17

Basal segment of antennal peduncle (basicerite) rectangular or acute dorsally 18

17.(16) Movable finger of major first chela far overreaching very short fixed finger *154. ***S. disparodigitus***

Movable finger of major first chela barely overreaching normal fixed finger *162. ***S. longicarpus***

18.(16) Movable finger of minor first chela broadly tridentate distally in extensor aspect; lateral branch of uropod armed with 3 or 4 fixed teeth and 1 or 2 movable spines at distal end of lateral margin ..... *168. ***S. paraneptunus***

Movable finger of minor first chela simple or bidentate distally; lateral branch of uropod armed with 8–17 fixed teeth on lateral margin 19

19.(18) Antennal scale with blade; distal tubercle on palm of major first chela armed distally *158. ***S. goodei***

Antennal scale without blade; distal tubercle on palm of major first chela armed ventrally ..... 166. ***S. osburni***

20.(1) Ocular teeth triangular, not much broader than rostrum, not tapering to slender, sharp tips 21

Ocular teeth elongate, much broader than rostrum, tapering to slender, sharp tips. 23

21.(20) Rostrum with well-developed ventral process preventing corneas of eyes from touching; palm of major first chela unarmed distally; merus of third pereiopod short and broad, less than two and one-half times as long as broad ..... 153. ***S. curacaoensis***

Ventral process of rostrum vestigial or lacking, not preventing corneas of eyes from touching; palm of major first chela with distal tooth or spine; merus of third pereiopod about four times as long as broad 22

22.(21) Ocular teeth acute; stylocerite tapering to slender tip; basal segment of antennal peduncle (basicerite) with acute or subacute dorsal projection ..... *164. ***S. minus***

Ocular teeth broadly obtuse; stylocerite broadly rounded distally; basal segment of antennal peduncle (basicerite) not produced dorsally ..... *166. ***S. obtusifrons***

23.(20) Dactyls of 3 posterior pairs of pereiopods with distal tooth on flexor margin distinctly divergent from axis of segment and much broader than extensor tooth, flexor margin with prominence proximal to distal tooth. (Basal segment of antennal peduncle [basicerite] strongly spinous dorsally.) 24

Dactyls of 3 posterior pairs of pereiopods with terminal teeth subparallel, no prominence on flexor margin proximal to distal tooth 25

24.(23) Proximal prominence on flexor margin of dactyls of 3 posterior pairs of pereiopods low and obtuse ..... *157. ***S. fritzmuelleri***

Proximal prominence on flexor margin of dactyls of 3 posterior pairs of pereiopods large and sharp ..... *159. ***S. hemphilli***

25.(23) Basal segment of antennal peduncle (basicerite) unarmed dorsally; distal spine on palm of major first chela straight ..... *173. ***S. townsendi***

Basal segment of antennal peduncle (basicerite) armed dorsally with strong spine; distal spine on palm of major first chela dorsally convex or lacking 26

26.(25) Palm of major first chela unarmed distally ..... 161. ***S. latastei tenuispina***

Palm of major first chela armed distally with curved spine 27

27.(26) Merus of third pereiopod unarmed; dactyls of 3 posterior pairs of pereiopods with distal tooth on flexor margin narrower than extensor tooth ..... *148. ***S. apioceros***

Merus of third pereiopod armed on distal half of flexor margin with series of movable spines; dactyls of 3 posterior pairs of pereiopods with distal tooth on flexor margin broader than extensor tooth ..... 155. ***S. dominicensis***

*146. *Synalpheus anasimus*, new species

FIGURES 25–28

MATERIAL.—Bahía de la Ascensión (Sta. 95-60: 1 ♂, holotype, USNM 135367).—Bahía del Espíritu Santo (Sta. 41-60: 2 ♀ [1 ovig.]).

DESCRIPTION.—Rostrum (Figures 25*a*, *b*) not reaching distal margin of first segment of antennular peduncle, depressed below level of ocular hoods, concave dorsally and strongly convex ventrally but without true ventral process. Ocular hoods separated from rostrum by broad deep rounded sinuses, forming bluntly acute teeth not reaching as far as tip of rostrum. Carapace carinate in dorsal midline on anterior fourth to half, carina ending near base of rostrum; pterygostomial margin slightly produced as broadly rounded lobe.

Pleuron of first abdominal somite of male (Figure 25*c*) with hooklike tooth on posterior half of ventral margin; pleura of remaining somites more or less rounded, those of fourth and fifth somites obscurely angulate, especially in females. Telson (Figure 25*d*) subtriangular with faintly sinuous lateral margins and narrowly convex posterior margin; dorsal surface slightly depressed mesially, armed typically with 2 pairs of prominent spines, both arising in anterior half of telson; posterior margin armed with 2 pairs of strong spines and 3 or 4 pairs of setae, mesial pair of spines more than twice as long as lateral pair.

Stylocerite of antennular peduncle (Figure 25*b*) acute, not reaching level of distal margin of basal antennular segment. Segments of peduncle short and broad, second segment not much longer than third.

Antennal scale overreaching antennular peduncle; blade reduced, represented by bluntly triangular lobe. Basal segment of peduncle not produced dorsally; lateral spine reaching to, or slightly beyond, end of basal third of scale. Distal segment of peduncle variable, long and slender in lateral view, and distinctly overreaching scale.

Mouth parts as figured (Figures 25*e*–*j*). Mandibles with 5 or 6 teeth on incisor process, molar process much larger than incisor. Palp of first maxilliped consisting of 2 segments. Third maxilliped overreaching antennal peduncle by about one-half of distal segment, exopod reaching nearly to end of antepenultimate segment.

Major first pereiopod of male (Figure 26*a*) (lacking in both females) overreaching antennal peduncle

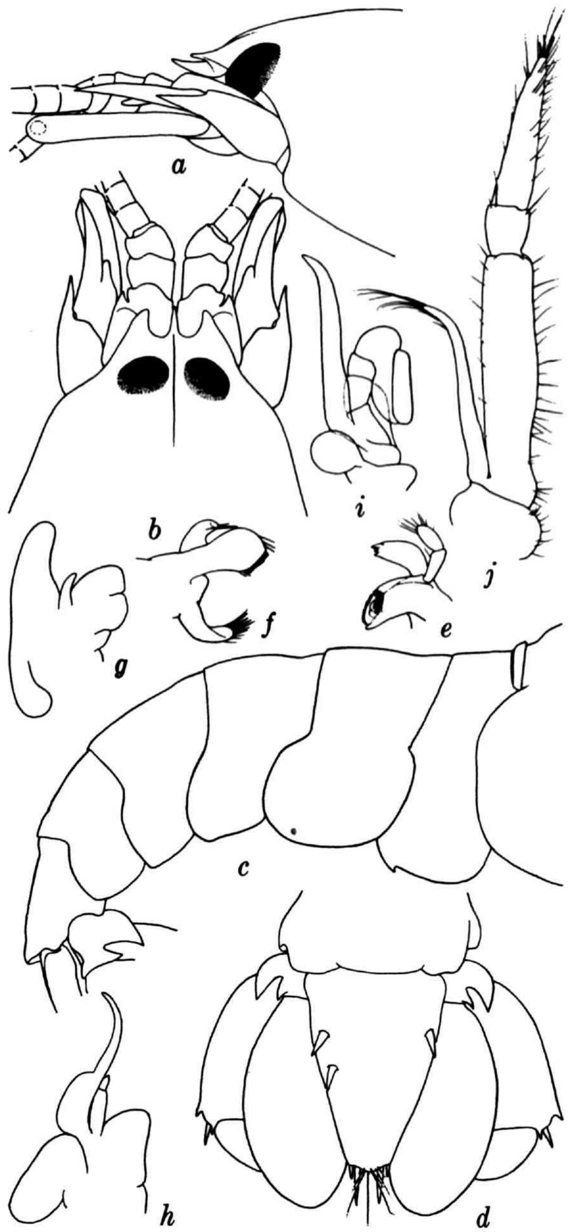


FIGURE 25.—*Synalpheus anasimus*, new species, holotype, male, carapace length 2.2 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, abdomen; *d*, telson and uropods; *e*, right mandible; *f*, right first maxilla; *g*, right second maxilla; *h*, right first maxilliped; *i*, right second maxilliped; *j*, right third maxilliped. (Magnifications: *a*–*j*, ×31.)

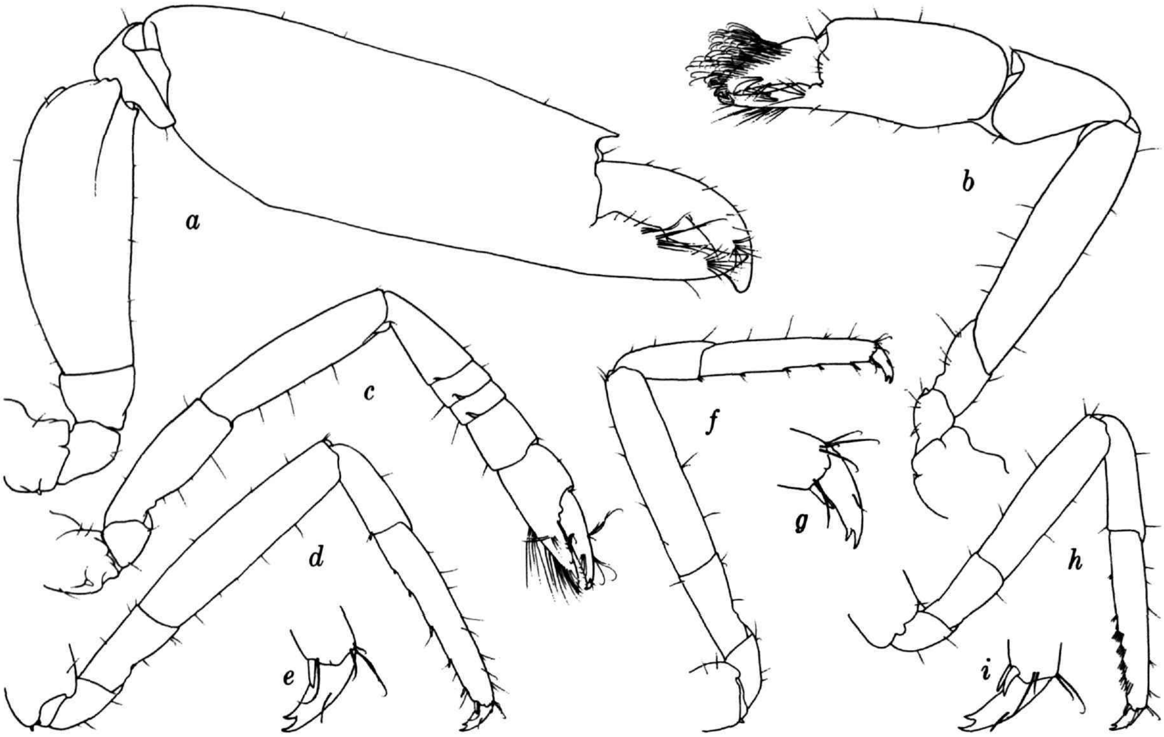


FIGURE 26.—*Synalpheus anasimus*, new species, holotype, male, carapace length 2.2 mm: *a*, right first pereiopod; *b*, left first pereiopod; *c*, right second pereiopod; *d*, right third pereiopod; *e*, same, dactyl; *f*, right fourth pereiopod; *g*, same, dactyl; *h*, right fifth pereiopod; *i*, same, dactyl. (Magnifications: *a–d*, *f*, *h*, ×31; *e*, *g*, *i*, ×78.)

by nearly entire length of chela. Chela not noticeably twisted, about three and one-half times as long as broad. Fingers from one-third to two-fifths as long as palm. Palm terminating dorsodistally in sharp horizontal tooth. Carpus short and broad. Merus considerably more than half as long as palm, bluntly produced at distal end of flexor margin. Minor first pereiopod (Figure 26*b*) overreaching antennal peduncle by nearly entire length of chela or by chela and as much as one-fourth of carpus. Chela slightly less than three times as long as broad. Fingers bidentate; movable finger with dense fringe of hairs on extensor margin. Carpus more than half as long as chela. Second pereiopod (Figure 26*c*) overreaching antennal peduncle by length of chela and at least half of carpus. Fingers more than one and one-half times as long as palm. Carpus slightly more than one and one-half times as long as chela and composed of 4 articles in male, nearly one and three-fourths times as long as chela and composed of 5 articles in females. Merus nearly as long as carpus and about one-third longer than ischium. Third, fourth, and fifth pereiopods with dactyls biunguiculate and rather short, somewhat shorter and stouter in females than in male; terminal process on flexor margin slightly divergent from curve of segment, narrower than, or subequal to, extensor process in male, broader in females. Third pereiopod (Figures 26*d*, *e*) overreaching antennal peduncle by length of dactyl and about one-half of propodus; propodus nearly five times as long as dactyl, flexor margin armed throughout length with 4 or 5 movable spinules in addition to distal one; carpus nearly two-thirds as long as propodus, armed with movable spinule at distal end of flexor margin; merus unarmed, one and one-third times as long as propodus in male, fully one and one-half times as long in females. Fourth pereiopod (Figures 26*f*, *g*) reaching nearly to end of antennal peduncle; propo-

FIGURE 27.—*Synalpheus anasimus?*. Ovigerous female, carapace length 3.2 mm, from Smithsonian-Bredin Station 41-60: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, right mandible; *d*, right first maxilla; *e*, right second maxilla; *f*, right first maxilliped; *g*, right second maxilliped; *h*, right third maxilliped. Female, carapace length 3.5 mm, from same station: *i*, telson and uropods. (Magnifications: *a–i*, ×31.)

dus barely four times as long as dactyl in male, more than four and one-half times as long in females, flexor margin armed throughout length with 4 movable spinules in addition to distal one; carpus about two-thirds as long as propodus, with movable spinule at distal end of flexor margin; merus unarmed, about one and one-third times as long as propodus in male, nearly one and one-half times as long in females. Fifth pereiopod (Figures 26*h, i*) reaching to about midlength of distal segment of antennal peduncle; propodus barely four and one-third times as long as dactyl in male, more than four and three-fourths times as long in females, flexor margin armed in distal half with 1–3 movable spinules in addition to distal one and with 5 or 6 oblique rows of setae; carpus unarmed, about four-fifths as long as propodus; merus unarmed, slightly longer than propodus.

Appendix interna on endopod of second to fifth pleopods in both sexes. Lateral branch of uropod (Figure 25*d*) convex and armed with 1 or 2 teeth proximal to movable spine at distal end of margin.

Eggs few and large, more than 1 mm in length.

SIZE.—Carapace length of male holotype to base of rostrum 2.2 mm; of females, 3.2 and 3.5 mm.

HABITAT.—The habitat of the male holotype is not known with certainty. The females were probably living in the upper portions of much eroded coral standing in 10 feet of water.

TYPE-LOCALITY.—Near Punta Solimán, Bahía de la Ascensión, Territorio de Quintana Roo, Mexico.

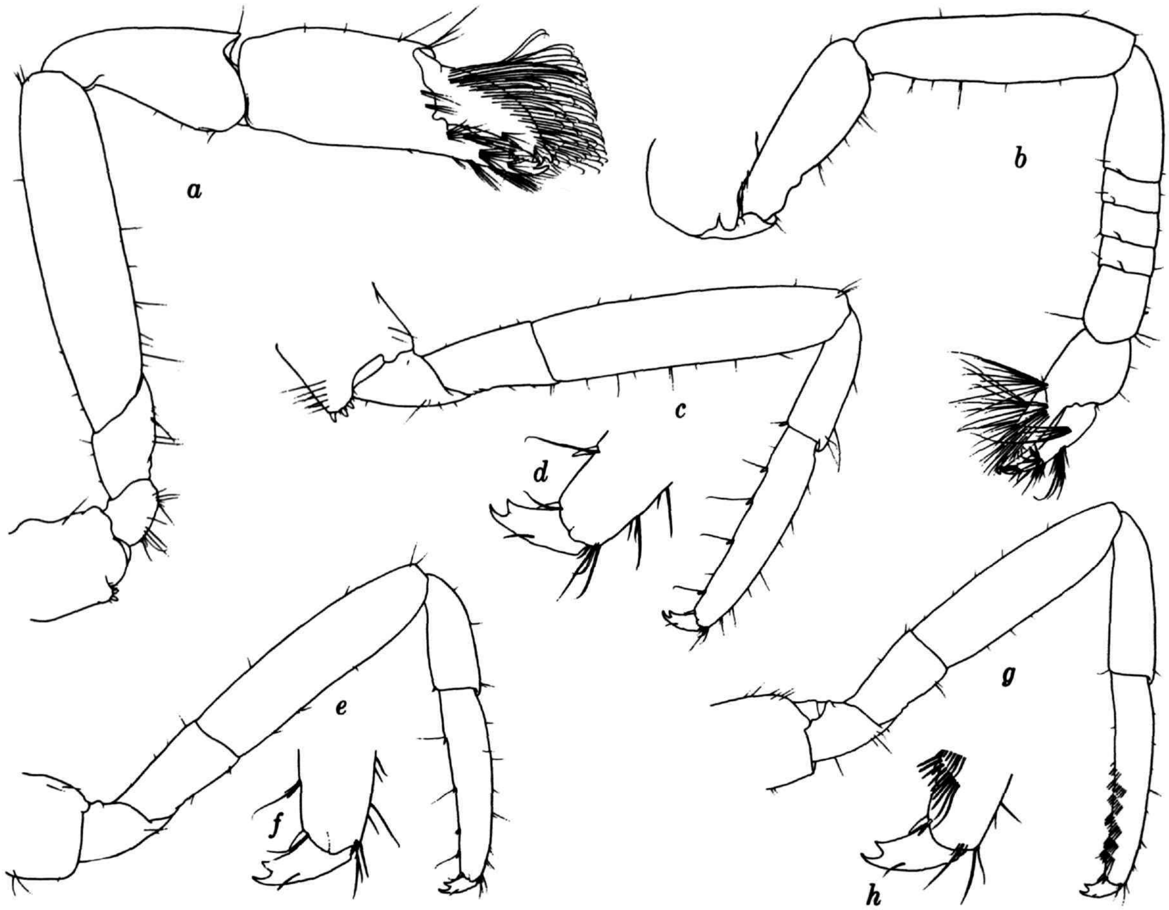


FIGURE 28.—*Synalpheus anasimus?*, ovigerous female, carapace length 3.2 mm, from Smithsonian-Bredin Station 41–60: *a*, right first pereiopod; *b*, right second pereiopod; *c*, right third pereiopod; *d*, same, dactyl; *e*, right fourth pereiopod; *f*, same, dactyl; *g*, right fifth periopod; *h*, same, dactyl. (Magnifications: *a–c*, *e*, *g*, ×31; *d*, *f*, *h*, ×78.)

DISTRIBUTION.—East coast of Yucatan Peninsula.

REMARKS.—The integument of this species is thin and fragile, resulting in some distortion during preservation. The cardiac notch at the junction of the posterior margin of the carapace with the branchiostegite is present but less well marked than in most species of the genus.

There is little doubt that *S. anasimus* belongs to the Laevimanus (or Gambarelloides) Group of the genus, but it seems to differ from all previously described species of that group in the depressed upturned rostrum (which suggested the specific name: anasimos, G., = with a turned-up nose), the median carina on the carapace, and the anteriorly placed dorsal spines on the telson. Until additional material becomes available, there must be some doubt that the two females from Bahía del Espíritu Santo (Figures 27, 28) are specifically identical with the male holotype from Bahía de la Ascensión. They differ from the male in having the dorsal spines on the telson placed farther anteriorly and the distal spines shorter and stouter, the terminal segment of the antennal peduncle more slender in dorsal view, the incisor process of the mandible armed with 6 rather than 5 marginal teeth, the carpus of the second pereiopod composed of 5 rather than 4 articles, and the 3 posterior pairs of pereiopods with slightly different proportions and the dactyls rather markedly different in form. Inasmuch as the two lots agree in the unique form of the rostrum and the median carina and rather obscure cardiac notch on the carapace, the differences are tentatively assumed to represent normal variation or sexual dimorphism.

147. *Synalpheus androsi* Coutière

Synalpheus androsi Coutière, 1909:82, fig. 50.

TYPE-LOCALITY.—West side of Andros Island, Bahamas.

DISTRIBUTION.—Apparently known only from the unique type-specimen from Andros Island, Bahamas.

*148. *Synalpheus apioceros* Coutière

Synalpheus apioceros Coutière, 1909:27, fig. 9.

MATERIAL.—Anegada (Sta. 42–58: 2 spec. [1 ovig.]).—Barbuda (Sta. 113a–58: 2 spec. [1 ovig.]).—Antigua Island (Sta. 73–56: 2 ovig. ♀; Sta. 80–56: 1 spec.; Sta. 82–56: 17 spec. [4 ovig.]; Sta. 94–56: 1 spec.; Sta. 78–58: 2 spec. [1 ovig.]; Sta. 79–58: 3 spec. [1 ovig.]; Sta. 105–59: 1 spec.; Sta. ?–59: 6 spec. [1 ovig.]).—Saint Lucia Island (Sta. 65–59: 1 ovig. ♀).—Carriacou Island (Sta. 15–56: 2 spec.).—Tobago (Sta. 31–59: 1 spec.).—Isla de Cozumel (Sta. 115–60: 1 ovig. ♀. [approaching *S. fritzmuelleri*]).—Bahía de la Ascensión (Sta. 52–60: 7 spec. [3 ovig.]; Sta. 60–60: 1 spec.; Sta. 67–60: 14 spec. [6 ovig.]; Sta. 72–60: 10 spec. [2 ovig.]; Sta. 82–60: 2 spec. [1 ovig.]; Sta. 91–60: 1 ovig. ♀).

HABITAT.—Most of the specimens listed above were taken on grass flats and weed-covered ships, wrecks, and a seawall, but some were apparently found under rocks and pieces of coral.

TYPE-LOCALITY.—Marco, Florida.

DISTRIBUTION.—Southern Florida to Surinam, westward to the Yucatan Peninsula.

REMARKS.—The Brazilian form named *S. apioceros desterroensis* by Coutière (1909) approaches *S. townsendi* in the shape of the distal tooth on the palm of the major chela, but the basal antennal segment is armed dorsally as in *S. apioceros*. The status of *S. a. desterroensis* must await the study of additional collections from South America.

149. *Synalpheus barahonensis* Armstrong

Synalpheus barahonensis Armstrong, 1949:20, fig. 7.

TYPE-LOCALITY.—Behind Piedra Prieta Reef, Barahona Harbor, Dominican Republic.

DISTRIBUTION.—Known only from the type-locality.

*150. *Synalpheus bousfieldi*, new species

FIGURES 29, 30

MATERIAL.—Virgin Gorda (Sta. 37–58: 1 ♀, 1 juv. [see "Remarks"]; Stas. 37, 38, 39–58: 1 ♀, 14 juv. [see "Remarks"]).—Bahía del Espíritu Santo (Sta. 41–60: 1 ♂, 2 ovig. ♀ [1 ovig. ♀ is holotype, USNM 135369.]).

DESCRIPTION.—Rostrum (Figures 29*a*, *b*, *k*) narrowly triangular, slightly overreaching or falling short of line between tips of stylocerites; no process extending ventrally from near base of rostrum. Ocular hoods deeply separated from rostrum by rounded sinuses, produced anterolaterally to broadly rounded teeth extending about as far as tip of rostrum. Pterygostomial angle of carapace rather strongly produced as rounded tooth.

Pleura of anterior 4 abdominal somites broadly rounded in female (Figure 29*c*), that of fifth somite subrectangular, of sixth acuminate. Pleuron of first somite in male (Figure 29*l*) bearing broad hooked tooth posteriorly, those of remaining somites similar to those of female but that of fourth somite obscurely angulate posteriorly. Telson (Figure 29*d*) triangular with nearly straight lateral margins and rather narrowly convex terminal margin; dorsal surface divided into 3 subequal parts by 2 pairs of distinct but not large spines, proximal pair situated nearer lateral margins than those of distal pair; distal margin armed with 2 pairs of unequal spines.

Stylocerite of antennular peduncle terminating in blunt tip reaching nearly to, or beyond, level of rostral projection. Segments of antennular peduncle rather short and broad, second segment slightly longer than third.

Antennal scale reaching about as far as end of antennular peduncle; blade absent in males, indicated by basal vestige in females. Basal segment of peduncle neither armed nor angulate dorsally; lateral spine long and stout, reaching about as far as tip of antennal scale. Distal segment of peduncle about five times as long as broad, overreaching antennular peduncle and antennal scale by more than one-fourth of length.

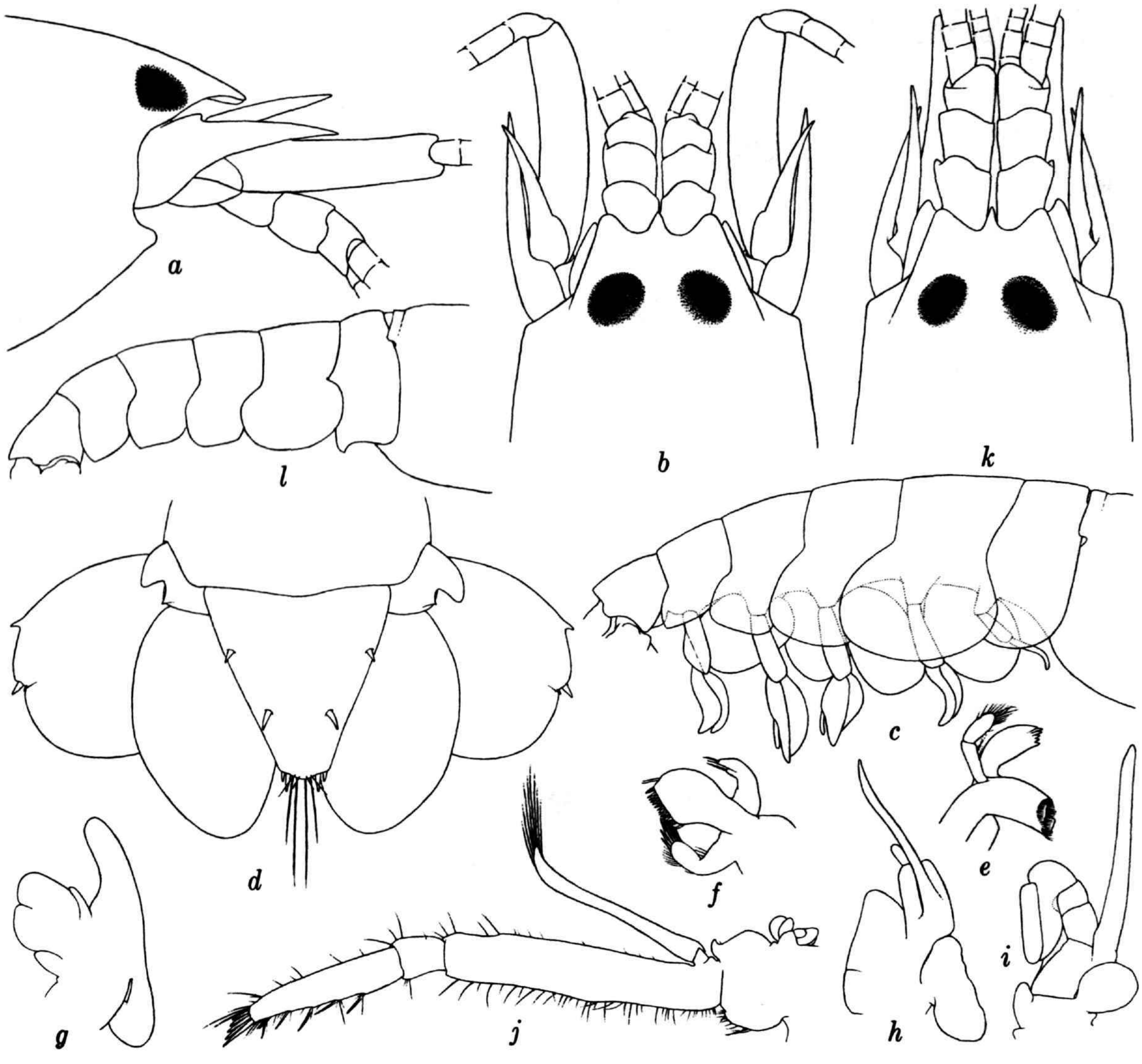


FIGURE 29.—*Synalpheus bousfieldi*, new species. Holotype, ovigerous female, carapace length 3.2 mm: *a*, anterior region, lateral view; *b*, same, dorsal view (antennuler peduncle slightly foreshortened); *c*, abdomen; *d*, telson and uropods; *e*, left mandible; *f*, left first maxilla; *g*, left second maxilla; *h*, left first maxilliped; *i*, left second maxilliped; *j*, left third maxilliped. Paratype, male, carapace length 3.2 mm: *k*, anterior region, dorsal view; *l*, abdomen. (Magnifications: *a*, *b*, *d–k*, ×31; *c*, *l*, ×15.5.)

Mouth parts as figured (Figures 29*e–j*). Mandible with 6 marginal teeth on incisor process. Palp of first maxilliped consisting of 2 segments. Third maxilliped reaching slightly beyond antennal peduncle, exopod falling slightly short of end of antepenultimate segment.

Major first pereiopod (Figure 30*a*) overreaching antennal peduncle by all but extreme proximal portion of chela. Chela not quite three times as long as broad. Fingers (Figure 30*b*) somewhat less than half as long as palm; movable finger opening and closing in oblique plane due to torsion of chela. Palm termi-

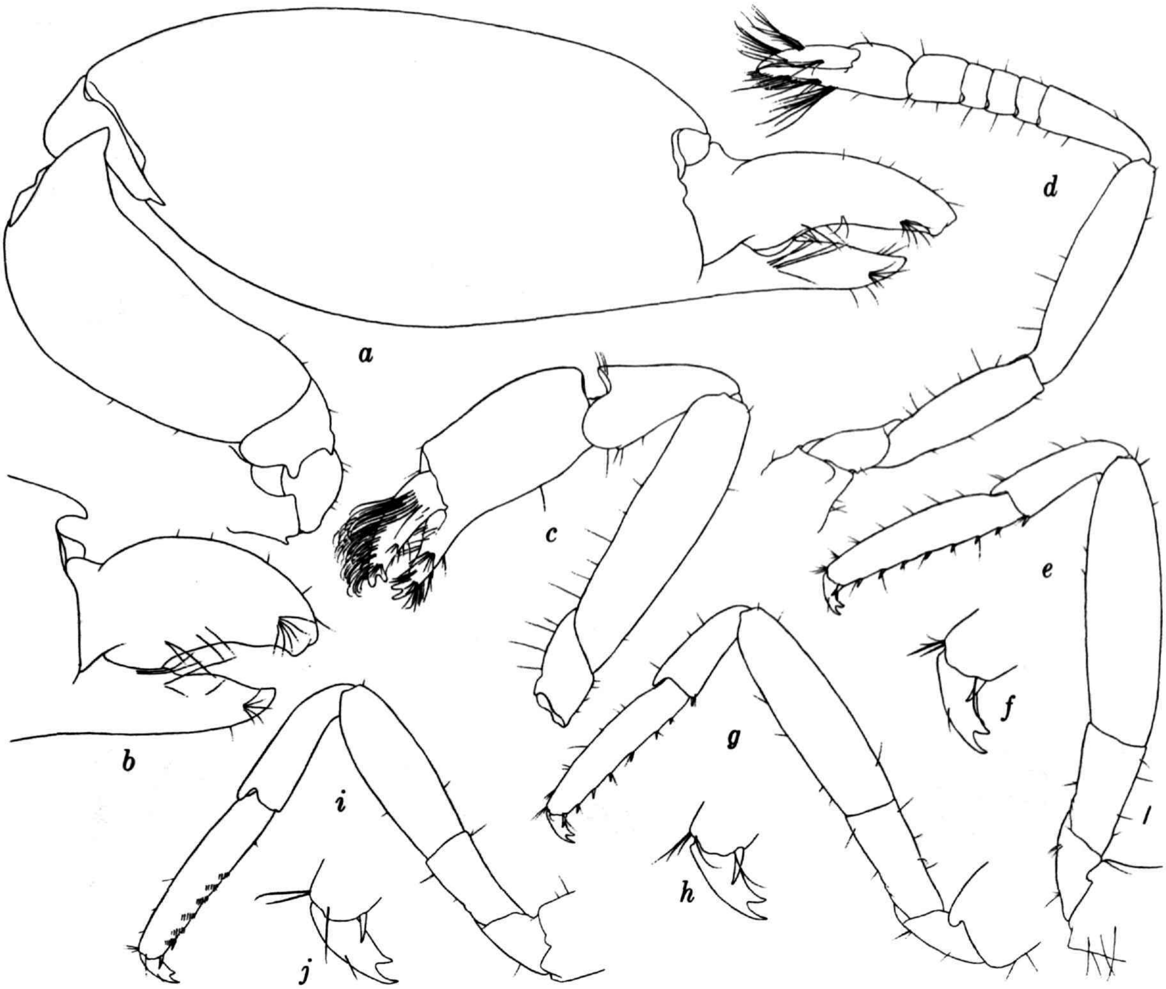


FIGURE 30.—*Synalpheus bousfieldi*, new species, holotype, ovigerous female, carapace length 3.2 mm: *a*, right first pereiopod; *b*, same, fingers; *c*, left first pereiopod; *d*, left second pereiopod; *e*, left third pereiopod; *f*, same, dactyl; *g*, left fourth pereiopod; *h*, same, dactyl; *i*, left fifth pereiopod; *j*, same, dactyl. (Magnifications: *a–e*, *g*, *i*, ×31; *f*, *h*, *j*, ×78.)

nating dorsodistally in blunt spine directed distoventrally. Carpus very short and broad. Merus unarmed, fully half as long as palm. Minor first pereiopod (Figure 30*c*) overreaching antennal peduncle by about two-thirds of chela. Chela not quite three times as long as broad. Fingers deeply bidentate; movable finger with dense fringe of hairs on extensor surface. Carpus about half as long as chela. Second pereiopod (Figure 30*d*) barely overreaching antennal peduncle. Fingers at least one and one-half times as long as palm. Carpus only slightly more than one and one-half times as long as chela, composed of 5 articles; proximal article not quite as long as combined lengths of distal 4; second, third, and fourth articles subequal, each about half as long as fifth. Merus nearly as long as carpus and about 1.3 times as long as ischium. Third, fourth, and fifth pereiopods with dactyls relatively short, biunguiculate; flexor terminal process not markedly divergent from curve of segment, shorter but not much broader at base than extensor process. Third pereiopod (Figures 30*e, f*) barely overreaching antennal peduncle; propodus more than four times as long as dactyl, entire flexor margin armed with movable spinules; carpus about three-fourths as long as propodus, armed with movable spinule at distal end of flexor margin; merus unarmed, about one and one-half times as long as propodus. Fourth pereiopod (Figures 30*g, h*) similar to third but shorter, barely overreaching antennular peduncle. Fifth pereiopod (Figures 30*i, j*) reaching about as far as distal end of basal segment of antennular peduncle; propodus about one and two-thirds times as long as dactyl, flexor margin armed with 2 spinules near distal end and several oblique rows of setae in distal two-thirds; carpus unarmed, nearly nine-tenths as long as propodus; merus unarmed, subequal in length to propodus.

Appendix interna on second to fifth pleopods in both sexes. Uropods (Figure 29*d*) very broad; lateral branch with fixed tooth on lateral margin about one-fourth of distance from obscure notch armed with large and small spines marking juncture with margin of blade.

Eggs (Figure 29*c*) few and very large, 1 mm or more in length.

SIZE.—Male with carapace length, to base of rostrum, of 3.2 mm; female without eggs, 2.3 mm; ovigerous females, 3.2 (holotype) and 3.8 mm; juveniles, 1.7–2.2 mm.

HABITAT.—The topotypic series was probably taken from the upper portions of much eroded coral standing in 10 feet of water.

TYPE-LOCALITY.—West side of reef east of anchorage, Bahía del Espíritu Santo, Territorio de Quintana Roo, Mexico.

DISTRIBUTION.—Yucatan Peninsula and, possibly, the Virgin Islands.

REMARKS.—The brush of hairs on the movable finger of the minor first pereiopod places this species in the Laevimanus (or Gambarelloides) Group. It seems to be most closely related to *S. tanneri*, but comparison with the unique type-specimen of that species shows that it differs in having the lateral margins of the orbital hoods straight or slightly concave rather than strongly convex, the lateral margins of the telson nearly straight rather than strongly concave posteriorly, and, especially, in having the antennular peduncle much stouter and the stylocerite broader and blunter.

The series of small specimens from Virgin Gorda are provisionally assigned to *S. bousfieldi*. They differ in having all of the abdominal pleura acuminate, the antennular peduncle somewhat longer, and the dorsodistal spine on the palm of the major chela reduced in size and, in some specimens, obsolescent. It has been assumed that all of these differences may represent growth changes.

This species is named for E. L. Bousfield, Chief Zoologist at the National Museum of Natural Sciences of Canada, who collected the type-series and whose enthusiasm and skill contributed materially to the success of the Smithsonian-Bredin Expedition of 1960.

*151. *Synalpheus brevifrons*, new species

FIGURES 31, 32

MATERIAL.—Dominica (Sta. 55–56: 1 ♀, holotype, USNM 135371).

DESCRIPTION.—Rostrum (Figures 31*a, b*) small, broadly acute, depressed below level of ocular hoods, slightly convex longitudinally in ventral midline, without ventral process. Ocular hoods separated from rostrum by broad shallow sinuses, forming broadly and obscurely obtuse projections slightly overreaching rostrum. Carapace slightly elevated in midline posterior to rostrum but not distinctly carinate; anterolateral margin nearly vertical, pterygostomial angle slightly produced but bent mesially, and invisible in lateral view.

Pleura of anterior 5 abdominal somites of female broadly rounded, of sixth sharply acute. Telson (Figure 31*c*) triangular with lateral margins nearly straight and posterior margin convex; rather flat dorsally, not noticeably depressed in midline; armed with 2 pairs of stout spines arising from lateral margins, anterior pair situated slightly proximal to midlength of telson, posterior pair midway between anterior pair and posterior margin; latter armed with 2 pairs of stout spines and 11 setae, 6 marginal and 5 submarginal, mesial pair of spines slightly less than twice as long as prominent lateral pair.

Stylocerite of antennular peduncle acute, not reaching level of distal margin of basal antennular segment. Segments of peduncle not elongate, second and third subequal.

FIGURE 31.—*Synalpheus brevifrons*, new species, holotype, female, carapace length 2.8 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, telson and uropods; *d*, left mandible; *e*, left first maxilla; *f*, left second maxilla; *g*, left first maxilliped; *h*, left second maxilliped; *i*, left third maxilliped. (Magnifications: *a–i*, ×31.)

Antennal scale reaching only slightly beyond antennular peduncle, blade completely lacking. Basal segment of peduncle not produced dorsally; lateral spine reaching slightly beyond midlength of scale. Distal segment of peduncle long and slender, nearly six times as long as broad and far overreaching scale.

Mouth parts as figured (Figures 31*d–i*). Mandible with 6 marginal teeth on incisor process, molar process slightly broader than incisor. Palp of first maxilliped consisting of 2 segments. Third maxilliped overreaching antennal peduncle by about one-half of distal segment, exopod not reaching end of antepenultimate segment.

Major first pereiopod (Figure 32*a*) overreaching antennal peduncle by chela and carpus. Chela not quite two and one-half times as long as broad. Fingers (Figure 32*b*) about two-fifths as long as palm; movable finger opening and closing in nearly vertical plane due to torsion of chela. Palm terminating dorsodistally in rounded tubercle. Carpus short and broad. Merus considerably more than half as long as palm, with acute projection at distal end of flexor margin. Minor first pereiopod (Figure 32*c*) overreaching antennal peduncle by chela and nearly two-thirds of carpus. Chela more than two and one-half times as long as broad. Fingers bidentate; movable finger with fringe of hairs in distal half of extensor margin. Carpus slightly more than half as long as chela. Second pereiopod (Figure 32*d*) overreaching antennal peduncle by length of chela and 3 distal articles of carpus. Fingers only slightly longer than palm. Carpus nearly twice as long as chela, composed of 5 articles; proximal article nearly as long as combined lengths of 4 distal articles; second, third, and fourth articles subequal, each about half as long as fifth. Merus distinctly shorter than carpus and more than one-third longer than ischium. Third, fourth, and fifth pereiopods with dactyls rather short, biunguiculate; terminal process on flexor margin divergent from curve of segment, subequal in basal width to extensor process. Third pereiopod (Figures 32*e, f*) overreaching antennal peduncle by dactyl and one-third of propodus; propodus about four times as long as dactyl, flexor margin armed throughout length with 7 movable spinules in addition to distal one; carpus nearly nine-tenths as long as propodus, armed with movable spinule at distal end of flexor margin; merus unarmed, more than one and one-half times as long as propodus. Fourth pereiopod (Figures

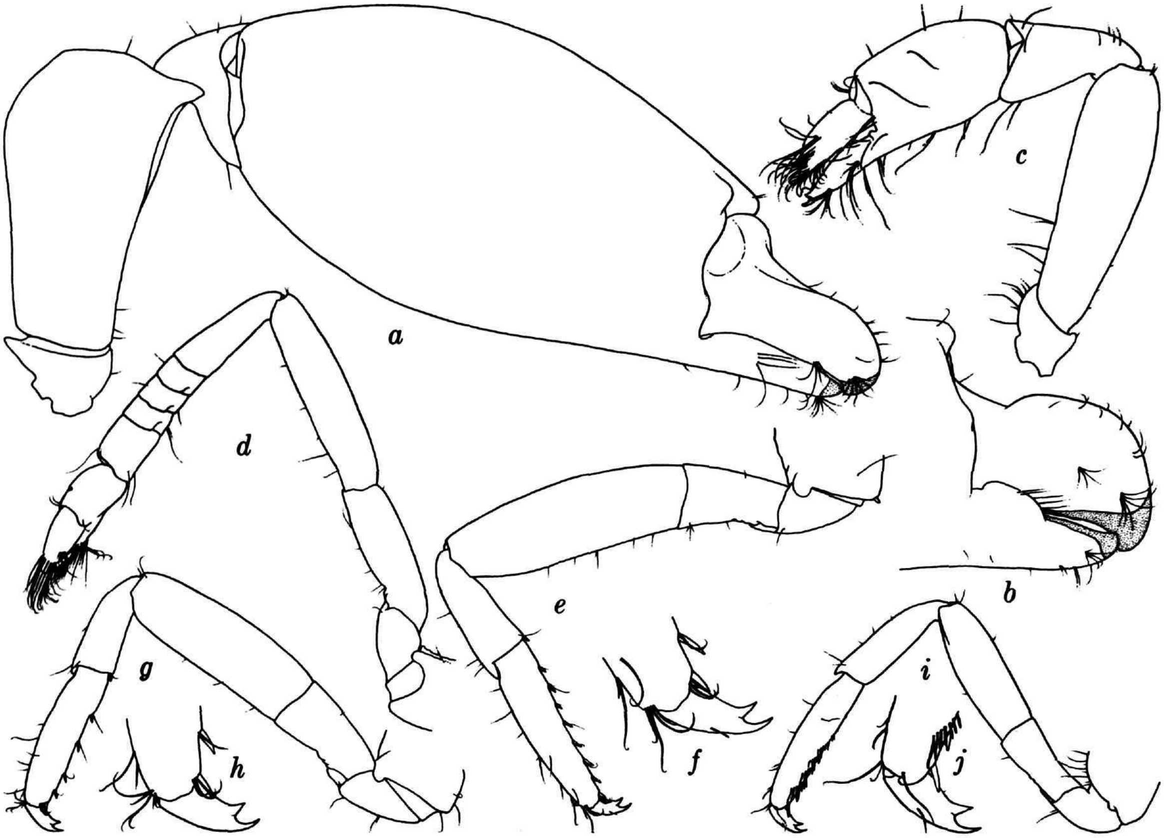


FIGURE 32.—*Synalpheus brevifrons*, new species, holotype, female, carapace length 2.8 mm: *a*, right first pereiopod; *b*, same, fingers; *c*, left first pereiopod; *d*, left second pereiopod; *e*, left third pereiopod; *f*, same, dactyl; *g*, left fourth pereiopod; *h*, same, dactyl; *i*, left fifth pereiopod; *j*, same, dactyl. (Magnifications: *a–e*, *g*, *i*, ×31; *f*, *h*, *j*, ×78.)

32*g*, *h*) reaching distal fourth of distal segment of antennal peduncle; propodus little more than three times as long as dactyl, flexor margin armed throughout length with 4 movable spinules in addition to distal one; carpus more than four-fifths as long as propodus. Fifth pereiopod (Figures 32*i*, *j*) reaching level of proximal end of distal segment of antennal peduncle; propodus less than four times as long as dactyl, flexor margin armed with 2 or 3 movable spinules in distal half in addition to distal one and with about 5 oblique rows of setae in distal two-thirds; carpus unarmed, about nine-tenths as long as propodus; merus unarmed, slightly shorter than propodus.

Lateral branch of uropod (Figures 31*c*) with lateral margin slightly convex and armed with 1 strong tooth far proximal to strong movable spine at distal end of margin. Inner branch of uropod unusually enlarged.

SIZE.—Carapace length of female holotype to base of rostrum 2.8 mm. The appearance of the abdomen and pleopods suggests that the specimen had recently carried eggs.

HABITAT.—On coral-encrusted boulders in a few feet of water.

TYPE-LOCALITY.—North end of Woodbridge Bay, Dominica.

DISTRIBUTION.—Known only from the unique specimen taken at the type-locality.

REMARKS.—There is little doubt that *Synalpheus brevifrons* belongs to the Laevimanus (or Gambarelloides) Group of the genus, but it seems to differ from all previously described species of that group in the form of the rostrum and ocular hoods (hence the specific name: brevis, L., = short + frons, L., = front) and the marginal position of the "dorsal" spines of the telson. It superficially resembles *S. tanneri* Coutière, 1909, from the northeastern Gulf of Mexico, but comparison of the unique holotypes of *S. brevifrons* and *S. tanneri* discloses that the former has the ocular hoods less produced (they are not accurately depicted in Coutière's figure); the telson of the former also has the distal margin convex rather than narrowly truncate and the proximal spines marginal rather than dorsolateral, the antennules are less elongate, the basal segment of the antennal peduncle has the lateral spine shorter and more slender, the major chela has the dorsodistal prominence less produced, and the branches of the uropod are more unequal.

*152. *Synalpheus brooksi* Coutière

Synalpheus brooksi Coutière, 1909:69, fig. 41.

MATERIAL.—Barbuda (Sta. 85–56: 15 spec. [9 ovig.]; Sta. 92–59: 40 spec. [19 ovig.]).—Antigua Island (Sta. 73–56: 1 spec. with abdominal bopyrid).—Tobago Cays (Sta. 22–56: 11 spec. [6 ovig., 1 with branchial bopyrid, 1 with abdominal bopyrid]; Sta. 23–56: 10 spec. [1 ovig.]; Sta. 24–56: 51 spec. [22 ovig., 13 with branchial bopyrids, 1 with abdominal bopyrid]).—Tobago (Sta. 30–59: 74 spec. [28 ovig., 1 with branchial bopyrid]).—Isla Mujeres (Sta. 17–60: 7 spec.; Sta. 28–60; 80 spec. [4 ovig., 1 with abdominal bopyrid]; Sta. 29–60: 2 spec. [1 ovig.]—Isla de Cozumel (Sta. 47–60: 13 spec. [1 ovig., 2 with abdominal bopyrids]; Sta. 48–60: 94 spec. [13 ovig., 1 with abdominal bopyrid]; Sta. 51–60: 4 spec.).—Bahía de la Ascensión (Sta. 72–60: 1 spec.; Sta. 77–60: 170 spec. [25 ovig.]; Sta. 91–60: 1 spec.).

HABITAT.—Many of the specimens listed above were found in sponges, some in coral rock, and most of the remainder were taken on turtle-grass flats or among mangrove roots without indication of exact association.

TYPE-LOCALITY.—Sugar Loaf Key, Florida.

DISTRIBUTION.—Gulf of Mexico, Florida Keys, Bahamas, and the Yucatan Peninsula to Estado do Rio Grande do Norte, Brazil; to a depth of 50 meters.

REMARKS.—Males and also ovigerous females were infested with both branchial and abdominal bopyrids. Several specimens with "male" abdominal pleura have spherical objects, possibly infertile eggs, attached to the pleopods.

153. *Synalpheus curacaoensis* Schmitt

Synalpheus curacaoensis Schmitt, 1924a:66, fig. 3.

TYPE-LOCALITY.—Spaansche Water, Curaçao.

DISTRIBUTION.—Curaçao and Bonaire.

*154. *Synalpheus disparodigitus* Armstrong

Synalpheus disparodigitus Armstrong, 1949:17, fig. 6.

MATERIAL.—Carriacou Island (Sta. 16–56: 1 ♂).

HABITAT.—The single specimen of this species was taken near the seaward edge of an exposed reef composed chiefly of dead *Pocillopora*.

TYPE-LOCALITY.—Behind Piedra Prieta Reef, Barahona Harbor, Dominican Republic.

DISTRIBUTION.—Known only from the Dominican Republic and now from Carriacou Island, Grenadines; sublittoral.

155. *Synalpheus dominicensis* Armstrong

Synalpheus dominicensis Armstrong, 1949:23, fig. 8.

TYPE-LOCALITY.—Inside Piedra Prieta Reef, Barahona Harbor, Dominican Republic.

DISTRIBUTION.—Apparently known only from the vicinity of Barahona Harbor, Dominican Republic.

156. *Synalpheus filidigitus* Armstrong

Synalpheus filidigitus Armstrong, 1949:15, fig. 5.

TYPE-LOCALITY.—Shoreward of Piedra Prieta Reef, Barahona Harbor, Dominican Republic.

DISTRIBUTION.—Known only from the type-locality.

*157. *Synalpheus fritzmuelleri* Coutière

Synalpheus fritzmülleri Coutière, 1909:35, fig. 18.
Synalpheus fritzmuelleri.—Williams 1965b:69, fig. 56.

MATERIAL.—Tortola (Sta. 117–56: 2 spec.; Sta. 5–58: 1 spec.).—Guana Island (Sta. 9–58: 2 spec.).—Virgin Gorda (Sta. 111–56: 3 spec. [1 ovig.];

Sta. 112–56: 6 spec. [1 ovig.]; Stas. 37, 38, 39–58: 5 spec. [2 ovig.]).—Anguilla (Sta. 55–58: 3 spec. [1 ovig.]).—Barbuda (Sta. 92–56: 11 spec. [4 ovig.]; Sta. 98–59: 4 spec. [2 ovig.]; Sta. 102–59: 1 ovig. ♀; Sta. 102a–59: 1 ovig. ♀).—Antigua Island (Sta. 73–56: 3 spec.; Sta. 75–56: 1 ♀ with larvae; Sta. 82–56: 1 ovig. ♀; Sta. 94–56: 3 spec. [2 ovig., other with abdominal bopyrid]; Sta. ?–59: 4 spec. [1 ovig.]).—Guadeloupe (Sta. 69–56: 14 spec. [4 ovig.]; Sta. 70–56: 7 spec. [3 ovig.]).—Dominica (Sta. 55–56: 2 spec.; Sta. 62–56: 5 spec.; Sta. 75–59: 8 spec. [2 ovig.]).—Saint Lucia Island (Sta. 56–59): 1 spec.; Sta. 65–59: 4 spec. [1 ovig.]).—Mustique (Sta. 34–56: 1 spec.).—Tobago Cays (Sta. 22–56: 1 spec.; Sta. 23–56: 1 ovig. ♀).—Carriacou Island (Sta. 15–56: 1 ovig. ♀; Sta. 16–56: 18 spec. [7 ovig., 1 with abdominal bopyrid]).—Tobago (Sta. 8–59: 27 spec. [10 ovig.]; Sta. 15–59: 7 spec. [4 ovig.]; Sta. 26–59: 13 spec. [4 ovig.]; Sta. 31–59: 6 spec.).—Isla de Cozumel (Sta. 51–60: 8 spec. [3 ovig.].—Bahía de la Ascensión (Sta. 52–60: 34 spec. [7 ovig.]; Sta. 53–60: 2 spec. [1 ovig.]; Sta. 60–60: 10 spec. [3 ovig., larger specimens approaching *S. hemphilli*]; Sta. 67–60: 32 spec. [8 ovig.]; Sta. 72–60: 4 spec. [2 ovig.]; Sta. 83–60: 1 ovig. ♀; Sta. 85–60: 2 spec.).—Bahía del Espíritu Santo (Sta. 41–60: 28 spec. [9 ovig.]).

HABITAT.—Except for a few lots taken from sponges, eroded dead coral, and weed-covered rocks, ships and timbers, there are few specific ecological data for this species. It seems, however, to have been collected rather commonly on grass flats studded with living and dead *Porites* and *Pocillopora,* as well as among the roots of mangroves.

TYPE-LOCALITY.—Marco, Florida.

DISTRIBUTION.—North Carolina and the Bermudas to Estado de Santa Catarina, Brazil; St. Helena Island, South Atlantic; Baja California; to a depth of 50 meters. The Greenland record for this species in the posthumous paper of Stephensen (1950) is almost certainly erroneous.

*158. *Synalpheus goodei* Coutière

Synalpheus goodei Coutière, 1909:58, fig. 33.

MATERIAL.—Dominica (Sta. 62–56: 1 ovig. ♀).—Tobago (Sta. 15–59: 1 ovig. ♀).

HABITAT.—One of the specimens came from coral-encrusted rocks at a depth of about 2 meters, the other from a reef area that dried at extra low tide.

TYPE-LOCALITY.—Bermudas.

DISTRIBUTION.—Bermudas and the Gulf of Mexico to Curaçao and Panama; to a depth of more than 60 meters.

*159. *Synalpheus hemphilli* Coutière

Synalpheus Hemphilli oxyceros Coutière, 1908b:711.
Synalpheus hemphilli Coutière 1909:38, fig. 20.

MATERIAL.—Dominica (Sta. 61–56: 1 spec.).

HABITAT.—The single specimen was dredged in 11–27 meters.

TYPE-LOCALITY.—Off the west coast of Florida at 27°04′N, 83°21′W; in 48 meters.

DISTRIBUTION.—Bermudas and the eastern Gulf of Mexico to Curaçao and Islas Los Roques; to a depth of 51 meters.

160. *Synalpheus herricki* Coutière

Synalpheus herricki Coutière, 1909:74, fig. 44.

TYPE-LOCALITY.—"Off Anclote, Florida," presumably Anclote Key off Tarpon Springs.

DISTRIBUTION.—Eastern Gulf of Mexico; to a depth of 38 meters. In the general Smithsonian collections, there is one lot of this species bearing the label "Anclote, Eleuthera, Bahamas"; Coutière, who identified the specimens, apparently was sufficiently suspicious of the documentation to omit mention of the lot in his 1909 report. The specimen from Barbados questionably assigned to *S. herricki* by Schmitt (1924c:81) is in poor condition, having dried out at some time, but it is probably not this species; it bears some resemblance to *S. brevifrons* in the form of the front and the armature of the telson.

161. *Synalpheus latastei tenuispina* Coutière

Synalpheus latastei tenuispina Coutière, 1909:26, fig. 8.

TYPE-LOCALITY.—Florianópolis, Estado de Santa Catarina, Brazil.

DISTRIBUTION.—The Atlantic form of this species is apparently known only from the type-locality. The typical form occurs in Peru and Chile.

*162. *Synalpheus longicarpus* (Herrick)

Alpheus saulcyi var. *longicarpus* Herrick, 1891[part]:383, pl. 21: figs. 5–7, pl. 22: figs. 3, 11, 17, pl. 24: figs. 2, 4–9.

Synalpheus longicarpus.—Coutière 1909:53, fig. 31.—Williams 1965b:73, fig. 59.

MATERIAL.—Virgin Gorda (Sta. 111–56: 2 spec.).—Saint Lucia Island (Sta. 41–56: 1 spec.).—Mustique (Sta. 35–56: 194 spec. [75 ovig., 3 with branchial bopyrids, 6 with abdominal bopyrids]).—Tobago Cays (Sta. 22–56: 37 spec. [12 ovig., 3 with abdominal bopyrids]; Sta. 23–56: 8 spec. [1 ovig.]; Sta. 24–56: 253 spec. [96 ovig., 4 with abdominal bopyrids]).—Tobago (Sta. 30–59: 9 spec. [4 ovig.]).—Bahía de la Ascensión (Sta. 52–60: 10 spec.).

HABITAT.—The two largest lots were taken from loggerhead sponges. Most of the other specimens were found in and under coral and coral rock.

TYPE-LOCALITY.—Bahamas [probably Nassau, New Providence].

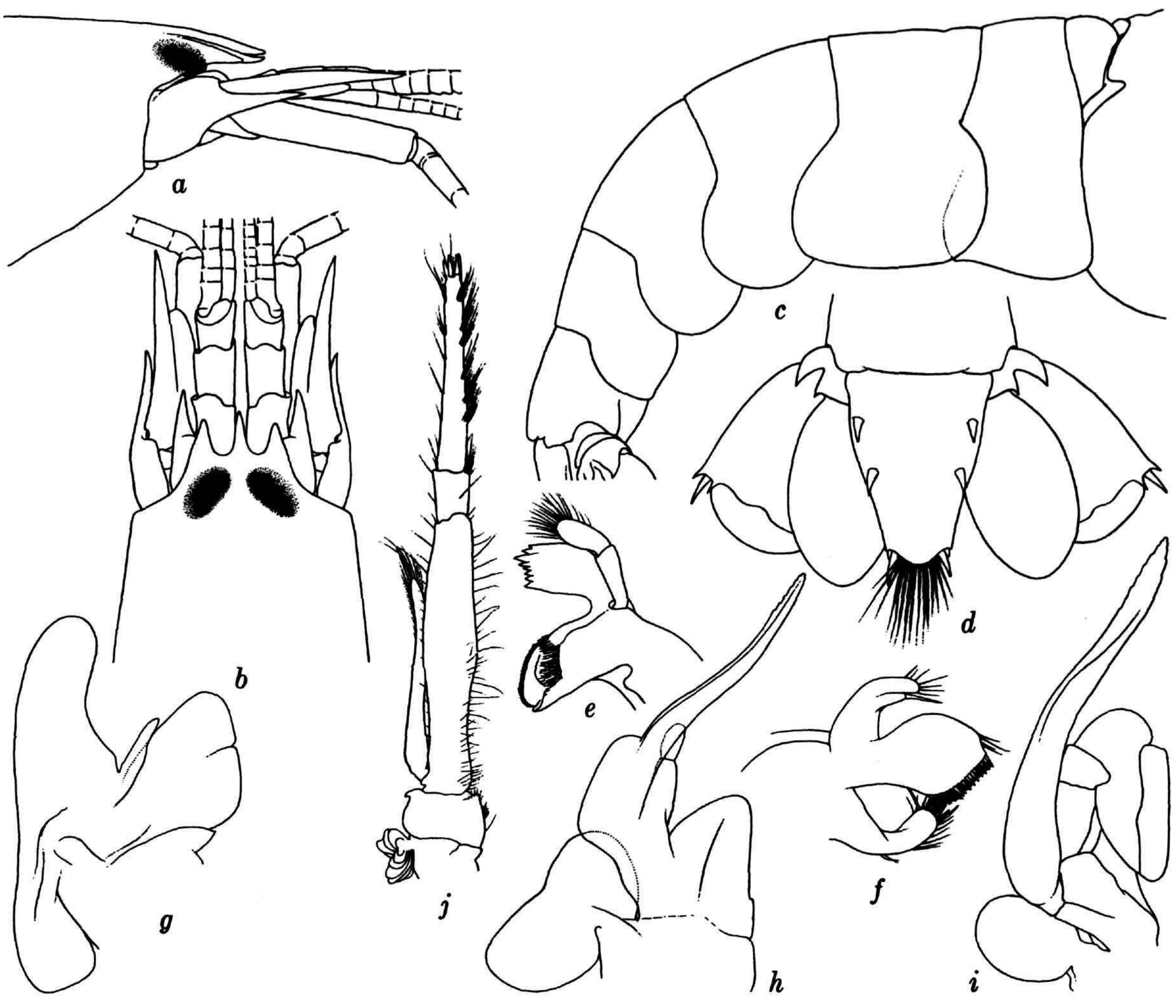


FIGURE 33.—*Synalpheus mcclendoni* Coutière, male, carapace length 5.0 mm, from Smithsonian-Bredin Station 30–59: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, abdomen; *d*, telson and uropods; *e*, right mandible; *f*, right first maxilla; *g*, right second maxilla; *h*, right first maxilliped; *i*, right second maxilliped; *j*, right third maxilliped. (Magnifications: *a–d*, *j*, ×15.5; *e–i*, ×32.)

DISTRIBUTION.—North Carolina and Bermudas to Curaçao and Islas Los Roques, westward to the Yucatan Peninsula; to a depth of 50 meters.

REMARKS.—Males and females, including those with eggs, were infested with both branchial and abdominal bopyrids.

*163. *Synalpheus mcclendoni* Coutière

FIGURES 33, 34

Synalpheus mcclendoni Coutière, 1910:487, fig. 3.

MATERIAL.—Saint Lucia Island (Sta. 65–59: 1 ♀). —Tobago Cays (Sta. 24–56: 1 ♂?).—Tobago (Sta. 30–59: 6 ♂).—Bahía de la Ascensión (Sta. 72–60: 1 ♂, 1 cheliped).—Bahía del Espíritu Santo (Sta. 41–60: 1 ♂, 1 ovig. ♀).

HABITAT.—At least seven of the twelve specimens of this species were found in sponges and two were probably taken from much eroded coral.

TYPE-LOCALITY.—Dry Tortugas, Florida.

DISTRIBUTION.—Dry Tortugas to Barbados and the Yucatan Peninsula; sublittoral.

*164. *Synalpheus minus* (Say)

FIGURES 35, 36

Alpheus minus Say, 1818:245.
?*Alpheus saulcyi*, var. *brevicarpus* Herrick, 1891:384, pl. 4: figs. 1–3, pl. 21: figs. 1–4, 8, 9, pl. 22: figs. 1, 2, 4–10, 12–16, pl. 23: figs. 1–8, pl. 24: figs. 1, 3.
Synalpheus minus.—Coutière 1909:43, fig. 25.
?*Synalpheus brevicarpus*.—Coutière 1909:50, fig. 29.

MATERIAL.—Tortola (Sta. 117–56: 4 spec. [2 ovig.]).—Guana Island (Sta. 9–58: 8 spec. [4 ovig.]).—Virgin Gorda (Sta. 111–56: 8 spec. [2 ovig.]; Sta. 112–56: 3 spec. [1 ovig., 1 with branchial bopyrid]; Sta. 10–58: 6 spec.—Anguilla (Sta. 55–58: 1 ovig. ♀).—Barbuda (Sta. 85–56: 2 spec.; Sta. 113a–58: 1 spec.; Sta. 98–59: 3 spec. [1 ovig.]; Sta. 102–59: 2 spec. [1 ovig.]).—Saint Christopher (Sta. 103–56: 1 ovig. ♀).—Antigua Island (Sta. 73–56: 5 spec. [4 ovig.]; Sta. 75–56: 1 spec.; Sta. 104–59: 1 spec.; Sta. ?–59: 1 spec.).—Guadeloupe (Sta. 69–56: 7 spec. [2 ovig.]; Sta. 70–56: 3 spec. [1 ovig.]).—Dominica (Sta. 75–59: 2 spec.).—Saint Lucia Island (Sta. 47–56: 1 spec.).—Tobago Cays (Sta. 22–56: 11 spec. [5 ovig.]; Sta. 23–56: 4 spec. [1 ovig.]).—Carriacou Island (Sta. 16–56: 9 spec. [2 ovig.]).—Tobago (Sta. 4–59: 1 spec.; Sta. 8–59: 13 spec. [5 ovig., 1 with branchial bopyrid]; Sta. 15–59: 3 spec.; Sta. 26–59: 4 spec.; Sta. 31–59: 19 spec. [3 ovig., 1 with branchial bopyrid]).—Isla Mujeres (Sta. 28–60: 2 spec. [1 with branchial bopyrid]).—Isla de Cozumel (Sta. 106–60: 4 spec. [1 ovig.]; Sta. 109–60: 3 spec. [1 ovig.]).—Bahía de la Ascensión (Sta. 45–60: 1 ovig. ♀; Sta. 52–60: 10 spec. [1 ovig.]; Sta. 67–60: 5 spec.; Sta. 72–60: 1 spec.).—Bahía del Espíritu Santo (Sta. 41–60: 9 spec.).

HABITAT.—Apparently *S. minus* occurs in any habitat that provides a suitable hiding place, such as sponges, eroded dead coral and coral rock, abandoned gastropod shells, and beneath stones and *Porites* and *Pocillopora* on grass flats.

TYPE-LOCALITY.—"Coasts of the southern states, and of East Florida."

DISTRIBUTION.—North Carolina and the Bermudas to Estado de Alagoas, Brazil; to a depth of 68 meters.

REMARKS.—Coutière, to whom we must remain deeply indebted for his profound and generally enduring treatment of the American species of *Synalpheus*, stated (1909:2) that "*S. brevicarpus*, which I had formerly considered synonymous with *S. minus* (Say), is . . . distinct." There is little doubt that Coutière's conclusion was reached principally on the basis of the great discrepancy in the size of eggs produced by the two forms. He did, however, enumerate other morphological characters that seemed to support the recognition of two distinct species. The telson was described as 1.84 times as long as its posterior width in *S. minus*, but always more than twice as long in *S. brevicarpus*. The basal segment of the antennal peduncle (basicerite) was supposed to be distinctly spinous dorsally in *S. minus*, merely angular in *S. brevicarpus*. The blade of the antennal scale was said to be narrow (7 to 8.5 times as long as wide) in *S. minus*, broad (5.5 to 6.4 times as long as wide) in *S. brevicarpus*. The distal segment of the antennal peduncle (carpocerite) was indicated as about 3.7 times as long as wide in *S. minus*, "sensibly 4 times as long as wide and more cylindrical" in *S. brevicarpus*. The carpus of the second pereiopod was supposed to be about 9.5 times as long as wide in *S. minus*, about 12 times as long as wide in *S. brevicarpus*, and the merus of that pereiopod only 0.75 times as long as the carpus in the former species, 0.85 times as long in the latter. The merus of the third pereiopod was described as about 4 times as long as wide, or less, in *S. minus*, and as much as 4.25 times

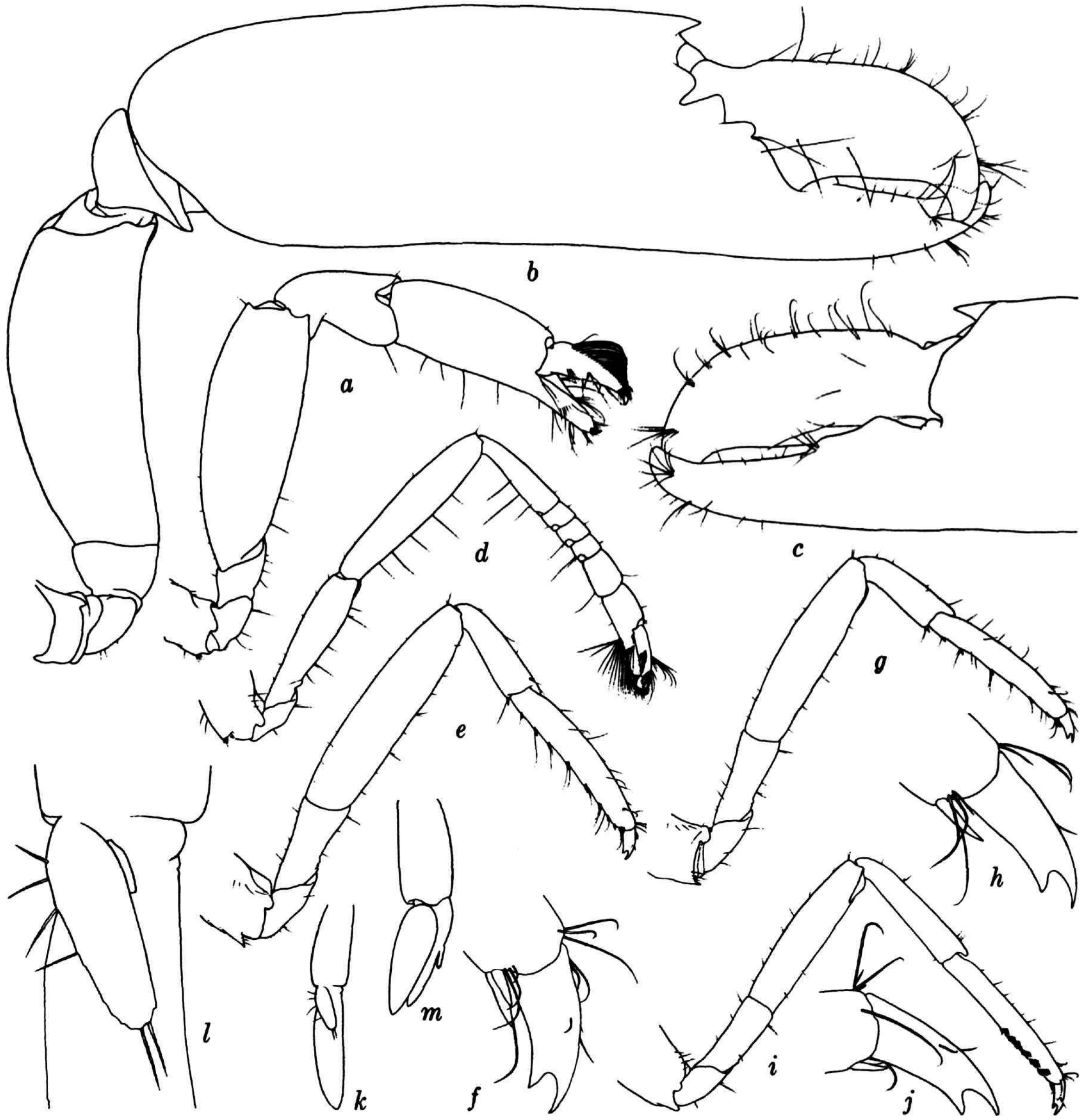


FIGURE 34.—*Synalpheus mcclendoni* Coutière, male, carapace length 5.0 mm, from Smithsonian-Bredin Station 30–59: *a*, right first pereiopod; *b*, left first pereiopod; *c*, same, fingers; *d*, right second pereiopod; *e*, right third pereiopod; *f*, same, dactyl; *g*, right fourth pereiopod; *h*, same, dactyl; *i*, right fifth pereiopod; *j*, same, dactyl; *k*, right first pleopod; *l*, same, endopod; *m*, right second pleopod. (Magnifications: *a–e*, *g*, *i*, *k*, *m*, ×15.5; *f*, *h*, *j*, *l*, ×78.)

as long as wide in *S. brevicarpus*. Finally, *S. minus* was said to be a smaller species, less than 25 mm in total length, as compared with a maximum length of at least 38 mm in *S. brevicarpus*.

Difficulty in separating the two species led me to investigate these characters rather carefully in the 40 ovigerous females assignable to either species in the Smithsonian-Bredin collections, with the results shown in Figure 35. The carapace was measured from one of the frontal sinuses to the posterior margin. The maximum diameter of the egg was used. The telson was measured in dorsal view, with the posterior somites of the abdomen pressed firmly against a horizontal surface. The antennal peduncle, antennal scale, and second and third pereiopods were removed, in order to determine the true dimensions. The blade of the antennal scale was measured from the point where the sometimes obscure basal suture meets the mesial margin to the distal end of the blade, and the width was recorded at the widest point of the blade. The length of the distal segment of the antennal peduncle was taken as the minimum length in the ventral midline; the width was the maximum in the same aspect. The dimensions of the carpus of the second pereiopod are maximum for both length and width, the latter at the distal article; the merus was measured along the extensor margin. The merus of the third pereiopod was also measured along the extensor margin, and the width is maximum.

All of the specimens with a carapace length of less than 6.0 mm have small eggs, measuring 1.0 or less in major diameter, as shown in Figure 35*a*, but small eggs may be associated with large specimens also; the three largest specimens in the collection, with carpace lengths of 9.0, 9.1, and 9.2 mm, have eggs measuring 1.3, 0.6, and 1.9 mm, respectively, which is the maximum range in egg size observed. There is little doubt that two distinct egg sizes are produced by the larger specimens. The smaller eggs have a major diameter of about 0.6 mm when laid and increase to about 1.0 mm before hatching. The larger eggs have a major diameter of 1.1 or 1.2 mm when freshly laid and may reach 1.9 mm before hatching.

The telson ratios of the Smithsonian-Bredin ovigerous females vary from 1.9 to 2.5 (Figure 35*b*); no correlation could be discovered between these proportions and the two egg sizes. The three largest specimens, with eggs varying from 0.6 to 1.9 mm, have telsons that are either 2.1 or 2.2 times as long as their

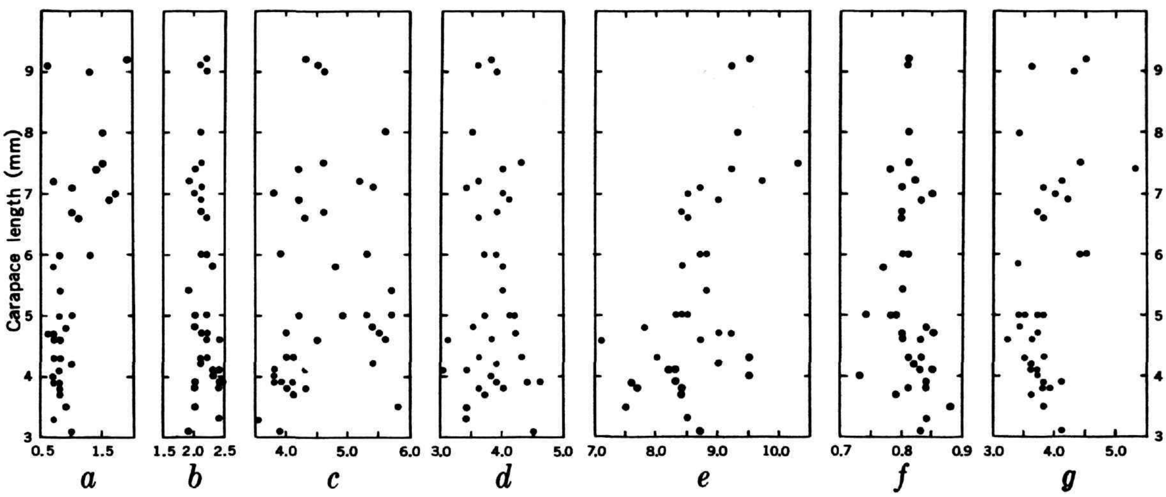


FIGURE 35.—Scatter diagrams, based on Smithsonian-Bredin ovigerous females, showing the variability of characters used to distinguish *Synalpheus brevicarpus* (Herrick) from *S. minus* (Say): *a*, eggs, major diameter in mm; *b*, telson, ratio of median length to posterior width; *c*, blade of antennal scale, length-width ratio; *d*, distal segment of antennal peduncle (carpocerite), length-width ratio; *e*, carpus of second pereiopod, length-width ratio; *f*, second pereiopod, merus-carpus ratio; *g*, merus of third pereiopod, length-width ratio.

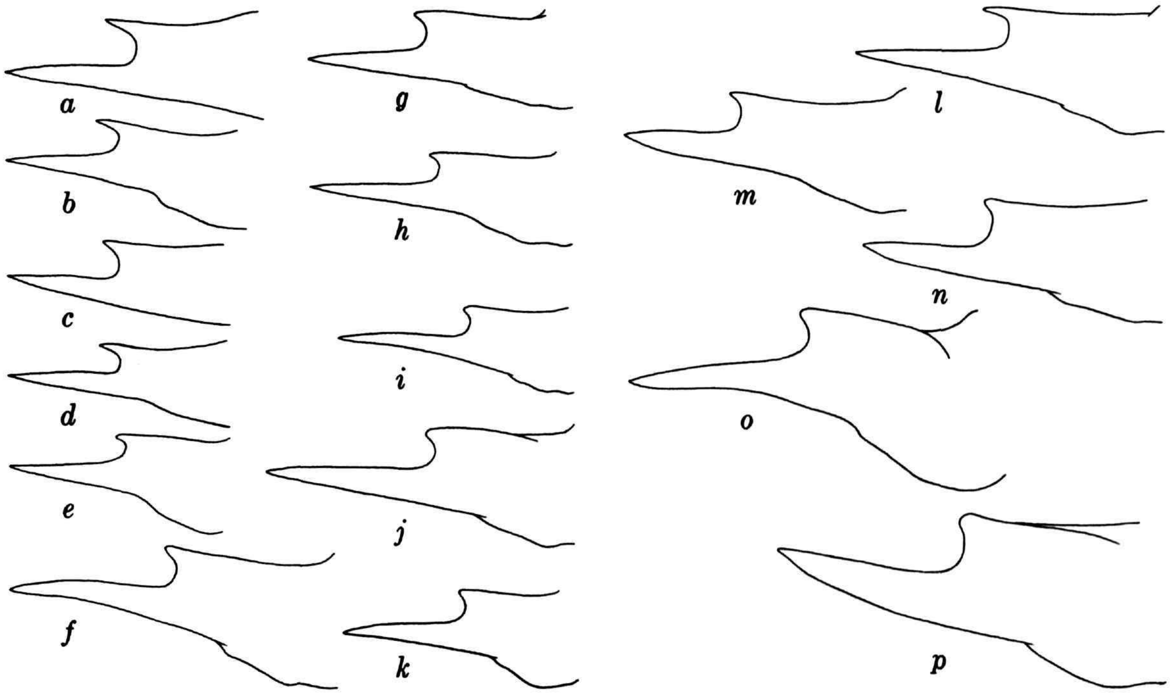


FIGURE 36.—*Synalpheus minus* (Say), basal segment of left antennal peduncle (basicerite) of ovigerous females, in lateral view (Sta=Smithsonian-Bredin Station, ratio=carapace length/egg length in mm, e=eyed eggs): *a*, Sta 31–59, 9.1/0.6; *b*, Sta 112–56, 7.2/0.7; *c*, Sta 73–56, 7.1/1.0e; *d*, Sta 9–58, 6.7/1.0e; *e*, Sta 106–60, 7.0/1.7e; *f*, Sta 22–56, 9.2/1.9e; *g*, Sta 22–56, 8.0/1.5e; *h*, Sta 98–59, 7.5/1.5e; *i*, Sta 22–56, 6.9/1.6e; *j*, Sta 111–56, 9.0/1.3e; *k*, Sta 22–56, 6.6/1.1e; *l*, Bimini, Bahamas, 9.8/0.7; *m*, Marco, Florida, 9.7/0.6; *n*, Port Royal, Jamaica, 10.2/0.9e; *o*, Bimini, Bahamas, 13.3/1.2; *p*, Key West, Florida, 13.2/1.2e. (Magnifications: *a–p*, ×15.5.)

posterior width; the three specimens with the broadest telsons (length-width ratio of 1.9) have eggs measuring 0.7, 0.8, and 1.0 mm, whereas the two specimens with the narrowest telsons (length-width ratio of 2.5) have eggs measuring 0.2 and 0.8 mm.

In the Smithsonian-Bredin material, the one character that gives any indication of correlation with egg size is the basal segment of the antennal peduncle (basicerite). The four specimens with the longest and sharpest dorsal spine on this segment are the four largest specimens with small eggs (Figures 36*a–d*). In all other specimens—those with small as well as large eggs—this spine is shorter and broader. Examination of material from other sources, however, disclosed some large specimens with small eggs and short spines (Figures 36*m, n*), although I was unable to find any long-spined individuals bearing large eggs. The most conclusive evidence against the existence of two sympatric species, characterized by different egg sizes and disproportionate development of the dorsal spine on the basal antennal segment, is furnished by a collection of 50 specimens taken at Bimini, Bahamas, in 1948 by A. S. Pearse, presumably from a single loggerhead sponge; on the basis of the form of the basal antennal segment and the size of the eggs, half of the specimens were identified as *S. minus* (Figure 36*l*) and half as *S. brevicarpus* (Figure 36*o*). It seems most unlikely that two such closely related species would be found in the same niche.

The proportions of the blade of the antennal scale vary widely from 3.5 to 5.8 times as long as broad (Figure 35*c*.) There is a suggestion of a bimodal distribution of these proportions, but it will be noticed that there is no correlation between the proportions and egg size; the three largest specimens, which show the greatest discrepancy in egg size, have the blades of the antennal scales varying only from 4.3 to 4.6 times as long as wide.

The distal segment of the antennal peduncle (carpocerite) also shows considerable variation in length-width ratio (3.0 to 4.6) without any apparent correlation with egg size (Figure 35*d*). Here again, the three largest specimens, with very different eggs, have the distal antennal segment ratio varying only from 3.6 to 3.9.

The carpus of the second pereiopod varies greatly in length-width proportions (7.1 to 10.3), with some indication that the appendage becomes more slender in larger individuals (Figure 35*e*), but without evidence of correlation with egg size. The two largest specimens, with eggs measuring 0.6 and 1.9 mm in major diameter, have the second carpus varying only from 9.2 to 9.5 times as long as wide, respectively.

The merus of the second pereiopod varies from 0.73 to 0.88 of the carpal length (Figure 35*f*), again without correlation with egg size.

The merus of the third pereiopod is usually less than 4 times as long as wide in small specimens, but it may be as much as 5.3 times as long in larger ones (Figure 35*g*). Although there is a slight suggestion that the broader merus is associated with small eggs, the correlation is by no means constant; in specimens bearing eggs measuring 1.4 and 1.5 mm, the meral proportions may vary from 3.4 to 5.3.

This analysis seems to demonstrate rather conclusively that the characters that Coutière believed to be useful in distinguishing *S. minus,* which has small eggs, from *S. brevicarpus,* with large eggs, are not very reliable. As noted under *S. paraneptunus,* a similar discrepancy in egg size may occur in that species. I am therefore tentatively placing *S. brevicarpus* in the synonymy of *S. minus,* while being fully aware that further study of living material may reveal characters, such as color pattern, by which it may be possible to reestablish the two species.

*165. *Synalpheus obtusifrons,* new species

FIGURES 37, 38

MATERIAL.—Bahía de la Ascensión (Sta. 52–60: 3♂, 2 ovig. ♀).—Bahía del Espíritu Santo (Sta. 41–60: 3♂, 1 ovig. ♀ [1♂ is holotype, USNM 135372]).

DESCRIPTION.—Rostrum (Figures 37*a, b*) broadly triangular, subrectangular, not nearly reaching distal margin of first segment of antennular peduncle; no process extending ventrally from near base of rostrum. Ocular hoods shallowly separated from rostrum by rounded sinuses, forming bluntly obtuse teeth falling slightly short of level of tip of rostrum. Pterygostomial angle of carapace strongly produced as acute lobe.

Pleuron of first abdominal somite of male (Figure 37*c*) subrectangular or slightly acute posteroventrally, rounded anteroventrally; pleura of second and third somites broadly rounded, of fourth somite angularly rounded, of fifth somite bluntly acute, of sixth somite rounded. Adult female with pleura of 4 anterior somites broadly rounded, of fifth somite bluntly acute, of sixth somite rounded. Telson (Figure 37*d*) trapezoidal with sinuous lateral margins and broadly convex posterior margin; dorsal surface strongly depressed in midline, armed laterally with 2 pairs of strong spines, anterior pair situated near midlength of telson, posterior pair about halfway between anterior pair and posterior margin of telson; distal margin armed with 2 pairs of spines and 6 pairs of long setae, mesial pair of spines unusually long and slender, at least four times as long as lateral pair.

Stylocerite of antennular peduncle terminating in broad blunt tip distinctly overreaching distal margin of basal antennular segment. Segments of antennular peduncle rather short and broad, second segment slightly longer than third.

Antennal scale reaching to about midlength of third segment of antennular peduncle; blade well developed in both males and females, falling only slightly short of tip of lateral spine. Basal segment of peduncle angularly rounded dorsally; lateral spine short and invisible in dorsal view, reaching about as far as level of extremities of ocular hoods. Distal segment of peduncle about three and one-half times as long as broad, overreaching antennular peduncle by about one-tenth of length.

Mouth parts as figured (Figures 37*e–j*). Mandible with 6 marginal teeth on incisor process, molar process somewhat reduced. Palp of first maxilliped consisting of 2 segments. Third maxilliped overreaching antennal peduncle by about one-third of distal segment, exopod reaching about to end of antepenultimate segment.

Major first pereiopod (Figure 38*a*) overreaching

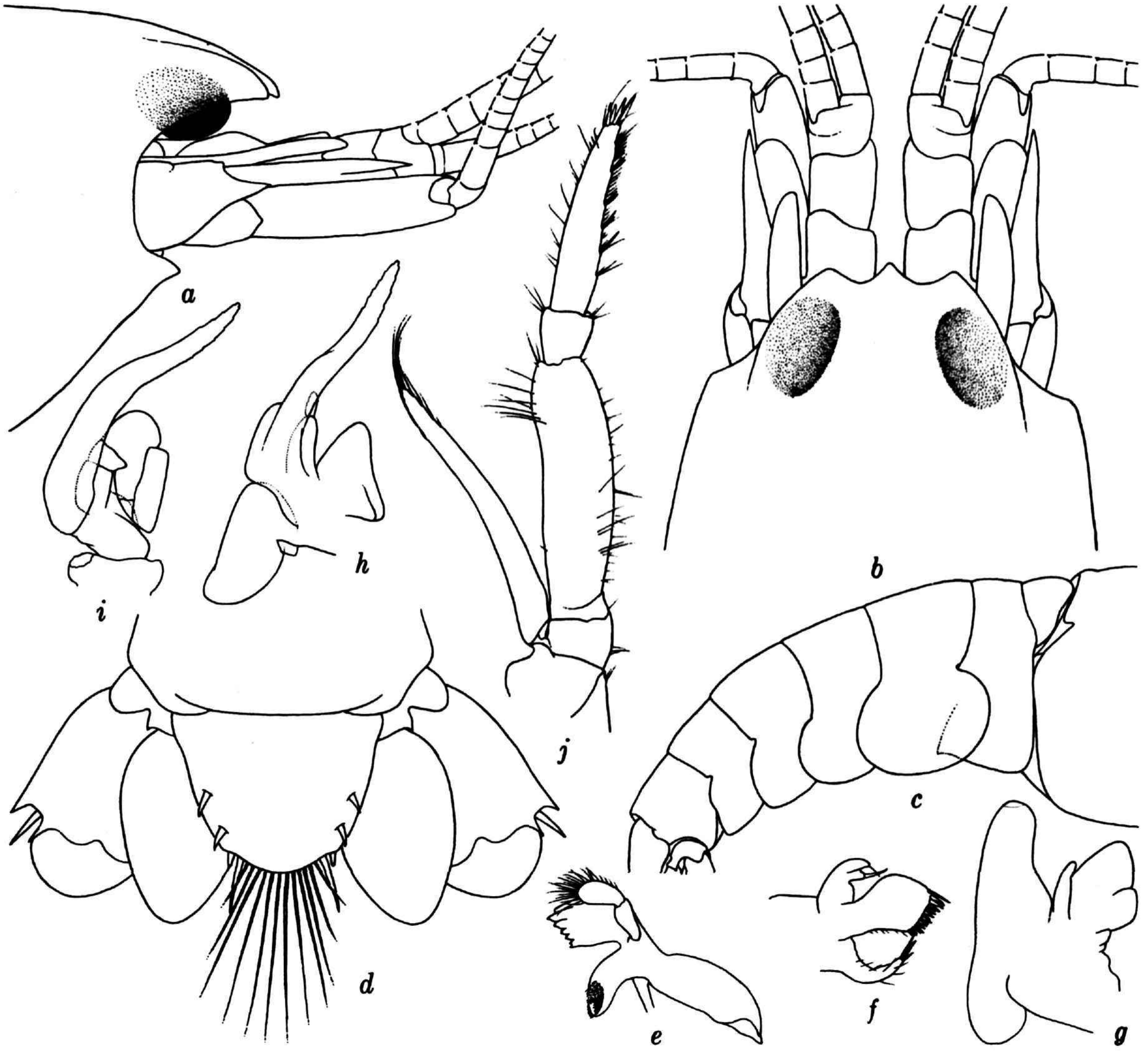


FIGURE 37.—*Synalpheus obtusifrons*, new species, holotype, male, carapace length 3.0 mm: *a*, anterior region, lateral view; *b*, same, dorsal view; *c*, abdomen; *d*, telson and uropods; *e*, right mandible; *f*, right first maxilla; *g*, right second maxilla; *h*, right first maxilliped; *i*, right second maxilliped; *j*, right third maxilliped. (Magnifications: *c*, ×15.5; *a*, *b*, *d–j*, ×31.)

antennal peduncle by entire length of chela. Chela about two and one-seventh times as long as wide. Fingers (Figure 38*b*) about two-fifths as long as palm; movable finger opening and closing in oblique plane because of torsion of chela. Palm terminating dorsodistally in stout tooth curving distoventrally. Carpus very short and broad. Merus unarmed, fully half as long as palm. Minor first pereiopod (Figure 38*c*) overreaching antennal peduncle by nearly half of chela. Chela slightly more than two and one-half times as long as broad. Fingers not bidentate; movable finger stout, without fringe of hairs on extensor margin, with partial carina on flexor side of chela paralleling carinate opposable margin. Carpus short,

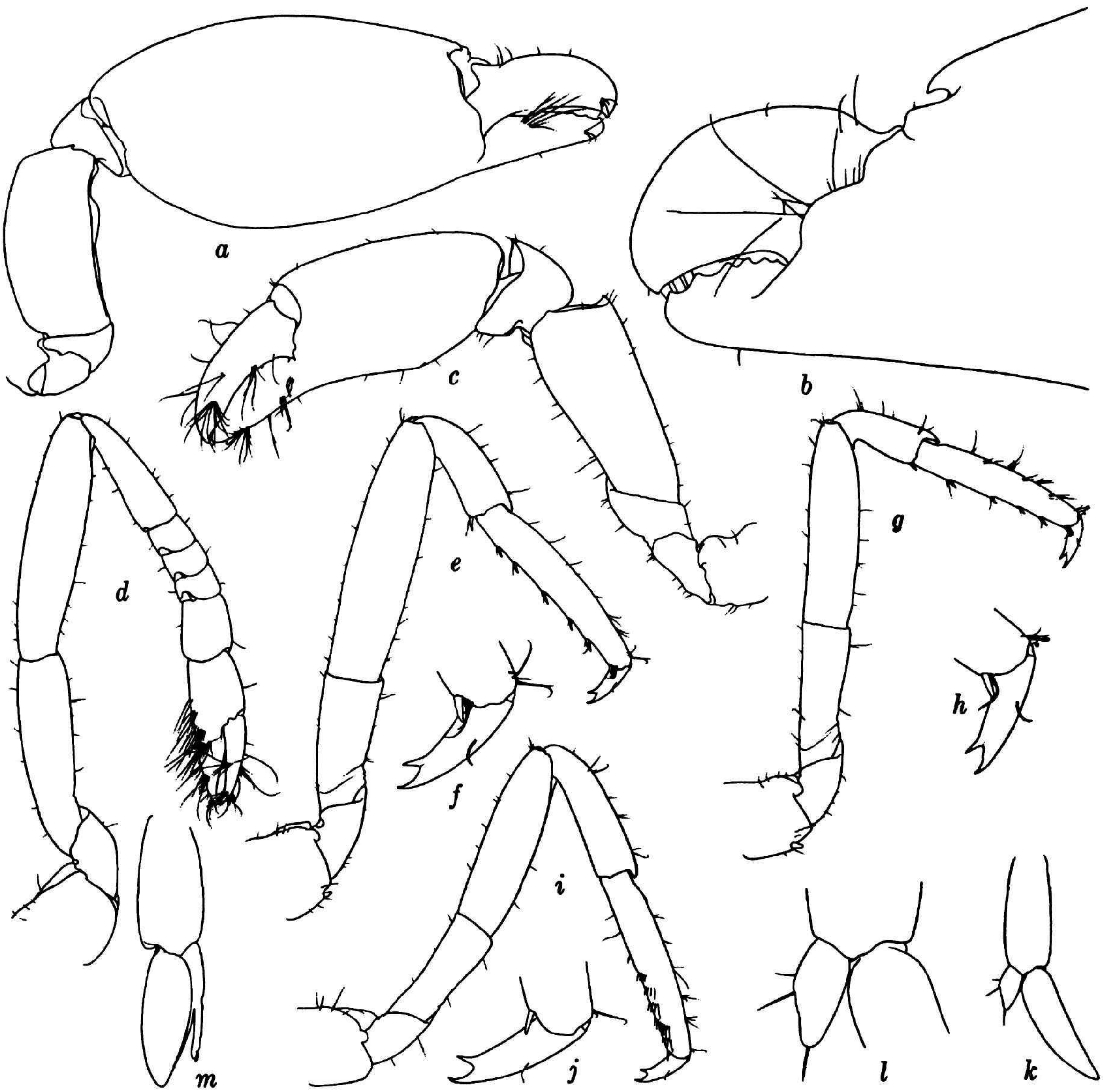


FIGURE 38.—*Synalpheus obtusifrons*, new species. Paratype, male, carapace length 3.3 mm, from Smithsonian-Bredin Station 41–60: *a*, right first pereiopod; *b*, same, fingers. Holotype, male, carapace length 3.0 mm: *c*, left first pereiopod; *d*, right second pereiopod; *e*, right third pereiopod; *f*, same, dactyl; *g*, right fourth pereiopod; *h*, same, dactyl; *i*, right fifth pereiopod; *j*, same, dactyl; *k*, right first pleopod; *l*, same, endopod; *m*, right second pleopod. (Magnifications: *a*, ×15.5; *b–e*, *g*, *i*, *k*, *m*, ×31; *f*, *h*, *j*, *l*, ×78.)

less than one-fourth as long as chela. Second pereiopod (Figure 38*d*) overreaching antennal peduncle by chela and two and one-half distal articles of carpus. Fingers not quite one and one-half times as long as palm. Carpus fully one and three-fourths times as long as chela, composed of 5 articles; proximal article not quite as long as combined lengths of distal 4; second, third, and fourth articles subequal, each about half as long as fifth. Merus slightly shorter than carpus and about 1.2 times as long as ischium. Third, fourth, and fifth pereiopods with dactyls of moderate length, biunguiculate; flexor terminal process slightly divergent from curve of segment, shorter and basally more slender than extensor process. Third pereiopod (Figures 38*e, f*) overreaching antennal peduncle by dactyl and one-third of propodus; propodus slightly less than three and one-half times as long as dactyl, flexor margin armed throughout length with about 5 movable spinules in addition to distal one; carpus about two-thirds as long as propodus, armed with movable spinule at distal end of flexor margin; merus unarmed, slightly less than one and two-fifths times as long as propodus. Fourth pereiopod (Figures 38*g, h*) reaching slightly beyond midlength of antennal peduncle; propodus about three times as long as dactyl, flexor margin armed throughout length with 4 movable spinules in addition to distal one; carpus two-thirds as long as propodus, with movable spinule at distal end of flexor margin; merus unarmed; one and one-fourth times as long as propodus. Fifth pereiopod (Figures 38*i, j*) reaching about to midlength of antennal peduncle; propodus about five times as long as dactyl, flexor margin armed with indistinct spinule proximal to midlength in addition to similar distal one and with 5 oblique rows of setae in distal half; carpus unarmed, slightly more than four-fifths as long as propodus; merus unarmed, subequal to propodus in length.

Appendix interna (Figure 38*m*) on second to fifth pleopods in both sexes. Lateral branch of uropod (Figure 37*d*) with lateral margin faintly sinuous and unarmed proximal to deeply and widely separated pair of prominent fixed spines flanking long but slender movable spine.

Eggs few and large, more than 1 mm in length.

SIZE.—Males with carapace lengths, to base of rostrum, of 1.8 to 3.3 mm (holotype, 3.0 mm); ovigerous females, 3.6 to 3.75 mm.

HABITAT.—In dead coral in less than 10 feet of water.

TYPE-LOCALITY.—West side of reef east of anchorage, Bahía del Espíritu Santo, Territorio de Quintana Roo, Mexico.

DISTRIBUTION.—East coast of Yucatan Peninsula; sublittoral.

REMARKS.—*Synalpheus obtusifrons* seems to belong to the Brevicarpus Group of the genus. As the name suggests (obtusus, L.,=blunt+frons, L.,=front), it is apparently distinguished from most other species of *Synalpheus* by the very short and broad frontal teeth, as well as by the form of the stylocerite. The true identity of *S. tridentulatus* (Dana 1852) may never be known with certainty, but Dana's brief description and rather crude figures seem to relate that species more closely to *S. minus* than to the form herein described. The unusually short and broad frontal teeth of *S. obtusifrons* are very similar to those of *S. anceps* Banner, 1956, from Saipan, Mariana Islands, but a close relationship with that species is not substantiated by other characters.

166. *Synalpheus osburni* Schmitt

Synalpheus osburni Schmitt, 1933:1, fig. 1; 1935:149, fig. 17.

TYPE-LOCALITY.—Inside Cayo María Langa, near Bahía de Guayanilla, Puerto Rico.

DISTRIBUTION.—Known only from the unique specimen from the type-locality.

*167. *Synalpheus pandionis* Coutière

Synalpheus grampusi Coutière, 1909:62, fig. 36.
Synalpheus pandionis Coutière, 1909:67, fig. 39.

MATERIAL.—Tortola (Sta. 23–58: 1 ovig. ♀).—Guana Island (Sta. 9–58: 1 ovig. ♀).—Virgin Gorda (Sta. 112–56: 1 spec.).

HABITAT.—All three specimens were probably collected on turtle-grass flats studded with clumps of *Porites*.

TYPE-LOCALITY.—Off Saint Thomas, 36–42 meters.

DISTRIBUTION.—Eastern Gulf of Mexico to Barbados and Curaçao; to a depth of about 60 meters.

REMARKS.—In contradistinction to Coutière's description and figures of *S. grampusi*, the two larger type-specimens (a male and a female) of that species from Fish Hawk Station 7123 have narrow but long and distinct blades on the antennal scales. The specimens in the other three lots assigned to *S. grampusi* by Coutière agree with his description in lacking any trace of a blade. Inasmuch as the only important difference between *S. grampusi* and *S. pandionis* is the presence or absence of a blade on the antennal scale, a new name might have to be assigned to the species described as *S. grampusi* if the two forms are considered specifically distinct. Examination of the material identified as either species in the national collections has convinced me, however, that they are not distinct. One of the syntypes of *S. pandionis* has the blade reaching barely to midlength of the lateral spine, and a specimen from the Dry Tortugas has the blade reduced to a vestige. It seems apparent, therefore, that the development of a blade on the antennal scale in this species is variable and not a reliable taxonomic character. I have selected *S. pandionis* as the valid name of the species as the choice least likely to cause nomenclatural confusion, even though that name does not have position precedence in Coutière's publication. The species is apparently related to, but distinct from, *S. parfaiti* Coutière, 1898c, from the eastern tropical Atlantic.

*168. *Synalpheus paraneptunus* Coutière

Synalpheus paraneptunus Coutière, 1909:86, fig. 52.

MATERIAL.—Guadeloupe (Sta. 70–56: 1 ovig. ♀).—Dominica (Sta. 55–56: 1 spec.; Sta. 61–56: 4 spec. [1 ovig.]; Sta. 62–56: 139 spec. [1 ovig.]).—Carriacou Island (Sta. 16–56: 2 ovig. ♀).—Bahía de la Ascensión (Sta. 52–60: 1 spec.; Sta. 72–60: 11 spec. [1 ovig.]).—Bahía del Epíritu Santo (Sta. 41–60: 2 spec. [1 ovig.]).

HABITAT.—Practically all of the specimens in the collections were associated with coral, much of it dead and eroded, from shallow flats to depths of 11–27 meters. The numerous specimens from Prince Rupert Bay, Dominica (Sta. 62–56) were taken from coral-encrusted rocks in 5 feet of water.

TYPE-LOCALITY.—Off Golfo de Morrosquillo, Colombia, 9°30′15″N, 76°20′30″W; in 77 meters.

DISTRIBUTION.—Dry Tortugas, Florida, and the Yucatan Peninsula to the Grenadines and Colombia; to a depth of 77 meters.

REMARKS.—Coutière's statement (1909:87) that "The eggs give rise to zoëae" would indicate that *S. paraneptunus* produces only small eggs, but this supposition is not confirmed by the material examined. Apparently the only ovigerous female available to Coutière was one of the two specimens from Jamaica, in which the eggs are only slightly developed and have a major diameter of about 0.8 mm. The only Smithsonian-Bredin specimens having eggs this small are the two from Carriacou Island (Sta. 16–56); the eggs of these specimens have not started to develop and they measure 0.7 and 0.9 mm in maximum diameter. All five other ovigerous females bear eggs measuring from 1.0 to 1.4 mm. The smallest of these were apparently freshly laid and carried by the specimen from Sta. 61–56, but one of the specimens from Sta. 41–60 bears a single egg that was obviously nearly ready to hatch and yet measures only 1.1 mm. The eggs of the ovigerous female from Sta. 72–60, on the other hand, show little indication of development and measure 1.2 mm. The largest eggs, well developed and measuring 1.4 mm, are borne by the specimen from Sta. 70–56. This evidence seems to suggest that *S. paraneptunus*, like *S. minus*, may produce eggs of two sizes.

*169. *Synalpheus pectiniger* Coutière

Synalpheus pectiniger Coutière, 1907:611; 1909:78, figs. 48, 49.

MATERIAL.—Virgin Gorda (Sta. 111–56: 2 spec. [1 with hatching eggs]).—Mustique (Sta. 35–56: 16 spec. [7 ovig., 1 with branchial bopyrid]).—Isla Mujeres (Sta. 28–60: 6 spec. [1 ovig.]).—Isla de Cozumel (Sta. 48–60: 37 spec. [9 ovig.]; Sta. 51–60: 1 spec.).—Bahía de la Ascensión (Sta. 77–60: 13 spec. [4 ovig., 1 with abdominal bopyrid]).

HABITAT.—The 16 specimens from Mustique (Sta. 35–56) were found in a loggerhead sponge. Most of the remaining specimens were collected on turtle-grass flats or among mangrove roots, but the exact habitat of the largest group, from Isla de Cozumel (Sta. 48–60) is unknown.

TYPE-LOCALITY.—Curaçao.

DISTRIBUTION.—Gulf of Mexico, Florida Keys, and Bahamas to Curaçao; to a depth of 48 meters.

*170. *Synalpheus rathbunae* Coutière

Synalpheus rathbunae Coutière, 1909:84, fig. 51.

MATERIAL.—Virgin Gorda (Sta. 111–56: 40 spec. [3 ovig.]).—Barbuda (Sta. 85–56: 250 spec. [10 ovig.]; Sta. 92–59: 442 spec. [40 ovig.]).—Saba Bank (Sta. 106–56: 1 spec.).—Carriacou Island (Sta. 16–56: 1 spec.).—Isla Mujeres (Sta. 29a–60: 1 spec.).—Bahía de la Ascensión (Sta. 67–60: 9 spec.; Sta. 72–60: 13 spec.).

HABITAT.—The data for the stations at which this species was obtained seem to present no consistent habitat pattern. Many of the specimens undoubtedly were found by cracking coral, and some probably occurred in weeds along shore and on reef margins as well as on turtle-grass flats with *Pocillopora*.

TYPE-LOCALITY.—Off Saint Thomas; in 37–55 meters.

DISTRIBUTION.—Bahamas to the Grenadines, westward to the Yucatan Peninsula; to a depth of about 50 meters.

REMARKS.—Curiously enough, all of the large female specimens taken at Barbuda in 1956 (Sta. 85–56) have two minor first chelipeds, as if the major cheliped had been lost and regenerated to duplicate the opposite member of the pair. Of the 442 specimens taken at Barbuda in 1959 (Sta. 92–59), two apparently adult males have 5 joints in the carpus of the second pereiopod, and one adult female has only 3 joints. Most of the ovigerous females in this lot have few, small, possibly infertile eggs.

171. *Synalpheus sanctithomae* Coutière

Synalpheus sanctithomae Coutière, 1909:61, fig. 35.

TYPE-LOCALITY.—Off Saint Thomas; in 37–42 meters.

DISTRIBUTION.—Known only from the three specimens from off Saint Thomas recorded by Coutière.

172. *Synalpheus tanneri* Coutière

Synalpheus tanneri Coutière, 1909:78, fig. 47.

TYPE-LOCALITY.—Gulf of Mexico south of Cape San Blas, Florida, 29°15′30″N, 85°29′30″W; in 49 meters.

DISTRIBUTION.—Known only from the unique ovigerous female from the type-locality.

*173. *Synalpheus townsendi* Coutière

Synalpheus townsendi Coutière, 1909:32, fig. 14.—Williams 1965b:72, fig. 58.

MATERIAL.—Tortola (Sta. 117–56: 7 spec. [2 ovig.]; Sta. 5–58: 2 spec. [1 ovig.]: Sta. 23–58: 2 spec. [1 ovig.]).—Guana Island (Sta. 9–58: 2 ovig. ♀).—Virgin Gorda (Sta. 111–56: 4 spec. [3 ovig.]; Sta. 112–56: 1 spec.).—Barbuda (Sta. 102a–59: 1 spec.).—Saint Christopher (Sta. 103–56: 1 spec.).—Antigua Island (Sta. 73–56: 3 spec.; Sta. 81–56: 1 spec.).—Dominica (Sta. 75–59: 1 spec.).—Carriacou Island (Sta. 16–56: 26 spec. [11 ovig., 1 with branchial bopyrid]; Sta. 17–56: 1 ovig. ♀).—Tobago (Sta. 8–59: 27 spec. [8 ovig.]; Sta. 15–59: 2 spec.; Sta. 26–59: 5 spec.; Sta. 31–59: 4 spec.).—Isla de Cozumel (Sta. 48–60: 2 spec.; Sta. 51–60: 1 spec.).—Bahía de la Ascensión (Sta. 52–60: 28 spec. [8 ovig.]; Sta. 67–60: 19 spec. [3 ovig.]; Sta. 72–60: 6 spec. [2 ovig.]; Sta. 77–60: 2 spec. [1 ovig.]; Sta. 82–60: 1 spec. with branchial bopyrid; Sta. 91–60: 1 spec.).—Bahía del Espíritu Santo (Sta. 41–60: 18 spec. [8 ovig.]).

HABITAT.—Specimens of this species were taken in various habitats, especially on turtle-grass flats with clumps of *Porites* and *Pocillopora* as well as in algae, but the largest lots were apparently cracked from eroded dead coral.

TYPE-LOCALITY.—Gulf of Mexico south of Cape San Blas, Florida, 29°14′00″N, 85°29′15″W; in 46 meters.

DISTRIBUTION.—North Carolina and Bermudas to Estado da Bahia, Brazil; to a depth of 102 meters. Two closely related forms, possibly subspecies, occur in the Gulf of California.

*Genus *Thunor* Armstrong, 1949

Only one Atlantic species is known.

*174. *Thunor rathbunae* (Schmitt)

FIGURE 39

Crangon rathbunae Schmitt, 1924c:74, pl. 1.
Thunor rathbunae.—Armstrong 1949:13, figs. 3, 4A–J, L.

MATERIAL.—Virgin Gorda (Sta. 112–56: 1 ♀).—Antigua Island (Sta. 73–56: 1 ovig. ♀).—Saint Lucia Island (Sta. 65–59: 1y♂, 1y♀).—Bahía de la Ascensión (Sta. 67–60: 2♂, 1♀).—Bahía del Espíritu Santo (Sta. 41–60: 8♂, 12♀ [10 ovig.]).

HABITAT.—Most of these specimens were apparently living in cavities in dead coral.

TYPE-LOCALITY.—Needhams Point, Barbados.

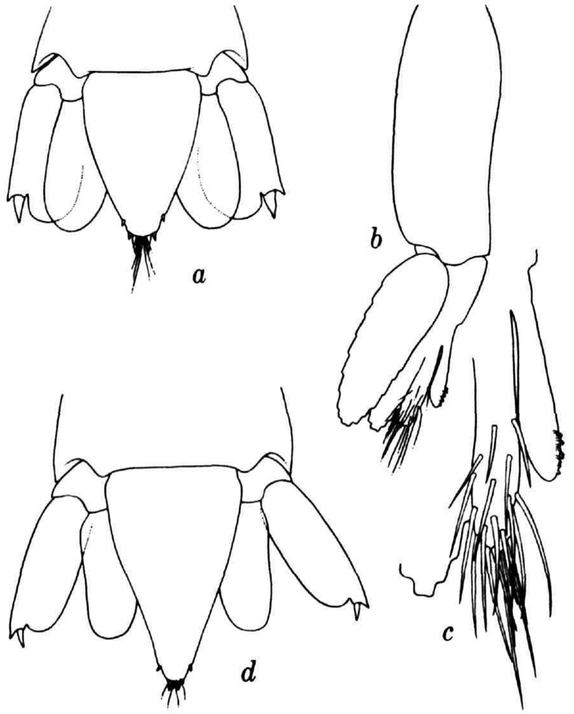


FIGURE 39.—*Thunor rathbunae* (Schmitt). Male, carapace length in midline 4.1 mm, from Smithsonian-Bredin Station 41–60: *a*, telson and uropods; *b*, right second pleopod; *c*, same, appendix masculina. Ovigerous female, carapace length 4.2 mm, from same station: *d*, telson and uropods. (Magnifications: *a*, *d*, ×15.5; *b*, ×32; *c*, ×78.)

DISTRIBUTION.—Key West, Florida, and Yucatan Peninsula to Barbados.

REMARKS.—As indicated in the accompanying figures, this species displays greater sexual dimorphism in the uropods than does any other alpheid with which I am familiar. In the male (Figure 39*a*), both branches are very broad; the lateral branch is armed with a stout movable spine, and the blade far overreaches the distolateral angle. In the female (Figure 39*d*), both branches are much narrower; the lateral branch is armed with a slender movable spine, and the distolateral angle far overreaches the subtruncate distal margin of the blade.

In the national collections there are two large specimens of *Thunor*, a male and an ovigerous female, collected on Florida Reef, Key West, Florida, by E. Lowe Pierce, 27 July 1957, that differ from all other specimens examined in having a small but distinct rostral point in the frontal sinus and in having the major first chelae longer than usual. Inasmuch as *T. rathbunae* has been shown by Armstrong (1949) to be unusually variable, at least in the armature of the telson, it seems best for the time being to consider these Key West specimens as representing only aberrant varieties of that species.

Banner and Banner (1966a:175) have advanced very convincing arguments for relegating *Thunor* to the synonymy of *Alpheus*. There is little doubt that the two genera, as now defined, cannot remain separate. My only reasons for retaining *Thunor*, in spite of this evidence, are the fact that *T. rathbunae* is very different from the Atlantic species of *Alpheus* and the belief that *Thunor* may have to be recognized if and when the unwieldly genus *Alpheus* is eventually subdivided.

Family OGYRIDIDAE

Only one genus is assigned to this family.

Genus *Ogyrides* Stebbing, 1914

Key to Western Atlantic Species

1. Single movable spine in dorsal midline of carapace posterior to rostrum ... 175. ***O. alphaerostris***
   Median postrostral crest armed with 7–14 fixed teeth ... 2

2.(1) Eyes reaching about as far as distal end of antennular peduncle ... 177. ***O. occidentalis***
   Eyes overreaching antennular peduncle by at least twice length of cornea ... 3

3.(2) Eyes overreaching antennular peduncle by about two and one-half times length of cornea; antennal peduncle not overreaching antennular peduncle ... 176. ***O. limicola***
   Eyes overreaching antennular peduncle by nearly three times length of cornea; antennal peduncle overreaching antennular peduncle ... 178. ***O. yaquiensis***

175. *Ogyrides alphaerostris* (Kingsley)

Ogyris alphaerostris Kingsley, 1880:420, pl. 14: fig. 7.
Ogyrides alphaerostris.—Williams 1955:56, 57; 1965b:75, fig. 61.

TYPE-LOCALITY.—Eastern shore of Northampton County, Virginia.

DISTRIBUTION.—Virginia to Georgia and northwestern Florida to Mississippi, Puerto Rico; sublittoral.

176. *Ogyrides limicola* Williams

Ogyrides limicola Williams, 1955:57, fig. 1; 1965b:74, fig. 60.

TYPE-LOCALITY.—Mouth of Far Creek at Engelhard, Hyde County, North Carolina.

DISTRIBUTION.—Virginia to Louisiana; sublittoral.

REMARKS.—This species may be identical with *O. yaquiensis*.

177. *Ogyrides occidentalis* (Ortmann)

Ogyris occidentalis Ortmann, 1893:46, pl. 3: figs. 4–4*n*.

TYPE-LOCALITY.—Mouth of Rio Tocantins, Estado do Pará, Brazil.

DISTRIBUTION.—Apparently known only from the type-locality.

178. *Ogyrides yaquiensis* Armstrong

Ogyrides yaquiensis Armstrong, 1949:3, fig. 1.

TYPE-LOCALITY.—Near mouth of Rio Yaqui del Sur, Dominican Republic.

DISTRIBUTION.—Southern Florida and Dominican Republic.

REMARKS.—There is a possibility that *O. yaquiensis* will eventually prove to be not only a senior synonym of *O. limicola* but also a junior synonym of *O. occidentalis*.

*Family HIPPOLYTIDAE

Key to West Indian Genera

1. Carpus of second pereiopod subdivided into more than 7 articles, multiarticulate 2
   Carpus of second pereiopod subdivided into no more than 7 articles 5

2.(1) Dactyls of third, fourth, and fifth pereiopods appearing biunguiculate because of series of prominent spines on flexor margin 3
   Dactyls of third, fourth, and fifth pereiopods simple, spines on flexor margin inconspicuous 4

3.(2) Mandible with 3-jointed palp ...... ***Barbouria***
   Mandible without palp ...... ***Lysmata***

4.(2) Rostrum longer than carapace, with dorsal crest near base; posterior tip of telson acuminate, overreaching lateral spines; third maxilliped with exopod; 4 anterior pereiopods with epipods ...... ***Exhippolysmata***
   Rostrum short, reaching little beyond eye, without dorsal crest near base; posterior margin of telson truncate; third maxilliped without exopod; pereiopods without epipods ...... ***Merguia***

5.(1) Third segment of antennular peduncle bearing subtriangular movable plate overhanging base of flagellum dorsally; carpus of second pereiopod composed of 6 or 7 articles ***Thor***
   Antennular peduncle without movable plate overhanging base of flagellum; carpus of second pereiopod composed of 2 or 3 articles 6

6.(5) Rostrum with deep ventral blade projecting posteroventrally at posterior end between bases of antennules 7
   Ventral lobe of rostrum, if present, not projecting posteroventrally near base 8

7.(6) Lateral surface of carapace smooth, not spinose; mandible without palp; carpus of second pereiopod composed of 3 articles ...... ***Latreutes***
   Lateral surface of carapace bearing numerous appressed spines; mandible with 2-jointed palp; carpus of second pereiopod composed of 2 articles ...... ***Trachycaris***

8.(6) Supra-orbital tooth present; third maxilliped with exopod ...... ***Hippolyte***
   Supra-orbital tooth absent; third maxilliped without exopod ...... ***Tozeuma***

*Genus *Barbouria* Rathbun, 1912

Key to Species

Carapace and rostrum nearly straight dorsally; 1 or 2 dorsal teeth on carapace posterior to base of rostrum; eyes large, cornea much broader than stalk; 3 posterior pairs of pereiopods with carpus and propodus multiarticulate .... *179. ***B. antiguensis***

Carapace and rostrum noticeably arched dorsally; 3 dorsal teeth on carapace posterior to base of rostrum; eyes reduced, cornea narrower than stalk; 3 posterior pairs of pereiopods with carpus and propodus undivided .... 180. ***B. cubensis***

*179. *Barbouria antiguensis*, new species

FIGURES 40, 41

MATERIAL.—Antigua Island (Sta. 83–56: 3♂, 4 ovig. ♀ [1♂ is holotype, USNM 135375]).

DESCRIPTION.—Rostrum (Figure 40*b*) nearly horizontal, reaching about to end of basal segment of antennular peduncle; dorsal margin armed with 4 prominent teeth, 1 or 2 situated on carapace posterior to level of orbital margin; ventral margin armed with single small but distinct tooth near tip. Dorsal carina on rostrum extending to near midlength of carapace. Postocular tooth (Figure 40*a*) prominent and buttressed, arising on carapace but reaching slightly beyond orbital margin dorsal to acutely but bluntly triangular ventral angle. Branchiostegal tooth similar to postocular, barely reaching anterior margin of carapace.

Pleura of first 4 abdominal somites rounded (Figure 40*c*), that of fifth sharply acute; posteroventral submarginal carina of sixth somite (Figure 40*d*) armed with small tooth. Sixth somite twice as long as fifth and barely longer than telson, not including terminal spines; median posteroventral projection between bases of uropods narrowly triangular, articulated at base and closely appressed to underlying tissue, not free. Dorsal spines of telson (Figure 40*e*) small, both pairs situated in posterior half of telson; distal margin (Figure 40*f*) tapering to sharp median point, armed with 3 pairs of spines, lateral pair similar to dorsal spines and situated above bases of large intermediate pair, mesial pair about half as long as intermediate.

Eyes short and stout, cornea greatly enlarged.

Antennular peduncle (Figure 40*g*) with stylocerite lying in nearly vertical plane and tapering rather abruptly to acute tip reaching distal third of basal segment; distal margin of basal segment armed with dorsomesial spine.

Antennal scale (Figure 40*h*) overreaching antennular peduncle by about two-fifths of length, fully four times as long as broad; lateral margin nearly straight, distal tooth not noticeably overreaching narrowly rounded distal margin of blade. Antennal peduncle short, barely reaching beyond basal fifth of scale; basal segment with sharp marginal tooth ventral to base of scale.

Mouth parts as figured (Figures 40*i–o*). Mandible with slender 3-segmented palp, distal segment nearly as long as combined lengths of 2 proximal segments; distal margin of molar process of right mandible armed with 6 teeth. Third maxilliped slightly overreaching antennal scale, exopod reaching beyond midlength of antepenultimate segment.

Four anterior pereiopods with well-developed epipods but no trace of arthrobranchs. First pereiopod (Figure 41*a*) reaching distal fifth of antennal scale; fingers about as long as palm; carpus slender, distinctly longer than chela and subequal to merus in length. Second pereiopod (Figure 41*b*) overreaching antennal scale by length of chela and half of carpus; carpus more than twice as long as merus, subdivided into 26–31 articles; merus shorter than ischium, subdivided into 11–14 articles. Third pereiopod (Figure 41*c*) overreaching antennal scale by dactyl, propodus, and two-thirds of carpus; dactyl (Figure 41*d*) armed distally with long, slender tooth continuous with extensor margin and shorter, stouter tooth on flexor side, with 2 slender spines on flexor margin; propodus nine times as long as dactyl, divided into 11–13 articles; carpus nearly one-fifth again as long as propodus, divided into 5–7 articles; merus armed with 9–12 sharp spines, one and one-third times as long as carpus and three and one-third times as long as ischium. Fourth pereiopod (Figure 41*e*) overreaching antennal scale by dactyl, propodus, and half of carpus; dactyl (Figure 41*f*) like that of third pereiopod; propodus eleven times as long as dactyl, di-

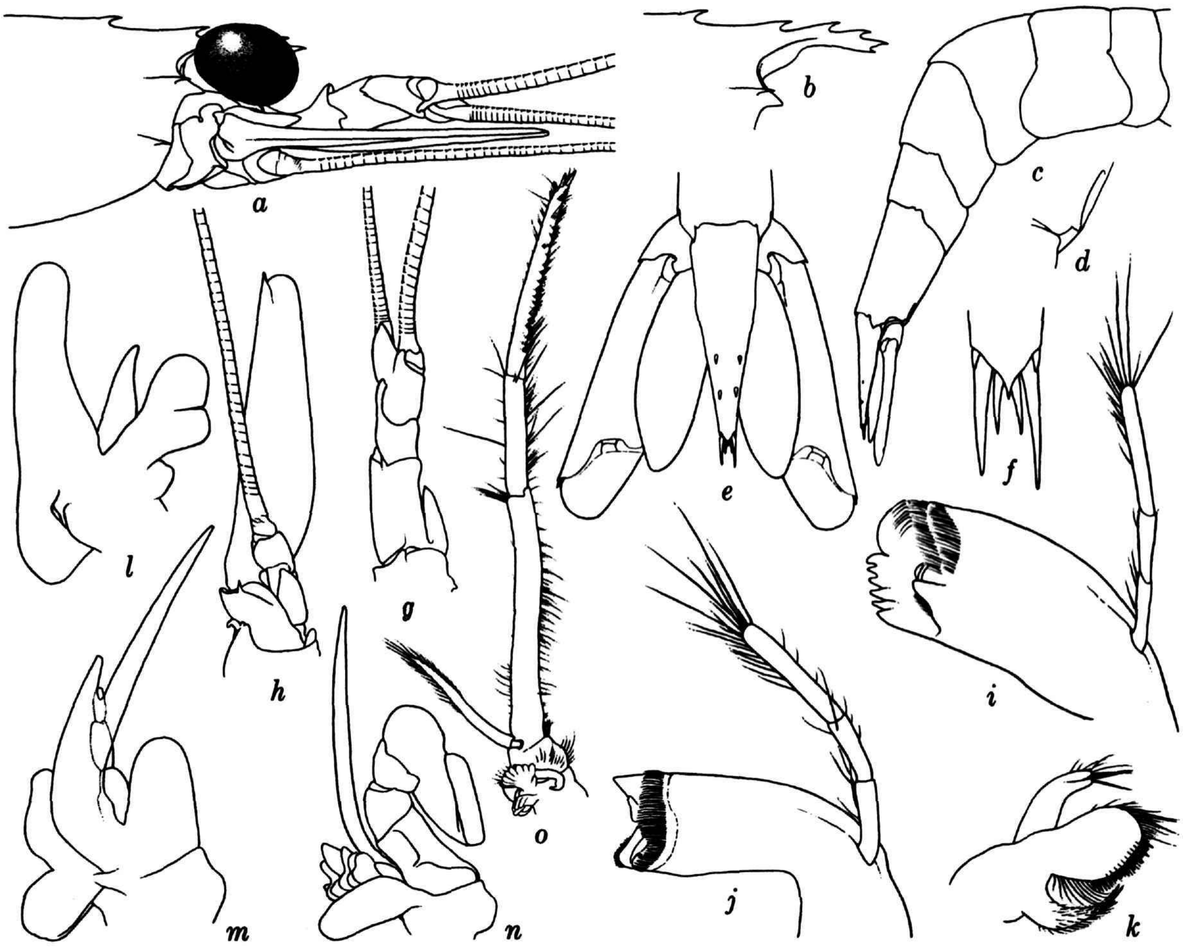


FIGURE 40.—*Barbouria antiguensis*, new species, holotype, male, carapace length 6.25 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen; *d*, posteroventral angle of sixth abdominal somite; *e*, telson and uropods; *f*, end of telson; *g*, right antennule; *h*, right antenna, *i*, right mandible, anterior aspect; *j*, left mandible, posterior aspect; *k*, right first maxilla; *l*, right second maxilla; *m*, right first maxilliped; *n*, right second maxilliped; *o*, right third maxilliped. (Magnifications: *c*, ×3.7; *a, b, e, g, h, o*, ×7.5; *d, k–n*, ×15.5; *f, i, j*, ×31.)

vided into 12–16 articles; carpus slightly shorter than propodus, divided into 6–8 articles; merus armed with 4–7 spines, distinctly longer than carpus and nearly two and one-third times as long as ischium. Fifth pereiopod (Figure 41*k*) longest, overreaching antennal scale by dactyl, propodus, and three-fifths of carpus; dactyl (Figure 41*l*) like those of 2 preceding pereiopods; propodus about thirteen times as long as dactyl, divided into 15–21 articles; carpus little more than four-fifths as long as propodus, divided into 6–10 articles; merus armed with 4 or 5 spines, slightly longer than carpus and more than two and one-fourth times as long as ischium.

Endopod of first pleopod of male (Figures 41*g, h*) more than half as long as exopod, slender and setose, with cluster of coupling hooks at distal end. Appendix masculina (Figure 41*j*) on endopod of second pleopod (Figure 41*i*) longer than appendix interna,

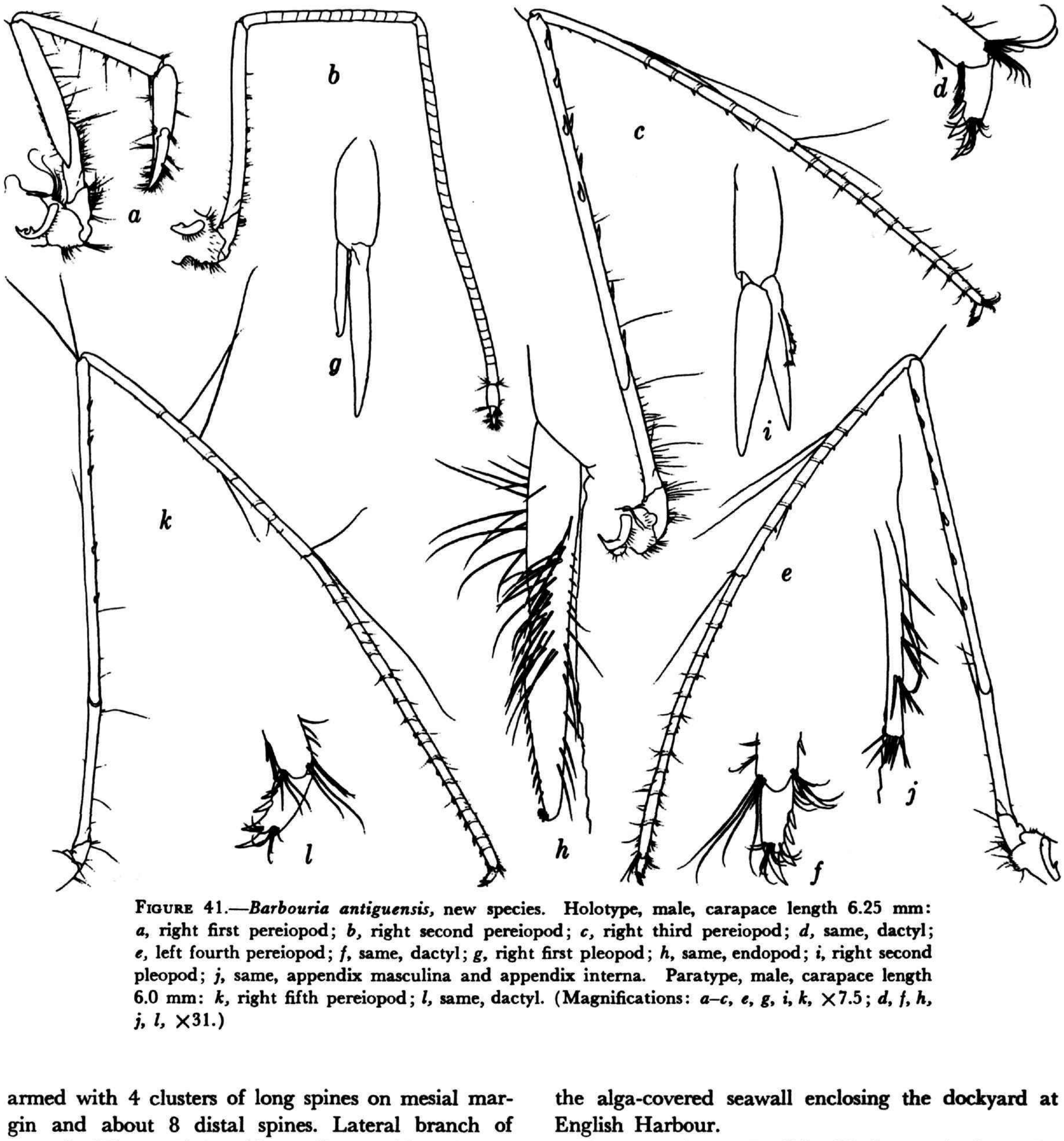


FIGURE 41.—*Barbouria antiguensis*, new species. Holotype, male, carapace length 6.25 mm: *a*, right first pereiopod; *b*, right second pereiopod; *c*, right third pereiopod; *d*, same, dactyl; *e*, left fourth pereiopod; *f*, same, dactyl; *g*, right first pleopod; *h*, same, endopod; *i*, right second pleopod; *j*, same, appendix masculina and appendix interna. Paratype, male, carapace length 6.0 mm: *k*, right fifth pereiopod; *l*, same, dactyl. (Magnifications: *a–c*, *e*, *g*, *i*, *k*, ×7.5; *d*, *f*, *h*, *j*, *l*, ×31.)

armed with 4 clusters of long spines on mesial margin and about 8 distal spines. Lateral branch of uropod (Figure 40*e*) with small movable spine at distal end of lateral margin.

SIZE.—Males with carapace lengths of 4.6–6.25 mm (holotype is largest); ovigerous females, 6.6–7.5 mm.

HABITAT.—These shrimps were not uncommon at night a few feet below the surface of the water on the alga-covered seawall enclosing the dockyard at English Harbour.

TYPE-LOCALITY.—English Harbour, Antigua Island.

DISTRIBUTION.—Thus far known only from the type-series from Antigua Island.

REMARKS.—The discovery of this fairly large and apparently common new shrimp was unexpected, especially in view of the fact that the members of the

Barbados-Antigua Expedition from the University of Iowa, under the direction of C. C. Nutting, lived for a month in 1918 in the dockyard at English Harbour, bounded on three sides by the seawall where we found the species in 1956. Is it possible that this shrimp is of seasonal or periodic occurrence or that it has recently invaded the area from elsewhere?

The opinion expressed by Holthuis (1947:33; 1963b:272–277) that the genus *Barbouria* is closely related to *Ligur* from the Mediterranean and Indo-Pacific regions is strengthened by the finding of this species. *Barbouria antiguensis* agrees with *B. cubensis* in showing no traces of arthrobranchs on the pereiopods, but it differs from that species in having the carpus and propodus of the 3 posterior pairs of pereiopods multiarticulate and in having a terminal cluster of coupling hooks on the endopod of the first pleopod of the male. The Indo-Pacific *Ligur uveae* (Borradaile, 1899), on the other hand, has prominent arthrobranchs but agrees with *B. antiguensis* in most other respects, including the multiarticulate posterior pereiopods and coupling hooks on the endopod of the first pleopod. This bears out Holthuis's inference that the presence or absence of arthrobranchs may be less fundamental in this group than it seems to be in most caridean families. It is possible that *Barbouria* eventually will be relegated to the synonymy of *Ligur* or perhaps that *Barbouria* will revert to its previous monotypic status and that *B. antiguensis* will be transferred to *Ligur*.

180. *Barbouria cubensis* (Von Martens)

Hippolyte Cubensis Von Martens, 1872:136, pl. 5: fig. 14.
Barbouria cubensis.—Chace and Hobbs 1969:116, figs. 28*f*, 29.

Type-locality.—Cuba.

Distribution.—Known only from Cuba, in marine or brackish pools near the coast.

Genus *Exhippolysmata* Stebbing, 1915

Kemp (1916:401) relegated this genus to the synonymy of *Hippolysmata* [*Lysmata*] because the two species assigned to it by Stebbing (1915) differed in characters that Kemp considered "to be altogether unsuitable for generic definition and . . . clearly of far less morphological value than those hitherto employed in the generic subdivision of the family." There was some justification for Kemp's action at the time, but now that four species are known to differ consistently from the approximately 22 species of *Lysmata*, it seems to me that *Exhippolysmata* should be returned to full generic status. All four species differ from those of *Lysmata* in having the rostrum longer than the carapace, with a basal crest of close-set teeth, and in having the telson tapering to a slender, sharp point that, in the adult, far overreaches the vestigial lateral spines, rather than terminating in a rounded posterior margin, with a short median point that is overreached by the well-developed lateral spines. They also differ from all of the species of *Lysmata*, except *L. dentata* (Kemp, 1914) [not *L. dentata* (De Haan, 1841)], in having the dactyls of the 3 posterior pairs of pereiopods elongate and slender and armed only with a few inconspicuous spines in the basal part of the flexor margin, rather than short and stout and armed throughout the flexor margin with conspicuous spines that increase in size distally and give a biunguiculate appearance to the dactyl.

Only one species is known from the western Atlantic.

181. *Exhippolysmata oplophoroides* (Holthuis)

Hippolysmata (Exhippolysmata) oplophoroides Holthuis, 1948:1106, figs. 2, 3; 1959:112, fig. 17.—Williams 1965b:85, fig. 69.

Type-locality.—Mouth of the Suriname River near De Resolutie, Surinam.

Distribution.—North Carolina to Estado de São Paulo, Brazil, except West Indies; in 7–27 meters.

*Genus *Hippolyte* Leach, 1814

Key to Western North Atlantic Species

1. Lateral spine on carapace branchiostegal, overreaching anterior margin; tergum of fifth abdominal somite armed with pair of strong posterior spines; telson with both pairs of dorsolateral spines situated in posterior third of segment; antennal scale with blade and distolateral spine about equally advanced; dactyls of 3 posterior pairs of pereiopods terminating in 2 strong distal spines. (Rostrum usually with single incon-

Key to Western North Atlantic Species—Continued

spicuous tooth on dorsal and ventral margins; basal segment of antennular peduncle armed with prominent distolateral spine.) .... 182. ***P. coerulescens***

Lateral spine on carapace hepatic, not nearly reaching anterior margin in adults; tergum of fifth abdominal somite unarmed; telson with anterior pair of dorsolateral spines situated near midlength of segment; antennal scale with blade reaching far beyond distolateral spine; dactyls of 3 posterior pairs of pereiopods terminating in either 1 or 3 strong distal spines 2

2.(1) Rostrum usually unarmed dorsally (rarely with 1 or 2 prominent dorsal teeth); dactyls of 3 posterior pairs of pereiopods terminating in single distal spine. (Basal segment of antennular peduncle unarmed distally.) .... *184. ***H. nicholsoni***

Rostrum usually armed with 2–4 strong teeth on dorsal margin; dactyls of 3 posterior pairs of pereiopods terminating in 3 strong distal spines 3

3.(2) Rostrum usually armed with 3 or 4 strong teeth on dorsal margin and with strong lateral carina in proximal third of length; basal segment of antennular peduncle armed with 1–3 strong distolateral spines .... *183. ***H. curacaoensis***

Rostrum usually armed with 2 (rarely 1 or 3) strong teeth in proximal half of dorsal margin and without distinct lateral carina; basal segment of antennular peduncle unarmed distally 4

4.(3) Rostrum not overreaching antennular peduncle in adult females, barely overreaching basal antennular segment in males .... 185. ***H. pleuracanthus***

Rostrum distinctly overreaching antennular peduncle in adult females, extending nearly as far as distal margin of second antennular segment in males .... *186. ***H. zostericola***

182. *Hippolyte coerulescens* (Fabricius)

FIGURES 42, 43

Astacus coerulescens Fabricius, 1775:414.
Hippolyte acuminata.—Gurney 1936:27, 31, pl. 2: figs. 28–31, pl. 3: figs. 32, 33, pl. 4: figs. 48, 49, pl. 5.
Hippolyte coerulescens.—Holthuis 1947:15, 53.

TYPE-LOCALITY.—"Pelago inter Tropicos."

DISTRIBUTION.—Widespread in the tropical and subtropical parts of the open Atlantic Ocean, usually associated with floating *Sargassum*.

REMARKS.—This species differs so markedly from most other species of *Hippolyte* in the form of the fifth abdominal somite, in the telson and uropods, and in the antennal scale that the genus *Virbius* eventually may have to be reestablished for it, but this action should not be taken until *Hippolyte* is reviewed on a worldwide scale.

*183. *Hippolyte curacaoensis* Schmitt

FIGURES 44, 45

Hippolyte curacaoensis Schmitt, 1924a:68, fig. 4.
Hippolyte zostericola.—Williams 1965b:82, fig. 66. [Not *Virbius zostericola* Smith, 1873.]

MATERIAL.—Saint Christopher (Sta. 103–56: 1♀). —Antigua Island (Sta. 73–56: 2♀ [1 ovig.]; Sta. 75–56: 1♀; Sta. 109–59: 2 ovig.♀).—Guadeloupe (Sta. 68–56: 1 ovig.♀).—Carriacou Island (Sta. 17–56: 1♂, 1 ovig.♀).—Tobago (Sta. 4–59: 5♂, 15♀ [8 ovig., 1♀ with branchial bopyrid, another with larval bopyrids but no adults in branchial chamber]; Sta. 31–59: 1♂, 13♀ [7 ovig.]).

HABITAT.—Most of the specimens were collected on sand and mud flats, probably from turtle-grass, but there is some indication that the species is not confined to that habitat. (See "Remarks" under *H. zostericola*.)

TYPE-LOCALITY.—West Punt, Curaçao.

DISTRIBUTION.—North Carolina and the West Indies from Cuba to Curaçao; sublittoral. The relative abundance of this species at Beaufort, North Carolina, was unexpected; I have not yet seen any North American material except from the coast of North Carolina.

REMARKS.—There seems little doubt that the species with usually 3 dorsal teeth on the rostrum and 1–3 spines on the distal margin of the basal segment of the antennular peduncle is the one described by Schmitt from a single mutilated male. Schmitt's figure of that specimen (1924: fig. 4*a*) shows a distinct spine on the basal antennular segment, and specimens from Bonaire subsequently assigned to the same species by Schmitt bear 2 or 3 antennular spines. There is a possibility, however, that this is not the oldest

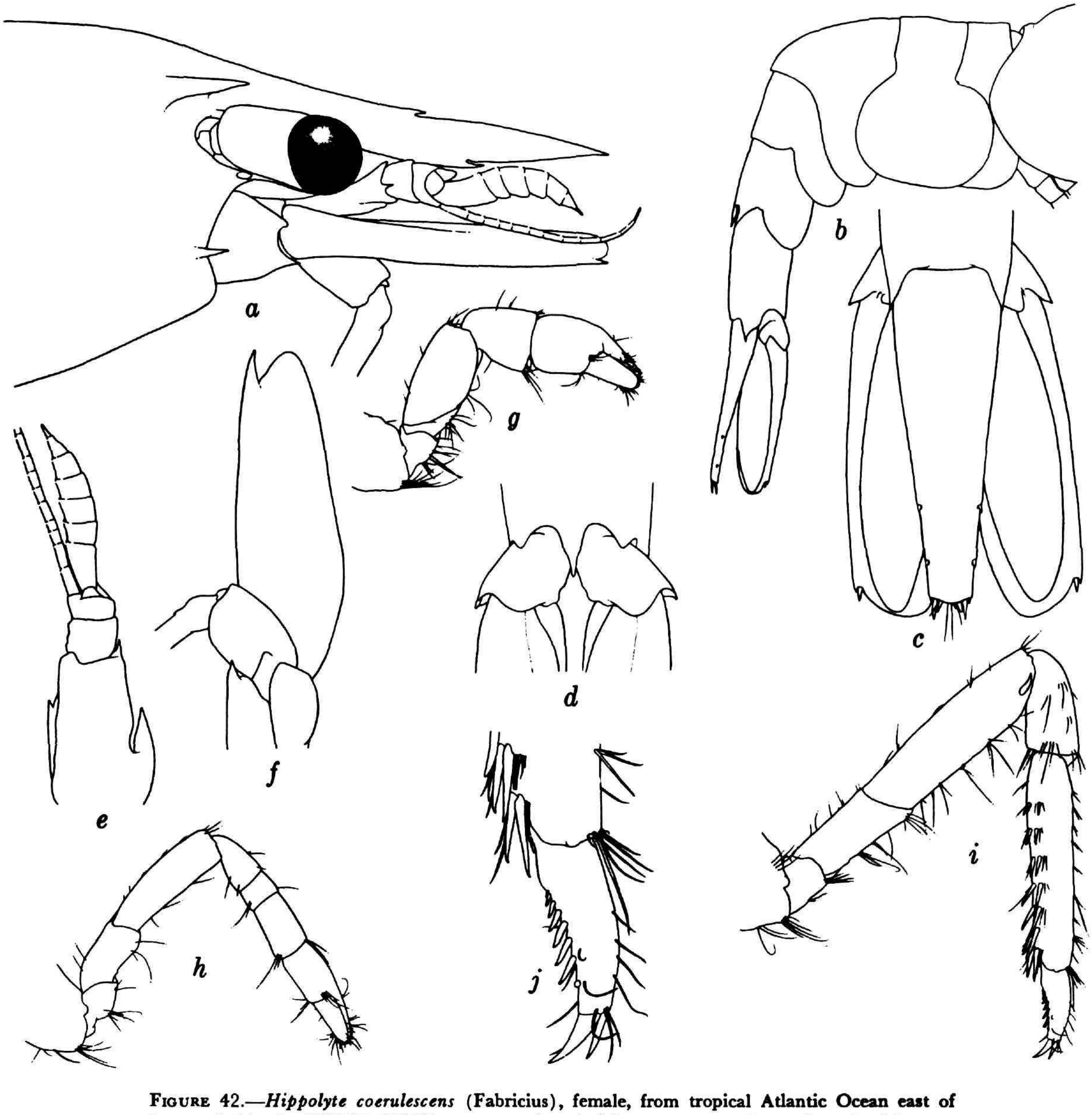


FIGURE 42.—*Hippolyte coerulescens* (Fabricius), female, from tropical Atlantic Ocean east of Leeward Islands (USNM 89690), carapace length 2.5 mm: *a*, anterior region; *b*, abdomen; *c*, telson and uropods; *d*, posteroventral margin of sixth abdominal somite; *e*, right antennule; *f*, right antenna; *g*, right first pereiopod; *h*, right second pereiopod; *i*, right third pereiopod; *j*, same, dactyl. (Magnifications: *b*, ×12.5; *a*, *c–i*, ×25; *j*, ×63.)

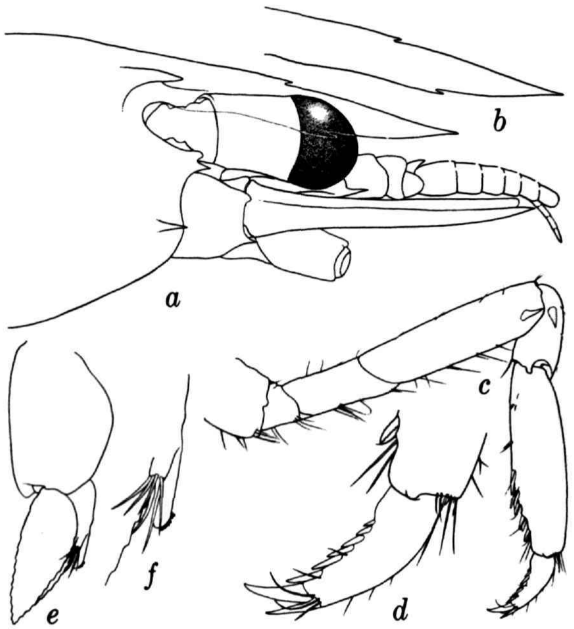


FIGURE 43.—*Hippolyte coerulescens* (Fabricius), male, from tropical Atlantic Ocean east of Leeward Islands (USNM 89690), carapace length 2.0 mm: *a*, anterior region; *b*, rostrum; *c*, right third pereiopod; *d*, same, dactyl; *e*, right second pleopod; *f*, same, appendix masculina and appendix interna. (Magnifications: *a–c*, *e*, ×25; *d*, *f*, ×63.)

name for the species. *Hippolyte exilirostrata* and *H. obliquimanus*, both described by Dana (1852) almost certainly from the male and female of a single species, superficially agree with *H. curacaoensis*, but the true identity of the species cannot be determined until material from Rio de Janeiro is reexamined.

It is quite understandable that Williams (1965b) should assume that one of the two common species in the Carolinas was *H. zostericola*. Examination of three syntypes of the latter species in the national collections has revealed, however, that the basal segment of the antennular peduncle is unarmed in that species.

*184. *Hippolyte nicholsoni*, new species

FIGURES 46, 47

MATERIAL.—Antigua Island (Sta. 113–59: 1 ovig. ♀).—Saint Lucia Island (Sta. 52–59: 9♂, 4♀).—Tobago (Sta. 42–59: 1♂, 5♀ [2 ovig., 1 is holotype, USNM 135377]).

Following the 1959 Expedition, Desmond V. Nicholson collected two lots of this species at Antigua Island, one lot at Black's Point, Falmouth, on *Pseudopterogorgia americana* in 2 meters, 24 May 1959: 15♂, 21♀ (13 ovig.); and one lot at Hammond's Dock, Nonsuch Bay, on *Pseudopterogorgia acerosa* in 2 feet, 25 May 1959: 1♂, 3♀ (1 ovig.).

I have also seen an additional lot collected by Raymond B. Manning at La Gata Island, La Parguera, Puerto Rico, on an alcyonarian, 25 June 1961: 4♂, 4 ovig. ♀.

DESCRIPTION.—Rostrum (Figures 46*a*, *b*, *x*, 47*a*) nearly horizontal or inclined slightly ventrad, reaching beyond midlength (rarely to distal fifth) of basal segment of antennular peduncle in adult males, to end of antennular peduncle (rarely to level of distolateral tooth of antennal scale) in adult females; dorsal margin usually unarmed, rarely with 1 or 2 strong sharp teeth in adult females; ventral margin unarmed or with 1–3 inconspicuous teeth near distal end in adult females, unarmed in males. Supraorbital teeth prominent and sharp. Antennal spine (Figure 46*c*) narrowly separated from, and overreaching, ventral angle of orbit. Hepatic spine strong, not reaching anterior margin of carapace in adults.

All abdominal pleura broadly rounded (Figure 46*d*). Sixth somite about one and three-fourths times as long as fifth and slightly longer than telson, not including terminal spines; posterior margin armed ventrally with long, slender mesial spine directed posteriorly between bases of uropods (Figure 46*f*). Dorsal spines of telson (Figures 46*e*, 47*b*) inconspicuous but not minute, proximal pair situated near midlength of segment, distal pair much nearer to extremity of telson than to proximal pair; distal margin subtruncate, armed with 2 pairs of long, stout spines and 4 pairs of spinules, 1 lateral to large lateral spine, 1 between large lateral and mesial spines, and 2 pairs between large mesial spines, mesial pair of spinules smallest of all.

Eyes with cornea slightly broader than, and subequal in length to, eyestalk.

Antennular peduncle (Figure 46*g*) with sharp stylocerite with subparallel margins proximally, abruptly tapering distally, reaching distinctly beyond midlength of basal segment; distal margin of basal

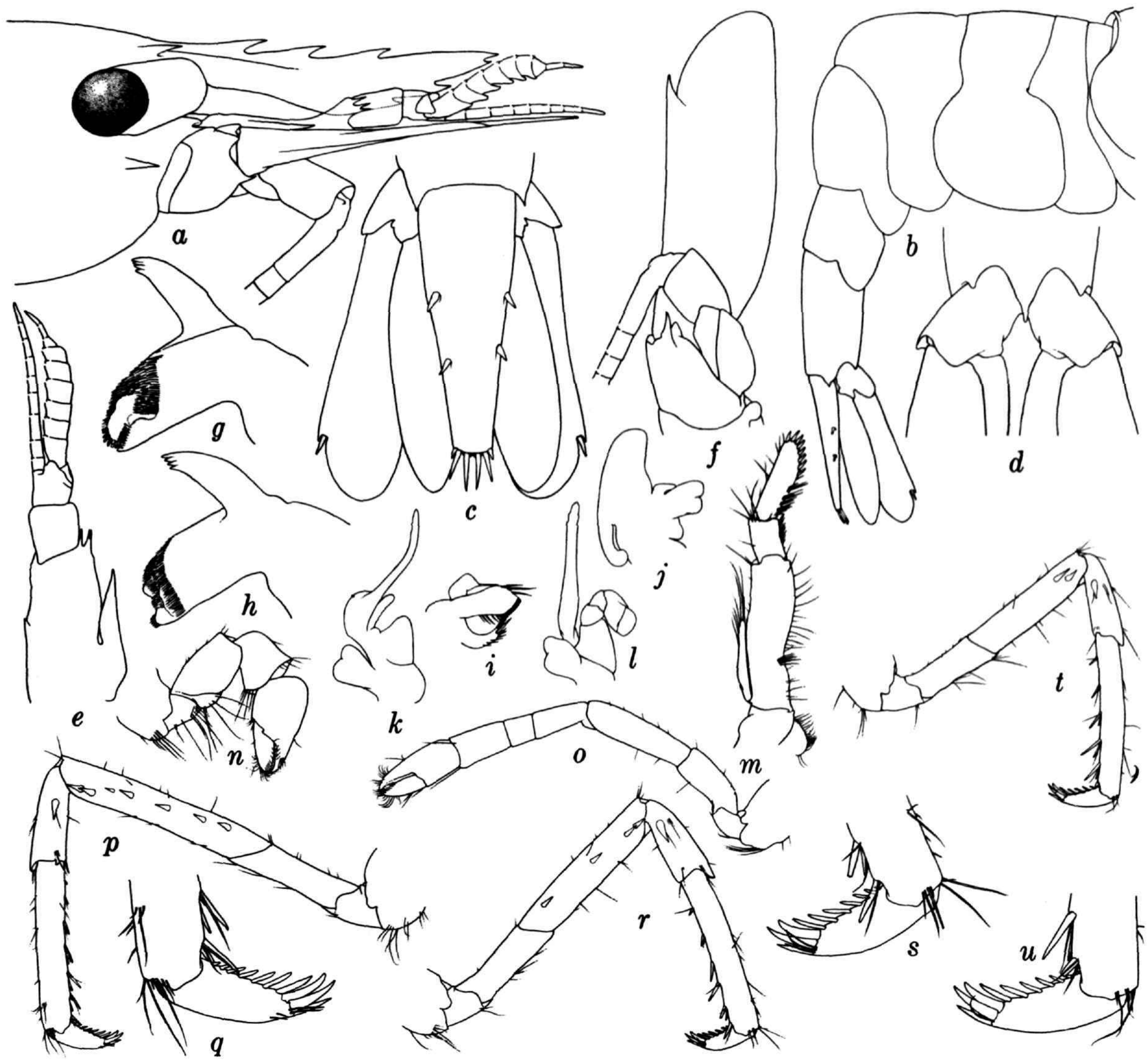


FIGURE 44.—*Hippolyte curacaoensis* Schmitt, female, from Smithsonian-Bredin Station 17–56, carapace length 2.0 mm: *a*, anterior region; *b*, abdomen; *c*, telson and uropods; *d*, posteroventral margin of sixth abdominal somite; *e*, right antennule; *f*, right antenna; *g*, right mandible, anterior aspect; *h*, left mandible, posterior aspect; *i*, right first maxilla; *j*, right second maxilla; *k*, right first maxilliped; *l*, right second maxilliped; *m*, right third maxilliped; *n*, right first pereiopod; *o*, left second pereiopod; *p*, left third pereiopod; *q*, same, dactyl; *r*, right fourth pereiopod; *s*, same, dactyl; *t*, right fifth pereiopod; *u*, same, dactyl. (Magnifications: *b*, ×12.5; *a*, *c–f*, *i–p*, *r*, *t*, ×25; *g*, *h*, *q*, *s*, *u*, ×63.)

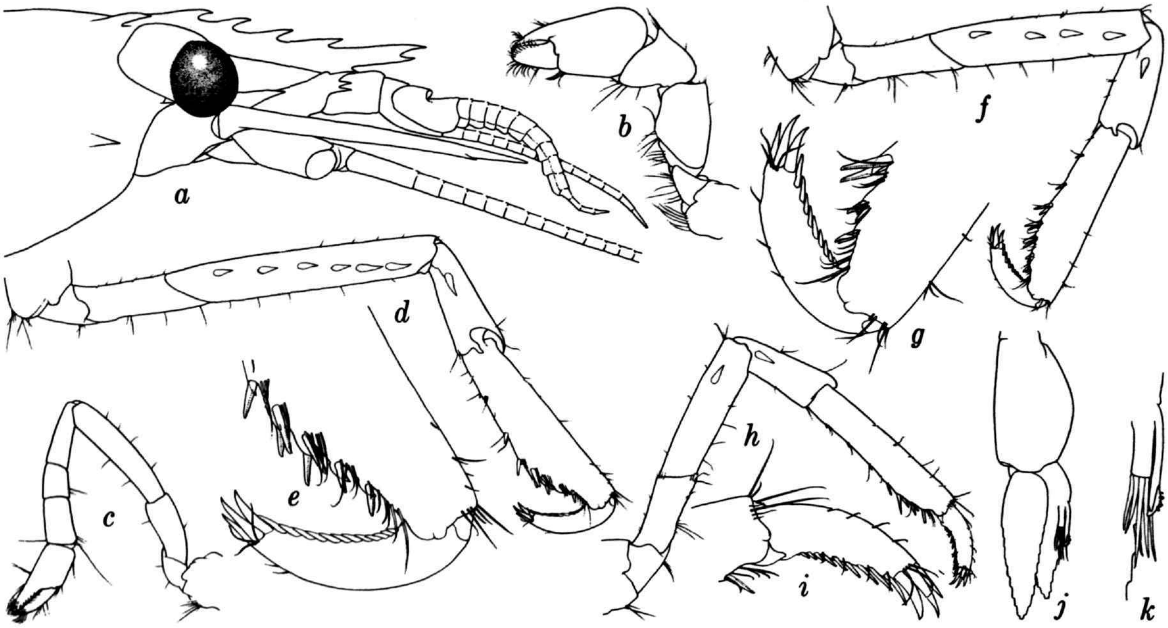


FIGURE 45.—*Hippolyte curacaoensis* Schmitt, male, from Smithsonian-Bredin Station 17–56, carapace length 1.6 mm: *a*, anterior region; *b*, left first pereiopod; *c*, left second pereiopod; *d*, right third pereiopod; *e*, same, dactyl; *f*, right fourth pereiopod; *g*, same, dactyl; *h*, right fifth pereiopod; *i*, same, dactyl; *j*, right second pleopod; *k*, same, appendix masculina and appendix interna. (Magnifications: *a–d, f, h, j*, ×25; *e, g, i, k*, ×63.)

segment unarmed; second and third segments subequal in length.

Antennal scale (Figure 46*h*) overreaching antennular peduncle by about one-fourth of length, about three times as long as broad; lateral margin nearly straight, distal tooth falling short of strongly produced distomesial angle of blade. Antennal peduncle not reaching midlength of scale; basal segment with strong lateral tooth near base of scale.

Mouth parts as figured (Figures 46*i–o*). Mandible with incisor process armed with 4 teeth and much narrower than swollen molar process. Second maxilla with mesial lacinia slightly cleft, scaphognathite broad, subtruncate distally. Third maxilliped reaching to about midlength of antennal scale, exopod reaching little beyond midlength of antepenultimate segment.

First pereiopod (Figures 46*p*, 47*c*) reaching only as far as proximal end of distal segment of antennal peduncle; fingers very broad and armed with stout marginal teeth distally; carpus slightly longer than broad, slightly more than two-thirds as long as subequal chela and merus. Second pereiopod (Figures 46*q*, 47*d*) reaching nearly to distal third of antennal scale; fingers longer than palm, bidentate distally; carpus about half again as long as chela, second joint much shorter than subequal first and third joints; merus slightly shorter than carpus and more than half again as long as ischium. Third pereiopod of female (Figure 46*r*) overreaching antennal scale by length of dactyl; dactyl (Figure 46*s*) tapering to slender, sharp tip, armed with 3 accessory denticles on flexor margin and 1 on extensor margin; propodus nearly three times as long as dactyl, about one and two-thirds times as long as carpus, with subparallel margins converging in distal fourth and armed with 3 slender blunt spines on distal fourth of flexor margin; merus unarmed, slightly longer than propodus and two and one-third times as long as ischium. Third pereiopod of male (Figure 47*e*) prehensile, overreaching antennal scale by dactyl and one-fourth of propodus; dactyl (Figure 47*f*) tapering to slender,

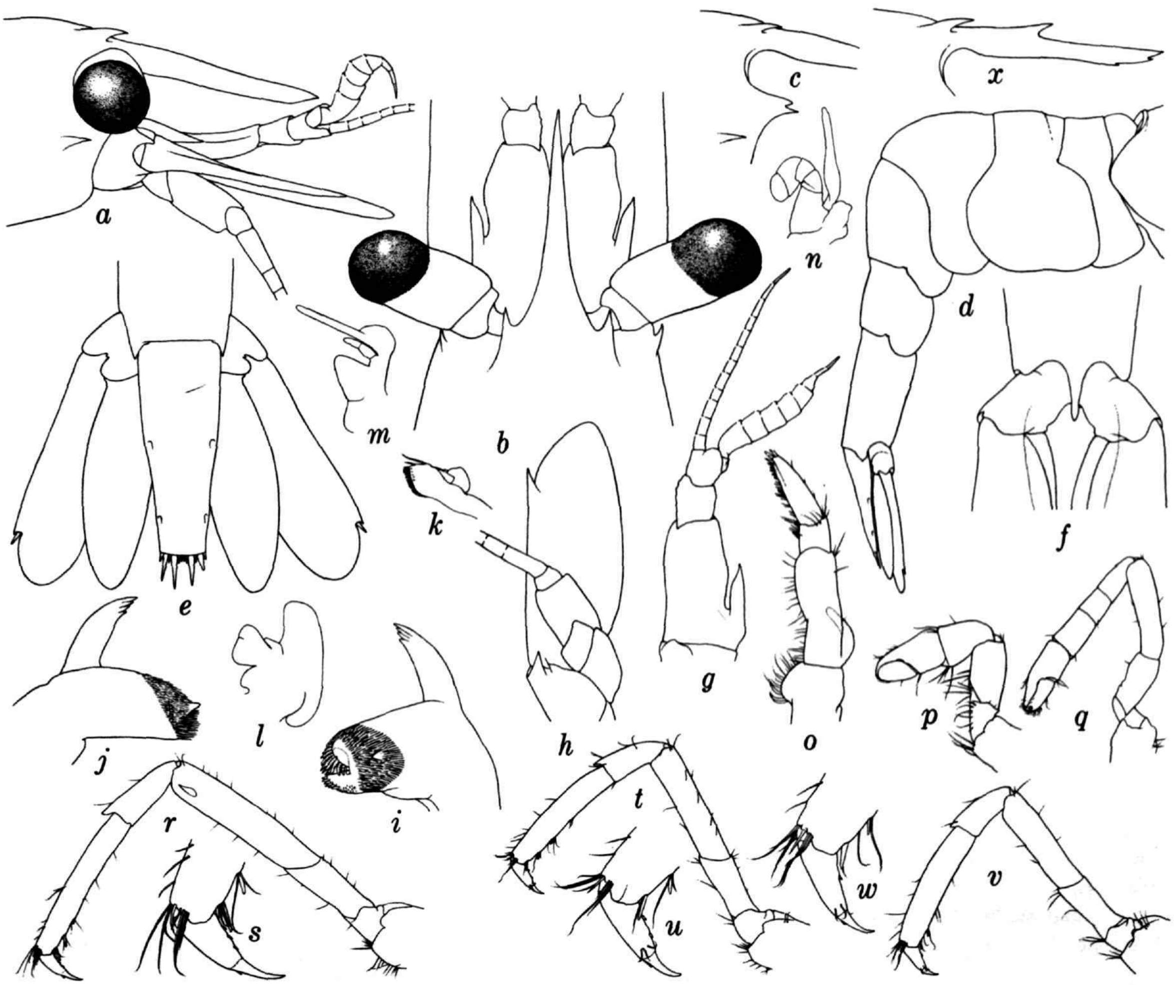


FIGURE 46.—*Hippolyte nicholsoni,* new species. Holotype, ovigerous female, carapace length 1.7 mm: *a,* anterior region, lateral view; *b,* same, dorsal view; *c,* orbital region; *d,* abdomen; *e,* telson and uropods; *f,* posteroventral margin of sixth abdominal somite; *g,* left antennule; *h,* left antenna; *i,* right mandible, anterior aspect; *j,* left mandible, anterior aspect; *k,* left first maxilla, proximal endite missing; *l,* left second maxilla; *m,* left first maxilliped; *n,* left second maxilliped; *o,* left third maxilliped; *p,* left first pereiopod; *q,* left second pereiopod; *r,* left third pereiopod; *s,* same, dactyl; *t,* left fourth pereiopod; *u,* same, dactyl; *v,* left fifth pereiopod; *w,* same, dactyl. Paratype, female, from Smithsonian-Bredin Station 42–59, carapace length 1.8 mm: *x,* rostrum. (Magnifications: *d,* ×12.5; *a–c, e–h, k–r, t, v, x,* ×25; *i, j, s, u, w,* ×63.)

sharp tip, armed with 7 overlapping, scalelike spines on flexor margin; propodus about two and two-thirds times as long as dactyl, slightly less than twice as long as carpus, broadening distally to distal third then narrowing, armed with 4 pairs of strong serrate spines on distal third of flexor margin; merus unarmed, distinctly longer than propodus and about two and two-thirds times as long as ischium. Fourth pereiopod of female (Figure 46*t*) reaching to distal third of antennal scale; dactyl (Figure 46*u*) as in third pereiopod but with only 2 denticles on flexor margin; propodus more than two and one-third times as long as dactyl, about one and two-thirds times as long as carpus, with subparallel margins converging

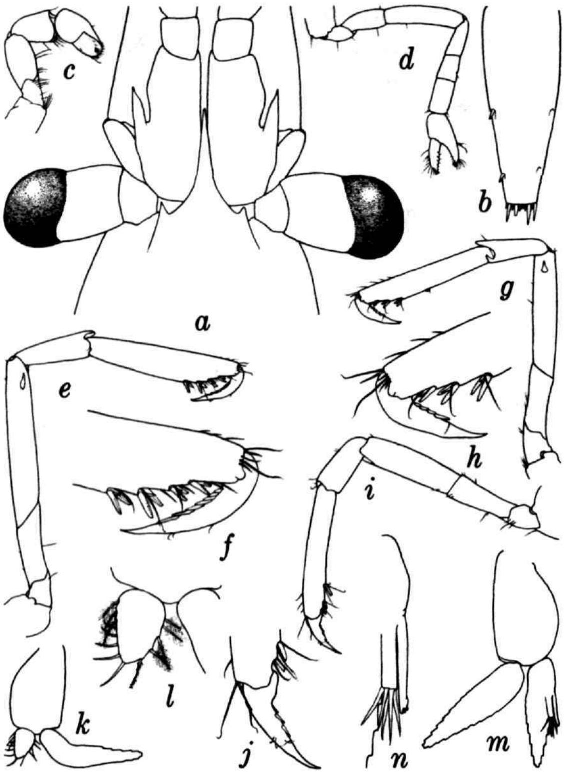


FIGURE 47.—*Hippolyte nicholsoni*, new species, paratype, male, from Smithsonian-Bredin Station 42–59, carapace length 1.2 mm: *a*, anterior region, dorsal view; *b*, telson; *c*, right first pereiopod; *d*, right second pereiopod; *e*, right third pereiopod; *f*, same, dactyl; *g*, left fourth pereiopod; *h*, same, dactyl; *i*, left fifth pereiopod; *j*, same, dactyl; *k*, right first pleopod; *l*, same, endopod; *m*, right second pleopod; *n*, same, appendix masculina and appendix interna. (Magnifications: *a–e*, *g*, *i*, *k*, *m*, ×25; *f*, *h*, *j*, *l*, *n*, ×63.)

distally and armed with 3 slender spines on distal third of flexor margin; merus unarmed, about as long as propodus and about twice as long as ischium. Fourth pereiopod of male (Figure 47*g*) prehensile, reaching distal end of antennal scale; dactyl (Figure 47*h*) as in third pereiopod but with only 4 overlapping, scalelike spines on flexor margin; propodus slightly more than two and one-half times as long as dactyl, about one and four-fifths times as long as carpus, broadening slightly to distal fourth, then narrowing, armed on flexor margin with pair of minute spines near midlength and 3 pairs of larger serrate spines on distal fourth; merus unarmed, subequal to propodus in length and twice as long as ischium. Fifth pereiopod of female (Figure 46*v*) reaching as far as distal end of antennal peduncle; dactyl (Figure 46*w*) as in third and fourth pereiopods but with only 1 denticle on flexor margin; propodus about two and three-fourths times as long as dactyl and carpus, with subparallel margins converging in extreme distal portion and armed there with 2 slender spines on flexor margin; merus unarmed, distinctly shorter than propodus and nearly twice as long as ischium. Fifth pereiopod of male (Figure 47*i*) not noticeably prehensile, reaching to distolateral tooth of antennal scale; dactyl (Figure 47*j*) abruptly narrowing near base, armed with 3 spines on flexor margin; propodus nearly two and one-half times as long as dactyl, fully twice as long as carpus, margins nearly subparallel, converging in distal fourth, armed there with 3 serrated spines on flexor margin; merus unarmed, less than four-fifths as long as propodus and one and one-half times as long as ischium.

Endopod of first pleopod of male (Figures 47*k*, *l*) with 3 plumose setae and 5 spines on mesial margin and 5 plumose setae on lateral margin. Appendix masculina on endopod of second pleopod (Figures 47*m*, *n*) shorter than appendix interna, armed distally with 5 long stout spines. Lateral branch of uropod (Figure 46*e*) with movable spine inserted between distolateral angle and margin of blade.

COLOR.—According to field notes kindly furnished by R. B. Manning, the ovigerous females from Puerto Rico had the carapace clear, with some scattered light-brown chromatophores and sometimes a transverse band of amber green near midlength. Each abdominal somite was clear dorsally, with a posterior band of amber green, the bands on the anterior somites widening ventrally and coalescing on the pleura, the band on the sixth somite covering the posterior third and all of the ventral surface. There was a band across the base of the telson and an obscure transverse band near midlength, with scattered amber-green chromatophores elsewhere. The bases of the anterior appendages were green, as were the entire third maxilliped and first pereiopod. The antennal scale was outlined with a row of green chromatophores, and there was a transverse band of yellow green near midlength. The bases of the second and third pereiopods were green, the distal podomeres clear. The fourth and fifth pereiopods were clear. The uropods matched the telson in having an obscure band near midlength and scattered amber-green chromatophores elsewhere.

The males had the thoracic appendages colored as in the females, but only the third abdominal somite was banded, with a vertical band of amber green.

SIZE.—Males with carapace lengths of 0.7–1.3 mm; females, 0.8–2.1 mm; ovigerous specimens, 1.1–2.1 mm (holotype, 1.7 mm).

HABITAT.—Apparently always associated with gorgonacean octocorals. The species was recorded with certainty from *Pseudopterogoria acerosa* and *P. americana.*

TYPE-LOCALITY.—Milford Bay, between Pigeon Point and Crown Point, Tobago, in 9–12 meters.

DISTRIBUTION.—Puerto Rico, Antigua Island, Saint Lucia Island, and Tobago; to a depth of 12 meters.

REMARKS.—Two of the five females from Tobago have a distinct dorsal tooth on the rostrum, and these same two specimens also have 1 or 2 denticles on the ventral margin; the other three females (two of them ovigerous) from Tobago have the rostrum completely unarmed on both margins. Only one of the four females from Saint Lucia Island has a dorsal tooth on the rostrum, and none of them have denticles on the ventral margin. Of the twenty-five females from Antigua Island, only one has 2 dorsal rostral teeth and three have a single dorsal tooth, but twenty-one have a single ventral denticle, one has 2 ventral denticles, and one has 3 ventral denticles.

The absence of distinct rostral teeth in most of the specimens and the simple dactyls of the 3 posterior pairs of pereiopods distinguish *H. nicholsoni* from all other Atlantic species and suggest a relationship with *H. commensalis* Kemp, 1925, which is associated with alcyonarians and actinians in the Nicobar and Andaman islands. The West Indian species differs noticeably from the Indian Ocean form, however, in having the rostrum narrower, the telson differently armed, the antennal scale narrower, the movable finger of the first cheliped much broader, and the 3 posterior pairs of pereiopods with spines on the flexor margins of the propodus and dactyl.

It is a pleasure to dedicate this species to Desmond V. Nicholson of St. Johns, Antigua Island, not only because he collected most of the specimens on which the description is based but also in recognition of his many other contributions to the success of the first three Smithsonian-Bredin Expeditions. As captain of the *Freelance* in 1956 and 1958 and as a member of the scientific party in 1959 on the *Caribee,* he added innumerable important specimens to the collections through his knowledge of the islands, his experience as a skin diver, and his eye for the unusual animal or association.

185. *Hippolyte pleuracanthus* (Stimpson)

FIGURE 48

Virbius pleuracanthus Stimpson, 1871:127.
Hippolyte pleuracantha.—Williams 1965b:80, fig. 65.

TYPE-LOCALITY.—Norfolk Harbor, Virginia, and Somers Point, Great Egg Harbor, New Jersey.

DISTRIBUTION.—Connecticut to North Carolina.

REMARKS.—See "Remarks" under *H. zostericola.*

*186. *Hippolyte zostericola* (Smith)

FIGURES 49, 50

Virbius zostericola Smith, 1873:550, pl. 3: fig. 11.
Hippolyte zostericola.—Gurney 1936:25, 26, pl. 2: figs. 22–27.
Hippolyte pleuracantha bermudensis Gurney, 1936:27, pl. 1: figs. 4–21.

MATERIAL.—Antigua Island (Sta. 74–56: 1 ovig. ♀).—Carriacou Island (Sta. 15–56: 6♂, 4♀ [1 ovig.]; Sta. 17–56: 18♂, 38♀ [36 ovig.]).—Bahía de la Ascensión (Sta. 66–60: 1 ovig. ♀; Sta. 68–60: 3♂, 1 ovig. ♀; Sta. 69–60: 7♂, 3♀ [2 ovig.]; Sta. 77–60: 1♂, 5 ovig. ♀).

HABITAT.—Most of the specimens were found on turtle-grass flats. (See "Remarks.")

TYPE-LOCALITY.—Vineyard Sound, Massachusetts.

DISTRIBUTION.—Massachusetts, North Carolina to the Yucatan Peninsula, Bermudas to Trinidad and Curaçao; sublittoral.

REMARKS.—There is considerable doubt that *H. zostericola* is distinct from *H. pleuracanthus.* The two forms can be distinguished almost invariably by the length and proportions of the rostrum, but all attempts to find correlated characters were dissipated in a profusion of variability. Numerous females examined from Woods Hole, Massachusetts, have the rostrum considerably overreaching the antennular peduncle, as described in *H. zostericola.* Less extensive material from various localities between Connecticut and North Carolina, on the other hand, have the female rostrum shorter or no longer than

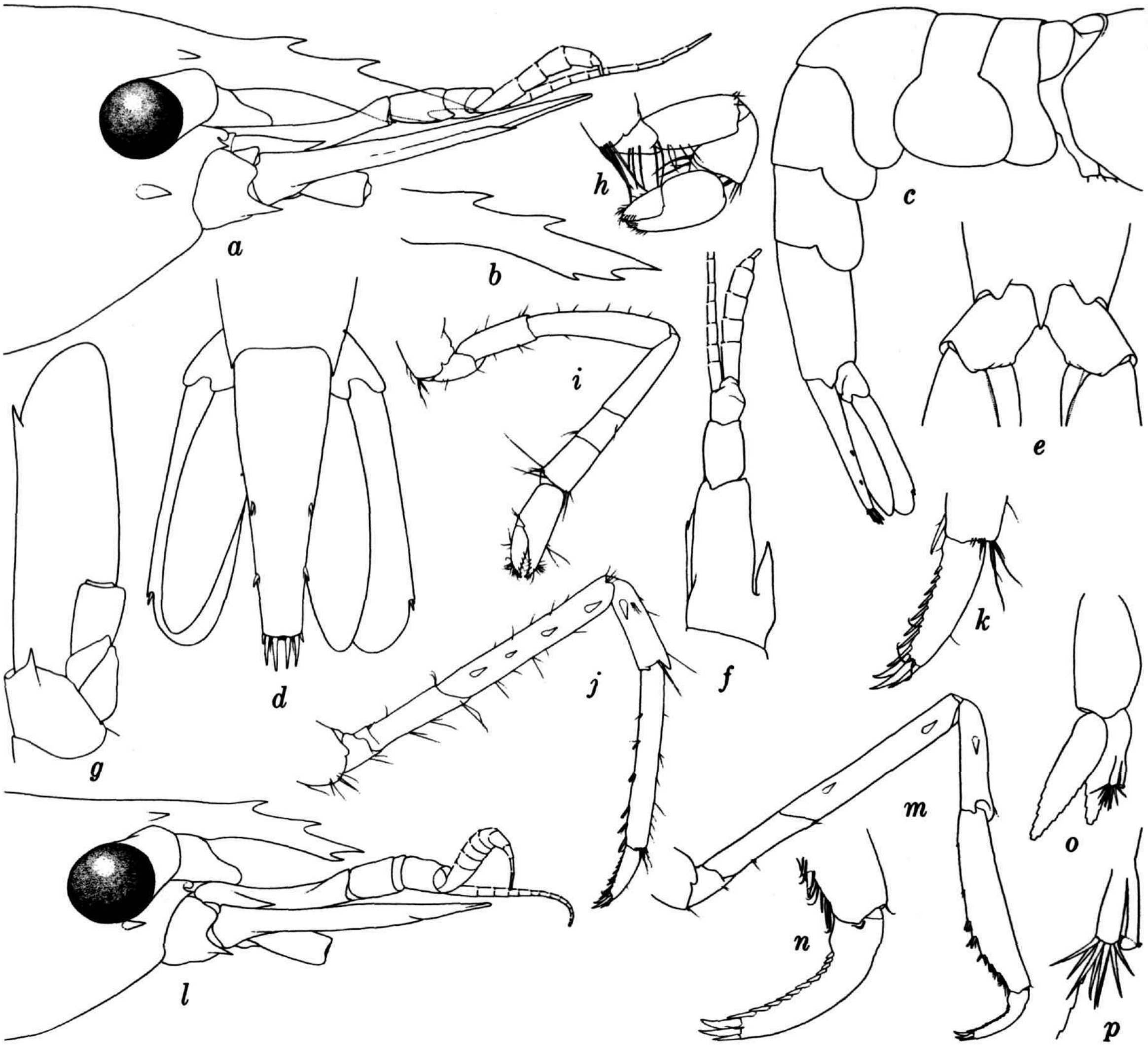


FIGURE 48.—*Hippolyte pleuracanthus* (Stimpson). Female, from Great Egg Harbor, New Jersey (USNM 4408), carapace length 2.1 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen; *d*, telson and uropods; *e*, posteroventral margin of sixth abdominal somite; *f*, right antennule; *g*, right antenna; *h*, right first pereiopod; *i*, right second pereiopod; *j*, right third pereiopod; *k*, same, dactyl. Male, from same lot, carapace length 1.5 mm: *l*, anterior region; *m*, right third pereiopod; *n*, same, dactyl; *o*, right second pleopod; *p*, same, appendix masculina and appendix interna. (Magnifications: *c*, ×12.5; *a*, *b*, *d–j*, *l*, *m*, *o*, ×25; *k*, *n*, *p*, ×63.)

the antennular peduncle, as in typical *H. pleuracanthus*. Most of the adequate series available from the vicinity of Beaufort, North Carolina, are of the latter form, but a few of them could be assigned to *H. zostericola*. Limited material from the east coast of Florida have the rostrum sensibly overreaching the antennular peduncle, but much less markedly so than in extensive samples from the northern and eastern shores of the Gulf of Mexico; in these samples, the rostrum attains its greatest length. The species need

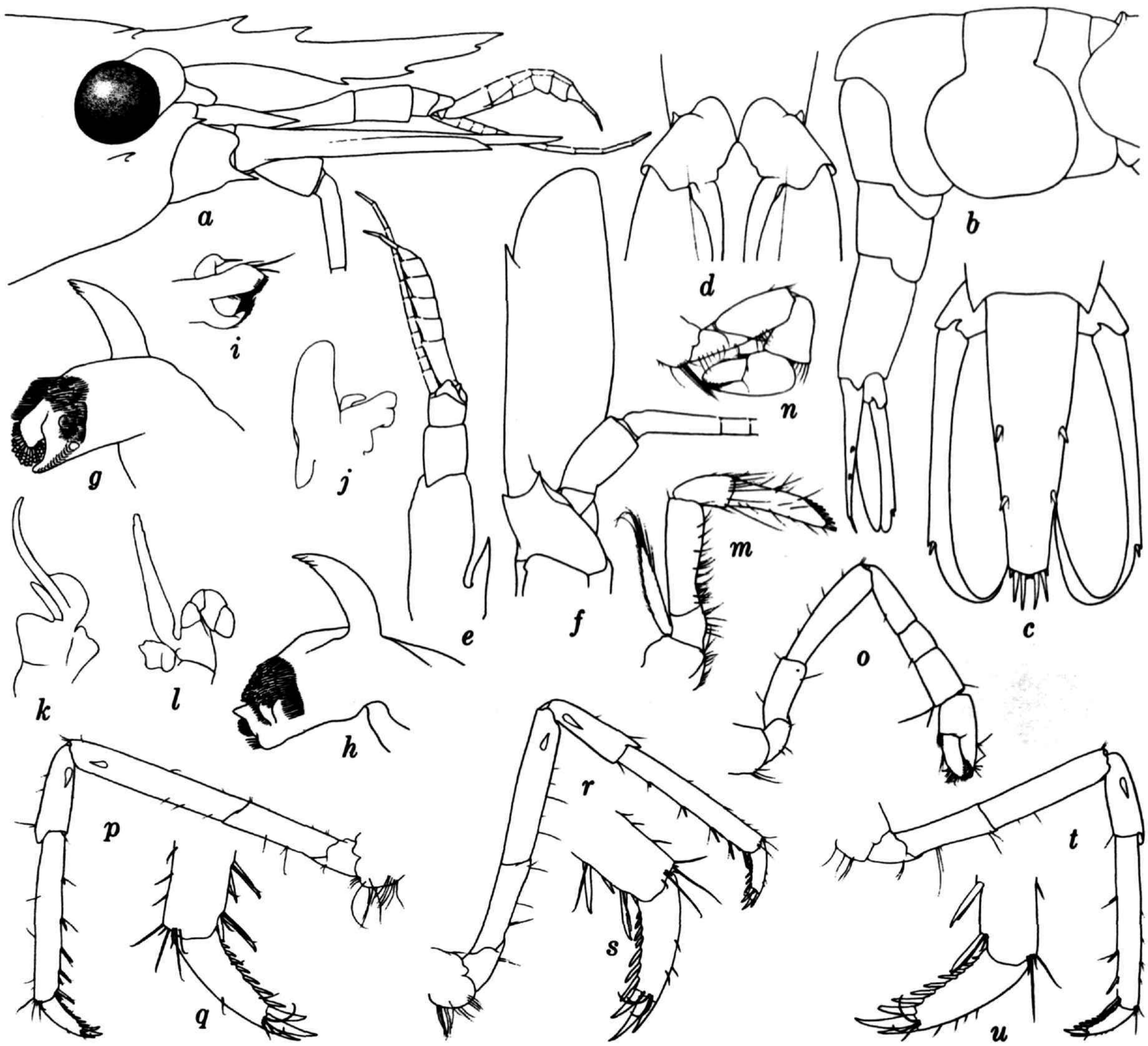
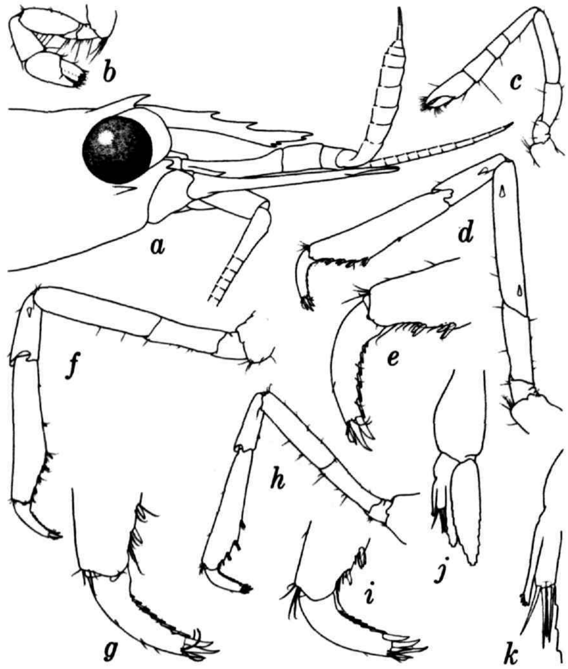


FIGURE 49.—*Hippolyte zostericola* (Smith), ovigerous female, from Smithsonian-Bredin Station 17–56, carapace length 1.8 mm: *a*, anterior region; *b*, abdomen; *c*, telson; *d*, posteroventral margin of sixth abdominal somite; *e*, right antennule; *f*, right antenna; *g*, right mandible, anterior aspect; *h*, left mandible, posterior aspect; *i*, right first maxilla; *j*, right second maxilla; *k*, left first maxilliped; *l*, right second maxilliped; *m*, right third maxilliped; *n*, right first pereiopod; *o*, right second pereiopod; *p*, left third pereiopod; *q*, same, dactyl; *r*, right fourth pereiopod; *s*, same, dactyl; *t*, right fifth pereiopod; *u*, same, dactyl. (Magnifications: *b*, ×12.5; *a*, *c–f*, *i–p*, *r*, *t*, ×25; *g*, *h*, *q*, *s*, *u*, ×63.)



more extensive study, and it seems best to retain the two available names until such investigations are completed.

Although the form described under the name *H. pleuracantha bermudensis* by Gurney (1936) does not have an unusually long rostrum, it appears to be more closely related to *H. zostericola* than to *H. pleuracanthus.*

Hippolyte zostericola and H. curacaoensis seem to have similar habitat preferences, but it may be significant that both species were taken at only one of the ten West Indian stations at which either species was collected. At Station 17–56 on Carriacou Island, one pair of *H. curacaoensis* was found with 56 specimens of *H. zostericola.*

FIGURE 50.—*Hippolyte zostericola* (Smith), male, from Smithsonian-Bredin Station 17–56, carapace length 1.2 mm: *a,* anterior region; *b,* left first pereiopod; *c,* left second pereiopod; *d,* left third pereiopod; *e,* same, dactyl; *f,* left fourth pereiopod; *g,* same, dactyl; *h,* left fifth pereiopod; *i,* same, dactyl; *j,* left second pleopod; *k,* same, appendix interna and appendix masculina. (Magnifications: *a–d, f, h, j,* ×25; *e, g, i, k,* ×63.)

*Genus *Latreutes* Stimpson, 1860

Key to Atlantic Species

1. Rostrum distally acute, usually unarmed except for single dorsal tooth on carapace slightly posterior to orbital margin; dactyls of 3 posterior pereiopods simple, not biunguiculate and without accessory spinules on flexor margin .... *188. ***L. inermis***
   Rostrum distally subtruncate and spinulose; dactyls of 3 posterior pereiopods biunguiculate and armed with accessory spinules on flexor margins 2
2. Single sharp tooth in dorsal midline of carapace posterior to orbital margin; antennal scale with blade tapering regularly to sharp distal spine .... *187. ***L. fucorum***
   Series of spaced spines in dorsal midline of anterior third of carapace and proximal third of rostrum; antennal scale with blade broadly rounded distally .... *189. ***L. parvulus***

*187. *Latreutes fucorum* (Fabricius)

Palaemon fucorum Fabricius, 1798:404.
Latreutes fucorum.—Sivertsen and Holthuis 1956:31, pl. 1: figs. 1, 2 (color).—Williams 1965b:78, fig. 63.

MATERIAL.—Norman Island (Sta. 35–58: 1♂).—Between Tortola and Guana Island (Sta. 7–58: 18♂, 23♀ [11 ovig., 1♂, 1♀ with branchial bopyrids]).—Barbuda (Sta. 98–59: 2♂, 5♀ [3 ovig.], 3?; Sta. 102–59: 9♂, 22♀ [8 ovig.]; Sta. 102a–59: 2 juv.; Sta. 103–59: 1♀).—Nevis (Sta. 67–58: 1♀).—Antigua Island (Sta. 104–59: 2♂; Sta. ?–59: 1♂).—Guadeloupe (Sta. 68–56: 1♂, 2 ovig. ♀, 1?).—Carriacou Island (Sta. 17–56: 1♂, 2 ovig. ♀).—Bahía de la Ascensión (Sta. 87–60: 1 juv.).

HABITAT.—Although this species is almost invariably associated with the *Sargassum* community in the open sea and is often believed to be restricted to that habitat, it is common on grass flats in the tropical western Atlantic, as indicated by the fact that all but one of the lots taken by the Smithsonian-Bredin Expeditions apparently occurred in such an environment.

TYPE-LOCALITY.—Floating gulfweed.

DISTRIBUTION.—Western North Atlantic between latitudes 10° and 50°N; Azores and Cape Verde Islands; pelagic and sublittoral.

*188. *Latreutes inermis*, new species

FIGURES 51, 52

MATERIAL.—Virgin Gorda (Sta. 112–56: 1 ♀).—Antigua Island (Sta. 113–59: 1 ♀).—Dominica (Sta. 62–56: 1 ovig. ♀).—Saint Lucia Island (Sta. 52–59: 2 ♀, 1? [1 ovig. female without eggs is holotype, USNM 135382]).—Tobago (Sta. 42–59: 1 ♀).

Following the 1959 Expedition, Desmond B. Nicholson collected two lots of this species at Antigua Island, one lot at Black's Point, Falmouth, on *Pseudopterogorgia americana* in 2 meters, 24 May 1959: 5 ♂, 4 ♀, 1?, and one lot at Hammond's Dock, Nonsuch Bay, on *Pseudopterogorgia acerosa* in 2 feet, 25 May 1959: 1 ♂, 2 ♀, 3?

I have also seen an additional specimen collected by Raymond B. Manning at La Gata Island, La Parguera, Puerto Rico, on an alcyonarian, 25 June 1961: 1 ♂.

DESCRIPTION.—Rostrum (Figures 51*a, b*, 52*a, b*) subtriangular, nearly as long as carapace, overreaching antennal scale, inclined slightly ventrad, about one-third as deep as long; dorsal margin faintly convex for most of length in females, usually faintly concave in males, unarmed except for single prominent tooth on carapace slightly posterior to orbital margin (rarely with small tooth about one-fifth of length from tip); ventral margin convex, unarmed; sharp lateral carina near dorsal margin ending before reaching median third of rostrum. Small spine superimposed on, and directed anterodorsad from, subquadrate lobe delimiting ventral angle of orbit. Branchiostegal margin of carapace armed with 1–4 spines (rarely none on one side).

All abdominal pleura broadly rounded (Figure 51*c*). Sixth somite about one and one-half times as long as fifth and about four-fifths as long as telson, posterior margin (Figure 51*e*) prolonged ventrally in narrow distally rounded projection directed posteriorly between bases of uropods. Dorsolateral spines of telson inconspicuous, both pairs situated in posterior half of segment (Figure 51*d*); distal margin prolonged mesially into cuneiform projection flanked by 2 pairs of movable spines, mesial pair fully twice as large as lateral pair.

Eyes (Figures 51*f, g*) with cornea set obliquely on stalk; stalk bearing prominent rounded lobe and sharp spine on mesial portion of distal margin, lobe more prominent in females than in males.

Antennular peduncle (Figure 51*h*) with stylocerite broad and rounded, not acuminate; distal margin of basal segment armed with single dorsolateral spine and with small tooth on ventral margin; second and third segments subequal in length.

Antennal scale (Figure 51*i*) overreaching antennular peduncle by about one-third of length, nearly five times as long as broad; lateral margin very faintly convex, distal tooth strong, extending for full length beyond barely distinguishable distal margin of narrowly tapered blade. Antennal peduncle not reaching end of basal third of scale; basal segment with strong ventrolateral tooth near base of scale.

Mouth parts as figured (Figures 51*j-p*). Mandible without incisor process or palp. Second maxilla with mesial lacinia slightly cleft in extreme distal portion, scaphognathite broad, obliquely subtruncate distally. Third maxilliped reaching end of basal third of distal segment of antennal peduncle, exopod reaching distal third of antepenulatimate segment.

Large epipods on 3 anterior pairs of pereiopods. First pereiopod (Figure 51*q*) barely overreaching branchiostegal margin of carapace; palm slightly longer than carpus and slightly shorter than merus. Second pereiopod (Figure 51*r*) reaching slightly beyond base of distal segment of antennal peduncle; finger subequal in length to palm; carpus about one and three-fourths times as long as chela, second joint longer than subequal first and third joints; merus slightly shorter than 2 proximal joints of carpus and about half again as long as ischium. Third pereiopod (Figures 51*s*, 52*c*) reaching nearly to mesial third of antennal scale; dactyl (Figures 51*t*, 52*d*) unarmed, tapering to slender, sharp tip; propodus more than two and one-half times as long as dactyl, less than one and one-half times as long as carpus, with unarmed subparallel margins; merus nearly one and one-half times as long as propodus and more than three and one-half times as long as ischium, armed with stout lateral spine near distal margin. Fourth pereiopod (Figure 51*u*) barely overreaching base of distal segment of antennal peduncle; dactyl (Figure 51*v*) like than of third pereiopod; propodus more than two and one-third times as long as dactyl, more than one and one-third times as long as carpus, with unarmed subparallel margins; merus slightly longer than propodus and more than three times as

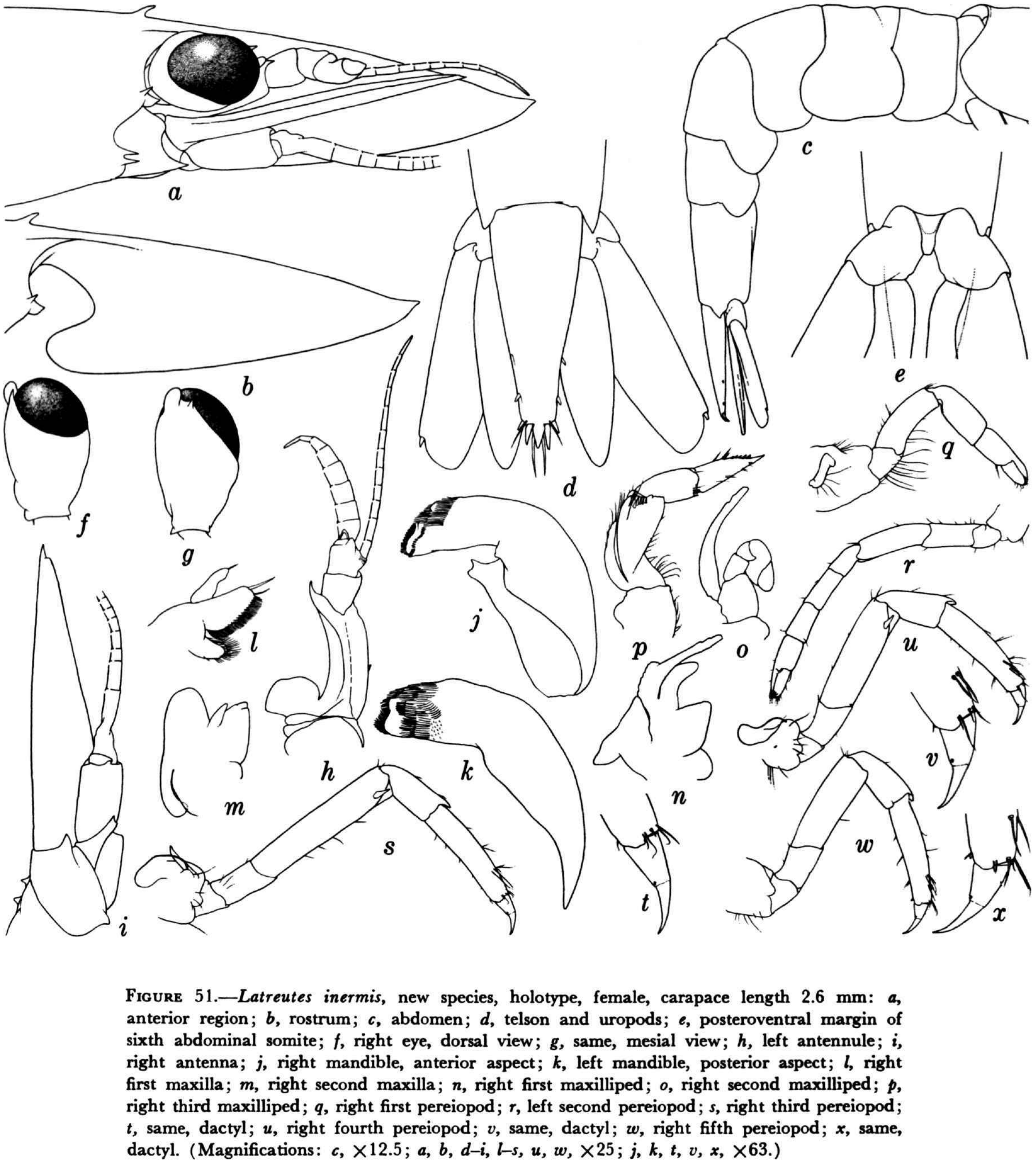


FIGURE 51.—*Latreutes inermis*, new species, holotype, female, carapace length 2.6 mm: ***a***, anterior region; ***b***, rostrum; ***c***, abdomen; ***d***, telson and uropods; ***e***, posteroventral margin of sixth abdominal somite; ***f***, right eye, dorsal view; ***g***, same, mesial view; ***h***, left antennule; ***i***, right antenna; ***j***, right mandible, anterior aspect; ***k***, left mandible, posterior aspect; ***l***, right first maxilla; ***m***, right second maxilla; ***n***, right first maxilliped; ***o***, right second maxilliped; ***p***, right third maxilliped; ***q***, right first pereiopod; ***r***, left second pereiopod; ***s***, right third pereiopod; ***t***, same, dactyl; ***u***, right fourth pereiopod; ***v***, same, dactyl; ***w***, right fifth pereiopod; ***x***, same, dactyl. (Magnifications: ***c***, ×12.5; ***a***, ***b***, ***d–i***, ***l–s***, ***u***, ***w***, ×25; ***j***, ***k***, ***t***, ***v***, ***x***, ×63.)

long as ischium, armed with stout lateral spine near distal margin. Fifth pereiopod (Figure 51*w*) reaching branchiostegal margin of carapace; dactyl (Figure 51*x*) like those of 2 preceding pereiopods; propodus slightly more than two and one-half times as long as dactyl, more than one and one-third times as long as carpus, with unarmed subparallel margins, except for minute spine at distal end of flexor margin;

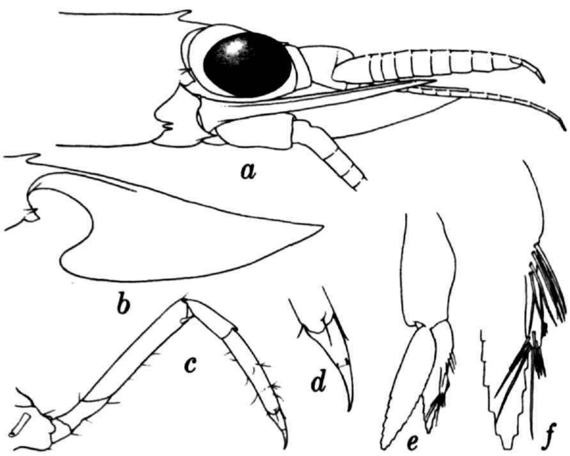


FIGURE 52.—*Latreutes inermis*, new species, paratype, male from Black's Point, Falmouth, Antigua Island, carapace length 1.7 mm: *a*, anterior region; *b*, rostrum; *c*, right third pereiopod; *d*, same, dactyl; *e*, right second pleopod; *f*, same, appendix masculina. (Magnifications: *a–c*, *e*, ×25; *d*, *f*, ×63.)

merus unarmed, barely longer than propodus and nearly three and one-third times as long as ischium. Three posterior periopods of males more slender than those of females but with similar podomere relationships.

Appendix masculina on endopod of second pleopod of male (Figures 52*e*, *f*) longer than appendix interna, with 7 long spines in proximal half and 8 distal spines of varying length. Lateral branch of uropod (Figure 51*d*) with inconspicuous movable spine but without acute angle at distal end of lateral margin.

COLOR.—According to the collector, the male specimen from Puerto Rico had the body generally transparent, dotted with scattered light-blue chromatophores, which formed no regular pattern.

SIZE.—Males with carapace lengths of 1.3–1.8 mm; females, 1.1–3.1 mm (holotype, 2.6 mm); ovigerous specimens, 2.9 and 3.1 mm.

HABITAT.—Probably always associated with gorgonacean octocorals. The species was recorded with certainty from *Pseudopterogorgia acerosa* and *P. americana*.

TYPE-LOCALITY.—Reef just south of Marigot Harbour, Saint Lucia Island, in 3½–5½ meters.

DISTRIBUTION.—Puerto Rico and Virgin Islands to Tobago; to a depth of 12 meters.

REMARKS.—In the general form of the rostrum and the absence of accessory spines on the dactyls of the 3 posterior pereiopods, this species displays a superficial similarity to *L. anoplonyx* Kemp, 1914, from Bombay, India. It differs from that species, however, in having the rostral margins unarmed rather than serrate, the branchiostegal margin of the carapace armed with no more than 4 rather than 11 spines, and the dorsolateral spines of the telson apparently distributed differently. Also, the dorsal tooth on the carapace is situated farther anteriorly in the West Indian species.

The name (inermis, L., = unarmed) was suggested by the unarmed rostrum and posterior pereiopods.

*189. *Latreutes parvulus* (Stimpson)

Rhynchocyclus parvulus Stimpson, 1866:48.
Latreutes parvulus.—Williams 1965b:79, fig. 64.

MATERIAL.—Bahía del Espíritu Santo (Sta. 41–60: 1♀).

HABITAT.—The single specimen was presumably taken from eroded dead coral.

TYPE-LOCALITY.—St. Joseph Island, Teaxs.

DISTRIBUTION.—North Carolina to Rio de Janeiro, Brazil; West Africa; to a depth of 44 meters.

REMARKS.—The single specimen in the Smithsonian-Bredin collections has the rostrum unusually slender and sparsely dentate.

*Genus *Lysmata* Risso, 1816

The presence or absence of an accessory branch on the dorsolateral flagellum of the antennule—the only feature distinguishing *Lysmata* from *Hippolysmata* Stimpson, 1860—is a variable character. Examination of material in the national collections suggests that some specimens of all species that have been assigned to *Hippolysmata*—even the type-species, *H. vittata* Stimpson, 1860—may bear a vestige of an accessory flagellum. In discussing this character, Kemp (1914:112) noted the possibility "that further investigation will reveal such a degree of gradation that two distinct genera can no longer be recognized, and in this case all the species must take rank under *Lysmata*." That time now seems to have come, and *Hippolysmata* is herein treated as a junior synonym of *Lysmata*.

Key to Western Atlantic Species

1. Antennal scale distinctly overreaching antennular peduncle (Exopod of third maxilliped reaching to, or beyond, midlength of antepenultimate segment.) 2
   Antennal scale overreaching antennular peduncle slightly, if at all. (Accessory branch of dorsolateral antennular flagellum absent or vestigial.) 5

2.(1) Antennal tooth fused with ventral angle of orbit; stylocerite reaching nearly to, or beyond, distal margin of basal segment of antennular peduncle; accessory branch of dorsolateral antennular flagellum well developed 3
   Antennal tooth distinct from depressed and obscure ventral angle of orbit; stylocerite falling far short of distal margin of basal antennular segment; accessory branch of dorsolateral antennular flagellum vestigial or absent 4

3.(2) Two to 4 teeth of dorsal rostral series situated on carapace posterior to level of orbital margin; carapace with pterygostomian tooth on anteroventral margin; antennal scale more than four times as long as wide, distal tooth distinctly overreaching distal margin of blade; carpus of second pereiopod composed of 28–30 articles. *192. ***L. intermedia***
   Only 1 tooth of dorsal rostral series situated on carapace; carapace with anteroventral margin rounded, unarmed; antennal scale little more than three times as long as wide, distal tooth not overreaching distal margin of blade; carpus of second pereiopod composed of about 17 articles .... 193. ***L. moorei***

4.(2) Rostrum usually reaching as far as, or beyond, end of antennular peduncle; antennal scale five times as long as wide .... 194. ***L. rathbunae***
   Rostrum reaching not much, if at all, beyond second segment of antennular peduncle; antennal scale less than four times as long as wide .... *195. ***L. wurdemanni***

5.(1) Rostrum with at most 1 ventral tooth; antennal tooth fused with ventral angle of orbit; carapace with anteroventral margin rounded, unarmed; stylocerite nearly reaching distal margin of basal segment of antennular peduncle; distal tooth of antennal scale not overreaching distal margin of blade; exopod of third maxilliped not nearly reaching midlength of antepenultimate segment; carpus of second pereiopod composed of 13–15 articles .... *190. ***L. anchisteus***
   Rostrum with 4–6 ventral teeth; antennal tooth distinct from depressed and obscure ventral angle of orbit; carapace with petrygostomian tooth on anteroventral margin; stylocerite falling far short of distal margin of basal antennular segment; distal tooth of antennal scale distinctly overreaching distal margin of blade; exopod of third maxilliped reaching at least to midlength of antepenultimate segment; carpus of second pereiopod composed of 17–23 articles .... 191. ***L. grabhami***

*190. *Lysmata anchisteus*, new species

FIGURES 53, 54

MATERIAL.—Antigua Island (Sta. 75–56: 3♂, 2♀, 2 juv., 1?—Grenada (Sta. 4–56: 1♂; Sta. 6–56: 2♂ [1 is holotype, USNM 135387]).

There are two additional lots of this species in the national collections: Playa del Maní, Añasco, Puerto Rico, 24 March 1939, J. A. Rivero: 2 ovig. ♀; cave on east side of Europa Bay, Saint John, Virgin Islands, 4–10 feet, 16 February 1959, Randall and Kumpf, Sta. 34: 1♀.

DESCRIPTION.—Rostrum (Figures 53*a*, *b*) directed slightly ventrad, upturned near tip, reaching barely as far as, or very slightly beyond, distal margin of basal segment of antennular peduncle; dorsal margin armed with 5 or 6 strong teeth, posteriormost situated on carapace, widely and deeply separated from rest of series;. ventral margin armed with single small tooth near tip (unarmed in one female); lateral carina sharp, situated near ventral margin of rostrum and fusing with posterior margin of orbit. Carapace without dorsal carina. Antennal tooth sharp, not separated from ventral angle of orbit. Anteroventral margin of carapace rounded, unarmed.

Pleura of first 4 abdominal somites rounded (Figure 53*c*), that of fifth sharply acute; sixth somite armed with sharply buttressed posteroventral tooth. Sixth somite one and one-half times as long as fifth, three-fifths as long as telson not including terminal spines; median posteroventral projection between bases of uropods short, rounded, and inconspicuous. Dorsal spines of telson (Figure 53*d*) prominent, anterior pair situated near end of basal third of segment, posterior pair about equidistant from anterior pair and from distal margin of telson; distal margin

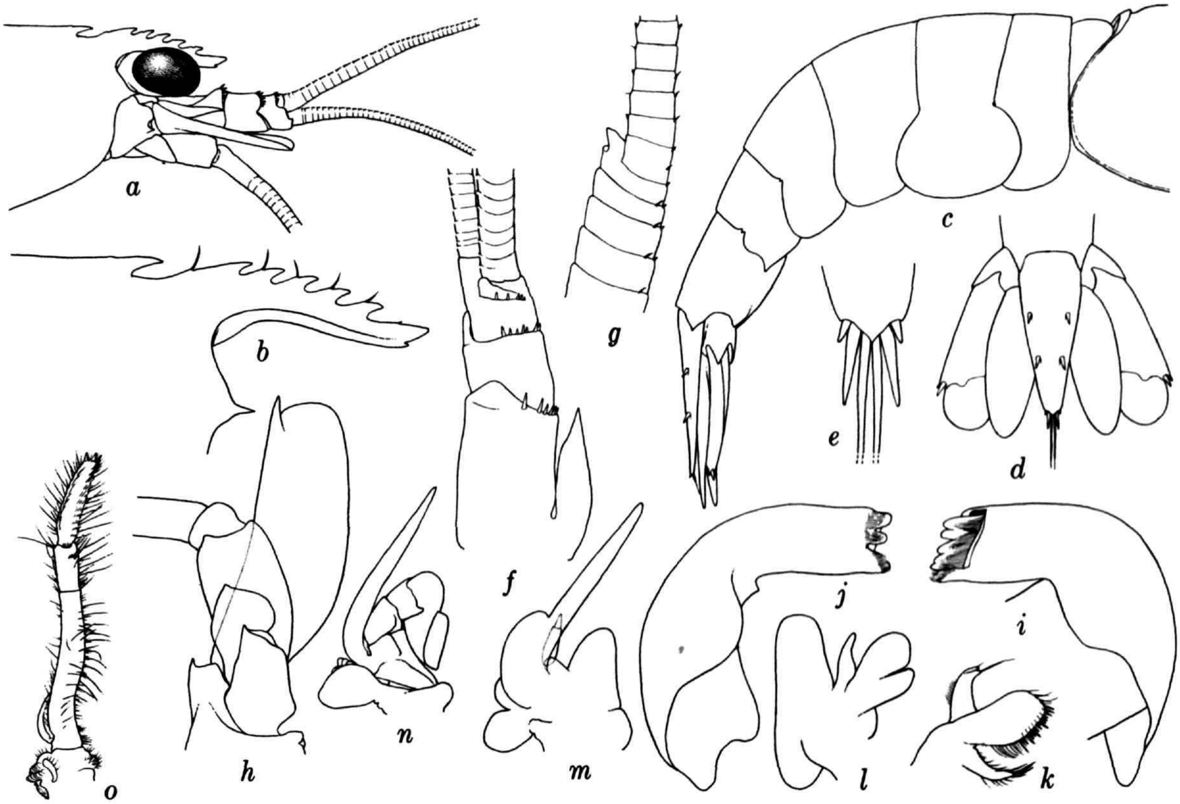


FIGURE 53.—*Lysmata anchisteus*, new species, holotype, male, carapace length 4.8 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen; *d*, telson and uropods; *e*, end of telson; *f*, right antennule; *g*, same, junction of setiferous and nonsetiferous portions of dorsolateral flagellum; *h*, right antenna; *i*, right mandible, anterior aspect; *j*, left mandible, anterior aspect; *k*, right first maxilla; *l*, right second maxilla; *m*, right first maxilliped; *n*, right second maxilliped; *o*, right third maxilliped. (Magnifications: *a, c, d, o*, ×7.5; *b, f, h, k–n*, ×15.5; *e, g, i, j*, ×31.)

(Figure 53*e*) acute mesially, armed with 2 pairs of spines separated by mesial pair of long, basally thickened setae, lateral pair of spines much smaller than dorsal spines and directed somewhat dorsad.

Eyes short and stout, cornea longer and broader than stalk.

Antennular peduncle (Figure 53*f*) with stylocerite tapering to sharp tip reaching about as far as distal margin of basal segment, margins not denticulate; each antennular segment armed with row of spinules near dorsolateral portion of distal margin; small tooth at proximal end of distal third of ventral surface of basal segment near mesial margin. Antennular flagella subequal, about three and one-fourth times as long as carapace; dorsolateral flagellum with 7–20 thickened, setigerous articles, distal article subacutely produced to form vestige of accessory flagellum (Figure 53*g*).

Antennal scale (Figure 53*h*) relatively small, not reaching much, if at all, beyond antennular peduncle, about three times as long as broad; lateral margin concave, especially near midlength, distal tooth strong, barely overreaching subtruncate distal margin of blade. Antennal peduncle proportionately massive, reaching fully as far as midlength of scale; basal segment with sharp marginal tooth ventral to base of scale.

Mouth parts as figured (Figures 53*i–o*). Mandibles unequal but subsimilar, right more complex than left. Third maxilliped overreaching antennal scale by half of distal segment; exopod short, not nearly reaching midlength of antepenultimate segment.

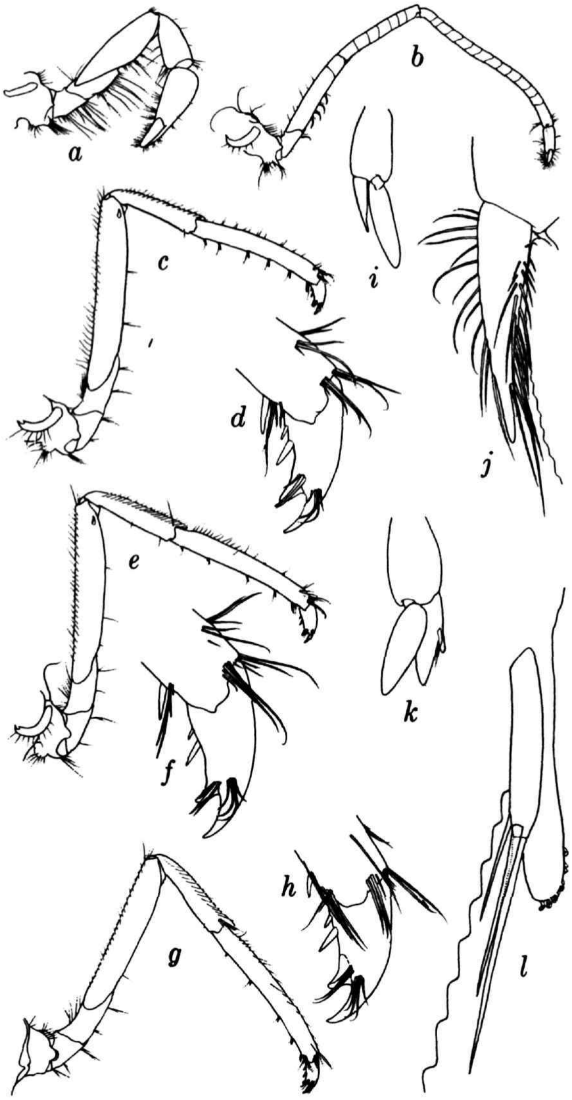


FIGURE 54.—*Lysmata anchisteus*, new species, holotype, male, carapace length 4.8 mm: *a*, right first pereiopod; *b*, right second pereiopod; *c*, right third pereiopod; *d*, same, dactyl; *e*, right fourth pereiopod; *f*, same, dactyl; *g*, right fifth pereiopod; *h*, same, dactyl; *i*, right first pleopod; *j*, same, endopod; *k*, right second pleopod; *l*, same, appendix masculina and appendix interna. (Magnifications: *a–c, e, g, i, k*, ×7.5; *d, f, h, j*, ×31; *l*, ×78.)

Four anterior pereiopods with well-developed epipods. First pereiopod (Figure 54*a*) slightly overreaching antennal peduncle; fingers little more than half as long as palm, movable finger bidentate distally; carpus subequal in length to palm, much shorter than merus; ischium unarmed. Second pereiopod (Figure 54*b*) overreaching antennal scale by length of chela and one-fourth of carpus; carpus nearly twice as long as merus, composed of 14 (rarely 13 or 15) articles; merus subequal to ischium in length, composed of 7 articles; ischium with 1 or 2 articulations near distal end. Third pereiopod (Figure 54*c*) overreaching antennal scale by length of dactyl and two-thirds of propodus; dactyl (Figure 54*d*) terminating distally in long spinelike tooth continuous with extensor margin and stouter, blunter tooth on flexor side, with movable spinules on flexor margin; propodus about three times as long as dactyl, armed with 6 movable spinules on flexor margin; carpus about four-fifths as long as propodus; merus not much less than twice as long as carpus, bearing single subdistal spine on lateral surface. Fourth pereiopod (Figures 54*e, f*) similar to, but slightly longer than, third, overreaching antennal scale by length of dactyl and nearly half of propodus. Fifth pereiopod (Figure 54*g*) slightly longer than fourth, overreaching antennal scale by length of dactyl and one-fifth of propodus; dactyl (Figure 54*h*) as in third and fourth pereiopods; propodus more than three and one-half times as long as dactyl, armed with 5 movable spinules and distal fringe of setae on flexor margin; carpus less than three-fourths as long as propodus; merus less than one and one-half times as long as carpus, without spine on lateral surface.

Endopod of first pleopod of male (Figures 54*i, j*) about half as long as exopod, tapering to slender, unadorned end piece. Appendix masculina on endopod of second pleopod (Figures 54*k, l*) shorter than appendix interna, armed with 3 long distal spines, terminal spine longer than appendix. Lateral branch of uropod (Figure 53*d*) armed with 2 fixed teeth flanking movable spine at distal end of lateral margin.

SIZE.—Males with carapace lengths of 2.7–5.2 mm (holotype, 4.8 mm); females 2.7–7.3 mm; ovigerous specimens, 6.0–7.0 mm.

HABITAT.—This species was found both along a rocky shore and on a mud bottom.

TYPE-LOCALITY.—Point Saline, Grenada.

DISTRIBUTION.—Puerto Rico to Grenada; in depths of less than 3 meters.

REMARKS.—As suggested by the name (anchisteus, G. = next of kin), this species is very similar to *L. uncicornis* Holthuis and Maurin, 1952, from Morocco. It seems to differ from that species in the following characters: The rostrum is shorter, reaching at most only slightly beyond the distal end of the basal antennular segment, rather than to the midlength of the second segment. The rostral formula is 1 + 4–5/1 rather than 2 + 4–5/2–3. The setose portion of the dorsolateral antennular flagellum is composed of 7–20, rather than 31–45, articles. The antennal scale has the lateral margin distinctly concave, rather than nearly straight, and the mesial margin of the blade straight or convex distally, rather than concave. The second pereiopod has the carpus composed of only 13–15 articles, rather than 19–28, and the merus has 7, rather than 11–14, subdivisions. The 3 posterior pairs of pereiopods have the dactyls armed with 2, rather than 3, movable spinules on the flexor margin, and the propodus and carpus are not minutely spinulous as in *L. uncicornis*. The third and fourth pereiopods have the carpus considerably, rather than a little, shorter than the propodus, and the merus is armed with 1, rather than 4–6, movable spines on the lateral surface. The fifth pereiopod has the merus unarmed laterally, rather than armed with 3 or 4 movable spines. Although the largest West Indian specimens are not much more than half as large as those from Morocco, it is unlikely that many of the differences indicated above are correlated with size. The number of setigerous articles in the basal portion of the dorsolateral antennular flagellum does increase with growth, but all of the other characters mentioned seem to be remarkably constant in the series examined; for example, the number of articulations in the carpus of the second pereiopod is nearly always 14, regardless of size.

191. *Lysmata grabhami* (Gordon), new combination

Hippolysmata grabhami Gordon, 1935:319, figs. 10, 11.
Hippolysmata (Hippolysmata) grabhami.—Limbaugh, Pederson, and Chace 1961:247, fig. 5.

MATERIAL.—This species is not represented in the Smithsonian-Bredin collections proper. As a consequence of the 1959 expedition, however, the following specimen was received from Desmond V. Nicholson from Exchange Bay, Antigua Island, associated with *Stoichactis helianthus*, 25 May 1959: 1♂.

TYPE-LOCALITY.—Funchal, Madeira.

DISTRIBUTION.—Northeastern Gulf of Mexico, Florida Keys, Bahamas, and Lesser Antilles; Madeira; Hawaii and Society Islands; to a depth of 55 meters.

*192. *Lysmata intermedia* (Kingsley)

Hippolysmata intermedia Kingsley, 1878a:90.
Lysmata intermedia.—Sivertsen 1933:5, pl. 2: figs. 9–15.

MATERIAL.—Tortola (Sta. 117–56: 10♂, 4♀ [2 ovig.]; Sta. 5–58: 1♂; Sta. 23–58: 4♂, 1 ovig. ♀). —Guana Island (Sta. 9–58: 24♂, 9♀ [7 ovig.]).—Virgin Gorda (Sta. 111–56: 3♂, 4♀ [3 ovig.]; Sta. 112–56: 2♂, 2 ovig. ♀; Sta. 10–58: 2♂; Sta. 37, 38, 39–58: 2♂, 1 ovig. ♀).—Barbuda (Sta. 85–56: 1♀; Sta. 102–59: 1♂).—Saint Christopher (Sta. 103–56: 1♂, 1 ovig ♀).—Antigua Island (Sta. 73–56: 1♂; Sta. 77–56: 1 ovig. ♀; Sta. ?–59: 1♂).—Tobago (Sta. 8–59: 1♂, 1 ovig. ♀).—Bahía de la Ascensión (Sta. 52–60: 2♂; Sta. 77–60: 1♂, 1 juv.).

HABITAT.—Most of the specimens were found on grass flats studded with *Porites* and *Pocillopora,* but some were associated with algae on rocky shores and a few with reef corals.

TYPE-LOCALITY.—Dry Tortugas, Florida.

DISTRIBUTION.—Florida Keys to Tobago and Curaçao; Azores; Galapagos Islands; to a depth of 22 meters.

193. *Lysmata moorei* (Rathbun)

Hippolysmata moorei Rathbun, 1901:115, fig. 23.
Lysmata moorei.—Schmitt 1935:154, fig. 20.

TYPE-LOCALITY.—Playa de Ponce, Puerto Rico.

DISTRIBUTION.—In addition to the type-series, there are four specimens in the national collections, from such widely separated localities as Puerto Rico, Isla de Providencia, and Estado da Paraíba, Brazil. It is also known from Ascension Island and Gabon, West Africa.

REMARKS.—The Brazilian specimen referred to above was recorded as *Hippolysmata wurdemanni* by Rathbun (1900:153).

194. *Lysmata rathbunae* Chace

Lysmata rathbunae Chace, 1970:59, figs. 1–4.

TYPE-LOCALITY.—Off Boynton Beach, Florida, 26°31′N, 80°01′W; in 55–64 meters.

DISTRIBUTION.—Eastern Florida to Yucatan; in 37–119 meters.

*195. *Lysmata wurdemanni* (Gibbes), new combination

Hippolyte Wurdemanni Gibbes, 1850:197.
Hippolysmata (Hippolysmata) wurdemanni.—Williams 1965b:84, fig. 68.

MATERIAL.—Bahía de la Ascensión (Sta. 7[illegible]): 1 ovig. ♀, 1 juv.; Sta. 85–60: 1♂, 1 juv.; Sta. 95–60: 1♂).

HABITAT.—Three of these specimens were taken on sand flats, the other two on a rocky shore where there were tide pools.

TYPE-LOCALITY.—Key West, Florida (restricted by Holthuis, 1959).

DISTRIBUTION.—Virginia to Estado de São Paulo, Brazil; to a depth of 30 meters.

REMARKS.—As noted above, the specimen from Mamanguape, Brazil, recorded by Rathbun (1900: 153) as *L. wurdemanni,* proved to be *L. moorei.* On the other hand, two large ovigerous females in the national collections from Santos, Estado de São Paulo, Brazil, agree reasonably well with North American specimens of *L. wurdemanni.* The only obvious difference lies in the number and possibly consequent arrangement of the dorsal rostral teeth. The Brazilian specimens have 6 or 7 dorsal teeth, instead of the usual 4 or 5 in northern specimens, and 1 or 2, in addition to the posteriormost tooth, are on the carapace posterior to the orbital margin. Otherwise, these specimens agree better with the typical form of *L. wurdemanni* than do some of those recorded by Holthuis (1959:111) from off Surinam and French Guiana; the stylocerite falls well short of the distal margin of the basal antennular segment, and the carpus of the second pereiopods contains only 30–31 articles. The species seems to be uncommon in the West Indies. I have seen one specimen from Golfo de Batabanó, Cuba, but, unfortunately, it is not available for reexamination at this time.

Genus *Merguia* Kemp, 1914

Only one Atlantic species is known.

196. *Merguia rhizophorae* (Rathbun)

Hippolysmata rhizophorae Rathbun, 1900:153, pl. 8: fig. 9.
Merguia rhizophorae.—Holthuis 1959:104, figs. 15, 16.—Abele 1970:661.

TYPE-LOCALITY.—Rio Paraíba, Estado da Paraíba, Brazil.

DISTRIBUTION.—Panama, Surinam, and Estado da Paraíba, Brazil.

*Genus *Thor* Kingsley, 1878a

The shrimps of this genus are as ubiquitous and difficult to identify as are those of *Hippolyte.* The task is complicated by the apparent occurrence of protandry in at least some of the species. The four western Atlantic species recognized in this report are very similar in general appearance, but they seem to be quite distinct physiologically. Most of the morphological characters investigated proved to be variable and useless, but the few reasonably stable characters finally found are sufficient to permit identification of most specimens. Where all four species occur in the same area, however, as in southeastern Florida and Yucatan, they challenge the identifier's skill.

Key to Atlantic Species

1. No vestige of supra-orbital tooth; anterolateral margin of carapace faintly angular, with microscopic branchiostegal tooth; distal margin of telson armed typically with 4 pairs of spines; endopod of first pleopod of functional males with mesial margin sparsely setose; appendix masculina (not including setae) of functional males falling short of end of endopod of second pleopod; associated with sea anemones. (Merus of first pereiopod unarmed in distal half of flexor margin; eggs not very large, increasing in major diameter during development from 0.48 to 0.70 mm.) .... *197. ***T. amboinensis***

Key to Atlantic Species—Continued

Supra-orbital tooth represented by obtuse prominence; anterolateral margin of carapace rounded, unarmed; distal margin of telson armed with 3 pairs of spines; endopod of first pleopod of functional males with mesial margin densely setose; appendix masculina (not including setae) of functional males reaching nearly to, or beyond, end of exopod of second pleopod; not usually associated with sea anemones 2

2.(1) Merus of first pereiopod armed with 1 or 2 spines in *distal* half of flexor margin. (Dactyls of fourth and fifth pereiopods commonly armed with 5—not unusually 4 or 6—spinules on flexor margin proximal to distal pair of spines; eggs not very large, increasing in major diameter during development from 0.36 to 0.74 mm.) .... ***189. *T. dobkini***

Merus of first pereipod unarmed in distal half of flexor margin 3

3.(2) Dactyls of fourth and fifth pereiopods commonly armed with 4 or 5 (rarely 3 or 6) spinules on flexor margin proximal to distal pair of spines; eggs large and few, increasing in major diameter during development from 0.66 to 1.40 mm .. ***199. *T. floridanus***

Dactyls of fourth and fifth pereiopods commonly armed with 3 (sometimes 2 or 4) spinules on flexor margin proximal to distal pair of spines; eggs not very large, increasing in major diameter during development from 0.36 to 0.73 mm. .. ***200. *T. manningi***

*197. *Thor amboinensis* (De Man)

FIGURES 55, 56

Hippolyte amboinensis De Man, 1888:535.
Thor discosomatis Kemp, 1916:388, fig. 1, pl. 36: fig. 1.

MATERIAL.—Antigua Island (Sta. 72–56: 6♂, 4 ovig. ♀; Sta. 73–56: 1♂, 1 ovig. ♀; Sta. 113–59: 1♂; Sta. ?–59: 1♂, 1 ovig. ♀).—Dominica (Sta. 62–56: 1?).—Tobago (Sta. 26–59: 1 ovig. ♀; Sta. ?–59: 1♂, 5♀ [4 ovig.]).—Isla de Cozumel (Sta. 34–60: 1♂).

HABITAT.—Apparently this shrimp is always associated with sea anemones of various species.

TYPE-LOCALITY.—Ambon, Indonesia.

DISTRIBUTION.—Florida Keys to Tobago and Yucatan; Bay of Bengal, Indonesia, and Caroline Islands.

REMARKS.—It was believed on first examination that the Smithsonian-Bredin collections contained two species of *Thor* associated with sea anemones. The form found with the "tufted anemone" (presumably *Bartholomea annulata*) had the telson armed with 3 pairs of posterior spines (Figure 55*e*); the carpus of the first periopod short and robust, less that three-fourths as long as the palm of the chela (Figure 55*o*); the third pereiopod of the male (Figure 55*q*) distinctly, but not markedly, prehensile, the dactyl (Figure 55*r*) being armed with only 5 accessory spinules on the flexor margin; and the fourth and fifth pereiopods (Fifth 55*s-v*) terminating in robust dactyls armed with only 2 or 3 spinules on the flexor margin. The form associated with the "thick-tentacled anemone" (probably *Condylactis gigantea*), on the other hand, had the telson armed with 4 pairs of distal spines (Figure 56*e*); the carpus of the first pereiopod much more slender and as long as the palm of the chela (Figure 56*o*); the third pereiopod of the male (Figure 56*q*) strongly prehensile, the dactyl (Figure 56*r*) bearing about 10 accessory spinules on the flexor margin; and the fourth and fifth pereiopods (Figures 56*s–v*) terminating in more elongate dactyls bearing 4 spinules on the flexor margin.

Further study, however, revealed the variability of all of these characters and failed to disclose any consistent differences by which the two forms could be distinguished. The telson normally bears 4 pairs of terminal spines; of the 24 specimens in the collections, only two have 3 spines on both sides of the posterior margin, three others have 3 spines on one side and 4 on the other, and one specimen (from the same lot as as the specimen illustrated in Figure 55) has 4 on one side and 5 on the other. The carpus of the first pereiopod varies from less than three-fourths as long as, to slightly longer than, the palm of the chela; another male in the lot containing the specimen illustrated in Figure 56 has the merus only three-fourths as long as the palm. The number of accessory spinules on the flexor margin of the dactyl of the male third pereiopod varies from 5 to 10, without apparent correlation with other characters. The dactyls of the 2 posterior pairs of pereiopods vary similarly.

Comparison of the Smithsonian-Bredin material with a male and a female collected by Stanley Kemp in the Andaman Islands and a male and two females

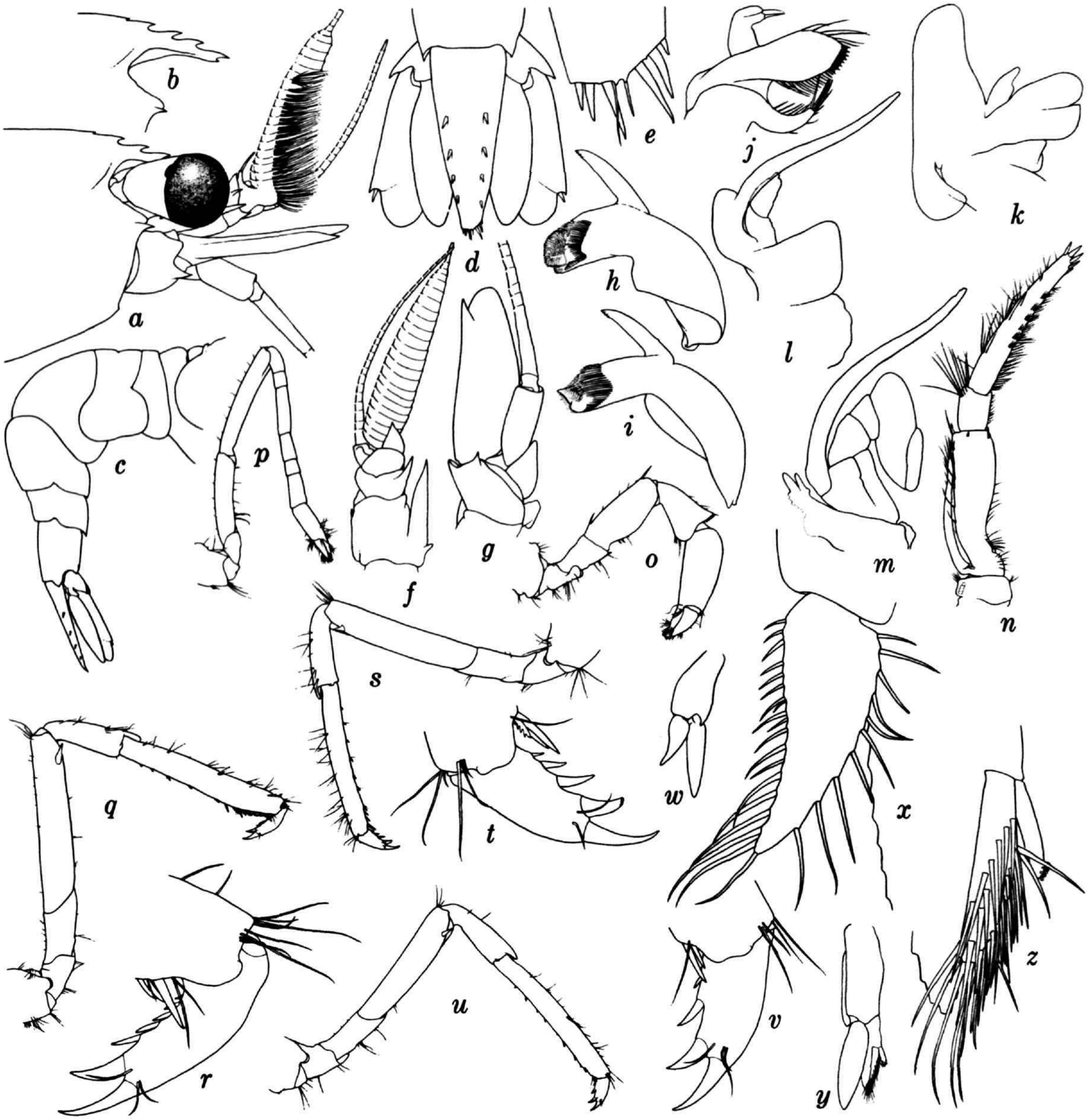


FIGURE 55.—*Thor amboinensis* (De Man), male, associated with "tufted anemone" from Tobago (Smithsonian-Bredin Station ?–59), carapace length 2.25 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen; *d*, telson and uropods; *e*, end of telson; *f*, right antennule; *g*, right antenna; *h*, right mandible, anterior aspect; *i*, left mandible, posterior aspect; *j*, right first maxilla; *k*, right second maxilla; *l*, right first maxilliped; *m*, right second maxilliped; *n*, right third maxilliped; *o*, right first pereiopod; *p*, right second pereiopod; *q*, right third pereiopod; *r*, same, dactyl; *s*, left fourth pereiopod; *t*, same, dactyl; *u*, right fifth pereiopod; *v*, same, dactyl; *w*, right first pleopod; *x*, same, endopod; *y*, right second pleopod; *z*, same, appendix masculina and appendix interna. (Magnifications: *c*, ×6; *a*, *b*, *d*, *f*, *g*, *n–q*, *s*, *u*, *w*, *y*, ×12.5; *h–m*, ×25; *e*, *r*, *t*, *v*, *x*, *z*, ×63.)

from Ifaluk Atoll, Caroline Islands, reveals no important morphological differences, except that the third pereiopod of the two Indo-Pacific males is not prehensile, whereas it is prehensile in the nine Atlantic males in which one or both of these appendages is still intact. The third pereiopods have been demonstrated to be dimorphic in some species of this and other hippolytid genera (see "Remarks" under *T. manningi*), and there is a suggestion that they may be polymorphic in this species (compare Figures 55*q* and 56*q*). Also, the color pattern of the Indo-Pacific anemone commensal, as detailed by Kemp, is remarkably like that of Atlantic specimens.

The unique type-specimen of *Hippolyte amboinensis* may no longer be extant, and there is therefore probably little chance of verifying the contention of Holthuis (1947:51) that De Man's species is a senior synonym of Kemp's *T. discosomatis*. The material at

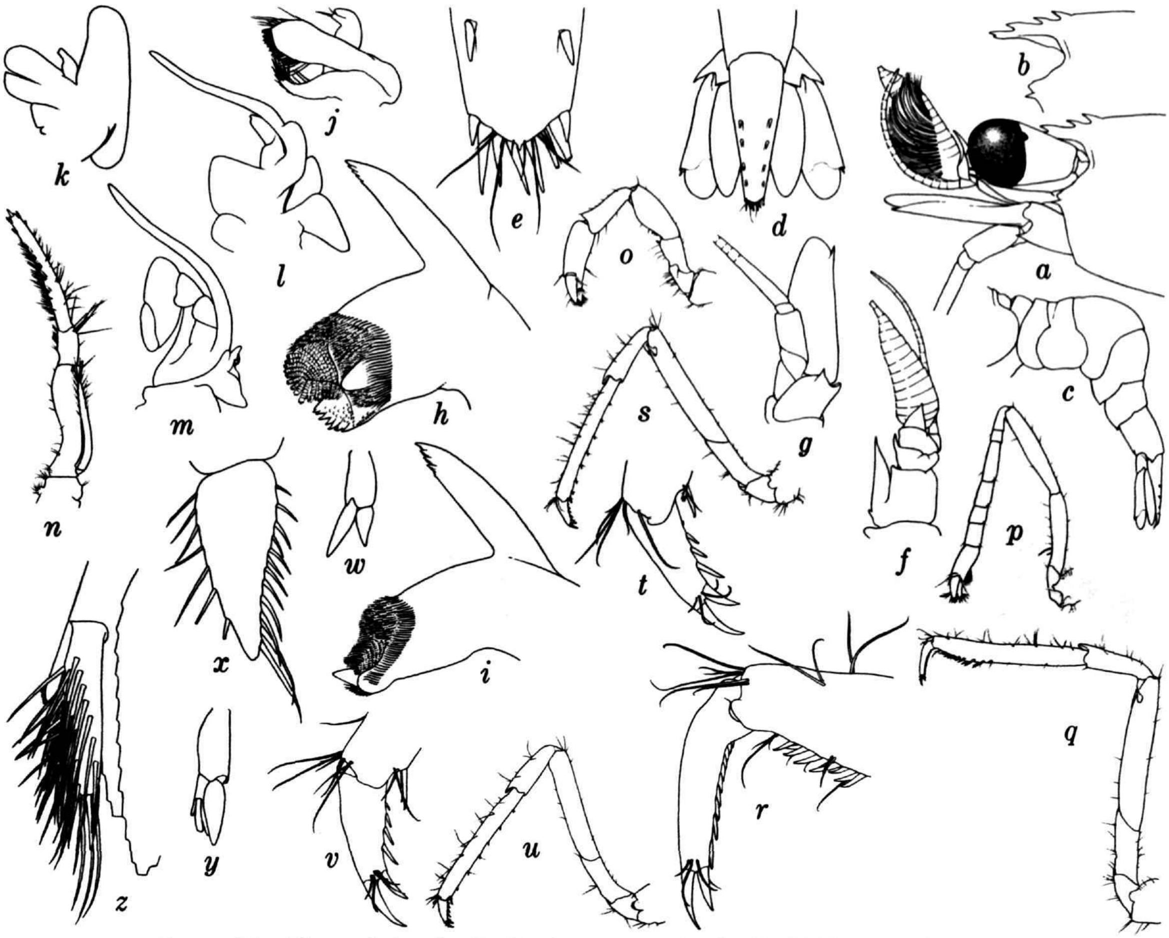


FIGURE 56.—*Thor amboinensis* (De Man), male, associated with "thick-tentacled anemone" from Antigua Island (Smithsonian-Bredin Station 72–56), carapace length 1.6 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen; *d*, telson and uropods; *e*, end of telson; *f*, left antennule; *g*, left antenna; *h*, right mandible, anterior aspect; *i*, left mandible, posterior aspect; *j*, left first maxilla; *k*, left second maxilla; *l*, left first maxilliped; *m*, left second maxilliped; *n*, left third maxilliped; *o*, left first pereiopod; *p*, left second pereiopod; *q*, left third pereiopod; *r*, same, dactyl; *s*, left fourth pereiopod; *t*, same, dactyl; *u*, left fifth pereiopod; *v*, same, dactyl; *w*, left first pleopod; *x*, same, endopod; *y*, left second pleopod; *z*, same, appendix interna and appendix masculina. (Magnifications: *c*, ×6; *a*, *b*, *d*, *f*, *g*, *n–q*, *s*, *u*, *w*, *y*, ×12.5; *j–m*, ×25; *e*, *h*, *i*, *r*, *t*, *v*, *x*, *z*, ×63.)

my disposal does corroborate the belief that there are usually only 3 dorsal teeth on the rostrum of *T. amboinensis,* that the rostrum is most often, but by no means always, simple rather than bifid distally, and that the stylocerite is probably longer on the average than it is in *T. paschalis.* These characters hardly suffice as proof, however, that De Man did not have an aberrant specimen of *T. paschalis.* That could be determined positively only if De Man's specimen proved to have 4 pairs of spines on the distal margin of the telson and a tooth near the base of the lateral margin of the stylocerite. Even in the absence of such evidence, however, it is probably best to follow the precedent set by Holthuis and accepted by subsequent workers.

*198. *Thor dobkini,* new species

FIGURE 57

Thor floridanus.—Dobkin 1968: 1–17. [Not *T. floridanus* Kingsley, 1878a.]

MATERIAL.—Bahía de la Ascensión (Sta. 69–60: 1 ovig. ♀; Sta. 77–60: 5♂, 15♀ [11 ovig.]).

In addition, the following lots in the national collections have been examined, and the holotype has been selected from one of them:

North Carolina. Beaufort, inside Shackleford Banks, washed from seaweed, 17 September 1928, W. L. Schmitt and C. R. Shoemaker: 2 ovig ♀.—Beaufort, from gorgonian, 21 August 1919, O. W. Hyman: 1 ovig. ♀.—Black Rocks off New River, 19 June 1949, A. S. Pearse: 1 ovig. ♀.—Same, 29 June 1949: 1 ovig. ♀.—Same, 9 July 1949: 1 ovig. ♀.—Same, 9 August 1949: 3 ovig. ♀.

South Carolina. Seven miles off Little River Inlet, 14 meters, 17 August 1949, A. S. Pearse: 5♀ (4 ovig.).

Florida. Norris Cut off Miami, dredged, April 1901, J. E. Benedict, 1 ovig. ♀.—No Name Key, among algae at low tide, H. Hemphill: 2♀.—Marco, among sponges in 2–5 1/5 meters, H. Hemphill: 1♂, 2 ovig. ♀.—Punta Rassa, 2 meters, H. Hemphill: 43♂, 54♀ (40 ovig.) [1♂ is holotype, USNM 135396].—Sarasota Bay, H. E. Webster: 1♀.—Same, among thick growth of *Sagittaria,* 19 April 1944, M. W. Williams: 1 ovig. ♀.—Tampa Bay, 1901, *Fish Hawk:* 1 ovig. ♀.—Boca Ciega Bay Dock, on oyster rack, 12 February 1964, U.S. Bureau of Commercial Fisheries: 1♂, 5♀.—Anclote Sponge Station, Tarpon Springs, 7 November 1896, B. W. Evermann: 1 ovig. ♀.—Alligator Harbor, Franklin County, 3 November 1951, J. A. Smyth: 1♀.—West Florida, Henderson and Simpson: 1♀.—Dry Tortugas, Edward Palmer: 1♂, 2♀ (1 ovig.).

Louisiana. Smack Channel, Chandeleur Island, 29°51′N, 88°51′W, 5 meters, 28 March 1954, R. M. Darnell: 1♀.—Same, 5½ meters, 28 March 1954, R. M. Darnell: 3♂, 4♀.—Lagoon on lee side of Chandeleur Island, 29°51′N, 88°51′W, 2 meters, 28 March 1954, R. M. Darnell: 2♂, 4♀.—Smack Channell one mile northwest of Mangrove Island, 29°52′N, 88°51′W, 2 meters, 26 August 1954, R. M. Darnell: 1 ovig. ♀.

Cuba. Punta Tolete, Bahía de Guadiana, Provincia de Pinar del Río, *Tomas Barrera* Expedition Sta. 9, Henderson and Bartsch: 1 ovig. ♀.—Cardenas Bay off 61st Street, Varadero, Provincia de Matanzas, dredged in 4 meters, 27 January 1957, W. L. Schmitt: 2♀ (1 ovig.).

DESCRIPTION.—Rostrum (Figure 57*b*) inclined ventrad, falling short of distal margin of basal segment of antennular peduncle; dorsal margin usually armed with 4 teeth, much less commonly with 5, rarely with 3, and very rarely with 6, posteriormost tooth usually situated in line with, or slightly posterior to, posterior margin of orbit; ventral margin bearing single tooth forming bifid rostral tip. Supraorbital tooth (Figure 57*a*) barely discernible as obtuse prominence. Antennal spine well marked, distinctly separated from, and overreaching, ventral angle of orbit. Anteroventral margin of carapace broadly rounded and unarmed.

Pleura of 3 anterior abdominal somites broadly rounded (Figure 57*c*); those of 3 posterior somites acute posteroventrally. Sixth somite nearly twice as long as fifth but distinctly shorter than telson not including terminal spines. Telson (Figure 57*d*) usually armed with 4 pairs of dorsal spines, occasionally with 3 pairs, rarely with 5; distal margin (Figure 57*e*) with small mesial point and bearing 3, very rarely 4, pairs of spines, intermediate pair distinctly longest.

Eyes with cornea broader than, and fully as long as, eyestalk.

Antennular peduncle (Figure 57*f*) with sharp stylocerite reaching to, or beyond, distal margin of second segment and armed with distinct tooth near proximal end of lateral margin; basal segment with tooth near distal end of ventromesial margin; second segment with curved lateral spine reaching distal third of distal segment; dorsal scale of distal segment subtriangular, with or without denticle on lateral slope.

Antennal scale (Figure 57*g*) overreaching antennular peduncle by at least one-third of length, about one and two-thirds times as long as broad; lateral margin nearly straight, distal tooth falling far short of strongly produced distomesial angle of blade. Antennal peduncle reaching about to midlength of scale; basal segment armed with strong ventrolateral tooth.

Mouth parts as figured (Figures 57*h–m*). Mandibles asymmetrical, incisor process armed with 6 teeth

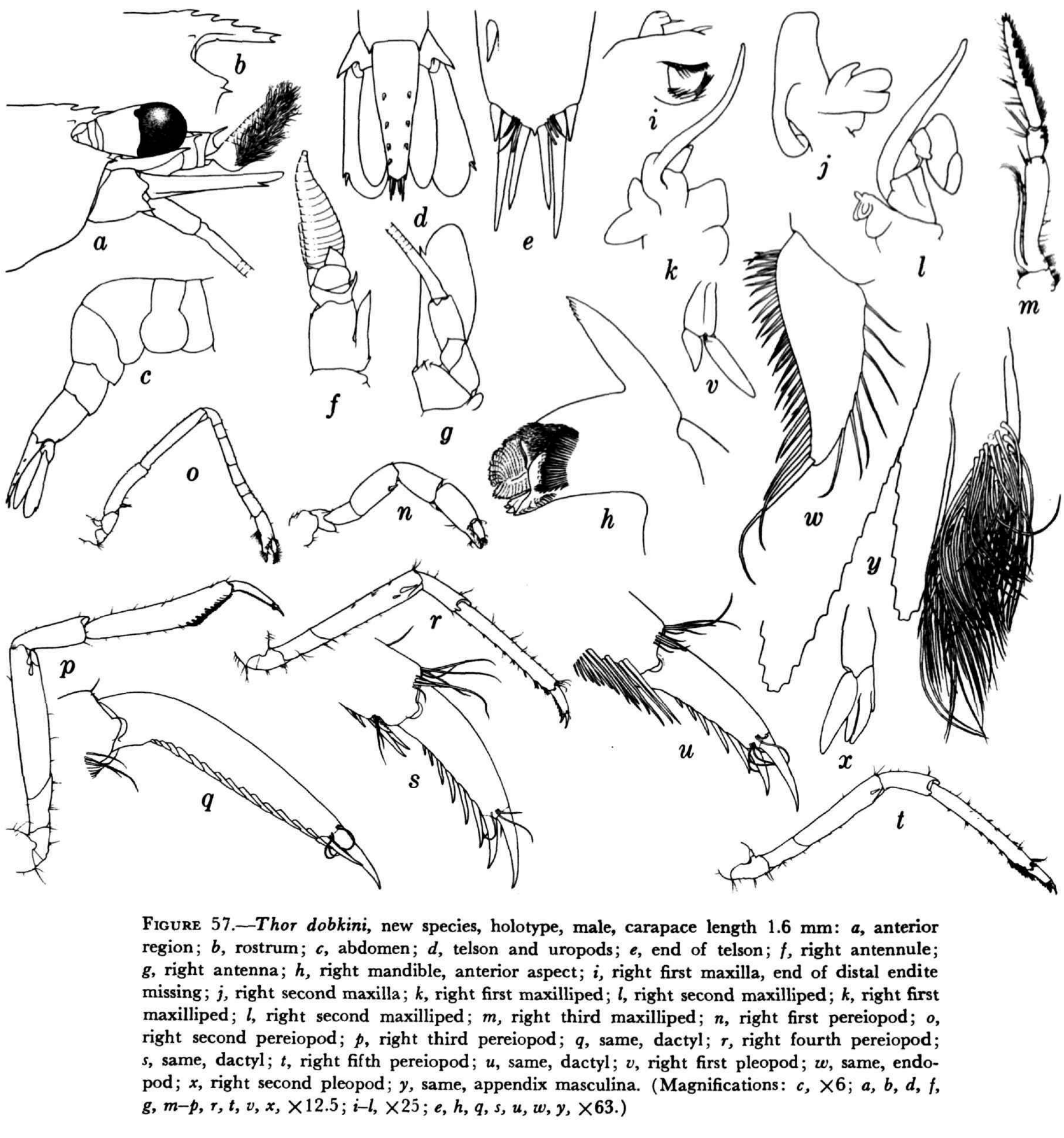


FIGURE 57.—*Thor dobkini*, new species, holotype, male, carapace length 1.6 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen; *d*, telson and uropods; *e*, end of telson; *f*, right antennule; *g*, right antenna; *h*, right mandible, anterior aspect; *i*, right first maxilla, end of distal endite missing; *j*, right second maxilla; *k*, right first maxilliped; *l*, right second maxilliped; *k*, right first maxilliped; *l*, right second maxilliped; *m*, right third maxilliped; *n*, right first pereiopod; *o*, right second pereiopod; *p*, right third pereiopod; *q*, same, dactyl; *r*, right fourth pereiopod; *s*, same, dactyl; *t*, right fifth pereiopod; *u*, same, dactyl; *v*, right first pleopod; *w*, same, endopod; *x*, right second pleopod; *y*, same, appendix masculina. (Magnifications: *c*, ×6; *a*, *b*, *d*, *f*, *g*, *m–p*, *r*, *t*, *v*, *x*, ×12.5; *i–l*, ×25; *e*, *h*, *q*, *s*, *u*, *w*, *y*, ×63.)

and much narrower than swollen molar process. Second maxilla with mesial lacinia deeply cleft, scaphognathite rather broad and truncate distally. Third maxilliped slightly overreaching antennal scale, exopod reaching distal sixth of antepenultimate segment.

First pereiopod (Figure 57*n*) reaching about as far as distolateral tooth of antennal scale; fingers slightly more than half as long as palm; carpus about as long as palm; merus nearly one-fourth again as long as carpus, armed with 1 or 2 movable spines distal to midlength of flexor margin; ischium little more than one-third as long as merus. Second pereiopod (Figure 57*o*) slightly overreaching antennal scale; fingers shorter than palm; carpus considerably more than twice as long as chela, articles decreasing in order 3, 6, 4, 1, 2, 5; merus less than three-fourths as long as carpus and nearly one-third again as long as ischium. Third pereiopod of male (Figure 57*p*) prehensile, subchelate, overreaching antennal scale by length of dactyl and three-fourths of propodus; dactyl (Figure 57*q*) provided with about 16 closely appressed spinules on flexor margin, distalmost considerably longer than, but similar to, others, not diverging from stout terminal spine of dactyl; propodus more than twice as long as dactyl, distal third of flexor margin rather abruptly converging toward extensor margin and densely spinose; carpus more than half as long as propodus; merus slightly longer than propodus, armed with 1 or 2 strong spines near distal end of lateral surface. Third pereiopod of female not prehensile, similar to, and not much longer than, fourth pereiopod but without microscopic comblike spine at distal end of propodus. Fourth pereiopod (Figure 57*r*) not prehensile in either sex, overreaching antennal scale by slightly more than length of dactyl; dactyl (Figure 57*s*) most commonly bearing 5 spines on flexor margin in addition to distal pair, less commonly with 3, 4, or 6 accessory spines; propodus slightly less than two and one-half times as long as dactyl, armed with about 8 subequally spaced spines on flexor margin and microscopic comblike spine near articulation with dactyl; carpus about half as long as propodus; merus very slightly longer than propodus, with 1 or 2 strong spines near distal end of lateral surface. Fifth pereiopod (Figures 57*t, u*) reaching as far as distal margin of antennal scale, similar to fourth pereiopod but with fringe of stout setae on distal fifth of flexor margin of propodus; merus usually with single spine near distal end of lateral surface.

Endopod of first pleopod of male (Figures 57*v, w*) with fringe of moderately long setae on mesial margin. Appendix masculina, not including dense covering of long setae, overreaching endopod of second pleopod and frequently approaching tip of exopod (Figures 57*x, y*). Lateral branch of uropod (Figure 57*d*) with movable spine inserted between distolateral tooth and margin of blade.

SIZE.—Males with carapace lengths of 1.0–1.9 mm (holotype, 1.6 mm); females, 1.1–3.4 mm; ovigerous specimens, 2.0–3.0 mm.

HABITAT.—Grass flats.

TYPE-LOCALITY.—Punta Rassa (near mouth of Caloosahatchee River), Lee County, Florida.

DISTRIBUTION.—North Carolina to Yucatan, north coast of Cuba; to a depth of 14 meters.

REMARKS.—Without the convincing evidence provided by the developmental studies of Sheldon Dobkin (1968), I would certainly have overlooked the subtle differences that distinguish this species from *T. floridanus*. Inasmuch as Dr. Dobkin graciously offered to forsake the proposed extension of his studies of *Thor* and provided me with notes that he had already assembled on possible morphological differences between the two species, it is appropriate for the new species to bear his name.

The presence or absence of a spine on the distal half of the flexor margin of the merus of the first pereiopod would seem to be a questionable specific character in this genus, but the material available to me indicates that it is a valid and useful means of distinguishing the species involved. I have seen no specimen of *Thor* with large eggs and no specimen of the apparently distinct West Indian species with small eggs that has a spine in this position. Occasional specimens of the two latter species may have a stout seta or slender spine on the proximal portion of the flexor margin of the merus of the first pereiopod, but it is certainly not homologous with the spine in *T. dobkini*.

There is little doubt that *T. dobkini* is normally a protandrous hermaphrodite. Of 70 females measured, all but three have a carapace length of 2.0 mm or more, whereas all 52 males measured have a carapace length of less than 2.0 mm. All of the males, however, have the third pereiopod subchelate and prehensile; no sexually intermediate forms, such as occur in *T. manningi*, have been observed.

*199. *Thor floridanus* Kingsley

FIGURE 58

Thor floridanus Kingsley, 1878:95.
Thor species Dobkin, 1968: 1–18, figs. 1–9.

MATERIAL.—Isla Mujeres (Sta. 17–60: 2♀; Sta. 26–60: 2 ovig. ♀, 1?; Sta. 28–60: 3♂, 10♀ [4 ovig.]; Sta. 29–60: 1 ovig. ♀; Sta. 29a–60: 1♂, 3 ovig. ♀).—Isla de Cozumel (Sta. 47–60: 5♂, 2♀; Sta. 100–60: 5♂, 4♀ [3 ovig.], 6 juv).—Bahía de la Ascensión (Sta. 60–60: 5♂, 3♀ [2 ovig.]; Sta. 66–60: 1 ovig. ♀; Sta. 69–60: 1♂, 4♀ [3 ovig.]; Sta. 77–60: 13♂, 6♀ [3 ovig.]; Sta. 83–60: 3♂, 28♀ [20 ovig.], 1 juv.; Sta. 89–60: 2 ovig. ♀; Sta. 91–60: 2♂, 1♀ with branchial bopyrid).

HABITAT.—Grass flats.

TYPE-LOCALITY.—Key West, Florida.

DISTRIBUTION.—North Carolina (?) to Yucatan, to a depth of 58 meters. Neither of the two specimens tentatively assigned to this species from north of Miami, Florida, is ovigerous; the northern limit of the range of the species therefore awaits verification.

REMARKS.—The type-series of *T. floridanus* is deposited in the Museum of Comparative Zoology at Harvard University and has been made available to me through the kind cooperation of Herbert W. Levi. It consists of seven males, eight females, and one juvenile. The males range in carapace length from 1.3 to 1.6 mm, the females (none of which, unfortunately, are ovigerous) from 1.5 to 2.3 mm, and the single juvenile 1.1 mm. The third pereiopod is prehensile in the four males in which both members of the pair have not been lost. The juvenile and two of the smaller males have 3 accessory spinules on the flexor margin of the dactyl of the fourth pereiopod, proximal to the terminal pair; the remaining five males and two of the females have 4 accessory spinules; and the four remaining females in which the fourth pereiopod is intact have 5. None of the specimens has a spine on the merus of the first pereiopod. The unarmed merus of the first pereiopod virtually eliminates the possibility that *T. floridanus* is the species described above under the name *T. dobkini,* and the distribution of accessory spinules on the dactyl of the fourth pereiopod does not agree with that in the West Indian species described below as *T. manningi* but does agree reasonably well with that in the form with large eggs, referred to as *Thor* sp. by Dobkin (1968). This conclusion is not contradicted

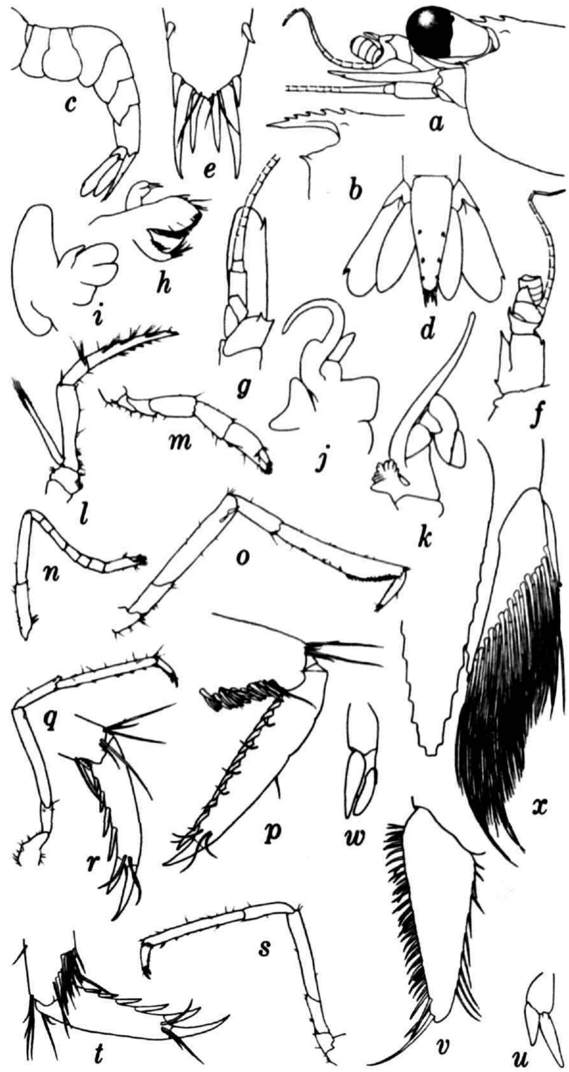


FIGURE 58.—*Thor floridanus* Kingsley, male, associated with females with large eggs from Bahía de la Ascensión (Smithsonian-Bredin Station 83–60), carapace length 1.5 mm: *a,* anterior region; *b,* rostrum; *c,* abdomen; *d,* telson and uropods; *e,* end of telson; *f,* left antennule; *g,* left antenna; *h,* right first maxilla; *i,* right second maxilla; *j,* right first maxilliped; *k,* right second maxilliped; *l,* right third maxilliped; *m,* right first pereiopod; *n,* right second pereiopod; *o,* right third pereiopod; *p,* same, dactyl; *q,* right fourth pereiopod; *r,* same, dactyl; *s,* left fifth pereiopod; *t,* same, dactyl; *u,* right first pleopod; *v,* same, endopod; *w,* right second pleopod; *x,* same, appendix masculina. (Magnifications: *c,* ×6; *a, b, d, f, g, l–o, q, s, u, w,* ×12.5; *h–k,* ×25; *e, p, r, t, v, x,* ×63.)

by the fact that all 19 ovigerous females that I have seen in other lots from Key West bear large eggs.

Evidence of protandry is less marked in *T. floridanus* than it is in either *T. dobkini* or *T. manningi.* All 40 males of *T. floridanus* analyzed have the third pereiopods subchelate and prehensile, as in *T. dobkini.* All but three small males have carapace lengths of 1.2–1.8 mm, and only 11 of the 92 females in the same lots fall within this size range. The proportionate number of females in the size range encompassing most of the males is therefore appreciably greater than it is in *T. manningi,* but still less than 25 percent, which would suggest imperfect protandry.

*200. *Thor manningi,* new species

FIGURES 59–61

MATERIAL.—Tortola (Sta. 117–56: 9♂, 2⚥, 19♀ [16 ovig., 2 with abdominal bopyrids]; Sta. 5–58: 9♂, 9♀ [7 ovig.], 1 juv.; Sta. 23–58: 2♂, 1⚥, 4♀ [2 ovig., 1 with abdominal bopyrid]; Sta. 35–58: 1 ovig. ♀).—Virgin Gorda (Sta. 112–56: 2♂, 2 ovig. ♀; Sta. 10–58: 1 ovig. ♀; Sta. 37, 38, 39–58: 1♂, 5♀ [3 ovig.], 1 juv.).—Anguilla (Sta. 55–58: 1♂; Sta. 59–58: 1 ovig. ♀).—Barbuda (Sta. 92–56: 1♂; Sta. 112a–58: 1 ovig. ♀; Sta. 112c–58: 8♂, 2⚥, 6♀ [5 ovig.]; Sta. 98–59: 4♂, 2♀ [1 ovig.];

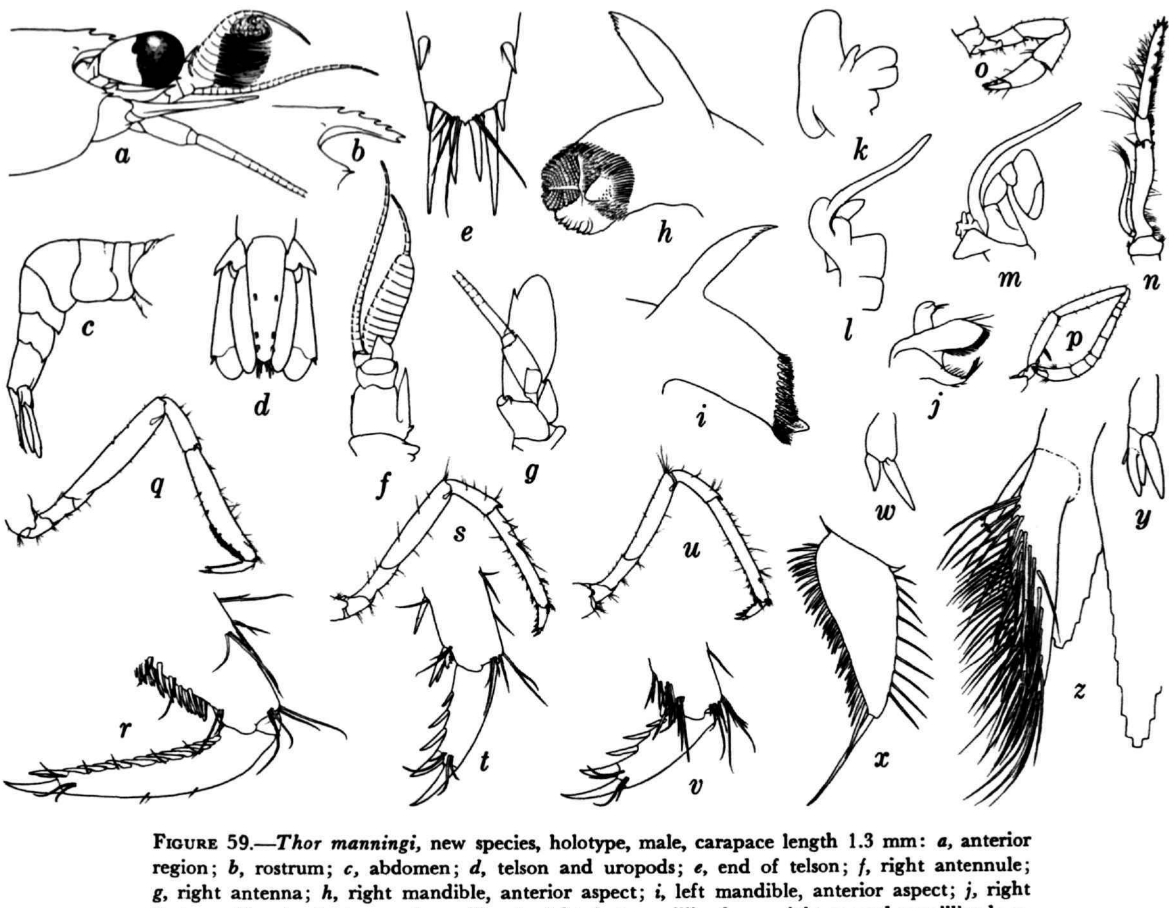


FIGURE 59.—*Thor manningi,* new species, holotype, male, carapace length 1.3 mm: *a,* anterior region; *b,* rostrum; *c,* abdomen; *d,* telson and uropods; *e,* end of telson; *f,* right antennule; *g,* right antenna; *h,* right mandible, anterior aspect; *i,* left mandible, anterior aspect; *j,* right first maxilla; *k,* right second maxilla; *l,* right first maxilliped; *m,* right second maxilliped; *n,* right third maxilliped; *o,* right first pereiopod; *p,* right second pereiopod; *q,* right third pereiopod; *r,* same, dactyl; *s,* right fourth pereiopod; *t,* same, dactyl; *u,* right fifth pereiopod; *v,* same, dactyl; *w,* right first pleopod; *x,* same, endopod; *y,* left second pereiopod; *z,* same, appendix interna and appendix masculina. (Magnifications: *c,* ×6; *a, b, d, f, g, n–q, s, u, w, y,* ×12.5; *j–m,* ×25; *e, h, i, r, t, v, x, z,* ×63.)

Sta. 102–59: 2♂, 2 ovig. ♀, 1 juv.).—Saint Christopher (Sta. 103–56: 3♂, 9♀ [7 ovig.]).—Antigua Island (Sta. 73–56: 1♂, 3⚥, 3♀ [1 ovig.]; Sta. 75–56: 1♂; Sta. 80–56: 1 ovig. ♀; Sta. 81–56: 1 ovig. ♀; Sta. 82–56: 3♂, 2⚥, 13 ovig. ♀, 1 juv. [1♂ is holotype, USNM 135393]; Sta. 79–58: 3♂, 6⚥, 4♀ [2 ovig.]; Sta. 96–58: 1♀; Sta. 104–59: 1♂, 1⚥, 1 ovig. ♀; Sta. 105–59: 1♂, 1⚥, 1 ovig. ♀; Sta. 109–59: 1 ovig. ♀; Sta. 112–59: 1♀; Sta. ?–59: 3♂, 5⚥, 8 ovig. ♀).—Guadeloupe (Sta. 69–56: 1♂).—Dominica (Sta. 61–56: 1?; Sta. 75–59: 2♂, 3 juv.).—Saint Lucia Island (Sta. 53–59: 1♂; Sta. ?–59: 1♂, 1⚥, 2 ovig. ♀).—Carriacou Island (Sta. 15–56: 7♂, 9♀ [6 ovig.], 2?; Sta. 17–56: 1♂, 3♀ [2 ovig.]).—Tobago (Sta. 4–59: 4♂, 2 juv.; Sta. 8–59: 1⚥, 2 ovig. ♀, 1 juv.; Sta. 26–59: 1 ovig. ♀; Sta. 30–59: 1 ovig. ♀; Sta. 31–59: 2♂, 3⚥, 7 ovig. ♀, 1 juv.).—Bahía de la Ascensión (Sta. 52–60: 2♂, 2⚥, 2♀; Sta. 53–60: 1 ovig. ♀; Sta. 67–60: 1♀; Sta. 68–60: 1♂, 3 ovig. ♀; Sta. 72–60: 1♂, 1⚥, 3♀; Sta. 77–60: 2♂, 2⚥, 3♀ [1 ovig.]; Sta. 81–60: 2♀; Sta. 95–60: 1⚥).—Bahía del Espíritu

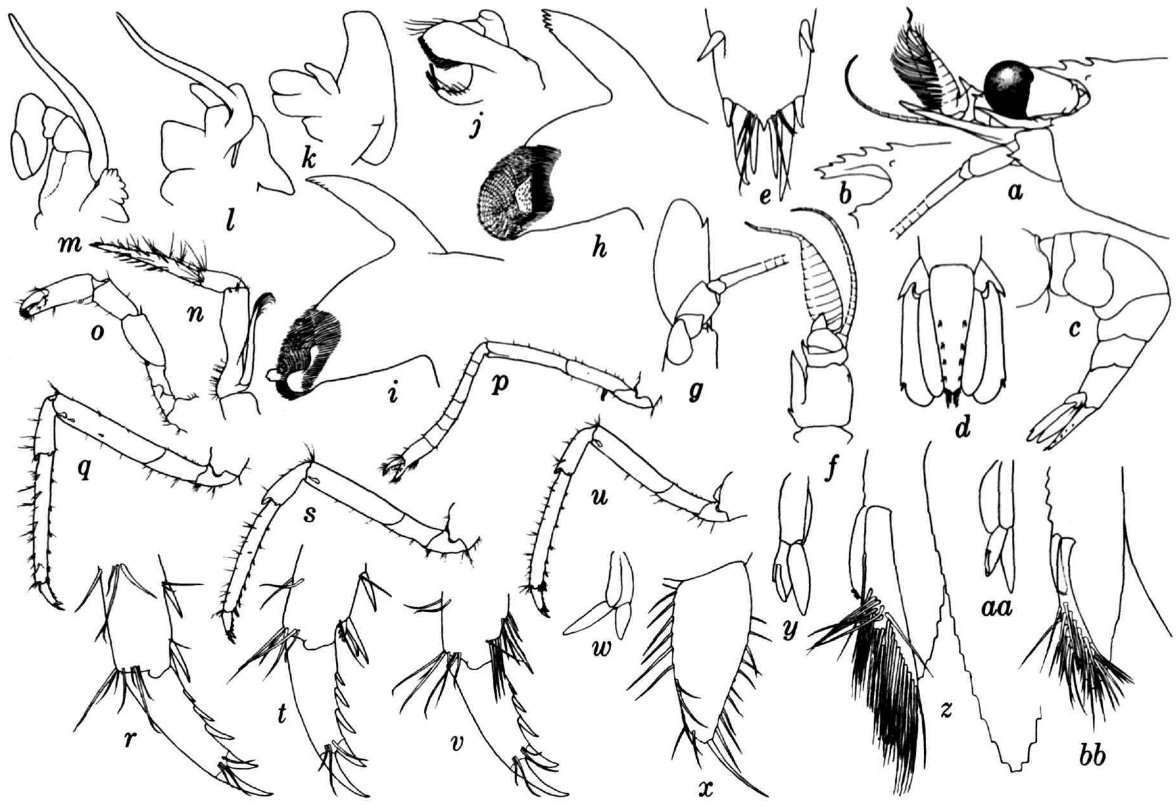


FIGURE 60.—*Thor manningi*, new species. Paratype, male with nonprehensile third pereiopods, from Tobago (Smithsonian-Bredin Station 31–59), carapace length 1.7 mm: *a*, anterior region; *b*, rostrum; *c*, abdomen; *d*, telson and uropods; *e*, end of telson; *f*, left antennule; *g*, left antenna; *h*, right mandible, anterior aspect; *i*, left mandible, posterior aspect; *j*, left first maxilla; *k*, left second maxilla; *l*, left first maxilliped; *m*, left second maxilliped; *n*, left third maxilliped; *o*, left first pereiopod; *p*, left second pereiopod; *q*, left third pereiopod; *r*, same, dactyl; *s*, left fourth pereiopod; *t*, same, dactyl; *u*, left fifth pereiopod; *v*, same, dactyl; *w*, left first pleopod; *x*, same, endopod; *y*, left second pleopod; *z*, same, appendix interna and appendix masculina. Similar paratype from Antigua Island (Smithsonian-Bredin Station ?–59), carapace length 1.6 mm: *aa*, left second pleopod; *bb*, same, appendix interna and appendix masculina. (Magnifications: *c*, ×6; *a, b, d, f, g, n–q, s, u, w, y, aa*, ×12.5; *j–m*, ×25; *e, h, i, r, t, v, x, z, bb*, ×63.)

Santo (Sta. 41–60: 1 ♂, 1 ovig. ♀).

Description.—Rostrum (Figures 59*b*, 60*b*) inclined ventrad, variable in length, sometimes falling short of distal margin of basal antennular segment, sometimes overreaching second segment; dorsal margin commonly armed with 4 teeth, less commonly with 3, rarely with 5, and very rarely with 2, posteriormost tooth usually situated in line with, or slightly posterior to, posterior margin of orbit; ventral margin typically bearing single tooth forming bifid rostral tip, rarely unarmed. Supraorbital tooth (Figures 59*a*, 60*a*) barely discernible as obtuse prominence, very rarely acute. Antennal spine stout, overreaching and not sharply separated from ventral angle of orbit. Anteroventral margin of carapace broadly rounded, unarmed.

Pleura of 3 anterior abdominal somites (Figures 59*c*, 60*c*) broadly rounded; those of 3 posterior somites acute posteroventrally. Sixth somite nearly twice as long as fifth but distinctly shorter than telson not including terminal spines. Telson (Figures 59*d*, 60*d*) armed with 3 or 4 pairs of dorsal spines, occasionally with 2 pairs especially in juveniles, rarely with 5; distal margin (Figures 59*e*, 60*e*) with small mesial point and bearing 3 (abnormally 2 or 4) pairs of spines, intermediate pair distinctly longest.

Eyes with cornea broader than, and subequal in length to, eyestalk.

Antennular peduncle (Figures 59*f*, 60*f*) with sharp stylocerite usually reaching slightly beyond distal margin of second segment and armed with distinct tooth near proximal end of lateral margin; basal segment with tooth near distal end of ventromesial margin; second segment with curved lateral spine reaching beyond midlength of distal segment; dorsal scale of distal segment subtriangular.

Antennal scale (Figures 59*g*, 60*g*) overreaching antennular peduncle by at least one-third of length, slightly less than one and one-half times as long as broad; lateral margin nearly straight, distal tooth falling far short of strongly produced distomesial angle of blade. Antennal peduncle reaching about to midlength of scale; basal segment armed with strong ventrolateral tooth.

Mouth parts as figured (Figures 59*h–n*, 60*h–n*). Mandibles asymmetrical, incisor process armed with 5 or 6 teeth and much narrower than swollen molar process. Second maxilla with mesial lacinia deeply cleft, scaphognathite subtruncate distally. Third maxilliped reaching about as far as distal margin of antennal scale, exopod reaching distal sixth of antepenultimate segment.

First pereiopod (Figures 59*o*, 60*o*) reaching about to midlength of antennal scale; fingers about three-fourths as long as palm; carpus about as long as palm; merus considerably longer than carpus, unarmed on distal half of flexor margin; ischium at least half as long as merus. Second pereiopod (Figures 59*p*, 60*p*) overreaching antennal scale by at least length of fingers; fingers shorter than palm; carpus more than half as long as chela, articles decreasing in order 3, 6, 4, 1, 2, 5 (right second pereiopod of holotype abnormally composed of 7 segments, left with 6); merus nearly three-fourths as long as carpus and less than one-third as long as ischium. Third pereiopod of presumably functional males (Figure 59*q*) prehensile, subchelate, overreaching antennal scale by length of dactyl and about two-thirds of propodus; dactyl (Figure 59*r*) bearing 9–13 closely appressed spines on flexor margin, distalmost somewhat longer than, but similar to, others, not diverging noticeably from stout terminal spine of dactyl; propodus more than twice as long as dactyl, distal third of flexor margin converging toward extensor margin and densely spinose; carpus about half as long as propodus; merus slightly longer than propodus, armed with 1 or 2 strong spines near distal end of lateral surface. Third pereiopod of females and nonfunctional males (Figures 60*q*, *r*) not prehensile, similar to, and not much longer than, fourth pereiopod but without microscopic comblike spine at distal end of propodus. Fourth pereiopod (Figures 59*s*, 60*s*) not prehensile in either sex, overreaching antennal scale by, at most, length of dactyl and one-fifth of propodus; dactyl (Figures 59*t*, 60*t*) most commonly bearing 3 spines on flexor margin in addition to distal pair, much less commonly with 2 or 4, and rarely with 5, accessory spines; propodus slightly more or less than three times as long as dactyl, armed with about 8 subequally spaced spines on flexor margin and microscopic comblike spine near articulation with dactyl; carpus fully half as long as propodus; merus subequal to propodus in length, with strong spine near distal end of lateral surface. Fifth pereiopod (Figures 59*u*, *v*, 60*u*, *v*) at most barely reaching distal margin of antennal scale, similar to fourth pereiopod, but with fringe of stout setae at distal end of flexor margin of propodus; merus usually with spine near distal end of lateral surface.

Endopod of first pleopod of functional males (Figures 59*w, x*) with dense fringe of rather short setae on mesial margin and very long seta at distal end. Appendix masculina (Figures 59*y, z*), not including dense covering of long setae, far overreaching endopod of second pleopod and often overreaching exopod. Lateral branch of uropod (Figures 59*d*, 60*d*) with movable spine inserted between distolateral tooth and margin of blade.

SIZE.—Functional males with carapace lengths of 0.8–1.6 mm (holotype, 1.3 mm); males with nonprehensile third pereiopods, 0.7–0.9 mm; females and juveniles, 0.6–2.5 mm; ovigerous specimens, 1.4–2.5 mm.

HABITAT.—The records of the Smithsonian-Bredin Expeditions indicate that this species is not confined to any particular ecological niche. Although it was commonly found on grass flats from the tide line to a depth of at least 11 meters, it was taken almost as frequently from living and dead coral and submerged timbers; on at least two occasions, it seemed to be associated with *Bartholomea,* but it is certainly not restricted to sea anemones as is *T. amboinensis.*

TYPE-LOCALITY.—English Harbour, Antigua Island.

DISTRIBUTION.—North Carolina to Tobago and Curaçao and westward to Yucatan; to a depth of 44 meters. In the national collections is a lot of four ovigerous females from Islas Tres Marías off the west coast of Mexico that seem to be indistinguishable from *T. manningi,* indicating that the species occurs also in the eastern Pacific.

REMARKS.—This species seems to be an imperfect protandrous hermaphrodite, as indicated by the relative paucity of females and the preponderance of males in the smaller sizes (Figure 61). The situation is further complicated by the existence of dimorphism in the males. Of 125 specimens with an appendix masculina on the second pleopod, 89 have the third pereiopods subchelate and prehensile and 36 have them simple, as in the females. With one or two questionable exceptions, all of the males with prehensile pereiopods have the appendix masculina fully developed, whereas all of those with the third pereiopods nonprehensile have the appendix masculina reduced to a varying degree (Figures 60*y–bb*). This observation counteracted my first thought that two species were represented. If the males with nonprehensile third pereiopods and reduced appendices masculinae occurred only at the lower and upper limits of the male size range, one could believe that they represented those males that had not yet attained sexual maturity and those that were metamorphosing into females, as in *Pandalus borealis* (see Allen 1959). To be sure, the smallest and largest males do belong to this presumably nonfunctional form, and this form is proportionately less abundant in the intermediate sizes, but the fact that there is some dimorphism throughout the male size range prevents a clear-cut conclusion.

This species is named for my esteemed colleague, Raymond B. Manning, who initiated a study of the

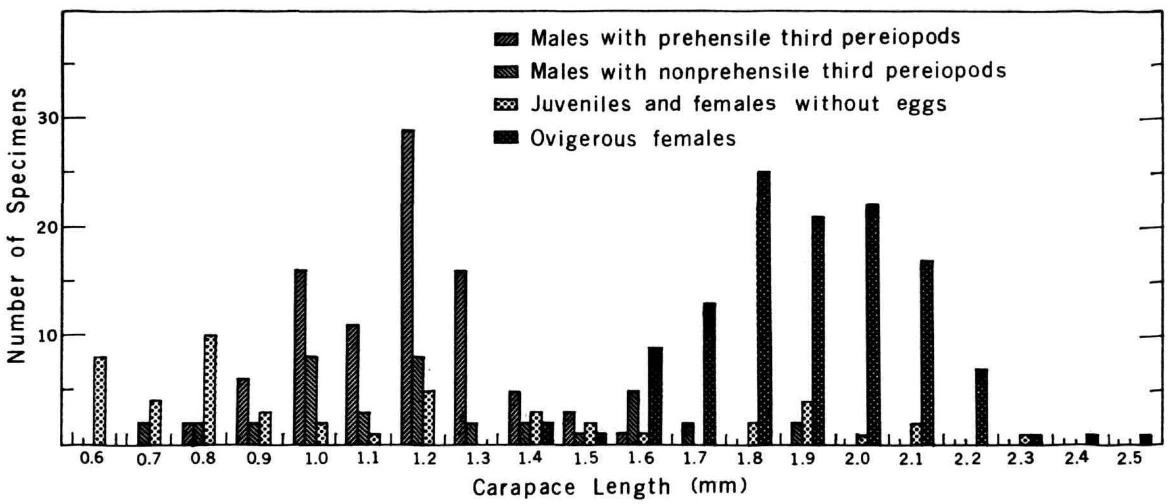


FIGURE 61.—Sexual distribution, by size, in West Indian specimens of *Thor manningi.*

Atlantic species of *Thor* long before my efforts began and who offered continuing assistance and encouragement during this investigation, especially by urging me to continue the quest when hope for a satisfactory solution was dim.

*Genus *Tozeuma* Stimpson, 1860

Key to Atlantic Species

1. Third abdominal somite bearing long rodlike dorsal projection recurved posteriorly and bidentate distally; third maxilliped with each of 2 distal segments short, slightly longer than broad, distal segment tapering throughout to narrow truncate tip; carpus of second pereiopod with proximal article subequal in length to combined lengths of 2 distal articles; dactyls of 3 posterior pereiopods without accessory spinules on flexor margin. (Rostrum unarmed dorsally.) .... 202. ***T. cornutum***
   Third abdominal somite not surmounted by recurved projection in adults; third maxilliped with each of 2 distal segments elongate, at least twice as long as broad, distal segment with subparallel margins nearly to distal extremity; carpus of second pereiopod with proximal article slightly more than four-fifths as long as combined lengths of 2 distal articles; dactyls of 3 posterior pereiopods with row of accessory spinules on flexor margin 2
2. Rostrum unarmed dorsally .... *201. ***T. carolinense***
   Rostrum armed with series of teeth both dorsally and ventrally .... 203. ***T. serratum***

*201. *Tozeuma carolinense* Kingsley

Tozeuma carolinensis Kingsley, 1878a:90.
Tozeuma carolinense.—Williams 1965b:83, fig. 67.—Ewald 1969:510–549, figs. 1–20.

MATERIAL.—Between Tortola and Guana Island (Sta. 7–58: 1 juv.).—Virgin Gorda (Sta. 110–56: 1 ♀).—Antigua Island (Sta. 80–58: 1 juv.).—Guadeloupe (Sta. 68–56: 1 ovig. ♀).—Dominica (Sta. 52–56: 2 ovig. ♀; Sta. 53–56: 2 juv.).—Saint Lucia Island (Sta. 38–56: 1 ovig. ♀).—Bahía de la Ascensión (Sta. 66–60: 3 ovig. ♀).

HABITAT.—Most of the specimens mentioned above were collected from grassy bottoms from the subtidal zone to a depth of 4 meters, but four specimens—one female and three juveniles—were attracted to a light at the surface over depths as great as 15 meters, and one juvenile was found on floating *Sargassum* in the open sea.

TYPE-LOCALITY.—Fort Macon, North Carolina.

DISTRIBUTION.—Southern Massachusetts to Curaçao and westward to Yucatan and Panama; to a depth of 75 meters.

202. *Tozeuma cornutum* A. Milne-Edwards

Tozeuma cornutum A. Milne-Edwards, 1881:16; 1883: pl. 32.

TYPE-LOCALITY.—Off Barbados.

DISTRIBUTION.—This species apparently was known until recent years only from the type-locality off Barbados in 73 meters. Ewald (1969) mentions a single specimen "collected in deep water east of the Florida Keys," and I have been able to examine an ovigerous female taken in Great Lameshur Bay, Saint John, Virgin Islands, by J. E. Randall and L. P. Thomas in 1958.

203. *Tozeuma serratum* A. Milne-Edwards

Tozeuma serratum A. Milne-Edwards, 1881:16; 1883: pl. 32.

TYPE-LOCALITY.—Off Barbados.

DISTRIBUTION.—Like the preceding species, *T. serratum* was apparently known for some time only from the type-locality off Barbados in 102 meters. Schmitt (1924c) recorded a second specimen "collected in deep water east of the Florida Keys." I have been able to examine two additional males. One was collected three miles east-northeast of Crocker Reef, Monroe County, Florida, at a depth of 46 meters by Starck, Herrid, and Emerson, 22 August 1961. The second was taken in the northeastern Gulf of Mexico at 29°49.5'N, 86°06.9'W in 44 meters by Dr. and Mrs. W. E. Pequegnat, 13 November 1965.

Genus *Trachycaris* Calman, 1906

Only one species is known.

204. *Trachycaris restrictus* (A. Milne-Edwards)

Hippolyte restrictus A. Milne-Edwards, 1878:231.

Trachycaris restrictus.—Holthuis 1949b:233, figs. 2, 3.

TYPE-LOCALITY.—Cape Verde Islands.

DISTRIBUTION.—Bermudas to Estado do Pará, Brazil; eastern Atlantic from the Canary Islands to Saint Helena Island; to a depth of 100 meters.

*Family PROCESSIDAE

Key to Genera

1. First pereiopods similar, both chelate. (First pereiopods without exopods; second pereiopods equal.) .... ***Ambidexter***
   First pereiopods dissimilar, one (usually right) chelate, other with simple unopposed dactyl. 2
2. First pereiopod with exopod .... ***Nikoides***
   First pereiopod without exopod .... ****Processa***

Genus *Ambidexter* Manning and Chace, 1971

Only one species is known.

205. *Ambidexter symmetricus* Manning and Chace

Ambidexter symmetricus Manning and Chace, 1971:3, figs. 1, 2.

TYPE-LOCALITY.—Matheson Hammock Wading Beach, Biscayne Bay, Miami, Florida.

DISTRIBUTION.—Gulf of Mexico to Trinidad; sublittoral to 6 meters.

Genus *Nikoides* Paulson, 1875

Only one Atlantic species is known.

206. *Nikoides schmitti* Manning and Chace

Nikoides schmitti Manning and Chace, 1971:8, figs. 3–5.

TYPE-LOCALITY.—Two miles south of Garden Key, Dry Tortugas, Florida.

DISTRIBUTION.—Florida Keys and Guianas; sublittoral to 25 meters.

*Genus *Processa* Leach, 1815

Key to Western Atlantic Species

1. Pleuron of fifth abdominal somite with sharp tooth near posteroventral angle. (Antennal spine present) 2
   Pleuron of fifth abdominal somite with posteroventral margin entire, without projecting tooth 3

2.(1) Eye twice as wide as antennal scale; third pereiopod overreaching antennal scale by length of dactyl and propodus only .... *208. ***P. fimbriata***
   Eye less than one and one-half times as wide as antennal scale; third pereiopod overreaching antennal scale by length of dactyl, propodus, and most of carpus .... 212. ***P. riveroi***

3.(1) Antennal spine lacking 4
   Antennal spine present 5

4.(3) Ventral margin of rostrum only slightly concave in distal half; second pereiopods unequal, right with 19–29 carpal articles, left with 13–15 .... 207. ***P. bermudensis***
   Ventral margin of rostrum markedly concave in distal half; second pereiopods equal, with 10–14 carpal articles .... 214. ***P. vicina***

5.(3) Second pereiopods equal or slightly unequal, merocarpal articulation of right not extending beyond antennal scale 6
   Second pereiopods very unequal, merocarpal articulation of right extending considerably beyond antennal scale 7

Key to Western Atlantic Species—Continued

6.(5) Second pereiopods equal, with 10 carpal articles .... 210. *P. hemphilli*
Second pereiopods slightly unequal, right with 23 carpal articles, left with 15 .... 215. *P. wheeleri*
7.(5) Posterior lobe of sixth abdominal somite, dorsal to uropodal articulation, armed with sharp tooth .... 211. *P. profunda*
Posterior lobe of sixth abdominal somite unarmed 8
8.(7) Rostrum only slightly convex dorsally; fifth pereiopod with propodus four times as long as dactyl, merus longer than carpus .... 209. *P. guyanae*
Rostrum strongly convex dorsally; fifth pereiopod with propodus seven times as long as dactyl, merus shorter than carpus .... 213. *P. tenuipes*

207. *Processa bermudensis* (Rankin)

Nika bermudensis Rankin, 1900:536, pl. 17: figs. 2, 2a, 2b.
Processa bermudensis.—Manning and Chace, 1971:15, figs. 6, 7.

TYPE-LOCALITY.—Harrington Sound, Bermudas.

DISTRIBUTION.—Bermudas and North Carolina to northwestern Florida, Cuba, and Puerto Rico; sublittoral.

*208. *Processa fimbriata* Manning and Chace

Processa fimbriata Manning and Chace, 1971:19, figs. 8–10.

MATERIAL.—Saba Bank (Sta. 106–56: 1♂, 1♀).—Antigua Island (Sta. 73–56: 1♀).—Guadeloupe (Sta. 70–56: 1♂).—Dominica (Sta. 55–56: 1♂; Sta. 62–56: 3♂; Sta. 75–59: 1♀).—Tobago Cays (Sta. 22–56: 1 ovig. ♀).—Tobago (Sta. 8–59: 1 ovig. ♀; Sta. 31–59: 1♂, 3 ovig. ♀).—Isla de Cozumel (Sta. 34–60: 1♂).—Bahía de la Ascensión (Sta. 67–60: 1♂, 1 juv.; Sta. 72–60: 1 ovig. ♀, 1 juv.; Sta. 85–60: 3♂, 2♀; Sta. 87–60: 2♂, 1 ovig. ♀, 1 juv.; Sta. 95–60: 2♂, 3♀, 1?).—Bahía del Espíritu Santo (Sta. 35–60: 3 juv.).

HABITAT.—Most of these specimens were found on coral flats and among coral encrusted rocks from the littoral zone to a depth of 13 meters.

TYPE-LOCALITY.—Off East Key, Dry Tortugas, Florida.

DISTRIBUTION.—North Carolina to Brazil; sublittoral to 37 meters.

209. *Processa guyanae* Holthuis

Processa guyanae Holthuis, 1959:115, figs. 18, 19.

TYPE-LOCALITY.—Off Coppename River, Surinam, 6°54′N, 56°14′W.

DISTRIBUTION.—Known only from off the coast of Surinam; in 44–49 meters.

210. *Processa hemphilli* Manning and Chace

Processa hemphilli Manning and Chace, 1971:23, figs. 11, 12.

TYPE-LOCALITY.—Marco, Florida.

DISTRIBUTION.—Known only from the west coast of Florida; in 2–31 meters.

211. *Processa profunda* Manning and Chace

Processa profunda Manning and Chace, 1971:25, figs. 13–15.

TYPE-LOCALITY.—Gulf of Mexico south of Cape San Blas, Florida, 28°36′N, 85°33′30″W.

DISTRIBUTION.—Known only from the eastern Gulf of Mexico; in 185–348 meters.

212. *Processa riveroi* Manning and Chace

Processa riveroi Manning and Chace, 1971:28, fig. 16.

TYPE-LOCALITY.—Maguey Island, La Parguera, Puerto Rico.

DISTRIBUTION.—Known only from the type-locality; sublittoral.

213. *Processa tenuipes* Manning and Chace

Processa tenuipes Manning and Chace, 1971:31, figs. 17, 18.

TYPE-LOCALITY.—Gulf of Mexico east-southeast of Cape San Blas, Florida, 29°12′N, 84°33′W.

DISTRIBUTION.—Off North Carolina, eastern Gulf of Mexico, and off the north coast of Cuba; in 31–331 meters.

214. *Processa vicina* Manning and Chace

Processa vicina Manning and Chace, 1971:34, figs. 19, 20.

TYPE-LOCALITY.—East of Cape Lookout, North Carolina, 34°35'30"N, 75°45'30"W.

DISTRIBUTION.—Off North Carolina, eastern Gulf of Mexico, and off Venezuela; in 46–100 meters.

215. *Processa wheeleri* Lebour

Processa wheeleri Lebour, 1941:403, figs. 1–9, 11–27.

TYPE-LOCALITY.—Off Bermudas.

DISTRIBUTION.—Known with certainty only from the Bermudas.

*Section Stenopodidea

*Family STENOPODIDAE

Key to Western Atlantic Shallow-water Genera

Body depressed; abdomen without spines on dorsal surface; sixth abdominal somite with pleura; mesial branch of uropod with 1 dorsal ridge .... ****Microprosthema***

Body compressed; abdomen spinose dorsally; sixth abdominal somite without pleura; mesial branch of uropod with 2 dorsal ridges .... ****Stenopus***

*Genus *Microprosthema* Stimpson, 1860

Only one Atlantic species is known.

*216. *Microprosthema semilaeve* (Von Martens)

Stenopus semilaevis Von Martens, 1872:144.—Rankin 1898: 241, pl. 29: fig. 2.

Microprosthema semilaeve.—Holthuis 1946:54, pl. 3: fig. *i*. —Manning 1961a:81.

MATERIAL.—Anguilla (Sta. 54–58: 1 ovig. ♀).—Barbuda (Sta. 98–59: 1♂, 1 ovig. ♀; Sta. 102–59: 1♂).—Saint Christopher (Sta. 103–56: 1♂).—Antigua Island (Sta. 73–56: 2 y♂; Sta. 113–59: 1 ovig. ♀).—Dominica (Sta. 76–59: 1 ovig. ♀).—Saint Lucia Island (Sta. 60–59: 2 y♂).—Tobago Cays (Sta. 22–56: 1♂).—Carriacou Island (Sta. 17–56: 1 ovig. ♀).—Tobago (Sta. 31–59: 1♂).—Bahía de la Ascensión (Sta. 85–60: 1♂, 1 juv.; Sta. 87–60: 1 juv.; Sta. 95–60: 3♂, 2 ovig. ♀).

HABITAT.—This species was collected in various situations. Several were found on sand flats, sometimes studded with boulders, to depths of nearly 4 meters, while others were cracked from reef corals. The specimen from Saint Christopher (Sta. 103–56) was associated with the sea anemone *Bartholomea annulata*.

TYPE-LOCALITY.—Cuba.

DISTRIBUTION.—Bahamas, southern Florida, and Yucatan to Fernando de Noronha; to a depth of 4 meters.

*Genus *Stenopus* Latreille, 1819

Key to Western Atlantic Species

Rostrum unarmed ventrally; third abdominal somite without shield-shaped boss; spines on terga of 3 posterior abdominal somites not arranged in transverse rows; antennal scale unarmed laterally for considerable distance proximal to distolateral tooth and with 2 or 3 rows of spinules arising from dorsal surface .... *217. ***S. hispidus***

Rostrum armed ventrally with 6 to 8 spines; third abdominal tergum bearing lobate, shield-shaped boss on posteromesial part; spines on 3 posterior abdominal terga arranged in transverse rows; antennal scale armed throughout distal two-thirds of lateral margin and without spinules on dorsal surface .... *218. ***S. scutellatus***

*217. *Stenopus hispidus* (Olivier)

Palaemon hispidus Olivier, 1811:666.

Stenopus hispidus.—Holthuis 1946:12, pl. 1: figs. *a–g*.—Limbaugh, Pederson, and Chace 1961:251, fig. 8.

MATERIAL.—Anguilla (Sta. 54–58: 1♂, 1 ovig. ♀).—Antigua Island (Sta. 72–56: 1♂; Sta. 73–56: 1♂; Sta. 82–56: 2 juv.; Sta. 83–56: 5♂, 4 ovig. ♀; Sta. 78–58: 1♂; Sta. 80–58: 1 y♂; Sta.

?–59: 2♂, 1 ovig. ♀; Sta. ?–59: 1♂, 1 ovig. ♀).—Saint Lucia Island (Sta. 53–59: 4♂).—Bahía de la Ascensión (Sta. 81–60: 1♂; Sta. 85–60: 3♂; Sta. 95–60: 1♂, 3 ovig. ♀).

HABITAT.—Most of the specimens were collected from a seawall, rocky shores, a waterlogged stump, and a shipwreck, occasionally to a depth of 5½ meters.

TYPE-LOCALITY.—"Australasiatic Seas."

DISTRIBUTION.—Bermudas and southern Florida to French Guiana; Red Sea and southeastern Africa to Japan, Hawaii, and Tuamotu Archipelago; to a depth of 210 meters.

*218. *Stenopus scutellatus* Rankin

Stenopus scutellatus Rankin, 1898:242, pl. 29: fig. 3.—Holthuis 1946:28, pl. 3: figs. *a, b*.—Limbaugh, Pederson, and Chace 1961:253, fig. 9.

MATERIAL.—Saint Martin (Sta. 46–58: 1♂, 1 ovig. ♀).—Saint Lucia Island (Sta. 53–59: 2♂, 1 ovig. ♀).—Tobago (Sta. 15–59: 2♂; Sta. 26–59: 1♂, 1 ovig. ♀).—Bahía de la Ascensión (Sta. 72–60: 1♂, 1 ovig. ♀; Sta. 91–60: 2♂, 1 ovig. ♀).

HABITAT.—These specimens were found in a variety of situations: a coral reef, a waterlogged stump, grass flats where there were conchs and *Porites* clumps, and a rocky bottom in 2–4 meters of water.

TYPE-LOCALITY.—Silver Cay, New Providence, Bahamas.

DISTRIBUTION.—Bermudas and the Gulf of Mexico to Fernando de Noronha; to a depth of 113 meters.

Station List

(Stations of the Smithsonian-Bredin Caribbean Expeditions at which natantian shrimps were collected and the species taken at each station)

EXPEDITION OF MARCH AND APRIL 1956

2–56. Trinidad; Maracas Bay River; 9 March; 8:00–10:00 A.M.
- 30. *Potimirim glabra*
- 46. *Macrobrachium carcinus*
- 47. *Macrobrachium crenulatum*

4–56. Grenada; Point Saline; rocks at northeast end of first beach on lee coast; 14 March.
- 121. *Alpheus bouvieri*
- 190. *Lysmata anchisteus*

6–56. Grenada; Point Saline; rocks at southwest end of first beach on lee coast; 14 March.
- 190. *Lysmata anchisteus*

8–56. Grenada; Grand Anse Bay outside Saint George's Harbour; from partially exposed conglomerate rock and coral ledge along shore; 14 March.
- 121. *Alpheus bouvieri*
- 129. *Alpheus malleator*
- 135. *Alpheus schmitti*

9–56. Grenada; Grand Anse Bay outside Saint George's Harbour; sublittoral; 14 March.
- 117. *Alpheus bahamensis*

15–56. Carriacou Island; Tyrrell Bay; submerged timbers from wreck near mangrove swamp; 16 March; 8:00–10:00 A.M.
- 75. *Periclimenes americanus*
- 121. *Alpheus bouvieri*
- 126. *Alpheus formosus*
- 148. *Synalpheus apioceros*
- 157. *Synalpheus fritzmuelleri*
- 186. *Hippolyte zostericola*
- 200. *Thor manningi*

16–56. Carriacou Island; Tyrrell Bay; outer edge of exposed reef near anchorage (chiefly dead *Pocillopora*); 16 March; 10:00–11:30 A.M.
- 75. *Periclimenes americanus*
- 117. *Alpheus bahamensis*
- 123. *Alpheus cristulifrons*
- 126. *Alpheus formosus*
- 154. *Synalpheus disparodigitus*
- 157. *Synalpheus fritzmuelleri*
- 164. *Synalpheus minus*
- 168. *Synalpheus paraneptunus*
- 170. *Synalpheus rathbunae*
- 173. *Synalpheus townsendi*

17–56. Carriacou Island; sand flats inside reef; 16 March; 10:00–11:30 A.M.
- 75. *Periclimenes americanus*
- 117. *Alpheus bahamensis*
- 126. *Alpheus formosus*
- 130. *Alpheus normanni*
- 173. *Synalpheus townsendi*
- 183. *Hippolyte curacaoensis*
- 186. *Hippolyte zostericola*
- 187. *Latreutes fucorum*
- 200. *Thor manningi*
- 216. *Microprosthema semilaeve*

21–56. Tobago Cays; west (lee) side of Baradal; under stones and in coral rock at low tide; 17 March; 11:00 A.M. – 1:00 P.M.
- 107. *Gnathophylloides mineri*
- 116. *Alpheus armillatus*
- 117. *Alpheus bahamensis*
- 121. *Alpheus bouvieri*
- 131. *Alpheus nuttingi*
- 132. *Alpheus paracrinitus*

22–56. Tobago Cays; west (lee) side of Baradal; in coral rock 1 m deep; 17 March; 11:00 A.M. – 1:00 P.M.
- 75. *Periclimenes americanus*

101. *Typton carneus*
126. *Alpheus formosus*
134. *Alpheus ridleyi*
152. *Synalpheus brooksi*
157. *Synalpheus fritzmuelleri*
162. *Synalpheus longicarpus*
164. *Synalpheus minus*
208. *Processa fimbriata*
216. *Microprosthema semilaeve*

23–56. Tobago Cays; west (lee) side of Baradal; in sponges 1 m deep; 17 March; 11:00 A.M. – 1:00 P.M.
101. *Typton carneus*
133. *Alpheus peasei*
152. *Synalpheus brooksi*
157. *Synalpheus fritzmuelleri*
162. *Synalpheus longicarpus*
164. *Synalpheus minus*

24–56. Tobago Cays: west (lee) side of Baradal; in loggerhead sponge 1 m deep; 17 March; 1:00 P.M.
75. *Periclimenes americanus*
124. *Alpheus cylindricus*
152. *Synalpheus brooksi*
162. *Synalpheus longicarpus*
163. *Synalpheus mcclendoni*

34–56. Mustique; off coral reef along shore near anchorage, lee side of island; sublittoral; 19 March; 8:30–10:30 A.M.
2. *Metapenaeopsis goodei*
75. *Periclimenes americanus*
157. *Synalpheus fritzmuelleri*

35–56. Mustique; reef along shore near anchorage, lee side of island; from loggerhead sponge; 19 March; 10:30 A.M.
124. *Alpheus cylindricus*
162. *Synalpheus longicarpus*
169. *Synalpheus pectiniger*

38–56. Saint Lucia Island; Marigot Harbour, outside of lagoon; seine hauls along shore; 21 March; 11:30 A.M.
201. *Tozeuma carolinense*

41–56. Saint Lucia Island; Marigot Harbour, just outside of lagoon; collected by diving in 2 m; snapping shrimps associated with sea anemones; 21 March; 1:00 P.M.
115. *Alpheus armatus*
162. *Synalpheus longicarpus*

47–56. Saint Lucia Island; reef off Pigeon Island; collected by diving in ½–3 m; 22 March; 9:00–11:00 A.M.
90. *Periclimenes rathbunae*
134. *Alpheus ridleyi*
164. *Synalpheus minus*

50–56. Martinique; Baie de Fort-de-France; light over side; 24 March; 7:00–9:30 P.M.
22. *Lucifer faxoni*

52–56. Dominica; Woodbridge Bay; dredged in 4 m; 25 March; 5:30–6:00 P.M.
4. *Metapenaeopsis martinella*
17. *Sicyonia parri*
201. *Tozeuma carolinense*

53–56. Dominica; Woodbridge Bay; light over side; 25 March; 7:00–9:00 P.M.
201. *Tozeuma carolinense*

55–56. Dominica; north end of Woodbridge Bay; from coral-encrusted boulders; 26 March; 3:00–4:00 P.M.
114. *Alpheus amblyonyx*
151. *Synalpheus brevifrons*
157. *Synalpheus fritzmuelleri*
168. *Synalpheus paraneptunus*
208. *Processa fimbriata*

61–56. Dominica; Prince Rupert Bay; dredged in 11–27 m; 28 March; 2:30–3:00 P.M.
159. *Synalpheus hemphilli*
168. *Synalpheus paraneptunus*
200. *Thor manningi*

62–56. Dominica; north end of Prince Rupert Bay; from coral-encrusted rocks in 1½ m; 28 March; 4:00–5:00 P.M.
65. *Periclimenaeus ascidiarum?*
69. *Periclimenaeus caraibicus*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
133. *Alpheus peasei*
157. *Synalpheus fritzmuelleri*
158. *Synalpheus goodei*
168. *Synalpheus paraneptunus*
188. *Latreutes inermis*
197. *Thor amboinensis*
208. *Processa fimbriata*

64–56. Dominica; Prince Rupert Bay; light over side at anchorage in 7 m; 28 March; 8:45–9:30 P.M.
36. *Leptochela bermudensis*

68–56. Guadeloupe; Pointe-à-Pitre; sandy mud flats between Îlet à Monroux and Îlet Rat; 30, 31 March; 9:30 A.M. – 1:00 P.M.
7. *Penaeus (Melicertus) brasiliensis*
51. *Palaemon (Palaeander) northropi*
55. *Palaemonetes (Palaemonetes) octaviae*
75. *Periclimenes americanus*
116. *Alpheus armillatus*
125. *Alpheus floridanus*
131. *Alpheus nuttingi*
137. *Alpheus viridari*
183. *Hippolyte curacaoensis*
201. *Tozeuma carolinense*

69–56. Guadeloupe; Îlet Rat, off Pointe-à-Pitre; from exposed reef and submerged weedy rocks; 30, 31 March; 9:30 A.M. – 1:00 P.M.
108. *Gnathophyllum americanum*
117. *Alpheus bahamensis*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
131. *Alpheus nuttingi*
157. *Synalpheus fritzmuelleri*

164. *Synalpheus minus*
200. *Thor manningi*

70–56. Guadeloupe; Pointe-à-Pitre; dead coral flat east of Îlet à Cochons; 31 March; 12:30–2:00 P.M.
90. *Periclimenes rathbunae*
121. *Alpheus bouvieri*
123. *Alpheus cristulifrons*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
168. *Synalpheus paraneptunus*
208. *Processa fimbriata*

72–56. Antigua Island; English Harbour; along dockyard seawall; 2, 4, 8 April; 10:00 A.M.
108. *Gnathophyllum americanum*
197. *Thor amboinensis*
217. *Stenopus hispidus*

73–56. Antigua Island; Charlotte Point, English Harbour; 2 April; 1:00–6:00 P.M.
42. *Brachycarpus biunguiculatus*
90. *Periclimenes rathbunae*
92. *Periclimenes yucatanicus*
96. *Pontonia miserabilis*
97. *Pontonia quasipusilla*
101. *Typton carneus*
108. *Gnathophyllum americanum*
112. *Alpheopsis labis*
115. *Alpheus armatus*
116. *Alpheus armillatus*
117. *Alpheus bahamensis*
121. *Alpheus bouvieri*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
132. *Alpheus paracrinitus*
133. *Alpheus peasei*
134. *Alpheus ridleyi*
142. *Metalpheus rostratipes*
148. *Synalpheus apioceros*
152. *Synalpheus brooksi*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
173. *Synalpheus townsendi*
174. *Thunor rathbunae*
183. *Hippolyte curacaoensis*
192. *Lysmata intermedia*
197. *Thor amboinensis*
200. *Thor manningi*
208. *Processa fimbriata*
216. *Microprosthema semilaeve*
217. *Stenopus hispidus*

74–56. Antigua Island; Tank Bay, English Harbour; seine hauls on mud bottom; under rocks and oyster bar; along beach; 3 April; 2:30–3:30 P.M.
6. *Penaeus (Melicertus) aztecus subtilis*
7. *Penaeus (Melicertus) brasiliensis*
75. *Periclimenes americanus*
116. *Alpheus armillatus*
125. *Alpheus floridanus*
130. *Alpheus normanni*
137. *Alpheus viridari*
186. *Hippolyte zostericola*

75–56. Antigua Island; Freeman's Bay, English Harbour; from seine hauls and diving in shallow water; 3 April; 3:30–5:00 P.M.
44. *Leander tenuicornis*
115. *Alpheus armatus*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
183. *Hippolyte curacaoensis*
190. *Lysmata anchisteus*
200. *Thor manningi*

77–56. Antigua Island; English Harbour; from ship fender along dockyard seawall; 4 April; 2:30 P.M.
126. *Alpheus formosus*
137. *Alpheus viridari*
192. *Lysmata intermedia*

78–56. Antigua Island; English Harbour; dredged in 5½ m; 4 April; 3:00 P.M.
75. *Periclimenes americanus*
126. *Alpheus formosus*

80–56. Antigua Island; English Harbour; from wreck of iron ship *Ordnance Bay;* 4 April; 4:00 P.M.
75. *Periclimenes americanus*
148. *Synalpheus apioceros*
200. *Thor manningi*

81–56. Antigua Island; Commissioner's Bay, English Harbour; from fragment of wooden piling; 4 April; 3:45 P.M.
75. *Periclimenes americanus*
173. *Synalpheus townsendi*
200. *Thor manningi*

82–56. Antigua Island; English Harbour; from bottom of yacht *Native Dancer* anchored for several months; 4 April; 4:30–5:15 P.M.
75. *Periclimenes americanus*
148. *Synalpheus apioceros*
157. *Synalpheus fritzmuelleri*
200. *Thor manningi*
217. *Stenopus hispidus*

83–56. Antigua Island; English Harbour; collected by flashlight along dockyard seawall; 4, 8, 9 April; 8:30–9:30 P.M.
5. *Metapenaeopsis smithi*
6. *Penaeus (Melicertus) aztecus subtilis*
7. *Penaeus (Melicertus) brasiliensis*
42. *Brachycarpus biunguiculatus*
179. *Barbouria antiguensis*
217. *Stenopus hispidus*

84–56. Barbuda; off Oyster Pond Landing, west side of island; light over side at anchorage in 5½ m; 5 April; 7:00–8:30 P.M.
22. *Lucifer faxoni*
36. *Leptochela bermudensis*
38. *Leptochela serratorbita*

85–56. Barbuda; west shore of lagoon near Oyster Pond Landing; 6 April; 9:30 A.M. – 12:00 M.
42. *Brachycarpus biunguiculatus*

75. *Periclimenes americanus*
130. *Alpheus normanni*
152. *Synalpheus brooksi*
164. *Synalpheus minus*
170. *Synalpheus rathbunae*
192. *Lysmata intermedia*

92–56. Barbuda; Martello Tower, south coast of island; offshore reefs; 7 April; 11:30 A.M. – 12:00 M.
75. *Periclimenes americanus*
117. *Alpheus bahamensis*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
157. *Synalpheus fritzmuelleri*
200. *Thor manningi*

94–56. Antigua Island; English Harbour; from bottom of yacht *Mercy Marsden* docked in harbor for two or three years; 9 April; 5:00 P.M.
148. *Synalpheus apioceros*
157. *Synalpheus fritzmuelleri*

103–56. Saint Christopher; windward beach opposite Frigate Bay; coral reef just off shore; 12 April; 1:30–3:30 P.M.
75. *Periclimenes americanus*
92. *Periclimenes yucatanicus*
115. *Alpheus armatus*
116. *Alpheus armillatus*
117. *Alpheus bahamensis*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
130 *Alpheus normanni*
133. *Alpheus peasei*
164. *Synalpheus minus*
173. *Synalpheus townsendi*
183. *Hippolyte curacaoensis*
192. *Lysmata intermedia*
200. *Thor manningi*
216. *Microprosthema semilaeve*

104–56. Saint Christopher; Basseterre; light over side at anchorage in 7 m; 12 April; 8:00–8:45 P.M.
12. *Trachypeneopsis mobilispinis*

106–56. Saba Bank; 17°28'N, 63°13'W; dredged in 13 m; 13 April; 5:30–6:30 P.M.
42. *Brachycarpus biunguiculatus*
99. *Pseudocoutierea antillensis*
101. *Typton carneus*
170. *Synalpheus rathbunae*
208. *Procesa fimbriata*

108–56. Saba Bank; 6 miles northwest by ½ north from Station 106–56; light over side in 55 m; 13 April; 9:30–10:45 P.M.
61. *Anchistioides antiguensis*

110–56. Virgin Gorda; off Vixen Point, Prickly Pear Island; light over side at anchorage in 15 m; 14 April; 8:00–8:30 P.M.
201. *Tozeuma carolinense*

111–56. Virgin Gorda; Vixen Point, Prickly Pear Island; along beach with much *Pocillopora;* 15 April; 7:45 A.M. and 5:30–6:30 P.M.
75. *Periclimenes americanus*
105. *Typton tortugae*
115. *Alpheus armatus*
116. *Alpheus armillatus*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
139. *Automate gardineri*
157. *Synalpheus fritzmuelleri*
162. *Synalpheus longicarpus*
164. *Synalpheus minus*
169. *Synalpheus pectiniger*
170. *Synalpheus rathbunae*
173. *Synalpheus townsendi*
192. *Lysmata intermedia*

112–56. Virgin Gorda; Colquhoun Reef at entrance to North Sound; 15 April; 9:30–11:30 A.M.
75. *Periclimenes americanus*
82. *Periclimenes longicaudatus*
92. *Periclimenes yucatanicus*
108. *Gnathophyllum americanum*
115. *Alpheus armatus*
116. *Alpheus armillatus*
117. *Alpheus bahamensis*
126. *Alpheus formosus*
132. *Alpheus paracrinitus*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
167. *Synalpheus pandionis*
173. *Synalpheus townsendi*
174. *Thunor rathbunae*
188. *Latreutes inermis*
192. *Lysmata intermedia*
200. *Thor manningi*

115–56. Tortola; Road Harbour; light over side at anchorage in 11 m; 16, 17 April; 8:00–8:45 P.M.
22. *Lucifer faxoni*
42. *Brachycarpus biunguiculatus*

117–56. Tortola; reef off Burt Point, Road Harbour; 17 April; 2:00–4:00 P.M.
75. *Periclimenes americanus*
115. *Alpheus armatus*
117. *Alpheus bahamensis*
126. *Alpheus formosus*
130. *Alpheus normanni*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
173. *Synalpheus townsendi*
192. *Lysmata intermedia*
200. *Thor manningi*

Expedition of March to May 1958

5–58. Tortola; Burt Point, Road Harbour; flats with *Porites* clumps and much dead coral; 27 March; 9:00–10:00 A.M.
126. *Alpheus formosus*
137. *Alpheus viridari*
157. *Synalpheus fritzmuelleri*

173. *Synalpheus townsendi*
192. *Lysmata intermedia*
200. *Thor manningi*

7–58. En route Road Harbour, Tortola to Guana Island; from *Sargassum* collected with insect net; 27 March.
44. *Leander tenuicornis*
187. *Latreutes fucorum*
201. *Tozeuma carolinense*

9–58. Guana Island; White Bay; from reefs in cove; honeycombed coral rock, *Porites* clumps, and diving in about 2 m; 28 March.
75. *Periclimenes americanus*
116. *Alpheus armillatus*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
132. *Alpheus paracrinitus*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
167. *Synalpheus pandionis*
173. *Synalpheus townsendi*
192. *Lysmata intermedia*

10–58. Virgin Gorda; east of Vixen Point, Prickly Pear Island; from grass beds, *Porites, Millepora,* and some *Acropora;* shore to 2 m; 28 March.
5. *Metapenaeopsis smithi*
108. *Gnathophyllum americanum*
164. *Synalpheus minus*
192. *Lysmata intermedia*
200. *Thor manningi*

18–58. Peter Island; Little Bay; from three or four hauls of small-toothed dredge in 16–27 m on sandy, shelly bottom around anchorage; 29 March.
2. *Metapenaeopsis goodei*

21–58. Peter Island; Little Bay; dredged in 4½–18 m; 30 March.
2. *Metapenaeopsis goodei*
75. *Periclimenes americanus*

22–58. Peter Island; Little Bay; collected by diving in 1–2 m off landing; 30 March.
92. *Periclimenes yucatanicus*
113. *Alpheopsis trigonus*

23–58. Tortola; Sopers Hole, West End; from flats before mangroves at head of bay in 2–3 feet; rocky, muddy, few corals, turtle grass; 31 March.
17. *Sicyonia parri*
44. *Leander tenuicornis*
75. *Periclimenes americanus*
115. *Alpheus armatus*
126. *Alpheus formosus*
132. *Alpheus paracrinitus*
167. *Synalpheus pandionis*
173. *Synalpheus townsendi*
192. *Lysmata intermedia*
200. *Thor manningi*

26–58. Tortola; Sopers Hole, West End; from poisoning in and about old wreck measuring 9 × 4½ m and from diving; 1 April.
88. *Periclimenes pedersoni*

33–58. Saint Thomas; Saint Thomas Harbor; dredged in 4–9 m, chiefly near north shore; 4 April.
8. *Penaeus (Melicertus) duorarum notialis*

35–58. Norman Island; Treasure Point; shore collecting; 6 April; 9:30–11:30 A.M.
187. *Latreutes fucorum*
200. *Thor manningi*

36b–58. Virgin Gorda; off Vixen Point, Prickly Pear Island; light at bottom at anchorage in 20 m; 6 April; 9:00 P.M.
22. *Lucifer faxoni*

37–58. Virgin Gorda; Colquhoun Reef at entrance to North Sound; 7 April; 7:00–11:00 A.M.
44. *Leander tenuicornis*
150. *Synalpheus bousfieldi*

40–58. Virgin Gorda; southwest of Vixen Point, Prickly Pear Island; dredged in 20 m on clay and calcareous sand bottom; 7 April; 2:00–3:00 P.M.
2. *Metapenaeopsis goodei*

42–58. Anegada; Pomato Point; from reef edge and grass flats in less than 1 m; 8 April.
44. *Leander tenuicornis*
148. *Synalpheus apioceros*

46–58. Saint Martin; Groot Baai; collected by diving in 2–4 m over rocky bottom off lighter landing on east side of bay; 11 April; 2:30–6:00 P.M.
218. *Stenopus scutellatus*

54–58. Anguilla; Sandy Island; collected by diving in 2–4 m; 13 April.
216. *Microprosthema semilaeve*
217. *Stenopus hispidus*

55–58. Anguilla; Sandy Island; collected along shore at northeast corner; 13 April.
75. *Periclimenes americanus*
116. *Alpheus armillatus*
117. *Alpheus bahamensis*
126. *Alpheus formosus*
132. *Alpheus paracrinitus*
133. *Alpheus peasei*
134. *Alpheus ridleyi*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
200. *Thor manningi*

67–58. Nevis; off Charlestown; dredged in 4–5½ m on weedy bottom near anchorage; 16 April; 5:00–6:00 P.M.
42. *Brachycarpus biunguiculatus*
187. *Latreutes fucorum*

70–58. Nevis; 3¾ km west by southwest from Charlestown; from Finlay mollusk trap set previous day in 48 m; 17 April.
42. *Brachycarpus biunguiculatus*

78–58. Antigua Island; English Harbour; scraped from seawall with Weber scoop; 19 April; afternoon and evening.
148. *Synalpheus apioceros*
217. *Stenopus hispidus*

79–58. Antigua Island; Freeman's Bay, English Harbour; from grass patch and nearby; 19 April; afternoon.
69. *Periclimenaeus caraibicus*
75. *Periclimenes americanus*
125. *Alpheus floridanus*
148. *Synalpheus apioceros*
200. *Thor manningi*

80–58. Antigua Island; English Harbour; light over side at mooring along seawall; 19 April; evening.
7. *Penaeus (Melicertus) brasiliensis*
22. *Lucifer faxoni*
201. *Tozeuma carolinense*
217. *Stenopus hispidus*

93–58. Antigua Island; just south of Bird Island, Nonsuch Bay; light over side at anchorage in 7 m; 23 April.
4. *Metapenaeopsis martinella*
38. *Leptochela serratorbita*

96–58. Antigua Island; north side of Bird Island, Nonsuch Bay; on and under rocks in 1–4 feet; *Acropora* and *Millepora* plentiful; 24 April; 7:30–9:00 A.M.
117. *Alpheus bahamensis*
140. *Automate rectifrons*
200. *Thor Manningi*

100–58. Barbuda; Dark Cave; 25 April.
33. *Typhlatya monae*

105–58. Barbuda; vicinity of jetty at Codrington; 27 April.
7. *Penaeus (Melicertus) brasiliensis*

108–58. Barbuda; east side of Cocoa Point; seining over turtle grass and other vegetation; 27 April.
17. *Sicyonia parri*
44. *Leander tenuicornis*

111–58. Barbuda; east of Spanish Point; *Porites* flats; 28 April.
42. *Brachycarpus biunguiculatus*
116. *Alpheus armillatus*
126. *Alpheus formosus*
131. *Alpheus nuttingi*

112a–58. Barbuda; west and south of Spanish Point; cracked from dead coral and living coral bases; 28 April.
75. *Periclimenes americanus*
113. *Alpheopsis trigonus*
116. *Alpheus armillatus*
133. *Alpheus peasei*
137. *Alpheus viridari*
200. *Thor manningi*

112c–58. Barbuda; east shore of Spanish Point; from "purple-stained" *Porites;* 29 April.
75. *Periclimenes americanus*
200. *Thor manningi*

113a–58. Barbuda; Gravenor Bay; along shore in honeycombed coral rock and limestone and among turtle grass. 28 April.
5. *Metapenaeopsis smithi*
132. *Alpheus paracrinitus*
148. *Synalpheus apioceros*
164. *Synalpheus minus*

123–58. Antigua Island; English Harbour; 3 May.
116. *Alpheus armillatus*
137. *Alpheus viridari*

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4–59. Tobago; west of Pigeon Point; 4 April; 1:00–3:30 P.M.
75. *Periclimenes americanus*
115. *Alpheus armatus*
116. *Alpheus armillatus*
117. *Alpheus bahamensis*
130. *Alpheus normanni*
164. *Synalpheus minus*
183. *Hippolyte curacaoensis*
200. *Thor manningi*

6–59. Tobago; west of Pigeon Point; cracked from weedy coral rock; 4 April; 1:00–3:30 P.M.
116. *Alpheus armillatus*
117. *Alpheus bahamensis*
128. *Alpheus intrinsecus*

8–59. Tobago; Buccoo Reef; 5 April; 9:30 A.M. – 12:30 P.M.
75. *Periclimenes americanus*
117. *Alpheus bahamensis*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
130. *Alpheus normanni*
132. *Alpheus paracrinitus*
133. *Alpheus peasei*
134. *Alpheus ridleyi*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
173. *Synalpheus townsendi*
192. *Lysmata intermedia*
200. *Thor manningi*
208. *Processa fimbriata*

15–59. Tobago; Buccoo Reef; from high ground dry at extra low tide; 6 April; 7:00–9:00 A.M.
115. *Alpheus armatus*
117. *Alpheus bahamensis*
126. *Alpheus formosus*
135. *Alpheus schmitti*
157. *Synalpheus fritzmuelleri*
158. *Synalpheus goodei*
164. *Synalpheus minus*
173. *Synalpheus townsendi*
218. *Stenopus scutellatus*

20–59. Tobago; Man of War Bay; dredged with Morrison toothed dredge in 11–20 m; 8 April; 11:00 A.M. – 12:30 P.M.
4. *Metapenaeopsis martinella*
17. *Sicyonia parri*
82. *Periclimenes longicaudatus*

25–59. Tobago; Bloody Bay; tow-netted (12″ net); 8 April; 8:15 A.M.

22. *Lucifer faxoni*

26–59. Tobago; Buccoo Reef; 9 April.
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
135. *Alpheus schmitti*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
173. *Synalpheus townsendi*
197. *Thor amboinensis*
200. *Thor manningi*
218. *Stenopus scutellatus*

27–59. Tobago; Parlatuvier-Roxborough road; 9 April.
30. *Potimirim glabra*

30–59. Tobago; east of Pigeon Point; 10 April.
137. *Alpheus viridari*
152. *Synalpheus brooksi*
162. *Synalpheus longicarpus*
163. *Synalpheus mcclendoni*
200. *Thor manningi*

31–59. Tobago; west of Pigeon Point; sand flats off beach; 10 April.
75. *Periclimenes americanus*
81. *Periclimenes iridescens*
101. *Typton carneus*
115. *Alpheus armatus*
117. *Alpheus bahamensis*
126. *Alpheus formosus*
130. *Alpheus normanni*
132. *Alpheus paracrinitus*
148. *Synalpheus apioceros*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
173. *Synalpheus townsendi*
183. *Hippolyte curacaoensis*
200. *Thor manningi*
208. *Processa fimbriata*
216. *Microprosthema semilaeve*

38–59. Tobago; near Crown Point Hotel; dredging in 7–9 m on sandy bottom; 11 April.
4. *Metapenaeopsis martinella*
7. *Penaeus (Melicertus) brasiliensis*

42–59. Tobago; Milford Bay, between Pigeon Point and Crown Point; collected by diving in 9–12 m; 12 April.
184. *Hippolyte nicholsoni*
188. *Latreutes inermis*

44–59. Tobago; river at Hermitage, about ¾ km from mouth; 12 April.
47. *Macrobrachium crenulatum*
48. *Macrobrachium faustinum*

48–59. West of Saint Vincent Island; from plankton tow near surface; 13 April; 10:15 A.M.
22. *Lucifer faxoni*

51–59. Saint Lucia Island; Marigot Harbour; sandy shore with some rock, coral, and *Thalassia* beds along west side of peninsula on north side of bay; 14 April.
75. *Periclimenes americanus*

52–59. Saint Lucia Island; reef just south of Marigot Harbour; collected in 4–6 m; 14 April.
64. *Neopontonides beaufortensis*
184. *Hippolyte nicholsoni*
188. *Latreutes inermis*

53–59. Saint Lucia Island; Marigot Harbour; from outside surface and burrows of waterlogged, *Teredo*-riddled stump about 3 × 2 × 2 feet, just below surface at low tide on sandy shore along west side of peninsula on north side of bay; 14 April.
69. *Periclimenaeus caraibicus*
75. *Periclimenes americanus*
107. *Gnathophylloides mineri*
115. *Alpheus armatus*
200. *Thor manningi*
217. *Stenopus hispidus*
218. *Stenopus scutellatus*

56–59. Saint Lucia Island; Marigot Harbour; sandy shore with some rock, coral, and *Thalassia* beds along west side of peninsula on north side of bay; 15 April.
95. *Pontonia mexicana*
157. *Synalpheus fritzmuelleri*

57–59. Saint Lucia Island; reef south of Marigot Harbour; collected in 2–3 m; 15 April.
77. *Periclimenes bowmani*

60–59. Saint Lucia Island; Pigeon Island; sand and boulder flats inside, outside, and off end of breakwater north of Pigeon Island Club, 1–6 feet; 15 April.
115. *Alpheus armatus*
117. *Alpheus bahamensis*
126. *Alpheus formosus*
131. *Alpheus nuttingi*
216. *Microprosthema semilaeve*

64–59. Saint Lucia Island; off Pigeon Island; dredged in 10–12 feet over sandy bottom with turtle-grass patches; 16 April; 8:30–9:00 A.M.
17. *Sicyonia parri*
44. *Leander tenuicornis*

65–59. Saint Lucia Island; off north end of Pigeon Island; collected by diving outside of reef; 16 April.
133. *Alpheus peasei*
142. *Metalpheus rostratipes*
148. *Synalpheus apioceros*
157. *Synalpheus fritzmuelleri*
163. *Synalpheus mcclendoni*
174. *Thunor rathbunae*

70–59. Dominica; Prince Rupert Bay; from subsurface plankton tow in outer part of bay; 18 April; 5:30 P.M.
22. *Lucifer faxoni*

72–59. Dominica; west of Portsmouth; from Finlay mollusk trap set overnight in 275 m; 19 April.
79. *Periclimenes finlayi*

73–59. Dominica; Indian River about ¾ km from mouth; 19 April.

27. *Jonga serrei*
28. *Micratya poeyi*
35. *Xiphocaris elongata*

75–59. Dominica; north end of Prince Rupert Bay; among boulders, rocks, dead coral head, and few *Acropora* just offshore in 1–1½ feet; 19 April; 4:00–6:00 P.M.
17. *Sicyonia parri*
117. *Alpheus bahamensis*
123. *Alpheus cristulifrons*
130. *Alpheus normanni*
133. *Alpheus peasei*
142. *Metalpheus rostratipes*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
173. *Synalpheus townsendi*
200. *Thor manningi*
208. *Processa fimbriata*

76–59. Dominica; north end of Prince Rupert Bay; collected by diving in 3–6 feet off shingle beach; 19 April; 3:30–5:15 P.M.
216. *Microprosthema semilaeve*

90–59. Barbuda; Dark Cave; 24 April.
33. *Typhlatya monae*

92–59. Barbuda; Oyster Pond Landing, west side of island; from black sponge about 25 cm high and 45 cm in diameter; 25 April.
152. *Synalpheus brooksi*
170. *Synalpheus rathbunae*

96–59. Barbuda; east side of Cocoa Point; collected from grass beds with plankton net, Needham scoop, etc.; 26 April.
44. *Leander tenuicornis*

98–59. Barbuda; "north" side of Cocoa Point; cracked from dead coral and from living and dead *Porites* clumps from a depth of 1–2 feet on reef close to shore; 26 April.
44. *Leander tenuicornis*
75. *Periclimenes americanus*
116. *Alpheus armillatus*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
132. *Alpheus paracrinitus*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
187. *Latreutes fucorum*
200. *Thor manningi*
216. *Microprosthema semilaeve*

99–59. Barbuda; off Cocoa Point; dredged in 8 m near anchorage; 26 April.
2. *Metapenaeopsis goodei*
12. *Trachypeneopsis mobilispinis*

102–59. Barbuda; east side of Cocoa Point; poisoned with rotenone concentrate; 27 April.
41. *Rhynchocinetes rigens*
44. *Leander tenuicornis*
69. *Periclimenaeus caraibicus*
75. *Periclimenes americanus*
116. *Alpheus armillatus*
126. *Alpheus formosus*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
187. *Latreutes fucorum*
192. *Lysmata intermedia*
200. *Thor manningi*
216. *Microprosthema semilaeve*

102a–59. Barbuda; east side of Cocoa Point; from algae; 27 April.
132. *Alpheus paracrinitus*
157. *Synalpheus fritzmuelleri*
173. *Synalpheus townsendi*
187. *Latreutes fucorum*

103–59. Barbuda; east side of Cocoa Point; washed from grass growing in about 2½ feet; 27 April.
44. *Leander tenuicornis*
187. *Latreutes fucorum*

104–59. Antigua Island; Freeman's Bay, English Harbour; 28 April; 4:30–5:00 P.M.
44. *Leander tenuicornis*
88. *Periclimenes pedersoni*
90. *Periclimenes rathbunae*
164. *Synalpheus minus*
187. *Latreutes fucorum*
200. *Thor manningi*

104a–59. Antigua Island; Freeman's Bay, English Harbour; 28 April; 11:30 A.M. – 12:00 M.
88. *Periclimenes pedersoni*

105–59. Antigua Island; English Harbour; dockyard seawall; 29 April.
96. *Pontonia miserabilis*
148. *Synalpheus apioceros*
200. *Thor manningi*

109–59. Antigua Island; Falmouth Harbour; beach north of Black's Point; from turtle grass in 2–3 feet; 30 April.
44. *Leander tenuicornis*
130. *Alpheus normanni*
183. *Hippolyte curacaoensis*
200. *Thor manningi*

110–59. Antigua Island; Falmouth Harbour; beach north of Black's Point; cracked from rocks and coral; 30 April.
75. *Periclimenes americanus*
116. *Alpheus armillatus*
126. *Alpheus formosus*
131. *Alpheus nuttingi*
135. *Alpheus schmitti*

112–59. Antigua Island; Falmouth Harbour; off Black's Point; from turtle grass uprooted in 2–3 feet; 30 April.
42. *Brachycarpus biunguiculatus*
116. *Alpheus armillatus*
130. *Alpheus normanni*
132. *Alpheus paracrinitus*
200. *Thor manningi*

113–59. Antigua Island; Falmouth Harbour; reef off Black's Point; 30 April.
- 90. *Periclimenes rathbunae*
- 115. *Alpheus armatus*
- 184. *Hippolyte nicholsoni*
- 188. *Latreutes inermis*
- 197. *Thor amboinensis*
- 216. *Microprosthema semilaeve*

116–59. Antigua Island; Freeman's Bay, English Harbour; from trap baited with crushed sea urchin; 2 May.
- 88. *Periclimenes pedersoni*
- 90. *Periclimenes rathbunae*
- 107. *Gnathophylloides mineri*

Expedition of March to May 1960

17–60. Isla Mujeres; bay side of inlet in harbor between larger island with oil tanks south of village and smaller islet to north; grass flats, calcareous mud (calcareous algae) in 1–3 feet; 30 March.
- 68. *Periclimenaeus bredini*
- 152. *Synalpheus brooksi*
- 199. *Thor floridanus*

26–60. Isla Mujeres; bay south of village, east of larger island; dredged on grass bottom; 31 March.
- 2. *Metapenaeopsis goodei*
- 75. *Periclimenes americanus*
- 199. *Thor floridanus*

28–60. Isla Mujeres; bay side of inlet between two islands south of village (near Station 17–60); from grass and from vicinity of mangrove roots; 31 March.
- 152. *Synalpheus brooksi*
- 164. *Synalpheus minus*
- 169. *Synalpheus pectiniger*
- 199. *Thor floridanus*

29–60. Isla Mujeres; other (channel) side of inlet between islands south of village; 2½–3 feet of water; 31 March.
- 123. *Alpheus cristulifrons*
- 152. *Synalpheus brooksi*
- 199. *Thor floridanus*

29a–60. Isla Mujeres; bay side of inlet between two islands south of village (near Station 17–60); 31 March; P.M.
- 170. *Synalpheus rathbunae*
- 199. *Thor floridanus*

34–60. Isla de Cozumel; San Miguel; collected by diving in 7–11 m near anchorage northwest of main dock; 3 April.
- 75. *Periclimenes americanus*
- 92. *Periclimenes yucatanicus*
- 95. *Pontonia mexicana*
- 115. *Alpheus armatus*
- 116. *Alpheus armillatus*
- 133. *Alpheus peasei*
- 197. *Thor amboinensis*
- 208. *Processa fimbriata*

35–60. Bahía del Espíritu Santo; anchorage in northern end of outer bay, 4½ km from shore; from white sand bottom in 4½ m; 5 April.
- 208. *Processa fimbriata*

41–60. Bahía del Espíritu Santo; west side of reef east of anchorage; chiefly from upper portions of much eroded coral standing in 3 m of water; 6 April.
- 42. *Brachycarpus biunguiculatus*
- 75. *Periclimenes americanus*
- 113. *Alpheopsis trigonus*
- 123. *Alpheus cristulifrons*
- 133. *Alpheus peasei*
- 142. *Metalpheus rostratipes*
- 145. *Salmoneus ortmanni*
- 146. *Synalpheus anasimus*
- 150. *Synalpheus bousfieldi*
- 157. *Synalpheus fritzmuelleri*
- 163. *Synalpheus mcclendoni*
- 164. *Synalpheus minus*
- 165. *Synalpheus obtusifrons*
- 168. *Synalpheus paraneptunus*
- 173. *Synalpheus townsendi*
- 174. *Thunor rathbunae*
- 189. *Latreutes parvulus*
- 200. *Thor manningi*

42–60. Bahía del Espíritu Santo; north shore near Punta Holchecat; from edge of mangroves in ½–4 feet of water; 6 April.
- 44. *Leander tenuicornis*

43–60. Bahía del Espíritu Santo; north shore near Punta Holchecat; from vicinity of mangroves; 6 April.
- 7. *Penaeus (Melicertus) brasiliensis*

45–60. Bahía de la Ascensión; Punta Nicchehabin; along shore on both sides of light; 7 April.
- 164. *Synalpheus minus*

47–60. Isla de Cozumel; north end of island; from sandy beach and grass flat with clumps of calcareous and green algae, 2–3 feet; 8 April.
- 75. *Periclimenes americanus*
- 116. *Alpheus armillatus*
- 117. *Alpheus bahamensis*
- 137. *Alpheus viridari*
- 152. *Synalpheus brooksi*
- 199. *Thor floridanus*

48–60. Isla de Cozumel; north end of island; about 90 m north of sandy beach, in 3–5 m; 8 April.
- 152. *Synalpheus brooksi*
- 169. *Synalpheus pectiniger*
- 173. *Synalpheus townsendi*

51–60. Isla de Cozumel; near lighthouse at Punta Molas; from coral rock and splash pools from above high-tide line to depth of 2 m; 9 April.
- 142. *Metalpheus rostratipes*
- 152. *Synalpheus brooksi*
- 157. *Synalpheus fritzmuelleri*
- 169. *Synalpheus pectiniger*
- 173. *Synalpheus townsendi*

52–60. Bahía de la Ascensión; just behind center of Arrecife Nicchehabin; on and under coral in 1–5 feet; 10 April.

42. *Brachycarpus biunguiculatus*
90. *Periclimenes rathbunae*
114. *Alpheus amblyonyx*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
133. *Alpheus peasei*
142. *Metalpheus rostratipes*
148. *Synalpheus apioceros*
157. *Synalpheus fritzmuelleri*
162. *Synalpheus longicarpus*
164. *Synalpheus minus*
165. *Synalpheus obtusifrons*
168. *Synalpheus paraneptunus*
173. *Synalpheus townsendi*
192. *Lysmata intermedia*
200. *Thor manningi*

53–60. Bahía de la Ascensión; cove across (south side of) peninsula on which light is situated; from dead mangroves and living and dead mangrove roots; 10 April.

75. *Periclimenes americanus*
137. *Alpheus viridari*
157. *Synalpheus fritzmuelleri*
200. *Thor manningi*

60–60. Bahía de la Ascensión; behind Punta Nicchehabin light; margin of mangrove swamp adjoining last sandy beach; 12 April; 10:30–11:40 A.M.

51. *Palaemon (Palaeander) northropi*
66. *Periclimenaeus atlanticus*
69. *Periclimenaeus caraibicus*
75. *Periclimenes americanus*
102. *Typton distinctus*
148. *Synalpheus apioceros*
157. *Synalpheus fritzmuelleri*
199. *Thor floridanus*

62–60. Bahía de la Ascensión; Punta Nicchehabin light to 4/5 km northward; collected along beach and shore to depth of 1 foot; 13 April; 10:30 A.M. – 12:00 M.

7. *Penaeus (Melicertus) brasiliensis*
125. *Alpheus floridanus*

64–60. Bahía de la Ascensión; lagoon behind Punta Nicchehabin light; 13 April; 10:30 A.M. and 1:00 P.M.

7. *Penaeus (Melicertus) brasiliensis*

65–60. Bah'a de la Ascensión; shore in front of Punta Nicchehabin light; seined in 2 feet or less; 13 April; 11:30 A.M. – 12:00 M.

7. *Penaeus (Melicertus) brasiliensis*
8. *Penaeus (Melicertus) duorarum notialis*
51. *Palaemon (Palaeander) northropi*
75. *Periclimenes americanus*
125. *Alpheus floridanus*
137. *Alpheus viridari*

66–60. Bah'a de la Ascensión; edge of mangroves about ½ km west of Punta Nicchehabin light; seined in 2 feet or less; 13 April; 1:00 P.M.

44. *Leander tenuicornis*
75. *Periclimenes americanus*
137. *Alpheus viridari*
186. *Hippolyte zostericola*
199. *Thor floridanus*
201. *Tozeuma carolinense*

67–60. Bahía de la Ascensíon; behind central part of Arrecife Nicchehabin; from coral pieces and flats in 1–3 feet; 13 April; 3:30–4:30 P.M.

5. *Metapenaeopsis smithi*
90. *Periclimenes rathbunae*
108. *Gnathophyllum americanum*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
133. *Alpheus peasei*
134. *Alpheus ridleyi*
142. *Metalpheus rostratipes*
145. *Salmoneus ortmanni*
148. *Synalpheus apioceros*
157. *Synalpheus fritzmuelleri*
164. *Synalpheus minus*
170. *Synalpheus rathbunae*
173. *Synalpheus townsendi*
174. *Thunor rathbunae*
200. *Thor manningi*
208. *Processa fimbriata*

68–60. Bahía de la Ascensión; behind Punta Nicchehabin light; from margin of mangrove swamp adjoining last sandy beach; 13 April; 10:30–11:40 A.M.

51. *Palaemon (Palaeander) northropi*
117. *Alpheus bahamensis*
186. *Hippolyte zostericola*
200. *Thor manningi*

69–60. Bahía de la Ascensión; behind Punta Nicchehabin light; margin of mangrove swamp adjoining last sandy beach; collected by sweeping net through grass and associated algae; 13 April.

186. *Hippolyte zostericola*
198. *Thor dobkini*
199. *Thor floridanus*

70–60. Bahía de la Ascensión; mangrove inlet behind Punta Nicchehabin light; poisoned with two gallons of rotenone; 14 April; 10:00 A.M. – 1:00 P.M.

51. *Palaemon (Palaeander) northropi*
137. *Alpheus viridari*

72–60. Bahía de la Ascensión; behind central part of Arrecife Nicchehabin, 4–6 feet; 14 April; 4:30–5:00 P.M.

42. *Brachycarpus biunguiculatus*
75. *Periclimenes americanus*
108. *Gnathophyllum americanum*
115. *Alpheus armatus*
116. *Alpheus armillatus*
117. *Alpheus bahamensis*
123. *Alpheus cristulifrons*
126. *Alpheus formosus*
145. *Salmoneus ortmanni*

148. *Synalpheus apioceros*
152. *Synalpheus brooksi*
157. *Synalpheus fritzmuelleri*
163. *Synalpheus mcclendoni*
164. *Synalpheus minus*
168. *Synalpheus paraneptunus*
170. *Synalpheus rathbunae*
173. *Synalpheus townsendi*
200. *Thor manningi*
208. *Processa fimbriata*
218. *Stenopus scutellatus*

76–60. Bahía de la Ascensión; shore of small bay behind "Halfway Point," between Punta Nicchehabin and Vigía Chico; turtle-grass on heavy calcareous clay bottom in 1 foot; 15 April; 2:30–3:30 P.M.
51. *Palaemon (Palaeander) northropi*

77–60. Bahía de la Ascensión; shore just east of "Halfway Point," between Punta Nicchehabin and Vigía Chico; turtle-grass flats, sandy beaches, and mangrove roots on very fine sandy mud to coarser shell sand; 15 April; 3:30–4:30 P.M.
75. *Periclimenes americanus*
116. *Alpheus armillatus*
145. *Salmoneus ortmanni*
152. *Synalpheus brooksi*
169. *Synalpheus pectiniger*
173. *Synalpheus townsendi*
186. *Hippolyte zostericola*
192. *Lysmata intermedia*
195. *Lysmata wurdemanni*
198. *Thor dobkini*
199. *Thor floridanus*
200. *Thor manningi*

78–60. Bahía de la Ascensión; small slough or embayment in mangrove swamp; poisoned with rotenone; 15 April.
51. *Palaemon (Palaeander) northropi*
54. *Palaemonetes (Palaemonetes) intermedius*

81–60. Bahía de la Ascensión; near second anchorage at northern end of outer part of bay; from 5½ m; 16 April.
75. *Periclimenes americanus*
108. *Gnathophyllum americanum*
200. *Thor manningi*
217. *Stenopus hispidus*

82–60. Bahía de la Ascensión; behind central part of Arrecife Nicchehabin; 2–5 feet; 16 April; 4:00–5:00 P.M.
107. *Gnathophylloides mineri*
114. *Alpheus amblyonyx*
116. *Alpheus armillatus*
126. *Alpheus formosus*
145. *Salmoneus ortmanni*
148. *Synalpheus apioceros*
173. *Synalpheus townsendi*

83–60. Bahía de la Ascensión; mangrove inlet behind Punta Nicchehabin light; seined; 16 April.
55. *Palaemonetes (Palaemonetes) octaviae*
114. *Alpheus amblyonyx*
157. *Synalpheus fritzmuelleri*
199. *Thor floridanus*

85–60. Bahía de la Ascensión; near Punta Solimán; from rocks above high-tide line to rocks and tide pools just below low-tide level; 17 April; 11:30 A.M. – 3:00 P.M.
5. *Metapenaeopsis smithi*
16. *Sicyonia laevigata*
116. *Alpheus armillatus*
117. *Alpheus bahamensis*
126. *Alpheus formosus*
133. *Alpheus peasei*
139. *Automate gardineri*
142. *Metalpheus rostratipes*
145. *Salmoneus ortmanni*
157. *Synalpheus fritzmuelleri*
195. *Lysmata wurdemanni*
208. *Processa fimbriata*
216. *Microprosthema semilaeve*
217. *Stenopus hispidus*

87–60. Bahía de la Ascensión; about 200–300 m southwest of Punta Solimán; sand shallows in 2–5 feet; 17 April; 12:00 M. – 3:30 P.M.
75. *Periclimenes americanus*
145. *Salmoneus ortmanni*
187. *Latreutes fucorum*
208. *Processa fimbriata*
216. *Microprosthema semilaeve*

89–60. Bahía de la Ascensión; at and near Punta Nicchehabin light; collected along shore in less than 1 foot; 18 April; 9:00–11:00 A.M.
7. *Penaeus (Melicertus) brasiliensis*
137. *Alpheus viridari*
199. *Thor floridanus*

91–60. Bahía de la Ascensión; inner side of Arrecife Nicchehabin ⅓ of distance from north end; bottom covered with turtle-grass, conchs, and *Porites* clumps; 18 April; 2:00–4:00 P.M.
5. *Metapenaeopsis smithi*
75. *Periclimenes americanus*
114. *Alpheus amblyonyx*
116. *Alpheus armillatus*
130. *Alpheus normanni*
140. *Automate rectifrons*
145. *Salmoneus ortmanni*
148. *Synalpheus apioceros*
152. *Synalpheus brooksi*
173. *Synalpheus townsendi*
199. *Thor floridanus*
218. *Stenopus scutellatus*

93–60. Bahía de la Ascensión; near "Halfway Point," between Punta Nicchehabin and Vigía Chico; from turtle grass, sandy beach, and submerged roots of trees; 18 April; 3:30–4:30 P.M.
7. *Penaeus (Melicertus) brasiliensis*
116. *Alpheus armillatus*
117. *Alpheus bahamensis*

95–60. Bahía de la Ascensión; Punta Solimán to 300 m southwest; shore, reef flats, and sand flats; 5 feet; 19 April; 10:00 A.M. – 3:00 P.M.
- 5. *Metapenaeopsis smithi*
- 116. *Alpheus armillatus*
- 117. *Alpheus bahamensis*
- 123. *Alpheus cristulifrons*
- 126. *Alpheus formosus*
- 133. *Alpheus peasei*
- 145. *Salmoneus ortmanni*
- 146. *Synalpheus anasimus*
- 195. *Lysmata wurdemanni*
- 208. *Processa fimbriata*
- 216. *Microprosthema semilaeve*
- 217. *Stenopus hispidus*

100–60. Isla de Cozumel; north of Punta Santa Maria; from shore and turtle-grass flats; 21 April; 3:00–5:00 P.M.
- 5. *Metapenaeopsis smithi*
- 66. *Periclimenaeus atlanticus*
- 75. *Periclimenes americanus*
- 130. *Alpheus normanni*
- 199. *Thor floridanus*

106–60. Isla de Cozumel; Punta Santa Maria and slightly eastward; from along shore in less than 2 feet; 22 April; 9:30–11:30 A.M.
- 108. *Gnathophyllum americanum*
- 137. *Alpheus viridari*
- 164. *Synalpheus minus*

109–60. Isla de Cozumel; 2 km north of Punta Santa Maria; from shore, stakes in water, and roots of black mangroves; 22 April; 10:30–11:30 A.M.
- 108. *Gnathophyllum americanum*
- 164. *Synalpheus minus*

115–60. Isla de Cozumel; 2/5 km northeast of San Miguel pier; from rocks along shore in front of military reservation barracks; 29 April; 3:00–5:00 P.M.
- 133. *Alpheus peasei*
- 134. *Alpheus ridleyi*
- 148. *Synalpheus apioceros*

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