

FIGURE 9.—*Alpheus malabaricus*, female from Alimango River, Buriyas Island, carapace length 7.0 mm: *a*, anterior carapace and appendages, dorsal aspect; *b*, same, lateral aspect; *c*, right 1st (major) cheliped, mesial aspect; *d*, same, chela, lateral aspect; *e*, left 1st (minor) cheliped, lateral aspect; *f*, same, fingers, mesial aspect; *g*, left 3rd pereopod; *h*, same, dactyl, flexor aspect.

It is quite possible that the evidence for the variability theory derived from the number of variations that are both sympatric and widespread geographically may eventually prove to be false, but such conclusions should be supported by the study of more material than is currently available.

***47. *Alpheus malleodigitus* (Bate, 1888)**

Betaeus malleodigitus Bate, 1888:565, pl. 101: fig. 5 [type locality: Levuka, Fiji Islands].

A[lpheus] phrygianus Coutière, 1905:886, pl. 77: fig. 25 [type locality: 2 sites in the Maldive Islands and 1 in Madagascar].

Alpheus Danae Coutière, 1905:887, pl. 77: fig. 26 [type locality: Maldive Islands].

Alpheus persicus Nobili, 1905:238 [type locality: Persian Gulf].

Alpheus malleodigitus, var. *gracilicarpus* De Man, 1909a:99 [type locality: 2 stations in the Sulu Archipelago, Philippines, and 2 in vicinity of Lesser Sunda Islands, Indonesia; 8–54 meters].

Alpheus malleodigitus.—A.H. and D.M. Banner, 1966a:162–175, figs. 8c,d, 9–18.—D.M. and A.H. Banner, 1982:92, fig. 22m–o.—A.H. and D.M. Banner, 1983:44.

DIAGNOSIS.—(Obesomanus Group). Body neither unusually compressed nor densely setose; rostrum very small, subrectangular, not reaching nearly as far as distal margin of 1st antennular segment, sharply carinate, carina disappearing rather abruptly into somewhat flattened triangular area somewhat sharply delimited from posterior ends of adrostral furrows; carapace without median tooth or tubercle posterior to base of rostrum and without paired acute teeth overhanging posterior ends of adrostral furrows, anterior margin transverse and unarmed mesial to orbital hoods, submarginal region not flattened, adrostral furrows rather deep; 2nd antennular segment usually at least 3 times as long as wide; basal antennal segment (basicerite) unarmed; antennal scale with lateral margin moderately concave, distolateral spine stout, far overreaching distal margin of blade; 1st pereopods with merus unarmed on mesial flexor margin; major chela subcircular in cross section, about $2\frac{3}{4}$ times as long as wide, dactyl straight in longitudinal plane, double-ended, bearing well-developed, truncated plunger, palm with rather extensive depression or broad furrow on lateral side of extensor surface immediately posterior to adhesive plaque and smaller lateral depression near base of fixed finger; minor chela about $3\frac{1}{2}$ times as long as wide, dactyl about $\frac{1}{2}$ as long as palm, not “balaeniceps” in either sex; 2nd pereopod with proximal carpal article $\frac{1}{2}$ as long as to subequal with 2nd; 3rd pereopod with dactyl simple, propodus bearing about 8 stout spines on flexor margin, carpus with short distal tooth on extensor margin, longer one on flexor margin, merus with subdistal tooth on flexor margin, ischium without movable spine; maximum carapace length to base of rostrum about 9 mm.

MATERIAL.—PHILIPPINES. Marungas Island, Sulu Archipelago [6°06'N, 120°58'E]; $1\frac{1}{4}$ to $2\frac{1}{2}$ m; scattered coral and sand; 10 Feb 1908 (1330–1500); diving, coral heads taken ashore; 2 females [7.4, 7.7], 1 ovig [7.7].

RANGE.—Red Sea and eastern Africa to Hong Kong, Japan, Philippines, Indonesia, and Australia, eastward to the Society Islands but not Hawaii; on and in corals, usually in surf zone.

REMARKS.—See “Remarks” under *A. microstylus*.

*48. *Alpheus microstylus* (Bate, 1888)

Betaeus microstylus Bate, 1888:566, pl. 101: fig. 6 [type locality: Albany Island, Cape York, Australia].

Alpheus microstylus.—A.H. and D.M. Banner, 1983:45, fig. 6a–f.

DIAGNOSIS.—(Obesomanus Group). Body neither unusually compressed nor densely setose; rostrum very small, rarely

absent, not reaching as far as distal margin of 1st antennular segment, sharply carinate, carina disappearing rather abruptly into somewhat flattened triangular area roughly delimited from posterior ends of adrostral furrows; carapace without median tooth or tubercle posterior to base of rostrum and without paired acute teeth overhanging posterior ends of adrostral furrows, anterior margin transverse or concave and unarmed mesial to orbital hoods, submarginal region not flattened, adrostral furrows rather deep; 2nd antennular segment usually no more than 3 times as long as wide; basal antennal segment (basicerite) unarmed; antennal scale with lateral margin somewhat concave, distolateral spine stout, usually overreaching distal margin of blade by moderate amount; 1st pereopods with merus usually unarmed on mesial flexor margin; major chela subcircular in cross section, about $2\frac{1}{2}$ times as long as wide, dactyl straight in longitudinal plane, double-ended, bearing well-developed, truncated plunger, palm with extensive depression immediately proximal to adhesive plaque and with sinuous furrow on fixed finger; minor chela about $2\frac{1}{2}$ times as long as wide, dactyl less than $\frac{1}{2}$ as long as palm, not “balaeniceps” in either sex; 2nd pereopod with proximal carpal article $\frac{1}{3}$ to $\frac{1}{2}$ as long as 2nd; 3rd pereopod with dactyl simple, propodus bearing about 8 stout spines on flexor margin, carpus with short distal tooth on extensor margin, longer one on flexor margin, merus with subdistal tooth on flexor margin, ischium bearing inconspicuous small 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 (1303–1700); 1 female [8.3].

RANGE.—Red Sea and eastern Africa to Indonesia, Vietnam, Philippines, Indonesia, Australia, and Caroline, Mariana, and Samoan islands.

REMARKS.—In their review of the alpheids of the western Indian Ocean, A.H. and D.M. Banner (1983) offered an analysis of the material available to them of *A. malleodigitus*, *A. microstylus*, and *A. obesomanus*. Although the species differed widely in geographic distribution, *A. malleodigitus* being most common in the western Indian Ocean, Thailand, and the Central Pacific, *A. microstylus* rare everywhere except the western Indian Ocean, and *A. obesomanus* common in Australia, the Philippines, and Thailand, they were “certain that further studies such as those we have made with preserved specimens, supplemented with crude field observations, will not resolve the question posed.” They concluded: “Although we are inclined towards the concept of a single variable species [*A. obesomanus*], we have no proof and we therefore leave the three nominal species standing.”

49. *Alpheus miersi* Coutière, 1898

Alpheus gracilipes.—Miers, 1884:287 [not *Alpheus gracilipes* Stimpson, 1860:31].

Alpheus rapax var. *Miersi* Coutière, 1898e:166, fig. 1 [type locality: the 2 specimens mentioned by Miers (1884:287) were found on the beach at Port

Molle and at Flinders Island, both on the Coral Sea coast of Queensland, Australia].

[?]A[*Alpheus*] *gracilipes* var. *serratus* Coutière, 1898e:167 [name erroneously credited to Miers for specimen from Flinders Island, see "Remarks"].

A[Alpheus] miersi.—Coutière, 1905:903, pl. 83: fig. 42, pl. 84: fig. 42b–i.

Alpheus miersi.—D. M. and A. H. Banner, 1982:168, fig. 51.

DIAGNOSIS.—(Brevirostris Group). Body neither unusually compressed nor densely setose; rostrum triangular, not reaching as far as distal margin of 1st antennular segment, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without paired teeth overhanging posterior ends of adrostral furrows, anterior margin unarmed and slightly concave mesial to orbital hoods, latter unarmed; 2nd antennular segment little more than twice as long as wide; basal antennal segment (basicerite) armed with rather prominent acute ventrolateral tooth not reaching level of apex of stylocerite; antennal scale with lateral margin slightly concave, distolateral spine overreaching distal margin of blade; 1st pereopods with merus armed with small distal tooth on inferior flexor margin; major chela subcylindrical, about $3\frac{1}{4}$ times 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, with narrow transverse groove or "saddle" proximal to adhesive plaque, without shoulder on margin proximal to fixed finger; minor chela slightly or considerably more than 4 times as long as wide, dactyl subequal to palm in length, "balaeniceps" in male only; 2nd pereopod with 2 proximal articles subequal in length; 3rd pereopod with dactyl simple, propodus bearing 7 spines on flexor margin; carpus projecting distally on extensor margin, merus with small tooth at distal end of flexor margin, ischium bearing prominent movable spine; maximum carapace length about 8 mm.

RANGE.—Somalia, Madagascar, Seychelles, Maldives and Laccadive islands, Sri Lanka, Philippines, Japan, Indonesia, and Australia; intertidal.

REMARKS.—Coutière (1898e:166) noted the following "Les différences légères qui séparent cette variété [*Miersi*] de *A. rapax* sont encore atténuées chez un autre spécimen nommé par Miers *A. gracilipes* var. *serratus* (Zool. de l'Alert," 1884:287), où le seul caractère distinctif consiste dans les dactylopodites non lancéoles." I can find no evidence that Miers ever used this name, which may have come to Coutière's attention from a specimen label on the syntype from Flinders Island when he examined British Museum material. If deemed an available name, it should be credited to Coutière, who apparently first published it. Inasmuch as Coutière mentioned among the characters of *A. rapax miersi*, "Les dactylopodites des pattes 3, 4, 5 sont comprimés latéralement en forme de griffe et ne montrent pas la forme aplatie et lancéolée caractéristique de *A. rapax*," it seems probable that he meant to indicate that *A. gracilipes serratus* agrees with *A. rapax* and perhaps disagrees with *A. miersi* in all characters mentioned except the nonlanceolate dactyls. This would seem to represent

an acceptable description of a species-group animal at the time of publication. It is possible, therefore, that "*serratus*" is an available name for an Australian representative of the genus *Alpheus*, and homonymy does not seem to be involved, but I am unable to find a currently known shrimp to which the name is applicable.

50. *Alpheus mitis* Dana, 1852

Alpheus mitis Dana, 1852a:22 [type locality: Balabac Strait]; 1852b:549; 1855, pl. 35: fig. 1.

DIAGNOSIS.—(Diadema Group). Body not unusually compressed or setose; rostrum reaching nearly to level of distal margin of 1st antennular segment, carina low, rounded; carapace without median tooth or tubercle on gastric region, without paired teeth overhanging posterior ends of adrostral furrows, anterior margin unarmed, transverse mesial to orbital hood, orbital hood unarmed, adrostral furrows shallow; 2nd antennular segment nearly twice as long as wide; basal antennal segment (basicerite) armed with acute ventrolateral tooth not reaching anteriorly as far as tip of stylocerite; antennal scale with lateral margin slightly concave, distolateral spine moderately strong, overreaching distal margin of blade; 1st pereopods with distal tooth on inferior flexor margin of merus; major chela oval in cross section, about 3 times as long as wide, dactyl little skewed, not double-ended, palm without sculpture, slightly less than twice as long as high, fingers slightly more than $\frac{1}{2}$ as long as palm; minor chela about 4 times as long as wide, fingers slightly shorter than palm; 2nd pereopod with proximal carpal article slightly longer than 2nd; 3rd pereopod with dactyl simple, neither biunguiculate nor subspatulate, propodus with 6–7 spines on flexor margin, carpus produced distally on extensor margin, merus unarmed, ischium bearing movable spine; maximum carapace length to base of rostrum about 7 mm.

RANGE.—If *A. mitis* is distinct from *A. paracrinitus*, it is apparently known with certainty only from the unique missing holotype from Balabac Strait.

REMARKS.—See "Remarks" under *A. paracrinitus*. The final sentence in the original description—"An femina *A. Lottinii*?" (Dana, 1852a:22)—would suggest that the holotype of *A. mitis* was a female.

*51. *Alpheus nonalter* Kensley, 1969

FIGURE 10

Alpheus nonalter Kensley, 1969:172, fig. 15 [type locality: northeast of Durban, South Africa; 118 meters].—A.H. and D.M. Banner, 1981:232.

DIAGNOSIS.—(Brevirostris Group). Body not unusually compressed or setose; rostrum narrow, sharp, not nearly reaching as far as distal margin of 1st antennular segment, bluntly carinate in midline, carina disappearing on anterior gastric region, base not abruptly delimited from adrostral furrows; carapace with or without median tubercle on gastric

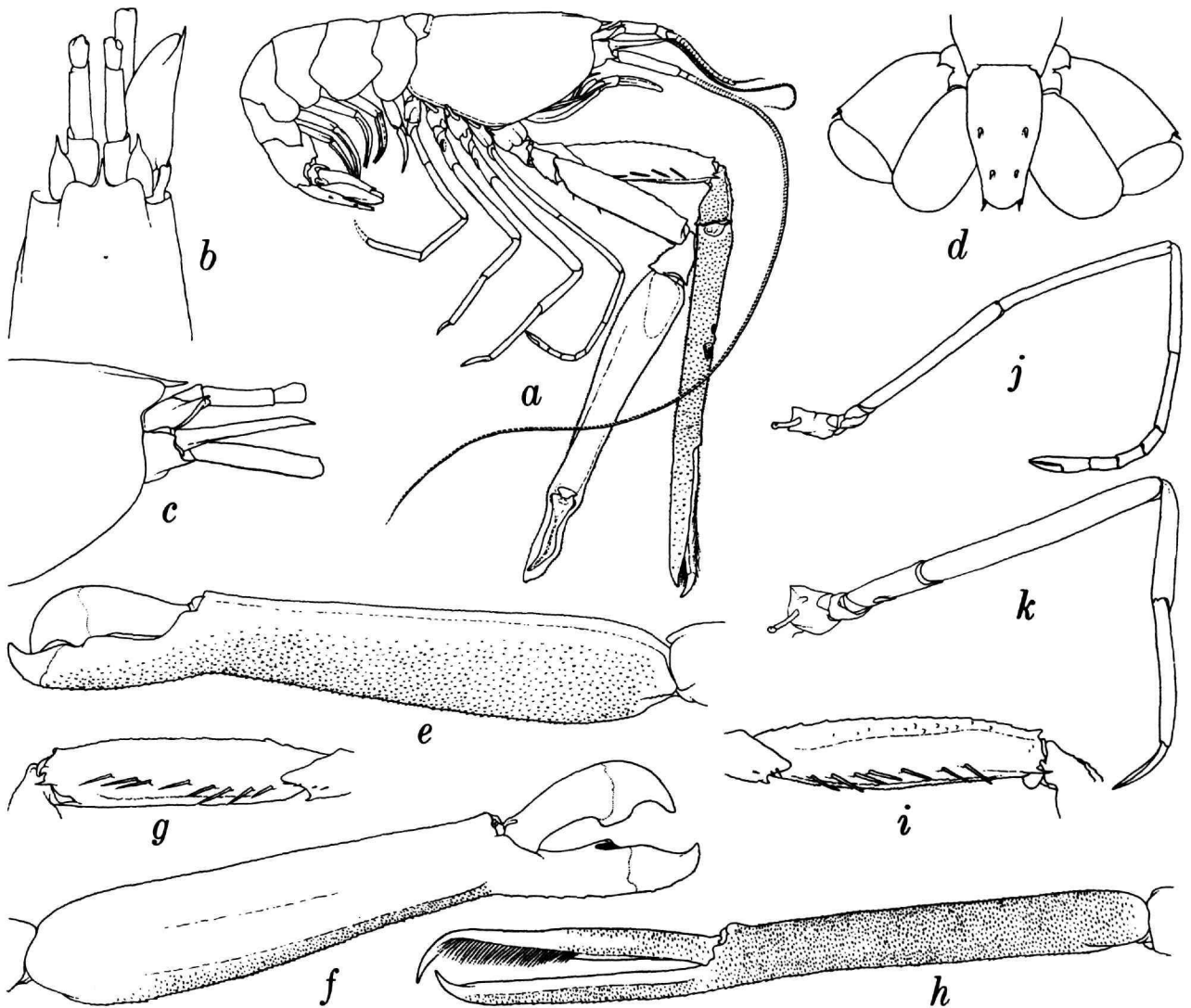


FIGURE 10.—*Alpheus nonalter*, male from *Albatross* sta 5397, carapace length 9.0 mm: *a*, lateral aspect; *b* anterior carapace and appendages, dorsal aspect; *c*, same, lateral aspect; *d*, telson and uropods, dorsal aspect; *e*, right 1st (major) chela, extensor aspect; *f*, same, flexor aspect; *g*, merus of right 1st (major) cheliped, mesial aspect; *h*, left 1st (minor) chela, flexor aspect; *i*, merus of left 1st (minor) cheliped, mesial aspect; *j*, right 2nd pereopod; *k*, right 3rd pereopod.

region, without paired flattened teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood variably incised, submarginal region not flattened, orbital hoods unarmed, adrostral furrows not very deep; 2nd antennular segment about 3 times as long as wide; basal antennal segment (basicerite) with sharp ventral spine not reaching level of tip of stylocerite; antennal scale with lateral margin slightly sinuous, distolateral spine not especially strong, overreaching distal margin of blade to varying extent; 1st pereopods with merus armed with sharp distal spine on

flexor margin; extensor margin unarmed; major chela about 6 times as long as wide, dactyl sometimes overreached by fixed finger, not double-ended, plunger little developed, palm without sharp tooth either side of dactylar articulation, without "saddle" proximal to adhesive plaque but with 5 rather obscure longitudinal carinae or ridges forming 4 facets on 3 of 4 surfaces, without shoulder on margin proximal to fixed finger; minor chela 10–14 times as long as wide, dactyl at least $\frac{2}{3}$ as long as palm, "balaeniceps" in male, palm granulate; 2nd pereopod with proximal carpal article distinctly longer than

2nd; 3rd pereopod with dactyl subspatulate, carpus produced distally on extensor margin, merus unarmed, ischium bearing movable spine; maximum carapace length to base of rostrum at least 9 mm.

MATERIAL.—PHILIPPINES. Samar Sea, east of Masbate: sta 5397; 11°57'27"N, 124°10'42"E; 245 m; green mud; 15 Mar 1909 (1036–1052); 12' Agassiz beam trawl, mud bag: 1 male [9.0]. West of Leyte: sta 5409; 10°38'N, 124°13'08"E; 346 m; green mud; 18 Mar 1909 (0951–1021); 12' Agassiz beam trawl, mud bag: 1 male [5.8].

RANGE.—Eastern Africa from Mozambique and Madagascar to Natal, Hong Kong, and the Philippines; 86–346 meters.

REMARKS.—There is no doubt that *A. nonalter* is a valid species that is distinguishable from *A. macroskeles* by the subrectangular cross-sectional configuration and the longitudinal carination of the major chela and the absence of a subdistal tooth on the extensor margin of the merus of both first chelipeds, but I have been unable to find any correlation between these features and any of the following variable characters: the depth of the sinus separating the rostrum from each orbital hood, the distinctness of the median postrostral tubercle on the carapace, the sharpness of the posteroventral angle of the pleuron of the fifth abdominal somite, the length of the distolateral spine of the antennal scale, the form of the dactyl of the major chela, the proportionate lengths of the fingers of the minor chela, the proportions of the merus of the anterior pair of chelipeds and the number of acicular spines near the flexor margin of that segment, the proportionate lengths of the two proximal articulations of the carpus of the second pereopod, and the presence of spines on the flexor margin of the propodus of the third pereopod. It is therefore virtually impossible to distinguish specimens of either of these species that lack both members of the anterior pair of chelipeds.

*52. *Alpheus obesomanus* Dana, 1852

Alpheus obeso-manus Dana, 1852a:21 [type locality: Fiji Islands]; 1852b:547; 1855, pl. 34: fig. 7.

Alpheus Lutini Coutière, 1905:885, pl. 76: fig. 24 [type locality: Maldive and Samoan islands and "l'île Tague"].

Alpheus obesomanus.—D.M. and A.H. Banner, 1982:89, fig. 22a–1.—A.H. and D.M. Banner, 1983:53, fig. 6g,h.

DIAGNOSIS.—(Obesomanus Group). Body neither unusually compressed nor densely setose; rostrum very small, rarely absent, not reaching as far as distal margin of 1st antennular segment, sharply carinate, carina disappearing posteriorly into somewhat flattened area roughly delimited from posterior ends of adrostral furrows; carapace without median tooth or tubercle posterior to base of rostrum and without paired acute teeth overhanging posterior ends of adrostral furrows, anterior margin transverse or concave and unarmed mesial to orbital hoods, submarginal region not flattened, adrostral furrows rather deep; 2nd antennular segment $1\frac{1}{2}$ to 3 times as long as wide; basal antennal segment (basicerite) unarmed; antennal scale with lateral margin somewhat concave, distolateral spine stout, usually overreaching distal margin of greatly reduced

blade to considerable extent; 1st pereopods with merus usually unarmed on mesial flexor margin; major chela oval in cross section, nearly $2\frac{1}{2}$ times as long as wide, dactyl straight in longitudinal plane, double-ended, palm with extensive depression immediately proximal to adhesive plaque; minor chela $3\frac{1}{2}$ to 5 times as long as wide, dactyl less than $\frac{1}{2}$ as long as palm, not "balaeniceps" in either sex; 2nd pereopod with proximal carpal article $\frac{1}{4}$ to $\frac{1}{2}$ as long as 2nd; 3rd pereopod with dactyl simple, propodus bearing about 6 spines on flexor margin, carpus acutely produced distally on both margins, strongly so on flexor side, merus with strong distal tooth on flexor margin, ischium bearing inconspicuously small movable spine; maximum carapace length to base of rostrum about 8 mm.

MATERIAL.—PHILIPPINES. Marungas Island, Sulu Archipelago [6°06'N, 120°58'E]; 19 Feb 1908; shore, coral head: 1 male [4.0] 2 ovig females [4.8. 5.2].

RANGE.—Red Sea, eastern Africa, and Madagascar to the Society Islands, including Japan and Australia, but not Hawaii.

REMARKS.—See "Remarks" under *A. microstylus*.

53. *Alpheus ovaliceps* Coutière, 1905

Alpheus ovaliceps Coutière, 1905:888, pl. 77: fig. 27 [type locality: Minicoy, Laccadive Islands].—D.M. and A.H. Banner, 1978:227; 1982:98, fig. 24.

DIAGNOSIS.—(Crinitus Group). Body not unusually compressed or setose; rostrum acute, not reaching level of distal margin of 1st antennular segment, carina rounded, reaching somewhat posterior to eyes, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or acute teeth overhanging posterior ends of adrostral furrows, anterior margin partially convex and unarmed mesial to orbital hoods, region somewhat flattened, orbital hood unarmed, with semblance of oblique, sinuous dorsal carina, adrostral furrows distinct; 2nd antennular segment about $1\frac{1}{2}$ times as long as wide; basal antennal segment (basicerite) armed with long ventrolateral tooth overreaching stylocerite; antennal scale with lateral margin concave, distolateral spine not unusually stout, considerably overreaching distal margin of blade; 1st pereopods with merus lacking distinct distal tooth on inferior flexor margin; major chela slightly compressed, about $2\frac{1}{2}$ 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 rather strong plunger directed proximad, palm without sculpture except for slight sinus proximal to adhesive plaque; minor chela about 3 times as long as wide, dactyl about equal to palm in length, not "balaeniceps" in either sex; 2nd pereopod with proximal carpal article slightly longer than 2nd; 3rd pereopod with dactyl simple, not biunguiculate or spatulate, propodus bearing 6 pairs of spines on flexor margin, carpus with acute distal tooth on flexor margin, merus unarmed, ischium bearing movable spine; maximum carapace length to base of rostrum about 7 mm.

RANGE.—Kenya, Laccadive Islands, Philippines, and Austra-

lia to Society Islands; intertidal to subtidal.

54. *Alpheus pachychirus* Stimpson, 1860

Alpheus pachychirus Stimpson, 1860:30 [type locality: Ryukyu Islands].—D.M. and A.H. Banner, 1982:102, figs. 23j,k, 26.

DIAGNOSIS.—(Crinitus Group). Body neither unusually compressed nor densely setose; rostrum much reduced, not reaching nearly as far as distal margin of 1st antennular segment, dorsal carina low, reaching posteriorly beyond eyes, not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region and without paired teeth overhanging posterior ends of adrostral furrows, anterior margin transverse and unarmed mesial to orbital hoods, region somewhat flattened, orbital hoods unarmed, adrostral furrows shallow; 2nd antennular segment $2\frac{1}{3}$ times as long as wide; basal antennal article (basicerite) bearing very small ventrolateral tooth not nearly reaching level of tip of stylocerite; antennal scale with lateral margin faintly sinuous, distolateral spine not especially stout, slightly overreaching distal margin of rather broad blade; major cheliped with chela slightly compressed, $3\frac{1}{3}$ 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 strong, distally truncate plunger directed somewhat proximad and connected by flange with distal end of dactyl, palm without sculpture except for slight depression proximal to adhesive plaque, merus with sharp distal tooth on inferior flexor margin; minor cheliped with chela about $2\frac{1}{3}$ times as long as broad, dactyl broadly "balaeniceps" in male only, narrowly tapering in female, merus unarmed; 2nd pereopod with proximal carpal article nearly twice as long as 2nd; 3rd pereopod with dactyl simple, propodus bearing about 9 spines on flexor margin, carpus with acute distal tooth on flexor margin, ischium with movable spine; maximum carapace length to base of rostrum about 9 mm.

RANGE.—Red Sea and eastern Africa to Indonesia, Philippines, Ryukyus, Australia, and Pacific Ocean islands as far eastward as Society Islands; intertidal to 36 meters, in algal tubes.

*55. *Alpheus pacificus* Dana, 1852

Alpheus pacificus Dana, 1852a:21 [type locality: Hawaii]; 1852b:544; 1855, pl. 34: fig. 5.—D.M. and A.H. Banner, 1982:217, fig. 68.

Alpheus gracilidigitus Miers, 1884:287 [type locality: Totoya, Fiji Islands, and Hawaii].

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum sharply acute, not reaching as far as distal margin of 1st antennular segment, dorsal carina rounded, not extending posteriorly beyond orbital hoods, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or paired teeth overhanging posterior ends of adrostral furrows, anterior

margin between rostrum and orbital hood rather distinctly incised, unarmed, orbital hood unarmed, adrostral furrows moderately deep; 2nd antennular segment fully twice as long as wide; basal antennal segment (basicerite) armed with broad lateral tooth reaching about to level of tip of stylocerite; antennal scale with lateral margin concave in proximal $\frac{1}{2}$, distolateral spine not unusually stout, slightly overreaching tapered blade; 1st pereopods with merus unarmed on inferior flexor margin; major chela compressed, about $2\frac{1}{4}$ times as long as wide, dactyl not noticeably curved in longitudinal plane, not double-ended, bearing reasonably well-developed, obliquely truncate plunger, palm without prominent longitudinal carina near margin proximal to fixed finger, with "saddle" proximal to adhesive plaque, proximal shoulder rounded, overhanging "saddle," shoulder proximal to fixed finger heavy, rounded; minor chela about $3\frac{3}{4}$ times as long as wide, fingers $1\frac{1}{2}$ to $2\frac{1}{4}$ times as long as palm, dactyl not "balaeniceps" in either sex; 2nd pereopod with proximal carpal article slightly longer than 2nd; 3rd pereopod with dactyl pointed, simple, propodus with about 8 spines on flexor margin, carpus with extensor margin somewhat produced distally, inferior distal angle subacutely produced, merus unarmed; maximum carapace length to base of rostrum at least 15 mm.

MATERIAL.—PHILIPPINES. Guihulñgan, Negros [10°07'N, 123°16'E]; shore; sand, gravel, grassy; 2 April 1908 (0800–1100); 150' seine: 1y male [4.8].

RANGE.—Red Sea and eastern Africa to Clipperton Island, eastern Pacific; intertidal to 20 meters.

56. *Alpheus paracrinitus* Miers, 1881

Alpheus paracrinitus Miers, 1881:365, pl. 16: fig. 6 [type locality: Goree Island, Senegal].—D.M. and A.H. Banner, 1982:129, fig. 35; 1985:21.

Alpheus paracrinitus, var. *Bengalensis* Coutière, 1905:901, pl. 82: fig. 37 [type locality: Minicoy, Laccadive Islands].

Crangon togatus Armstrong, 1940:2, fig. 1 [type locality: La Piedra Prieta reef, Barahona, Dominican Republic].

DIAGNOSIS.—(Diadema Group). Body not unusually compressed or setose; rostrum variable, not overreaching distal margin of 1st antennular segment, carina low, rounded; carapace without median tooth or tubercle on gastric region, without paired teeth overhanging posterior ends of adrostral furrows, anterior margin unarmed, sinuous or transverse mesial to orbital hood, orbital hood unarmed, adrostral furrows shallow; 2nd antennular segment about twice as long as wide; basal antennal segment (basicerite) armed with acute ventrolateral tooth not reaching level of tip of stylocerite; antennal scale with lateral margin nearly straight, distolateral spine slightly overreaching distal margin of blade; 1st pereopods with or without tooth on inferior flexor margin of merus; major chela oval in cross section, about 3 times as long as wide, dactyl little skewed, not double-ended, palm without sculpture, slightly more than twice as long as high, fingers slightly less than $\frac{1}{2}$ as long as palm; minor chela about 4 times as long as

wide, fingers slightly longer than palm, dactyl occasionally "balaeniceps" in male; 2nd pereopod with proximal carpal article little more than $\frac{1}{2}$ as long as to slightly longer than 2nd; 3rd pereopod with dactyl simple, propodus with 6–8 spines on flexor margin, carpus distally bluntly produced on both extensor and flexor margins, merus unarmed, ischium bearing small movable spine; maximum carapace length to base of rostrum about 7 mm.

RANGE.—Pantropical; intertidal to 18 meters.

REMARKS.—In their review of the western Indian Ocean alpheids, A.H. and D.M. Banner (1983:55) concluded that the specimens that they had previously identified as *A. mitis* are assignable to the variable and wide-ranging *A. paracrinitus*, if indeed the two species are distinguishable from each other. On the basis of the proportions of the first chelae depicted by Dana (1855, pl. 35: fig. 1), the Banners decided that "the question of the separation of the two species must at present be left unanswered, and we continue to use the name *A. paracrinitus*." Consideration might also be accorded the accuracy of Dana's fig. 1a on pl. 35, which suggests that the distolateral spine of the antennal scale may extend farther beyond the distal margin of the blade (not shown in Dana's figure) than it usually does in *A. paracrinitus*.

57. *Alpheus paradentipes* Coutière, 1905

Alpheus paradentipes Coutière, 1905:880, pl. 74: fig. 17 [type locality: Miladummadulu and Male atolls, Maldives Islands].—A.H. Banner, 1953:72, figs. 23, 24.

DIAGNOSIS.—(Macrocheles Group). Body not unusually compressed or setose; rostrum acute, not reaching nearly as far as distal margin of 1st antennular segment, carina low and short, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without paired acute teeth overhanging posterior ends of adrostral furrows, anterior margin concave and unarmed mesial to orbital hood, meeting rostrum at nearly right angle, region slightly flattened, rostral hoods armed with spines overreaching rostrum, adrostral furrows short, not deep; 2nd antennular segment nearly 3 times as long as wide; basal antennal segment (basicerite) armed with distinct lateral tooth not nearly reaching level of tip of stylocerite; antennal scale with lateral margin concave, distolateral spine elongate, far overreaching distal margin of tapered blade, but not especially stout; major cheliped with chela somewhat compressed, about 3 times as long as wide, dactyl directed somewhat toward ventral side of chela, not double-ended, palm with strong, carinate tooth each side of dactylar articulation, carina supporting 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 nearly rectangular shoulder on margin proximal to fixed finger; minor chela nearly 5 times as long as wide, fingers about as long as palm, dactyl not "balaeniceps" in either

sex, palm with strong tooth on each side at dactylar articulation; 2nd pereopod with proximal carpal article about $1\frac{1}{2}$ times as long as 2nd; 3rd pereopod with dactyl biunguiculate, propodus bearing about 8 pairs of spines on flexor margin, carpus distally produced on extensor margin, merus with strong distal tooth on flexor margin, ischium unarmed; maximum carapace length to base of rostrum probably about 4 mm.

RANGE.—Eastern Africa to Hawaii; offshore to a depth of at least 170 meters, sometimes living in sponges.

*58. *Alpheus paralcycone* Coutière, 1905

Alpheus paralcycone Coutière, 1905:895, pls. 80, 81: fig. 34 [type locality: 4 localities in the Maldives and Laccadive islands].—D.M. and A.H. Banner, 1982:113, fig. 30.—A.H. and D.M. Banner, 1983:57, fig. 8.

A[lpheus] Providencei Coutière, 1908:208 [type locality: Providence Island, Seychelles; 91–143 meters].

Crangon laysani Edmondson, 1925:17, fig. 3 [type locality: Laysan Island, Hawaii].

DIAGNOSIS.—(Crinitus Group). Body neither unusually compressed nor densely setose; rostrum represented by minute angle protruding but little beyond anterior margin of carapace, distinct, low median carina extending posteriorly to base of orbital hoods, rostral base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle posterior to base of rostrum and without paired teeth overhanging posterior ends of adrostral furrows, anterior margin faintly sinuous, unarmed, and somewhat flattened mesial to orbital hoods, orbital hoods unarmed, adrostral furrows shallow; 6th abdominal somite tridentate on posterior margin; 2nd antennular segment (basicerite) armed with sharp ventrolateral tooth not reaching level of tip of stylocerite; antennal scale with lateral margin concave in proximal $\frac{1}{2}$, distolateral spine stout, far overreaching distal margin of narrowly tapered blade; 1st pereopods with merus bearing distal tooth on inferior flexor margin; major chela broadly oval in cross section, $2\frac{1}{3}$ times as long as wide, dactyl slightly curved in longitudinal plane, not double-ended, bearing short, truncated plunger, palm without sculpture; minor chela 3 to 4 times as long as wide, dactyl of male slightly longer than palm and wide, but not "balaeniceps," in proximal $\frac{1}{2}$ of length, of female subequal to palm in length and very slender; 2nd pereopod with proximal carpal article less than $\frac{1}{2}$ as long as 2nd; 3rd pereopod with dactyl variably biunguiculate, propodus bearing 9 spines on flexor margin, carpus with both margins distally produced and 1 to 4 spines on flexor margin, merus bearing acute distal tooth on flexor margin, ischium bearing movable spine; maximum carapace length to base of rostrum about 7 mm.

MATERIAL.—PHILIPPINES. Southwest of Manila Bay, Luzon: sta 5108; 14°05'05"N, 120°19'45"E; 24 m; coral; 15 Jan 1908 (0834–0835); 9' *Albatross-Blake* beam trawl, mud bags (dredging cable fouled on gin block; trawl not dragged on bottom): 1 ovig female [4.9]. Davao Gulf, Mindanao: sta 5249; 7°06'06"N, 125°40'08"E; 42 m; coral, sand; 18 May 1908 (1102–1109); 6' Johnston oyster dredge: 1 male [3.3];

sta 5250; 7°05'07"N, 125°39'45"E; 42 m; coral, sand; 18 May 1908 (1124–1127); 6' Johnston oyster dredge: 1 male [3.7]. Off Jolo Island, Sulu Archipelago: sta 5145; 6°04'30"N, 120°59'39"E; 42 m; coral sand, shells; 15 Feb 1908 (1344–1359); 12' Agassiz beam trawl, mud bag: 1 male [4.7]; sta 5555; 5°51'15"N, 120°58'35"E; 62 m; coarse sand; 18 Sep 1909 (1109–1113); 6' McCormick trawl: 1 ovig female [5.3]. Near Siasi, Sulu Archipelago: sta 5146; 5°46'40"N, 120°48'50"E; 44 m; coral sand, shells; 16 Feb 1908 (1011–1031); 12' Agassiz beam trawl, mud bag: 1 ovig female [4.2]; 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 [4.2].

RANGE.—Madagascar to Indonesia, Philippines, Japan, Australia, and Pacific islands to Hawaii; immediate subtidal to 165 meters.

***59. *Alpheus pareuchirus pareuchirus* Coutière, 1905**

Alpheus pareuchirus Coutière, 1905:906, pl. 84: fig. 43. [type locality: Male Atoll, Maldive Islands].

Alpheus pareuchirus var. *Leucothea* De Man, 1911:420, pl. 23: fig. 102 [type locality: the type series came from 6 different *Siboga* stations in the Sulu Archipelago and Indonesia].

Alpheus pareuchirus pareuchirus.—D.M. and A.H. Banner, 1982: 276, fig. 85a–k.

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum prominent, not reaching as far as distal margin of 1st antennular segment, dorsal carina strong, blunt, not extending posteriorly beyond limits of orbital hoods, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or paired teeth overhanging posterior ends of adrostral furrows, anterior margin mesial to orbital hoods unarmed, meeting rostral margin at about right angle, orbital hoods unarmed, adrostral furrows reasonably deep; 2nd antennular segment almost twice as long as wide; basal antennal segment (basicerite) armed with sharp ventrolateral tooth not reaching level of tip of stylocerite; antennal scale with lateral margin slightly concave, distolateral spine overreaching narrowly tapering blade; 1st pereopods with merus armed with acute distal tooth on inferior flexor margin; major chela somewhat compressed, nearly 2½ times as long as wide, dactyl slightly curved 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, shoulder proximal to "saddle" bluntly acute and overhanging "saddle," shoulder on margin proximal to fixed finger very low and obtuse; minor chela nearly 3¾ times as long as wide, dactyl nearly as long as palm, "balaeniceps" in male only; 2nd pereopod with proximal carpal article slightly shorter or slightly longer than 2nd; 3rd pereopod with dactyl simple, propodus bearing 9–14 spines on flexor margin, carpus distally produced on extensor margin, merus unarmed, ischium with movable spine; maximum carapace length to base of rostrum

about 10 mm.

MATERIAL.—PHILIPPINES. 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 ovig female [4.2].

RANGE.—Red Sea, Madagascar, Seychelles, Maldives, Thailand, Indonesia, Philippines, Australia, and Caroline Islands; in depths of more than 3 meters.

***60. *Alpheus parvirostris* Dana, 1852**

Alpheus parvi-rostris Dana, 1852a:22 [type locality: Balabac Strait]; 1852b:551.

Alpheus parvirostris.—Dana, 1855, pl. 35: fig. 3.—D.M. and A.H. Banner, 1982:185, fig. 56.—A.H. and D.M. Banner, 1983:60, fig. 9.

Alpheus lineifer Miers, 1875:343 [type locality: Samoa Islands].

Alpheus euchiroides Nobili, 1906:257 [type locality: Marutea, Tuamotu Archipelago].

Alpheus braschi Boone, 1935:131, fig. 10, pl. 34 [type locality: Pago Pago, Samoa Islands].

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum slender, sharp, nearly or quite reaching level of distal margin of 1st antennular segment, dorsal carina blunt, not extending posteriorly beyond orbital hoods, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without paired teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood unarmed, produced anteriorly to form flattened, convex prominence, orbital hoods unarmed, adrostral furrows moderately deep anteriorly; 2nd antennular segment fully 1¾ times as long as wide; basal antennal segment (basicerite) strong, considerably overreaching stylocerite; antennal scale with lateral margin rather decidedly sinuous, distolateral spine fairly stout, considerably overreaching distal margin of narrow blade; 1st pereopods with merus armed with strong, sharp distal tooth on inferior flexor margin; major chela somewhat compressed, about 2½ times as long as wide, dactyl not noticeably curved in longitudinal plane, not double-ended, bearing well-developed plunger directed proximally, palm without longitudinal carina near margin proximal to fixed finger, with "saddle" proximal to adhesive plaque in form of distinct but narrow oblique groove with rounded proximal and distal shoulders; minor chela about 3 times as long as wide, fingers slightly shorter than palm, not "balaeniceps" in either sex; 2nd pereopod with proximal carpal article considerably longer than 2nd; 3rd pereopod with dactyl simple, propodus bearing about 10 spines on flexor margin, carpus with both margins projecting distally as acute teeth; merus with acute distal tooth on flexor margin; ischium with movable spine, maximum carapace length to base of rostrum no more than 6 mm.

MATERIAL.—PHILIPPINES. Southwest of Manila Bay, Luzon: sta 5108; 14°05'05"N, 120°19'45"E; 24 mm; coral; 15 Jan 1908 (0834–0835); 9' *Albatross-Blake* beam trawl, mud bag (dredging cable fouled on gin block; trawl not dragged on

bottom): 1 major cheliped.

RANGE.—Red Sea, eastern and South Africa to Japan, Philippines, Indonesia, and Australia to the Tuamotu Archipelago but not Hawaii; abundant on reef flats in dead coral, occasionally in living coral and sponges, to a depth of 32 meters.

REMARKS.—It is rather surprising that this paradoxically misnamed but readily recognizable species, which was taken at numerous Philippine stations by the Banners, is represented in the *Albatross* collections by only a single major cheliped.

***61. *Alpheus parvus* De Man, 1909**

FIGURE 11

Alpheus parvus De Man, 1909a:102 [type locality: anchorage off Lirung, Pulau Salebabu, Indonesia; 36 meters]; 1911:358, pl. 15: fig. 74.

DIAGNOSIS.—(Crinitus Group). Body neither unusually compressed nor densely setose; rostrum sharp, not reaching as far as distal margin of 1st antennular segment, sharply carinate anteriorly, carina becoming blunt and somewhat obscure posteriorly but extending nearly to posterior $\frac{1}{3}$ of carapace, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region and without paired teeth overhanging posterior ends of adrostral furrows, anterior margin sinuous, unarmed, and submarginally flattened mesial to orbital hoods, orbital hoods slightly produced but unarmed, adrostral furrows rather deep immediately posterior to flattened submarginal area; 2nd antennular segment about twice as long as wide; basal antennal segment (basicerite) armed with sharp ventrolateral tooth not reaching level of end of stylocerite; antennal scale with lateral margin concave, distolateral spine fairly stout, overreaching narrowly tapered blade; 1st pereopods with merus armed with sharp, spine-like distal tooth on inferior flexor margin; major chela compressed, about $2\frac{1}{2}$ times as long as wide, dactyl bent slightly toward flexor side of chela, not double-ended, bearing reduced plunger bluntly produced proximad, palm without distinct sculpture except for deep longitudinal sulcus on flexor surface proximal to adhesive plaque; minor chela nearly 3 times as long as wide in male, 4 times in female, dactyl about as long as palm, broader in male than female but not "balaeniceps" in either sex; 2nd pereopod with proximal carpal article $\frac{2}{3}$ to $\frac{4}{5}$ as long as 2nd; 3rd pereopod with dactyl simple, propodus armed with 7 to 11 spines on flexor margin, merus with strong, acute distal spine on flexor margin, ischium bearing strong movable spine; maximum carapace length to base of rostrum at least 4 mm.

MATERIAL.—PHILIPPINES. Southwest of Manila Bay, Luzon: sta 5108; $14^{\circ}05'05''N$, $120^{\circ}19'45''E$; 24 m; coral; 15 Jan 1908 (0834–0835); 9' *Albatross-Blake* beam trawl, mud bag (dredging cable fouled on gin block; trawl not dragged on bottom): 2 males [3.3, 3.8].

RANGE.—Apparently known previously only from the ovigerous female holotype without the major cheliped, from a depth of 36 meters, off Pulau Salebabu in the northern Molucca

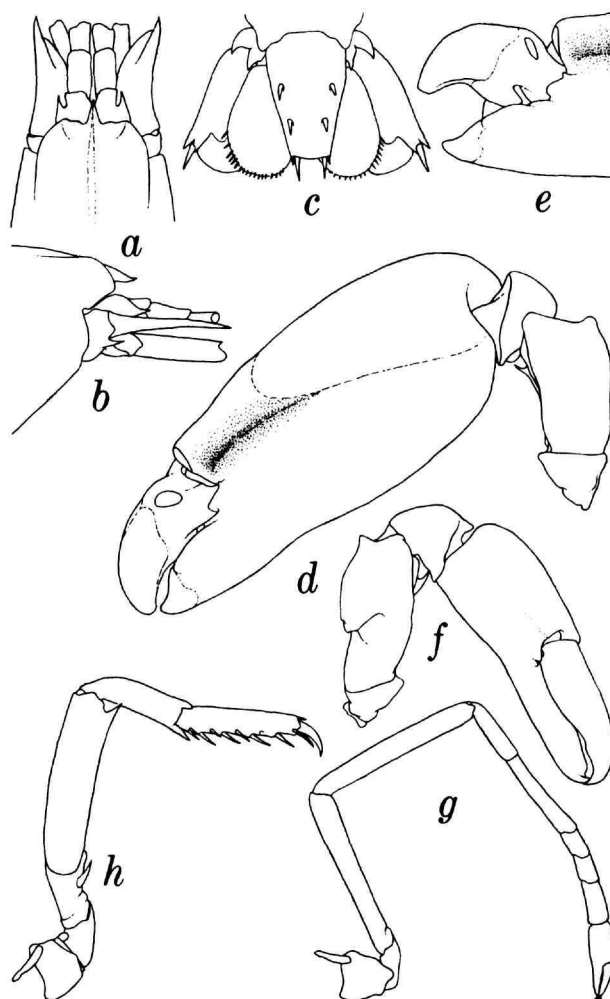


FIGURE 11.—*Alpheus parvus*, male from *Albatross* sta 5108, carapace length 3.8 mm: a, anterior carapace and appendages, dorsal aspect; b, same, lateral aspect; c, telson and uropods, dorsal aspect; d, left 1st (major) cheliped; e, same, fingers; f, right 1st (minor) cheliped; g, right 2nd pereopod; h, right 3rd pereopod.

Sea, southeast of Mindanao.

***62. *Alpheus polyxo* De Man, 1909**

Alpheus Polyxo De Man, 1909a:108 [type locality: Banda anchorage, Moluccas, Indonesia; 18–36 meters].

Alpheus polyxo.—D.M. and A.H. Banner, 1982:274, fig. 84.

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum sharply acute, reaching to about distal margin of 1st antennular segment, dorsal carina high, rounded, extending posteriorly onto anterior gastric region, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or paired teeth overhanging posterior ends of adrostral furrows, anterior

margin between rostrum and orbital hood unarmed, incised, orbital hood unarmed but projecting subrectangularly in mesial part, adrostral furrows well-marked; 2nd antennular segment about $2\frac{1}{2}$ times as long as wide; basal antennal segment (basicerite) armed with sharp ventrolateral tooth not nearly reaching level of tip of stylocerite; antennal scale with lateral margin concave, distolateral spine not unusually stout, distinctly overreaching tapered blade; 1st pereopods with merus armed with small distal tooth on inferior flexor margin; major chela somewhat compressed, fully twice as long as wide, dactyl not noticeably curved in longitudinal plane, not double-ended, having very short, truncated plunger well defined only proximally, palm without prominent longitudinal carina near margin proximal to fixed finger, with "saddle" proximal to adhesive plaque, proximal shoulder blunt, overhanging "saddle," shoulder proximal to fixed finger strong, slightly projecting but not acute; minor chela $3\frac{3}{4}$ to 4 times as long as wide, fingers shorter than or equal to palm in length, dactyl "balaeniceps" in male only; 2nd pereopod with proximal carpal article twice as long as 2nd; 3rd pereopod with dactyl biunguiculate, propodus with about 10 spines on flexor margin, carpus with distal flexor margin bluntly produced distally, merus unarmed, ischium with small movable spine; maximum carapace length to base of rostrum about 11 mm.

MATERIAL.—PHILIPPINES. Southwest of Manila Bay, Luzon: sta 5109; $14^{\circ}03'45''N$, $120^{\circ}16'30''E$; 18 m; coral; 15 Jan 1908 (1026–1038); 9' *Albatross-Blake* beam trawl (trawl immediately torn on coral): 1 female [6.2]. Off Romblon Island, Sibuyan Sea: sta 5179; $12^{\circ}38'15''N$, $122^{\circ}12'30''E$; 68 m; hard sand; $24.3^{\circ}C$; 25 Mar 1908 (1049–1104); 12' Agassiz beam trawl, 3 mud bags: 1 male [6.7] 1 ovig female [10.0]. Near Siasi, Sulu Archipelago: sta 5147; $5^{\circ}41'40''N$, $120^{\circ}47'10''E$; 38 m; coral sand, shells; 16 Feb 1908 (1127–1147); 12' Agassiz beam trawl, mud bag: 1 male [6.2] 1 female [8.9].

RANGE.—Madagascar, Philippines, Indonesia, and Australia; in subtidal dead coral to 130 meters.

REMARKS.—In neither of the two small males in the *Albatross* collections is the dactyl of the minor chela distinctly "balaeniceps" in form.

63. *Alpheus proseuchirus* De Man, 1908

Alpheus proseuchirus De Man, 1908:111 [type locality: 2 *Siboga* stations in and near entrance to Teluk Kuandang, north coast of Celebes, Indonesia; 72 and 75 meters]; 1911:407, pl. 22: fig. 96.—A.H. and D.M. Banner, 1981:233.

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum sharp, reaching nearly as far as distal margin of 1st antennular segment, flat dorsally, sharply delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or strong paired teeth overhanging posterior ends of adrostral furrows, anterior margin mesial to orbital hood unarmed, transversely concave, meeting rostral margin at more than right angle, orbital hoods

unarmed, adrostral furrows deep and narrow; 2nd antennular segment twice as long as wide; basal antennal segment (basicerite) armed with very small spine; antennal scale with lateral margin slightly concave, distolateral spine distinctly overreaching distal margin of tapered blade; 1st pereopods with merus armed with acute distal tooth on inferior flexor margin; major chela 3 times as long as wide, dactyl not double-ended, palm with "saddle" proximal to adhesive plaque, shoulder proximal to "saddle" broadly acute and slightly overhanging "saddle," shoulder on opposite margin proximal to fixed finger rather weak; minor chela $4\frac{2}{3}$ times as long as wide in male, $4\frac{4}{5}$ times as long as wide in female, fingers subequal in length to palm in male, nearly $1\frac{1}{2}$ times as long in female, "balaeniceps" in male only; 2nd pereopod with proximal carpal article $1\frac{1}{2}$ times as long as 2nd; 3rd pereopod with dactyl simple, subspatulate, propodus bearing 7 spines on flexor margin, carpus slightly produced distally on extensor margin, merus unarmed, ischium with movable spine; maximum carapace length to base of rostrum about 8 mm.

RANGE.—Philippines and Indonesia; 22–134 meters.

*64. *Alpheus pustulosus* A.H. and D.M. Banner, 1968

Alpheus pustulosus A.H. and D.M. Banner, 1968:143, fig. 2 [type locality: south of Hong Kong; $21^{\circ}N$, $114^{\circ}E$; 55–73 meters; mud and sand]; 1981:233.

DIAGNOSIS.—(Brevirostris Group). Body not unusually compressed or setose; rostrum not reaching as far as distal margin of 1st antennular segment, strongly but bluntly carinate in midline, carina not extending far posteriorly, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or paired teeth overhanging posterior ends of adrostral furrows, anterior margin transverse or concave and unarmed mesial to orbital hood, curving directly onto rostral margin, region not unusually flattened, orbital hoods unarmed, adrostral furrows deep anteriorly; 2nd antennular segment $2\frac{1}{4}$ times as long as wide; basal antennal segment (basicerite) armed with sharp ventrolateral tooth not nearly reaching level of tip of stylocerite; antennal scale with lateral margin very slightly concave, distolateral spine not unusually stout, slightly overreaching distal margin of blade; 1st pereopods with merus armed with small distal tooth on inferior flexor margin; major chela compressed, 4 times as long as wide, dactyl not double-ended, bearing very short plunger defined only proximally, palm without teeth either side of dactylar articulation, sculpture limited to flattened margin proximal to fixed finger and shallow depression extending proximally from fixed finger on one lateral surface, surface obscurely pustulate; minor chela about 8 to 9 times as long as wide, dactyl slightly shorter than palm, "balaeniceps" in male; 2nd pereopod with proximal carpal article $\frac{5}{6}$ as long as 2nd; 3rd pereopod with dactyl simple, subspatulate, propodus bearing 7 or 8 spinules on flexor margin, carpus and merus unarmed, ischium with small movable spine; maximum carapace length more than 7 mm.

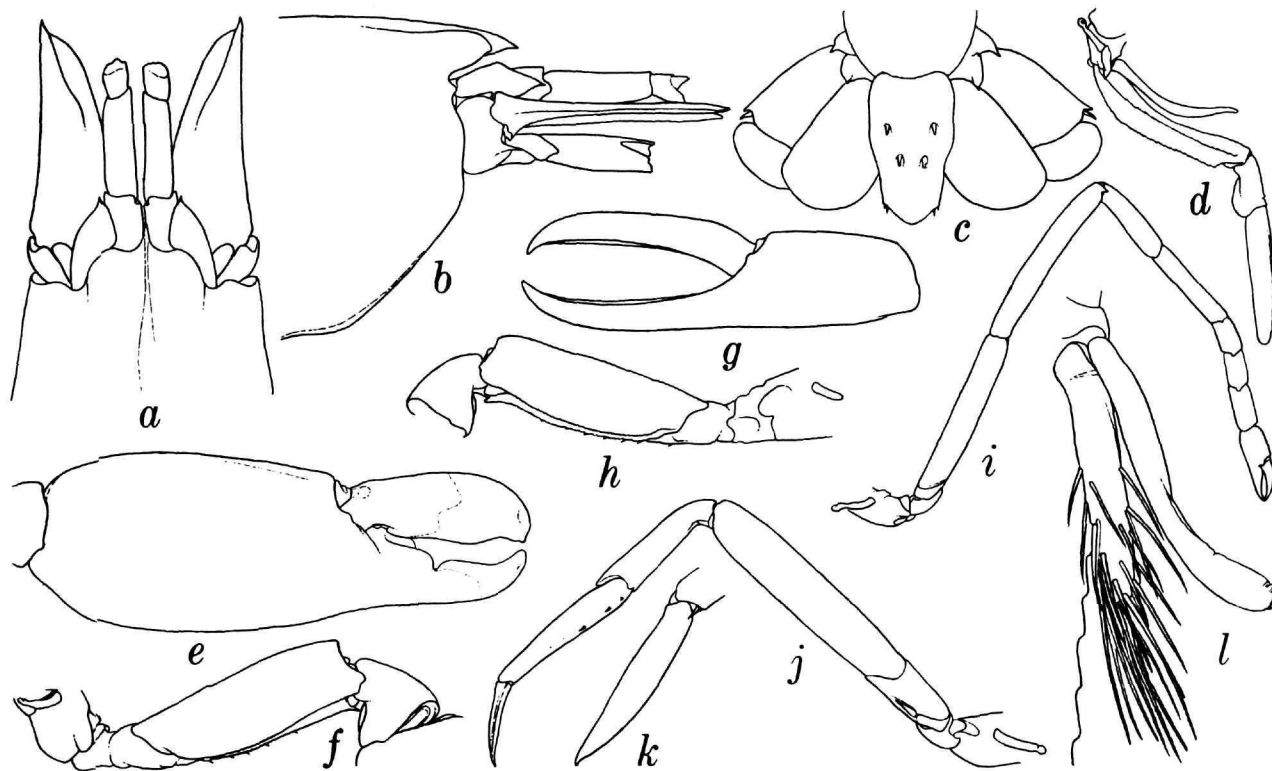


FIGURE 12.—*Alpheus quasirapacida*, new species, *a, b*, ovigerous female paratype from *Albatross* sta 5159, carapace length 12.8 mm; *c–l*, male holotype from same station, carapace length 10.1 mm: *a*, anterior carapace and appendages, dorsal aspect; *b*, same, lateral aspect; *c*, telson and uropods, dorsal aspect; *d*, right 3rd maxilliped; *e*, right 1st (major) chela; *f*, right 1st (major) cheliped, proximal segments; *g*, left 1st (minor) chela; *h*, left 1st (minor) cheliped, proximal segments; *i*, right 2nd pereopod; *j*, left 3rd pereopod; *k*, same, dactyl, flexor aspect; *l*, right appendices masculina and interna.

MATERIAL.—PHILIPPINES. Southeastern Visayan Sea near Guintacan Island; 11°16'45"N, 123°55'45"E; 130 m; green mud; 3 Apr 1908 (1112–1132); 12' Agassiz beam trawl, 3 mud bags; 1 male [7.2].

RANGE.—Known from only two localities, both in the Philippines, in addition to the type locality in the northern South China Sea south of Hong Kong; 55–134 meters.

REMARKS.—The *Albatross* specimen lacks the major cheliped, and the anterior margin of the carapace is transverse, rather than concave, between the rostrum and the orbital hoods, but comparison with the holotype has engendered little doubt that it belongs to the same species, especially because of the similar form of the third maxilliped and minor cheliped. The pustules on the major and minor chelae, from which the name of the species was derived, are apparent only at rather high magnification and with optimum lighting. This is apparently the largest of the five specimens, all males, thus far recorded of *A. pustulosus*; the holotype has a carapace length of 5.0 mm, and the two paratypes are slightly smaller, notwithstanding the greater total lengths cited with the original description,

a discrepancy that is almost certainly attributable to the somewhat fragmentary condition of the type series.

***65. *Alpheus quasirapacida*, new species**

FIGURE 12

DIAGNOSIS.—(Brevirostris Group). Body not unusually compressed or setose; rostrum narrowly acute, not reaching anteriorly nearly as far as distal margin of 1st antennular segment (Figure 12*a*), bluntly but strongly carinate in midline, carina widening posteriorly and disappearing on midgastric region, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or paired teeth overhanging posterior ends of adrostral furrows, anterior margin unarmed and concave mesial to orbital hoods, curving gradually into rostral margin, region somewhat depressed submarginally, orbital hoods unarmed and uncarinated, adrostral furrows deep; 2nd antennular segment about 3 times as long as wide; basal antennal segment (basicerite) with sharp ventrolateral tooth not reaching level of tip of

stylocerite (Figure 12b); antennal scale with lateral margin slightly concave, distolateral spine strong, overreaching distal margin of tapered blade; 1st pereopods with acute distal tooth and series of short, inconspicuous spines on inferior flexor margin of merus, extensor margin unarmed (Figure 12f,h); major chela (Figure 12e) rather strongly compressed, $2\frac{3}{4}$ times as long as wide, dactyl nearly straight in longitudinal plane, not double-ended, carinate on extensor margin, plunger much reduced, defined only by proximal angle, palm without tooth either side of dactylar articulation, sculpture limited to slightly flattened area in distal half proximal to adhesive plaque, without "saddle"; minor chela (Figure 12g) slightly more than 4 times as long as wide, fingers with numerous long setae on opposable and extensor margins, nearly $1\frac{1}{2}$ times as long as palm, dactyl bluntly carinate on extensor margin but not "balaeniceps" in male; 2nd pereopod (Figure 12i) with proximal carpal article little more than $\frac{4}{5}$ as long as 2nd; 3rd pereopod (Figure 12j) with dactyl (Figure 12k) subspatulate, propodus bearing about 3 obscure submarginal spines in proximal half of flexor margin, merus unarmed, ischium bearing strong movable spine; maximum carapace length to base of rostrum more than 13 mm.

MATERIAL.—PHILIPPINES. Off Tawitawi, Sulu Archipelago: sta 5159; $5^{\circ}11'50''N$, $119^{\circ}54'E$; 18 m; coarse sand; 21 Feb 1908 (1008–1010); 9' Johnston oyster dredge: 1 male [10.1] holotype (USNM 205666) 1 ovig female [12.8].

TYPE LOCALITY.—Off Tawitawi, Sulu Archipelago, Philippines, as cited above.

RANGE.—Known only from the pair of specimens from the type locality.

REMARKS.—Neither one of the pair of specimens representing this species—the only caridean shrimps obtained at this unexplainably brief station—is undamaged. The rostrum and anterior gastric region of the male holotype are mutilated, but the anterior pair of chelipeds and at least one member of each of the remaining pairs of pereopods are present. The carapace of the ovigerous female paratype is intact but both of the anterior chelipeds are missing.

These specimens were at first assigned to *A. rapacida* De Man, 1908, a species recorded from the eastern Mediterranean, Red Sea, Madagascar, southeastern Africa, Singapore, Thailand, Vietnam, near Hong Kong, Indonesia, Australia, and Hawaii, in depths of 2–56 meters. That original reaction to the identity of the species may well prove to be proper after more intensive study of the question. The *Albatross* specimens differ from typical material of *A. rapacida* in only two characters: the failure of the dorsal rostral carina to extend posteriorly to near the midlength of the carapace and the proportion of the major chela being less than three, rather than nearly four, times as long as wide. In my report on the western Atlantic alpheids (Chace, 1972:66), I assigned to a single species, *A. floridanus* Kingsley, 1878, specimens in which the major chela varied from less than three to more than six times as long as wide, and D.M. and A.H. Banner (1982:162) included in *A. rapacida*

specimens from Madagascar and Hawaii in which there was a small transverse groove in the palm of the major chela proximal to the adhesive plaque, apparently similar to a condition illustrated by Tiwari (1963, pl. 22b) in a specimen from Vietnam that also displayed a dactyl very unlike that usually found in *A. rapacida*. My chief purpose in assigning these specimens to a distinct species is to draw attention to the differences between what may be the first Philippine representation of *A. rapacida* and material previously assigned to that species.

ETYMOLOGY.—The Latin word *quasi* ("simulating") is attached as a prefix to the specific name of the species that the possibly previously unknown shrimp seems to most closely resemble.

*66. *Alpheus serenei* Tiwari, 1963

Alpheus serenei Tiwari, 1963:310, figs. 27, 28 [type locality: "Station Cauda, Nhatrang Bay, Vietnam"; coral reef, 3–4 meters].—D.M. and A.H. Banner, 1981:38; 1982:196, fig. 60.

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum sharp, reaching, at most, level of distal margin of 1st antennular segment, dorsal carina strong anteriorly, continuing posteriorly, sometimes obscurely, to about midlength of carapace, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without paired teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood unarmed, partially convex, dorsally flattened, adrostral furrows rather shallow; 2nd antennular segment $2\frac{1}{2}$ times as long as wide; basal antennal segment (basicerite) armed with rather strong ventral tooth not reaching level of tip of stylocerite; antennal scale with lateral margin concave, distolateral spine fairly strong, considerably overreaching narrowly tapering blade; 1st pereopods with merus armed with distal tooth on inferior flexor margin; major chela somewhat compressed, about $2\frac{1}{4}$ times as long as wide, dactyl not much curved in longitudinal plane, not double-ended, with plunger very short, truncate, subacutely produced proximally, palm without prominent longitudinal carina near margin proximal to fixed finger, with "saddle" proximal to adhesive plaque, proximal shoulder bluntly acute, overhanging "saddle," shoulder proximal to fixed finger strong, rounded, not projecting; minor chela about $3\frac{1}{2}$ times as long as wide, dactyl subequal to palm in length, laterally carinate in male but not distinctly "balaeniceps" in either sex; 2nd pereopod with proximal carpal article nearly twice as long as 2nd; 3rd pereopod with dactyl often obscurely biunguiculate, propodus bearing 16 spines on flexor margin, carpus with strong, acute distal tooth on flexor margin, blunt distal tooth on extensor margin, merus with acute subdistal tooth on flexor margin, ischium with strong movable spine; maximum carapace length to base of rostrum about 11 mm.

MATERIAL.—PHILIPPINES. Visayan Sea north of Cebu: sta

5401; 11°24'45"N, 124°06'E; 55 m; fine sand; 16 Mar 1909 (1005–1032); 6' McCormick trawl: 2 ovig females [9.9, 10.5]. San Juanico Strait between Samar and Leyte: sta 5205; 11°19'30"N, 124°58'05"E; 15 m; 13 Apr 1908 (0928); 12' Agassiz beam trawl, 3 mud bags (fouled bottom; trawl lost; mud bag only recovered; sounding with hand lead): 1 male [7.4] 1 ovig female [8.0]. 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 [9.1] 1 ovig female [9.4]; sta 5555; 5°51'15"N, 120°58'35"E; 62 m; coarse sand; 18 Sep 1909 (1109–1113); 6' McCormick trawl: 1 male [8.7] 1 ovig female [9.0].

RANGE.—Red Sea, eastern Africa, Madagascar, Singapore, Gulf of Thailand, Viet Nam, Philippines, Indonesia, Australia; 1–62 meters.

REMARKS.—The median dorsal carina on the carapace may be so obscure that it can be seen only by partially drying the surface. As noted by D.M. and A.H. Banner (1982:197), the flattened frontal region of the carapace anteromesial to the orbital hoods may be the most distinctive character of this species, but I have not seen enough material of *A. hippothoe* and *A. serenei* to be certain of the validity of the latter species.

***67. *Alpheus soela* D.M. and A.H. Banner, 1987**

FIGURES 13, 14

Alpheus soela D.M. and A.H. Banner, 1987:21, fig. 1 [type locality: West of La Grange Bay, Western Australia; 18°41'S, 120°07'E; 430 m].

DIAGNOSIS.—(Sulcatus Group). Body not unusually compressed or setose; rostrum narrowly acute, not reaching as far as distal margin of 1st antennular segment, dorsally rounded, not carinate in midline, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without paired teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood incised, not flattened, orbital hood armed with sharp spine, adrostral furrows shallow; 2nd antennular segment about 3½ times as long as wide; basal antennal segment (basicerite) armed with strong, sharp lateral spine not quite reaching level of tip of stylocerite; antennal scale with lateral margin slightly concave, distolateral spine not very stout, overreaching distal margin of tapered blade; 1st pereopod with merus armed with inconspicuous, acute distal tooth on inferior flexor margin; major chela moderately compressed proximally, twisted, tapering to subcylindrical distal part of palm, about 4 times as long as wide, dactyl little divergent from longitudinal plane of chela, not double-ended, with vestigial plunger defined only proximally, palm with small sharp tooth on "dorsal" side of dactylar articulation, without longitudinal carina near margin proximal to fixed finger but with distinct blunt carina on opposite margin extending proximad from adhesive plaque, without shoulder on margin proximal to fixed finger, longitudinal sulcus on "ventral" surface extending short distance proximad from adhesive plaque; minor chela about

8½ times as long as wide in male, about 6 times as long as wide in female, dactyl fully as long as palm, "balaeniceps" in both sexes; 2nd pereopod with proximal carpal article about 1¾ times as long as 2nd; 3rd pereopod with dactyl simple with subdistal notch in extensor margin, propodus with about 9 spinules in single row on flexor margin, carpus with extensor margin extended distally, merus unarmed, ischium with movable spine; maximum carapace length to base of rostrum about 18 mm.

MATERIAL.—PHILIPPINES. Babuyan Channel, north of Luzon: sta 5325; 18°34'15"N, 121°51'15"E; 410 m; green mud; 11.8°C; 12 Nov 1908 (1113–1132); 12' Tanner beam trawl, mud bag: 1 ovig female [7.9]. Balayan Bay, southern Luzon: sta 5364 or 5365; 13°48'30"N, 120°43'45"E or 13°44'24"N, 120°45'30"E; [293 or 391 m]; 20 or 22 Feb 1909 (1440–1553 or 0904–0940); 25' Agassiz beam trawl: 1 male [13.7]. West of Leyte: sta 5406; 10°49'03"N, 124°22'30"E; 545 m; mud; 17 Mar 1909 (1141–1208); 12' Agassiz beam trawl: 1 male [16.4], 2 females [14.0, 14.3]; sta 5407; 10°51'38"N, 124°20'54"E; 640 m; green mud; 17 Mar 1909 (1328–1348); 12' Agassiz beam trawl: 1 male [11.3]. Between Negros and Siquijor: sta 5536; 9°15'45"N, 123°22'00"E; 510 m; green mud; 11.9°C; 19 Aug 1909 (1336–1356); 12' Tanner beam trawl: 2 females [12.2 (with branchial parasite), 17.8].

RANGE.—Philippines and Indian Ocean off Western Australia; 293 or 391 to 640 meters.

***68. *Alpheus spatulatus* A.H. and D.M. Banner, 1968**

Alpheus spatulatus A.H. and D.M. Banner, 1968:146, fig. 3 [type locality: northwestern South China Sea east of Hainan; 19°17'N, 112°81'E; 95 meters].—D.M. and A.H. Banner, 1978:229.—A.H. and D.M. Banner, 1981:233.

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum overreaching 1st antennular segment, dorsally transversely convex, without median carina, base abruptly delimited from but not overhanging adrostral furrows; carapace without median tooth or tubercle on gastric region or paired teeth overhanging posterior ends of adrostral furrows, anterior margin rather narrowly incised or notched and unarmed between rostrum and orbital hoods, latter unarmed, adrostral furrows narrow and comparatively deep; 2nd antennular segment nearly 3 times as long as wide; basal antennal segment (basicerite) bearing small, sharp ventrolateral tooth not nearly reaching level of tip of stylocerite; antennal scale with lateral margin moderately concave, distolateral spine somewhat reduced, barely overreaching rather broad blade; 1st pereopods with merus armed with acute distal tooth on inferior flexor margin; major chela compressed, 3 times as long as wide, dactyl straight in longitudinal plane, not double-ended, plunger distinct only proximally, opposable surface concave, palm without carina near margin proximal to fixed finger, with "saddle" proximal to adhesive plaque, shoulder proximal to

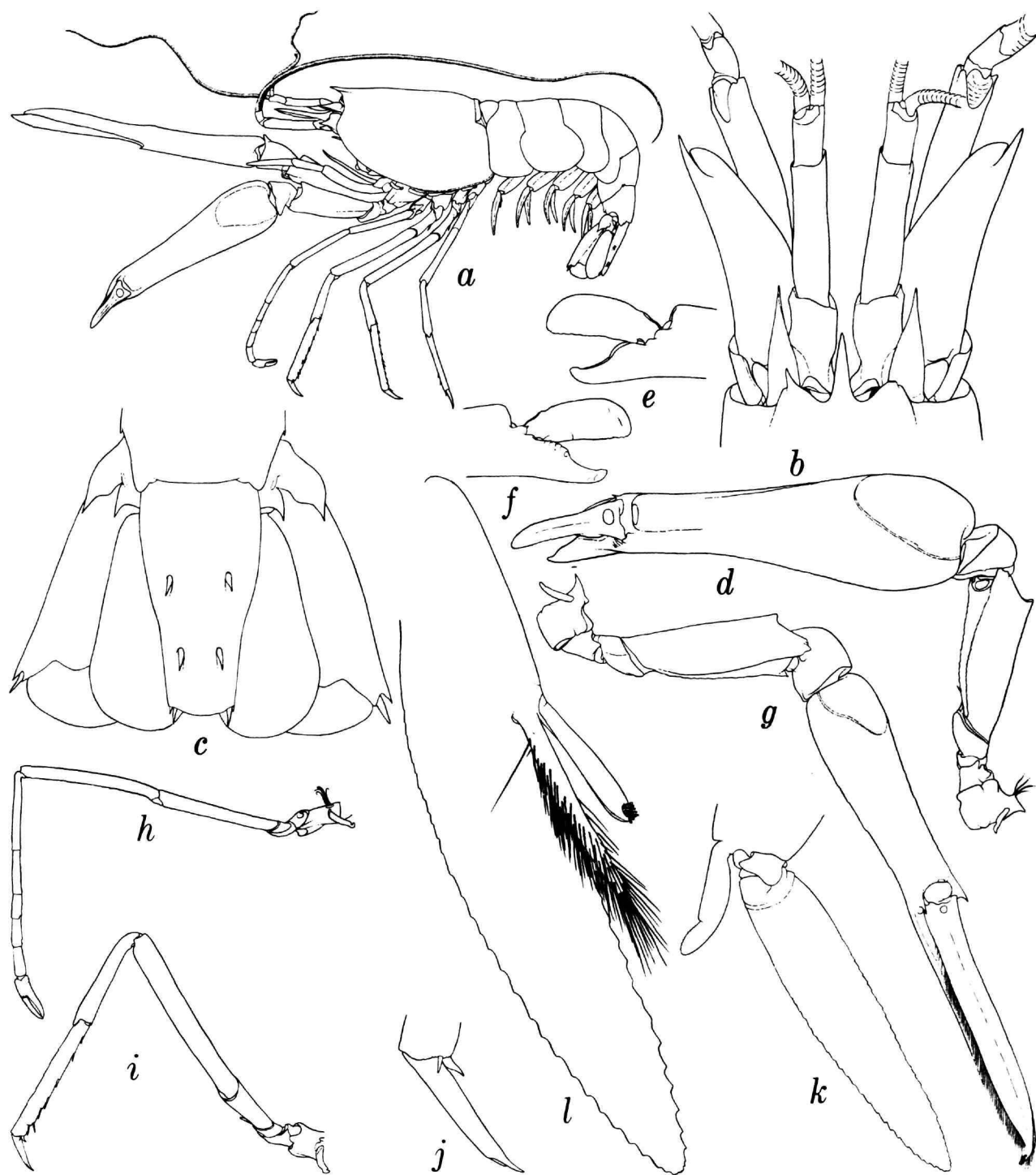


FIGURE 13.—*Alpheus soela*, male from *Albatross* sta 5406, carapace length 16.4 mm: a, lateral aspect; b, anterior margin and appendages, dorsal aspect; c, telson and uropods, dorsal aspect; d, left 1st (major) cheliped; e, same, flexor aspect; f, same, extensor aspect; g, right 1st (minor) cheliped; h, left 2nd pereopod; i, left 3rd pereopod; j, same, dactyl; k, right 1st pleopod; l, right 2nd pleopod, endopod.

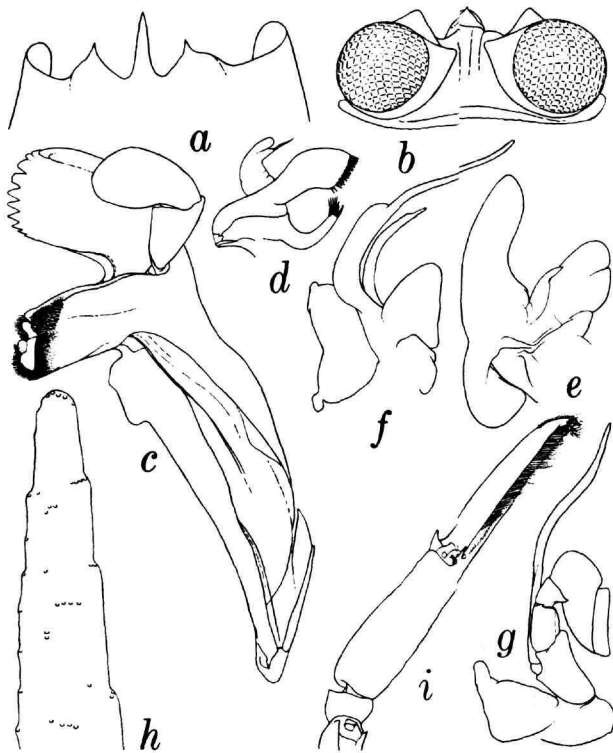


FIGURE 14.—*Alpheus soela*, female from *Albatross* sta 5406, carapace length 14.3 mm: a, frontal margin of carapace; b, ophthalmic somite; c, right mandible; d, right 1st maxilla; e, right 2nd maxilla; f, right 1st maxilliped; g, right 2nd maxilliped; h, right 3rd maxilliped, denuded heavily setose distal end, lateral aspect; i, right 1st (minor) chela.

“saddle” subacutely projecting over “saddle,” no distinct shoulder on margin proximal to fixed finger; minor chela nearly 6 times as long as wide, dactyl little longer than palm, probably not “balaeniceps” in either sex; 2nd pereopod with proximal carpal article about twice as long as 2nd; 3rd pereopod with dactyl subspatulate, propodus with 7 spines on flexor margin, carpus not much produced distally on either margin, merus unarmed, ischium with small movable spine; maximum carapace length to base of rostrum about 14 mm.

MATERIAL.—PHILIPPINES, Lingayen Gulf, western Luzon: sta 5442; 16°30'36"N, 120°11'06"E; 82 m; coral sand; 10–11 May 1909 (1858–0532); 25' Agassiz beam trawl (apparently drifted 15.5 miles S, 12°E from original position): 2 females without major chelipeds [13.2, 14.1], 1 ovig [14.1].

RANGE.—The species is known thus far only from the South China Sea. The type series came from the northwestern part between east of Hainan and south of Hong Kong. The pair of specimens reported by D.M. and A.H. Banner in 1978 were found in the southern part of the Sea north of western Sarawak. The single specimen recorded by A.H. and D.M. Banner in 1981 was taken by *Vauban* at station 72, which lies virtually in the entrance to Manila Bay, rather than off the Lubang

Islands, as reported in 1978. The other Philippine record is reported herein from the Lingayen Gulf, which is also part of the South China Sea. The depth range is 48–127 meters.

69. *Alpheus splendidus* Coutière, 1897

A[lpheus] splendidus Coutière, 1897a:236 [type locality: Djibouti, Republic of Djibouti; under stones at low tide].

Alpheus pomatoceros A.H. and D.M. Banner, 1966b:93, fig. 32 [type locality: Lam Chong Klan, Ko Samui, Thailand; coral head in 2–3 meters on outer reef front].

Alpheus splendidus.—D.M. and A.H. Banner, 1982:56, fig. 12.

DIAGNOSIS.—(Sulcatus Group). Body not unusually compressed or setose; rostrum acute, prominent, slightly overreaching 1st antennular segment, rounded dorsally, extending posteriorly as sharp carina to near midlength of carapace, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or paired 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 tooth arising from dorsal part of hood, not marginal, adrostral furrows moderately deep; 2nd antennular segment about 1¹/₄ times as long as wide; basal antennal segment (basicerite) armed with strong lateral tooth nearly reaching level of tip of stylocerite; antennal scale with lateral margin slightly concave, distolateral spine strong, overreaching distal margin of blade; anterior pereopods with merus armed with acute distal tooth on inferior flexor margin; major chela compressed, 2³/₄ times as long as wide, slightly twisted, but dactyl lying in longitudinal plane, not double-ended, plunger well developed, palm with tooth on at least one side of dactylar articulation, without longitudinal carina near margin proximal to fixed finger, without distinct “saddle” proximal to adhesive plaque but with longitudinal furrow on central third of that margin and shallow longitudinal sulcus on distal part of lateral surface; minor chela 4¹/₃ times as long as wide, dactyl slightly longer than palm, not “balaeniceps” in either sex, palm with acute tooth on one side of dactylar articulation; 2nd pereopod with proximal carpal article more than twice as long as 2nd; 3rd pereopod with dactyl simple, propodus with 10 spines on flexor margin, carpus with both extensor and flexor margins projecting distally, merus and ischium unarmed; maximum carapace length to base of rostrum 14 mm.

RANGE.—Red Sea, eastern Africa, Seychelles, Malaysia, Thailand, Hong Kong, Philippines, Indonesia, and Queensland, Australia; intertidal to 2–3 meters.

70. *Alpheus spongiarum* Coutière, 1897

A[lpheus] spongiarum Coutière, 1897a:236 [type locality: Djibouti, Republic of Djibouti].

A[lpheus] paraculeipes Coutière, 1905:894, pls. 79, 80: fig. 32 [type locality: the type series was collected on 4 different atolls of the Maldives Islands].

Alpheus spongiarum.—D.M. and A.H. Banner, 1982:116, fig. 31.

DIAGNOSIS.—(Crinitus Group). Body neither unusually

compressed nor densely setose; rostrum equilaterally triangular, not reaching level of distal margin of 1st antennular segment, carinate posteriorly to level of base of eyes, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region and without paired teeth overhanging posterior ends of adrostral furrows, anterior margin transverse and unarmed mesial to orbital hoods, region not especially flattened, orbital hoods unarmed, adrostral furrows shallow; 2nd antennular segment twice as long as wide; basal antennal segment (basicerite) unarmed; antennal scale with lateral margin slightly concave, distolateral spine stout, blade vestigial; 1st pereopods with merus armed with small acute distal tooth on inferior flexor margin; major chela broadly oval in cross section, about $2\frac{1}{4}$ times as long as wide, dactyl not double-ended; minor chela nearly $3\frac{1}{2}$ times as long as wide, dactyl about $\frac{2}{3}$ as long as palm, not "balaeniceps" in either sex; 2nd pereopod with proximal carpal article $\frac{1}{2}$ as long as 2nd; 3rd pereopod with dactyl usually obscurely biunguiculate, propodus bearing 8 spines on flexor margin, carpus with both extensor and flexor margins projecting distally, merus with strong distal tooth on flexor margin; maximum carapace length to base of rostrum about 6 mm.

RANGE.—Madagascar, Seychelles, Réunion, Gulf of Aden, Maldives and Laccadive islands, Sri Lanka, Singapore, Japan, Philippines, Indonesia, and Australia; intertidal to 42 meters, in sponges.

71. *Alpheus stanleyi* Coutière, 1908

Alpheus *Stanleyi* Coutière, 1908:207 [type locality: Amirante Isles; 55 meters].

Alpheus Stanleyi var. *dearmatus* De Man, 1910:287 [type locality: two Indonesian localities: Wunoh Bay, Pulau Waigeo, and Banda anchorage, Kepulauan Banda. 18–36 meters]; 1911:367, pl. 17: fig. 78.

Alpheus stanleyi.—Coutière, 1921:423, pl. 63: fig. 18.

Alpheus cloudi A.H. Banner, 1956:352, fig. 16 [type locality: about 0.6 mile off Muchot Point, south side of Saipan Harbor, Mariana Islands; 2–4 meters].

Alpheus stanleyi.—D.M. and A.H. Banner, 1978:230, fig. 2a–c.—A.H. and D.M. Banner, 1983:65.

DIAGNOSIS.—(Crinitus Group). Body neither unusually compressed nor densely setose; rostrum broadly triangular, not reaching as far as distal margin of 1st antennular segment, sharply carinate anteriorly, carina widening and disappearing on anterior gastric region, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region and without paired teeth overhanging posterior ends of adrostral furrows, anterior margin transverse or concave mesial to orbital hoods, frontal region flattened, orbital hoods unarmed, adrostral furrows not especially deep; 2nd antennular segment variable, 2 to $3\frac{1}{2}$ times as long as wide; basal antennal segment (basicerite) armed with rather strong lateral tooth not reaching level of tip of stylocerite; antennal scale with lateral margin variably concave, distolateral spine stout, considerably overreaching convex distal margin

of blade; 1st chelipeds with or without distal tooth on inferior flexor margin; major chela more or less sexually dimorphic, about twice as long as wide in males, up to more than 3 times as long as wide in females, broadly oval in cross section, dactyl not truly double-ended, palm without apparent sculpture except for faint depression in margin immediately posterior to adhesive plaque and slight lateral longitudinal sulcus extending posteriorly from near dactylar articulation; minor chela 2 to 3 times as long as wide, dactyl not especially slender, but not "balaeniceps" in either sex, subequal to palm in length; 2nd pereopod with proximal carpal article barely to distinctly longer than 2nd; 3rd pereopod with dactyl variably biunguiculate, sometimes obscurely so, propodus with about 8 spines on flexor margin, carpus distally produced at extensor and flexor angles, merus with distal tooth on flexor margin, ischium bearing small movable spine; maximum carapace length to base of rostrum about 8 mm.

RANGE.—Western and central Indian Ocean, Philippines, Indonesia, Caroline, Fiji, and Samoa islands; littoral to 60 meters, in sponges.

72. *Alpheus staphylinus* Coutière, 1908

Alpheus staphylinus Coutière, 1908:204 [type locality: Salomon Islands, Chagos Archipelago]; 1921:418, pl. 62: fig. 13.

Alpheus staphylinus.—D.M. and A.H. Banner, 1978:232; 1985:32.

(?)*Alpheus staphylinus*.—D.M. and A.H. Banner, 1982:42, fig. 7.

DIAGNOSIS.—(Macrocheles Group). Body not unusually compressed or setose; rostrum acute, not reaching level of distal margin of 1st antennular segment, not carinate, not abruptly delimited from surface of carapace; carapace without median tooth or tubercle or paired teeth on gastric region, anterior margin concave and unarmed mesial to orbital hood, curving gradually into rostral margin, region not depressed, orbital hood armed with acute marginal tooth, adrostral furrows absent; 2nd antennular segment nearly twice as long as wide; basal antennal segment (basicerite) not reaching level of tip of stylocerite; antennal scale with lateral margin slightly concave to nearly straight, distolateral spine strong, considerably overreaching distal margin of blade; 1st pereopods with merus armed with distal acute tooth on inferior flexor margin; major chela about 3 times as long as wide, dactyl diverging little from longitudinal plane, not double-ended, without prominent crest on extensor margin, distally rounded, plunger consisting of conical tooth with rounded apex, palm with acute tooth each side of dactylar articulation, carina supporting tooth on mesial side of dactylar articulation interrupted by notch, without "saddle" on broadly rounded margin proximal to adhesive plaque, rounded shoulder on margin proximal to fixed finger; minor chela nearly $5\frac{1}{2}$ times as long as wide, dactyl subequal in length to palm, not "balaeniceps" or carinate on extensor margin in male; 2nd pereopod with proximal carpal article about $1\frac{3}{4}$ times as long as 2nd; 3rd pereopod with dactyl simple, slender, propodus with 9 spines on flexor margin,

merus unarmed, ischium with movable spine; maximum carapace length to base of rostrum about 5 mm.

RANGE.—Mombasa, Kenya, Chagos Archipelago, Ryukyu Islands, Philippines, Indonesia, and possibly Murray Island, Torres Strait; sublittoral.

***73. *Alpheus strenuus strenuus* Dana, 1852**

[?] *Alpheus Rhode* White, 1847:74 [Philippine Islands, nomen nudum].—A.H. and D.M. Banner, 1977b:280.

Alpheus Doris White, 1847:75 [Torres Strait; nomen nudum].—A.H. and D.M. Banner, 1977b:281.

Alpheus strenuus Dana, 1852a:21 [type locality: Tongatapu, Tonga Islands]; 1852b:543, pl. 34: fig. 4.

Alpheus strenuus var. *angulatus* Coutière, 1905:914 [type locality: Hulele, Male Atoll, Maldive Islands].

Alpheus strenuus strenuus.—D.M. and A.H. Banner, 1982:225, fig. 71.—A.H. and D.M. Banner, 1983:68.—D.M. and A.H. Banner, 1985:32.

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum narrowly acute, not reaching level of distal margin of 1st antennular segment, dorsal carina rounded, not extending posteriorly beyond orbital hoods, base widening slightly but not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region or paired teeth overhanging posterior ends of adrostral furrows, anterior margin mesial to orbital hood unarmed, sinuous, orbital hood unarmed, adrostral furrows rather shallow; 2nd antennular segment $1\frac{2}{3}$ to $2\frac{1}{2}$ times as long as wide; basal antennal segment (basicerite) armed with sharp ventrolateral tooth not reaching level of tip of stylocerite; antennal scale with lateral margin concave, of distolateral spine slightly convex, spine moderately stout, slightly overreaching somewhat tapered blade; 1st pereopods with merus armed with acute distal tooth on inferior flexor margin; major chela somewhat compressed, $2\frac{1}{3}$ times as long as wide, dactyl not noticeably curved in longitudinal plane, not double-ended, having well-developed plunger, palm with longitudinal sulcus on mesial surface near margin proximal to fixed finger but no true carina bordering it, with "saddle" proximal to adhesive plaque, proximal shoulder blunt, but usually slightly overhanging "saddle," shoulder proximal to fixed finger strong, slightly projecting but not acute; minor chela $3\frac{1}{3}$ to $4\frac{1}{3}$ times as long as wide, dactyl distinctly "balaeniceps" in both sexes, $\frac{2}{3}$ as long as palm; 2nd pereopod with proximal carpal article subequal in length to 2nd; 3rd pereopod with dactyl simple, propodus with about 10 spines on flexor margin, carpus with distal extensor angle projecting, merus unarmed, ischium with movable spine; maximum carapace length to base of rostrum 38 mm.

MATERIAL.—PHILIPPINES. Mactan Island, Bohol Strait [10°18'N, 123°58'E]; 31 Aug 1909; tidepools: 1 ovig female [10.8]. Mahinog, Camiguin Island, Mindanao Sea [9°09'N, 124°47'E]; 3 Aug 1909; tidepools: 5 males [10.0–14.8, 1 with abdominal parasite] 5 females [10.5–19.3], 4 ovig. [11.0–19.3]. Nasipit, Mindanao [8°57'N, 125°19'E]; 1 Aug 1909;

tidepool: 1 male [8.0] 3 ovig females [8.2–11.4].

INDONESIA. Great Toba, Selat Butung, Celebes [4°33'S, 122°42'E]; tidepools; 15 Dec 1909: 11 males [9.0–19.2] 10 females [12.8–22.7], 7 ovig [14.0–22.7].

RANGE.—Red Sea to Society Islands, not including Hawaii; usually littoral (see A.H. and D.M. Banner, 1983:68, for discussion of habitat). The specimen from the Galapagos Islands identified by Schmitt (1939:26) as *Crangon strenuus* is a male (carapace length 4.8 mm) of *Alpheus leviusculus* or the close relative of that species that has been recorded from those Islands.

74. *Alpheus sulcatus* Kingsley, 1878

Alpheus sulcatus Kingsley, 1878:193 [type locality: the two syntypes of this species came from Bahía de Panamá and Zorritos, Peru].—D.M. and A.H. Banner, 1982:79, fig. 20.—Wicksten, 1983:46.

Alpheus macrochirus Richters, 1880:164, pl. 17: figs. 31–33 [type locality: Île aux Fouquets, Mauritius].

Alpheus luciae Barnard, 1947:389 [type locality: Lake Saint Lucia, Zululand, Natal, South Africa].

DIAGNOSIS.—(Sulcatus Group). Body not unusually compressed or setose; rostrum triangular, not reaching nearly as far as distal margin of 1st antennular segment, rounded dorsally, base abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region and without paired teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood nearly transverse, unarmed, adrostral furrows rather deep, somewhat flattened anteriorly, orbital hood unarmed; 2nd antennular segment about twice as long as wide; basal antennal segment (basicerite) armed with strong ventrolateral tooth overreaching stylocerite; antennal scale with lateral margin nearly straight, distolateral spine overreaching distal margin of tapered blade; 1st pereopods without distinct distal tooth on inferior flexor margin of merus; major chela compressed, fully $2\frac{1}{2}$ times as long as wide, setose mesially, dactyl rather strongly arched, not double-ended, bearing well-developed plunger, palm without sharp tooth either side of dactylar articulation, without longitudinal carina near margin proximal to fixed finger, without distinct "saddle" proximal to adhesive plaque or shoulder on margin proximal to fixed finger, longitudinal sulcus near margin proximal to adhesive plaque; minor chela about 3 times as long as wide, setose mesially, dactyl not especially slender, fully as long as palm, not "balaeniceps" in either sex; 2nd pereopod with proximal carpal article longer than 2nd; 3rd pereopod with dactyl biunguiculate or simple, propodus bearing 8 spines on flexor margin, carpus with extensor margin bluntly projecting distally, merus unarmed, ischium bearing movable spine; maximum carapace length to base of rostrum about 20 mm.

RANGE.—Southeastern Africa to Philippines, Indonesia, Japan, and Australia to Society and Galapagos islands and Pacific American mainland from Gulf of California to Peru,

western Africa from equator to southern Angola, (not Red Sea, Japan, Hawaii, or western Atlantic); intertidal to 24 meters.

***75. *Alpheus suluensis*, new species**

FIGURES 15, 16

DIAGNOSIS.—(Edwardsii Group). Body not unusually compressed or setose; rostrum slender, sharp, reaching nearly to level of distal margin of 1st antennular segment (Figure 15a), dorsally rounded, blunt ridge rather prominent posteriorly but not extending much beyond eyes, base not abruptly delimited from adrostral furrows; carapace without tooth or tubercle on gastric region, without paired teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood sinuous, concave mesially, orbital hood unarmed, adrostral furrows moderately deep; 2nd antennular segment about twice as long as wide; basal antennal segment (basicerite) with sharp ventrolateral tooth not nearly reaching level of tip of stylocerite (Figure 15b); antennal scale with lateral margin concave at midlength, distolateral spine strong, considerably overreaching narrow blade, laterally convex; 1st pereopods with merus armed with sharp distal tooth on inferior flexor margin (Figure 15g,i); major chela somewhat compressed, nearly 2½ times as long as wide, dactyl not noticeably skewed from longitudinal plane, with rather strong, blunt, curved carina on extensor margin, not double-ended, plunger truncated, sharply demarcated only proximally (Figure 15e), palm with obscure submarginal sulcus but no strong longitudinal ridge near margin proximal to fixed finger (Figure 15f), with "saddle" proximal to adhesive plaque, proximal shoulder bluntly acute, overhanging "saddle," shoulder proximal to fixed finger strong, obtuse slightly projecting; minor chela (Figure 15h) nearly 6 times as long as wide, dactyl slightly shorter than palm, laterally slightly carinate but not "balaeniceps" in either sex; 2nd pereopod (Figure 16a), with proximal carpal article 1½ times as long as 2nd; 3rd pereopod (Figure 16b) with dactyl pointed, simple, propodus bearing about 10 spines on flexor margin, carpus with extensor margin slightly produced distally, merus unarmed, ischium with movable spine; carapace length to base of rostrum 8.3 mm.

MATERIAL.—PHILIPPINES. 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 [7.2] holotype USNM 205668) 1 ovig female [8.3].

TYPE LOCALITY.—Known only from the pair of specimens from off Siasi, Sulu Archipelago; 38 meters.

REMARKS.—Of the approximately 76 currently recognized species and subspecies in the Edwardsii Group of *Alpheus*, *A. suluensis* agrees with eight taxa in one or more of the following characters: (1) base of rostrum not abruptly delimited from adrostral furrows, (2) carapace not carinate in midline from rostrum nearly to midlength or without median tooth or

tubercle on gastric region, (3) first pereopods with distal tooth on inferior flexor margin of merus, (4) major chela less than three times as long as wide, (5) minor chela with dactyl no longer than palm and not "balaeniceps" in either sex, (6) second pereopod with proximal carpal article longer than second, and (7) third pereopod with dactyl subconical, not subspatulate, merus unarmed, and ischium bearing movable spine. *Alpheus suluensis* differs from *A. batesi* in having the rostrum and second antennular segment distinctly longer, the antennal scale with its lateral margin sinuous rather than nearly straight, the major chela wider and more strongly sculptured, the second pereopod with the proximal carpal article one and one-half rather than nearly twice as long as the second, and the third pereopod more slender. It seems to be distinguished from *A. buchianorum* A.H. and D.M. Banner, 1983, from the Seychelles in having the dorsal rostral carina blunt rather than sharp, the first pereopods with a much stronger distal tooth on the inferior flexor margin of the merus, the major and minor chelae not profusely setose on their mesial surfaces, and the third pereopod with the merus four and one-half rather than about three times as long as wide. The distinction of *A. suluensis* from *A. haanii* Ortmann, 1890, cannot be fixed from present knowledge of that Japanese species; D.M. and A.H. Banner (1982:273) indicated that the holotype of *A. haanii* "falls within the ranges" of *A. edwardsii*, but the minor chela of *A. haanii* is unknown; *A. suluensis* seems to have a much less massive plunger on the dactyl of the major chela than does *A. edwardsii*. From *A. hululensis* Coutière, 1905 from the Maldives, *A. suluensis* differs in the stronger and overhanging shoulder proximal to the "saddle" on the major chela, in comparison with the illustration of that appendage in Crosnier and Forest (1966, fig. 25b); on the other hand, the anterior appendages of *A. suluensis* correspond remarkably well with the illustration by Crosnier and Forest (1966, fig. 26c) of the female specimen from the Red Sea assigned to *A. bouvieri* var. *hululensis* by Coutière (1905:1909), but that specimen, which lacks the major cheliped, may probably be distinguished from *A. suluensis* by the strong dorsal rostral carina mentioned by Crosnier and Forest (1966:284). *Alpheus suluensis* clearly differs from *A. ladronis* in the much more prominent rostrum, antennal scales, and shoulder proximal to the "saddle" on the major chela. From *A. maindroni*, it differs in the longer rostrum and the major chela provided with a transverse rather than an oblique "saddle" and a less well developed, truncate plunger on the dactyl. From *A. parvirostris*, it is separated by the nonangulate orbital hoods, the much smaller tooth on the basal antennal segment, the transverse rather than oblique "saddle" and the less well developed, truncate plunger on the dactyl of the major chela, and, usually, by the absence of a distal tooth on the flexor margin of the merus of the third pereopod. Finally, *A. suluensis* may be separated from *A. viridari* (Armstrong, 1949) from the western Atlantic by the greater relative length of the distolateral spine of the antennal scale and by the overhanging shoulder proximal to the "saddle" and the absence of a notch in the

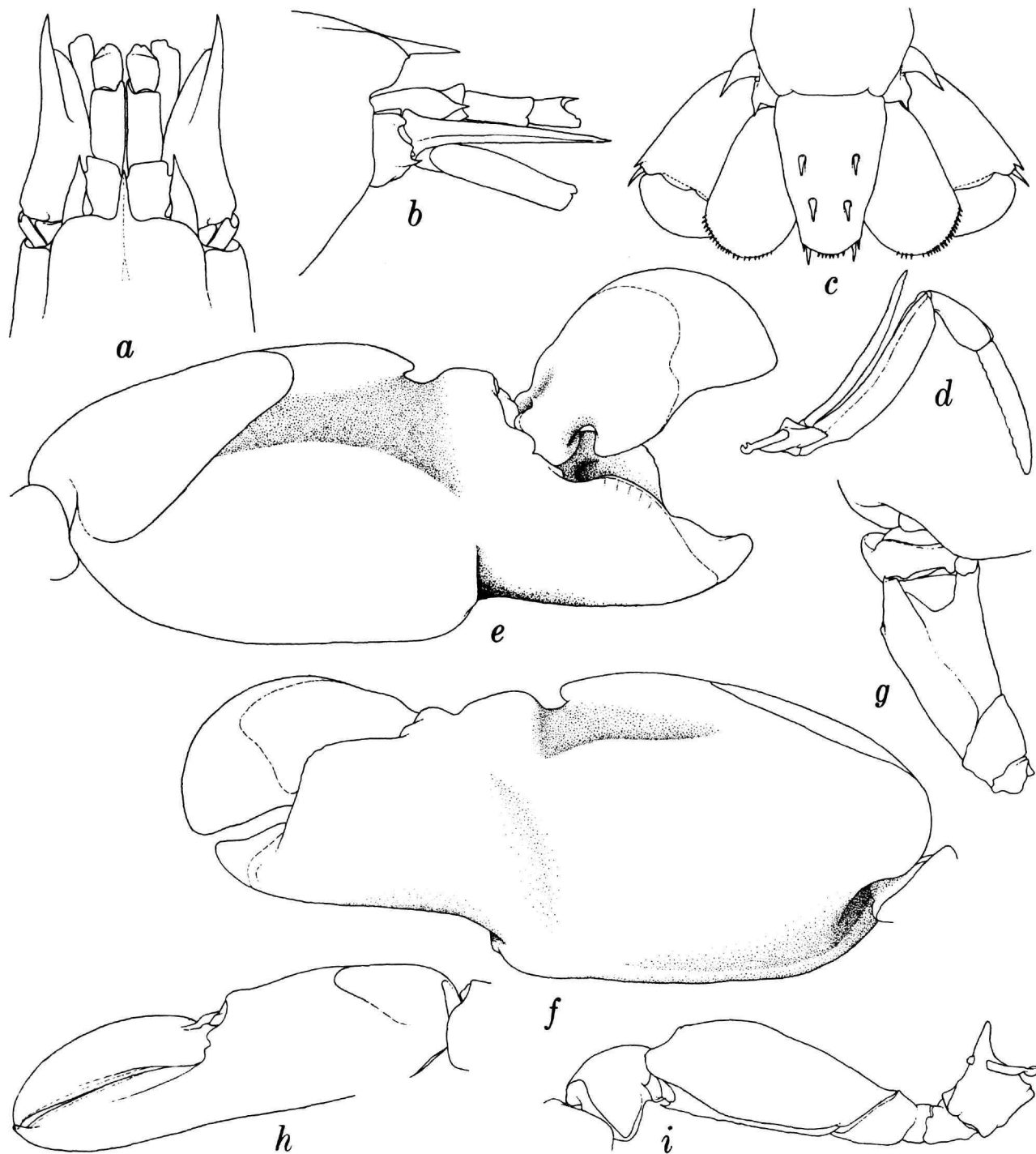


FIGURE 15.—*Alpheus suluensis*, new species, male holotype from *Albatross* sta 5147, carapace length 7.2 mm: *a*, anterior carapace and appendages, dorsal aspect; *b*, same, lateral aspect; *c*, telson and uropods, dorsal aspect; *d*, right 3rd maxilliped; *e*, right 1st (major) chela (detached but probably from holotype); *f*, same, opposite aspect; *g*, right 1st (major) cheliped, proximal segments; *h*, left 1st (minor) chela; *i*, left 1st (minor) cheliped, proximal segments.

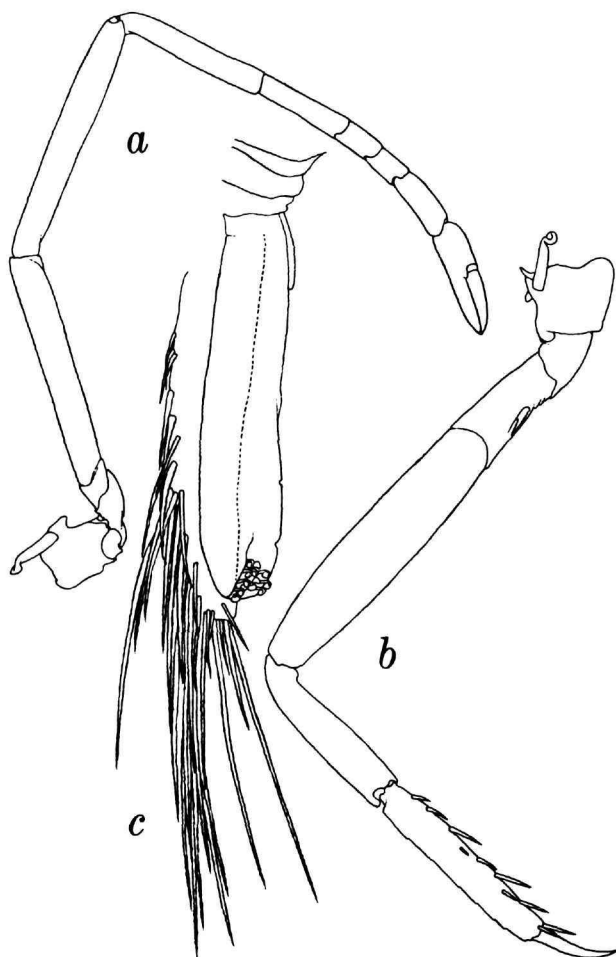


FIGURE 16.—*Alpheus suluensis*, new species, male holotype from *Albatross* sta 5147, carapace length 7.2 mm; a, right 2nd pereopod; b, left third pereopod; c, right appendices interna and masculina.

opposable margin of the fixed finger of the major chela.

ETYMOLOGY.—The suggested specific name is derived from the Archipelago embracing the type locality of the species and the predominant inhabitants for whom the region was named.

76. *Alpheus villosus* (Olivier, 1811)

Palaemon diversimanus Olivier, 1811:663 [type locality: Australia].

Palaemon villosus Olivier, 1811:664 [type locality: "la mer des Indes"; D.M. and A.H. Banner (1982:52) noted that the holotype bore "the label in the vial of 'Port du Roi Georges,' presumably King George Sound at Albany, W.A."].

Alpheus villosus.—D.M. and A.H. Banner, 1982:49, fig. 10.

DIAGNOSIS.—(Sulcatus Group). Body not unusually compressed but covered with short stiff setae together with a few long setae; rostrum triangular, reaching as far as distal margin

of 1st antennular segment, sharply carinate in midline, carina extending posteriorly to midlength of carapace, base of rostrum not abruptly delimited from adrostral furrows; carapace with acute median tooth on gastric region, without paired teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood armed with triangular tooth, orbital hood bearing acute tooth overhanging margin; 2nd antennular segment about twice as long as wide; basal antennal segment (basicerite) armed with strong ventrolateral tooth far overreaching stylocerite; antennal scale with lateral margin concave, distolateral spine distinctly overreaching distal margin of narrow blade; 1st pereopods with merus armed with small acute distal tooth on inferior flexor margin; major chela compressed, nearly $2\frac{1}{4}$ times as long as wide, dactyl bent, distally truncate, not double-ended but overhanging end of fixed finger, palm with acute tooth either side of dactylar articulation, without longitudinal carina near margin proximal to fixed finger, without distinct transverse "saddle" proximal to adhesive plaque but with longitudinal groove over entire length of margin proximal to plaque, obscure shoulder on margin proximal to fixed finger; minor chela about $2\frac{3}{4}$ times as long as wide, dactyl not very slender, nearly equal to palm in length, not "balaeniceps" in either sex, palm granulate and setose on mesial surface; 2nd pereopod with proximal carpal article twice as long as 2nd; 3rd pereopod with dactyl biunguiculate, propodus armed with 14 spines on flexor margin, carpus with sharp distal tooth on flexor margin, merus armed with strong distal tooth on flexor margin, ischium bearing movable spine; maximum carapace length to base of rostrum about 22 mm.

RANGE.—Mascarene Islands, Sulu Archipelago, and Australia; intertidal to 44 meters, in coral. Although Kensley (1972:54, fig. 25p,q) included *A. villosus* in his illustrated key to the shrimps and prawns of southern Africa, it was not incorporated in the checklist published later (Kensley, 1981:17–50), and that author has informed me that he has not seen material of the species from the African continent.

Aretopsis De Man, 1910

Aretopsis De Man, 1910:310 [type species, by monotypy: *Aretopsis amabilis* De Man, 1910:311; gender feminine].

DIAGNOSIS.—Body not unusually compressed; rostrum distinct, blunt apically in lateral aspect; carapace without high carina throughout length of dorsal midline; abdomen with triangular flap articulated at posterolateral angle of 6th somite; telson not terminating posteriorly in triangular tooth; cornea of eye usually largely exposed in dorsal aspect; mandible typically with incisor process but without palp; 3rd maxilliped not unusually broadened to form partial operculum over other mouthparts; 1st pereopods with major chela lacking socket on fixed finger to receive plunger on movable finger; 2nd pereopod with carpus composed of 5 articles; pereopods

typically with strap-like epipods on 2 or 3 anterior pairs.

RANGE.—Red Sea to Okinawa, Philippines, Indonesia, Australia, and Marshall Islands.

REMARKS.—Two nominal species have been assigned to this rather uncommon genus, in addition to the type species, *A. amabilis*: *A. aegyptiaca* Ramadan, 1936, from the Egyptian coast of the northern Red Sea and *A. manazuruensis* Suzuki, 1971, from Sagami Bay, Japan. Ramadan's species was synonymized with *A. amabilis* by D.M. and A.H. Banner (1973:330), and that synonymy was retained by the same authors later (1981:40). The specimen from Sagami Bay described by Suzuki superficially resembles the type species so closely—even to the color pattern and the association with hermit crabs—that its specific identity might be questioned, especially if the symmetrical first chelipeds of the unique holotype could possibly have resulted from regeneration. Examination of the first specimen of *Aretopsis* to be recorded from the Philippines, however, revealed no palp on the mandible, in contrast with the prominent one illustrated by Suzuki. If *A. manazuruensis* does prove to differ in consistently having one, rather than two, pairs of posterolateral telson spines, symmetrical first chelipeds, and a slightly different branchial formula, in addition to the mandibular palp, perhaps a distinct genus should be proposed for it.

77. *Aretopsis amabilis* De Man, 1910

Aretopsis amabilis De Man, 1910:311 [type locality: Pulau Kaniungan-Ketjil, Makassar Strait coast of Borneo; reef]; 1911:171, pl. 4: fig. 14.—D.M. and A.H. Banner, 1973:330, fig. 12; 1981:40; 1985:33.

Aretopsis aegyptiaca Ramadan, 1936:16, pls. 1, 2: figs. 9–17 [type locality: Hurghada, Egypt].

DIAGNOSIS.—Rostrum triangular, slightly overreaching 1st antennular segment; carapace with suborbital tooth subrectangular; cornea more than $\frac{1}{2}$ exposed in dorsal aspect; 2nd antennular segment about as long as wide; basal antennal segment (basicerite) with strong ventral spine not reaching level of tip of stylocerite; antennal scale with lateral margin nearly straight, distolateral spine extending far beyond distal margin of blade; 1st pereopods asymmetrical, merus without distal tooth on inferior flexor margin; major chela with 1 or 2 large, blunt teeth on opposable margin of dactyl, fixed finger with deep basal sinus bounded by large tooth on each side, palm sharply carinate on margin proximal to fixed finger, bluntly carinate on opposite margin; minor chela about $\frac{2}{3}$ times as long as wide, fingers about as long as palm, crossing at tips; 2nd pereopod with 5 carpal articles; 3rd pereopod with dactyl distinctly biunguiculate, propodus with 6–8 spines on flexor margin, carpus with distal spine on flexor margin, merus and ischium unarmed; maximum carapace length about 9 mm.

RANGE.—Red Sea to Okinawa, Philippines, Indonesia, Australia, and Marshall Islands.

REMARKS.—The inclusion of *A. amabilis* in the Philippine

fauna is based on a male specimen with a carapace length of 5.2 mm collected on 12 May by the Smithsonian Philippine Expedition of 1978 at Bonbonon Point, Negros Island (9°03'45"N, 123°07'33"E), and identified in 1983 by A.H. Banner (see generic "Remarks").

**Athanas* Leach, 1814

Athanas Leach, 1814:432 [type species, by monotypy: *Palaemon nitescens* Leach, 1814:401; gender: masculine].

Arete Stimpson, 1860:32 [type species, by monotypy: *Arete dorsalis* Stimpson, 1860:32; gender: feminine].

DIAGNOSIS.—Body not unusually compressed; rostrum distinct, acute in lateral aspect; carapace without high carina throughout length of dorsal midline; abdomen with triangular flap articulated diagonally at posterolateral angle of 6th somite; telson not terminating posteriorly in triangular tooth; cornea of eye largely exposed in dorsal aspect; mandible with palp and molar process; 3rd maxilliped not unusually broadened to form partial operculum over other mouthparts; 1st pereopods with major chela without molar-like tooth on movable finger; 2nd pereopod with carpus composed of 4 or 5 articles; number of pereopodal epipods variable.

RANGE.—*Athanas* is generally believed to live in most tropical and some temperate seas, except off the American continents, but Coutière (1899:544) mentions a specimen of *A. dorsalis* from "la mer des Antilles," and the same author (1903:86–88) records a specimen of *A. dorsalis* var. *pacificus* from "Amerique Centrale (sans indic. de versant)"; no American material of the genus is represented among the identified Smithsonian collections. Most species of *Athanas* occur in shallow water, but a few are found in more than 100 meters, and *A. phyllocheles* A.H. and D.M. Banner, 1983:152, came from 450 meters in the western Indian Ocean off La Réunion.

REMARKS.—Since the Indo-Pacific members of the genus were revised by A.H. and D.M. Banner (1960a), five of the 24 species recognized in that work have fallen into synonymy and six additional ones have been described, bringing the total species count to 29, including the four species currently recognized from the eastern Atlantic. Of the species cited by the Banners, I believe that the spelling of *A. haswelli* should revert to the original orthography, *A. hasswelli*; there seems to be no "clear evidence of an inadvertent error" in the original publication, as required by Article 32(c)(ii) of the third edition of the *International Code of Zoological Nomenclature* (1985), for a justified emendation.

Five species of *Athanas* were recorded from the Philippines by D.M. and A.H. Banner (1979). Three additional species were collected by the Smithsonian Philippine Expedition of 1978 and identified by A.H. Banner, and the specimen in the *Albatross* collections tentatively identified as *A. jedanensis* brings the total Philippine count to nine.