

The Caridean Shrimps (Crustacea:  
Decapoda) of the *Albatross*  
Philippine Expedition, 1907–1910,  
Part 5: Family Alpheidae

Fenner A. Chace, Jr.

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The Caridean Shrimps (Crustacea: Decapoda)  
of the *Albatross* Philippine Expedition,  
1907–1910, Part 5: Family Alpheidae

*Fenner A. Chace, Jr.*



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## ABSTRACT

Chace, Fenner A., Jr. The Caridean Shrimps (Crustacea: Decapoda) of the *Albatross Philippine Expedition, 1907-1910, Part 5: Family Alpheidae*. *Smithsonian Contributions to Zoology*, number 466, 99 pages 25 figures, 1988. Keys are offered to the Philippine genera of the family, including the new monotypic genus *Vexillipar*, based on the new species *V. repandum*, the commonest alpheid in the collection and a possible inhabitant of *Euplectella*, the Venus's-flower-basket sponge, in depths of 296 to 875 meters. Also included are keys to all currently recognized species of *Automate*, *Batella*, *Betaeopsis*, and *Nennalpheus*, and to the known Philippine species of *Alpheopsis*, *Alpheus*, *Athanas*, and *Synalpheus*. The following new species are described, in addition to *Vexillipar repandum*: *Alpheus davaoensis* from 51 meters in Davao Gulf, Mindanao; *A. hyphalus* from 296 meters in Verde Island Passage south of western Luzon; *A. macellarius* from the Cebu Market; *A. quasirapacida* and *A. suluensis* from 18 and 38 meters, respectively, in the southwestern Sulu Archipelago; and *Batella leptocarpus* from 296 meters in the western Mindanao Sea.

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# The Caridean Shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition, 1907–1910, Part 5: Family Alpheidae

*Fenner A. Chace, Jr.*

## Introduction

General considerations about the *Albatross* Philippine Expedition and its collections have been presented in Part 1 of this series (Chace, 1983). Repeated below are those particulars that are common to each of the parts.

The taxa itemized are those known from the Philippines, whether or not they are represented in the *Albatross* collections; those taken by that Expedition are indicated by an asterisk (\*). (This is a departure from earlier parts of the report, in which taxa recorded from either the Philippines or Indonesia were included.) The genera and species are arranged alphabetically, and the latter are numbered sequentially by order of appearance in the taxonomic portion of the report. The generic entries comprise at least the original reference followed by designation of the type species and of the gender of the generic name, a diagnosis, and the geographic and bathymetric ranges of the genus. There has been no attempt to list all references or even all synonyms under the taxa headings in the text. Usually the species and subspecies entries are limited to: (1) the original reference and type locality of both senior and junior synonyms mentioned; (2) a reference to a published illustration, if possible; (3) a diagnosis; and (4) the range of the taxon. Under "Material" of species and subspecies represented in the *Albatross* collections are listed the following particulars when known: (1) general locality; (2) station number; (3) latitude and longitude; (4) depth in meters (in brackets when estimated); (5) character of bottom; (6) bottom temperature in degrees Celsius; (7) date and astronomical time intervals (hours between midnight and midnight, local time) that the gear operated at the indicated depth; (8) gear used; and (9) the number and sex of the specimens, with minimum and maximum carapace length to base of rostrum, in brackets (the

numbers and size ranges of ovigerous females are included in the female totals, as well as separately). Additional station data may be available in Anonymous (1910).

## Acknowledgments

This report compares quite unfavorably with the exemplary publications on Indo-Pacific alpheids by the late Albert H. and Dora May Banner (see "Literature Cited") but it is far better than it would have been without benefit of the solid foundation that they established. Perhaps partial reiteration of my remarks to Dora Banner following Hank's untimely death on August 18, 1985, will not only express publicly my indebtedness to them but may demonstrate to other novices the requirements for successful taxonomic research: "Only someone who has taken full advantage of the Banner legacy, as I have for the past eight months, knows the significance of the example they have set for anyone undertaking the revision of a group of organisms: (1) become sufficiently familiar with earlier students of the group and their publications to be able to interpret their descriptions to the utmost; (2) take advantage of every opportunity to examine type specimens; (3) visit as many collecting sites as possible, especially type localities, in an effort to correlate color and ecological factors with morphological ones; (4) develop an ample standard descriptive format that permits ready comparison of diagnostic characters and follow it consistently; and (5) when disaster strikes, don't cry over spilled milk—pitch into the cow and get more!" Thirty years of adherence to such doctrines provided the Banners with an alpheid species sense that seems to me to be nearly infallible.

In addition to their published contributions, I have been privileged to profit in two other ways from the Banners' industry: (1) much of the material identified by A.H. Banner—especially unrecorded specimens from the Philippines collected subsequent to the Banner reports of 1978 and 1981—was available in the Smithsonian for direct comparison

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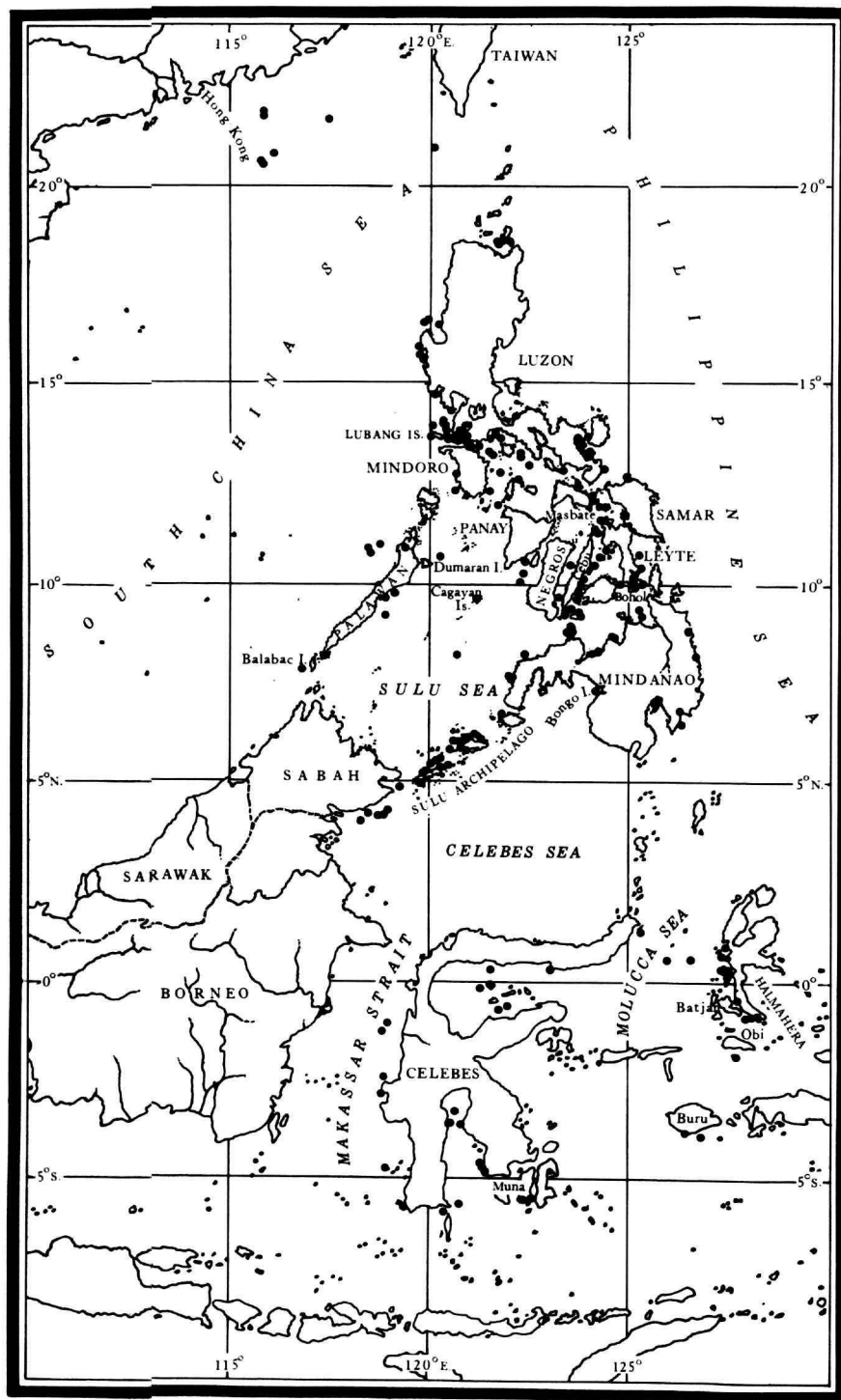


FIGURE 1.—The Philippines and central Indonesia, showing the positions of the more than 330 *Albatross* offshore stations at which caridean shrimps were collected.

during preparation of the keys, and (2) D.M. Banner, although retired from active systematic research and coping with grievous terminal illness, graciously reviewed the penultimate draft of this report and considerably enhanced its value, especially in regard to the reliability of the ranges of the species—a component of contributions of this kind that I am prone to treat with somewhat limited enthusiasm because of the often questionable reliability of identifications in the literature (a problem that is of minor importance in an area that has been so nearly monopolized for so long by a single research team). The report has also been materially improved by a characteristically detailed review by L.B. Holthuis of the Rijksmuseum van Natuurlijke Historie in Leiden and perusal by my Smithsonian colleague, B.F. Kensley, who devoted considerable effort to testing the keys to the genera and to the genus *Alpheus*. A.J. Bruce of the Northern Territory Museum, Darwin, Australia, also reported successful trials of some of the keys. R.W. Ingle of the British Museum (Natural History) voluntarily made the holotype of *Batella parvimanus* available for examination. As previously, my colleagues Horton H. Hobbs, Jr., Raymond B. Manning, and Austin B. Williams were continuing sources of professional assistance and encouragement. Finally, I am deeply indebted to Sandra L. Charles and Mary Ann MacLeod, who shared the task of transferring my typescript to a word processor, an exercise so remote from my sphere of competence as to distinguish clearly my helpless senior status from that of my colleagues, nearly all of whom have long since mastered such currently mandatory research procedures.

**\*ALPHEIDAE Rafinesque, 1815**

*Alphidia* Rafinesque, 1815:98.

**DIAGNOSIS.**—Rostrum, if present, immovably attached to remainder of carapace, without single subterminal dorsal tooth; eyes short, often partially or completely concealed by carapace; antennule with dorsolateral flagellum usually more or less bifurcate; 2nd maxilliped with terminal segment applied as strip to mesial margin of flexed penultimate segment; 3rd maxilliped bearing well-developed exopod; pereopods without distinct exopods, both members of 2 anterior pairs distinctly chelate, 2nd pair with carpus subdivided into 2 or more segments, 3 posterior pairs not unusually long, carpus shorter than propodus.

**RANGE.**—Commonly pantropical, especially numerous on coral reefs, to 45°—unusually to 60°—north and south latitude; littoral, rarely in fresh water, to 875 meters.

**REMARKS.**—Of the slightly less than 30 alpheid genera generally recognized today, more than half are represented in the Philippines, alone. Partly because most of the alpheid genera are represented by small species that are commonly found in shallow water, whereas the emphasis of the *Albatross* Expedition was directed toward collecting the larger, offshore animals, only six of the 15 Philippine genera are represented in the resultant material. The most abundant species in the collections, however, belongs to a new genus that occurs only in depths greater than 296 meters.

**Key to Philippine Genera of Alpheidae**

1. Strap-like epipods on at least 2 anterior pairs of pereopods . . . . . 2  
    No strap-like epipods on any pereopods . . . . . 13
2. Eyes concealed from view in dorsal aspect (except when artificially displaced anteriorly) . . . . . 3  
    Eyes at least partially exposed in dorsal aspect . . . . . 11
3. Third maxilliped broad, flat, and longitudinally curved, partially covering enlarged anterior mouthparts; appendix masculina unusually elongate, overreaching exopod of 2nd pleopod of male . . . . . *Metalpheus*  
    Third maxilliped subtriangular in cross-section, not suboperculate; appendix masculina not unusually elongate . . . . . 4
4. Telson produced posteriorly into triangular point . . . . . *Neopalpheopsis*  
    Telson posteriorly truncate, convex, incised, not triangularly produced . . . . . 5
5. Body much compressed from side to side; carapace with sharp, high carina over nearly entire length of dorsal midline . . . . . *Racilius*  
    Body not unusually compressed, carapace with, at most, partial low carina in dorsal midline . . . . . 6
6. Rostrum absent . . . . . *Betaeopsis*  
    Rostrum usually distinct (if not, 1st pereopods asymmetrical, major chela carried with movable finger dorsolateral, not ventral, with molar-like tooth on movable finger, with adhesive plaques at base of movable finger and on distal end of palm, and with strap-like epipods on 4 anterior pairs of pereopods) . . . . . 7

7. Major cheliped carried in flexed position . . . . . *Salmoneus*  
 Major cheliped carried extended . . . . . 8
8. Major cheliped carried with movable finger dorsolateral . . . . . 9  
 Major cheliped carried with movable finger ventrolateral . . . . . 10
9. Major chela without molar-like tooth on movable finger . . . . . \**Alpheopsis*  
 Major chela with molar-like tooth on movable finger . . . . . \**Alpheus*
10. Mandible with palp; major chela with adhesive plaques at base of movable finger  
 and on distal end of palm; 3rd pereopod with dactyl simple, not biunguiculate  
 . . . . . *Nennalpheus*  
 Mandible without palp; 1st pereopods without adhesive plaques at base of movable  
 finger and on distal end of palm; 3rd pereopod with dactyl biunguiculate  
 . . . . . \**Vexillipar*
11. Both cornea and eyestalk exposed in dorsal aspect; rostrum vestigial or absent; 6th  
 abdominal somite without articulated plate at posteroventral angle . *Automate*  
 Little more than cornea of eye exposed in dorsal aspect; rostrum overreaching eyes;  
 6th abdominal somite with movable plate articulated at posteroventral angle . 12
12. Rostrum broadly rounded terminally in lateral aspect; mandible without palp; 1st  
 pereopods carried with movable finger ventrolateral . . . . . *Aretopsis*  
 Rostrum acute in lateral aspect; mandible with palp; 1st pereopods carried with  
 movable finger dorsolateral . . . . . \**Athanas*
13. Sixth abdominal somite with movable plate articulated at posteroventral angle . .  
 . . . . . 14  
 Sixth abdominal somite without articulated plate at posteroventral angle . . . . 15
14. Eyes exposed in dorsal aspect; mandible with palp and molar process . . . . .  
 . . . . . \**Athanas*  
 Eyes concealed from view in dorsal aspect; mandible without palp or molar process  
 . . . . . *Prionalpheus*
15. Eyes exposed in dorsal aspect; mandible without palp; 1st pereopods symmetrical;  
 major chela without molar-like tooth on movable finger; appendix masculina  
 on 2nd pleopod of male . . . . . \**Batella*  
 Eyes concealed in dorsal aspect; mandible with palp; 1st pereopods asymmetrical;  
 major chela with molar-like tooth on movable finger; no appendix masculina  
 on 2nd pleopod of male . . . . . \**Synalpheus*

**\**Alpheopsis* Coutière, 1896**

*Alpheopsis* Coutière, 1896:382 [type species, selected by Holthuis, 1955:84:  
*Betaeus trispinosus* Stimpson, 1860:32; gender: feminine].

DIAGNOSIS.—Body not unusually compressed from side to side; rostrum distinct, acute in lateral aspect; carapace without high carina throughout length of dorsal midline; abdomen usually with triangular flap articulated at posterolateral angle of 6th somite; telson terminating posteriorly in triangular tooth; eyes concealed from dorsal view, visible in anterior aspect; mandible with palp and molar process; 3rd maxilliped not unusually broadened to form partial operculum over other mouthparts; 1st pereopods similar but not necessarily equal, carried extended with movable finger dorsal or lateral, not ventral, major chela without molar-like tooth on movable finger; 2nd chela with fingers about as long as palm, carpus with 3–5, usually 5, articles; pereopods with strap-like epipods on at least 3 anterior pairs; appendix masculina not overreaching exopod of 2nd pleopod.

RANGE.—Pantropical with temperate extensions; littoral to 786 meters.

REMARKS.—The useful list of species of *Alpheopsis* published by Hobbs (1973:77) may be modified by adding the species *A. harperi* Wicksten, 1984, *A. shearmii* (Alcock and Anderson, 1899) A.H. and D.M. Banner, 1977a, *A. undicola* D.M. and A.H. Banner, 1973, and *A. yaldwyni* D.M. and A.H. Banner, 1973, and also *A. equidactylus* (Lockington, 1877) and *A. garricki* Yaldwyn, 1971, by those who consider those two forms to be distinct from *A. trispinosa* (Stimpson, 1860), and by deleting *A. haugi* Coutière, 1906, and *A. monodi* Sollaud, 1932, both of which were transferred to the genus *Potamalpheops* by Powell (1979), and *A. stygicola* Hobbs, 1973, subsequently transferred to that genus by Hobbs (1983). Currently, *Alpheopsis* seems to be represented by 21 species, or 19 species in the opinion of those who believe that *A. trispinosa* is a single pantropical species. Wicksten (1984b:99) recorded *A. trispinosa* from the Gulf of Mexico and referred to it as "a pantropical species," but the same author in a paper

issued a month earlier (1984a:186) reported a range extension of *A. equidactylus* without referring to the remark in Schmitt (1921:77) that "According to Coutière this [species] is *Alpheopsis trispinosus* of Stimpson (Rathbun)." A footnote in D.M. and A.H. Banner (1973:337) reads: "In personal correspondence Dr. J.C. Yaldwyn has indicated that he believes his species *A. garrick* [sic] (1971:87) may prove to be a synonym of this species [*A. trispinosa*] as redefined," but three pages later (1973:340), Banner and Banner remark that "On the basis of distributional pattern, we feel as we did in our 1966 paper that there may well be 3 species, one from the tropical Pacific, one from the south temperate Pacific, and another from the tropical and subtropical Atlantic," and "Until the true identity of De Man's, Coutière's, Sollaud's, and our specimens are confirmed, we are loath to ascribe any non-Australian distribution to this species."

The only specimen of *Alpheopsis* in the *Albatross* Philippine collections is a large female without either anterior cheliped with a postrostral carapace length of 10.2 mm (total length about 31 mm) from station 5188; Tañon Strait, east of Negros; 9°44'N, 123°14'20"E; 547 m; green mud; 17.0°C; 1 Apr 1908 (1044–1104); 12' Agassiz beam trawl, 3 mud bags. The frontal margin is devoid of ocular teeth, there are five articles in the

carpus of the second pereopod, and the dactyls of the three posterior pairs of pereopods are simple. This combination of characters is shared by only five of the known species of the genus: *A. aequalis* Coutière, 1897, *A. consobrinus* De Man, 1910, *A. labis* Chace, 1972, *A. trigonus* (Rathbun, 1901), and *A. yaldwyni* D.M. and A.H. Banner, 1973. The *Albatross* specimen seems to agree with most of the species of *Alpheopsis* examined in having strap-like epipods on the four anterior pairs of pereopods, but specimens available of the variable *A. aequalis* seem to have them on only the three anterior pairs. Even more distinctive is the dorsolateral antennular flagellum in the *Albatross* specimen, in which the fused portion, of six articles, is only one-half to three-fourths as long as the shorter of the free branches, which consists of as many as 12 articles. Of the five species that may be most like the *Albatross* specimen, only the Australian *A. yaldwyni* seems to be of similar size and to have even superficially similar antennular flagella, but that species has the proximal article in the carpus of the second pereopod proportionately longer and it is known only from shallow water, whereas the Philippine specimen came from a depth of nearly 550 meters, the deepest record for the genus, except for 786 meters at the type locality of *A. shearmii*.

**Key to Previously Known Philippine Species of *Alpheopsis***

- Ocular hoods convex, unarmed; 2nd pereopod with proximal article of carpus little if any longer than 2 succeeding articles combined; 3rd–5th pereopods with dactyl simple . . . . . 1. *A. aequalis*
- Ocular hoods acutely produced, front tridentate; 2nd pereopod with proximal article of carpus longer than 4 succeeding articles combined; 3rd–5th pereopods with dactyl biunguiculate . . . . . 2. *A. diabolus*

**1. *Alpheopsis aequalis* Coutière, 1896**

*Alpheopsis aequalis* Coutière, 1896:382 [type locality; the type specimens were recorded from two localities: Red Sea and Indian Ocean].

*Alpheopsis equalis*.—A.H. Banner, 1953:15, fig. 4.—D.M. and A.H. Banner, 1973:342, fig. 16; 1978:218.

DIAGNOSIS.—Ocular hoods variably convex, not dentate; dorsolateral antennular flagellum with fused portion very short, composed of 1 or 2 articles; 2nd pereopod with proximal article of carpus no longer than 2 succeeding articles combined; 3rd–5th pereopods with dactyl simple, not biunguiculate; epipods on 3 anterior pairs of pereopods; maximum carapace length about 5 mm.

RANGE.—Red Sea and eastern Africa to Hawaii; intertidal to 80 meters.

REMARKS.—There is no apparent justification for spelling the specific name of this shrimp in any but the correct Latin way originally proposed by Coutière (1896).

**2. *Alpheopsis diabolus* A.H. Banner, 1956**

*Alpheopsis diabolus* [*diabolus* in figure legend] A.H. Banner, 1956:325, fig. 3 [type locality: Saipan, Mariana Islands].

*Alpheopsis diabolus*.—A.H. and D.M. Banner, 1964:86; 1967:262.—D.M. and A.H. Banner, 1978:218.

DIAGNOSIS.—Ocular hoods dentate; dorsolateral antennular flagellum with fused portion swollen and composed of more than 5 articles; 2nd pereopod with proximal article of carpus considerably longer than 4 succeeding articles; 3rd–5th pereopods with dactyl biunguiculate; epipods on 4 anterior pairs of pereopods; maximum carapace length about 4 mm.

RANGE.—Philippines and Mariana, Phoenix, and Society islands, littoral.

REMARKS.—A.H. and D.M. Banner (1964) confirmed that the original spelling of the specific name of this species (1956) was a typographical error. Although that external evidence does not automatically invalidate the original spelling, according to Article 32c(ii) of the *International Code of*

*Zoological Nomenclature*, the alternate spelling was validated by the Banners' action under the first reviser principle, Article 24(c).

### \**Alpheus* Fabricius, 1798

*Crangon* Weber, 1795:94 [type species, by monotypy: *Astacus Malabaricus* Fabricius, 1775:415; gender feminine; name suppressed by plenary action of the International Commission on Zoological Nomenclature, Opinion 334 (1955)].

*Alpheus* Fabricius, 1798:380, 404 [type species, selected by Latreille, 1810:422: *Alpheus avarus* Fabricius, 1798:404; gender: masculine].

*Cryptopthalmus* Rafinesque, 1814:23 [type species, by monotypy: *Cryptopthalmus ruber* Rafinesque, 1814:23 (= *Cancer glaber* Olivi, 1792:51); gender: masculine].

*Autonomaea* Risso, 1816:166 [type species, by monotypy: *Autonomaea Olivii* Risso, 1816:166 (= *Cancer glaber* Olivi, 1792:51); gender: feminine].

*Asphalius* P. Roux, 1831:22 [type species, by monotypy: *Palaemon brevis* Olivier, 1811:664; gender: masculine].

*Dienezia* Westwood in Hailstone, 1835:552 [type species, by monotypy: *Hippolyte rubra* Hailstone, 1835:272 (= *Hippolyte macrocheles* Hailstone, 1835:395); gender: feminine].

*Phleusa* Nardo, 1847:6 [type species, by monotypy: *Phleusa cynea* Nardo, 1847:6 (= *Cancer glaber*, Olivi, 1792:51); gender: feminine].

*Halopsyche* De Saussure, 1857:100 [type species, by monotypy: *Halopsyche lutaria* De Saussure, 1857:100 (= *Alpheus heterochaelis* Say, 1818:243); gender: feminine].

*Alpheoides* Paulson, 1875:105 [type species, selected by Holthuis, 1955:91: *Alpheus insignis* Heller, 1861:26; gender: masculine].

*Paralpheus* Bate, 1888:567 [type species, by monotypy: *Palaemon diversimanus* Olivier, 1811:663; gender: masculine].

**DIAGNOSIS.**—Rostrum variable, acute in lateral aspect; carapace without high carina throughout length of dorsal midline; abdomen without triangular flap articulated at posterolateral angle of 6th somite; telson not terminating posteriorly in triangular tooth; eyes concealed from dorsal view; mandible with palp and molar process; 3rd maxilliped not unusually broadened to form partial operculum over other mouthparts; 1st pereopods dissimilar and unequal, carried extended with movable finger dorsal or lateral, not ventral, major chela usually with molar-like tooth on movable finger; 2nd chela with fingers about as long as palm, carpus with 5 articles; pereopods with strap-like epipods on 4 anterior pairs; appendix masculina not overreaching exopod of 2nd pleopod.

**RANGE.**—Virtually all tropical and subtropical and some temperate seas; intertidal to 640 meters.

**REMARKS.**—Of the approximately 220 species and 10 subspecies of the genus *Alpheus* currently recognized (including the six species described herein and seven nominal species that must be regarded for the time being as nomina dubia), 74 have now been recorded from the Philippines, and 41 of them are represented in the *Albatross* collections.

It is unfortunate that acceptable means of subdividing this cumbersome genus are not yet apparent. To be sure, the seven generally accepted species groups of *Alpheus* are probably characterized by valid phylogenetic differences, but there would be no practical gain in elevating them to even subgeneric status. The most important taxonomic features of each of the

groups stems from the structure of the major cheliped, an appendage that is all too often missing from preserved material. It is hoped that recourse to these characters only as a last resort in the following key may facilitate the identification of collections comprising variably intact material. Each of the species diagnoses, however, is accompanied by an indication of the group with which it is associated, and the groups are characterized below in alphabetical order (characterizations adapted from D.M. and A.H. Banner, 1982).

#### Brevirostris Group

Orbital teeth lacking, orbital hoods often prominent; major chela with palm always compressed, more or less quadrangular in cross-section, often with surfaces delimited by distinct angles, with or without "saddle" proximal to adhesive plaque; minor chela sometimes "balaeniceps" in male; 3rd pereopod with dactyl always simple, sometimes subspatulate, merus usually unarmed on flexor margin.

#### Crinitus Group

Rostrum often reduced, sometimes lacking; orbital teeth lacking; major chela with palm rounded in cross-section, without sculpture; minor chela often "balaeniceps" in male; 3rd pereopod with dactyl simple or biunguiculate, merus usually armed with strong tooth on flexor margin.

#### Diadema Group

Rostrum with base sometimes flattened and abruptly delimited from adrostral furrows; orbital teeth usually lacking; major chela with palm rounded to oval in cross-section, usually with "saddle" proximal to adhesive plaque but lacking longitudinal grooves; minor chela sometimes "balaeniceps" in male; 3rd pereopod with dactyl almost always simple, sometimes variable intraspecifically, merus with or without tooth on flexor margin.

#### Edwardsii Group

Orbital teeth lacking except in *A. euchirus*; major chela with palm compressed, with "saddle" proximal to adhesive plaque and usually with shoulder on opposite margin proximal to fixed finger, "saddle" usually extending onto both adjoining surfaces as triangular or quadrangular depressions; minor chela often "balaeniceps" in male; 3rd pereopod with dactyl usually simple, sometimes subspatulate, merus usually dentate on flexor margin.

#### Macrocheles Group

Orbital teeth always present; major chela with dactyl often deep and compressed into thin lamina, tip sometimes bulbous, palm compressed, somewhat twisted, with 3 longitudinal ridges and grooves, sometimes interrupted, terminating distally in

adhesive plaque and strong tooth on each side of dactylar articulation; minor chela never “balaeniceps”; 3rd pereopod with dactyl simple or biunguiculate, merus with or without teeth on flexor margin.

longitudinal grooves; minor chela never “balaeniceps”; 2nd pereopods sometimes unusually long and asymmetrical; 3rd pereopod variable, not strongly dentate.

**Obesomanus Group**

Rostrum reduced, sometimes lacking; orbital teeth lacking; antennal peduncle often elongate, stylocerite with tooth weak or lacking; antennal peduncle and scale reduced; major chela with dactyl in form of single- or double-headed hammer, palm proximally rounded, distally tapering, with variably distinct

**Sulcatus Group**

Rostrum sometimes with base flattened and delimited from adrostral furrows; orbital teeth often present; major chela with palm never markedly compressed, usually with longitudinal but without transverse grooves; minor chela never “balaeniceps”; 3rd pereopod with dactyl simple or biunguiculate, merus with or without tooth on flexor margin.

**Key to Philippine Species of *Alpheus***

1. Acute anterior tooth on each orbital hood or on margin between rostrum and orbital hood . . . . . 2  
    Anterior margin of carapace without acute tooth either side of rostrum . . . . . 18
2. Orbital spine arising from surface rather than margin of orbital hood . . . . . 3  
    Frontal spine arising from margin of adrostral region or of orbital hood, which may be incised dorsad to base of spine . . . . . 6
3. Third pereopod with merus armed with distal tooth on flexor margin . . . . . 4  
    Third pereopod with merus unarmed on flexor margin . . . . . 5
4. Body not densely setose; adrostral frontal margin unarmed; without median tooth or tubercle on gastric region; 3rd pereopod with dactyl simple, not biunguiculate . . . . . \*19. *A. deuteropus*  
    Body densely setose; both adrostral frontal margin and orbital hood armed with acute tooth; median tooth or tubercle on gastric region; 3rd pereopod with dactyl biunguiculate . . . . . 76. *A. villosus*
5. Rostral base dorsally flattened and abruptly delimited from adrostral furrows; 3rd pereopod with dactyl blunt distally . . . . . \*42. *A. lottini*  
    Rostral base not flattened, sloping gradually into adrostral furrows; 3rd pereopod with dactyl sharp pointed . . . . . 69. *A. splendidus*
6. Third pereopod with strong distal tooth on flexor margin of merus . . . . . 7  
    Third pereopod without strong distal tooth on flexor margin of merus . . . . . 10
7. Major chela without tooth either side of dactylar articulation . . . . . 8  
    Major chela with sharp tooth either side of dactylar articulation . . . . . 9
8. Rostrum barely overreaching distal margin of 1st antennular segment; carapace with median tubercle on anterior gastric region and paired flanges overhanging posterior ends of adrostral furrows, anterior margin armed with acute tooth slightly mesial to orbital hood, orbital hood unarmed; 2nd antennular segment twice as long as wide; major chela with narrow transverse “saddle” on palm proximal to adhesive plaque, minor chela with dactyl distinctly shorter than palm, palm without teeth at dactylar articulation; 2nd pereopod with proximal carpal article subequal to 2nd; 3rd pereopod with dactyl simple, not biunguiculate . . . . . 8. *A. bicostatus*  
    Rostrum not reaching nearly as far as distal margin of 1st antennular segment; carapace without median tubercle on gastric region or paired flanges overhanging posterior ends of adrostral furrows, anterior margin unarmed mesial to orbital hood, latter armed with sharp marginal tooth; 2nd antennular segment 3 times as long as wide; major chela without “saddle” on palm proximal to adhesive plaque; minor chela with dactyl slightly longer than palm, sharp tooth on extensor margin of palm at articulation with dactyl; 2nd pereopod with proximal carpal article nearly twice as long as 2nd; 3rd pereopod with dactyl biunguiculate . . . . . 11. *A. canaliculatus*

9. Rostrum overreaching orbital spines . . . . . 13. *A. collumianus*  
 Rostrum shorter than orbital spines . . . . . 57. *A. paradentipes*
10. Major chela contorted and strongly sculptured, with at least 1 sharp carina  
 terminating distally in acute tooth at dactylar articulation . . . . . 11  
 Major chela relatively smooth, without sharp carina supporting acute tooth at  
 dactylar articulation . . . . . 14
11. Adrostral furrows distinct, extending posteriorly beyond eyes . 13. *A. collumianus*  
 Adrostral furrows short and somewhat obscure or absent . . . . . 12
12. Major chela with carina supporting mesial tooth at dactylar articulation entire, not  
 interrupted . . . . . \*17. *A. crockeri*  
 Major chela with carina supporting mesial tooth at dactylar articulation interrupted  
 by transverse incision . . . . . 13
13. Major chela with dactyl strongly compressed and curved in longitudinal plane; 3rd  
 pereopod with dactyl usually at least obscurely biunguiculate; typically  
 deepwater species (25–536 meters) . . . . . \*35. *A. hailstonei*  
 Major chela with dactyl not strongly compressed or markedly curved in longitudinal  
 plane; 3rd pereopod with dactyl simple, not even obscurely biunguiculate;  
 shallow-water species . . . . . 72. *A. staphylinus*
14. Major chela twice as long as wide, with distinct “saddle” proximal to adhesive  
 plaque and marginal shoulder proximal to fixed finger . . . . . 26. *A. euchirus*  
 Major chela 2<sup>1</sup>/<sub>2</sub> to 4 times as long as wide, without distinct “saddle” proximal to  
 adhesive plaque or marginal shoulder proximal to fixed finger . . . . . 15
15. Second antennular segment 3 or more times as long as wide . . . . . 16  
 Second antennular segment less than twice as long as wide . . . . . 17
16. Body strongly compressed, carapace twice as high as wide; minor chela with dactyl  
 not “balaeniceps,” at least in female; 3rd pereopod with dactyl subspatulate  
 . . . . . 14. *A. compressus*  
 Body not unusually compressed; minor chela with dactyl “balaeniceps” in both  
 sexes; 3rd pereopod with dactyl not subspatulate . . . . . \*67. *A. soela*
17. Margin between rostrum and orbital hood convex throughout; blunt rostral carina  
 extending posteriorly to near midlength of carapace; major chela without  
 depression on either margin proximal to fingers; 3rd pereopod with movable  
 spine on ischium . . . . . 29. *A. facetus*  
 Margin between rostrum and orbital hood deeply incised at base of rostrum; rostrum  
 dorsally rounded, not carinate; major chela with slight depressions on both  
 margins proximal to fingers; 3rd pereopod without spine on ischium . . . . .  
 . . . . . 34. *A. gracilis*
18. Rostrum abruptly delimited from adrostral furrows . . . . . 19  
 Rostrum sloping gradually into adrostral furrows . . . . . 24
19. Rostrum carinate in dorsal midline; margin between rostrum and orbital hood  
 convex; median tubercle on gastric region; major chela subcylindrical; 3rd  
 pereopod with acute subdistal tooth on flexor margin of merus . . . . .  
 . . . . . \*20. *A. diadema*  
 Rostrum not carinate in dorsal midline; margin between rostrum and orbital hood  
 not distinctly convex; without median tubercle on gastric region; major chela  
 compressed; 3rd pereopod with merus unarmed on flexor margin . . . . . 20
20. Third pereopod with dactyl subspatulate . . . . . 21  
 Third pereopod with dactyl conical or biunguiculate, not subspatulate . . . . . 23
21. Rostral margin not overhanging adrostral furrow; 2nd antennular segment 3 times  
 as long as wide; major chela with proximal shoulder overhanging “saddle”  
 proximal to adhesive plaque . . . . . \*68. *A. spatulatus*  
 Rostral margin overhanging adrostral furrow; 2nd antennular segment twice as  
 long as wide; major chela with proximal shoulder overhanging very slightly, if  
 at all, “saddle” proximal to adhesive plaque . . . . . 22



- 22. Antennal scale with lateral margin straight, distolateral spine overreaching distal margin of blade little, if at all; major chela with proximal shoulder sloping into "saddle" proximal to adhesive plaque, not abrupt, distinct shoulder on opposite margin proximal to fixed finger; minor chela with dactyl not "balaeniceps" in either sex . . . . . 30. *A. foresti*  
 Antennal scale with lateral margin concave, distolateral spine clearly overreaching distal margin of blade; major chela with abrupt shoulder proximal to "saddle" proximal to adhesive plaque, without distinct shoulder on opposite margin proximal to fixed finger; minor chela with dactyl "balaeniceps" in male . . . . . 63. *A. proseuchirus*
- 23. First pereopods with flexor margin of merus armed with sharp distal tooth and 2 or more spines proximal thereto; major chela 3 1/2 times as long as wide, with distinct "saddle" proximal to adhesive plaque; minor chela with dactyl "balaeniceps" in both sexes; 3rd pereopod with dactyl simple, not biunguiculate . . . . . \*33. *A. gracilipes*  
 First pereopods with merus unarmed on flexor margin; major chela less than 3 times as long as wide, without distinct "saddle" proximal to adhesive plaque; minor chela with dactyl not "balaeniceps" in either sex; 3rd pereopod with dactyl often biunguiculate or with vestige of subdistal tooth on flexor margin . . . . . 74. *A. sulcatus*
- 24. Median tooth or tubercle on gastric region . . . . . 25  
 Without median tooth or tubercle on gastric region . . . . . 28
- 25. Rostrum overreaching 1st antennular segment; large acute tooth arising each side of median gastric denticle and overhanging posterior end of adrostral furrow; 2nd antennular segment barely twice as long as wide; major chela less than 3 times as long as wide, with narrow transverse cleft or "saddle" proximal to adhesive plaque; 3rd pereopod with dactyl not subspatulate, merus armed with sharp subterminal tooth on flexor margin . . . . . \*9. *A. bidens*  
 Rostrum not reaching as far as distal margin of 1st antennular segment; carapace without tooth arising either side of median gastric tubercle; 2nd antennular segment more than 3 times as long as wide; major chela more than 4 times as long as wide, without "saddle" proximal to adhesive plaque; 3rd pereopod with dactyl subspatulate, merus unarmed on flexor margin . . . . . 26
- 26. Median postrostral carina extending posteriorly at least to midlength of carapace; antennal scale with distolateral spine barely overreaching distal margin of blade . . . . . 3. *A. acutocarinatus*  
 Median postrostral carina, if present, not extending posteriorly beyond anterior gastric region; antennal scale with distolateral spine distinctly overreaching distal margin of blade . . . . . 27
- 27. First pereopods with strong subdistal tooth on extensor margin of merus; major chela oval in cross section, without longitudinal carinae or ridges on palm . . . . . \*44. *A. macroskeles*  
 First pereopods without subdistal tooth on extensor margin of merus; major chela with palm subrectangular in cross section and bearing strong longitudinal carina near margin proximal to fixed finger, obscure longitudinal ridge near midline of same surface, and 2 ridges defining flattened surface proximal to adhesive plaque . . . . . \*51. *A. nonalter*
- 28. Median postrostral carina extending posteriorly nearly or quite to midlength of carapace . . . . . 29  
 Median rostral carina not extending posteriorly beyond anterior gastric region . . . . . 35
- 29. Third pereopod with acute distal tooth on flexor margin of merus . . . . . 30  
 Third pereopod with merus unarmed on flexor margin . . . . . 34
- 30. Major chela without conspicuous sculpture; 2nd pereopod with proximal carpal article much shorter than 2nd . . . . . 31

- Major chela with "saddle" overhung by proximal shoulder proximal to adhesive plaque and shoulder on opposite margin proximal to fixed finger; 2nd pereopod with proximal carpal article much longer than 2nd . . . . . 33
31. Rostrum prominent, sharply acute; frontal margin of carapace not extending anteriorly beyond margins of orbital hoods; antennal scale with well-developed blade reaching nearly or quite to distal end of antennular peduncle, basal antennal segment (basicerite) bearing strong lateral spine; 3rd pereopod with conspicuous movable spine on ischium . . . . . \*61. *A. parvus*  
 Rostrum very short and broad; frontal margin of carapace extending anteriorly beyond margins of orbital hoods; antennal scale with reduced blade reaching about as far as midlength of 2nd antennular segment, basal antennal segment (basicerite) unarmed; 3rd pereopod with ischium unarmed . . . . . 32
32. Rostrum minute, not extending anteriorly as far as lateral frontal margin; antennal scale strongly concave laterally, distolateral spine not unusually robust; major chela without distal sinus on palm proximal to adhesive plaque; minor chela with fingers shorter than palm . . . . . \*18. *A. davaoensis*  
 Rostrum extending anteriorly beyond lateral frontal margin; antennal scale moderately concave laterally, distolateral spine unusually stout; major chela with distal sinus on palm immediately proximal to adhesive plaque; minor chela with fingers slightly longer than palm . . . . . \*27. *A. eulimene*
33. Margins of orbital hoods not extended anteriorly as flattened projections; minor chela without distinct lateral crest on dactyl . . . . . \*36. *A. hippothoe*  
 Margins of orbital hoods extended anteriorly as flattened projections; minor chela with distinct lateral crest on dactyl, setiferous in male . . . . . \*66. *A. serenei*
34. Major chela with strong shoulder on margin proximal to fixed finger; 3rd pereopod with dactyl not subspatulate, ischium unarmed . . . . . 15. *A. coutierei*  
 Major chela without distinct shoulder on margin proximal to fixed finger; 3rd pereopod with dactyl subspatulate, ischium bearing movable spine . . . . . \*21. *A. dispar*
35. Third pereopod with strong distal tooth on flexor margin of merus . . . . . 36  
 Third pereopod without strong distal tooth on flexor margin of merus . . . . . 53
36. Second pereopod with proximal article of carpus no more than  $\frac{1}{2}$  as long as 2nd . . . . . 37  
 Second pereopod with proximal article of carpus more than  $\frac{1}{2}$  as long as longer than 2nd . . . . . 45
37. Third pereopod with dactyl biunguiculate . . . . . 38  
 Third pereopod with dactyl simple, not biunguiculate . . . . . 40
38. Antennal scale with blade much reduced, reaching little more than halfway to tip of distolateral spine; 3rd pereopod without spines on flexor margin of carpus or movable spine on ischium . . . . . 70. *A. spongiarum*  
 Antennal scale less reduced, reaching at least  $\frac{2}{3}$  of distance to tip of distolateral spine; 3rd pereopod with 1-4 spines on flexor margin of carpus and with movable spine on ischium . . . . . 39
39. Minor chela not sexually dimorphic, fingers no more than  $\frac{3}{4}$  as long as palm; 3rd pereopod with series of spines on mesial flexor margin of merus . . . . . \*5. *A. alcyone*  
 Minor chela sexually dimorphic, dactyl distinctly wider and slightly longer in male than in female, fingers at least as long as palm in both sexes; 3rd pereopod without series of spines on flexor margin of merus . . . . . \*58. *A. paralcycone*
40. Third pereopod with movable spine on ischium . . . . . 41  
 Third pereopod without spine on ischium . . . . . 44
41. Major chela with dactyl like double-headed hammer . . . . . 42  
 Major chela with conventional dactyl, not double-headed . . . . . 43
42. Antennal scale with blade well-developed, overreaching 2nd antennular segment . . . . . \*48. *A. microstylus*

- Antennal scale with blade reduced, not reaching beyond midlength of 2nd antennular segment . . . . . \*52. *A. obesomanus*
43. Basal antennal segment (basicerite) armed with strong lateral tooth; major chela with transverse and longitudinal grooves; minor chela with fingers less than  $\frac{1}{2}$  as long as palm, dactyl not "balaeniceps" in either sex . \*4. *A. acutofemoratus*  
Basal antennal segment (basicerite) usually unarmed; major chela without apparent sculpture; minor chela with fingers at least  $\frac{3}{4}$  as long as palm, dactyl "balaeniceps" in male . . . . . \*10. *A. bucephalus*
44. Second antennular segment 3 times as long as wide; major chela with dactyl like double-headed hammer . . . . . \*47. *A. malleodigitus*  
Second antennular segment twice as long as wide; major chela with conventional dactyl, not double-ended . . . . . 70. *A. spongiarum*
45. Major chela with strong tooth either side of dactylar articulation . . . . . 13. *A. collumianus*  
Major chela without strong teeth flanking dactylar articulation . . . . . 46
46. Major chela with palm distinctly constricted on both margins proximal to dactylar articulation . . . . . 47  
Major chela without distinct sinus in margin proximal to fixed finger . . . . . 50
47. Major chela with sinus on margin proximal to fixed finger not delimited proximally by very strong shoulder . . . . . 7. *A. batesi*  
Major chela with very strong shoulder on margin proximal to fixed finger . . . 48
48. Basal antennal segment (basicerite) with unusually long ventrolateral tooth far overreaching stylocerite; major chela with "saddle" proximal to adhesive plaque in form of narrow oblique groove; 2nd pereopod with proximal carpal article considerably longer than 2nd article . . . . . \*60. *A. parvirostris*  
Basal antennal segment (basicerite) armed with spine-like ventrolateral tooth not overreaching stylocerite; major chela with "saddle" proximal to adhesive plaque U-shaped and transverse; 2nd pereopod with proximal carpal article shorter than 2nd article . . . . . 49
49. Major cheliped with sharp distal tooth on inferior flexor margin of merus; minor chela without sharp carina on extensor margin of dactyl and without sharp granules on extensor surface of palm . . . . . \*23. *A. edamensis*  
Major cheliped with flexor margin of merus unarmed; minor chela with sharp carina on extensor margin of dactyl and sharp granules on extensor surface of palm . . . . . \*32. *A. funafutensis*
50. Rostrum prominent, acute . . . . . 51  
Rostrum small, subrectangular . . . . . 52
51. Major chela with palm devoid of grooves and ridges, fingers about  $\frac{1}{3}$  as long as palm . . . . . 16. *A. crinitus*  
Major chela with subdistal, cleft-like "saddle" on palm, fingers about  $\frac{2}{3}$  as long as palm . . . . . 49. *A. miersi*
52. Antennal scale with distolateral spine not especially stout, laterally convex, slightly overreaching well-developed blade; minor 1st chela with dactyl broadly "balaeniceps" in male only; 3rd pereopod with dactyl simple . . . . . 54. *A. pachychirus*  
Antennal scale with distolateral spine stout, laterally straight or slightly concave, considerably overreaching somewhat reduced blade; minor 1st chela with dactyl not "balaeniceps" in either sex; 3rd pereopod with dactyl variably biunguiculate . . . . . 71. *A. stanleyi*
53. Third pereopod with dactyl biunguiculate or subspatulate . . . . . 54  
Third pereopod with dactyl neither biunguiculate nor subspatulate . . . . . 63
54. Third pereopod with dactyl biunguiculate . . . . . 55  
Third pereopod with dactyl subspatulate . . . . . 56
55. Major chela with prominent acute tooth either side of dactylar articulation, without "saddle" proximal to adhesive plaque, without distinct shoulder on margin

- proximal to fixed finger; minor chela with dactyl not "balaeniceps" in either sex; 2nd pereopod with proximal carpal article  $1\frac{3}{4}$  times as long as 2nd . . . . . 13. *A. collumianus*
- Major chela without prominent acute tooth either side of dactylar articulation, with distinct "saddle" proximal to adhesive plaque overhung by proximal shoulder, with distinct shoulder on margin proximal to fixed finger; minor chela with dactyl "balaeniceps" in male only; 2nd pereopod with proximal carpal article twice as long as 2nd . . . . . \*62. *A. polyxo*
56. Major chela without "saddle" proximal to adhesive plaque . . . . . 57  
Major chela with "saddle" proximal to adhesive plaque . . . . . 61
57. Body strongly compressed, carapace twice as high as wide; 1st pair of pereopods with merus armed with 3 distal teeth on extensor margin . . 14. *A. compressus*  
Body not unusually compressed; 1st pair of pereopods with merus armed, at most, with single distal tooth on extensor margin . . . . . 58
58. Second pereopod with proximal article of carpus shorter than 2nd . . . . . 59  
Second pereopod with proximal article of carpus longer than or subequal to 2nd . 60
59. Antennal peduncle (carpocerite) overreaching antennular peduncle; 1st pereopods with series of long, acicular spines on flexor margin of merus; minor chela nearly 8 times as long as wide, dactyl slightly shorter than palm, "balaeniceps" in male . . . . . \*64. *A. pustulosus*  
Antennal peduncle (carpocerite) not reaching as far as distal end of antennular peduncle; 1st pereopods with short, inconspicuous spines on flexor margin of merus; minor chela less than 5 times as long as wide, dactyl distinctly longer than palm, not "balaeniceps" in male . . . . . \*65. *A. quasirapacida*
60. First pereopods with strong subdistal tooth on extensor margin of merus; major chela oval in cross-section, without longitudinal carinae or ridges on palm . . . . . \**A. macroskeles*  
First pereopods without subdistal tooth on extensor margin of merus; major chela with palm subrectangular in cross section and bearing strong longitudinal carina near margin proximal to fixed finger, obscure longitudinal ridge near midheight of same surface, and 2 ridges defining flattened surface proximal to adhesive plaque . . . . . \*51. *A. nonalter*
61. Major chela without shoulder on margin proximal to fixed finger . . . . . \*43. *macellarius*  
Major chela with shoulder on margin proximal to fixed finger . . . . . 62
62. Major chela less than  $2\frac{1}{2}$  times as long as wide; minor chela with fingers subequal to or slightly longer than palm, dactyl "balaeniceps" in male; maximum carapace length about 27 mm . . . . . \*28. *A. euphrosyne euphrosyne*  
Major chela  $2\frac{1}{2}$  to  $3\frac{1}{2}$  times as long as wide; minor chela with fingers usually about 3 times as long as palm, dactyl not "balaeniceps" in either sex; maximum carapace length about 13 mm . . . . . \*46. *A. malabaricus*
63. Major chela with "saddle" or transverse cleft proximal to adhesive plaque . . . 64  
Major chela without "saddle" or transverse cleft proximal to adhesive plaque . . . . . 80
64. Second pereopod with proximal carpal article 2 or more times as long as 2nd . . . . . 65  
Second pereopod with proximal carpal article less than twice as long as 2nd . . . . . 67
65. Major chela with abrupt shoulder on margin proximal to fixed finger; 3rd pereopod without spine on ischium . . . . . 45. *A. maindroni*  
Major chela without marginal shoulder proximal to fixed finger; 3rd pereopod with movable spine on ischium . . . . . 66
66. Margin of orbital hood curving regularly to base of rostrum, not produced anteromesially; major cheliped without distal tooth on inferior flexor margin of

- merus . . . . . 6. *A. barbatus*  
 Frontal margin between rostrum and orbital hood convexly produced; major  
 cheliped with strong distal spine on inferior flexor margin of merus . . . . .  
 . . . . . 25. *A. ehlersii*
67. Major chela with "saddle" proximal to adhesive plaque at least partially overhung  
 by shoulder proximal to "saddle" . . . . . 68  
 Major chela with "saddle" proximal to adhesive plaque not even partially overhung  
 by shoulder proximal to "saddle" . . . . . 74
68. Major chela with dactyl bearing very short, obliquely truncate plunger . . . . . 69  
 Major chela with dactyl bearing well-developed plunger . . . . . 71
69. Major chela with both proximal shoulder overhanging "saddle" proximal to  
 adhesive plaque and shoulder on margin proximal to fixed finger sharply acute  
 . . . . . 12. *A. chiragricus*  
 Major chela with both proximal shoulder overhanging "saddle" proximal to  
 adhesive plaque and shoulder on margin proximal to fixed finger bluntly rounded  
 . . . . . 70
70. Major chela with margin proximal to fixed finger supporting low shoulder, forming  
 shallow notch distally; minor chela of male with dactyl strongly "balaeniceps"  
 and with distinct "saddle" on palm proximal to dactylar articulation . . . . .  
 . . . . . \*59. *A. pareuchirus pareuchirus*  
 Major chela with margin proximal to fixed finger supporting strong shoulder  
 forming rather deep notch distally; minor chela with dactyl not "balaeniceps"  
 and palm without distinct "saddle" in either sex . . . . . \*75. *A. suluensis*
71. First pereopods with merus armed with acute distal tooth on inferior flexor margin  
 . . . . . 72  
 First pereopods with merus unarmed at distal end of inferior flexor margin . . . . .  
 . . . . . 73
72. Minor chela with dactyl "balaeniceps" in male only; 2nd pereopod with proximal  
 article of carpus 1<sup>1</sup>/<sub>4</sub> to 2 times as long as 2nd . . . . . \*24. *A. edwardsii*  
 Minor chela with dactyl "balaeniceps" in both sexes; 2nd pereopod with proximal  
 subequal to 2nd article in length . . . . . \*73. *A. strenuus strenuus*
73. Rostrum nearly reaching level of distal margin of 1st antennular segment; antennal  
 scale with distolateral spine distinctly overreaching distal margin of blade; major  
 chela with sharp ridge on mesial surface of palm subparallel with "dorsal"  
 margin of palm; minor chela of male with dactyl robust, displaying "balaeniceps"  
 carina, especially on lateral surface . . . . . \*37. *A. hyphalus*  
 Rostrum not nearly reaching level of distal margin of 1st antennular segment;  
 antennal scale with distolateral spine only moderately overreaching distal margin  
 of blade; major chela with sharp ridge on mesial surface of palm diverging  
 distally from "dorsal" margin of palm at angle of about 45°; minor chela of  
 male with dactyl slender, without "balaeniceps" carina on either surface . . . . .  
 . . . . . \*55. *A. pacificus*
74. Major chela 3 or more times as long as wide . . . . . 75  
 Major chela seldom more than 2<sup>1</sup>/<sub>2</sub> times as long as wide . . . . . 76
75. Frontal margin between rostrum and orbital hood convex . . . . . 7. *A. batesi*  
 Frontal margin between rostrum and orbital hood incised . . . . . 39. *A. leptochirus*
76. Second pereopod with proximal article of carpus not appreciably longer than 2nd  
 . . . . . 77  
 Second pereopod with proximal article of carpus distinctly longer than 2nd . . . . . 78
77. Antennal scale with lateral margin sinuous, distolateral spine laterally convex; 1st  
 pereopods with 2–3 spines on flexor margin of merus proximal to distal tooth;  
 minor chela with dactyl not distinctly "balaeniceps" in either sex . . . . .  
 . . . . . 22. *A. dolerus*  
 Antennal scale with lateral margin concave, distolateral spine nearly straight

- laterally; 1st pereopods without spines on flexor margin proximal to distal tooth; minor chela with dactyl strongly "balaeniceps" in both sexes . . . . . \*73. *A. strenuus strenuus*
78. Major chela with "saddle" proximal to adhesive plaque rather broad longitudinally and shallow, not abruptly delimited proximally; minor chela with dactyl not "balaeniceps" in either sex . . . . . 38. *A. ladronis*  
Major chela with "saddle" proximal to adhesive plaque in form of notch rather abruptly delimited proximally; minor chela with dactyl usually "balaeniceps" in male . . . . . 79
79. Major cheliped without distal or subdistal tooth on inferior flexor margin of merus; 3rd pereopod usually without spine on ischium . . . . . 40. *A. leviusculus leviusculus*  
Major cheliped usually with subdistal tooth on inferior flexor margin of merus; 3rd pereopod usually with movable spine on ischium . . . . . \*41. *A. lobidens*
80. Major cheliped without distal tooth on inferior flexor margin of merus . . . . . 81  
Major cheliped usually with acute tooth on inferior flexor margin of merus . . . . . 82
81. Rostrum vestigial, frontal margin of carapace extending well beyond margins of orbital hoods; 2nd antennular segment nearly 3 times as long as wide; basal antennal segment (basicerite) armed with small, inconspicuous tooth; 2nd pereopod with proximal article of carpus more than twice as long as 2nd . . . . . \*31. *A. frontalis*  
Rostrum well-developed, frontal margin of carapace not extending beyond margins of orbital hoods; 2nd antennular segment about 1½ times as long as wide; basal antennal segment (basicerite) armed with large, sharp tooth overreaching stylocerite; 2nd pereopod with proximal article of carpus less than 1½ times as long as 2nd . . . . . 53. *A. ovaliceps*
82. Major chela with palm slightly less than twice as long as wide, fingers slightly more than ½ as long as palm; minor chela with fingers slightly shorter than palm . . . . . 50. *A. mitis*  
Major chela with palm slightly more than twice as long as wide, fingers slightly less than ½ as long as palm; minor chela with fingers slightly longer than palm . . . . . 56. *A. paracrinitus*

### 3. *Alpheus acutocarinatus* De Man, 1909

*Alpheus acutocarinatus* De Man, 1909a:104 [type locality: the type series came from 4 Indonesian localities: Selat Madura (56 m); west coast of Lombok (18–27 m); north coast of Celebes (72 m); and east coast of Sumbawa (to 36 m)]; 1911:301, pl. 21: fig. 94–94f, pl. 22: fig. 94g–j.—A.H. and D.M. Banner, 1981:225.—D.M. and A.H. Banner, 1982:151, fig. 44.

DIAGNOSIS.—(Brevirostris Group). Body not unusually compressed or setose; rostrum prominent but not reaching as far as distal margin of 1st antennular segment, sharply carinate in midline, carina extending posteriorly beyond midlength of carapace, base not abruptly delimited from adrostral furrows; carapace with median tooth interrupting postrostral carina on gastric region, without flattened teeth overhanging posterior ends of adrostral furrows, anterior margin transverse and unarmed mesial to orbital hoods, curving directly onto rostral margin, region not unusually flattened, orbital hoods unarmed, adrostral furrows deep; 2nd antennular segment more than 4 times as long as wide; basal antennal segment (basicerite) armed with small lateral tooth not nearly reaching level of tip of

stylocerite; antennal scale with lateral margin moderately concave, distolateral spine not unusually stout, barely overreaching distal margin of blade; 1st pereopods with merus armed with acute distal tooth on inferior flexor margin; major chela oval in cross-section, 6 times as long as wide, dactyl nearly straight in longitudinal plane, not double-ended, bearing well-developed plunger, palm without teeth either side of dactylar articulation or other obvious sculpture, without longitudinal carina near margin proximal to fixed finger, without "saddle" proximal to adhesive plaque but with indistinct distal sinus adjacent to plaque, without shoulder on margin proximal to fixed finger; minor chela 9 times as long as wide, dactyl slender, slightly shorter than or subequal to palm, "balaeniceps" in male only, without longitudinal crests on opposable margin; 2nd pereopod with proximal carpal article subequal to 2nd; 3rd pereopod with dactyl pointed, simple, subspatulate, propodus, carpus, and merus without spines on flexor margin, ischium bearing movable spine; maximum carapace length to base of rostrum about 9.0 mm.

RANGE.—Madagascar, Gulf of Thailand, Philippines (off

Manila Bay), Indonesia, and southern Queensland, Australia; about 20–72 meters. In the Smithsonian collections, there are six specimens of *A. acutocarينات* collected by the NAGA Expedition in the Bay of Nha Trang, Viet Nam in 1966.

REMARKS.—The *Albatross* collected, at station 5397 in the Samar Sea east of Masbate in 245 meters, an ovigerous female (carapace length 8.3 mm to base of rostrum) of a shrimp without its three anterior pairs of pereopods that seems to be related to *A. acutocarينات*. That it probably represents a distinct species is suggested not only by the greater depth at which it was taken but also by the remnant of what must have been a larger mesial gastric tooth, by a small spine on the frontal margin either side of the rostrum, and by a rather distinct branchiostegal spine.

#### \*4. *Alpheus acutofemoratus* Dana, 1852

*Alpheus acuto-femoratus* Dana, 1852b:550, pl. 35: fig. 2 [type locality: Balabac Strait].—De Man, 1902:888, pl. 27: fig. 63.

*Alpheus parabrevipes* Coutière, 1898a:151, fig. 2 [type locality: Samoa].

*Alpheus acutofemoratus*.—D.M. and A.H. Banner, 1978:218; 1982:77, fig. 29; 1985:11.

DIAGNOSIS.—(Sulcatus Group). Body not unusually compressed or setose; rostrum distinct but not reaching as far as distal margin of 1st antennular segment, bluntly carinate in midline, carina broadening posteriorly and disappearing on anterior gastric region, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle posterior to base of rostrum, without flattened teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood unarmed but angularly projecting anteriorly beyond orbital hood, submarginal region somewhat flattened, orbital hoods unarmed, adrostral furrows not very deep; 2nd antennular segment about twice as long as wide; basal antennal segment (basicerite) armed with distinct lateral tooth that does not reach level of tip of stylocerite; antennal scale with lateral margin rather strongly concave, distolateral spine stout, distinctly overreaching distal margin of blade; 1st pereopods with merus armed with acute distal tooth on inferior flexor margin; major chela subconical, slightly more than twice as long as wide, dactyl little curved but directed somewhat laterad from longitudinal plane of palm, not double-ended, bearing well-developed plunger, palm without sharp teeth either side of dactylar articulation, without longitudinal carina near margin proximal to fixed finger, with narrow, V-shaped transverse “saddle” proximal to adhesive plaque, proximal shoulder not overhanging “saddle,” without shoulder on margin proximal to fixed finger, deep longitudinal sulcus but no sharp carina on mesial surface of palm subparallel with dorsal margin; minor chela about 3 times as long as wide, dactyl not especially slender, less than  $\frac{1}{2}$  as long as palm, not carinate on extensor margin, not “balaeniceps” even in males, palm granulate and setose on mesial surface; 2nd pereopod with proximal carpal article  $\frac{1}{3}$  as long as 2nd; 3rd and 4th

pereopods with dactyl simple, propodus armed with 10–12 spines on flexor margin, carpus with acute tooth at distal end of flexor margin, merus armed with large acute distal tooth on flexor margin, ischium bearing movable spine; maximum carapace length to base of rostrum about 9 mm.

MATERIAL.—PHILIPPINES. Port Gubat, southeastern Luzon [12°55'N, 124°09'E]; tide pool; 23 Jun 1909 (1300–1700): 1 ovig female [7.3].

RANGE.—Andaman Sea, Gulf of Thailand, Philippines, Indonesia, and Queensland, Australia, to the Marshall, Fiji, Samoa, and Tonga islands; intertidal to 3 meters.

#### \*5. *Alpheus alcyone* De Man, 1902

*Alpheus crinitus*.—Bate, 1888:548, pl. 98: fig. 2 [not *A. crinitus* Dana, 1852].

*Alpheus alcyone* De Man, 1902:870, pl. 27: fig. 61 [type locality: Ternate].—D.M. and A.H. Banner, 1982:110, fig. 29.

*Alpheus aculeipes* Coutière, 1905:892, pl. 79: fig. 31 [type locality: several localities in the Maldives Islands, as well as Djibouti and Mozambique].

DIAGNOSIS.—(Crinitus Group). Body neither unusually compressed nor densely setose; rostrum small, not reaching nearly as far as distal margin of 1st antennular segment, sharply carinate in extreme anterior part, carina becoming blunt posteriorly and disappearing on anterior gastric region, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle posterior to base of rostrum and without flattened teeth overhanging posterior ends of adrostral furrows, anterior margin transverse and unarmed mesial to orbital hoods, region not flattened, orbital hoods unarmed, adrostral furrows rather deep; 2nd antennular segment less than twice as long as wide; basal antennal segment (basicerite) unarmed; antennal scale with lateral margin moderately concave, distolateral spine stout, far overreaching distal margin of rather narrow blade; major 1st cheliped with merus armed with acute distal tooth on inferior flexor margin; minor 1st cheliped with merus unarmed on flexor margin; major chela broadly oval in cross-section, about  $2\frac{1}{2}$  times as long as wide, dactyl slightly curved in longitudinal plane, not double-ended, bearing short, truncated plunger, palm without obvious sculpture of any kind; minor chela 4 times as long as wide, dactyl not especially slender, nearly  $\frac{1}{3}$  as long as palm, not “balaeniceps” and without carinae on either extensor or opposable margin; 2nd pereopod with proximal carpal article about  $\frac{1}{3}$  as long as 2nd; 3rd pereopod with dactyl variably biunguiculate, sometimes obscurely so, propodus bearing 8 spines on flexor margin, carpus with 1–4 spines on flexor margin, merus with distal tooth and 3–12 spines on parallel carina of flexor margin; 4th pereopod with merus lacking teeth or spines on flexor margin; maximum carapace length to base of rostrum about 8 mm.

MATERIAL.—PHILIPPINES. Off Jolo Island, Sulu Archipelago: sta 5174; 6°03'45"N, 120°57'E; 37 m; coarse sand; 5 Mar 1908 (1551–1557); 9' Johnston oyster dredge: 1 male [5.5]. Near Siasi, Sulu Archipelago: sta 5147; 5°41'40"N, 120°47'10"E;

38 m; coral sand, shells; 16 Feb 1908 (1127–1147); 12' Agassiz beam trawl, mud bag; 1 male [4.0].

RANGE.—Red Sea and eastern Africa to Japan, Philippines, Indonesia, Australia, and Caroline, Marshall, Fiji, Samoa, and Tonga islands; intertidal to 71 meters, in coral and probably sponges.

REMARKS.—Apparently a small and inconspicuous movable spine may be present or absent on the ischium of the third and fourth pereopods in this species.

#### 6. *Alpheus barbatus* Coutière, 1897

*Alpheus barbatus* Coutière, 1897a:235 [type locality: Djibouti]; 1899:230, figs. 279, 280.—De Man, 1911:387, pl. 19: fig. 88.—D.M. and A.H. Banner, 1982:163, fig. 49.

DIAGNOSIS.—(Brevirostris Group). Body neither unusually compressed nor densely setose; rostrum short, subrectangular, not reaching nearly as far as distal margin of 1st antennular segment, slightly carinate in midline, carina not extending posteriorly beyond orbital hoods, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without flattened teeth overhanging posterior ends of adrostral furrows, anterior margin transverse or concave and unarmed mesial to orbital hoods, region not especially flattened, orbital hoods unarmed, adrostral furrows shallow; 2nd antennular segment only slightly longer than wide; basal antennal segment (basicerite) unarmed; antennal scale with lateral margin nearly straight, distolateral spine unusually stout, moderately overreaching distal margin of blade; 1st pereopods with merus unarmed on flexor margin; major chela compressed, about twice as long as wide, dactyl not double-ended, palm without teeth either side of dactylar articulation, without longitudinal carina on mesial surface parallel with "dorsal" margin, but with shallow longitudinal sulcus on lateral surface extending from base of fixed finger to midlength of palm; minor chela about  $2\frac{1}{2}$  times as long as wide, fingers gaping, about  $\frac{12}{3}$  times as long as palm, lateral surface of dactyl and mesial surface of both fingers bearing dense fringes of hair, filling gap, dactyl not "balaeniceps"; 2nd pereopod with proximal carpal article twice as long as 2nd; 3rd pereopod with dactyl pointed, simple, propodus bearing 7 spines on flexor margin, carpus and merus unarmed on flexor margin, ischium bearing movable spine; maximum carapace length to base of rostrum probably at least 10 mm.

RANGE.—Red Sea and eastern Africa to Philippines, Indonesia, and Queensland, Australia; intertidal to 10 meters.

#### 7. *Alpheus batesi* A.H. and D.M. Banner, 1964

*Alpheus leviusculus*, var. Bate, 1888:549, pl. 98: fig. 1.  
*Alpheus batesi* A.H. and D.M. Banner, 1964:94 [type locality: Viscayan Sea off Tagubanan Island, Philippines; 11°06'N, 123°09'E; 37 meters; mud].

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum sharp, overreaching distal margin of 1st antennular segment, dorsally rounded, mesial ridge not

extending posteriorly beyond orbital hoods, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without flattened teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood unarmed but protruding anteriorly as convex lobe, region slightly flattened, orbital hoods unarmed, adrostral furrows not very deep; 2nd antennular segment about 3 times as long as wide; basal antennal segment (basicerite) not armed with strong ventro-lateral tooth; antennal scale with lateral margin slightly concave, distolateral spine not unusually stout, slightly overreaching and separated from blade by moderate gap; major chela slightly compressed, about 3 times as long as wide, dactyl not doubled-ended, bearing short, truncate plunger, unarmed either side of dactylar articulation, without longitudinal carina near margin proximal to fixed finger, with shallow "saddle" on palm proximal to adhesive plaque, without distinct shoulder proximal to "saddle," with sinus on opposite margin proximal to fixed finger but without distinct shoulder proximal thereto, palm without sharp ridge on mesial surface subparallel with "dorsal" margin of palm; minor chela lost; 2nd pereopod with proximal article slightly longer than 2nd; 3rd pereopod with dactyl elongate, simple, and sharp; carapace length about 11 mm.

RANGE.—Apparently known only from the ovigerous female holotype from the Viscayan Sea, Philippines, in 37 meters.

#### 8. *Alpheus bicostatus* De Man, 1908

*Alpheus bicostatus* De Man, 1908:102 [type locality: the type series came from 3 Philippine and Indonesian localities: Kepulauan Balabagan, Makassar Strait (to 27 m); off North Ubian Island, Sulu Archipelago (surface to 23 m); and Selat Butung, southern Celebes (in floating seaweed)].—D.M. and A.H. Banner, 1982:124, fig. 34.

DIAGNOSIS.—(Diadema Group). Body not unusually compressed or setose; rostrum slender, sharp, slightly overreaching distal margin of 1st antennular segment, bluntly carinate, carina interrupted on anterior gastric region, finally terminating on midgastric region; carapace with median tubercle on anterior gastric region, with paired convex or oblique flanges abruptly delimiting and overhanging posterior ends of adrostral furrows, anterior margin armed with acute tooth slightly mesial to orbital hood, meeting base of rostrum at right angle, region flattened, orbital hood unarmed but bearing nearly vertical carina; 2nd antennular segment twice as long as wide; basal antennal segment (basicerite) armed with prominent ventral tooth reaching anteriorly nearly as far as tip of stylocerite; antennal scale with lateral margin concave, distolateral spine stout, overreaching distal margin of blade; major cheliped with chela subcylindrical, about 3 times as long as wide, dactyl nearly straight in longitudinal plane, not double-ended, bearing poorly developed concavely truncate plunger, palm without sculpture except for narrow and shallow "saddle" proximal to adhesive plaque, merus with subdistal tooth on inferior flexor



margin; minor cheliped with chela about 4 times as long as wide, dactyl  $\frac{2}{3}$  as long as palm, without carina in midline of extensor surface, palm without sculpture, merus unarmed on inferior flexor margin; 2nd pereopod with proximal carpal article subequal to 2nd; 3rd pereopod with dactyl pointed, simple, neither biunguiculate nor subspatulate, propodus with numerous spines on and near flexor margin, carpus with long distal tooth on flexor margin, merus with acute distal tooth on flexor margin, ischium bearing movable spine; maximum carapace length to base of rostrum about 10 mm.

RANGE.—Kenya and Madagascar to the Philippines, Indonesia, and Australia; intertidal to 27 meters, occasionally at surface.

#### \*9. *Alpheus bidens* (Olivier, 1811)

*Palaemon bidens* Olivier, 1811:663 [type locality: Australia ("sur les cotes de la Nouvelle-Hollande")].

*Alpheus tridentatus* Zehnter, 1894:204, pl. 8: fig. 24 [type locality: Ambon, Indonesia].

*Alpheus praedator* De Man, 1908:103 [type locality: Ambon, Indonesia].

*Alpheus dissodonotus* Stebbing, 1915:83, pl. 86 [type locality: off Port Elizabeth, South Africa; 33°50'S, 25°46'E; 37 meters].

*Alpheus bidens*.—D.M. and A.H. Banner, 1982:136, fig. 39.

DIAGNOSIS.—(Diadema Group). Body not unusually compressed or setose; rostrum prominent, reaching anteriorly as far as or beyond distal margin of 1st antennular segment, strongly and sharply carinate in dorsal midline, base not abruptly delimited from adrostral furrows; carapace with median tubercle interrupting postrostral carina on gastric region and with paired large acute teeth overhanging posterior ends of adrostral furrows, anterior margin unarmed but convex mesial to orbital hoods, meeting base of rostrum at almost right angle, region somewhat depressed, concave, orbital hoods unarmed but with strong vertical carina appearing almost toothlike in lateral aspect, adrostral furrows deep; 2nd antennular segment nearly  $1\frac{1}{2}$  times as long as wide; basal antennal segment (basicerite) with strong ventrolateral tooth not reaching level of tip of stylocerite; antennal scale with lateral margin concave, stout, laterally convex distolateral spine overreaching blade; major cheliped with chela nearly cylindrical, fully  $2\frac{1}{2}$  times as long as wide, dactyl nearly straight in longitudinal plane, not double-ended, bearing poorly developed, somewhat concave plunger, palm virtually without sculpture except for narrow, deep "saddle" proximal to adhesive plaque, merus with inferior flexor margin armed with strong distal tooth; minor cheliped with chela  $\frac{2}{3}$  to  $\frac{3}{4}$  times as long as wide, dactyl subequal to palm in length, balaeniceps and with suggestion of "saddle" on palm in male only, merus without distal tooth on inferior flexor margin; 2nd pereopod with proximal carpal article as long as 2nd; 3rd pereopod with dactyl usually simple, neither subspatulate nor biunguiculate, propodus bearing 9–16 spines on flexor margin, carpus with 2 terminal spines on flexor margin, merus with acute subdistal tooth, ischium bearing movable spine; maximum carapace

length about 23 mm.

MATERIAL.—PHILIPPINES. Off Jolo Island, Sulu Archipelago; 6°06'N, 120°58'50"E; 35 m; sand, coral; 14 Feb 1908 (1055–1115); 12' Agassiz beam trawl, 2 mud bags: 1 female [6.3].

RANGE.—Madagascar and Hong Kong, Ryukyus, Philippines, Indonesia, Australia, Tasmania, Caroline, and Marshall islands; intertidal to 83 m.

REMARKS.—Although D.M. and A.H. Banner (1982:139) considered "rather insignificant" the fact that all of the Australian specimens seen by them lacked elongate teeth on the distal margin of the first antennular segment, while all of De Man's Indonesian specimens bore two prominent teeth in this position, I attempted to couple this difference with an apparent difference in size between the Australian population and specimens available to me from off Hong Kong, the Philippines, and the Marshall Islands. The extra-Australian material examined was composed of small specimens, none exceeding a carapace length of 10 mm, ovigerous females yielding carapace lengths of 6.0 to 9.7 mm, whereas Australian material recorded in the literature seemed to be larger, corresponding to carapace lengths of 14 to 23 mm, and to occur in shallower water, 0 to 24 meters in contrast to 0 to 83 meters for the smaller form. Of 11 specimens of the extra-Australian shrimps examined, however, only two specimens displayed two teeth on the first segment of both antennular peduncles, two had two teeth on one side and one on the other, one had one tooth on each peduncle, two had one on one side and none on the other, and four specimens—all from the Marshall Islands—had no teeth on either peduncle. I am forced, therefore, to agree with the Banners about the variability of this character but I am still intrigued by the apparently larger size of the Australian examples and the possibility of eventually finding correlated morphological differences that might be of taxonomic significance.

#### \*10. *Alpheus bucephalus* Coutière, 1905

*Alpheus bucephalus* Coutière, 1905:890, pl. 78, fig. 29 [type locality: the material cited came from 2 Indian Ocean localities: Hulele, Male, Maldives Islands, and Minicoy, Laccadive Islands].—D.M. and A.H. Banner, 1982:120, figs. 23d–f, 32.

*Alpheus consobrinus* De Man, 1908:101 [type locality: the type series came from 7 Siboga stations in the Philippines and Indonesia: Pulau Lumulumu, Makassar Strait (reef); Pearl Bank (Lahangan Island), Sulu Archipelago (15 m); Pulau Pajunga, Kuandang Bay, northern Celebes (reef); Pulau Siau [Kepulauan Sangi] (reef); Pulau Selajar [south of Celebes] (to 36 m); Pulau Roti (to 36 m); and Kepulauan Balabalagan [Makassar Strait] (to 36 m)].

DIAGNOSIS.—(Crinitus Group). Body not unusually compressed or setose; rostrum acute, short, not reaching nearly as far as distal margin of 1st antennular segment, sharply carinate in midline, carina not extending posteriorly beyond base of eyes, rostral base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or acute teeth overhanging posterior end of adrostral

furrows, anterior margin partially convex and unarmed mesial to orbital hoods, region flattened, orbital hood unarmed but with projecting vertical carina, adrostral furrows distinct; 2nd antennular segment twice as long as wide; basal antennal segment (basicerite) usually unarmed; antennal scale with lateral margin quite concave, distolateral spine not unusually stout, reaching considerably beyond distal margin of blade; 1st pereopods with merus often armed with acute distal tooth on inferior flexor margin; major chela subcylindrical,  $2\frac{1}{2}$  times as long as wide, dactyl not curved in longitudinal plane but both fingers bent slightly toward flexor aspect of chela, not double-ended, bearing truncate plunger becoming acute proximally, palm without sculpture except for faint distal sinus adjacent to adhesive plaque; minor chela about  $2\frac{1}{2}$  to  $3\frac{1}{2}$  times as long as wide, dactyl about equal to or somewhat longer than palm, "balaeniceps" in male only; 2nd pereopod with proximal carpal article  $\frac{1}{3}$  to  $\frac{1}{2}$  as long as 2nd; 3rd pereopod with dactyl simple, curved to sharp tip, not subspatulate or biunguiculate, propodus bearing 6 pairs of spines on flexor margin, carpus with acute distal tooth on flexor margin, merus armed with strong acute distal tooth on flexor margin, ischium bearing movable spine; maximum carapace length to base of rostrum, probably little more than 6 mm.

**MATERIAL.**—PHILIPPINES. Off Jolo Island, Sulu Archipelago: sta 5145;  $6^{\circ}04'30''N$ ,  $120^{\circ}59'30''E$ ; 42 m; coral sand, shells; 15 Feb 1908 (1344–1359); 12' Agassiz beam trawl, mud bag: 1 ovig female [5.3]. Marungas Island, Sulu Archipelago: [ $6^{\circ}06'N$ ,  $120^{\circ}58'E$ ]; 19 Feb 1908; shore, coral head: 1 male [4.3].

**RANGE.**—Red Sea and eastern Africa to Japan, Philippines, Indonesia, Australia, and Pacific Islands to Line and Society islands; intertidal to 80 meters.

#### 11. *Alpheus canaliculatus* A.H. and D.M. Banner, 1968

*Alpheus canaliculatus* A.H. and D.M. Banner, 1968:141, fig. 1 [type locality: South China Sea southeast of Hong Kong;  $20^{\circ}05'N$ ,  $115^{\circ}11'E$ ; 250 meters; sand and mud]; 1981:225.

**DIAGNOSIS.**—(Sulcatus Group). Body not unusually compressed or setose; rostrum sharp, prominent, but not reaching nearly as far as distal margin of 1st antennular segment, rounded dorsally, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or paired large acute teeth overhanging posterior ends of adrostral furrows, anterior margin unarmed mesial to orbital hoods, joining rostral margin at less than right angle, orbital hood armed with sharp marginal tooth directed slightly mesiad, adrostral furrows moderately deep but narrow; 2nd antennular segment 3 times as long as wide; basal antennal segment (basicerite) armed with strong ventrolateral tooth nearly reaching level of tip of stylocerite; antennal scale with lateral margin concave in proximal  $\frac{1}{2}$ , distolateral spine strong, laterally convex, considerably overreaching distal margin of blade; anterior pereopods with merus armed with acute distal

tooth on inferior flexor margin; major chela compressed, fully  $2\frac{1}{2}$  times as long as wide, dactyl not curved in longitudinal plane but directed slightly toward flexor side of chela, not double-ended, bearing truncated, very short plunger, palm without teeth either side of dactylar articulation, without longitudinal carina near margin proximal to fixed finger, without "saddle" proximal to adhesive plaque but with 4 longitudinal furrows, furrow extending posteriorly from adhesive plaque bounded on each side by rather distinct carina; minor chela nearly 4 times as long as wide, dactyl slightly longer than palm, "sub-balaeniceps" even in female, with sharp tooth on extensor margin of palm at articulation with dactyl; 2nd pereopod with proximal carpal article nearly twice as long as 2nd; 3rd pereopod with dactyl biunguiculate, propodus with 14 spinules on flexor margin, carpus unarmed, merus bearing small, acute, distal tooth on flexor margin, ischium with distinct movable spine; carapace length to base of rostrum 5 mm.

**RANGE.**—South China Sea off Hong Kong and northeast of Lubang Islands, Philippines; 186 to 250 meters.

**REMARKS.**—The carapace length and the proportions of the carpal articles of the second pereopod were determined from examination of the female holotype in the Smithsonian collections.

#### 12. *Alpheus chiragricus* H. Milne Edwards, 1837

*Alpheus chiragricus* H. Milne Edwards, 1837:354 [type locality: "les mers d'Asie"].—D.M. and A.H. Banner, 1982:267, fig. 82.

**DIAGNOSIS.**—(Edwardsii Group). Body not unusually compressed or setose; rostrum prominent, 2–3 times as long as wide, reaching nearly as far as distal margin of 1st antennular segment, distinctly carinate in midline, carina extending posteriorly onto anterior gastric region, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or strong paired acute teeth overhanging posterior ends of adrostral furrows, anterior margin mesial to orbital hoods unarmed, meeting rostral margin at less than right angle, orbital hoods unarmed, adrostral furrows comparatively deep and narrow; 2nd antennular segment about twice as long as wide; basal antennal segment (basicerite) armed with small, acute ventrolateral tooth not reaching level of tip of stylocerite; antennal scale with lateral margin slightly concave, distolateral spine strong but not unusually stout, distinctly but not greatly overreaching distal margin of blade; 1st pereopods with merus armed with acute distal tooth on inferior flexor margin; major chela somewhat compressed, about  $2\frac{1}{2}$  times as long as wide, dactyl straight in longitudinal plane, not double-ended, bearing short, truncated plunger, palm without longitudinal carina near margin proximal to fixed finger, with "saddle" proximal to adhesive plaque, both proximal shoulder overhanging "saddle" and shoulder on margin proximal to fixed finger sharply acute; minor chela nearly 4 to nearly  $4\frac{1}{2}$  times as long as wide, dactyl

about as long as palm, "balaeniceps" in male; 2nd pereopod with proximal carpal article nearly twice as long as 2nd; 3rd pereopod with dactyl pointed, simple, propodus bearing 8 spines on flexor margin, carpus unarmed except for distal tooth on extensor margin, merus unarmed, ischium with strong movable spine; maximum carapace length to base of rostrum perhaps exceeding 25 mm.

RANGE.—Eastern Africa and Madagascar, Mergui Archipelago, Indonesia, and Australia; intertidal to 20 meters.

REMARKS.—In their description of the neotype of *A. edwardsii*, A.H. and D.M. Banner (1972:1142) fail to mention the size of the plunger on the dactyl of the major chela either in their "Diagnosis" or under "Variation". In their Australian report, however (D.M. and A.H. Banner, 1982:271, fig. 83q), they illustrated the plunger on the dactyl of a small female of *A. edwardsii* dredged in Moreton Bay, Queensland. Comparison of this drawing with two in the same work showing the dactyl of a male *A. chiragricus* trawled in the Gulf of Carpentaria, Queensland (1982:268, fig. 82c) and of a Madras specimen of the same species (fig. 82j) suggests that the development of the plunger may offer another character for distinguishing *A. chiragricus* from *A. edwardsii*. Unfortunately the material of the former species available to me is insufficient to confirm or deny that possibility.

### 13. *Alpheus collumianus* Stimpson, 1860

*Alpheus collumianus* Stimpson, 1860:30 [type locality: Bonin Islands; in coral in 2 meters].—D.M. and A.H. Banner, 1982:45, fig. 9.

*Alpheus Malhaensis* Coutière, 1908:205 [type locality: the original pair of specimens came from 2 localities in the western Indian Ocean: Saya de Malha Bank (53 m) and Amirante Isles, Seychelles (53 m)].

*Alpheus collumianus probabilis* A.H. Banner, 1956:338, fig. 10 [type locality: off northwest coast of Saipan, Mariana Islands; about 3 meters].

*Alpheus collumianus medius* A.H. Banner, 1956:340, fig. 11 [type locality: Hawaii].

*Alpheus collumianus inermis* A.H. Banner, 1956:342, fig. 12 [type locality: off Saipan, Mariana Islands; about 6 meters].

DIAGNOSIS.—(Macrocheles Group). Body not unusually compressed or setose; rostrum acute, not nearly reaching as far as distal margin of 1st antennular segment, bluntly but strongly carinate in midline, carina not extending posteriorly far beyond eyes, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without paired large acute teeth overhanging posterior ends of adrostral furrows, anterior margin somewhat convex and unarmed mesial to orbital hoods, typically notched adjacent to rostrum, and region often flattened, orbital hoods varying from armed with strong marginal tooth to unarmed, adrostral furrows deep; 2nd antennular segment 2 to 3½ times as long as wide; basal antennal segment (basicerite) varying from unarmed to armed with strong, acute tooth overreaching stylocerite; antennal scale with lateral margin concave, distolateral spine strong, far overreaching narrow blade, but not unusually stout; 1st pereopods with merus armed with few

short spines and acute distal tooth on inferior flexor margin; major chela somewhat compressed, about 2⅓ times as long as wide, dactyl nearly straight in longitudinal plane but directed somewhat toward flexor side of chela, not double-ended, bearing short, truncated plunger, palm with strong, carinate tooth on mesial side of articulation interrupted by transverse incision, without longitudinal carina near margin proximal to fixed finger, without "saddle" or distal sinus on palm proximal to adhesive plaque, with indistinct shoulder on margin proximal to fixed finger; minor chela about 3 times as long as wide, fingers about as long as palm, dactyl carinate on extensor margin but not "balaeniceps," palm with strong tooth on mesial aspect at dactylar articulation, with transverse incision in carina supporting tooth; 2nd pereopod with proximal carpal article distinctly longer than 2nd; 3rd pereopod with dactyl variably biunguiculate, propodus bearing 6 pairs of spines on flexor margin, merus varying from being armed with series of spines and strong distal tooth on flexor margin to complete absence of spines and rounded distal angle, ischium bearing movable spine; maximum carapace length to base of rostrum about 9 mm.

RANGE.—Red Sea, Madagascar, and South Africa to Japan and Australia and Pacific islands to Hawaii and Societies; intertidal reef flats to about 75 meters.

REMARKS.—This species vies with some of those in the Brevirostris Group for extreme variability in characters that are otherwise believed to be relatively stable, like the presence or absence of spines on the orbital hoods and of a distal tooth on the flexor margin of the merus of the 3rd pereopod.

### 14. *Alpheus compressus* A.H. and D.M. Banner, 1981

*Alpheus compressus* A.H. and D.M. Banner, 1981:227, fig. 3 [type locality: southwest of Manila Bay, Philippines; 13°59.8'N, 120°18.6'E; 192 meters].

DIAGNOSIS.—(Brevirostris Group). Body strongly compressed, carapace twice as high as wide, not unusually setose; rostrum narrow, reaching nearly to distal margin of 1st antennular segment, base not abruptly delimited from orbital hoods; carapace without median tooth or tubercle or acute paired teeth on gastric region, anterior margin of orbital hood joining base of rostrum at slightly less than right angle, adrostral furrows minimal; 2nd antennular segment 3 times as long as wide; basal antennal segment (basicerite) armed with strong acute tooth reaching nearly to level of tip of stylocerite; antennal scale with lateral margin straight, distolateral spine not unusually stout, barely overreaching distal margin of blade; 1st pereopods with merus armed with acute subdistal tooth on inferior flexor margin; major chela somewhat compressed, 3¾ times as long as wide, dactyl nearly straight in longitudinal plane, not double-ended, bearing poorly developed plunger marked only by semicircular gap in proximal part of dactyl, palm without teeth either side of dactylar articulation or other obvious sculpture, without carina near margin proximal to fixed finger, without "saddle" proximal to adhesive plaque,