

The larger first leg is as figured by COUTIÈRE, though sometimes the palm is somewhat higher. The distal end of the upper margin of the merus in some specimens ends in a minute spine. This spine sometimes is inconspicuous or absent in other specimens. The smaller leg is of the *laevimanus* type. The fingers are $\frac{2}{3}$ of the length of the palm. The dactylus bears a large tuft of hairs on the dorsal surface. The carpus is short and conical, it is more than half as long as the palm. The carpus of the second leg in one of my specimens consists of 6 instead of 5 joints, this of course is an abnormality, since in the other material the number of carpal joints is 5.

The eggs are fairly numerous in the larger females, few in the smaller. They measure 0.4 to 0.6 mm. in diameter.

Colour. Most of the colour has disappeared in my specimens, but the fingers of the large chela have the margins tinged with pink, while the tips are horny yellow.

Distribution. The species is known only from the coast of West Africa. The specimens from Porto Rico and St. Thomas referred by RATHBUN (1902) to the present species obviously belong to one of the closely related American forms. The records of the present species are: Prampram, Gold Coast (BALSS, 1916), Anno Bom, Gulf of Guinea (COUTIÈRE, 1898b, 1909; BALSS, 1914, 1916). The present material thus considerably extends the known range of distribution of the species.

Synalpheus senegambiensis Coutière 1908.

(Fig. 19).

Synalpheus Paulsoni Senegambiensis Coutière 1908a, p. 202.

Synalpheus paulsoni senegambiensis Coutière 1909, p. 92.

Synalpheus paulsoni senegambiensis Balss 1916, p. 19.

Material examined:

Station 44, off French Guinea, 10°22' N, 16°22' W; Sigsbee trawl, otter trawl, and triangular dredge (45 cm.), 41–55 m. depth, bottom sand and shells; December 17, 1945. — 28 specimens (including 6 ovigerous females, 9–12 mm.) 6–12 mm.

Station 45, off French Guinea, 9°23' N, 15°07' W; Sigsbee trawl and otter trawl, 30–34 m. depth, bottom sand; December 18, 1945, 15h–18h. — 2 ovigerous females 14 and 18 mm.

Station 141, off Freetown, Sierra Leone; Commercial otter trawl, 15 m. depth, bottom sand; April 9, 1946, 11h–16h. — 18 specimens (including 1 ovigerous female, 19 mm.) 5–19 mm.

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, 32 m. depth, bottom shells and Foraminifera; April 13, 1946,

7h⁴⁵—10h¹⁰. — 26 specimens (including 3 ovigerous females, 14—17 mm.) 5—17 mm.

Station 146, off French Guinea, 9°27' N, 14°48' W; Sigsbee trawl and otter trawl, 50 m. depth, bottom shells and Foraminifera; April 13, 1946, 14h²⁰.

— 8 specimens (including 3 ovigerous females, 12—22 mm.) 10—22 mm.

Station 147, off French Guinea, 9°28' N, 14°58' W; Sigsbee trawl, 45 m.

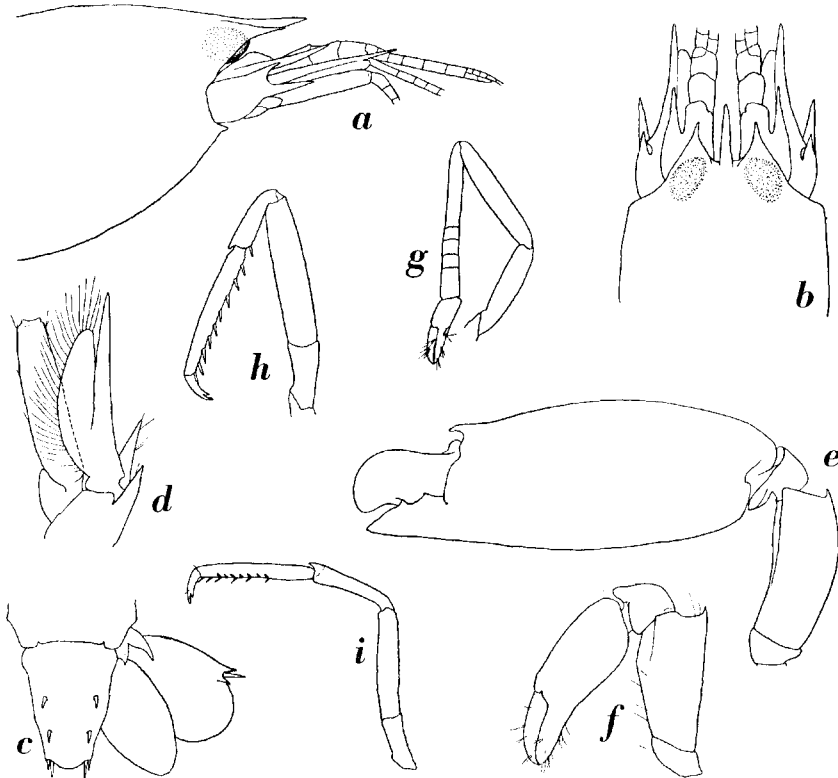


Fig. 19. *Synalpheus senegambiensis* Cout. a, anterior part of body in lateral view; b, anterior part of body in dorsal view; c, telson and right uropod in dorsal view; d, scaphocerite; e, larger first pereiopod; f, smaller first pereiopod; g, second pereiopod; h, third pereiopod; i, fifth pereiopod. a—c, e, i, $\times 10$; d, $\times 15$.

depth, bottom shells and Foraminifera; April 14, 1946, 8h⁵⁵–9h³⁵. — 4 specimens (including 2 ovigerous females, 9 and 17 mm.) 6–17 mm.

Station 151, off French Guinea, 10°40' N, 16°44' W; Sigsbee trawl, 65 m. depth, bottom coarse sand; April 16, 1946, 8h⁵⁵. — 1 specimen 10 mm.

Station 153, off French Guinea, 10°49' N, 16°39' W; Sigsbee trawl, 42 m. depth, bottom coarse sand; April 16, 1946, 13h²⁰–13h⁵⁰. — 25 specimens (including 7 ovigerous females, 11–14 mm.) 8–14 mm.

The present species was described for the first time as a variety of the Indo-westpacific *Synalpheus paulsoni* Nobili, but in my opinion it de-

serves full specific rank. COUTIÈRE's description is extremely short, giving only very few details; furthermore COUTIÈRE's type and only specimen was damaged. A new description, based on the extensive material of this species of the Atlantide Expedition, is given here.

The rostrum is narrow and slender. It reaches to or slightly beyond the end of the basal segment of the antennular peduncle and slightly surpasses the corneal teeth. The base of the rostrum bears at its ventral side a process, which is directed vertically downwards. This process is triangular with an emarginate tip, when seen from the front; it is very narrow when looked at from the side. The corneal teeth are somewhat broader than the rostrum and end in a narrow sharp point. Between the corneal hoods and the rostrum the carapace is deeply hollowed. The pterygostomial angle of the carapace ends in a rather sharp tooth.

The abdomen has the pleurae of the first two segments broadly rounded. In the males the first, third and fourth segments show no hook-shaped angles as in *S. parfaiti*. The pleurae of the third segment of the males have the tip about rectangular, those of the fourth and fifth segments end in posteriorly directed, rather sharp, points. In the female the pleurae of the third and fourth segments are rounded, that of the fifth segment is pointed. The telson is broadly triangular, with curved lateral margins and a broad convex posterior margin. The posterolateral angles are somewhat produced and blunt. The upper surface of the telson bears two pairs of well developed but not very strong spines. The first of these two pairs of spines stands slightly before, the second slightly behind the middle of the telson. There are two pairs of posterior spines.

The antennulae have the stylocerite slender and regularly tapering towards the sharp apex, which reaches to or slightly beyond the middle of the second segment of the peduncle. The second segment of this antennular peduncle is slightly longer than the third. The flagella are normal.

The scaphocerite has the final tooth strong and reaching beyond the antennular peduncle. The lamella is well developed. It is slender and just attains the end of the antennular peduncle, it reaches as far forwards as the carapocerite (= last joint of the antennal peduncle). The two spines of the basicerite are distinct, the upper is the smaller of the two. The outer reaches about to the end of the basal segment of the antennular peduncle. The carapocerite is almost four times as long as broad.

The oral parts are normal. The palp of the first maxilliped consists of two joints.

The larger first pereopod has the chela almost three times as long as high. The fingers are distinctly less than half as long as the palm. The dorsal margin of the palm ends in a distinct anteriorly directed spine. In some specimens, and especially in the larger ones, this spine is reduced to a rounded tubercle. The carpus is very small and narrow. The merus

is half as long as the palm and has its upper margin ending in a small but distinct anterior spine. The smaller first leg has the chela slightly less than three times as long as high. The fingers are $\frac{2}{3}$ of the length of the palm, the latter bears no spine. There is no conspicuous tuft of hairs on the upper margin of the dactylus. The carpus is short and cup-shaped, it is half as long as the palm. The merus is distinctly longer than the palm and has the upper margin ending in an anteriorly directed spine. The second legs are equal. The chela has the fingers about as long as the palm. The carpus is $\frac{7}{3}$ of the length of the chela, it consists of 5 joints. The proximal of these is about as long as the others together. The 3 intermediate joints are of equal length, the distal joint is twice as long as each of the intermediates. The merus is $\frac{5}{6}$ of the length of the carpus and 1.4 times as long as the ischium. The last three legs have the dactylus biunguiculate. The two claws of the dactylus are about equal, slender and placed so that their general direction follows the curve of the dactylus. The propodus of the third leg is 3.5 times as long as the dactylus and is provided on its lower margin with a row of spinules. The carpus is about half as long as the propodus. The merus is longer than the propodus. The fifth leg differs from the third by having transverse rows of hairs or minute spinules placed in the ultimate part of the posterior margin of the propodus, by having the carpus $\frac{2}{3}$ of the length of the propodus, and by having the merus shorter than the latter joint. None of the last three legs has the merus provided with spinules.

The pleopods of the male have neither an appendix masculina nor an appendix interna. In the females there is an appendix interna on the second to fifth pleopods. The uropods are broadly ovate. The outer margin of the exopod is convex and ends in two sharp teeth, between which a movable spine is present.

The eggs are rather numerous and are 0.5 to 0.7 mm. in diameter.

In his very short description of the present form COUTIÈRE states the merus of the smaller first leg to be unarmed, while it actually has the upper margin ending in a spine in all my specimens. COUTIÈRE's remark therefore is probably due to a mistake.

Distribution. The species is a littoral form, the present material is found at depths ranging between 15 and 65 m. The only record in literature is that of COUTIÈRE (1908a, 1909), who reports one specimen from Cape Verde, Senegal (not the Cape Verde Islands as stated by BALSS, 1916). The Atlantide collection shows that the species is far from rare and that it occurs from French Guinea to Sierra Leone.

Synalpheus neptunus (Dana) 1852.

Restricted synonymy:

Alpheus neptunus Dana 1852, p. 22.

Alpheus neptunus Doflein 1900, p. 127.

Distribution. This species is widely distributed throughout the Indo-westpacific region. DOFLEIN's (1900) record of it from the West African coast is very doubtful, the more so as his material was obtained through a dealer and does not bear an accurate locality label. DOFLEIN does not give any details of his material.

Coutière (1899, p. 453) mentions specimens from Cape Lopez, Gabon, which he thinks to be closely related to, if not identical with, *Synalpheus neptunus*; on p. 25 of his 1909 paper Coutière mentions these specimens again and states that they are "with difficulty separable" from *Synalpheus latastei tenuispina* Cout., a Brazilian form. The identity of Coutière's specimens is not certain, since he gives no other data concerning this material.

Alpheopsis haugi Coutière 1906.

Alpheopsis Haugi Coutière 1906, p. 376, figs. 1, 2.

Distribution. This is a fresh water species, which has been found in a lake 200 km. from the sea shore. Up till now the only record of this species is that of COUTIÈRE (1906) from Ngômô near the Ogowé River, Gabon.

Alpheopsis monodi Sollaud 1932.

Alpheopsis Monodi Sollaud 1932, p. 375, figs. 1, 2.

Distribution. Like the previous species, this also is a fresh water form. It has been reported by SOLLAUD (1932) from near the coast of the Manoka Bay, Cameroons. It was collected together with *Macrobrachium macrobrachion* (Herklots), which might indicate that the water was slightly brackish.

Alpheopsis trispinosus (Stimpson) 1860.

Betaeus trispinosus Stimpson 1860, p. 32.

Betaeus trispinosus Haswell 1882, p. 192.

Alpheopsis trispinosus Coutière 1896, p. 382.

Alpheopsis trispinosus Coutière 1899, pp. 73, 190, 259, 315, figs. 26, 96, 120, 168, 228—231, 315, 396.

Alpheopsis trispinosus Coutière 1906, p. 377.

Alpheopsis sp. De Man 1922, p. 24, pl. 3 fig. 12.

Alpheopsis trispinosus Sollaud 1932, p. 376.

Alpheopsis trispinosus Coutière 1938 b, p. 187.

Alpheopsis trispinosus Hale 1941, p. 266, fig. 4.

Distribution. The species is known from the Malay Archipelago and E. Australia. COUTIÈRE (1896, 1938) records it from the Azores, while the same author (COUTIÈRE, 1906) states it to occur at the West African coast, without, however, giving any exact locality. Finally, SOLLAUD (1932) in a footnote says that the species has been dredged near the Azores and in the Cape Verde region. Since probably neither COUTIÈRE nor Sollaud had Indo-westpacific material of *Alpheopsis trispinosus* at their disposal for comparison with their Atlantic specimens, their identifications should be taken with some reserve.

Jousseamea jarli n. sp.

(Fig. 20).

Material examined:

Station 112, off Nigeria, 4°12' N, 7°05' E ; bottom sample HIR; Petersen

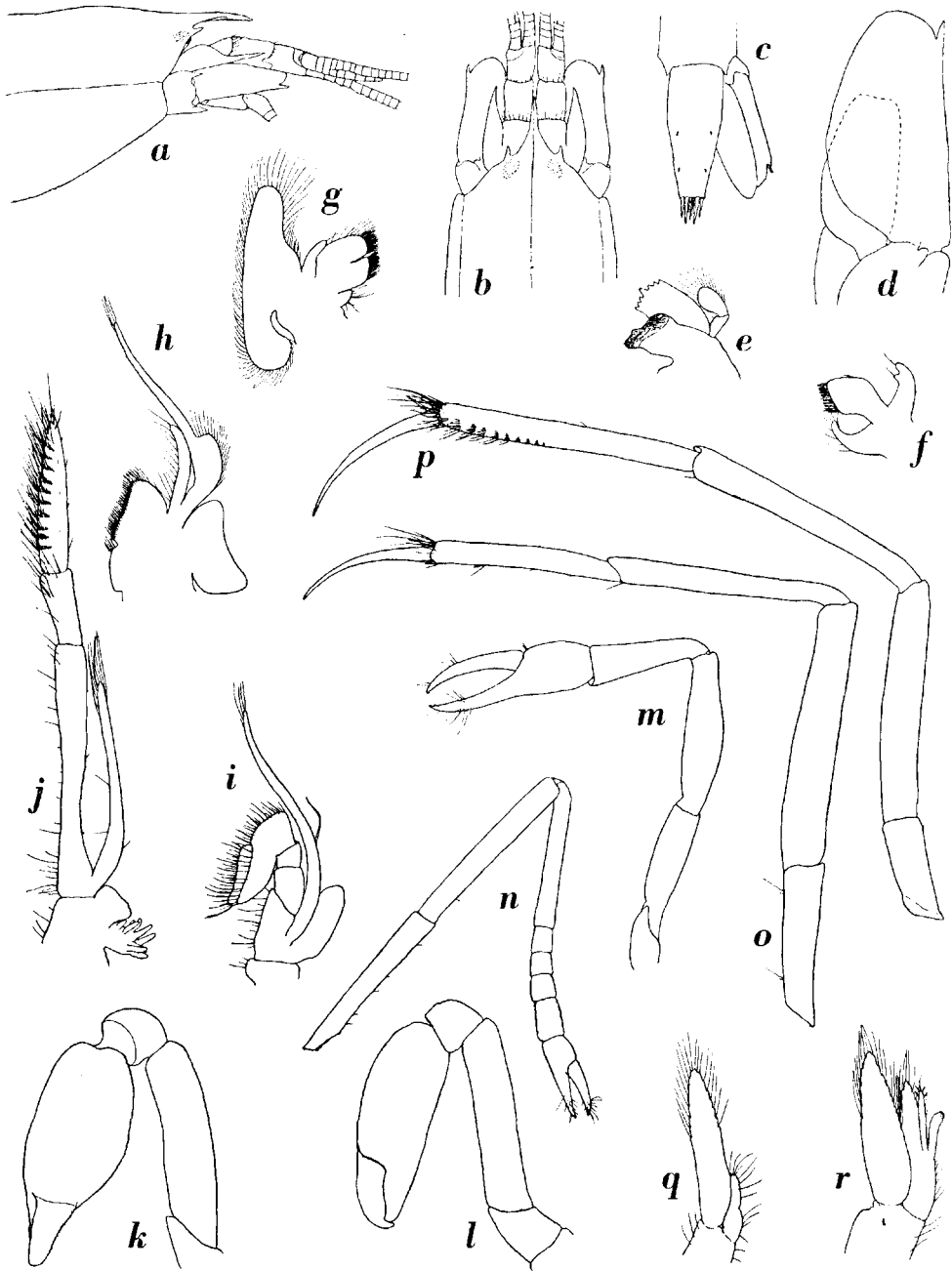


Fig. 20. *Jousseaumea jarli* n. sp. a, anterior part of body in lateral view; b, anterior part of body in dorsal view; c, telson and right uropod in dorsal view; d, scaphocerite; e, mandible; f, maxillula; g, maxilla; h, first maxilliped; i, second maxilliped; j, third maxilliped; k, larger first pereopod in dorsal view; l, larger first pereopod in lateral view; m, smaller first pereopod; n, second pereopod; o, third pereopod; p, fifth pereopod; q, first pleopod of male; r, second pleopod of male. a—c, $\times 12$; d—r, $\times 25$.

grab, 19 m. depth, bottom clayish mud; February 22, 1946, 13h⁰⁰. — 1 specimen 11 mm.

Description. The rostrum is depressed and slightly curved downwards, it reaches about to the middle of the second joint of the antennular peduncle. The lower surface shows a longitudinal median carina, which obliterates posteriorly. When seen in dorsal view the rostrum is rather narrow and slender in the anterior part, rapidly broadening in the basal part, its lateral margin becoming confluent with the anterior margin of the carapace. The rostrum dorsally is also provided with a sharp median carina, which continues posteriorly as a distinct carina over the anterior third of the carapace. In the posterior two thirds of the carapace this carina is very obscure and finally disappears completely. The anterior margin of the carapace bears a well developed spine just in front of the eyes. The anterior part of the carapace forms a pointed hood over the eyes (the point of this hood being the rostrum). A narrow groove, which is visible as a sharp line extends from the anterior margin of the carapace at the level of the base of the antenna, backwards over $\frac{2}{3}$ of the length of the carapace. This groove is seen best when the surface of the carapace is dried. The posterior margin of the carapace is deeply incised at the level of the base of the abdominal pleurae.

The pleurae of the first three abdominal segments are broadly rounded, those of the fourth and fifth segments are pointed. The fifth being more sharply pointed than the fourth. The sixth segment has both the pleurae and the posterolateral angles ending in a sharp point. This segment is somewhat longer than the fifth. The telson is about 1.5 times as long as the sixth abdominal segment. It bears two pairs of dorsal and two pairs of posterior spines. The anterior of the dorsal pairs is placed in about the middle of the telson, the posterior pair lies somewhat closer to the posterior margin of the telson than to the anterior pair of spines. The posterior margin of the telson is straight and does not show a median emargination as the Indo-westpacific species of the genus. There are four posterior spines, two on each half; these spines are well developed and slender, the inner being somewhat longer than the outer. Five hairs are placed between the inner spines.

The eyes dorsally are wholly covered by the carapace, only anteriorly are they exposed. The cornea is rounded and well pigmented. The stalk bears a tubercle at the inner side near the base of the cornea.

The basal segment of the antennular peduncle has the stylocerite broad and pointed, it reaches almost to the end of the second segment of the antennular peduncle. The second segment is somewhat shorter than the first and longer than the third. Some stiff hairs are present on the anterior margin of the segments. The outer flagellum consists of two rami, the first three joints of which are fused. The free part of the shorter ramus consists of about six joints.

The scaphocerite is 2.5 times as long as broad, it fails to reach the end of the antennular peduncle. The outer margin is slightly sinuous, being almost straight. The final tooth is small and reaches about as far forwards as the lamella. The antennal peduncle reaches slightly beyond the middle of the scaphocerite. It bears two spines near the base of the scaphocerite: a large ventral and a smaller inner one.

The oral parts of the species are figured here. The mandible has the palp distinctly two-jointed, the incisor process ends in 7 teeth, the middle one being the largest. The molar process bears numerous spinules. The maxillula is of the normal type with the lower endite slender, the upper endite is truncated and provided with many spinules, the palp is bilobed. The maxilla has the upper endite bifid, the lower is very small, the palp and the scaphognathite are well developed. All maxillipeds bear exopods. The first maxilliped has the endites of the basis and coxa separated by a deep notch, the palp is very long and undivided, the caridean lobe of the exopod is rather small, the outer margin of the epipod is emarginate. The second maxilliped resembles that of *Athanas* in all essential points. The third maxilliped reaches to the end of the scaphocerite. The last joint is twice as long as the penultimate and $\frac{3}{5}$ of the length of the antepenultimate. An epipod and an arthrobranch are present. The exopod fails to reach the end of the antepenultimate segment.

The branchial formula runs as follows:

	maxillipeds			pereiopods				
	I	II	III	I	II	III	IV	V
pleurobranchs	—	—	—	1	1	1	1	1
arthrobranchs	—	—	1	—	—	—	—	—
podobranchs	—	—	—	—	—	—	—	—
setobranchs	—	—	—	1	1	1	1	1
epipods	1	1	1	1	1	1	1	—
exopods	1	1	1	—	—	—	—	—

The first legs are distinctly unequal. The left is short and robust, the right longer and more slender. The left reaches slightly beyond the end of the antennal peduncle. The fingers are about half as long as the palm, they are unarmed, rather short and high, but laterally compressed. The palm is strongly depressed, being much broader than high. The carpus is very short and broad, it is less than half as long as the palm. The merus is distinctly longer than the palm, it is rather narrow. The ischium is short. The right leg reaches with part of the palm beyond the antennal peduncle. The fingers are 1.5 times as long as the palm, they are curved and unarmed. The carpus is slender, being slightly longer than the fingers, it widens distally. The merus, which measures $\frac{3}{4}$ of the length of the carpus, is

elongate, being widest in the middle. The ischium is about as long as the carpus. The second legs are equal, they reach with the chela beyond the scaphocerite. The fingers are about twice as long as the palm. The carpus is three times as long as the chela and is divided in 5 joints. The proximal of these joints is about $\frac{4}{3}$ as long as the other joints together. The following three joints are of equal size, while the fifth is about 1.5 times as long as each of the three shortest joints. The merus is about $\frac{5}{7}$ of the length of the carpus and slightly longer than the ischium. The last three legs are slender and have the dactylus simple. The third reaches with the larger part of the propodus beyond the scaphocerite. The dactylus is very long and slender, it is about $\frac{4}{5}$ of the length of the propodus. The latter bears two spines on its posterior margin, one of which is placed near the base of the dactylus. The carpus is 1.2 times as long as the propodus and slightly shorter than the merus. The ischium is somewhat more than half as long as the merus. The fifth leg reaches with a small part of the propodus beyond the scaphocerite. The dactylus is slender and measures $\frac{3}{5}$ of the length of the propodus. The latter has the posterior margin provided with transverse rows of hairs in the distal part. The carpus is slightly shorter than the propodus and about as long as the merus. The ischium is short.

My only specimen, a male, has the endopod of the first pleopod small, elongate, and somewhat constricted before the middle. The endopod of the second pleopod has the appendix masculina longer than the appendix interna, it almost reaches the tip of the endopod. Appendices internae are present on the second to fifth pleopods. The uropods are ovate. The outer margin of the exopod ends in a tooth, which at its inner side bears a movable spine.

Of the genus *Jousseaumea* 10 species are known at present, 7 of these inhabit the Indo-westpacific area, three are known from the Atlantic coast of America. Up till now the genus has not been recorded from the West African coast. *Jousseaumea jarli* differs from all Indo-westpacific species by having the posterior margin of the telson straight and not emarginate in the middle. In the shape of the telson the present new species shows most resemblance to *J. arubae* Schmitt from Aruba (Netherlands West Indies). Unfortunately, the shape of the telson in the two other known Atlantic species, *J. ortmanni* (Rankin) and *J. trigona* Rathbun, is not known. From all three Atlantic species the present form differs by having the dactyli of the last three pereopods very long and slender. Like *J. ortmanni* and *J. arubae*, it differs from *J. trigona* in not having the carapace provided with 9 sharp longitudinal carinae. In the shape of the supracorneal spines it resembles most *J. ortmanni*, these spines are much less distinct in *J. arubae* and completely absent in *J. trigona*. From the available data it seems most probable that *Jousseaumea jarli* n. sp. is most closely related to *J. ortmanni* (Rankin).

Athanas nitescens (Leach) 1814.

(Fig. 21).

Restricted synonymy:

- Palaemon nitescens* Leach 1814, p. 401.
Athanas veloculus Bate 1888, p. 529, pl. 96 fig. 1.
Athanas nitescens Ortmann 1893, p. 44.
Athanas nitescens Coutière 1896, p. 380.
Athanas nitescens veloculus Coutière 1896, p. 380.
Athanas nitescens Coutière 1911, p. 1.
Athanas nitescens Balss 1916, p. 18.
Athanas nitescens Monod 1933, p. 462.
Athanas nitescens Coutière 1938, p. 267.

Material examined:

Station 141, off Freetown, Sierra Leone; Commercial otter trawl, 15 m. depth, bottom sand; April 9, 1946, 11h—16h. — 4 specimens (including 2 ovigerous females, 8 and 9 mm.) 7—9 mm.

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, 32 m. depth, bottom shells and Foraminifera; April 13, 1946, 7h⁴⁵—10h¹⁰. — 8 specimens (including 1 ovigerous female, 7 mm.) 4—8 mm.

Station 146, off French Guinea, 9°27' N, 14°48' W; Sigsbee trawl and otter trawl, 50 m. depth, bottom shells and Foraminifera; April 13, 1946, 14h²⁰. — 1 ovigerous female 9 mm.

Station 148, off French Guinea, 9°57' N, 15°22' W; Sigsbee trawl, 25 m. depth, bottom shells and hydroids; April 14, 1946, 16h²⁵—16h⁵⁵. — 5 specimens (including 3 ovigerous females, 8—11 mm.) 7—11 mm.

The rostrum is straight. The lower margin is slightly convex, the upper margin is straight or somewhat convex too. It reaches to or slightly beyond the second segment of the antennular peduncle and fails to reach as far as the stylocerite. The rostrum is somewhat winged laterally, so that it is more or less \perp -shaped in transverse section. The orbit is provided with three teeth. The upper (= supra-corneal tooth) is situated close to the lateral margin of the rostrum and is separated from it by a rather broad but pointed incision. The apex of this supra-corneal tooth is rounded. The extra-corneal tooth is longest and rather sharp and slender. The infra-corneal tooth is shorter than the extra-corneal, it is broader and less sharply pointed. Between the teeth the margin of the orbit is concave: between the supra- and extra-corneal teeth the distance is much larger than between the extra- and infra-corneal teeth. The size and situation of the teeth, however, is rather variable. No other teeth or spines are present on the carapace. The antero-lateral angles are rounded.

The abdomen is smooth. The pleurae of the first three segments are broadly rounded, that of the fourth ends in a rectangular posterior angle,

while the posterior angle of the pleura of the fifth segment is sharply pointed. The sixth abdominal segment is about as long as the fifth. The postero-lateral angles of the sixth segment end in a small spine. A small but rather broad plate is present near the base of the uropods. This plate articulates

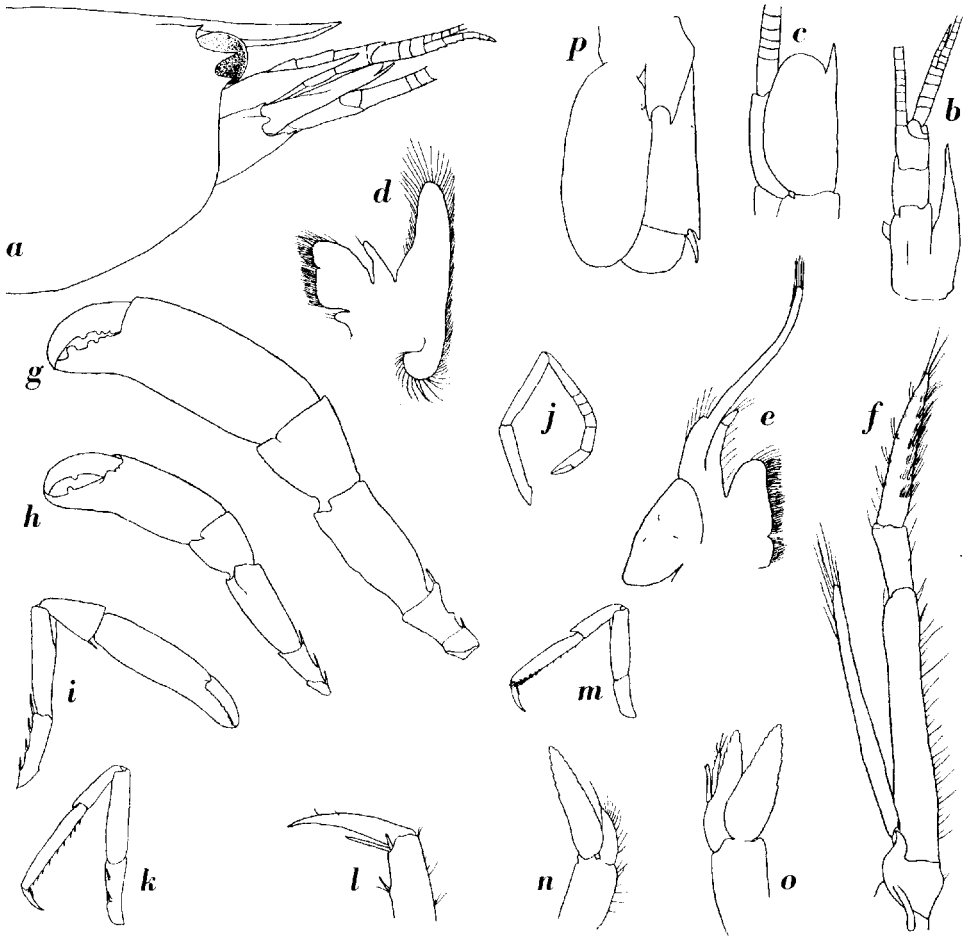


Fig. 21. *Athanas nitescens* (Leach). a, anterior part of body in lateral view; b, antennula; c, antenna; d, maxilla; e, first maxilliped; f, third maxilliped; g, larger first pereiopod of male; h, smaller first pereiopod of male; i, first pereiopod of female; j, second pereiopod; k, third pereiopod; l, dactylus of third pereiopod; m, fifth pereiopod; n, first pleopod of male; o, second pleopod of male; p, uropod. a- c, $\times 17$; d- f, n-p, $\times 20$; g- k, m, $\times 9$; l, $\times 40$.

with the sixth abdominal segment; it tapers posteriorly and ends there in a sharp point. The telson is slightly longer than the sixth abdominal segment, it is rather broad and tapers only slightly posteriorly, ending in a broad posterior margin. The dorsal surface of the telson bears two pairs of spines. These spines divide the telson into three transverse sections, the middle of which is the shortest. The posterior margin is broadly convex

and bears numerous hairs. At either lateral end the posterior margin bears two spines. The outer of these spines is shortest and about half as long as the inner, which is slender and overreaches the top of the telson.

The eyes have the cornea rounded and partly concealed by the corneal teeth. The eye is rather easily retractable, this is the reason why in some specimens it projects farther out of the orbit than in others.

The antennular peduncle has the stylocerite long, reaching about to the middle of the third segment of the peduncle. This stylocerite is fairly broad at the base but becomes slender distally, it is curved slightly inwards. The second segment of the peduncle is the shortest of the three, or is as long as the third. The upper flagellum consists of two rami, which are fused for 3 to 5 joints, the free part of the shorter ramus consists of 3 to 5 joints.

The scaphocerite reaches to or somewhat beyond the antennular peduncle. The outer margin is straight or slightly convex and ends in a terminal tooth, which overreaches the lamella. The lamella is broadest near the base and narrows slightly towards the apex, which is broadly rounded. The antennal peduncle bears two spines near the base of the scaphocerite, one is placed on the dorsal side the other on the ventral.

The mandible and maxillula are like those figured by COUTIÈRE (1899, figs. 147, 158). The maxilla is of the usual type, resembling COUTIÈRE'S (1899) figure 165 of that organ of *Synalpheus minor*; the lower endite is rather broad and bears two setae at the top. The first maxilliped has the endites of the basis and coxa separated by a small notch; the palp consists of two joints; the exopod is long and has the caridean lobe extremely narrow; the epipod is not bilobed, but oval in shape. The third maxilliped reaches to the end of the antennular peduncle. The last joint is 2.5 times as long as the penultimate and somewhat more than half as long as the antepenultimate joint. The exopod is strong and slightly overreaches the antepenultimate joint. A slender epipod is present, but there is no arthrobranch. The branchial formula runs as follows:

	maxillipeds			pereiopods				
	I	II	III	I	II	III	IV	V
pleurobranchs	—	—	—	1	1	1	1	1
arthrobranchs	—	—	—	—	—	—	—	—
podobranchs	—	—	—	—	—	—	—	—
setobranchs	—	—	—	1	1	1	1	—
epipods	1	1	1	1	1	1	—	—
exopods	1	1	1	1	—	—	—	—

In adult males the first pereiopod reaches with the entire carpus beyond the scaphocerite. A reduced exopod is present at the base of this pereiopod. The first legs are unequal in size. The larger leg has the fingers less than

half as long as the palm. The fixed finger is almost straight, the dactylus is strongly curved. Both fingers bear 4 distinct blunt teeth on the cutting edge, the anterior of these teeth is largest. The anterior tooth of the dactylus lies about in the middle of the cutting edge, that of the fixed finger is placed much closer to the tip of the finger. The palm is slightly compressed and smooth. It is slightly more than twice as long as high. The carpus is short, it is less than half as long as the palm, and about as long as broad. The anterior margin possesses a narrow incision on the outer side and a broad incision on the inner side. The merus measures $\frac{2}{3}$ of the length of the palm, it is about twice as long as broad. The ischium is about half as long as the merus and bears three spines on the upper margin: two in the middle and one at the antero-dorsal point. The basis possesses an antero-dorsal spine too. The smaller leg resembles the larger strongly, except for its size. The fingers each bear one tooth on the cutting edge, the dactylus has this tooth almost in the middle of the edge, in the fixed finger it is placed closer to the tip of the finger. The hairs of the fingers here are more numerous than in the large leg. The fingers measure $\frac{2}{3}$ of the length of the palm. The carpus is about half as long as the palm. The merus is 1.5 times as long as the carpus and 2.5 times as long as the ischium. In the female the second legs are equal in shape and size. They reach with the chela and a small part of the carpus beyond the scaphocerite. The fingers are somewhat less than half as long as the palm. Both fingers are straight and close over their entire length. The cutting edges bear several (5 or 6) small sharp irregularly placed teeth in the proximal $\frac{2}{3}$ of their length. The teeth of the fixed finger are placed somewhat in front of those of the dactylus. The palm is elongate, being almost three times as long as high. The carpus is more slender than in the males, it is half as long as the palm and about 1.5 times as long as high. The merus is about $\frac{6}{7}$ of the length of the palm. The ischium is half as long as the palm. Its upper margin bears 4 spines. The second legs are equal in shape and size. They are slender and reach with the chela or part of it beyond the scaphocerite. The chela has the fingers longer than the palm. The carpus is about 2.5 times as long as the chela. It consists of 5 joints, the proximal of which is longest, being somewhat shorter than the other joints together. The next 3 joints are of equal length, together they measure about $\frac{2}{3}$ of the length of the first joint. The distal joint is about twice as long as each of the three short joints. The merus is about $\frac{5}{7}$ of the length of the carpus, and is slightly longer than the ischium. The third leg reaches with the dactylus beyond the scaphocerite. The dactylus is slender and simple. The propodus is almost three times as long as the dactylus. Its posterior margin bears several (about 10) small spinules, distributed over its whole length. A longer spine is furthermore present on this margin close to the base of the dactylus. The carpus is half as long as the propodus. The merus is somewhat shorter than the propodus and about

1.5 times as long as the ischium. The fourth leg strongly resembles the third, only it is less slender. The fifth leg reaches slightly beyond the base of the scaphocerite. The dactylus is like that in the third leg, the propodus is somewhat more than twice as long as the dactylus. Its posterior margin bears several small spinules, and in the distal half it is provided with several transverse rows of hairs. As in the third leg a longer spine is present on the posterior margin of the propodus near the base of the dactylus. The carpus is 0.6 times as long as the propodus and $\frac{3}{4}$ of the length of the merus. The ischium is $\frac{3}{5}$ of the length of the merus.

The endopod of the first pleopod of the male is small and pointed, the outer margin is more convex than the inner. The second pleopod of the male has the appendix masculina well developed, being longer than the appendix interna, but it fails to reach the top of the endopod. Appendices internae are present on the endopod of the first to fifth pleopods in both sexes. The uropods reach beyond the end of the telson. The protopod bears an elongate posteriorly directed process, which ends in two teeth, the margin between which is deeply concave. This process reaches over the base of the exopod. The endopod is ovate. The exopod has the outer margin straight and ending in a tooth, which at its inner side is provided with a long and strong movable spine. A straight diaeresis is present.

The eggs are numerous and small, they measure 0.3 to 0.5 mm. in diameter.

The above description is based on the specimens from Station 148, which show the closest resemblance to the records in the literature of the typical *Athanas nitescens* (Leach). One of the ovigerous females agrees in every respect with KEMP'S (1910) figure of the species.

The specimens from Stations 141, 145, and 146 differ from the above description in the following points:

1. They are smaller.
2. The rostrum overreaches the stylocerite and surpasses the base or even the middle of the third segment of the antennular peduncle.
3. The infra-corneal tooth is very little pronounced.

The present material is too small to decide whether these differences indicate separate forms or whether they are merely due to differences in habitat or to individual variation. If, however, this second form proves to be a distinct species or subspecies, the specific or subspecific name *veloculus* Bate should be used for it, since BATE'S description of his species agrees best with the present material from Stations 141, 145, and 146.

Distribution. *Athanas nitescens* is a littoral species. It has been recorded in the literature from S. Norway southwards to the Cape Verde Islands, from the Mediterranean and the Black Sea. As will be pointed out (p. 107)

at least part of the specimens recorded from the Mediterranean as *Athanas nitescens* belong to the species *Athanas laevirhincus* (Risso). As the two species up till now have not been distinguished by most authors, we do not know their exact range of distribution. The West African records are very few. BATE is the first to record the species from the Cape Verde Islands. He thought his specimens to belong to a new species which he named *Athanas veloculus*. As later authors pointed out this species is identical with *A. nitescens*, accepting thereby some errors in BATE's figures. As far as I can see from BATE's description and figures (the latter indeed containing a large number of inaccuracies) his specimens mostly resemble my *Athanas* specimens from Stations 141, 145 and 146. Also COUTIÈRE (1896, 1911, 1938) gives the Cape Verde Islands, without a more precise indication, as a locality whence *Athanas nitescens* has been obtained. ORTMANN (1893) records the species from Boavista and from Baixo de João Leitão, S. of Boavista, both localities in the Cape Verde Islands. Finally, COUTIÈRE (1911, p. 2) states to have examined material of this species from Cape Verde, Senegal; this is the only record of the species from the West African main land. It is not certain whether ORTMANN's and COUTIÈRE's specimens belong to the present or to the next species, as these were not distinguished at that time. The records by BALSS (1916) and MONOD (1933) of the present species from the Cape Verde Islands are based on those by BATE, ORTMANN and COUTIÈRE.

Athanas nouvelae n. sp.

(Fig. 22).

Material examined:

Station 39, São Pedro Bay, São Vicente, Cape Verde Islands, 16°50' N, 25°04' W; bottom sample An 40; Van Veen grab, 22 m. depth, bottom sand and corals; December 10, 1945, 13h⁵⁵. — 2 specimens 6 and 7 mm.

Station 40, off São Pedro Bay, São Vicente, Cape Verde Islands; triangular dredge (45 cm.), 40 m. depth, bottom Foraminifera; December 11, 1945, 14h¹⁰. — 27 specimens (including 4 ovigerous females, 7–9 mm.) 5–10 mm.

Station 40, anchorage of São Pedro Bay, São Vicente, Cape Verde Islands; bottom sample Arv 48; Van Veen grab, 32 m. depth, bottom sand, corals and Foraminifera; December 11, 1945, 7h⁰⁰. — 3 specimens 7–8 mm.

Description. The rostrum is slender and distinctly curved upwards, the upper margin generally being distinctly concave. The lower margin is convex. The apex is pointed and reaches slightly to distinctly beyond the base of the third segment of the antennular peduncle, at the same time overreaching the stylocerite. It is more slender than that of *Athanas nitescens*, and the lateral wings are narrower. The corneal teeth are almost as in *A. nitescens*, their arrangement is rather variable, but here generally the

extra-corneal tooth is less slender than in *A. nitescens*, and it is only slightly longer than the infra-corneal tooth.

The abdomen and the telson are as in *A. nitescens*, only the pleurae of the fifth segment are generally more pointed.

The eyes are as in the previous species.

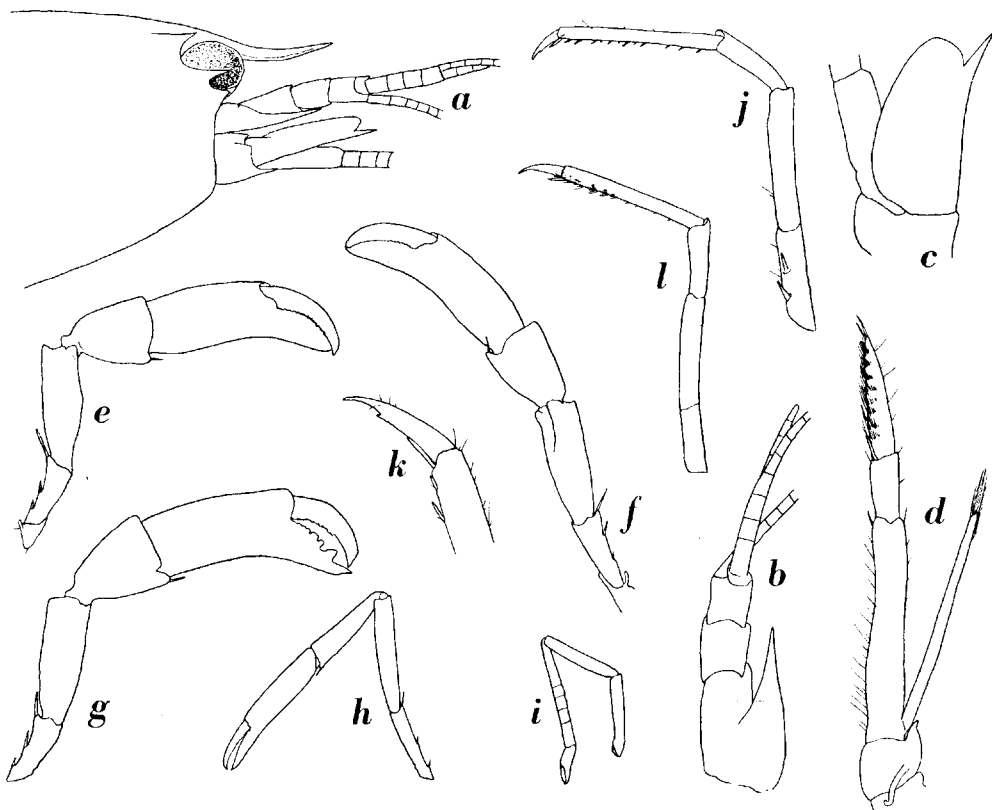


Fig. 22. *Athanas nouvelae* n. sp. a, anterior part of body in lateral view; b, antennula; c, scaphocerite; d, third maxilliped; e, f, left and right first pereopods of intact male; g, loose large first pereopod of male; h, first pereopod of female; i, second leg; j, third leg; k, dactylus of third leg; l, fifth leg. a, $\times 25$; c, d, $\times 36$; e—j, l, $\times 10$; k, $\times 50$.

The stylocerite is slender, but fails to reach the end of the second segment of the antennular peduncle, or just attains the articulation between the second and third segments. The upper antennular flagellum has the two rami fused for 3 or 4 joints.

The scaphocerite reaches the end of the antennular peduncle. The outer margin is concave. The final tooth is directed outwards, and slightly over-reaches the lamella.

The mouthparts are similar to those of *A. nitescens*. The penultimate joint of the third maxilliped is somewhat more slender, however. The

ultimate joint being twice as long as the penultimate and about half as long as the antepenultimate. The branchial formula is the same as in the previous species. Here too a reduced exopod is present at the base of the first pereiopods.

The first pereiopods of the male reach with the chela beyond the scaphocerite. They probably are unequal. My material contains a large cheliped similar to that of the males of *Athanas nitescens*, this cheliped is detached and it cannot be said with certainty to which male it belongs. The only larger male in my material with both second legs attached, has them equal and much more like the chela of the female of *A. nitescens*. Figures are given here of the loose large chela and the two chelae of the above mentioned male specimen. In the detached cheliped the fingers are slightly more than half as long as the palm. The dactylus is distinctly curved, the fixed finger is almost straight. The cutting edge of the fixed finger bears about 7 broad and blunt teeth, the distals of which are largest. A short distance before the tip the cutting edge is unarmed. The dactylus bears one broad tooth somewhat before the middle of the cutting edge, while some four small teeth are placed behind it. The palm is twice as long as high. The carpus measures $\frac{3}{5}$ of the length of the palm and $\frac{3}{4}$ of that of the merus, it is somewhat longer than broad. The merus is 2.6 times as long as high, and is 1.6 times as long as the ischium. The ischium bears three dorsal spines. The largest male in which both the left and the right first pereiopod are still attached is 10 mm. long. The legs are equal in shape and practically equal in size. The fingers are $\frac{3}{4}$ of the length of the palm, they close perfectly and the dactylus is only slightly curved. There are numerous irregular small teeth on the cutting edge, as in the female of *A. nitescens*. The palm is smooth, somewhat compressed and about twice as long as broad. The carpus is $\frac{2}{3}$ of the length of the palm, it is about 1.2 times as long as broad. The merus is 1.5 times as long as the carpus and about three times as long as broad. The ischium is somewhat longer than half the merus and bears three spines on the dorsal margin. In the females the first legs are equal, they reach with part of the carpus beyond the scaphocerite. The fingers are slender and close over their whole length, the dactylus is not strongly curved. The dentition is as in the female of *A. nitescens*. The palm is about twice as long as the fingers and about four times as long as high. The carpus is about four times as long as high too and it is only slightly shorter than the palm. The merus is 1.2 times as long as the palm and 1.6 times as long as the ischium. The ischium bears three dorsal spines. The second legs are equal and reach with a small part of the carpus beyond the scaphocerite. The fingers are about equal in length to the palm. The other joints are exactly as in *A. nitescens*. The third leg reaches with part of the propodus beyond the scaphocerite. The dactylus is provided with a small accessory tooth on the posterior margin. Only

under a strong magnification can the bifid nature of the dactylus be seen. The propodus is four times as long as the dactylus and bears several small spines over the whole length of the posterior margin. The distal of these spines, which is placed near the base of the dactylus is strongest. The carpus is half as long as the propodus. The merus is somewhat shorter than the propodus and 1.5 times as long as the ischium. The latter joint bears two spines. The fourth leg resembles the third in every essential respect. The fifth leg reaches about to the middle of the scaphocerite. The dactylus, like in the third and fourth legs, is minutely bifid. The propodus is three times as long as the dactylus. Its posterior margin bears some minute spines in addition to the stronger spine at the base of the dactylus, furthermore there are several transverse rows of hairs placed in its distal part. The carpus is half as long as the propodus, while the merus is $\frac{3}{4}$ of the length of the propodus. The ischium is unarmed and about half as long as the merus.

The pleopods and uropods very closely resemble those of *A. nitescens*.

The eggs are fairly large and few in number, they are 0.5 to 0.7 mm. in diameter.

Type. Holotype is the largest ovigerous female from Station 40.

Up till now the European specimens of *Athanas* were placed into one species: *Athanas nitescens* (Leach). Madame NOUVEL (1941) was the first to point out differences between various groups of European specimens. She divided *Athanas nitescens* into three types: Type I and II occurring on the Atlantic coast of France, Type III being found in the Mediterranean. Madame NOUVEL attaches a great value to the colour of the eyes of spirit specimens and the shape and relative length of the corneal teeth. In my specimens, however, the colour of the eye is very variable. In specimens from one locality and obviously belonging to one species, the eye may be black or blue, or even blue with a large black spot. The rate of persistence of the dark pigment of the eye in preserved specimens is probably to a large extent due to the nature and composition of the preservative. Mme NOUVEL's Type I has the eyes blue, her Type II possesses black eyes. The other differences mentioned by Mme NOUVEL for these two types seem to be very small and variable, at least the characters used vary considerably in my material. Mme NOUVEL remarks (NOUVEL, 1941, pp. 10, 12) that the differences are not constant and that specimens of Type I and Type II in all probability interbreed. Perhaps Type I and II are forms or varieties of *A. nitescens*, but certainly do not deserve the status of separate species or even subspecies. Type III is different. Of this type I could examine six specimens collected in the summer of 1949 by Dr. R. ZARIQUIEY ALVAREZ and myself in several localities of the N.E. coast of Spain just S. of Cabo de Creus, and moreover several specimens from San Antonio, Ibiza Island,

which Dr. ZARIQUIEY was so kind to send me for examination. All these Mediterranean specimens perfectly agree with Mme NOUVEL'S description and figure of her Type III and differ from her Type I and II and from other accounts given of Atlantic specimens of *A. nitescens* (e. g. the beautiful figure given by KEMP, 1910). In my opinion the Mediterranean form must be considered a different species from the Atlantic form, as the differences between them are important and as far as can be ascertained, constant. The main points in which the Mediterranean form differs from the Atlantic form are:

1. The rostrum is longer and more slender, it reaches beyond the stylocerite and is distinctly curved upwards, having the upper margin concave.
2. The fifth abdominal segment has the pleurae more sharply pointed.
3. The stylocerite is shorter and generally straighter.
4. The scaphocerite has the outer margin concave.
5. The third maxilliped is more slender.
6. The first legs of the female have the carpus very long and slender, being only slightly shorter than the palm and four times as long as high.

Especially the last character in my opinion is very important.

Mme NOUVEL (1941, pp. 12, 13) repeatedly mentions that the Mediterranean form is "la forme de l'*Athanas nitescens* typique". This, however, is not true. *Athanas nitescens* has been described for the first time by LEACH (1814) under the name *Palaemon nitescens* from "the southern coast of Devonshire". Thus the Atlantic form is the typical *Athanas nitescens* (Leach), while the Mediterranean form has to get another name. As far as I can see the first name available is Risso's (1816) *Palemon Laevirhincus*. Risso's (1816, p. 108) description of this species runs as follows: "9 P[alémon]. Bec Lisse. N. P[alémon]. *Laevirhincus*. N. *P. Rostrum parvo, subulato, subtilis infraque laevi*. N. Cette espèce termine la progression que la nature paroît avoir suivie dans le nombre des dentelures du rostre des palémons. Son corps est d'un noir foncé, parsemé de quelques taches blanchâtres. Le corcelet est uni avec deux petites pointes sur le devant; il est terminé par un petit rostre subulé, lisse et uni de chaque côté. Les pièces latérales ont deux épines. Le dernier segment de l'abdomen est adhérent à une plaque arrondie, noire, lisérée de blanc, terminée par quatre filets roides; cette pièce sert de pivot aux écailles natatoires qui sont bordées de gris. La femelle porte des œufs noirâtres, en mai. *Dimens. long.* 0,030. *larg.* 0,005. *Séjour: sur les bas fonds.*" In 1826 Risso (p. 75) names the species *Alpheus levirhincus* and gives the following description: "Un noir foncé, parsemé de quelques taches blanchâtres, couvre son corps; le corcelet est garni de deux pointes, avec un petit rostre subulé, lisse et sans dents; l'œil est brillant; les antennes

extérieures assez longues; les pièces latérales bi-épineuses; la première paire de pattes courte, la seconde noirâtre, pointillée de gris; les autres, annelées de blanc et de violet; l'abdomen terminé en pointe sur les côtés; les écailles caudales oblongues, bordées de poils; la plaque du milieu subarrondie, lisérée de blanc, terminée par quatre filets. La femelle pond des œufs noirâtres au printemps. Long. 0,034, larg. 0,005. Ség. Régions des algues. App. Mars, mai." Of the comparatively few *Macrura* from the Mediterranean which have the rostrum simple, the present *Athanas* is the only one which agrees with the colour description given by Risso. The Sergestidae and Pasiphaeidae are colourless transparent, sometimes tinged with red or purple, moreover they do not inhabit the "région des algues". *Hippolyte inermis*, which has been described by Risso (1816) previously as *Palemon Olivieri*, does not have the rostrum small and subulate, while ventral teeth are usually present; this species is generally of a plain green or yellowish brown colour. *Typton spongicola* Costa, *Pontonia flavomaculata* Heller and *Pontonia pinnophylax* (Otto) all have the body colourless transparent, in *Pontonia flavomaculata* it is marked with distinct scattered yellow spots, in *P. pinnophylax* with opaque white bands. The only species with which *Palemon laevirhincus* may be identified is the present species of *Athanas*. In this species the body colour is rather variable, but very dark specimens often occur. I have myself seen a large female, which had the body very dark reddish brown with white spots and a white dorsal line, while the legs were banded with white and the telson had a white posterior margin. This agrees so well with Risso's description that in my opinion it seems best to accept Risso's name for the Mediterranean species of *Athanas*. The name of this species will thus be *Athanas laevirhincus* (Risso, 1816). A synonym of this name is *Arete diocletiana* Heller (1862). In a recent publication (HOLTHUIS, 1947, p. 24) I identified *Nika variegata* Risso, 1816 (= *Hippolytes variegatus* Risso, 1826) with *Athanas nitescens* (Leach). This, however, is an error, Risso's species is the same as *Alpheus dentipes* Guérin (vid. p. 71).

The present Atlante material from the Cape Verde Islands is very closely related to *Athanas laevirhincus*, but nevertheless proved to possess various constant differences, which induced me to describe it as belonging to a new species. In all the Mediterranean material seen by me the dactylus of the last three pairs of pereopods is perfectly simple. Also Mme NOUVEL (1941) states her French material to have that dactylus simple. My Cape Verde Islands specimens on the contrary have this dactylus constantly biunguiculate. Furthermore, the eggs of the Mediterranean specimens seen by me are smaller, being only 0.4 to 0.55 mm. in diameter. It would be of the greatest importance to examine a large collection of *Athanas* from many localities throughout the range of distribution of *Athanas "nitescens"* s. l., in order to ascertain the variability and the range of distribution of the various species up till now confounded under this name.

It is a great pleasure to name the present new species for Mme LOUISE NOUVEL—VAN RYSELBERGE, whose interesting observations made her conclude that *Athanas nitescens* Leach as held by most authors is not a homogeneous species.

Athanas grimaldii Coutière 1911.

Athanas Grimaldii Coutière 1911, p. 1, figs. 1—6.

Athanas Grimaldii De Man 1911, p. 146.

Athanas grimaldii Lenz & Strunck 1914, p. 316, pl. 20 figs. 5, 6.

Athanas Grimaldii Balss 1916, p. 19.

Athanas grimaldii Stebbing 1921, p. 18.

Athanas grimaldii Schmitt 1926, p. 19.

Athanas Grimaldii Coutière 1938, p. 267, pl. 6 fig. 13.

Material examined:

Station 38, Porto Grande, São Vicente, Cape Verde Islands, 16°53' N, 25°00' W; triangular dredge (45 cm.), 9 m. depth, bottom sand; December 10, 1945, 11h²⁰. — 2 specimens 7 and 12 mm.

Station 39, São Pedro Bay, São Vicente, Cape Verde Islands, 16°50' N, 25°04' W; triangular dredge (45 cm.), 41—50 m. depth, bottom Foraminifera and corals; December 10, 1945, 14h⁴⁰. — 1 male 12 mm., 1 ovigerous female 14 mm.

Station 44, off French Guinea, 10°22' N, 16°22' W; Sigsbee trawl, otter trawl and triangular dredge (45 cm.), 41—45 m. depth, bottom brown sand and shells; December 17, 1945. — 5 specimens 10—18 mm.

Station 45, off French Guinea, 9°23' N, 15°07' W; Sigsbee trawl and otter trawl, 30—34 m. depth, bottom sand; December 18, 1945, 15h—18h. — 1 specimen 8 mm.

This species belongs in the group containing *Athanas nitescens* (Leach), *A. laevirhincus* (Risso) and *A. nouvelae* n. sp. It is still more heavily built than the former of these three species. The rostrum is shorter, the extra- and infra-corneal teeth are placed very close together. The pleurae of the fifth abdominal segment end in an acute angle, which is not turned backwards. The first legs are somewhat more heavy than in *A. nitescens*, the carpus is relatively shorter. Sometimes the ischium bears more than three dorsal spines. As in *A. nitescens* and *A. nouvelae* a reduced exopod is visible at the base of the first pereopod. The second legs are as in *A. nitescens*, but the last three legs differ from those of that species by having the dactylus minutely biunguiculate. The second pleopods of the male are curious by the extreme elongation of the appendix masculina, which overreaches the top of the endopod. The endopod of the first pleopod of the male is similar to that of *A. nitescens*.

The eggs are numerous and small, being 0.35 to 0.6 mm. in diameter.

BARNARD (1950, pp. 730, 731) states that "it can scarcely be claimed

that *grimaldii* is really distinct from *nitescens*; *e. g.* Lenz and Strunck (1914) find the accessory denticle on the dactyls of 3rd—5th legs in Mediterranean examples of *nitescens* as well as in *grimaldii*." The difference shown in the shape of the rostrum, carapace and especially that in the pleopods, show that *A. grimaldii* is a perfectly good species, distinct from *A. nitescens*. LENZ & STRUNCK (1914, p. 317) do not state that their Mediterranean specimen have the dactylus biunguiculate, though their remark is apt to be misleading: "Dicht vor der Kralle steht jedesmal eine sehr starke, schwach gebogene, spitz endigende Borste, etwa zwei Drittel so lang wie die Kralle.... Man könnte sie fast als Nebenkralle ansehen, sie findet sich aber in gleicher Weise auch bei den mir aus Neapel vorliegenden *A. nitescens*." The "Borste", which according to LENZ & STRUNCK may easily give the dactylus ("Kralle") the appearance of being biunguiculate, is not the accessory tooth, but the strong spine at the end of the posterior margin of the propodus.

Distribution. This seems to be a littoral form, though COUTIÈRE besides two records of specimens from 16 m. depth gives one from a depth of 91 m. and another from 155 m. SCHMITT (1926) reports the species to be commensal in a species of *Pinna*. It seems to be a rather characteristic species of the West African coast, though it has been reported once from the west-coast of France and once from South Africa. The records in literature are: Near Belle Isle, Brittany, W. France (COUTIÈRE, 1911, 1938), Porto Grande, São Vicente, Cape Verde Islands (DE MAN, 1911; LENZ & STRUNCK, 1914), near Santa Luzia, Cape Verde Islands (COUTIÈRE, 1911, 1938), near Boavista, Cape Verde Islands (COUTIÈRE, 1911, 1938), Lagos, Nigeria (BALSS, 1916), São Paulo de Loanda, Angola (SCHMITT, 1926), near Durban, Natal (STEBBING, 1921). BARNARD (1950, p. 729) reports upon the material identified as *Athanas grimaldii* by STEBBING (1921, p. 18), together with a mutilated ovigerous female from False Bay, which STEBBING (1915, p. 88) described as *Athanas* sp., and some unpublished material from Algoa Bay, East London and Durban, as *Athanas* cf. *nitescens* or *grimaldii*. The identity of the South African specimens is thus not certain at all.

Athanas amazone n. sp.

(Fig. 23).

Material examined:

Station 114, off Nigeria, 4°01' N, 7°12' E; bottom sample Hv; Petersen grab, 52 m. depth, bottom mud; February 22, 1946, 16h³⁸. — 1 ovigerous female 7 mm.

Description. The rostrum is straight, slender and ends in a sharp point. It fails to attain the end of the second segment of the antennular peduncle and reaches about as far forwards as the stylocerite. The orbital margin

bears only two teeth: the supra-corneal tooth is absent. The extra-corneal tooth is distinct and sharply pointed. The infra-corneal tooth is broad and fairly little pronounced. The carapace is smooth and has the anterolateral angle broadly rounded.

The abdomen has the pleurae of the first four segments rounded, that of the fifth ends in a small, sharp, posteriorly directed tooth. The sixth segment is about 1.5 times as long as the fifth. The posterolateral angles of the sixth segment are truncated. The usual movable plate is present near the bases of the uropods, it is fairly broad and pointed. The telson is as long as the sixth abdominal segment. The shape of the telson is like that of *A. nitescens*, being only a little more elongate, the arrangement of the spines is the same as in the latter species.

The eyes are well developed. The cornea is well pigmented.

The antennular peduncle has the stylocerite straight, slender and pointed. It reaches about as far forwards as the tip of the rostrum. The second segment is longer than the third, together they are longer than the first. The upper flagellum has the two rami fused for a distance of 4 joints. The free part of the shorter of the two rami consists of 1 joint only; this joint bears some hairs at the top.

The scaphocerite reaches slightly beyond the antennular peduncle. The outer margin is straight or somewhat concave. Its breadth is $\frac{3}{8}$ of its length. The final tooth is directed forwards and slightly outwards. The lamella is somewhat produced antero-internally and slightly overreaches the tooth. The last segment of the antennal peduncle is very long and distinctly overreaches the scaphocerite. A small spine is present near the lower side of the base of the scaphocerite.

The mouthparts have not been dissected in order not to damage the only available specimen. The third maxilliped reaches slightly beyond the middle of the scaphocerite. It has the general shape of that of *Athanas nitescens*, though the ratios between the lengths of the various parts are different. The ultimate segment is 1.4 times as long as the penultimate and half as long as the antepenultimate segment. The exopod fails to reach to the end of the antepenultimate segment. The branchial formula is exactly like that of *Athanas nitescens*.

Though my specimen is a female the first pereopods are strong and distinctly unequal. The larger of the two legs reaches with part of the merus beyond the scaphocerite. The fingers are $\frac{3}{4}$ of the length of the palm, they are slender and close over their entire length. The dactylus bears two large teeth on the cutting edge, while the fixed finger possesses only one tooth in this place. The palm becomes higher posteriorly. The lower margin of the palm and of the fixed finger are provided with a row of small tubercles. The carpus is slender and somewhat longer than the chela. It gradually narrows proximally and bears tubercles on the upper and lower margins.

The merus is very broad, especially in the middle. It is distinctly longer than the carpus. The inner side of the merus is concave and forms an elongate depression, the margins of which are provided with small tubercles. The ischium is about half as long as the merus and has both margins provided with tubercles. The carpus and the chela are generally directed backwards, the carpus then fits in the depression of the inner surface of the

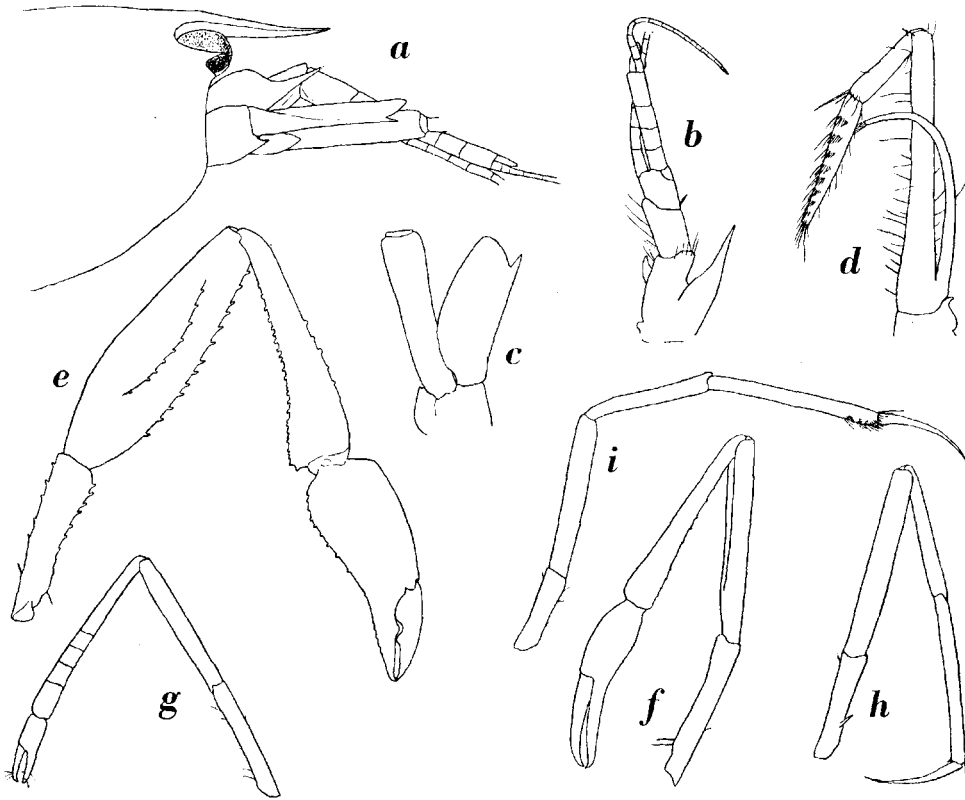


Fig. 23. *Athanas amazona* n. sp. a, anterior part of body in lateral view; b, antennula; c, antenna; d, third maxilliped; e, larger first pereiopod; f, smaller first pereiopod; g, second pereiopod; h, third pereiopod; i, fifth pereiopod. a—i, $\times 24$.

merus. The smaller first leg is more slender than the larger. It reaches with the larger part of the carpus beyond the scaphocerite. The fingers are slender and unarmed. They are slightly longer than the palm and close over their entire length. The palm is smooth and somewhat swollen in the middle. The carpus is slender, slightly narrowing posteriorly. It is about 1.2 times as long as the chela and bears some tubercles ventrally. The merus too is slender, it is of the same breadth throughout its length and does not show the broadening in the middle as the merus of the large leg. It is as long as the carpus, and, as in the large leg, it has a depression at the inner side

for the reception of the carpus, when the carpus and chela are directed backwards. The ischium is about $\frac{2}{3}$ of the length of the merus. The second legs are equal. They reach slightly beyond the scaphocerite. The chela has the fingers about as long as the palm and it is about $\frac{1}{3}$ of the length of the carpus. The latter is divided into 5 joints, the proximal of which is as long as the four distals together. The following 3 joints are of equal length, while the fifth joint is somewhat less than twice as long as each of the three short joints. The merus is about $\frac{3}{4}$ of the length of the carpus, it is slightly longer than the ischium. The last three pairs of legs are slender and have the dactylus simple. The third leg reaches with part of the propodus beyond the scaphocerite. The dactylus is extremely slender, it measures $\frac{3}{5}$ of the length of the propodus. The latter has the posterior margin unarmed, except for a small spinule near the base of the dactylus. The carpus is $\frac{4}{5}$ of the length of the propodus. The merus is slightly longer than the propodus. The ischium measures $\frac{4}{7}$ of the length of the merus, it bears a strong spine at the inner side near the base. The fifth leg reaches with part of the dactylus beyond the scaphocerite. The dactylus is similar to that of the third leg, it also measures $\frac{3}{5}$ of the length of the propodus. The propodus differs from that of the third leg by having the posterior margin provided with transverse rows of short setae in the distal part. The carpus is slightly less than $\frac{4}{5}$ of the length of the propodus, while the merus is slightly shorter than the latter joint. The ischium bears no spine and is about half as long as the merus.

The pleopods and uropods of my only specimen are similar to those of the females of *Athanas nilescens*.

The eggs are relatively few, they measure 0.3 to 0.4 mm. in diameter.

This species is the first representative of the *dimorphus* group of the genus *Athanas* which is known from the Atlantic region. It is most closely related to *Athanas minikoensis* Cout. and *A. orientalis* Pearson, both from the Indo-westpacific region. It agrees with these two species in the unequal first legs of the female, in the simple dactyli of the last three pairs of pereopods and in the absence of the supra-corneal tooth. But it differs from both these forms in the completely different shape of the first legs of the female, which have the carpus longer than the chela and as long as the merus, and which have most of the joints provided with tubercles.

Automate talismani Coutière 1900.

Automate dolichognatha Coutière 1896, p. 385 (non de Man, 1888).

Automate dolichognatha Coutière 1897 a, p. 235.

Automate Talismani Coutière 1900, p. 357.

Automate Talismani Coutière 1902, p. 340.

Distribution. COUTIÈRE (1896) gave a short description of *Automate dolichognatha* De Man, without stating the locality whence his material originated. In his 1897a paper the same author remarks that his 1896 description was based on two specimens

of DE MAN's species from the Cape Verde Islands and that notwithstanding some differences he does not deem it necessary to separate them as a distinct species from this Indo-westpacific form. In 1900 COUTIÈRE for the first time uses the name *Automate Talismani*. His type specimens of that species were collected by the Talisman Expedition off the Cape Verde Islands and he remarks that it was these specimens "que nous n'avions pu jusqu'alors distinguer avec sûreté de *A. dolichognatha* de Man". There is hardly any doubt therefore that COUTIÈRE's (1896, 1897a) specimens of *A. dolichognatha* are the same as his 1900 specimens of *A. Talismani*, the more so as he remarks in 1897 that his specimens were collected by the Talisman Expedition. In 1902 COUTIÈRE described the species and stated that his two specimens originated from "Puerto-Grande (Açores)", he does not refer to the earlier records. In no geographic dictionary or atlas could I find a reference to a locality named Puerto Grande or Porto Grande in the Azores, while Porto Grande is a much frequented harbour of São Vicente, Cape Verde Islands. It seems very probable to me that the type locality of *Automate Talismani* is Porto Grande, São Vicente, Cape Verde Islands, and that COUTIÈRE's 1896, 1897a, 1900 and 1902 material of *Automate dolichognatha* or *A. Talismani* from the Cape Verde Islands or the "Azores" is exactly the same lot. This latter supposition is confirmed by the fact that COUTIÈRE in 1897 as well as in 1902 mentions that his material consists of two specimens only.

Automate evermanni Rathbun 1902.

(Fig. 24).

Automate evermanni Rathbun 1902, p. 112, fig. 22.

Automate evermanni Schmitt 1935, p. 139, fig. 14.

Material examined:

Station 40, anchorage of São Pedro Bay, São Vicente, Cape Verde Islands; bottom sample Arv₄₉; Van Veen grab, 32 m. depth, bottom sand, corals and Foraminifera; December 11, 1945, 7h⁰⁰. — 1 specimen 12 mm.

Station 55, off Liberia, 6°03' N, 10°25' W; bottom sample Cvi; Petersen grab, 44 m. depth, bottom sandy mud; January 8, 1946, 8h⁴⁵. — 1 specimen 14 mm.

Station 55, off Liberia, 6°03' N, 10°25' W; bottom sample Cvii; Petersen grab, 44 m. depth, bottom sandy mud; January 8, 1946, 8h⁴⁵. — 1 specimen 9 mm.

Station 57, off Liberia, 5°59' N, 10°26' W; bottom sample Cx; Van Veen grab, 62 m. depth, bottom muddy sand; January 8, 1946, 10h⁵⁵. — 1 ovigerous female 11 mm.

Station 85, off Gold Coast, 5°37' N, 0°38' E; Sigsbee trawl, 50 m. depth, bottom greyish mud; January 30, 1946, 10h²⁰—10h⁵⁰. — 1 specimen 13 mm.

Station 100, off Nigeria, 6°06' N, 4°29' E; bottom sample Fiv; Van Veen grab, 29 m. depth, bottom soft mud; February 15, 1946, 13h⁰⁰. — 1 specimen 23 mm.

Station 100, off Nigeria, 6°06' N, 4°29' E; bottom sample Fv; Van Veen grab, 29 m. depth, bottom soft mud; February 15, 1946, 13h⁰⁰. — 1 specimen 10 mm.

The specimens agree in all respects with RATHBUN's description and figures of *Automate evermanni*. The anterior margin of the carapace behind the eyes is deeply emarginate and shows a minute triangular rostrum in the middle. This rostrum does not reach so far forwards as the lateral parts of the anterior margin of the carapace; it is sharply pointed. The carapace is smooth, it is rather strongly compressed, being much higher than broad. No spines are present on the carapace. Very often the anterolateral parts of the carapace are covered with a thin film of mud.

The abdomen is smooth, the pleurae of the first five segments are broadly rounded. The sixth segment has small rounded pleurae and truncated posterolateral angles. In my female specimens there are two long blunt tubercles on the sternum of the sixth abdominal segment close to the pleurae. The sixth segment is as long as the fifth and almost as long as the telson. The telson is triangular, and regularly tapers posteriorly. In its basal third the telson has the lateral margins somewhat constricted. There are two pairs of dorsal spinules. The anterior of these is placed a small distance behind the constriction, the other pair is situated much closer to the anterior pair than to the posterior margin of the telson. This posterior margin is rather narrow, it bears two pairs of spines and one pair of feathered setae, which are placed close together. The outer spines are very short, the inner are much longer and stronger. The setae are placed between the inner spines.

The eyes resemble those of species of the genus *Callianassa*. They lie close together, with the inner margins touching over nearly their entire length. The eyes narrow somewhat anteriorly, but have the tips rounded. The cornea is small and lies a small distance behind the top of the eye and near the outer margin of it.

The antennular peduncle is long and slender. The first segment reaches with much more than half its length beyond the eyes. The stylocerite is large, it reaches beyond $\frac{2}{3}$ of the length of the basal segment of the peduncle. The outer margin of the stylocerite is slightly, the inner margin strongly convex. These margins taper towards a sharp apex. The second segment of the peduncle is decidedly longer than the first. Both are slender. The third segment measures $\frac{1}{4}$ to $\frac{1}{5}$ of the length of the second. The entire antennular peduncle is about $\frac{2}{3}$ of the length of the carapace. The two flagella are simple and slender.

The antennal peduncle reaches distinctly beyond the antennular peduncle. The scaphocerite, which lies with its base about level with the middle or $\frac{2}{3}$ of the length of the basal antennular segment, reaches somewhat beyond

the middle of the second segment of the antennular peduncle. The last joint of the antennal peduncle (= carpopocrite) reaches with about half its length beyond the scaphocerite; it is about three times as long as wide. The outer margin of the scaphocerite is almost straight and ends in a distinct final tooth, which slightly overreaches the lamella.

The mandible has the incisor process strong and ending in about 6 distinct teeth. The molar process bears numerous spinules at the distal surface, the palp is two-jointed. The maxillula has the lower endite slender,

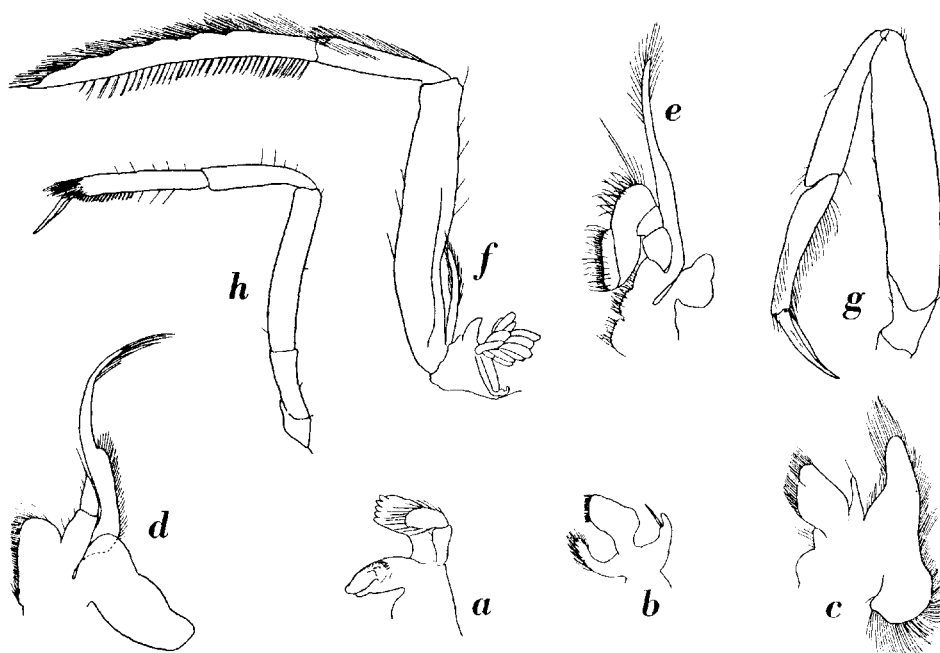


Fig. 24. *Automate evermanni* Rathbun. a, mandible; b, maxillula; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped; g, third pereopod; h, fifth pereopod. a -f, $\times 10$; g, h, $\times 7$.

the upper is broader and bears short spines at the distal margin, the palp is indistinctly bilobed and bears a strong seta. The maxilla is of the normal shape, with the upper endite large and bilobed, and the lower reduced. All maxillipeds are provided with exopods. The basis and the coxa of the first maxilliped are not visibly separated. The palp is two-jointed, the caridean lobe is narrow and the epipod elongate. The second maxilliped is of the usual shape in members of this family. The third maxilliped is very large, reaching with about the entire last joint beyond the antennal peduncle. The last joint is fully twice as long as the penultimate, it ends in a strong point and the upper margin is undulated. The antepenultimate joint is as long as the ultimate and bears a carina in the basal part of the outer surface. The exopod is small and does not reach the middle of the antepenultimate

segment. An arthrobranch and two epipods are present. One of these epipods is analogous with those of the other maxillipeds, being broad and leaf-like, the second is like the epipods of the pereopods, being narrow and ribbon-like. The branchial formula of the present species runs as follows:

	maxillipeds			pereopods				
	I	II	III	I	II	III	IV	V
pleurobranchs.....	—	—	—	1	1	1	1	1
arthrobranchs.....	—	—	1	—	—	—	—	—
podobranchs.....	—	—	—	—	—	—	—	—
setobranchs.....	—	—	—	1	1	1	1	1
epipods.....	1	1	2	1	1	1	1	—
exopods.....	1	1	1	—	—	—	—	—

The setobranchs bear one long hair only.

The first legs are strong and unequal. In only one of my specimens both left and right leg of the first pair are present, viz., in that from Station 40. Both first legs reach with part of the palm beyond the antennal peduncle. The two legs agree in all respects with RATHBUN'S figures. Of the larger leg the fingers are slightly shorter than the palm and gape slightly. The dactylus has the cutting edge provided with one tooth in the proximal part. The distal part of the cutting edge is slightly convex and bears one minute tooth. The fixed finger also possesses one basal tooth, while, in addition, two broad, blunt and low elevations are visible in the distal part. The distal of these elevations bears a very small tooth, and there are some minute serrations before the tip of the finger. The palm is less than twice as long as broad, it has the lower margin convex. The carpus is short, being about half as long as the palm. It is cup-shaped, near the base it is distinctly constricted. The lower outer part of the anterior margin shows a blunt lobe. The merus is as long as the palm, it has the lower margin more convex than the upper. The small chela is more slender than the larger. The fingers close over their entire length and have the cutting edges entire. The fingers are about as long as the palm. The carpus is more elongate than in the larger leg, it is almost as long as the palm, whereas the merus is longer than the palm. Of both first legs the palm may be slightly rugose by the presence of numerous low, rounded tubercles, which are placed very close together. The second leg reaches with the carpus beyond the scaphocerite. The chela is small and slender, with the fingers shorter than the palm. The carpus is somewhat more than four times as long as the chela, it is divided into five joints. The second (from the base) of these joints is twice as long as the basal joint. The third is decidedly shorter than the second but longer than the rest. The fifth is longer than the fourth, which is about as long as the first. The merus is longer than the ischium,

but shorter than the carpus. The third leg reaches with part of the propodus beyond the antennal peduncle. The dactylus is flattened, with the posterior surface somewhat hollowed. It ends in a sharp point and is almost oval in outline. The outer margin, however, is straighter than the inner. The propodus is 1.6 times as long as the dactylus; its posterior margin bears some spinules near the base of the dactylus. The carpus is about as long as the propodus and $\frac{3}{5}$ of the length of the merus. The fourth leg strongly resembles the third. The fifth leg reaches slightly beyond the base of the antenna, it is shorter and narrower than the two previous legs. The dactylus is similar to that of the third leg, but it is smaller. The propodus is about twice as long as the dactylus, it bears no spines. The carpus is $\frac{6}{7}$ of the length of the propodus and about $\frac{2}{3}$ of the length of the merus.

In the female the endopod of the first pleopod is small and without appendices. The endopods of the other pleopods all possess a slender appendix interna. The uropods are broadly ovate (in my specimens the endopod has the apex somewhat blunter than in RATHBUN's figure). The exopod has the outer margin somewhat convex. This margin ends in a minute sharp tooth, which on its inner side (near the diaeresis) bears a movable spinule, which distinctly overreaches the tooth. RATHBUN's (1902) fig. 22e shows that the spine and the tooth are of about equal size.

In the specimen from Station 100 (bottomsample Fv), which is rather strongly damaged, the dactylus of the third leg is somewhat longer than figured here, moreover it is also more strongly curved.

The present specimens agree in such a degree with the description and figures given by RATHBUN of her *Automate evermanni*, that they must be considered identical with that species.

Distribution. Up till now *Automate evermanni* Rathbun was only known from Porto Rico (off Aguadilla, 225 m.; Mayaguez Harbor, 22--33 m.).

Ogyrides rarispina n. sp.

(Fig. 25).

Material examined:

Station 52, anchorage of Monrovia, Liberia; bottom sample Cr; Van Veen grab, 11 m. depth, bottom sand; January 3, 1946, 9h⁰⁰. — 3 specimens 5—13 mm.

Station 53, anchorage of Marshall, Liberia; hand net, with electric light; January 5, 1946, 20h³⁰. — 17 specimens (including 6 ovigerous females, 13—21 mm.) 8—21 mm.

Station 53, anchorage of Marshall, Liberia; bottom sample CII; Van Veen grab, 12 m. depth, bottom sandy mud; January 7, 1946, 9h⁰⁰. — 2 specimens (including 1 ovigerous female, 12 mm.) 11 and 12 mm.

Station 77, anchorage of Accra, Gold Coast; bottom sample 77I; Van Veen grab, 10 m. depth, bottom muddy sand; January 29, 1946, 7h³⁰.— 1 specimen 13 mm.

Description. The rostrum is short and curved downwards, it is triangular in dorsal view and has the apex rounded. The upper surface of the rostrum is roughened by the presence of minute tubercles. The carapace is provided in the anterior sixth of its median dorsal line with three to five spinules. These spinules do not reach, or just attain, the base of the rostrum. The lower orbital angle is indicated by a broad and shallow curve of the anterior margin of the carapace. A minute antennal spine is present on this margin below the infra-orbital angle. The anterolateral angles of the carapace are rounded. Short hairs are present in the anterior part of the carapace.

The abdomen is smooth and the pleurae of the first five segments are broadly rounded. The sixth segment is about as long as the fifth. The pleurae and posterolateral angles of the sixth segment are rounded. The telson is about as long as the sixth abdominal segment, it is triangular in outline. The lateral margins of the telson show a triangular lateral projection at about $\frac{1}{3}$ of their length, measured from the base. At about $\frac{2}{3}$ of the length of the lateral margin there are two spines, placed close together. The outer of these spines is the shorter of the two. These spines probably have to be considered the posterior spines, so that the posterior third of the lateral margin of the telson is actually the (much produced) posterior margin. Hairs are present on this posterior margin and not on the lateral margin proper. The upper surface of the telson bears two pairs of spines, the anterior of which is placed level with the projection of the lateral margin, the other pair lies closer to the posterolateral spines. There are three short curved ridges at each half of the underside of the telson. These ridges touch the lateral margin of the telson somewhat anteriorly of the lateral projection. An indication of a fourth ridge may be seen under this lateral projection.

The eyes are very long. They reach to the end of the antennular peduncle. The cornea is short and rounded, the stalk is excessively long. Hairs are present on the stalk.

The antennular peduncle is slender. The basal segment has the stylocerite ending in two slender spines. The lateral of these spines almost reaches to the end of the basal segment and overreaches the upper spine. The second segment is somewhat shorter than the first and is almost twice as long as the third. The flagella are simple.

The antennal peduncle reaches as far forwards as the antennular peduncle. The distal margin of the segment bearing the scaphocerite, is provided with two spines: an outer and a ventral spine. The scaphocerite is rather small, it falls short of the end of the antennal peduncle. The outer margin is almost straight and ends in a small final tooth, the inner margin is convex.

The mandible has the molar process ending in several teeth; its distal end is striate by the presence of various parallel ridges. The incisor process is rather slender and ends in some five teeth. The palp is distinct and two-

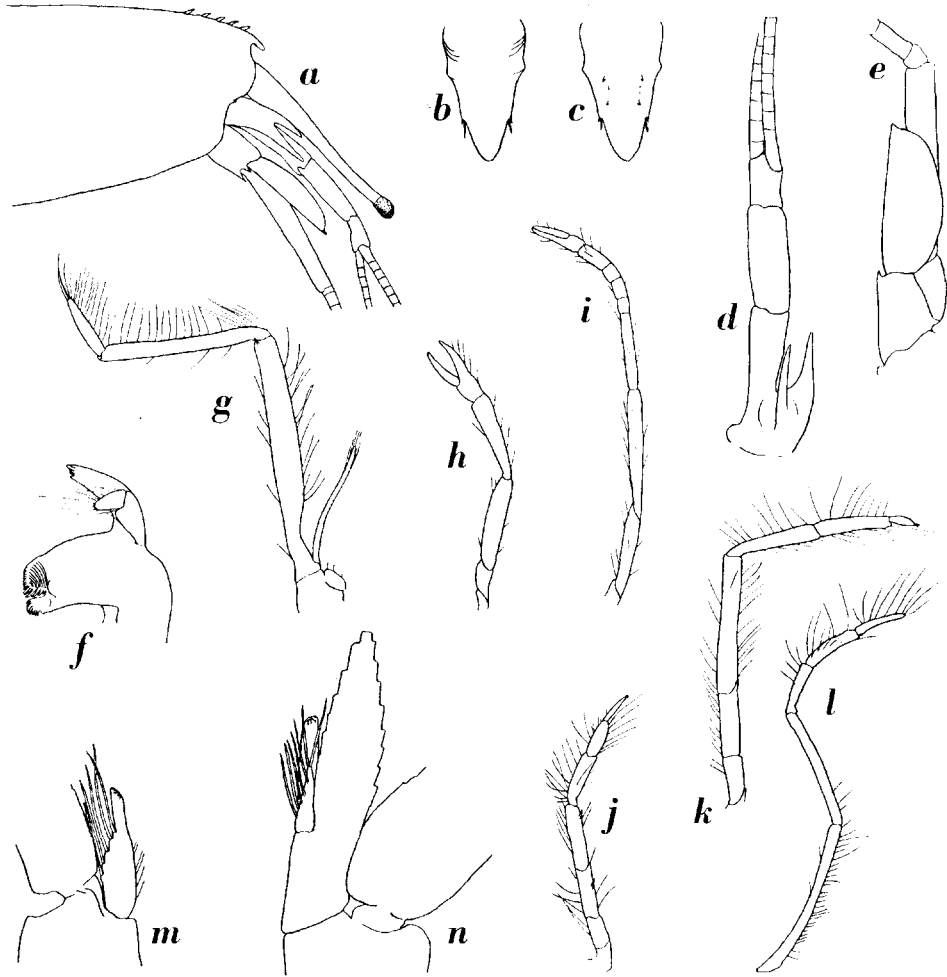


Fig. 25. *Ogyrides rarispina* n. sp. a, anterior part of body in lateral view; b, telson in ventral view; c, telson in dorsal view; d, antennula; e, antenna; f, mandible; g, third maxilliped; h, first pereopod; i, second pereopod; j, third pereopod; k, fourth pereopod; l, fifth pereopod; m, endopod of first pleopod of male; n, endopod of second pleopod of male. a—c, g 1, $\times 10$; d, e, $\times 15$; f, $\times 25$; m, n, $\times 50$.

jointed. The basal joint is somewhat widened on one side of its distal portion, but on the other side its lateral margin forms an uninterrupted line with the lateral margin of the distal joint. The arrangement thus being quite different from that in *Ogyrides striaticauda* Kemp. The maxillula, maxilla, first and second maxillipeds do not show any noteworthy difference

from those of *Ogyrides striaticauda* figured by KEMP (1915, p. 286), only in the second maxilliped is the distal margin of the last joint not convex, but almost straight. The third maxilliped reaches with the antepenultimate joint to the end of the scaphocerite. The last joint is about $\frac{2}{5}$ as long as the penultimate, while the antepenultimate joint is $\frac{4}{3}$ as long as the penultimate. A small and slender spinule is present in the distal part of the antepenultimate joint. The exopod is well developed, an epipod is present. The branchial formula is the same as that given by KEMP (1915, p. 284) for *O. striaticauda*.

The first leg is small, it slightly overreaches the scaphocerite. The fingers are about twice as long as the palm, they are curved and thereby gape. The carpus is somewhat longer than the chela and about as long as the merus. The second legs are longer than the first, they reach with the chela beyond the end of the antennular peduncle. Here too the fingers are about twice as long as the palm. The carpus is almost three times as long as the chela and divided into five joints, the proximal of which is longest (in some specimens the proximal articulation is less distinct than the distals). The merus is about twice as long as the chela. The third leg reaches somewhat beyond the base of the scaphocerite. The dactylus is slightly shorter and conspicuously narrower than the propodus, it ends in some hairs. The carpus is almost 1.5 times as long as the propodus, it is about as long as the ischium and shorter than the merus. Both the ischium and the merus bear a distinct spine. The fourth leg reaches somewhat beyond the eyes, when stretched forwards. The dactylus is broadly ovate and ends in some 4 or 5 short hairs. The propodus is about 2.5 times as long as the dactylus and somewhat shorter than the carpus. The merus is $\frac{7}{5}$ of the length of the carpus and about twice as long as the ischium. The fifth leg reaches about as far forwards as the third, it is more slender than the fourth. The dactylus is slender, it is slightly shorter than the propodus, and as long as the carpus. The merus is fully twice as long as the carpus and somewhat shorter than the ischium. Between the bases of the fourth pereopods a two-pointed sternal process, like the one figured by KEMP (1915, fig. 30d), is present in the males as well as in the females.

The first pleopod of the male has the endopod small, ovate, with the top produced into an appendix interna bearing small curved hooks in the extreme distal part. The endopod of the second pleopod of the male has the appendix masculina short, regularly tapering towards the top and provided with several strong hairs. The appendix interna of this leg is much longer than the appendix masculina. The females have the endopod of the first pleopod slender, without hooks. All other pleopods bear an appendix interna. The uropods are slender, both exo- and endopod taper regularly towards the apex. The exopod is curved slightly outwards, the outer margin bears no spines, it is provided only with some hairs.

The eggs are numerous and small, being 0.3 to 0.5 mm. in diameter.

Juvenile specimens have the eyes relatively shorter and more robust. In my specimens of 5 to 7 mm., the eyes reach about to the base of the last segment of the antennular peduncle. The scaphocerite almost attains the end of the antennular peduncle. The second legs of these small specimens are peculiar in being only 3-jointed.

Type. Holotype is the largest ovigerous female from Station 53 (January 5, 1946).

The present new species differs from most species known, in the number of spinules behind the rostrum: In *Ogyrides alphaerostris* (Kingsley) these spines are absent, in *O. striaticauda* Kemp their number varies between 7 and 9, in *O. mjobergi* Balss they number 3, in *O. occidentalis* (Ortmann) there are 7 to 9, in *O. orientalis* (Stimpson) 4 or 5, in *O. sibogae* de Man 4, in *O. saldanhae* Barnard 6 to 8, and in *O. yaguiensis* Armstrong 8 to 13. In the number of these postrostral spines *O. rarispina* thus bears most resemblance to *Ogyrides orientalis* (Stimpson), *O. sibogae* de Man, and to *O. mjobergi* Balss. The status of these three Indo-westpacific species, which are closely related if not identical, is rather uncertain. YOKOYA (1927) places *O. sibogae* in the synonymy of *O. orientalis*, but his figures of the telson and the scaphocerite of *O. orientalis* are strongly different from those of *O. sibogae*. *Ogyrides rarispina* differs from all these three species by having the antennal spine sharply pointed. From *O. mjobergi* and *O. sibogae* it may be distinguished by the shape of the scaphocerite, while it very much resembles that of *O. orientalis*. From the latter species the new form differs, however, by having all four dorsal spinules of the telson placed behind the lateral expansion of the telson. From all species of the present genus *O. raridens* differs by having the carpus of the second leg 5-jointed.

ARMSTRONG (1949) places the genus *Ogyrides* in the family Hippolytidae. *Ogyrides*, it is true, is a very aberrant member of the Alpheidae, and ARMSTRONG probably is correct in removing it from that family, but as far as I can see it will form a very aberrant member of the Hippolytidae. I do not venture at present to form likewise a definite opinion of the place of this genus in the system of the Caridea and therefore leave it provisionally in the family Alpheidae.

Ogyrides occidentalis (Ortmann) 1893.

Ogyris occidentalis Ortmann 1893, p. 46, pl. 3 fig. 4.

Ogyris occidentalis Cary & Spaulding 1909, p. 11.

Ogyris occidentalis Balss 1913, p. 107.

non *Ogyrides occidentalis* Stebbing 1914a, p. 32.

Ogyris occidentalis Balss 1916, p. 20.

Ogyris occidentalis Monod 1927, p. 594.

Ogyrides occidentalis Barnard 1950, p. 728.

Distribution. The type locality of *Ogyrides occidentalis* is the mouth of the Pará (= Tocantins) River, N.E. Brazil (ORTMANN, 1893). The only other American record of the species known to me is that of CARY & SPAULDING (1909) from the Louisiana coast (U. S. A.). All the other records refer to animals from South and West Africa. BARNARD (1947) pointed out that STEBBING's (1914a) animals from Saldanha Bay, S. Africa do not belong to ORTMANN's species but to *Ogyrides saldanhae* Barnard. To this species, according to BARNARD, BALSS's (1913) material from Lüderitz Bay, S.W. Africa probably also belongs. BALSS (1916) reports the species from: Accra, Gold Coast; Victoria, Cameroons; Kabinda, Kabinda; Mucula and Quissenbo, N. Angola. MONOD's (1927) record of the species from Cameroons is based on that of BALSS (1916). It seems possible that BALSS's (1916) material does not belong to *O. occidentalis* but to *O. rarispina*. As BALSS gives no details of the shape of his animals, it is impossible to decide this question without examination of the material.

Family Hippolytidae.

Merhippolyte agulhasensis Bate 1888.

Restricted synonymy:

Merhippolyte agulhasensis Bate 1888, p. 619, pl. 110 fig. 4.

Merhippolyte agulhasensis Odhner 1923, p. 5.

Distribution. This species is known from deeper water off S. Africa (70—318 m. depth). The only record within the region dealt with here is that by ODHNER (1923) from Porto Alexandre, S. Angola.

Eualus lebourae n. sp.

(Fig. 26).

Material examined:

Station 153, off French Guinea, 10°49' N, 16°39' W; Sigsbee trawl, 42 m. depth, bottom coarse sand; April 16, 1946, 13h²⁰—13h⁵⁰. — 5 specimens (including 1 ovigerous female, 10 mm.) 5—10 mm.

Description. The present species is very closely related to *Eualus occultus* (Lebour). The differences between the two forms, however, are sufficiently constant to justify the separation of the present form as a distinct species.

The rostrum is rather slender, it reaches slightly beyond the eyes and also overreaches the anterior margin of the basal segment of the antennular peduncle. It is slightly curved upwards. The upper margin bears four teeth, the first of which is placed behind the posterior limit of the orbit. The distance between the last tooth and the apex is distinctly greater than that between the last and penultimate teeth. The lower margin bears a single tooth, which is placed close to the apex. The carapace is smooth. It only bears a small antennal spine, which is placed slightly below the rounded lower orbital angle. The anterolateral angle of the carapace is broadly rounded and somewhat produced anteriorly.

The abdomen is smooth. The pleurae of the first three segments are rounded. The fourth and fifth segment have the pleurae ending in a sharp point. The telson bears only three pairs of dorsal spinules, while in *Eualus*

occultus there are four pairs. The posterior margin of the telson ends in a sharp median point and bears three pairs of spines.

The eyes are normal in shape. The cornea is darkly pigmented and rounded. A distinct ocellus is present.

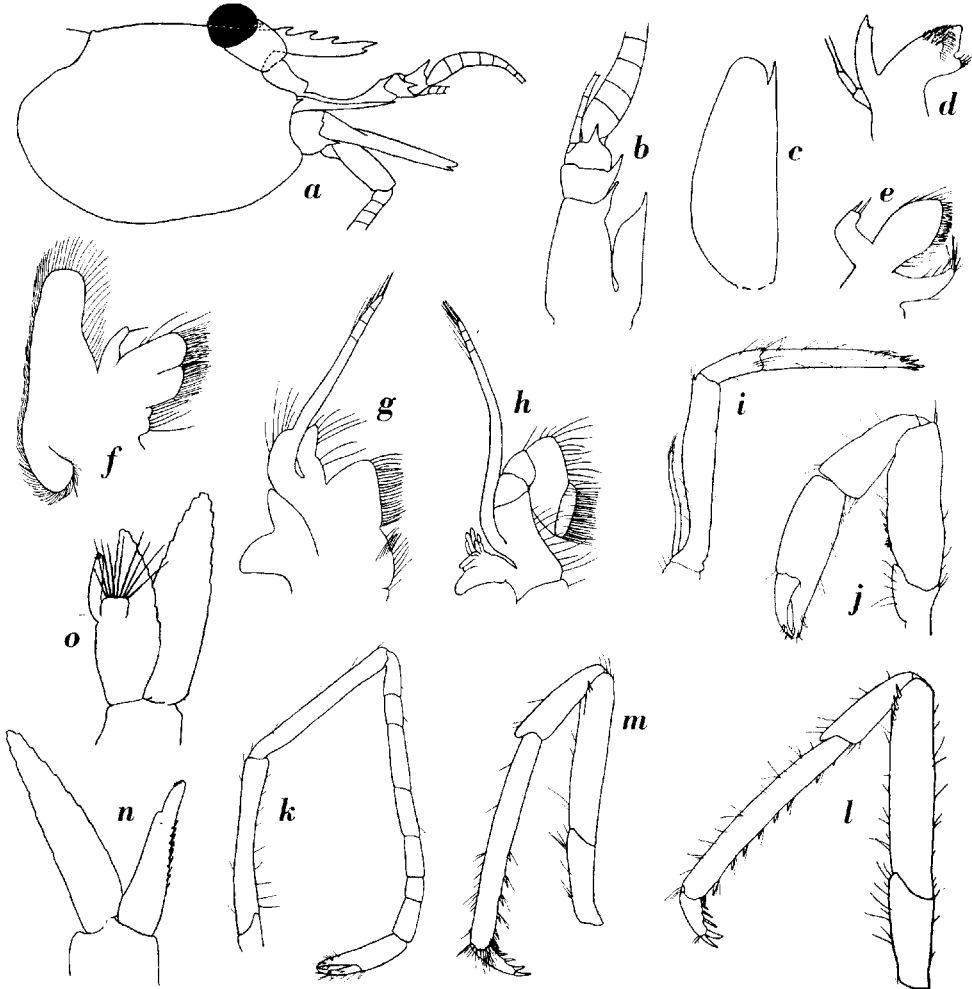


Fig. 26. *Eualus lebourae* n. sp. a, anterior part of body in lateral view; b, antennula; c, scaphocerite; d, mandible; e, maxillula; f, maxilla; g, first maxilliped; h, second maxilliped; i, third maxilliped; j, first pereopod; k, second pereopod; l, third pereopod; m, fifth pereopod; n, first pleopod of male; o, second pleopod of male. a, $\times 13$; b, c, i-m, $\times 20$; d, h, n, o, $\times 42$.

The antennular peduncle has the stylocerite reaching somewhat beyond the end of the basal segment. The outer margin of the stylocerite is straight, the inner is convex, the apex is sharp. The second and third segments of the antennular peduncle are very short. Each of the three segments bears a large tooth on the anterior margin, those of the first and second segment

are placed more externally than that of the third segment. The upper flagellum is simple and has the basal joints thickened.

The scaphocerite is somewhat more than 2.5 times as long as broad. The outer margin is straight and ends in a tooth, which reaches almost as far as the top of the lamella. The lamella has the top rounded. A spine is present near the base of the scaphocerite.

The mandible possesses a distinct two-jointed palp, the incisor process ends in about 5 small teeth, at the end the molar process is provided with some spines, hairs and ridges. The maxillula has the palp simple, the lower endite is slender, the upper is broader. The lower endite of the maxilla is short and inconspicuously bilobed, the upper endite is well developed and deeply incised. The exopods of all maxillipeds are well developed, that of the first and second maxilliped are articulated in the distal part. The endites of the basis and the coxa of the first maxilliped are separated by a notch, the epipod of this maxilliped is bilobed. The second maxilliped is of the usual shape, an epipod and a podobranch are present. The third maxilliped reaches with the greater part of the ultimate joint beyond the scaphocerite. This joint bears some spines in the distal part, it is twice as long as the penultimate joint and about $\frac{4}{5}$ of the length of the antepenultimate joint. This antepenultimate joint bears a spine in the distal part of the outer margin. The exopod reaches somewhat beyond the middle of this joint. The branchial formula runs as follows:

	maxillipeds			pereiopods				
	I	II	III	I	II	III	IV	V
pleurobranchs	---	---	---	1	1	1	1	1
arthrobranchs	---	---	---	---	---	---	---	---
podobranchs	---	1	---	---	---	---	---	---
setobranchs	---	---	---	1	1	1	---	---
epipods	1	1	1	1	1	1	---	---
exopods	1	1	1	---	---	---	---	---

The first legs are short, thickset and equal. They do not reach the end of the scaphocerite. The fingers end in dark coloured ungues, they are $\frac{2}{3}$ of the length of the palm. The carpus is slightly longer than the palm and $\frac{3}{5}$ of the length of the merus. The latter joint bears some small spinules on its inner margin. The second legs are slender, they reach with half the carpus beyond the scaphocerite. The chela is small, with the fingers about as long as the palm. The carpus is three times as long as the chela. It is divided into 7 joints. The ratio of the lengths of the various joints is exactly like that in *Eualus occultus*. The merus is $\frac{3}{5}$ of the length of the carpus and about as long as the ischium. The third leg reaches with part of the propodus beyond the scaphocerite. The dactylus ends in two strong teeth and

has some three spinules on the posterior margin. The propodus is about three times as long as the dactylus and bears various spinules on the posterior margin. The carpus is slightly less than half as long as the propodus. The merus is about as long as the propodus. The distal part of its outer surface bears a row of three spines near the posterior margin. A distinct epipod is present at the base of this leg. The fourth leg resembles the third, but it lacks the epipod. The fifth leg almost reaches the tip of the scaphocerite. It has the same shape as the third leg, but is somewhat more slender. The merus bears only one spine at the distal posterior angle.

The pleopods of the second to fifth pairs of both sexes are provided with appendices internae. The first pleopod of the male has the endopod elongate and narrowing distally, the tip bears some curved hooks, a row of spinules is present on the inner margin. The second pleopod of the male has the appendix masculina very short and broad. The uropods are elongate. The outer margin of the exopod ends in a tooth, which at its inner side bears a movable spine.

The eggs are numerous and small, they are 0.3 to 0.5 mm. in diameter.

Type. Holotype is the ovigerous female.

The species shows a very close resemblance to *Eualus occultus* (Lebour), but may immediately be recognized from it by the presence of an epipod at the base of the third pereopods and by having the spines at the postero-distal angle of the merus of the last three pairs of legs less numerous. More material of both forms must decide whether the differences in the shape of the rostrum, of the telson and of the appendix masculina are constant or not. The present specimens are also smaller than the specimens of *Eualus occultus* seen by me.

This new species is named for Dr. MARIE V. LEBOUR of Plymouth, whose important studies on European Hippolytidae greatly added to our knowledge of this interesting group of Caridea.

Thoralus cranchii (Leach) 1817.

Restricted synonymy:

Hippolyte Cranchii Leach 1817, pl. 38 figs. 17—21.

Hippolyte cranchi Ortmann 1893, p. 45.

Spirontocaris Cranchi Monod 1933, p. 465.

Material examined:

Station 43, Praia, São Thiago, Cape Verde Islands; Sigsbee trawl, 22 m. depth, bottom corals; December 13, 1945, 14h⁴⁰. — 1 specimen 8 mm.

Station 44, off French Guinea, 10°22' N, 16°22' W; Sigsbee trawl, otter trawl and triangular dredge (45 cm.), 41—55 m. depth, bottom brown sand and shells; December 17, 1945. — 1 ovigerous female 9 mm.

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, 7—10 m. depth, bottom shells and Foraminifera; March 13, 1946, 7h—10h. — 18 specimens (including 3 ovigerous females, 9—11 mm.) 5—11 mm.

Station 147, off French Guinea, 9°28' N, 14°58' W; Sigsbee trawl, 45 m. depth, bottom shells and Foraminifera; April 14, 1946, 8h⁵⁵—9h³⁵. — 2 specimens 6 and 8 mm., 1 fragment.

The present specimens show an extremely close resemblance to the typical *Thoralus cranchii*. As far as I can see they differ in two respects only. In the first place the number of spines on the merus in the females is much smaller in the West African specimens. In my ovigerous females the merus of the third leg bears 2 or 3 (generally 2) spines, that of the fourth and fifth legs 1 or 2 (generally 2) spines. Secondly, the West African specimens are smaller than the European. The latter feature, however, is found in almost all West African representatives of European littoral species (e. g., *Alpheus dentipes* Guérin, *A. macrocheles* (Hailst.)). The value of the first difference can only be ascertained after examination of material from more northern localities of the West African coast.

Distribution. This littoral species has been recorded from W. Norway southwards to the Mediterranean and the Cape Verde Islands. The only West African records of the species found by me in literature are: Cape Blanco, Mauritania (MONOD, 1933), Baixo de João Leitão, S. of Boavista, Cape Verde Islands (ORTMANN, 1893).

LEBOUR (1936) for the first time pointed out that the form generally considered up to that time to be "*Spirontocaris cranchii*" in reality consists of two species, one of which is the present *Thoralus cranchii* (Leach), the other *Euulus occultus* (Lebour). It is probable therefore that part of the references to *Spirontocaris cranchii* given in literature do not refer to the present species. Thus the exact range of *Thoralus cranchii* is unknown; it is known with certainty, however, from S. England, the Netherlands, the Mediterranean coast of Spain and Naples.

Hippolyte coeruleus (Fabricius) 1775.

Restricted synonymy:

- Astacus coeruleus* Fabricius 1775, p. 414.
- Hippolyte acuminatus* Dana 1852, p. 24.
- Hippolyte acuminatus* Dana 1852a, p. 562.
- Hippolyte acuminata* Dana 1855, atlas, p. 11, pl. 36 fig. 1.
- Virbius acuminatus* Ortmann 1893, p. 46.
- Hippolyte bidentatus* Lenz & Strunck 1914, p. 318.
- Hippolyte acuminatus* Stebbing 1914, p. 289.
- Hippolyte bidentata* Odhner 1923, p. 4.
- Hippolyte (Virbius) acuminatus* Balss 1925, p. 288.

Distribution. This is one of the typical Gulfweed prawns. It is known from the Central Atlantic Ocean from Bermuda and the S.E. coast of the United States of America to the Azores, the Canary and Cape Verde Islands, the Gulf of Guinea and S. Angola. The West African records are: N.W. of the Cape Verde Islands, 18°43' N, 27°46' W (STEBBING, 1914), N.W. of the Cape Verde Islands (ORTMANN, 1893), 13 stations on an almost straight line between the Cape Verde Islands and Ascension (ORTMANN, 1893), S.W. of Sierra Leone, 4°07' N, 20°43' W (DANA, 1852 a), S.W. of Liberia, ca. 0° N, 15° W (LENZ & STRUNCK, 1914), off Liberia, ca. 1° N, 8° W; off Ivory Coast, 0°20' N, 6°45' W; off Nigeria, 2°36' N, 3°27' E (BALSS, 1925), Porto Alexandre, S. Angola (ODHNER, 1923).

Hippolyte ? longirostris Holthuis 1947.

Restricted synonymy:

Hippolyte longirostris Holthuis 1947, pp. 15, 54.

Material examined:

Station 148, off French Guinea, 9°57' N, 15°22' W; Sigsbee trawl, 25 m. depth, bottom shells and hydroids; April 14, 1946, 16h²⁵—16h⁵⁵. — 6 specimens (including 1 ovigerous female, 7 mm.) 5—8 mm.

The present material shows most resemblance to *Hippolyte longirostris* Holthuis (= *Hippolyte gracilis* (Heller, 1862, non Lilljeborg, 1850). It differs, however, from that species in the following points:

1. The animals are much smaller than specimens of *Hippolyte longirostris* from the Mediterranean, though at least one of them is adult.
2. The rostrum in the ovigerous female is completely unarmed, though a minute notch on the lower margin may indicate a reduced tooth. The other specimens too have the rostrum unarmed or possess a very small ventral tooth close to the apex and a dorsal tooth just before the posterior margin of the orbit.

The genus *Hippolyte* is one of the most difficult genera of Hippolytidae to deal with. Even the European species of it are insufficiently known. Before we know more about the status of the various European species and especially of *Hippolyte longirostris*, of the variability of the various characters and of the forms of the N.W. coast of Africa, it is impossible to fully decide the identity of the present Atlantide material.

Distribution. *Hippolyte longirostris* is known from the south coast of England southwards to the Mediterranean and the Black Sea. It is a littoral form.

Hippolyte species.

Hippolyte sp. ? Osorio 1889, p. 137.

Hippolyte sp. ? Osorio 1898, p. 194.

Hippolyte species Rathbun 1900, p. 313.

In a list of Crustacea from São Thomé, OSORIO (1889) mentions *Hippolyte* sp., without giving a description of this species. Since also no more information of this material has been given later, its identity remains unknown. It was collected at Praia das Conchas, São Thomé.

Trachycaris restricta (A. Milne Edwards) 1878.

(Fig. 27).

- Hippolyte restrictus* A. Milne Edwards 1878, p. 231.
Platybema rugosus Bate 1888, p. 579, pl. 104 fig. 2.
Platybema rugosum Ortmann 1893, p. 47.
Platybema rugosum Rathbun 1902, p. 113.
Platybema rugosus Calman 1906, p. 33 (new genus *Trachycaris* erected).
Platyblema rugosum Bouvier 1918, p. 6.
Trachycaris rugosus Schmitt 1924, p. 82.
Trachycaris rugosus Schmitt 1924a, p. 68.
Trachycaris rugosus Schmitt 1935, p. 156, fig. 23.
Trachycaris rugosus Gurney 1940, p. 123, pls. 1—3.
Trachycaris rugosus Holthuis 1947, p. 16.
Hippolyte restrictus Holthuis 1947, p. 22.
Trachycaris restrictus Holthuis 1949, p. 233, figs. 2, 3.

Material examined:

Station 40, off São Pedro Bay, São Vicente, Cape Verde Islands; triangular dredge (45 cm.), 40 m. depth, bottom corals; December 11, 1945, 14 h¹⁰. — 1 specimen 9 mm.

The present specimen agrees well with the description and figures given by me (HOLTHUIS, 1949, p. 233) of an ovigerous female from the Canary

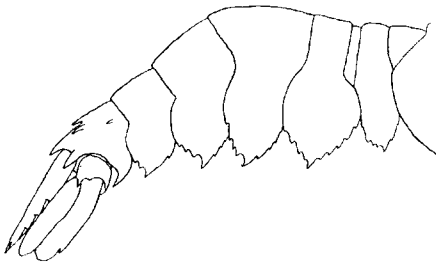


Fig. 27. *Trachycaris restricta* (A. Milne Edw.).
 Abdomen in lateral view. $\times 15$.

Islands. The small differences may be due to the fact that the Atlantide specimen is juvenile. Only two minute teeth are visible on the truncated apex of the rostrum, while the upper margin of the rostrum bears 9 teeth, which are slightly larger than in the Canary Islands specimen. The pleurae of the abdominal segments end in a sharp median tooth, which is directed somewhat posteriorly. In the first five seg-

ments smaller teeth are visible on the margin of the pleurae before and behind this median tooth. In the sixth segment the pleurae also end in a sharp point, but bear no additional teeth. The telson is provided with three pairs of lateral and two pairs of posterior spines. The pleopods are small and the endopods bear no appendices.

Distribution. The species is a littoral form generally occurring at depths between 0 and 50 m. It is known from the Atlantic coast of America (Ber-

muda, West Indies and N.E. Brazil) and from West Africa. The West African records are: Tenerife, Canary Islands (HOLTHUIS, 1949), Cape Verde Islands (A. MILNE EDWARDS, 1878), Gulf of Guinea (GURNEY, 1940), St. Helena (GURNEY, 1940).

Latreutes fucorum (Fabricius) 1798.

Restricted synonymy:

Palaemon fucorum Fabricius 1798, p. 404.

Latreutes fucorum Stebbing 1914, p. 290.

Distribution. Like *Hippolyte coerulescens* (Fabr.) this is also a typical inhabitant of the Gulfweed. It has been reported from the Atlantic Ocean from near Newfoundland to the West Indies, Bermuda, the Azores and the Cape Verde Islands; there is a doubtful record from the Cape of Good Hope. The only record I could find within the present region is that of STEBBING (1914): N.W. of the Cape Verde Islands, 18°43' N, 27°46' W.

Latreutes parvulus (Stimpson) 1866.

(Figs. 28, 29).

Rhynchocyclus parvulus Stimpson 1866, p. 48.

Rhynchocyclus parvulus Stimpson 1874, p. 124.

Rhynchocyclus parvulus Kingsley 1878, p. 56.

Concordia gibberosus Kingsley 1879, p. 414, pl. 14 fig. 5.

Rhynchocyclus parvulus Kingsley 1899, p. 716.

Concordia gibberosus Kingsley 1899, p. 716, fig. 17.

Conchordia gibberosa Cary & Spaulding 1909, p. 10.

Concordia gibberosus Fowler 1912, p. 554.

Concordia gibberosus Hay & Shore 1918, p. 391, pl. 26 fig. 11.

Latreutes gibberosus Schmitt 1935, p. 152, fig. 18.

Latreutes gibberosus McDougall 1943, p. 371.

Latreutes parvulus Holthuis 1947, pp. 17, 59.

Material examined:

Station 141, off Freetown, Sierra Leone; Commercial otter trawl, 15 m. depth, bottom sand; April 9, 1946, 11h–16h. — 1 ovigerous female 7 mm.

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, 32 m. depth, bottom shells and Foraminifera; April 13, 1946, 7h⁴⁵–10h¹⁰. — 15 specimens (including 5 ovigerous females, 10–11 mm.) 6–12 mm.

Station 147, off French Guinea, 9°28' N, 14°58' W; Sigsbee trawl, 45 m. depth, bottom shells and Foraminifera; April 14, 1946, 8h⁵⁵–9h³⁵. — 1 specimen 7 mm.

Station 148, off French Guinea, 9°57' N, 15°22' W; Sigsbee trawl, 25 m. depth, bottom shells and hydroids; April 14, 1946, 16h²⁵–16h⁵⁵. — 6 specimens (including 5 ovigerous females, 11–15 mm.) 10–15 mm.

The rostrum is compressed laterally and very high. It is almost circular in outline in the female, more elongate in the male. The upper margin is serrate and bears six to eight teeth in the female, two to four in the male. Some small teeth are present on the tip of the rostrum. The lower margin of the rostrum is entire or bears up to 5 shallow teeth. The ventral part of the rostrum is produced somewhat backwards. The middorsal line of the carapace bears a row of five to seven (generally six) small erect teeth. This row starts somewhat anterior of the middle of the carapace and extends all the way to the base of the rostrum. In the female the carapace is somewhat swollen, the upper margin making thereby a distinct angle near the base of the row of teeth. In the males the upper margin is nearly straight. The anterior margin of the carapace shows a narrow, anteriorly directed lobe, which forms the lower angle of the orbit. A slender spine is placed on this lobe. The anterolateral angles of the carapace end in from two to four teeth. Between the lower orbital angle and the anterolateral angle of the carapace a row of three or four slender spines is placed slightly behind and parallel to the anterior margin of the carapace.

The abdomen is smooth and has the pleurae of the first five segments broadly rounded in both sexes. The sixth segment is somewhat less than twice as long as the fifth. The pleura of the sixth segment is bluntly, the posterolateral angle sharply pointed. A subanal spine is present on the lower surface of the segment. The telson is elongate, it is about as long as the fifth and sixth abdominal segments combined. The dorsal surface bears two pairs of spines, the former being placed in or somewhat before the middle of the telson, the last pair stands halfway between the first pair and the posterior margin. The latter ends in a sharp point and bears two pairs of spines, the outer of which is short, the inner long and slender.

The eyes are well developed and have the cornea globular. In my spirit specimens 4 small dark spots, which are arranged in a quadrangle, are visible on the cornea. The eyestalk bears at the upper inner part of its anterior margin a small truncated process, which overlaps the line separating the cornea from the stalk.

The antennular peduncle has the stylocerite broad and rounded, it is hollowed above, and together with the basal segment of the peduncle forms a cavity for the reception of the eye. The second segment of the peduncle is very short, being much shorter than the third. There are two flagella, the upper of which is the shorter, consisting of about 7 or 8 broad and 1 or 2 narrow joints.

The scaphocerite is short and broad, it is about twice as long as broad. It overreaches the antennular and antennal peduncles, but falls short of the end of the rostrum. The outer margin is almost straight and ends in a small final tooth, which reaches about as far forwards as the lamella. A small spine is present on the outer surface of the antennal peduncle near the base of the scaphocerite.

The mandible bears no palp and possesses no incisor process. The molar process has the distal surface provided with blunt teeth and various spinules. The maxillula has the lower endite slender and ending in some slender spinules, the upper endite is somewhat broader. The palp is simple. The maxilla has the upper endite distinctly bilobed, the lower endite is reduced to an inconspicuous lobe bearing some hairs; the palp and the scaphocerite are well developed. All maxillipeds possess exopods, which are incon-

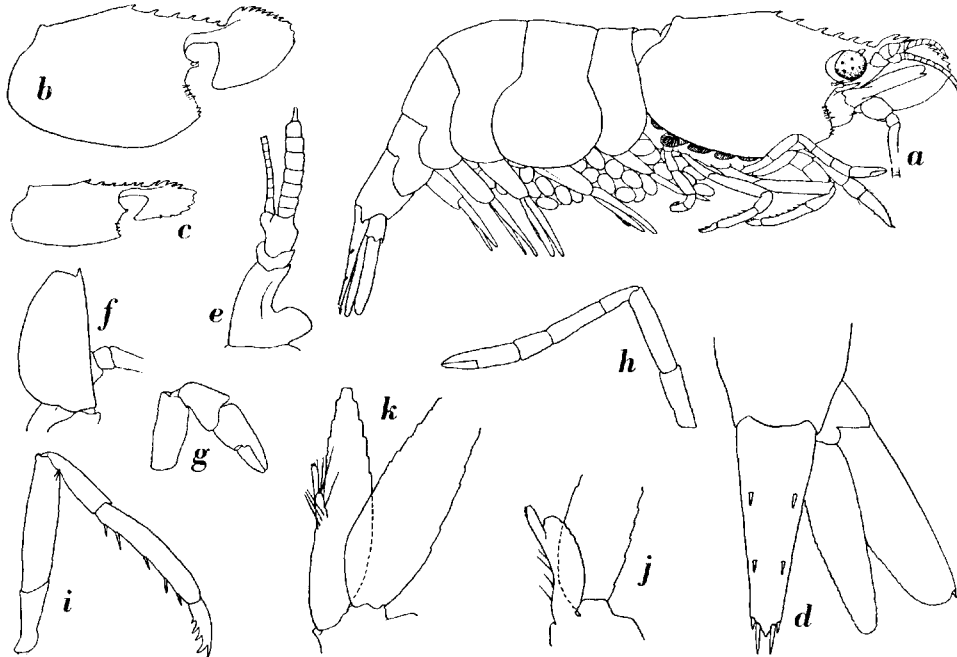


Fig. 28. *Latreutes parvulus* (Stimpson). a, ovigerous female in lateral view; b, carapace of ovigerous female in lateral view; c, carapace of male in lateral view; d, telson and right uropod in dorsal view; e, antenna; f, antenna; g, first pereopod; h, second pereopod; i, third pereopod; j, first pleopod of male; k, second pleopod of male. a—c, $\times 6$; d, g—i, $\times 17$; e, f, $\times 13$; j, k, $\times 20$.

spicuously articulated in the distal part. The first maxilliped has the endites of the basis and coxa distinctly separated, the coxal endite projecting beyond the basal. The palp is very broad, the caridean lobe very narrow. The epipod is well developed and inconspicuously bilobed. The second maxilliped has the last joint short, almost semicircular, it is placed at the end of the penultimate joint. The third maxilliped reaches somewhat beyond the end of the antennal peduncle. The last joint is more than twice as long as the penultimate, and about $\frac{5}{7}$ of the length of the antepenultimate joint. Spines are present on the top and in the distal part of the inner margin of the distal joint. The second joint bears two spines on the outer anterior angle, while in the third joint there is a row of about 5 spines along the distal

part of the outer margin. The exopod is short, failing to reach the middle of the antepenultimate segment. The branchial formula runs as follows:

	maxillipeds			pereiopods				
	I	II	III	I	II	III	IV	V
pleurobranchs.....	---	---	---	1	1	1	1	1
arthrobranchs.....	---	---	---	---	---	---	---	---
podobranchs.....	---	---	---	---	---	---	---	---
epipods.....	1	1	1	1	1	1	1	---
exopods.....	1	1	1	---	---	---	---	---

The first legs are equal, short and thickset. When stretched forwards they slightly overreach the base of the scaphocerite. The fingers are somewhat shorter and narrower than the palm. The tips of the fingers end in some dark coloured ungues. The palm broadens somewhat posteriorly. The carpus is about as long as the palm, it is about conical, narrowing towards the base. The merus is unarmed and almost as long as the chela. The second legs are slenderer. They reach about to the end of the antennal peduncle. The chela has the fingers slightly shorter than the palm. The carpus is somewhat less than twice as long as the chela. It consists of three joints, the median of which is longest. This median joint is 1.5 times as long as the basal joint. The ultimate joint is slightly shorter than the basal. The merus measures $\frac{2}{3}$ of the length of the carpus and is 1.5 times as long as the ischium. The third leg reaches about to the end of the scaphocerite. The dactylus ends in a sharp tooth and bears a row of four teeth on the posterior margin. Of these four teeth the distal is largest, the teeth decrease in size proximally. The propodus is twice as long as the dactylus, it bears 5 posterior movable spines. The carpus is $\frac{5}{8}$ of the length of the propodus, while the merus is as long as the latter segment. A movable spine is present in the distal posterior part of the outer surface of the merus. The ischium is half as long as the merus. The fourth and fifth legs in all essential points are similar to the third. The distal posterior spine of the merus, however, lacks in leg 5.

The male has the endopod of the first pleopod small and provided with a small appendix interna. The second pleopod of the male has the appendix masculina short, thickset and provided with several strong hairs. The appendix interna distinctly overreaches the appendix masculina. The other three pleopods have the endopod provided with a small appendix interna. In the female appendices internae are present from the second to fifth pleopods; no appendix is present here on the endopod of the first pleopod. The uropods are elongate. The exopod has the outer margin ending in a small movable spine.

The eggs are fairly numerous, they are 0.4 to 0.5 mm. in diameter.

Distribution. The species is a littoral form. It has been recorded from the Atlantic coast of the U. S. A. (North Carolina, South Carolina, Florida, Louisiana and Texas) and from the West Indies (Cuba and Porto Rico). It is reported now for the first time from the West African coast.

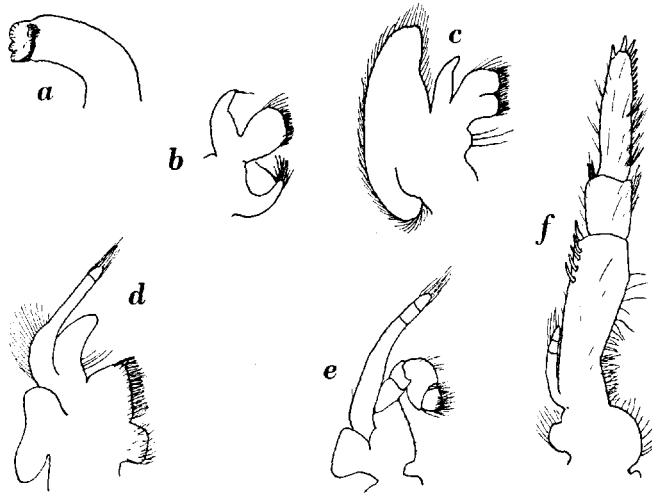


Fig. 29. *Latreutes parvulus* (Stimpson). a, mandible; b, maxillula; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped. a—f, $\times 27$.

I was able to compare a specimen of this species from Bahia Honda, Cuba (coll. Zoological Museum, Amsterdam) with the Atlantide material. This comparison fully convinced me that the American and West African specimens belong to one species.

Bythocaris cosmetops n. sp.
(Fig. 30).

Material examined:

Station 49, off Sierra Leone, $7^{\circ}29' N$, $13^{\circ}38' W$; Sigsbee trawl, 74—78 m. depth, bottom muddy sand; December 30, 1945, 8h²⁰. — 1 ovigerous female 13 mm.

Description. The rostrum is depressed, it is broadly triangular in dorsal view, and ends in a rather blunt median point, which fails to reach the end of the eyestalks when the eyes are directed forwards. The rostrum forms a wing-like expansion over the orbits; these expansions end in a distinct sharp angle, and may be considered to be the supra-orbital teeth. The rostrum bears no teeth on either upper or lower surface, but there is a median dorsal carina. A distinct tooth is present at the middorsal line of the carapace near the base of the rostrum. The orbit is rather deeply sunk,

its lower angle is rounded. The antennal spine is placed closely below this lower orbital angle. No other spines are present on the carapace.

The abdomen is smooth. The posterior margin of the third segment is damaged in the middle. The pleurae of the first two segments in my specimen are broadly rounded, that of the second segment especially is very broad

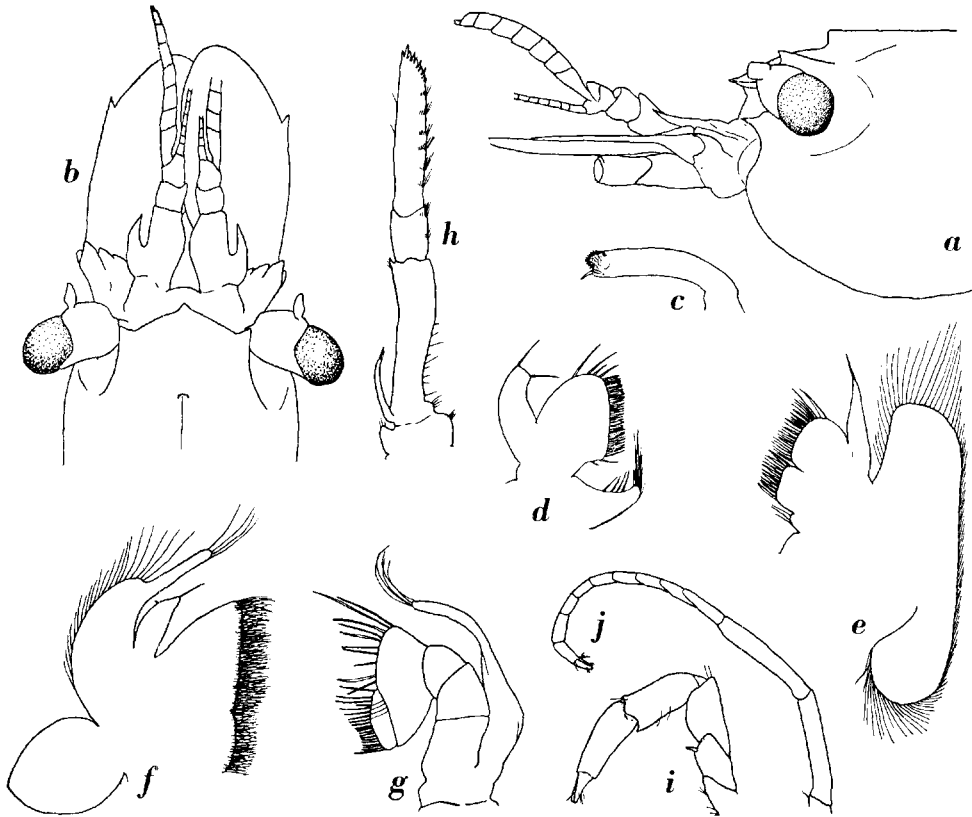


Fig. 30. *Bythocaris cosmetops* n. sp. a, anterior part of body in lateral view; b, anterior part of body in dorsal view; c, mandible; d, maxillula; e, maxilla; f, first maxilliped; g, second maxilliped; h, third maxilliped; i, first pereopod; j, second pereopod. a, b, h—j, $\times 20$; c—g, $\times 42$.

and it almost completely covers the pleura of the first segment. The pleurae of the third, fourth and fifth segments are pointed. The fifth somite possesses a carina parallel to and placed at some distance from the posterior margin. The sixth segment is somewhat longer than the fifth, its pleurae are small and rounded, each of the posterolateral angles is provided with a small denticle at the top. The telson is longer than the sixth abdominal segment. The dorsal surface bears three pairs of spines, which are placed close to the lateral margins. The anterior pair is placed at $\frac{1}{3}$ of the length of the telson measured from its base. The posterior margin of the telson is slightly

convex and bears about 8 spinules, the inner 5 of which are present in my specimen, they are slender.

The eyes have the cornea rounded and well pigmented. The peduncle is peculiar in bearing at the inner side an almost quadrangular compressed lobe, which stands almost at right angles to the peduncle itself.

The basal segment of the antennular peduncle has the stylocerite rather slender and pointed, it almost reaches the end of the segment. The second and third segments are short. The two flagella are simple, the outer consists of about 7 broad and 1 narrow joints, the inner flagellum is narrow.

The scaphocerite far overreaches the antennular peduncle. The outer margin is slightly convex and ends in a distinct but not very large tooth. This tooth is far overreached by the lamella. The scaphocerite is about twice as long as broad.

The mandible is simple, it has neither an incisor process nor a palp. The maxillula has the lower endite slender, the upper endite is much broader, the palp is truncate and bears two hairs. The maxilla has the upper endite well developed and distinctly cleft, the lower endite is reduced to a single lobe; the palp is short and rather broad, it is inserted on the margin of the upper endite; the scaphognathite is well developed. All maxillipeds are provided with an exopod. The first maxilliped has the endites of the coxa and basis separated by a distinct notch, the palp is somewhat broadened in the middle, the caridean lobe is distinct, the epipod is rather broad. The second maxilliped is of the usual shape, the last joint is fused with the penultimate joint along its longer side. There is no distinct epipod at the base of the second maxilliped. The third maxilliped reaches almost to the end of the scaphocerite. The last joint is about three times as long as the penultimate. At the top it bears a row of spines. These spines are of two kinds: slender spines of the usual shape alternate with short broad and flattened spines. The antepenultimate segment of the third maxilliped is somewhat longer than the ultimate and bears a distinct spine at the outer distal angle. A small exopod is present. The branchial formula runs as follows:

	maxillipeds			perciopods				
	I	II	III	I	II	III	IV	V
pleurobranchs	—	—	—	1	1	1	1	1
arthrobranchs	—	—	—	—	—	—	—	—
podobranchs	—	—	—	—	—	—	—	—
epipods	1	—	1	—	—	—	—	—
exopods	1	1	1	—	—	—	—	—

The first legs are short, equal and thickset, they reach about to the base of the scaphocerite. The fingers are slightly less than half as long as the palm. The carpus is about as long as the palm and longer than the merus.

The ischium is short and bears a spine on the internal margin. The second leg is slender. The chela has the fingers shorter than the palm. The carpus is four times as long as the chela. It is subdivided into 8 joints, the extremes of which are longest. Between the distal joints the articulation is straight, lying about at right angles to the axis of the carpus. Between the proximal joints of the carpus, however, the articulation stands very obliquely on the axis of the carpus. The merus is somewhat more than half as long as the carpus and as long as the ischium. None of the last three pairs of pereopods is present in the only specimen at my disposal.

The endopod of the first pleopod in my ovigerous female is ovate and bears no appendix. An appendix interna is present on the endopods of the following pleopods. The uropods are elongate ovate. The exopod has the outer margin ending in a distinct tooth on the inner side of which a minute movable spinule is visible.

The eggs are large and few, they measure 0.6 to 0.8 mm.

Some parts of the present specimen, which is preserved in spirit like all the present material, show a dark colour by the presence of dark brown chromatophores. Such dark coloured spots may be observed on the antennal scales, on the carapace (especially in the middorsal line and on the supra-orbital spines), in the middorsal line of the first three abdominal segments, on the pleurae of the third and fourth segments, on the whole of the fifth segment, and on the uropodal endo- and exopods; furthermore a dark coloured band extends over the distal part of the sixth abdominal segment and the basal part of the caudal fan.

Though the specimen is incomplete and other specimens of the same species are not available, the characters are so distinct that it can easily be recognized from all other known species of the genus. Therefore, I do not hesitate to establish a new species on this single imperfect specimen. *Bythocaris cosmetops* differs from all other species of the genus by the ornamentation of the eyestalk and by the absence of a hepatic spine on the carapace. It resembles *Bythocaris leucopsis* Sars and *B. simplicirostris* Sars by having a middorsal tooth on the carapace. The shape of the antennulae, antennae and mouth parts, however, like the branchial formula, are similar to that of the species of *Bythocaris* hitherto known.

Of the genus *Bythocaris* five species were known, all of which inhabit the Northern Atlantic Ocean north of the line connecting N. Carolina (U. S. A.) with Ireland and the northern North Sea. The species were found northwards up to Davis Strait, Spitsbergen, the Barents and the Kara Seas. The present species thus extends the known range of distribution of the genus very far southwards.

Lysmata moorei (Rathbun) 1902.

Restricted synonymy:

Hippolysmata moorei Rathbun 1902, p. 115, fig. 23.

Hippolysmata Moorei Balss 1916, p. 23, fig. 6.

Distribution. The littoral species is known from the West Indies and from West Africa. The only West African record is that by BALSS (1916): Sette Camma, Gabon.

Hippolysmata (Exhippolysmata) hastatoides (Balss) 1914.

Mimocaris hastatoides Balss 1914a, p. 596.

Mimocaris hastatoides Balss 1916, p. 23.

Mimocaris hastatoides Balss 1925, p. 289, textfigs. 68—74, pl. 28.

Exhippolysmata hastatoides De Man 1925, p. 29, figs. 5a, b.

Mimocaris hastatoides Monod 1927, p. 595.

Hippolysmata hastatoides Holthuis 1947, p. 19.

Distribution. The species is known from fresh and salt waters of West Africa. The records in literature are: Victoria, Cameroons (BALSS, 1914a, 1916, 1925), Vista, Belgian Congo (DE MAN, 1925), Boma, Belgian Congo (BALSS, 1916), Quissembo, N. Angola (BALSS, 1916).

Family **Palaemonidae.**Subfamily *Palaemoninae.**Desmocariss trispinosa* (Aurivillius) 1898.

Palaemonetes trispinosus Aurivillius 1898, p. 29, pl. 4 figs. 1, 2.

Palaemonetes trispinosus Rathbun 1900, p. 316.

Desmocariss trispinosus Sollaud 1911, p. 913.

Desmocariss trispinosus De Man 1912, p. 202.

Desmocariss trispinosa De Man 1925, p. 31, fig. 6.

Desmocariss trispinosus Schmitt 1926, p. 23.

Desmocariss trispinosa Holthuis 1950, p. 6.

Distribution. This species inhabits fresh water of the West African region. The records in literature are: Gold Coast (SOLLAUD, 1911), Kitta, Cameroons (AURIVILLIUS, 1898), Brazzaville, French Congo (SOLLAUD, 1911), Ottenge River near Banzyville, Belgian Congo (DE MAN, 1912), Banzyville (DE MAN, 1925), Stanleyville (DE MAN, 1925; SCHMITT, 1926), Elisabetha near Basoko, and Banana, Belgian Congo (DE MAN, 1925).

Palaemon serratus (Pennant) 1777.

Restricted synonymy:

Astacus Serratus Pennant 1777, p. 19, pl. 16 fig. 28.

Palaemon serratus Holthuis 1949, p. 241.

Distribution. *Palaemon serratus* is known from Denmark, Holland and the British Isles southwards to Cape Blanco, the Mediterranean and the Black Sea. The only record falling within the region dealt with here is that of HOLTHUIS (1949) from Bahia del Oeste, Cape Blanco, Rio de Oro.

Palaemon elegans Rathke 1837.

Restricted synonymy:

- Palaemon elegans* Rathke 1837, p. 370, pl. 4 fig. 5.
Palaemon squilla Osorio 1888, p. 189.
Leander squilla Ortmann 1893, p. 47.
Palaemon squilla Osorio 1898, p. 194.
Leander squilla Balss 1913, p. 107.
Leander squilla Stebbing 1914, p. 286.
Leander squilla Balss 1916, p. 24.
Palaemon squilla Schmitt 1926, p. 24, fig. 64.
Palaemon squilla Monod 1933, p. 464.
Leander squilla Barnard 1950, p. 783.

Material examined:

Station 42, Praia, São Thiago, Cape Verde Islands; handnet, rocky bottom; December 13, 1945, 10h⁰⁰. — 14 specimens (including 1 ovigerous female, 27 mm.) 12—28 mm.

Palaemon elegans has often been cited in literature under the name *Leander* (or *Palaemon*) *squilla*. My reasons for changing this name have dealt with in detail in another paper (HOLTHUIS, 1950, pp. 55, 56).

Distribution. *Palaemon elegans* is a littoral species, it is generally found in the upper littoral zone on a rocky bottom. It has been reported from S.W. Norway to the Mediterranean and the Black Sea, and from various localities along the westcoast of Africa till Lüderitz Bay. The West African records are: Cape Blanco, Mauritania (MONOD, 1933), São Vicente, Cape Verde Islands (ORTMANN, 1893), Porto Grande, São Vicente (STEBBING, 1914), São Thiago, Cape Verde Islands (OSORIO, 1888), Bissago, Portuguese Guinea (BALSS, 1916), Los Islands, French Guinea (MONOD, 1933), Bibundi, Cameroons (BALSS, 1916), Gabon (BALSS, 1916), São Paulo de Loanda, N. Angola (SCHMITT, 1926), Swakopmund, S.W. Africa (BALSS, 1916), Lüderitz Bay, S.W. Africa (BALSS, 1913, 1916). The specimens mentioned by STEBBING (1910) as *Leander squilla* from S. Africa in reality are *Palaemon pacificus* Stimps. *Palaemon elegans* also is known from the Canary Islands, the Azores and Madeira.

Palaemon maculatus (Thallwitz) 1892.

- Leander maculatus* Thallwitz 1892, pp. 19, 49.
 ?*Leander adpersus* Sharp 1893, p. 119.
Leander maculatus Rankin 1898, p. 246.
Palaemon edwardsii Rathbun 1900, p. 314 (non Heller, 1863).
Leander edwardsii Johnston 1906, p. 862.
Palaemon (*Laender*) *Edwardsii* Lenz 1910, p. 126.
Leander Edwardsii Balss 1916, p. 26, figs. 7, 8.
Leander maculatus De Man 1923, p. 3.

Leander maculatus Kemp 1925, p. 290.

Leander maculatus De Man 1925, p. 36, figs. 8 a—d.

Palaemon maculatus Schmitt 1926, p. 25, fig. 65.

Leander maculatus Barnard 1950, p. 782.

Palaemon (Palaeander) maculatus Holthuis 1950, p. 8.

Material examined:

Station 93, Lagoon of Lagos, Nigeria; handnet, bottom sand; February 6, 1946, 10h⁰⁰. — 3 specimens 19—25 mm.

Station 93, Fisheries Development Station, Lagos, Nigeria; handnet, bottom mud; February 5, 1946, 10h⁰⁰. — 30 specimens (including 11 ovigerous females, 23—32 mm.) 17—36 mm.

BALSS (1916) gives a good figure of the present species. An extensive description of it has been published by DE MAN (1925).

In my material a distinct branchiostegal groove is present. This groove attains the anterior margin of the carapace just above the branchiostegal spine.

The pleurae of the fifth abdominal segment end in a distinct sharp point.

The stylocerite bears no dorsal tooth in the basal part.

The mandible has the palp two-jointed. This is in contradiction with SCHMITT'S statement that the palp is three-jointed.

The endopod of the first pleopod of the male is elongate ovate with the inner margin almost straight or somewhat concave in the middle. The second pleopod of the male has the appendix masculina slender and a little longer than the appendix interna.

The eggs are numerous and small, being 0.4 to 0.6 mm. in diameter.

KEMP (1925) ranges the present species among the forms which have the shorter ramus of the upper flagellum of the antennula fused with the longer ramus for much less than half its length. As is shown by my material, and also by DE MAN'S (1925) description and figure, the fused part of the shorter ramus is about as long as the free part.

BALSS (1916) states the propodus of the fifth pair of pereiopods to have the distal part of the posterior margin provided with a row of small spinules. In reality, however, these are the various transverse rows of short hairs, which are always present in the species of this genus. A few minute spinules occur on the propodus of the fifth as well as of the third and fourth legs, these are, however, distributed throughout the length of the joint and are small in number.

SHARP (1893) in the list of Crustacea of the collection of the Philadelphia Academy of Sciences, mentions a specimen of "*Leander adpersus*" from Liberia. It is possible that SHARP'S specimen belongs to *Palaemon maculatus* (Thallw.), but since he does not give a description, this can not be made out with certainty without reexamination of the material.

Distribution. The species inhabits brackish water. It is known only from West Africa. The records in literature are: Liberia (JOHNSTON, 1906), Monrovia and Mount Coffee, Liberia (RATHBUN, 1900), Old Calabar, Nigeria (BALSS, 1916), Ogowé River, Gabon (THALLWITZ, 1892), Chiloango River near Landana, Kabinda (LENZ, 1910), Banana, Belgian Congo (DE MAN, 1923, 1925; SCHMITT, 1926), Great Fish Bay, S. Angola (BALSS, 1916). BALSS (1916) adds to his record of this species from the Great Fish Bay, "Deutsche Tiefsee-Expedition", but in the reports of the Valdivia Expedition no mention is made of this species or any other member of the genus.

Palaemon hastatus Aurivillius 1898.

Palaemon (Leander) hastatus Aurivillius 1898, p. 27, pl. 4 figs. 3—6.

Palaemon hastatus Rathbun 1900, p. 315.

Palaemon (Leander) hastatus Gruvel 1912, p. 16.

Leander hastatus Balss 1916, p. 25.

Leander hastatus Kemp 1917, p. 204.

Leander hastatus Kemp 1925, p. 289.

Leander hastatus De Man 1925, p. 34, figs. 7 a—h.

Palaemon (Nematopalaemon) hastatus Holthuis 1950, p. 9.

Material examined:

Station 101, off Nigeria, 5°59' N, 4°36' E; Sigsbee trawl, 17 m. depth, bottom mud; February 15, 1946, 15h⁰⁰—15h⁵⁵. — 2 specimens 47 and 48 mm.

Station 130, off Angola, 6°00' S, 12°14' E; bottom sample Jvu; Petersen grab, 80 m. depth, bottom mud; March 15, 1946, 9h¹⁰. — 1 specimen 22 mm.

Station 131, off Congo River, 5°58' S, 12°08' E; Sigsbee trawl and otter trawl, 27 m. depth, bottom sandy mud; March 15, 1946, 11h³⁰—13h¹⁵. — 102 specimens (including 50 ovigerous females, 37—55 mm.) 24—57 mm.

Station 143, Konakri, French Guinea, quay; handnet; April 12, 1946, 16h⁰⁰. — 7 specimens 34—45 mm.

In the juvenile specimen from Station 130 the rostrum is very short, it fails to reach the end of the antennular peduncle. The upper teeth are distinct, but the ventrals are inconspicuous. In this specimen the dactylus of the third leg is slightly shorter than the propodus and carpus together.

The rostral formula is $\frac{7-10+1}{3-5}$. The branchiostegal spine is placed on the anterior margin of the carapace, which below this spine runs obliquely backwards and merges with the lateral margin. There is no branchiostegal groove. In the posterolateral region of the carapace there are two rather deep groove-like depressions, which are also figured by AURIVILLIUS.

The fifth abdominal segment has the pleura posteriorly produced, its apex is broadly rounded. The pleura and the posterolateral angle of the

sixth segment both end in a small sharp point. The telson bears two dorsal pairs of minute spinules, the anterior of which is very small, sometimes absent. Of the two pairs of spinules on the posterior margin of the telson the outer is almost invisible. Two setose hairs are present between the inner spines.

The stylocerite is short and pointed, it bears a large sharp tooth on its dorsal surface. This tooth has the tip curved anteriorly.

The mandibular palp is large and distinctly three-jointed.

The propodus of the fifth pereopod bears in the distal part of its posterior margin several transverse rows of short hairs. No spinules are visible there.

The endopod of the first pleopod of the male is simple and elongate ovate. The endopod of the second pleopod of the male has the appendix masculina much stronger and slightly longer than the appendix interna. The uropods are very elongate. The blade of the exopod reaches far beyond the end of the outer margin, which is formed by a small tooth. At the inner side of this tooth a slender movable spine is present.

The eggs are numerous and small, being 0.5 to 0.7 mm. in diameter.

Distribution. The species is mainly a marine form, but occurs also in brackish water. It is only known from the West African coast. The records in literature are: Monrovia and Grand Bassa, Liberia (BALSS, 1916), Saltpond, Accra and Addah, Gold Coast (BALSS, 1916), Grand Popo, Dahomey (BALSS, 1916), Beticka ba Mallale, Cameroons (AURIVILLIUS, 1898), Duala, Cameroons (BALSS, 1916), Loango, French Congo (BALSS, 1916), Kabinda, Kabinda (BALSS, 1916), mouth of Congo River (GRUVEL, 1912), Vista and Banana, Belgian Congo (DE MAN, 1925), Boma, Belgian Congo (BALSS, 1916), Quissembo, N. Angola (BALSS, 1916).

Palaemonetes africanus Balss 1916.

Palaemonetes africanus Balss 1916, p. 27, fig. 9.

Palaemonetes africanus Kemp 1925, p. 316.

Palaemonetes (Palaemonetes) africanus Holthuis 1950, p. 9.

Distribution. This species is only known from the original record: BALSS (1916) reports the species from Old Calabar, Nigeria.

Brachycarpus biunguiculatus (Lucas) 1849.

Restricted synonymy:

Palaemon biunguiculatus Lucas 1849, p. 45, pl. 4 fig. 4.

Material examined:

Station 53, off Marshall, Liberia; handnet, collected with electric light; January 1, 1946, 20h³³. — 1 specimen 16 mm.

The specimen is rather damaged, its rostrum is broken and both second legs are absent. The other characters, as for instance the presence of a

hepatic spine, the posterior margin of the telson which bears two pairs of spines and one pair of setae, the presence of a three-jointed mandibular palp, the branchial formula, the biunguiculate dactyli of the last three pairs of pereopods, these all make the identity of the specimen with *Brachycarpus biunguiculatus* certain. Also the other features are as in LUCAS's species. The upper flagellum of the antennula has the shorter ramus with 5 fused and 3 free joints.

Distribution. *Brachycarpus biunguiculatus* is a littoral form, which has an extremely wide range of distribution: Mediterranean, East American coast from N. Carolina to Venezuela, Bermuda, Bahama Islands, West Indies, West American coast from Mexico to Colombia, Cocos Island, Clipperton Island, Galápagos Islands, Hawaiian Archipelago, Ceylon,? Red Sea. This is the first record of the species from West Africa.

Macrobrachium macrobrachion (Herklots) 1851.

- Palaemon mabrobrachion* Herklots 1851, p. 15 (*Palaemon macrobrachion* on p. 25).
Palaemon forceps p. p. Von Martens 1869, p. 28.
Palaemon macrobrachion De Man 1879, p. 177.
Palaemon africanus Kingsley, 1882, p. 107 (non *Macrobrachium africanum* Bate, 1868).
Palaemon macrobrachion Büttikofer 1890, vol. 1, pp. 125, 337; vol. 2, pp. 466, 487.
Palaemon macrobrachion Ortmann 1891, p. 722.
Palaemon africanus Thallwitz 1892, p. 6.
Palaemon macrobrachion Thallwitz 1892, p. 10.
Palaemon africanus Sharp 1893, p. 121.
Palaemon macrobrachion Bouvier 1895, p. 160.
Palaemon acanthurus Aurivillius 1898, p. 19 (non WIEGMANN, 1836).
Palaemon africanus De Man 1900, p. 60.
Palaemon macrobrachion De Man 1900, p. 62.
Bithynis acanthurus Rathbun 1900, p. 315.
Palaemon macrobrachion Thompson 1901, p. 19.
Palaemon (Bithynis) acanthurus Lönnberg 1903, p. 46.
Palaemon (Eupalaemon) macrobrachion De Man, 1904, p. 299, pl. 18 figs. 13—16, 19—22, 25, 27, pl. 19 figs. 17, 18, 23, 24, 26, 28, 29.
Palaemon macrobrachion Johnston 1906, p. 862.
Palaemon (Eupalaemon) macrobrachion Lenz 1910, p. 127.
Palaemon (Eupalaemon) macrobrachion De Man 1911b, pp. 261, 262.
Palaemon acanthurus Gruvel 1912, p. 16, pl. 2 figs. 5, 6.
Palaemon (Eupalaemon) macrobrachion De Man 1912a, p. 203, pl. 2 fig. 1, pl. 4 fig. 1a.
Bithynis acanthurus Sandler 1912, p. 206.
Palaemon (Eupalaemon) macrobrachion Balss 1914, p. 98.
Palaemon (Eupalaemon) macrobrachion De Man 1925, p. 38, fig. 9.
Macrobrachium macrobrachion Schmitt 1926, p. 27.
Palaemon (Eupalaemon) macrobrachion J. Roux 1927, p. 238.
Palaemon macrobrachion Sollaud 1932, p. 376.
Macrobrachium macrobrachion Holthuis 1949a, p. 175.
Macrobrachium macrobrachion Holthuis 1950, p. 16.

Material examined:

Station 93, Fisheries Development Station, Lagos, Nigeria; handnet, bottom mud; February 5, 1946, 10h⁰⁰. — 24 specimens 52—78 mm.

Though none of the present specimens has attained its full size, they may be referred with certainty to this well known species.

HERKLOTS described the present form under the name *Palaemon mabrobrachion*, that this spelling is a lapsus for *macrobrachion* is clear, since HERKLOTS in the same paper (on p. 25) uses the correct spelling *macrobrachion*.

Distribution. The species inhabits fresh and brackish waters. It is only known from West Africa. The records in literature are: West Africa (DE MAN, 1879; KINGSLEY, 1882; SHARP, 1893), Coyah River, French Guinea (GRUVEL, 1912), Sierra Leone (VON MARTENS, 1869; THOMPSON, 1901), Liberia (DE MAN, 1904; JOHNSTON, 1906), Grand Cape Mount region, St. Paul River near Bavia, and Hilltown, N.W. of Marshall, Liberia (BÜTTIKOFER, 1890), Butri near Dixcove, Gold Coast (HERKLOTS, 1851), Pra River, Gold Coast (DE MAN, 1904), Ekundu, Cameroons (AURIVILLIUS, 1898), Meme River (AURIVILLIUS, 1898; LÖNNBERG, 1903), Bibundi, N.W. of Victoria, Cameroons (AURIVILLIUS, 1898; SENDLER, 1912), Isongo, W. of Victoria (SENDER, 1912), near Manoka Bay, Cameroons (SOLLAUD, 1932), between Yukaduma and Assobam, and Mwini River near Campo, both localities in S. Cameroons (BALSS, 1914), Fernando Po Island (HOLTHUIS, 1949 a), Port Gentil near Cape Lopez, Gabon (J. ROUX, 1927), French Congo (BOUVIER, 1895), Brazzaville, French Congo (GRUVEL, 1912), mouth of Chiloango River near Landana, Kabinda (LENZ, 1910), Banana, Belgian Congo (DE MAN, 1912 a, 1925; SCHMITT, 1926), Malela near Banana (SCHMITT, 1926), Ambriz, N. Angola (DE MAN, 1904), Katumbella near Benguela, Angola (DE MAN, 1904). According to RATHBUN (1900) BATE has recorded the present species from St. Helena, I cannot find in which paper Bate did this and the whole thing seems a little dubious to me. GRUVEL's (1912) statement that the species is found at St. Helena obviously is based on RATHBUN's record.

Macrobrachium sollaudii (De Man) 1912.

Palaemon (Eupalaemon) Foa De Man 1904, p. 306, pl. 19 figs. 30—37 (non Cou-
tière, 1902).

Palaemon (Eupalaemon) Foa Lenz 1910, p. 127, pl. 3 fig. 1.

Palaemon (Eupalaemon) Sollaudii de Man 1912, p. 413.

Palaemon (Eupalaemon) Sollaudii de Man 1912 a, p. 205, pl. 1 figs. 2—2 i.

Palaemon Sollaudi Sollaud 1923, p. 567.

Palaemon (Eupalaemon) Sollaudii de Man 1925, p. 39, figs. 10 a—e.

? *Macrobrachium sollaudii* Schmitt 1926, p. 28.

Macrobrachium sollaudii Holthuis 1949 a, p. 176.

Macrobrachium sollaudii Holthuis 1950, p. 18.

Distribution. The species inhabits West African fresh waters. The records in literature are: Dume, Cameroons (LENZ, 1910; DE MAN, 1912a), Yaunde (DE MAN, 1912a, Kribi River, Cameroons (DE MAN, 1904, 1912a), Bimbili¹⁾ River, branch of Rio Benito, Rio Muni (LENZ, 1910; DE MAN, 1912a), Rio Nkama near Nkamayop, and Rio Chime near Ebomiku, Rio Muni HOLTHUIS, 1949a), Sanga River, French Congo (DE MAN, 1912a), Ottenge River near Banzyville, Belgian Congo (DE MAN, 1912, 1912a), Elisabetha near Basoko, Ikengo near Coquilhatville, and Mongende near Bolobo, all three localities on the Congo River (DE MAN, 1925), Lulua and Kasai Rivers near Luebo, Belgian Congo (DE MAN, 1925).

Macrobrachium foai (Coutière) 1902.

- Palaemon (Eupalaemon) Foai* Coutière 1902a, p. 517.
Palaemon (Eupalaemon) sp. (?) Coutière 1902a, p. 519.
 non *Palaemon (Eupalaemon) Foai* De Man 1904, p. 306, pl. 19 figs. 30—37.
Palaemon (Eupalaemon) Foai Coutière 1908, p. 574, figs. 1—4.
 non *Palaemon (Eupalaemon) Foai* Lenz 1910, p. 127, pl. 3 fig. 1.
Palaemon (Eupalaemon) Foai de Man 1911b, pp. 261, 263.
Palaemon (Eupalaemon) spec. (?) De Man 1911b, pp. 261, 264.
Palaemon (Eupalaemon) Foai De Man 1912a, pp. 198, 200.
Palaemon (Eupalaemon) spec. (?) De Man 1912a, pp. 198, 200.
Macrobrachium foai Schmitt 1926, p. 29, pl. 1 fig. 1.
Macrobrachium foai Holthuis 1949 a, p. 176.
Macrobrachium foai Holthuis 1950, p. 14.

The specimens mentioned by DE MAN (1904) and LENZ (1910) as *Palaemon Foai*, are in reality *Macrobrachium sollaudii* (De Man), as pointed out by De Man (1912).

Distribution. The species is only known from the upper Congo basin. The records in literature are: Upper Congo (COUTIÈRE, 1902a, 1908), Stanleyville, Belgian Congo (SCHMITT, 1926).

Macrobrachium lujae (De Man) 1912.

- Palaemon (Eupalaemon) Lujae* De Man 1912, p. 415.
Palaemon (Eupalaemon) Lujae De Man 1912a, p. 215, pl. 2 figs. 3—3b, pl. 3 figs. 3c—3e.
Palaemon (Eupalaemon) Lujae De Man 1925, p. 42.
Macrobrachium lujae Schmitt 1926, p. 30, pls. 2, 3, pl. 4 fig. 1.
Macrobrachium lujae Holthuis 1949 a, p. 176.
Macrobrachium lujae Holthuis 1950, p. 16.

Distribution. This species is only known from fresh water of the Belgian Congo. The records in literature are: Aba River near Aba (Ubangi River basin), N.E. Belgian Congo (SCHMITT, 1926), Stanleyville (SCHMITT, 1926), Kasai River near Tshikapa and near Kalambaic, Moakechi River near Kamaiembe, and Lulua River near Luebo, all localities lying in the Kasai district of Belgian Congo (DE MAN, 1925), Sankuru River at Kondué near Lusambo, Kasai district, Belgian Congo (DE MAN, 1912, 1912a).

¹⁾ LENZ (1910) mentions this locality as "Bimfalle", which means falls of the Bim River. DE MAN (1912) refers to it as Bimfille River. On the maps at my disposal I could only find a Bimbili River, which is a tributary river to the Rio Benito, and I suppose this to be the river meant by LENZ.

Macrobrachium dux (Lenz) 1910.

- Palaemon* (*Eupalaemon*) *dux* Lenz 1910, p. 129, pl. 3 figs. 2—5.
Palaemon (*Eupalaemon*) *Lenzii* De Man 1911a, p. 225.
Palaemon (*Eupalaemon*) *dux* De Man 1911a, p. 225.
Palaemon (*Eupalaemon*) *dux* De Man 1911b, pp. 262, 263.
Palaemon (*Eupalaemon*) *Lenzii* De Man 1911b, p. 262.
Palaemon (*Eupalaemon*) *dux* Lenz 1911, p. 313.
Palaemon (*Eupalaemon*) *dux congoensis* De Man 1912, p. 416.
Palaemon (*Eupalaemon*) *Lenzii* De Man 1912a, p. 222, pl. 2 figs. 4—4b, pl. 3 figs. 4c—4e.
Palaemon (*Eupalaemon*) *dux* De Man 1912a, p. 222, pl. 4 figs. 5—5b.
Palaemon (*Eupalaemon*) *dux congoensis* De Man 1912a, p. 229, pl. 4 figs. 6, 6a.
Palaemon (*Eupalaemon*) *dux* Balss 1914, p. 98.
Palaemon (*Eupalaemon*) *Lenzii* De Man 1925, p. 41, figs. 11a, b.
Palaemon (*Eupalaemon*) *dux* (with the varieties *tenuicarpus* and *congoensis*) De Man 1925, p. 43, figs. 10 f, g, 12 a—m.
Macrobrachium dux Schmitt 1926, pp. 33, 65, pl. 4 fig. 2, pl. 5, pl. 6 fig. 1.
Palaemon (*Eupalaemon*) *dux* J. Roux 1927, p. 238.
Macrobrachium dux Holthuis 1949 a, p. 176.
Macrobrachium dux Holthuis 1950, p. 13.

SCHMITT (1926) made it perfectly clear that the forms *Palaemon dux*, *P. Lenzii*, *P. dux congoensis* and *P. dux tenuicarpus* as they are recognized by DE MAN, are but a single species.

Distribution. The species inhabits West African fresh waters. The records in literature are: Rio Benito, Rio Muni (DE MAN, 1911a, b; LENZ, 1911), Odavo River, Ogowé basin, Gabon (J. ROUX, 1927), Mbima near Uele River, Belgian Congo (DE MAN, 1912, 1912a), Uele River near Dungu (DE MAN, 1925), Koloka, between Uele and Ituri Rivers (BALSS, 1916), Pilipili near Avakubi (DE MAN, 1925), Ituri River near Avakubi (LENZ, 1910, 1911; DE MAN, 1911a, b, 1925; SCHMITT, 1926), Niapu near Ituri River (SCHMITT, 1926), Ituri River near Panga and near Banalia (DE MAN, 1925), Kole River, a branch of the Ituri River (DE MAN, 1912, 1912a, 1925), Elisabetha near Basoko, Congo River (DE MAN, 1925), Lindi River near Makala and Bafwasende (DE MAN, 1925), Batama near Lindi River (SCHMITT, 1926), Tumba Lake near Bikoro, Lukenie River near Oshwe, Kasai River near Tshikapa, Lukonga River at Kidada near Kitobolo (DE MAN, 1925), Mateke River near Ganda Lundi, Lundi and Buto-Polo near Chiloango River, Mala River near Mbuma, Vembra River near Kisala, all 5 localities lying in the Chiloango basin (DE MAN, 1925), Lower Congo, probably near Boma (DE MAN, 1911a, b).

Macrobrachium raridens (Hilgendorf) 1893.

- Palaemon* (*Eupalaemon*?) *paucidens* Hilgendorf 1893, p. 155 (non De Haan 1841).
Palaemon (*Eupalaemon*) *raridens* Hilgendorf 1893a, p. 181.
Palaemon (*Macrobrachium*) *raridens* Hilgendorf 1893b, p. 217.
Palaemon paucidens De Man 1900, p. 63.
Bithynis paucidens Rathbun 1900, p. 315.
Palaemon (*Eupalaemon*) *paucidens* De Man 1911b, pp. 261, 263, 264.
Palaemon (*Eupalaemon*) *paucidens* Lenz 1911, p. 313, figs. a, b.
Palaemon paucidens Gruvel 1912, p. 16.

- Palaemon (Eupalaemon) paucidens* De Man 1912a, pp. 199, 201.
Palaemon paucidens Sollaud 1923, p. 558, figs. 14—17.
Palaemon (Eupalaemon) paucidens Irvine 1932, p. 17.
Palaemon (Eupalaemon) paucidens J. Roux 1935b, p. 27.
Palaemon (Eupalaemon) paucidens Irvine 1947, p. 306, fig. 212.
Macrobrachium raridens Holthuis 1949 a, p. 176.
Macrobrachium raridens Holthuis 1950, p. 18.

The present species is best known as *Palaemon paucidens* Hilg. This name, however, is preoccupied by the much older name *Palaemon paucidens* de Haan. Hilgendorf (1893a) himself already proposed a new name, *P. raridens*, for the species and moreover used this new name in a later publication. Nevertheless the name *Palaemon raridens* has been overlooked by all subsequent authors.

Distribution. *Macrobrachium raridens* lives in fresh waters of the northern part of tropical West Africa. The records in literature are: Mamu, French Guinea (GRUVEL, 1912), Futa Jallon, French Guinea (SOLLAUD, 1923), Danané, Douékoué, Man, Nigoulalé near Man, Lobo near Daloa, and Toumodi, Ivory Coast (J. ROUX, 1935b), Gold Coast (Irvine, 1932), Begoro, Gold Coast (IRVINE, 1947), Adeli near Bismarckburg, Togo (HILGENDORF, 1893), Nigeria (SOLLAUD, 1923). J. ROUX (1935b, p. 30) states that the present species also inhabits Cameroons, but he does not mention on which data he bases this statement.

Macrobrachium chevalieri (J. Roux) 1935.

- ?*Palaemon Olfersi* p. p. Greeff 1882, p. 30.
Palaemon (Macrobrachium?) sp. De Man 1904, p. 319, pl. 20 figs. 75—80.
Palaemon (Macrobrachium?) sp. De Man 1912a, p. 199.
Palaemon chevalieri (Macrobrachium) J. Roux 1935a, p. 193, figs. 1, 2.
Macrobrachium chevalieri Holthuis 1949 a, p. 177.
Macrobrachium chevalieri Holthuis 1950, p. 13.

GREEFF (1882) described a large material of what he considered to be *Palaemon Olfersi*. One of the male specimens (mentioned by him on p. 34) differed from the rest by being much larger, by having the second legs not as much swollen as the other adult males, by having the ischium and merus of the large legs covered on the inner side with felt-like hairs, and by having the fingers not gaping. It seems very probable to me that this large specimen belongs to *Macrobrachium chevalieri* (Roux), though GREEFF still gives too few data of the specimen to make its identity certain. The other specimens brought by GREEFF to *Palaemon Olfersi* probably are *Macrobrachium zariquiyei* Holth. (vid. there).

Distribution. The species is restricted to West African fresh waters. The records in literature are: Paul, São Antão, Cape Verde Islands (J. ROUX, 1935a), ?São Thomé (GREEFF, 1882), Katumbella near Benguella, Angola (DE MAN, 1904; HOLTHUIS, 1949 a).

Macrobrachium felicinum Holthuis 1949.

- Palaemon (Macrobrachium) Olfersii* De Man 1904, p. 314, pl. 20 figs. 54—74.
Macrobrachium felicinum Holthuis 1949 a, p. 183.
Macrobrachium felicinum Holthuis 1950, p. 14.

Distribution. The species inhabits fresh waters. It is only known with certainty from the following localities: Pra River, Gold Coast (DE MAN, 1904), Katumbella near Benguella, Angola (DE MAN, 1904; HOLTHUIS, 1949 a). The species has pro-

bably been recorded more than once under the name *Palaemon* (or *Macrobrachium*) *olfersii*. The West African records of the latter species include *M. felicinum*, *M. zariquieyi* and possibly also *M. chevalieri*. In only very few cases the identity of the specimens recorded can be made out. All the doubtful records are given here under *Macrobrachium zariquieyi* Holth.

Macrobrachium zariquieyi Holthuis 1949.

- ? *Palaemon Olfersi* Greeff 1882, p. 30.
 ? *Palaemon Olfersi* Greeff 1884, p. 54.
 ? *Palaemon Olfersi* Osorio 1887, p. 223.
 ? *Palaemon Olfersi* Osorio 1888, p. 190.
 ? *Palaemon Olfersi* Osorio 1889, pp. 129, 139 (*Palaemon Olfersii* on p. 139).
 ? *Palaemon Olfersi* Osorio 1891, p. 47.
 ? *Palaemon Olfersi* Osorio 1892, p. 200.
Palaemon spinimanus Bouvier 1895, p. 159, fig. 1.
 ? *Palaemon Olfersi* Osorio 1895, p. 249.
 ? *Palaemon Olfersii* Osorio 1895a, p. 251.
 ? *Palaemon Olfersi* Osorio 1895b, p. 57.
 ? *Palaemon Olfersi* Aurivillius 1898, p. 23.
 ? *Palaemon Olfersi* Osorio 1898, pp. 186, 194.
 ? *Palaemon olfersii* Doflein 1900, p. 128.
 ? *Bithynis olfersii* Rathbun 1900, p. 316.
 ? *Bithynis Olfersi* Bouvier & Lesne 1901, p. 13.
 ? *Palaemon (Bithynis) Olfersi* Lönnberg 1903, p. 46.
 ? *Palaemon (Macrobrachium) Olfersi* Bouvier 1906, p. 493.
 ? *Palaemon (Macrobrachium) Olfersi* Gravier 1909, p. 78.
Palaemon (Macrobrachium) Olfersi Gravier 1909a, p. 123, figs. 1, 2.
 ? *Bithynis olfersii* Sendler 1912, p. 207.
 ? *Palaemon olfersii* Balss 1914, p. 98.
 ? *Macrobrachium olfersii* Schmitt 1926, p. 40.
Macrobrachium zariquieyi Holthuis 1949a, p. 178, figs. 1, 2.
Macrobrachium zariquieyi Holthuis 1950, p. 19.

Distribution. The present species inhabits fresh-waters of the West African region. At present it is only known with certainty from the following localities: Rio Consul, Fernando Po (HOLTHUIS, 1949a) and São Thomé (BOUVIER, 1895), both localities situated in the Gulf of Guinea. Of the rather large number of records of *Palaemon* (or *Bithynis*, or *Macrobrachium*) *olfersii* Wieg. from West Africa part are in all probability based on this and part on the previous species (*M. chevalieri* and *M. felicinum*). Of all these records only that of BOUVIER (1895) could be proved to be based on *M. zariquieyi* and that of DE MAN (1904) on *M. felicinum*. All the other records give too little information about the material to make the identity of the latter certain. These doubtful records are from the following localities: Etome, Cameroons (AURIVILLIUS, 1898), Meme River (LÖNNBERG, 1903), Bibundi, N.W. of Victoria (AURIVILLIUS, 1898; SENDLER, 1912), Isongo (SENDER, 1912), Victoria, Cameroons (DOFLEIN, 1900), Malela, Belgian Congo (SCHMITT, 1926), Biapa, Fernando Po (OSORIO, 1895b), Rio Consul, Fernando Po (BALSS, 1914), Rio Queté, Principe (OSORIO, 1888), Rio Papagaio (OSORIO, 1889), Rio Banzu, Principe (OSORIO, 1895a), São Thomé (GREEFF, 1882, 1884; OSORIO, 1887; BOUVIER & LESNE, 1901; BALSS, 1914), Rio Quija (OSORIO, 1891), Portinha (OSORIO, 1892), Rio do Ouro, São Thomé (BOUVIER, 1906; GRAVIER, 1909, 1909a), Rio São João, Anno Bom (OSORIO,

1895), Crater Lake, Anno Bom (BALSS, 1914). Several authors state that GREEFF reports the species from the island Rolas near São Thomé. This is not true, however, since GREEFF mentions the species only from São Thomé itself. Furthermore GREEFF in another paper described Rolas to be very dry, having no fresh water except for some pools in the rainy season.

Macrobrachium vollenhovenii (Herklots) 1857.

- Palaemon Vollenhovenii* Herklots 1857, p. 96.
Palaemon jamaicensis p. p. Semper 1868, p. 585.
Palaemon Vollenhovenii De Man 1879, p. 178.
Palaemon Jamaicensis Osorio 1887, p. 230.
Palaemon Jamaicensis Osorio 1888, p. 189.
Palaemon vollenhoveni Büttikofer 1890, p. 487.
Palaemon Jamaicensis p. p. Miers 1891, p. 124.
Palaemon vollenhovenii Ortmann 1891, p. 731.
Palaemon Jamaicensis Osorio 1892, p. 200.
Palaemon vollenhovii Thallwitz 1892, p. 14.
Palaemon jamaicensis ? Benedict 1893, p. 540.
Palaemon (Macrobrachium) vollenhoveni Hilgendorf 1893b, p. 217.
Palaemon jamaicensis africanus Bouvier 1895, p. 160.
Palaemon Jamaicensis Osorio 1895b, p. 57.
Palaemon jamaicensis Vollenhoveni Aurivillius 1898, p. 16, pl. 2 figs. 1—5.
Palaemon jamaicensis Osorio 1898, pp. 186, 194.
Palaemon Vollenhovenii De Man 1900, p. 64.
Bithynis jamaicensis vollenhovenii Rathbun 1900, p. 315.
Palaemon (Bithynis) jamaicensis Vollenhoveni Lönnberg 1903, p. 45.
Palaemon (Macrobrachium) jamaicensis Vollenhovenii De Man 1904, p. 309, pl. 19 fig. 38.
Palaemon (Macrobrachium) jamaicensis angolensis De Man 1904, p. 314, pl. 19 figs. 39—45, 47, pl. 20 figs. 46, 48—53.
Palaemon jamaicensis Osorio 1905, p. 102.
Palaemon vollenhoveni Johnston 1906, p. 862.
Palaemon (Macrobrachium) jamaicensis Vollenhovenii Nobili 1906, p. 297.
Palaemon Jamaicensis Osorio 1906, p. 150.
Palaemon (Macrobrachium) jamaicensis vollenhovenii Pearse 1911, p. 135.
Palaemon jamaicensis Vollenhoveni Gruvel 1912, p. 14, pl. 2 fig. 4.
Palaemon (Parapalaemon) Vollenhovenii De Man 1912a, p. 232.
Palaemon (Macrobrachium) jamaicensis Herklotsii De Man 1912a, p. 239.
Bithynis jamaicensis vollenhovenii Sandler 1912, p. 206.
Palaemon (Macrobrachium) jamaicensis Herklotsii Balss 1914, p. 98.
Palaemon (Parapalaemon) Vollenhovenii De Man 1925, p. 50, figs. 14a—d.
Palaemon (Macrobrachium) jamaicensis Herklotsii De Man 1925, p. 51, figs. 15a—d.
Macrobrachium vollenhovenii Schmitt 1926, pp. 37, 65, pl. 6 fig. 2, pl. 7.
Palaemon (Parapalaemon) vollenhoveni J. Roux 1927, p. 238.
Macrobrachium Vollenhoveni Monod 1933, p. 464.
Palaemon (Macrobrachium) jamaicensis vollenhoveni J. Roux 1935a, p. 190.
Palaemon (Macrobrachium) vollenhoveni J. Roux 1935b, p. 30.
Macrobrachium vollenhoveni Holthuis 1949a, p. 184
Macrobrachium vollenhovenii Holthuis 1950, p. 19

Material examined:

Station 94, Isheri, Ogun River, 12 miles N. of Lagos, Nigeria; February 8, 1946. — 1 specimen 155 mm.

Station 127, Boma, Belgian Congo; bought; March 10, 1946. — 4 specimens 151–167 mm.

The specimens from Station 127 all are males and have the chelae rather well developed. These chelae still bear some traces of the original colouration. The fingers are dark blue, almost black, only the tips of the large teeth are pale yellowish brown. Furthermore, there is a broad dark blue longitudinal streak, which extends over the whole length of the upper half of the outer surface of the palm. The lower part of the palm bears a much less sharply defined very pale blue streak. Both these blue streaks are continued on the carpus and the merus; the upper one is more distinct on the palm than on the other joints, the lower is of about the same intensity of colour on all three joints.

Distribution. The present species is very common in West African fresh waters. It has been recorded in literature from: Cape Verde Islands (SEMPER, 1868; OSORIO, 1888; MIERS, 1891; BOUVIER, 1895), São Antão (J. ROUX, 1935a), Ribeira Brava, São Nicolau, Cape Verde Islands (OSORIO, 1905), Senegal (GRUVEL, 1912), Coyah River, French Guinea (GRUVEL, 1912), Liberia (BÜTTIKOFER, 1890; DE MAN, 1904; JOHNSTON, 1906), mouth of Mesurado River near Monrovia, and St. Paul's River near Mount Coffee, Liberia (RATHBUN, 1900), Man, Ivory Coast (J. ROUX, 1935b), Sassandra and Comoé Rivers (GRUVEL, 1912), Assini, Ivory Coast (BOUVIER, 1895), Gold Coast¹) (HERKLOTS, 1857; BOUVIER, 1895), Pra River, Gold Coast (DE MAN, 1904), Togo (HILGENDORF, 1893b), Abomey, Dahomey (MONOD, 1933), Ahémé Lake and Ouémé River near Zagnanado, Dahomey (GRUVEL, 1912), Lagos, Nigeria (ORTMANN, 1891), Elephant Lake near Johann-Albrechtshöhe, Cameroons (LÖNNBERG, 1903), Meme River (AURIVILLIUS, 1898; LÖNNBERG, 1903), Bibundi (SENDER, 1912), Efulan, Kribi (PEARSE, 1911), Afán, Nkolumbembe, Cameroons (BALSS, 1914), Bassapó, Fernando Po (OSORIO, 1895b), Rio Consul, Fernando Po (HOLTHUIS, 1949a), Rio Quija and Rio Gamoela, São Thomé (OSORIO, 1892), Rio Agua Izé, São Thomé (OSORIO, 1906), near Cabo San Juan, Rio Muni (NOBILI, 1906), Gabon (BOUVIER, 1895; GRUVEL, 1912), Ogowé River, Gabon (BOUVIER, 1895), Port Gentil near Cape Lopez, Gabon (J. ROUX, 1927), Congo (DE MAN, 1879, 1904; BOUVIER, 1895), Kouilou River, French Congo (BOUVIER, 1895), Upper Congo (RATHBUN, 1900), Matadi and Boma, Belgian Congo (GRUVEL, 1912), Malela (GRUVEL, 1912; SCHMITT, 1926), Ganda Lundi, Kisala, and Mbuma, Mayumbe region, Chiloango basin (DE MAN, 1925), Banana, Belgian Congo (DE MAN, 1912a, 1925), Cuanza River, Angola (GRUVEL, 1912), Cuanza River near Kunga (BENEDICT, 1893), Katumbella (OSORIO, 1887; DE MAN, 1904; GRUVEL, 1912), Benguella and Biballa (OSORIO, 1887), Kunene River, S. Angola (GRUVEL, 1912).

¹) HERKLOTS (1857) gave as the locality of his type material "côte de Guinée", but as the collector, H. S. PEL, only made collections on the Gold Coast, we safely may assume that as the type locality of the species.

Subfamily *Pontoniinae*.*Palaemonella atlantica* n. sp.

(Fig. 31).

Material examined:

Station 39, São Pedro Bay, São Vicente, Cape Verde Islands, 16°50' N, 25°04' W; triangular dredge (45 cm.), bottom Foraminifera and corals; December 10, 1945, 14h⁴⁰. — 1 ovigerous female 14 mm.

Station 40, off São Pedro Bay, São Vicente, Cape Verde Islands; triangular dredge (45 cm.), 40 m. depth, bottom corals; December 11, 1945, 14h¹⁰. — 1 ovigerous female 11 mm.

Description. The rostrum is curved somewhat upwards, it reaches about to the end of the antennular peduncle. The upper margin bears 9 teeth. The first two of these are situated on the anterior half of the carapace behind the orbit. The intervals between the teeth become smaller anteriorly. The lower margin of the rostrum bears 2 or 3 teeth. The carapace is smooth. There is a distinct postorbital ridge, which runs upwards from the antennal spine. The lower orbital angle is somewhat triangularly produced. The antennal spine is strong and placed a small distance below the orbital angle on the anterior margin of the carapace. A short carina runs from the antennal spine backwards. The hepatic spine is somewhat smaller than the antennal and is placed behind and below it.

The abdomen is smooth. The third segment has the posterior margin produced slightly backwards in the middle; there is no hump there, however. The pleurae of the first four abdominal segments are broadly rounded. The pleurae of the fourth segment are narrower than those of the first three somites. The pleurae of the fifth segment end in a sharp posteriorly directed point. The sixth segment is a little less than 1.5 times as long as the fifth, its pleurae are small and end in a blunt point, the posterolateral angles, however, are sharply pointed. The telson is 1.5 times as long as the sixth abdominal segment. The dorsal surface bears two pairs of well developed spines, which divide the surface into three almost equal parts. The posterior margin of the telson bears three pairs of spines, the outer of which are short, the intermediate longest. The inner spines are slender, but somewhat shorter than the intermediate.

The eyes are well developed. The cornea is globular and slightly shorter than the stalk. An inconspicuous ocellus is present.

The basal segment of the antennular peduncle is broad. The stylocerite is slender and pointed, it almost reaches the middle of the basal segment. The anterolateral angle of the segment bears a distinct spine, which overreaches the slightly convex anterior margin of the basal segment and attains the middle of the second segment of the peduncle. The second and third segments are rather short, together they are about half as long as the basal

segment. The upper antennular flagellum has the two rami fused for about 9 joints, the free part is very short and consists of about three joints.

The scaphocerite slightly overreaches the antennular peduncle. It is slightly more than three times as long as broad. The outer margin is slightly concave and ends in a sharp final tooth, which distinctly overreaches the lamella. The latter is of about equal breadth throughout its entire length,

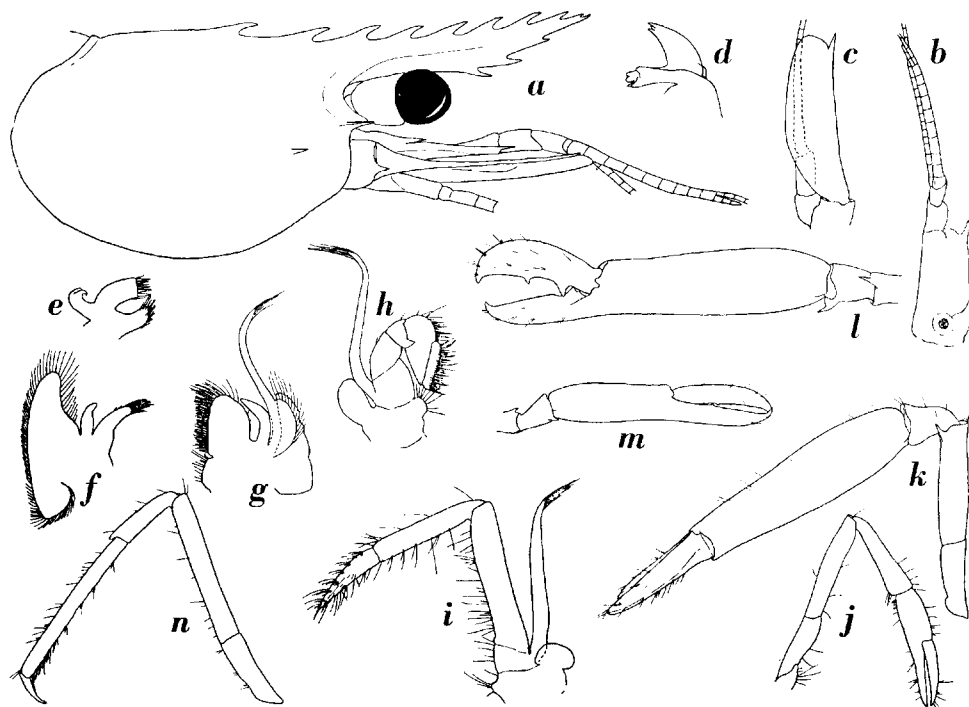


Fig. 31. *Palaemonella atlantica* n. sp. a, carapace in lateral view; b, antennula; c, antenna; d, mandible; e, maxillula; f, maxilla; g, first maxilliped; h, second maxilliped; i, third maxilliped; j, first pereopod; k, larger second pereopod in dorsal view; l, distal part of larger second pereopod in lateral view; m, distal part of smaller second pereopod; n, third pereopod. a, $\times 13$; b, c, j, n, $\times 10$; d, i, $\times 15$; k, l, m, $\times 7$.

it only tapers very slightly anteriorly and ends in a broad and rounded anterior margin. The antennal peduncle distinctly fails to reach the middle of the scaphocerite. An external spine is present near the base of the scale.

The mandible possesses a small one-jointed palp, which bears a seta on the apex. The incisor process ends in three sharp teeth, while the molar process bears some broad distal teeth. The maxillula has the lower endite rather slender, the upper one bears some spines and is broader; the palp is distinctly bilobed. The maxilla has the endite simple, the palp is normal, the scaphognathite not very broad. All maxillipeds bear well developed exopods. The first maxilliped has the endites of the basis and coxa separated

by a deep notch, the palp is well developed, the exopod has the caridean lobe rather narrow, the epipod is large, being strongly produced upwards. The second maxilliped is of the usual shape, no podobranch is present on the epipod. The third maxilliped reaches to the end of the first segment of the antennular peduncle. The ultimate joint has $\frac{2}{3}$ of the length of the penultimate and is about half as long as the antepenultimate. An epipod is present.

The first pereopod reaches with part of the chela beyond the scaphocerite. The fingers are unarmed, they are elongate and somewhat longer than the palm. The carpus is about $\frac{4}{5}$ of the length of the chela. The merus is almost as long as the chela and less than twice as long as the ischium. The second legs are unequal and rather heavy. The larger reaches with the entire chela beyond the scaphocerite. The fingers are slightly more than half as long as the palm. The dactylus is rather high and has the upper margin distinctly convex. The cutting edge bears two teeth, the anterior of these is the smaller and is placed slightly before the middle of the cutting edge, the posterior tooth is narrowly triangular. The cutting edge of the fixed finger bears one large and one small tooth, which are placed close together behind the posterior tooth of the dactylus. The palm is slightly swollen. The carpus is short and conical, it is about $\frac{1}{4}$ of the length of the palm. The anterior margin of the carpus bears a strong subterminal anteriorly directed spine in its lower part. The merus is about half as long as the palm, it bears a distinct anteroventral tooth at its outer surface. The ischium is somewhat more than half as long as the merus. The smaller leg reaches with part of the palm beyond the scaphocerite. The fingers have $\frac{4}{5}$ of the length of the palm and are equal in height. The cutting edge of the dactylus bears two minute teeth in its proximal half, while the cutting edge of the fixed finger bears a similar tooth, which is placed between the upper two. The shape of the rest of the leg is almost like that of the larger, the spine on the carpus and the tooth on the merus are also present here, though they are smaller than in the large leg. The last three pereopods are of about the same shape. The third reaches with a small part of the propodus beyond the scaphocerite. The dactylus is short and simple. The propodus is about four times as long as the dactylus, its posterior margin bears numerous spinules, the distals of which are longest and most crowded. The carpus is $\frac{2}{5}$ of the length of the propodus, while the merus is slightly shorter than this joint.

The pleopods in both my female specimens are quite typical of the genus. The uropods are ovate. The outer margin of the exopod ends in a small tooth, which on its inner side bears a movable spinule.

The eggs are numerous and small, they are 0.3 to 0.5 mm in diameter.

Type. Holotype is the specimen from Station 39.

The present species shows most resemblance to *Palaemonella tenuipes* Dana from the Indo-westpacific region, with which species it agrees in the spinulation of the second legs, especially in that of the carpus. *Palaemonella tenuipes* possesses a large subterminal spine on the carpus of the second legs, which spine lacks in all the other Indo-westpacific species. *Palaemonella atlantica* differs from *P. tenuipes* in the broader scaphocerite, which strongly resembles that of *Palaemonella lata* Kemp, by having the mandibular palp only one-jointed, and in the shape of the fingers of the second legs. Unfortunately, I have no specimens of *Palaemonella tenuipes* at my disposal for direct comparison.

Up till now the genus *Palaemonella* was only known from the Indo-westpacific and East Pacific areas. All records in literature of this genus from East American waters were based on species of the genus *Periclimenes*.

Periclimenes (Periclimenes) scriptus (Risso) 1822.

Restricted synonymy:

Alpheus scriptus Risso 1822, p. 247.

Urocaris de Mani Balss 1916, p. 29, fig. 10.

Periclimenes (Periclimenes) scriptus Kemp 1922, p. 147.

Material examined:

Station 39, São Pedro Bay, São Vicente, Cape Verde Islands, 16°50' N, 25°04' W; triangular dredge (45 cm.), bottom Foraminifera and corals; December 10, 1945, 14h⁴⁰. — 1 ovigerous female 17 mm.

Station 45, off French Guinea, 9°23' N, 15°07' W; Sigsbee trawl and otter trawl, 30—34 m. depth, bottom sand; December 18, 1945, 15h—18h. — 2 specimens 12 and 17 mm.

Station 129, off Angola, 6°0.2' S, 12°20' E; bottom sample Jiv; Petersen grab, 12 m. depth, bottom muddy sand; March 15, 1946, 7h²⁴. — 1 ovigerous female 17 mm.

Station 141, Freetown, Sierra Leone; Commercial otter trawl, 15 m. depth, bottom sand; April 9, 1946, 11h—16h. — 2 ovigerous females 23 and 24 mm.

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, 32 m. depth, bottom shells and Foraminifera; April 13, 1946, 7h⁴⁵—10h¹⁰. — 16 specimens (including 6 ovigerous females, 15—21 mm.) 9—21 mm.

Station 146, off French Guinea, 9°27' N, 14°48' W; Sigsbee trawl and otter trawl, 50 m. depth, bottom shells and Foraminifera; April 13, 1946, 14h²⁰—16h¹⁰ — 1 specimen 9 mm.

Station 147, off French Guinea, 9°28' N, 14°58' W; Sigsbee trawl, 45 m. depth, bottom shells and Foraminifera; April 14, 1946, 8h⁵⁵—9h³⁵. — 1 specimen 20 mm.

Station 148, off French Guinea, 9°57' N, 15°22' W; Sigsbee trawl, 25 m. depth, bottom shells and hydroids; April 14, 1946, 16h²⁵—16h⁵⁵. — 3 specimens (including 2 ovigerous females, 18 and 19 mm.) 14—19 mm.

Station 151, off French Guinea, 10°40' N, 16°44' W; Sigsbee trawl, 65 m. depth, bottom coarse sand; April 16, 1946, 8h⁵⁵. — 1 ovigerous female 21 mm.

Station 163, off Senegal, 13°43' N, 17°23' W; Sigsbee trawl and otter trawl, 65—89 m. depth; April 25, 1946, 10h⁰⁰. — 1 ovigerous female 21 mm.

The extensive collection of the present species gathered by the Atlantide-Expedition distinctly shows the large variability of various characters. The rostrum sometimes reaches to the middle of the third segment of the antennular peduncle, sometimes it overreaches the scaphocerite. The upper margin may be straight, convex, or slightly concave. The rostral formula is:

$$\frac{2 \cdot 3) 7 - 11}{2 - 3}.$$

In the present specimens generally 9 or 10 teeth may be observed on the upper margin. The first of the upper rostral teeth is always placed slightly before or in the middle of the carapace. Sometimes the teeth are regularly divided over the rostrum, but often the distances between the first three teeth are larger than those between the others.

The upper antennular flagellum has the fused part relatively short in the present material, it contains 5 to 10 joints (in the Mediterranean specimens there are up to 16 fused joints), the free joints of the shorter ramus are 3 to 7 in number.

The fingers of the second legs are as long as, somewhat longer, or slightly shorter than the palm. They are always very slender. The carpus in the present material never attains the slenderness of the Mediterranean specimens seen by me. The greater part has the carpus about as slender as figured by me recently (HOLTIGIS, 1949, fig. 4e) for specimens from the Canary Islands, the specimen from Station 151 even being somewhat more slender. The specimen from Station 129 has the carpus about as heavy as in the specimen from Gabon figured by BALSS (1916, fig. 10). It looks as if the specimens of this species have the carpus more heavy the more southwards they live. The differences between the present material and Mediterranean specimens are only gradual and even variable in material from one locality, so that I am fully convinced that all these forms belong to one large species. KEMP (1924) already pointed out the probability that *Urocaris de Mani* Balss is identical with *Periclimenes scriptus*. The present material fully confirms this.

Periclimenes scriptus (Risso) and *P. amethysteus* (Risso) are two closely related but undoubtedly distinct species, which both occur in the Mediterranean. The two species have often been confused, so that it is difficult

to form a correct idea of the exact range of distribution of each of them. *Periclimenes scriptus* is known with certainty from the Western Mediterranean, the Adriatic, the Canary Islands and the West coast of Africa down to Belgian Congo. *Dennisia sagittifera* Norman from the Channel Islands is placed by most authors in the present species, it is, however, undoubtedly synonymous with *Periclimenes amethysteus*. So far the only record of *Periclimenes scriptus* from West Africa is that by BALSS (1916) who described and figured the species from Sette Camma, Gabon.

Periclimenes (Harpilius) platalea n. sp.

(Fig. 32).

Material examined:

Station 39, São Pedro Bay, São Vicente, Cape Verde Islands, 16°50' N, 25°04' W; triangular dredge (45 cm.), bottom Foraminifera and corals; December 10, 1945, 14h⁴⁰. — 3 specimens (including 1 ovigerous female, 17 mm.) 12—17 mm.

Station 45, off French Guinea, 9°23' N, 15°07' W; Sigsbee trawl and otter trawl, 30—34 m. depth, bottom sand; December 18, 1945, 15h—18h. — 6 specimens 10—15 m.

Description. The rostrum is straight and reaches only slightly beyond the base of the second segment of the antennular peduncle. The upper margin is convex and bears 8 or 9 teeth. The first of these teeth is very small and placed a great distance behind the other teeth. It is the only tooth situated on the carapace behind the orbit. The lower margin bears no teeth at all. The rostrum is highest just above the posterior margin of the orbit and gradually tapers towards the top. The lower orbital angle is produced forwards into a broadly rounded lobe. The antennal spine is well developed and placed just below this lobe on the anterior margin of the carapace. The hepatic spine is placed behind the antennal spine and lies at about the same level with it, or even slightly higher. The anterolateral angle of the carapace is rounded.

The abdomen is smooth. The posterior margin of the third segment is somewhat produced in the middle, but does not form a distinct hump-like organ as for instance in *Periclimenes aesopius* (Bate). The pleurae of the first five abdominal segments are broadly rounded. The sixth segment is twice as long as the fifth. The pleurae of the sixth segment are very small and rounded, the posterolateral angles of the segment end in a blunt point. The telson has $\frac{2}{3}$ of the length of the sixth abdominal segment. The dorsal surface bears two pairs of spines, the anterior of which lies in the middle of the length of the telson. The other pair lies about midway between the anterior pair and the posterior margin of the telson. This posterior margin is narrow, it ends in a sharp tip and bears three pairs of spinules. The outer of these spinules are shortest, the intermediate longest.

The eyes are elongate. The cornea is rounded, it is distinctly shorter than, but more than half as long as the stalk.

The basal segment of the antennular peduncle has the stylocerite slender, pointed, and reaching about to the middle of the length of the basal segment. The anterolateral angle of the segment ends in a strong spine directed slightly outwards; it reaches about as far forwards as the anterior margin of the segment. The second and third segments of the peduncle together are more than half as long as the basal segment. The upper antennular flagellum has the two rami fused for 5 or 6 joints, the free part of the shorter ramus also consists of 5 or 6 joints and is slightly shorter than the fused part.

The scaphocerite reaches slightly beyond the antennular peduncle. It is about 4 times as long as broad. The outer margin is slightly concave. The final tooth is strong, but is distinctly overreached by the lamella. The antennal peduncle reaches about to the middle of the scaphocerite, it bears a distinct spine at the outer side near the base of the scaphocerite.

The oral parts are normal in shape. The mandible bears no palp, there are numerous spinules at the end of the molar process; the incisor process ends in three teeth. The maxillula has the lower endite slender, the upper is broader and bears several small spinules, the palp is distinctly bilobed. The maxilla has the endite simple, the palp and scaphognathite are normal in shape. All maxillipeds are provided with well developed exopods. The first maxilliped has the basal and coxal endites fused, the palp is slender, the caridean lobe rather broad and the epipod slightly bilobed. The second maxilliped is of the usual shape, the epipod does not bear a podobranch. The third maxilliped reaches about to the base of the scaphocerite. The last joint is slightly shorter than the penultimate and slightly less than half as long as the antepenultimate. The exopod fails to reach the end of the antepenultimate joint. An epipod is present.

The first pereopod reaches to or beyond the end of the antennal peduncle. The fingers are slightly shorter than the palm. They are peculiar in being dorsoventrally depressed: when seen in lateral view they are very narrow, but they are broad in dorsal view, while they even are spoon-like broadened near the apex. The fingers thus in a way resemble the bill of a spoonbill (*Platalea leucorodia* L.). The fingers are unarmed. The carpus is about $\frac{5}{4}$ as long as the chela and almost as long as the merus. The second legs are equal in shape, but generally somewhat unequal in size. They are slender and reach to or beyond the end of the scaphocerite. The fingers are unarmed and measure $\frac{1}{2}$ to $\frac{3}{4}$ of the length of the palm. They are of the usual form, being laterally compressed. The palm is elongate. The carpus is slightly longer than the whole chela and has $\frac{5}{7}$ of the length of the merus. Both the carpus and the merus bear no spines at all. The ischium is somewhat more than half as long as the merus. The last three legs are of about equal shape. The third reaches about to the end of the scaphocerite. The dactylus

is large, simple and distinctly curved. The propodus is about three times as long as the dactylus, it is slightly curved in the distal part. The posterior margin of the propodus bears some long and slender spines in the distal half. The convex curve of the distal part of the posterior margin, together

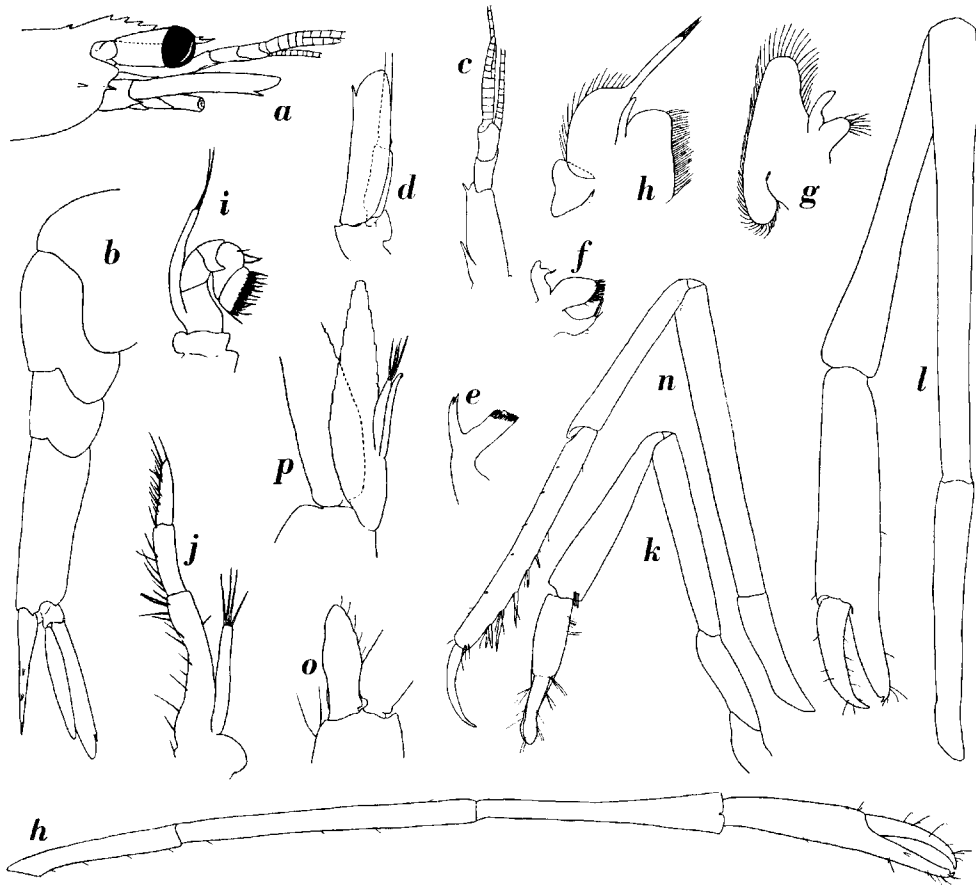


Fig. 32. *Periclimenes platalea* n. sp. a, anterior part of body in lateral view; b, posterior part of abdomen in lateral view; c, antennula; d, antenna; e, mandible; f, maxillula; g, maxilla; h, first maxilliped; i, second maxilliped; j, third maxilliped; k, first pereopod; l, second pereopod (specimen from Station 39); m, second pereopod (specimen from Station 45); n, third pereopod; o, endopod of first pleopod of male; p, endopod of second pleopod of male. a—d, $\times 17$; e—p, $\times 32$.

with the presence of these long spines and the long and curved dactylus give the leg the appearance of a prehensile organ. The carpus is about $\frac{3}{4}$ of the length of the propodus and $\frac{3}{5}$ of the length of the merus.

The first pleopod of the male has the endopod short and ovate, with some hairs at the inner margin. The endopod of the second pleopod of the male has the appendix masculina slightly shorter and broader than the

appendix interna. The second to fifth pleopods in both sexes bear an appendix interna. The uropods are elongate. The outer margin ends in a tooth, which at its inner margin bears a movable spine.

The eggs are rather few in my ovigerous females and measure about 0.4 to 0.6 mm. in diameter.

Type. Holotype is the largest specimen from Station 45.

The species strongly resembles a yet undescribed form from the Malay Archipelago, which will be described later. The two species agree in having the hepatic spine placed slightly higher than or as high as the antennal, in the slender shape of the antennula and scaphocerite, in the shape of the chelae of the first legs and that of the last three legs. In the Indo-westpacific species, however, the rostrum is more slender and reaches to the end of the antennular peduncle, the eyes have the stalk twice as long as the cornea, while the second legs have the carpus 1.5 times as long as the chela.

Pontonia pinnophylax (Otto) 1821.

Restricted synonymy:

Palaemon pinnophylax Otto 1821, p. 12.

Pontonia tyrrhena Schmitt 1926, p. 40, fig. 66 (non *Astacus tyrrhenus* Petagna 1792).

Pontonia tyrrhena J. Roux 1927, p. 238.

Pontonia pinnophylax Delamare Deboutteville 1948, p. 444.

Distribution. This species lives commensally within species of the genus *Pinna* L. (*Mollusca Lamellibranchiata*). It is known throughout the Mediterranean, the Azores and the West African coast. The West African records are: Port Gentil near Cape Lopez, Gabon (J. ROUX, 1927; DELAMARE DEBOUTTEVILLE, 1948), São Paulo de Loanda, N. Angola (SCHMITT, 1926).

Pontonia flavomaculata Heller 1864.

Restricted synonymy:

Pontonia flavomaculata Heller 1864, p. 51.

Material examined:

Station 153, off French Guinea, 10°49' N, 16°39' W; Sigsbee trawl, 42 m. depth, bottom coarse sand; April 16, 1946, 13h²⁰-13h⁵⁰. - 1 specimen 11 mm.

The present specimen lacks both second legs. In all other characters it shows a perfect resemblance to *Pontonia flavomaculata*, so that I do not hesitate to identify it with that species. Like so many West African representatives of Mediterranean species, the present specimen is also much smaller than *Pontonia flavomaculata* specimens from the Mediterranean.

Distribution. *Pontonia flavomaculata* is a species from shallow littoral waters, where it is always found living within Ascidians like *Ascidia mentula*

(O. F. Müll.) and *Ascidia mammillata* (Cuv.). It has been recorded up till now from the Western Mediterranean and the Adriatic, while DE MAN (1926) reported upon several specimens from the Atlantic coast of Morocco, 33°24' N, 8°24'46'' W and 32°44'30'' N, 9°2'30'' W. The present locality forms the southernmost point of the known range of distribution of the species.

Balssia gastii (Balss) 1921.

Amphipalaemon Gastii Balss 1921, p. 524, figs. 1—8.

Balssia gastii Kemp 1922, p. 267.

Balssia gastii Zariquiey Cenarro 1935, p. 97.

Balssia gastii Zariquiey Cenarro 1935a, p. 101, figs. 1—14.

Balssia gastii Zariquiey Alvarez 1946, p. 87, figs. 111, 112.

Balssia gastii Zariquiey Alvarez 1950, p. 79.

Material examined:

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, bottom shells and Foraminifera; April 13, 1946, 7h—10h. — 3 specimens (including 1 ovigerous female, 12 mm.) 9—12 mm.

Station 151, off French Guinea, 10°40' N, 16°44' W; Sigsbee trawl, 65 m. depth, bottom coarse sand; April 16, 1946, 8h⁵⁵. — 1 specimen 8 mm.

Station 153, off French Guinea, 10°49' N, 16°39' W; Sigsbee trawl, 42 m. depth, bottom coarse sand; April 16, 1946, 13h²⁰—13h⁵⁰. — 1 ovigerous female 12 mm.

The present specimens agree well with the descriptions and figures given in literature of this rare species. In my material the ovigerous female has the fixed finger of the second legs broadened only at the external side and much less distinctly than in ZARIQUEY CENARRO'S (1935a) figs. 8 and 9. The first legs of my specimens have the carpus about as long as the chela, as in BALSS'S (1921) figure. ZARIQUEY CENARRO, however, figures the carpus distinctly longer than the chela.

The juvenile specimens (all being females) of the present material differ from the ovigerous females in the following points:

1. The three teeth on the dorsal margin of the carapace are of about equal size, the median tooth is not so much inflated as in the ovigerous female.
2. The sixth abdominal segment is almost twice as long as the fifth.
3. The general shape of the pleurae of the third to fifth abdominal segments is as in the ovigerous female, they are rounded with a small blunt lobe on the lower margin. In this lobe the median pleural carina ends. The lobe, however, is much less distinct than in the adults.
4. The pleurae of the fourth abdominal segment do not end in a sharp posteriorly directed spine. Such a spine, however, is present in the fifth segment, just as in the adults.

The eggs are 0.3 to 0.4 mm. in diameter.

Through the courtesy of Dr. RICARDO ZARIQUIEY ALVAREZ of Barcelona, I was allowed to examine three specimens of the present species, which Dr. ZARIQUIEY collected near Cadaqués, N.E. Spain, August 23, 1948. One of these specimens was generously donated by Dr. ZARIQUIEY to the Rijksmuseum van Natuurlijke Historie at Leiden and it now lies before me. This specimen is an ovigerous female of 15 mm. length. It has the sculpture of the body still more pronounced than in ZARIQUIEY CENARRO'S (1935a) figure. The dorsal teeth of the carapace are much higher, the middle one is elevated to a kind of ridge, which is indented in the middle, the anterior of the three teeth is very high and narrow. On the rest of the carapace too the ridges and spines are more distinct than in the figures given in literature. The first three abdominal segments each bear a dorsal median crest, while a more or less distinct spine is present at the base of the pleurae of the third and fourth segments, near the posterior margin. The lobes at the ventral margin of the pleurae of the fourth and fifth segments are more distinct than in ZARIQUIEY CENARRO'S figure. The chelae of the second legs agree perfectly with the figures in literature. The West African specimens have the sculpture of the body much less pronounced than the Catalonian specimen seen by me. It is not known to me whether the West African material and the specimens dealt with in literature are not yet fully developed, or that the strength of the sculpture of the body in specimens of the same age is variable. The fact that some of the less distinctly sculptured specimens are ovigerous females seems to suggest the latter possibility, but it should be remembered that among the Palaemonidae often sexual maturity is reached before the body has attained its final shape.

Distribution. The species is a littoral form, which does not live in too shallow water, having been found between 20 and 65 m. depth. It lives among *Corallium rubrum* L. Up till now it has only been recorded from Naples (BALSS, 1921) and near Cadaqués, N.E. Spain (ZARIQUIEY CENARRO, 1935, 1935a; ZARIQUIEY ALVAREZ, 1946, 1950). The present records from French Guinea largely extend its known range of distribution.

Typton spongicola Costa 1844.

Restricted synonymy:

Typton spongicola Costa 1844, p. 289.

Typton spongicola Lenz & Strunck 1914, p. 322.

Typton spongicola Balss 1916, p. 28.

Typton spongicola Monod 1933, p. 464.

Material examined:

Station 38, Porto Grande, São Vicente, Cape Verde Islands, 16°53' N, 25°00' W; triangular dredge (45 cm.), 9 m. depth, bottom sand; Decem-

ber 10, 1945, 11h²⁰. — 4 specimens (including 1 ovigerous female, 7 mm.) 5 to 7 mm.

Station 44, off French Guinea, 10°22' N, 16°22' W; Sigsbee trawl, otter trawl and triangular dredge (45 cm.), 41—55 m. depth, bottom brown sand and shells; December 17, 1945. — 1 specimen 8 mm.

Station 141, Freetown, Sierra Leone; Commercial otter trawl, 15 m. depth, bottom sand; April 9, 1946, 11h—16h. — 1 specimen 5 mm.

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, 32 m. depth, bottom shells and Foraminifera; April 13, 1946, 7h—10h. — 1 specimen 5 mm.

Station 146, off French Guinea, 9°27' N, 14°48' W; Sigsbee trawl and otter trawl, 50 m. depth, bottom shells and Foraminifera; April 13, 1946, 14h²⁰—16h¹⁰. — 1 specimen 7 mm.

Station 147, off French Guinea, 9°28' N, 14°58' W; Sigsbee trawl, 45 m. depth, bottom shells and Foraminifera; April 14, 1946, 8h⁵⁵—9h³⁵. — 1 specimen 5 mm.

The present specimens were carefully compared with specimens of *Typton spongicola* Costa from the Gulf of Naples. Except for the much smaller size, no other differences were found.

Of several specimens part of the legs are detached or lacking.

Distribution. *Typton spongicola* is a littoral form, which lives associated with sponges. It occurs in the Eastern Atlantic from the English south coast to Sierra Leone and is known also from the entire Mediterranean. LENZ & STRUNCK (1914) report the species from Porto Grande, São Vicente, Cape Verde Islands. BALSS's (1916) and MONOD's (1933) West African records are based on that of LENZ & STRUNCK.

Family Crangonidae.

Pontocaris cataphracta (Olivi) 1792.

Restricted synonymy:

Cancer cataphractus Olivi 1792, p. 50, pl. 3 fig. 1.

Crangon (Cheraphilus) cataphractus Miers 1881, p. 365.

Pontophilus cataphractus Rathbun 1900, p. 311.

Aegeon cataphractus Balss 1916, p. 31.

Aegeon cataphractus Monod 1933, p. 465.

Material examined:

Station 45, off French Guinea, 9°23' N, 15°07' W; Sigsbee trawl and otter trawl, 30—34 m. depth, bottom sand; December 18, 1945, 15h—18h. — 2 specimens 18 and 20 mm.

Station 49, off Sierra Leone, 7°29' N, 13°38' W; Sigsbee trawl, 74—78 m. depth, bottom muddy sand; December 30, 1945, 8h²⁰. — 7 specimens (including 1 ovigerous female, 34 mm.) 8—34 mm.

Station 60, off Liberia, 5°06' N, 9°34' W; Sigsbee trawl, 78 m. depth, bottom mud; January 9, 1946, 9h⁵⁰. — 2 specimens (including 1 ovigerous female, 27 mm.) 20 and 27 mm.

Station 85, off Gold Coast, 5°37' N, 0°38' E; otter trawl, 28–40 m. depth, bottom mud; January 30, 1946, 11h⁴⁵–16h¹⁵. — 5 specimens (including 1 ovigerous female, 32 mm.) 18–32 mm.

Station 102, off Nigeria, 5°34' N, 4°50' E; triangular dredge (45 cm.) and 3 otter trawls, 27–29 m. depth, bottom mud; February 16, 1946, 9h⁴⁰–15h⁵⁰. — 4 specimens (including 1 ovigerous female, 35 mm.) 29–35 mm.

Station 116, off Nigeria, 4°01' N, 7°56' E; otter trawl with 2 bords, 66 m. depth, bottom mud; February 23, 1946, 10h⁴⁰–14h⁰⁰. — 3 specimens 32–41 mm.

Station 123, off Gabon, 2°03' S, 9°05' E; Sigsbee trawl and otter trawl, 50 m. depth, bottom mud; March 5, 1946, 8h⁴⁵. — 1 specimen 19 mm.

Station 133, off N. Angola, 7°19' S, 12°40' E; Sigsbee trawl and eel trawl, 47 m. depth; March 16, 1946, 8h⁴⁵–10h⁴⁰. — 10 specimens (including 1 ovigerous female, 32 mm.) 22–35 mm.

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, 32 m. depth, bottom shells and Foraminifera; April 13, 1946, 7h⁴⁵–10h¹⁰. — 2 specimens 23 and 25 mm.

Station 147, off French Guinea, 9°28' N, 14°58' W; Sigsbee trawl, 45 m. depth, bottom shells and Foraminifera; April 14, 1946, 8h⁵⁵–9h³⁵. — 5 specimens 16–23 mm.

Station 161, off Bathurst, Gambia; triangular dredge (45 cm.), 18 m. depth, bottom very fine sand; April 24, 1946, 13h⁰⁰. — 1 specimen 25 mm.

The specimens collected by the Atlantide Expedition agree very well with material of *Pontocaris cataphracta* from the Mediterranean, so that I have no doubt that they belong to the same species. The distinctness of the teeth, ridges and other sculpture is very variable, even in specimens, which belong to one lot. The strength of the sculpture does not seem to be dependent on age: strongly sculptured specimens are found among the juveniles as well as among the old specimens.

Distribution. *Pontocaris cataphracta* is a littoral species and seems to prefer a muddy or sandy bottom. It is known from the entire Mediterranean, from S. Portugal, from the West African coast, from S. Africa, S. Arabia and India. The West African records in literature are: Cape Blanco, Mauritania (MONOD, 1933), Goree Island, Senegal (MIERS, 1881).

Pontocaris lacazei (Gourret) 1887.

Restricted synonymy:

Crangon Lacazei Gourret 1887, p. 1033.

Material examined:

Station 120, off Rio Muni, 2°09' N, 9°27' E; otter trawl, 260–650 m. depth, bottom mud; March 1, 1946, 14h¹⁰–15h⁴⁰. — 3 ovigerous females 45–47 mm.

Comparison of the present material with specimens of this species from the Mediterranean showed their specific identity.

Distribution. The species occurs in much deeper water than *P. cataphracta*, it has been recorded from depths between 178 and 758 m. Like *Pontocaris cataphracta* the present species has a wide distribution. It is known from off S.W. Ireland, from the Bay of Biscay, from the western Mediterranean, from off S. Africa, from the Zanzibar area and New Zealand. It now is reported for the first time from West Africa.

Pontophilus challengerii Ortmann 1893.

Restricted synonymy:

Pontophilus challengerii Ortmann 1893, p. 49.

Distribution. A deep water species which has been recorded from depths between 2000 and 4980 m. It has been collected near the Cape Verde Islands, near Tristan da Cunha, in the Celebes Sea, near the Torres Strait, and off New Zealand. The only West African record is that by ORTMANN (1893): northwest of the Cape Verde Islands.

Pontophilus bidens n. sp.

(Fig. 33).

Material examined:

Station 154, off Portuguese Guinea, 11°54' N, 17°14' W; Sigsbee trawl and otter trawl, 55–80 m. depth, bottom bluish mud; April 17, 1946, 11h¹⁰–14h⁰⁰. — 1 ovigerous female 20 mm.

Description. The body is rather slender. The rostrum is narrow and elongate, it almost reaches to the end of the eyes. It widens slightly at the apex and the anterior margin is rather deeply emarginate. The anterior margin of the carapace bears at each half two large teeth, one of which forms the outer limit of the orbit, the other is placed near the base of the antenna. In addition, there is a much smaller tooth placed just below the outer large tooth. The carapace bears in its anterior half three spines, which are placed almost in one transverse row. The median of these spines is smallest, it lies slightly anteriorly of the two lateral spines. The lateral spines are placed slightly higher than the external teeth of the anterior margin of the carapace. No ridges and no other spines are visible on the carapace.

The abdomen shows no distinct sculpture. There are some shallow inconspicuous pits on most of the segments, while the sixth somite has the

upper margin provided with two indistinct longitudinal carinae. Some segments show some inconspicuous shallow transverse groove-like depressions (one such depression is visible on the first, third and fifth segment, two on the second). The pleurae of the first to fifth segments have the lateral margin posteriorly with a minute sharp tooth. The sixth segment is about 1.5 times as long as the fifth. Its lower surface projects distinctly beyond that of the fifth segment. The pleurae of the sixth segment are very small with the apex broadly rounded. The posterolateral angle is truncate with a very small spinule at the top. The telson is twice as long as the fifth abdominal segment. Its dorsal surface is sulcate and bears two pairs of almost invisible spines, which are placed in the posterior half of the telson. The posterior margin is very narrow and ends in a distinct median spine, it bears two pairs of slender spines, the outer one of which is the longer and stronger.

The eyes are well developed and of the usual shape.

The basal segment of the antennular peduncle reaches distinctly beyond the eyes. The stylocerite is broad and quadrangular. The anterior margin is about straight, the anterolateral angles are rounded. The last two segments of the peduncle are short.

The scaphocerite reaches with about half its length beyond the antennular peduncle. The outer margin is slightly concave, and bears in the proximal third of its length two very distinct teeth. The final tooth is strong and reaches with its full length beyond the lamella. The latter is rather broad in the basal part and gradually tapers towards the apex. The antennal peduncle reaches somewhat beyond the middle of the scaphocerite. This peduncle bears a small external spine near the base of the scaphocerite.

The mouth parts are of the usual Crangonid type. The mandible consists of the molar process only, which ends in some blunt teeth. The maxillula has the lower endite bluntly rounded, the upper one bears some distal spines; the palp is simple. The maxilla has only one reduced endite, the palp and the scaphognathite are well developed. All maxillipeds are provided with distinct exopods, each of which consisting of two parts: the peduncle and the flagellum. The articulations of the flagellum are only visible in the distal part. The first maxilliped possesses no endites, the palp is slender. The caridean lobe of the exopod is rather narrow, but the epipod is well developed. The second maxilliped has the last joint small and attached with its longer side to the end of the penultimate joint, an epipod is present. The third maxilliped reaches with half the ultimate joint beyond the scaphocerite. The last joint is slightly longer than the penultimate and about half as long as the antepenultimate joint. An epipod and a pleurobranch are present.

Pleurobranches are present also at the bases of the pereopods. No arthrobranches, epipods or exopods are present there. The first leg reaches with a small part of the chela beyond the scaphocerite. The dactylus is slender, the subchelar spine is long, rather narrow and simple. The chela is about

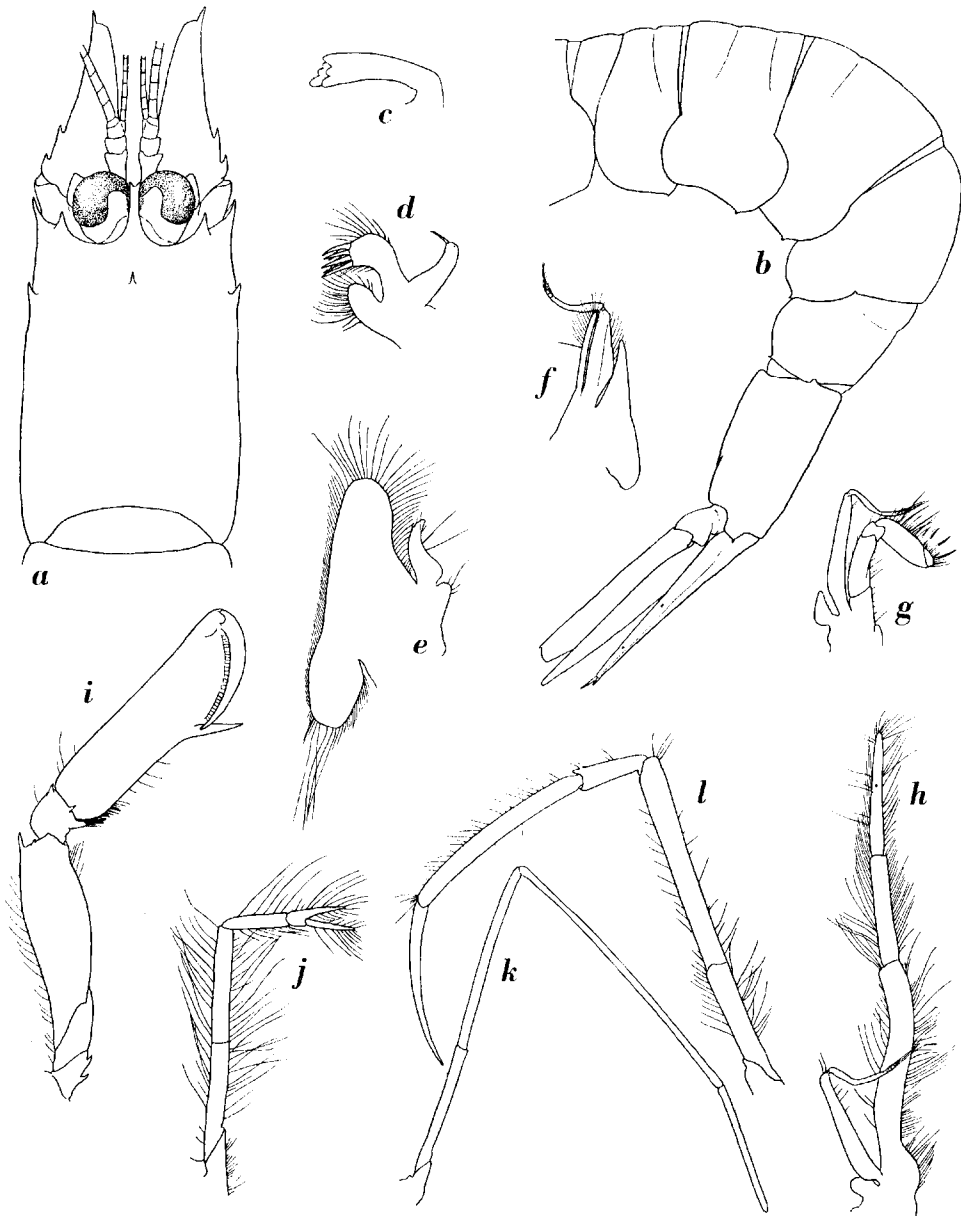


Fig. 33. *Pontophilus bidens* n. sp. a, anterior part of body in dorsal view; b, abdomen in lateral view; c, mandible; d, maxillula; e, maxilla; f, first maxilliped; g, second maxilliped; h, third maxilliped; i, first pereopod; j, second pereopod; k, third pereopod; l, fourth pereopod. a, b, i, $\times 9$; c—h, j—l, $\times 13$.

3.5 times as long as broad. The carpus is short, being about $\frac{1}{5}$ of the length of the chela. Its anterior margin bears a small spine in the upper part, one in the outer part and a rounded lobe in the lower part. The merus is almost as long as the chela, it bears a strong anterodorsal spine. Furthermore, the anterior margin of the merus bears a small spine in the outer part somewhat below the anterodorsal spine. The ischium and basis are short, the latter joint bears two teeth on the inner side. The second legs are short, they reach slightly beyond the base of the scaphocerite. The dactylus is somewhat longer than the fixed finger and is about three times as long as the palm. The carpus is about as long as the chela and has $\frac{4}{7}$ of the length of the merus. The latter joint is about as long as the ischium. Only one of the third legs is present in my specimen, and even that is not complete as it lacks the dactylus and part of the propodus. It is very slender and reaches with a small part of the carpus beyond the scaphocerite. The carpus is 1.5 times as long as the merus. The ischium measures $\frac{2}{3}$ of the length of the merus. The fourth and fifth legs are equal. The fourth reaches with the dactylus beyond the scaphocerite. The propodus is 1.2 times as long as the dactylus, it bears no spines. The carpus has $\frac{1}{3}$ of the length of the dactylus. The merus is slightly longer than the propodus and somewhat less than twice as long as the ischium.

The endopods of the pleopods are slender and undivided, that of the first pleopod is longest, that of the fifth shortest. Each of the second to fourth pleopods bears an appendix interna; these appendices diminish in size posteriorly. In the last pleopod no appendix is visible. The uropods are elongate. The exopod is about as long as the telson, but it is overreached by the endopod. The outer margin of the exopod ends in a small simple tooth.

The eggs are rather numerous and are 0.4 to 0.6 mm. in diameter.

The present new species differs from all known species of the present genus by having two teeth in the basal part of the outer margin of the scaphocerite. In *Pontophilus sculptus* (Bell) and allied forms (*P. incisus* Kemp, *P. vanderbilli* Boone, *P. angustirostris* De Man and *P. kempfi* De Man) there is only one tooth there, in *P. japonicus* Doflein and *P. lowisi* Kemp there is a series of denticles on the outer margin, while in the other species of the genus the outer margin of the scaphocerite is entire. From the most closely related Atlantic form, *P. sculptus* (Bell) it may furthermore be immediately distinguished by the narrow rostrum, by the presence of only three spines on the carapace and by the absence of a distinct sculpture on the abdomen. The shape of the pleopods of the present specimen shows that in all probability it belongs to KEMP'S (1916) group II.

The specimen has the propodi of the last two pairs of pereopods covered with a reddish coloured film of mud, which is most distinct in the distal part of these joints.

Pontophilus sculptus (Bell) 1846—51.

Restricted synonymy:

Crangon sculptus Bell 1846—1851, p. 263, textfig.

Pontophilus sculptus Odhner 1923, p. 6.

Pontophilus sculptus Monod 1933, p. 465.

Material examined:

Station 44, off French Guinea, 10°22' N, 16°22' W; Sigsbee trawl, otter trawl and triangular dredge (45 cm.), 41—55 m. depth, bottom brown sand and shells; December 17, 1945. — 2 specimens (including 1 ovigerous female, 9 mm.) 9 and 11 mm.

Station 49, off Sierra Leone, 7°29' N, 13°38' W; Sigsbee trawl, 74—78 m. depth, bottom muddy sand; December 30, 1945, 8h²⁰. — 1 ovigerous female 12 mm.

Station 145, off French Guinea, 9°20' N, 14°15' W; Sigsbee trawl and otter trawl, 32 m. depth, bottom shells and Foraminifera; April 13, 1946, 7h—10h. — 41 specimens (including 9 ovigerous females, 11—13 mm.) 8—13 mm.

Station 146, off French Guinea, 9°27' N, 14°48' W; Sigsbee trawl and otter trawl, 50 m. depth, bottom shells and Foraminifera; April 13, 1946, 14h²⁰. — 9 specimens (including 1 ovigerous female, about 11 mm.) 8—14 mm.

Station 147, off French Guinea, 9°28' N, 14°58' W; Sigsbee trawl, 45 m. depth, bottom shells and Foraminifera; April 14, 1946, 8h⁵⁵—9h³⁵. — 6 specimens (including 2 ovigerous females, 12 and 13 mm.) 9—13 mm.

Station 148, off French Guinea, 9°57' N, 15°22' W; Sigsbee trawl, 25 m. depth, bottom shells and hydroids; April 14, 1946, 16h²⁵—16h⁵⁵. — 15 specimens (including 3 ovigerous females, 10—13 mm.) 5—13 mm.

The present specimens agree fairly well with the descriptions and figures given in literature. Unfortunately, I had no European material at my disposal for comparison.

The teeth and ridges on the carapace in my material are generally much less distinct than shown in KEMP'S (1910) figure. As in ODHNER'S (1923) material from Angola the anterior of the two smaller median teeth of the carapace often is very indistinct or even completely invisible. Also the posterior median teeth are often inconspicuous. The anterior of the two larger median teeth, however, is distinct and spiniform in most specimens. The long inner lateral row of 5 and the short intermediate lateral row of 4 teeth are much less distinct in most of my specimens than shown in KEMP'S figure, in some specimens, however, they are almost as distinct as figured by KEMP. Between the median row of teeth and the inner lateral row there are 3 or 4 inconspicuous teeth or short ridges placed in a triangle or a quadrangle. These teeth are not shown in KEMP'S figure.

but are present in all my specimens. Near the lateral margin of the carapace KEMP figures a long carina which bears two distinct teeth in the anterior part. In my specimens these teeth are present too, the anterior is spiniform, the posterior often blunt. They are not situated on one line which KEMP's figure seems to indicate, but the anterior one lies closer to the median line of the carapace than the posterior. Both teeth end posteriorly in a carina; the carina of the anterior tooth reaches slightly beyond the posterior tooth.

KEMP (1910) states that the merus of the first pair of legs bears no anterodorsal spine. At first I thought that this spine was also absent in my specimens, but on closer examination it proved to be present, though it is small and almost completely concealed by long hairs.

The shape of the pleopods is as described by KEMP (1916) for this species.

Distribution. *Pontophilus sculptus* is a littoral form. It is known from the British Isles southwards to the Western Mediterranean and the Adriatic; furthermore, it is known from West and South Africa. The West African records are: Cape Blanco, Mauritania (MONOD, 1933) and Porto Alexandre, Angola (ODHNER, 1923).

Pontophilus wolffi n. sp.

(Fig. 34).

Material examined:

Station 146, off French Guinea, 9°27' N, 14°48' W; Sigsbee trawl and otter trawl, 50 m. depth, bottom shells and Foraminifera; April 13, 1946, 14h²⁰. — 1 ovigerous female 14 mm.

Station 148, off French Guinea, 9°57' N, 15°22' W; Sigsbee trawl, 25 m. depth, bottom shells and hydroids; April 14, 1946, 16h²⁵—16h⁵⁵. — 3 specimens (including 1 ovigerous female, 11 mm.) 6—11 mm., and 1 post-larval stage 4 mm.

Description. The body is small and robust. The rostrum is short and fairly broad, the anterior margin is truncate, the upper surface is distinctly hollowed. The rostrum does not by far reach the end of the eyes. The carapace is smooth and bears no spines. In the median dorsal line a small tubercle is visible. This tubercle is separated from the tip of the rostrum by about $\frac{1}{4}$ of the length of the carapace (rostrum included). A very inconspicuous elevation is placed slightly before and one slightly behind the tubercle. Furthermore a third slightly elevated point may be observed at $\frac{1}{3}$ of the length of the carapace from its posterior margin. The anterior margin of the carapace bears two teeth on each half: one is small and sharply pointed, it is placed at the lower angle of the orbit, the other is strong and stands near the base of the antenna. Below the strong spine the margin is entire.

The abdomen is smooth. The posterior part of the third and the whole

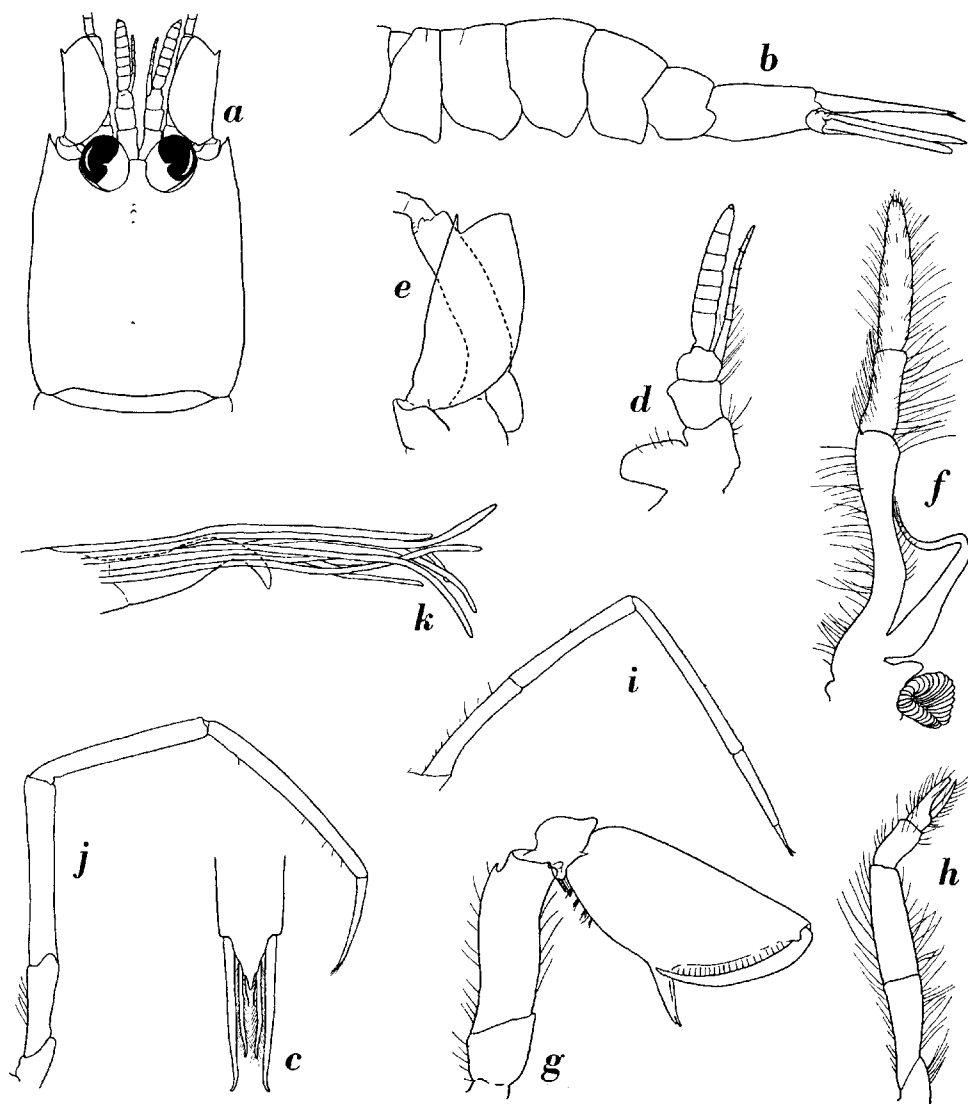


Fig. 34. *Pontophilus wolffi* n. sp. a, anterior part of body in dorsal view; b, abdomen in lateral view; c, tip of telson in dorsal view; d, antennula; e, antenna; f, third maxilliped; g, first pereopod; h, second pereopod; i, third pereopod; j, fourth pereopod; k, tip of dactylus of fourth pereopod. a, b, $\times 7$; c, $\times 48$; d—j, $\times 15$; k, $\times 300$.

of the fourth and fifth segments show an indistinct median longitudinal carina. The sixth segment has a shallow elongate depression in the posterior part of its median dorsal line. The pleurae are rounded, though those of the first four segments have the posterior part of the lateral margin slightly and bluntly angular. The sixth segment has the pleurae small and pointed, the posterolateral angles are rounded. This segment is somewhat less than

twice as long as the fifth, while it measures $\frac{3}{4}$ of the length of the telson. The upper surface of the telson is sulcate. I have not observed any dorsal spinules in my material. The posterior margin bears a large median triangular plate, which ends in a sharp point and which bears a strong hair on each side of that point. There are two pairs of long and strong spines on the posterior margin of the telson. These spines are covered by the above mentioned triangular plate in their basal part. The inner spines are the shorter and bear small hairs.

The eyes are normal in shape and have the cornea darkly pigmented. They reach slightly beyond the end of the basal segment of the antennular peduncle.

The stylocerite is very broad, its anterior margin is rounded, the posterior is almost straight; there are no spinules on the stylocerite. The second segment of the antennular peduncle is somewhat longer and broader than the third. The two flagella are short, they reach only slightly beyond the scaphocerite, the outer is broad.

The scaphocerite is about twice as long as broad, it has the outer margin almost straight and without teeth. The final tooth is distinct, but it is somewhat overreached by the lamella, which is produced somewhat anteriorly. The antero-internal angle of the lamella is nearly rectangular with the apex rounded. The antennal peduncle reaches to the end of the scaphocerite. The peduncle bears no spine near the base of the scaphocerite.

The mandible, maxillula and maxilla are practically identical with those figured here for *Pontophilus bidens*. The first maxilliped differs from that of the latter species by having the epipod somewhat broader and pointed dorsally, in the second maxilliped the epipod is somewhat smaller than in *P. bidens*. The third maxilliped reaches slightly beyond the scaphocerite. The ultimate segment is almost twice as long as the penultimate. Together these two segments are as long as the antepenultimate. The exopod is of the usual shape, while an epipod and an arthrobranch are present.

Each of the pereopods bears a pleurobranch, no epipods or exopods are present. The first leg reaches to the end of the scaphocerite. The chela is about twice as long as broad. The dactylus is slender, the subchelar spine is incised at the top and thus ends in two sharp points. The carpus is short, being about $\frac{1}{4}$ of the length of the chela. The anterior margin bears a small spinule in the outer region. Ventrally there is a rounded lobe, which bears some hairs. The merus is somewhat more than $\frac{2}{3}$ of the length of the chela. Its upper margin bears a distinct spine somewhat behind the anterior margin. The ischium is short. The second leg fails to reach the base of the scaphocerite. Its fingers are of nearly equal length, and are twice as long as the palm. The carpus is about as long as the chela and half as long as the merus. The latter is somewhat longer than the ischium. The third leg is very slender, it reaches about to the end of the scaphocerite. The dactylus bears a tuft of hairs at the apex, it is about $\frac{1}{3}$ of the length of the