

MATERIAL EXAMINED.—*Pillsbury Material*: Ivory Coast: Sta 64, 68 m, 2♂ (L, W).

Geronimo Material: Gabon: Sta 211, 100 m, 1♂ (W).

Other Material: Dahomey: Off Dahomey, 55 m, Oct 1963, A. Crosnier, 2♀ (W).

DESCRIPTION.—Monod, 1956:306.

Figures: Capart, 1951, fig. 61, pl. 3: fig. 13; Monod, 1956, fig. 380; Guinot and Ribeiro, 1962, fig. 25; Crosnier, 1967, figs. 5, 11, 12, 15.

Male Pleopod: Capart, 1951, pl. 3: fig. 13 (Angola); Guinot and Ribeiro, 1962, fig. 25 (Spanish Sahara); Williams, 1978, fig. 4a (Gabon).

MEASUREMENTS.—Our specimens have carapace widths of 5 to 21 mm; the largest was taken by the *Geronimo*.

BIOLOGY.—*Pseudomedeus africanus* is an offshore species, living on the shelf and upper slope in depths between 34 and 200 m. Crosnier (1964) characterized it as a cold water species, living in depths greater than 50 m off Cameroon. Longhurst (1958) found it on shelly mud in 34 to 100 m off Sierra Leone, and Gauld (1960) reported it from colonies of *Dendrophyllia* in 100 m off Ghana. A large series of more than 70 specimens was collected by the *Calypso* on mud shells, gorgonians and ascidians in 43–45 m off Spanish Sahara (Forest and Guinot, 1966).

Ovigerous females have been collected in March and May (Monod, 1956; Forest and Guinot, 1966).

DISTRIBUTION.—West Africa, from scattered localities between Spanish Sahara and Angola, in depths between 34 and 200 m. Records since 1956 include the following:

Spanish Sahara: 21°05'N, 17°14'W, 43–45 m (Forest and Guinot, 1966).

Senegal: Dakar (Guinot, 1968a).

Sierra Leone: No specific locality, in 34–100 m (Longhurst, 1958).

Ghana: Off Accra, 100 m (Gauld, 1960).

Dahomey: No specific locality, 55 m (Williams, 1978).

Cameroon: No specific locality, deeper than 50 m (Crosnier, 1964).

Gabon: No specific locality (Crosnier, 1967). W of Libreville, 45–57 m, and W of Nyanga, Pointe Panga, 03°10'S (Rossignol, 1962). 02°32'S, 09°05'E, 101 m (Williams, 1978).

Congo: No specific locality (Crosnier, 1967). WSW of Pointe-Noire, 120 m (Rossignol, 1962).

Angola: Ilha de Luanda, 105 m (Guinot and Ribeiro, 1962).

Genus *Xantho* Leach, 1814

Xantho Leach, 1814:430 [type-species: *Cancer incisus* Leach, 1814, by monotypy; gender: masculine; name 1016 on *Official List*].—Guinot, 1971:1067 [list of species].

Salax Gistel, 1848:xi [substitute name for *Xantho* Leach, 1814; type-species: *Cancer incisus* Leach, 1814; gender; masculine].

Xantho incisus (Leach, 1814)

Xantho floridus.—Chapman and Santler, 1955:374 [Azores] [not *Cancer floridus* Linnaeus, 1767].

Xantho (Xantho) incisa.—Monod, 1956:274 [Cape Verde Islands, São Tomé(?); references].

Xantho incisus.—Figueira, 1960:9 [Azores].—Forest and Gantès, 1960:352 [Morocco].

Xantho incisus incisus.—Zariquiey Alvarez, 1968:398 [Spain; references].—Guinot, 1968a:703, figs. 17, 26 [discussion]; 1971:1067 [listed].—Türkay, 1976b:61 [listed], 68 [Madeira, Ilhas Desertas].

REMARKS.—There is material of this species from the Azores and the Canary Islands, but not from tropical West Africa, in the collection of the Smithsonian Institution.

In the Mediterranean this species is replaced by *Xantho granulicarpus* Forest, 1953 (Zariquiey Alvarez, 1968:398).

DISTRIBUTION.—Eastern Atlantic, from the North Sea southward to Morocco, including the Azores, Madeira, Ilhas Desertas, Canary Islands, and Cape Verde Islands; possibly also from São Tomé and Príncipe islands in the Gulf of Guinea (see Monod, 1956:274). It usually lives in shallow water, littorally to 30–40 m, but also has been recorded from as deep as about 100 m.

Xantho pilipes A. Milne Edwards, 1867

Xantho (Xantho) pilipes.—Monod, 1956:275, figs. 326–329 [Mauritania, Senegal; references].—Guinot and Ribeiro, 1962:53 [Angola].

Xantho pilipes.—Zariquiey Alvarez, 1968:395, fig. 130b [Spain; references].—Guinot, 1968a:704 [discussion].—Christiansen, 1969:79, fig. 32, map 26 [Scandinavia].—

Guinot, 1971:1068 [listed].—Türkyay, 1975a:71 [listed], 74, figs. 4, 5 [Spanish Sahara].

DISTRIBUTION.—W coast of Norway, Shetland Isles, and England southward to Angola, Mediterranean; shallow water, intertidal to about 40 m.

Xantho sexdentatus (Miers, 1881)

Xantho sexdentatus.—Capart, 1951:157.—Guinot, 1968a:704 [discussion]; 1971:1068 [listed].

Xantho (Xantho) sexdentata.—Monod, 1956:277, figs. 330–334.

MATERIAL EXAMINED.—*Pillsbury Material*: None.

Other Material: Senegal: Les Almadies, Dakar, 0–0.5 m, under stones, 9 Jun 1964, F. M. Bayer, R. B. Manning, L. B. Holthuis, 1♂, 1 juv (L).

DESCRIPTION.—Miers, 1881a:211.

Figures: Monod, 1956, figs. 330–334.

Male Pleopod: Monod, 1956, figs. 332–334 (Senegal).

MEASUREMENTS.—Our specimens have carapace widths of 6 and 8 mm.

BIOLOGY.—*Xantho sexdentatus* is a shallow water species, occurring from the intertidal zone to a depth of 23 m. Apparently it is a characteristic inhabitant of rocky shores of Senegal (Sourie, 1954a).

Ovigerous females have been collected in January, February, July, and October (Monod, 1956).

DISTRIBUTION.—West Africa, where it is known only from the coasts of Spanish Sahara, Mauritania, and Senegal, from the intertidal zone to a depth of 23 m. Monod (1956) summarized earlier records. We have found no references to this species published since 1956, other than the remarks of Guinot (1968a) as part of her revision of the xanthids.

Genus *Xanthodius* Stimpson, 1859

Xanthodius Stimpson, 1859:52 [type-species: *Xanthodius sternberghii* Stimpson, 1859, by monotypy; gender: masculine; name 379 on *Official List*].—Guinot, 1971:1068 [list of species; *Xantho denticulata* White not included].

* *Xanthodius denticulatus* (White, 1848)

Xantho (Xantho) denticulata.—Monod, 1956:280, figs. 335–339.

Xantho denticulata.—Gauld, 1960:70.

Xantho (Xantho) denticulatus.—Forest and Guinot, 1966:74.

Xantho denticulatus.—Guinot, 1968a:700 [discussion].

Xanthodius denticulatus.—Guinot, 1968a:712 [discussion].

[*Xantho*] *denticulatus*.—Guinot, 1971:1068 [listed; “Parfois aussi, rangé dans *Xanthodius*”].

MATERIAL EXAMINED.—*Pillsbury Material*: Fernando Poo: Sta 258, shore, 1♀ (L).

Annobon: Sta 271, shore, sand beach: 1♀ (L). Sta 275, 9–69 m, rubble of coralline algae, 1♀, 1 juv (W).

DESCRIPTION.—Monod, 1956:281.

Figures: Monod, 1956, figs. 335–339.

Male Pleopod: Monod, 1956, figs. 337–339 (Ghana).

MEASUREMENTS.—Our specimens have carapace widths of 5 to 11 mm.

REMARKS.—We assign this species, which was not assigned to any genus in Guinot’s preliminary revision (1968a, 1971), to *Xanthodius*. Guinot (1971:1068) noted that it and three other xanthids, including the West African *Cycloxanthops occidentalis*, were “au voisinage de *Macromedaeus* [Ward, 1942], et présentant également des affinités avec *Leptodius* et peut-être aussi avec *Cycloxanthops*, trois-quatre espèces apparentées.” Apparently this problem is under study by Guinot.

BIOLOGY.—*Xanthodius denticulatus* is a shallow water species, living from the intertidal zone to a depth of 21 m or more; it was taken in depths of 11 m or less in 11 of 12 of the stations occupied by the *Calypso* (Forest and Guinot, 1966). One of the collections taken by the *Pillsbury* was in 9–69 m, so it may also occur somewhat deeper than 21 m. It appears to be fairly abundant sublittorally off São Tomé, where it was taken at 9 stations by the *Calypso* (Forest and Guinot, 1966). The *Pillsbury* specimens were taken from shore stations and in the offshore bed of coralline algae off Annobon. The following bottom types were noted for the *Calypso* collections: calcareous algae (5 stations); rocks or sand and rocks (4 stations); and algae and calcareous algae (1 station).

Off West Africa ovigerous females have been

collected in February and June (Monod, 1956; Forest and Guinot, 1966).

DISTRIBUTION.—Atlantic. Western Atlantic from Bermuda and the Bahamas southward to Brazil. Eastern Atlantic, from Ghana on the mainland and the offshore islands of the Gulf of Guinea: Fernando Poo, Príncipe, São Tomé, and Annobon; shallow water, intertidal to at least 21 m, possibly as deep as 69 m. Monod (1956) was the first to record the species from West Africa; he reported material from Ghana, São Tomé, and Annobon. Records in the literature since 1956 include the following:

Ghana: Prampram and Winneba, intertidal (Gauld, 1960).

Príncipe: 01°42'30"N, 07°28'E, 21 m; Ponta da Mina, beach (Forest and Guinot, 1966).

São Tomé: No specific locality, shore; 00°20'N, 06°46'E, 10 m; off São Tomé 8 m; in front of Ponta Oquedelrei, 6 m; Ilhéu das Cabras, 0–2 m; in front of the harbor master's office, shore; in front of Praia Lagarto, 5–6 m; off Ponta Diogo Nunes, 4–5 m; in front of Ponta São Sebastião, 11 m (all Forest and Guinot, 1966).

Annobon: N of San Antonio, 9 m (Forest and Guinot, 1966).

Xanthodius inaequalis faba (Dana, 1852)

Actaeodes faba Dana, 1852b:195; atlas, 1855 pl. 11: fig. 1.

Chlorodius (Leptodius) convexus A. Milne Edwards, 1869:410.

Xantho (Leptodius) inaequalis convexus.—Monod, 1956:284 [part of synonymy], 290, figs. 341a, 349, 350.—Guinot and Ribeiro, 1962:55.—Ribeiro, 1964:8.

Xanthodius (Leptodius) inaequalis convexus.—Guinot, 1968a:712 [listed].

Xanthodius inaequalis convexus.—Guinot, 1968a:714 [discussion], fig. 31; 1971:1068 [listed].

MATERIAL EXAMINED.—*Pillsbury Material*: None.

Other Material: Cape Verde Islands, São Vicente, 26 Jul 1883, *Talisman*, 1♂, 1♀ (L).

DESCRIPTION.—A. Milne Edwards and Bouvier, 1900:97.

Figures: A. Milne Edwards and Bouvier, 1900, pl. 17: figs. 1–6.

Male Pleopod: Monod, 1956, figs. 349, 350 (Cape Verde Islands).

Color: “Coloration vert olivâtre, yeux grenat, pattes ambulatoires lavées de violet” (Monod, 1956:290).

REMARKS.—At least two authors, Odhner (1925:37, footnote, and 80) and Monod (1933b: 511–513), have pointed out that *Chlorodius convexus* A. Milne Edwards, 1869, from the Cape Verde Islands, is conspecific with *Actaeodes faba* Dana, 1852, from the same locality; Dana's name has priority and must be used for the taxon from the Cape Verde Islands.

Monod (1956:284, synonymy) noted that A. Milne Edwards (1869) included material from Gabon as well as from the Cape Verde Islands in his original account of *Chlorodius convexus*; we can find only localities from the Cape Verde Islands in his account (São Vicente, Santa Luzia, Maio, Santiago).

BIOLOGY.—Like the nominate subspecies, *X. inaequalis faba* is a littoral species inhabiting rocky shores. Monod (1956) recorded one specimen taken in pools with coral, and Guinot and Ribeiro (1962) and Ribeiro (1964) found it in rocks, on calcareous algae, and in worm tubes on rocks.

Ovigerous females have been collected in May, August, September, and October (Monod, 1956; Guinot and Ribeiro, 1962; Ribeiro, 1964).

DISTRIBUTION.—Known only from the Cape Verde Islands, where it occurs in the littoral zone. The nominate subspecies, *Xanthodius inaequalis inaequalis* occurs on the African mainland and the offshore islands of the Gulf of Guinea. Monod (1956) summarized the literature. Records since his paper were published include the following:

Cape Verde Islands: No specific locality (Guinot, 1968a). Baía das Gatas, Praia da Matiota, and Baía da Calheta, São Vicente; Baía de Sal Rei, Boavista; Pedra Lume, Sal; and Baía do Tarrafal and Porto da Praia, São Tiago (all Guinot and Ribeiro, 1962; Ribeiro, 1964).

* *Xanthodius inaequalis inaequalis* (Olivier, 1791)

Xantho faba.—Capart, 1951:155, fig. 58, pl. 3: fig. 14 [not *Actaeodes faba* Dana, 1852].

Xantho (Leptodius) inaequalis punctata.—Monod, 1956:284 [part of synonymy], 286, figs. 340, 341b, 342–348.

Xantho inaequalis.—Gauld and Buchanan, 1959:127.—Gauld, 1960:70.—Bassindale, 1961:491, fig. 5.

Xantho (Leptodius) inaequalis inaequalis.—Guinot and Ribeiro, 1962:54.—Forest and Guinot, 1966:75.—Guinot, 1968a: 712 [listed].

Leptodius angolensis Bott, 1964:30, fig. 3, pl. 1: figs. 4, 5.—Guinot, 1968a:712 [discussion].
Xanthodius inaequalis inaequalis.—Guinot, 1968a:714 [discussion]; 1971:1068 [listed].

SYNONYM.—*Leptodius punctatus* Miers, 1881.

MATERIAL EXAMINED.—*Pillsbury Material*: Fernando Poo: Sta 257, shore, 2♂, 1♀ (L). Sta 258, shore, 15♂, 17♀ (8 ov), 4 juv (W).

Annobon: Sta 271, shore, 2♀, 2 juv (L).

Other Material: Senegal: Dakar, littoral zone, very rocky, 30 Dec 1965, 1♂ (W). Dakar, littoral zone, 2 Aug 1966, D. E. Harvey, 2♂, 1 juv (W). Dakar: low tide, R. Mauny, 3♂ (W). Somb-Dioun, Dakar, shore, 0–0.5 m, 9 Jun 1964, F. M. Bayer, R. B. Manning, L. B. Holthuis, 6♂, 7♀ (3 ov) (L, W). Les Almadies, Dakar, among rocks, near watermark, 0–0.5 m, 9 Jun 1964, F. M. Bayer, R. B. Manning, L. B. Holthuis, 9♂, 7♀ (1 ov) (L).

DESCRIPTION.—Capart, 1951:155.

Figures: Capart, 1951, fig. 58, pl. 3: fig. 14; Monod, 1956, figs. 340–348.

Male Pleopod: Capart, 1951, pl. 3: fig. 14 (Angola); Monod, 1956, figs. 342–348 (Senegal).

Color: “Coloration brun rougeâtre avec des taches plus claires; les doigts noirs” (Capart, 1951:155). Monod (1956:285) noted that West African specimens are “brun-chocolat marbré de gris, avec des yeux rouge vif.”

MEASUREMENTS.—Our specimens have carapace widths of 3 to 24 mm; the carapace widths of ovigerous females range from 9 to 18 mm.

REMARKS.—Guinot and Ribeiro (1962:55) correctly pointed out that Monod (1956) was in error in using Miers' (1881a) name for the population of this species occurring south of the Cape Verde Islands. The type-locality for both *Cancer inaequalis* Olivier, 1791, and *Leptodius punctatus* Miers, 1881, is Senegal (Gorée), so Olivier's name clearly has priority.

BIOLOGY.—*Xanthodius inaequalis inaequalis* is an intertidal species, characteristic of rocky shore habitats of West Africa. Bassindale (1961) reported that it occurred across the whole tidal flat off Tenkpobo, Ghana.

Apparently this species breeds all year. Ovigerous females have been collected in January, March, April, May, June, July, September, Oc-

tober, and November (Monod, 1956; Guinot and Ribeiro, 1962; Forest and Guinot, 1966; *Pillsbury*).

DISTRIBUTION.—West Africa, from Mauritania southward to Angola as well as from the offshore islands of the Gulf of Guinea, Principe, São Tomé, Fernando Poo, and Annobon; intertidal. It has not been recorded previously from Fernando Poo. In the Cape Verde Islands it is replaced by *Xanthodius inaequalis faba*. Monod (1956) summarized the earlier literature and reported numerous specimens from localities between Senegal and Angola; records in the literature since 1956 include the following:

Ghana: No specific locality (Gauld, 1960). Tenkpobo (Gauld and Buchanan, 1959; Bassindale, 1961).

Principe: Ponta da Mina; Santo António (Forest and Guinot, 1966).

São Tomé: Praia Pantufo; Praia Melão; W of Ponta Diogo Nunes; off the harbor master's office; Ilhéu das Cabras; Praia das Conchas (all Forest and Guinot, 1966).

Angola: Baía de Benguela and Mangais, Lobito (type-localities of *Leptodius angolensis*) (Bott, 1964). Baía do Lobito; Praia da Rocha, Benguela; Baía da Caota; Baía Farta; Baía das Vacas; Lucira; Baía de Santa Marta; Praia das Conchas, Moçâmedes; Praia Amélia, Moçâmedes; Baía dos Tigres (all Guinot and Ribeiro, 1962).

Family GONEPLACIDAE MacLeay, 1838

GONEPLACIDAE MacLeay, 1838:63 [corrected to Goneplacidae by Stebbing, 1902:15].

CARCINOPLACINAE H. Milne Edwards, 1852:164.

RHIZOPIIDAE Stimpson, 1858b:95.

Galénides A. Milne Edwards, 1862a:40.

EURYPLACINAE Stimpson, 1871a:150.

EUCRATOPSINAE Stimpson, 1871a:151.

GALENOIDA Alcock, 1898:77, 136 [corrected to Galeninae by Alcock, 1898:136].

PRIONOPLACIDAE Alcock, 1900:286, 292.

PSEUDORHOMBILINAE Alcock, 1900:286, 292, 297.

TYPHLOCARCINOPSINAE Rathbun, 1909:112 [corrected to Typhlocarcinopinae herein].

CHASMOCARCININAE Serène, 1964a:185.

EASTERN ATLANTIC GENERA.—Six, of which five are represented by species occurring off tropical West Africa. The extralimital genus is *Eucrate* de Haan (1835:36). Type-species: *Cancer (Eucrate) crenatus* de Haan, 1835, by monotypy; gender: feminine; name 301 on *Official List*.

EASTERN ATLANTIC SPECIES.—Seven, six of which occur off tropical West Africa. Several of the names used by Monod (1956) have been changed, as follows:

Name in Monod	Current Name
<i>Pilumnoplax atlantica</i>	<i>Machaerus atlanticus*</i>
<i>Pilumnoplax oxyacantha</i>	<i>Machaerus oxyacantha*</i>
<i>Carcinoplax barnardi</i>	<i>Carcinoplax barnardi*</i>
<i>Goneplax angulata</i>	<i>Goneplax rhomboides</i>
<i>Typhlocarcinodes integrifrons</i>	<i>Typhlocarcinodes integrifrons*</i>
<i>Acidops cessaci</i>	<i>Acidops cessaci</i>
<i>Hexapus (Thaumastoplax) anomalipes</i> (Goneplacidae)	<i>Thaumastoplax anomalipes</i> (Hexapodidae)
<i>Hexapus (Pseudohexapus) platydactylus</i> (Goneplacidae)	<i>Pseudohexapus platydactylus</i> (Hexapodidae)
<i>Hexapus (Parahexapus) africanus</i> (Goneplacidae)	<i>Parahexapus africanus</i> (Hexapodidae)
<i>Hexapus (Hexapus) buchanani</i> (Goneplacidae)	<i>Hexapinus buchanani</i> (Hexapodidae)

The four species assigned by Monod to *Hexapus* (Goneplacidae: Hexapodinae) are herein assigned to the Hexapodidae (pp. 166–181).

The extralimital species is *Eucrate crenata* de Haan, 1835. An Indo–West Pacific immigrant into the eastern Mediterranean (Holthuis and Gottlieb, 1958; Ramadan and Dowidar, 1976).

Subfamily CARCINOPLACINAE H. Milne Edwards, 1852

Genus *Carcinoplax* H. Milne Edwards, 1852

Curtonotus de Haan, 1833:4 [a subgenus established without included nominal species; an invalid junior homonym of *Curtonotus* Stephens, 1827 (Coleoptera)].

Carcinoplax H. Milne Edwards, 1852:164 [substitute name for *Curtonotus* de Haan, 1833; type-species: *Cancer (Curtonotus) longimanus* de Haan, 1833, by subsequent designation by Glaessner, 1929:111; gender: feminine].—Guinot, 1969b:524 [revision]; 1971:1081 [list of species].

* *Carcinoplax barnardi* Capart, 1951

Carcinoplax barnardi Capart, 1951:170, fig. 65, pl. 3: figs. 5, 12.—Monod, 1956:351, figs. 456–461.—Forest, 1963:627,

628.—Maurin, 1968b:484.—Guinot, 1969b:526 [discussion]; 1971:1081 [listed].

MATERIAL EXAMINED.—*Pillsbury Material*: Ivory Coast: Sta 44, 403–586 m, hard dark gray mud, 1♂ (L). Sta 51, 329–494 m, 2♂, 1♀, 1 juv (L).

Nigeria: Sta 255, 264–269 m, 1♂, 1♀ ov (L). Sta 256, 409–485 m, 1♀ (L).

Geronimo Material: Gabon: Sta 179, 293 m, 2♀ (W). Sta 198, 300 m, 2♂, 2♀ (W). Sta 203, 200 m, 1♀ (W).

DESCRIPTION.—Capart, 1951:170.

Figures: Capart, 1951, fig. 65, pl. 3: figs. 5, 12; Monod, 1956, figs. 456–461.

Male Pleopod: Capart, 1951, pl. 3: figs. 5, 12 (Angola); Monod, 1956, figs. 460, 461 (Senegal).

Color: Capart (1951:172) gave the following notes on color: “Coloration rose bistre, des taches noires à l’extrémité des doigts des pinces.”

MEASUREMENTS.—Our specimens have carapace widths of 15 to 28 mm; the carapace width of the single ovigerous female is 23 mm.

BIOLOGY.—*Carcinoplax barnardi* is a deep water species, living in depths between 200 m and at least 500 m; there is one record for the species in depths ranging from 403 to 586 m. Of 16 available depth records for the species, there are only five from depths of less than 300 m, none shallower than 200 m. It has been collected on mud, sandy mud, or hard dark gray mud.

Ovigerous females have been collected in March and May (Capart, 1951; *Pillsbury*).

DISTRIBUTION.—West Africa, from scattered localities between Spanish Sahara and Angola, in depths between 200 m and at least 500 m (403–586 m). The species has not previously been recorded from off Nigeria or Gabon, although these records are well within its known range. Monod (1956), who was the second to record the species, reported material from Senegal; records in the literature since 1956 include the following:

Spanish Sahara: Off Villa Cisneros, 300–500 m (Maurin, 1968b).

Ivory Coast: 04°54'N, 03°23'W, 380–400 m (Forest, 1963).

Ghana: 04°16'S, 02°09'30"W, 380–400 m (Forest, 1963).

Subfamily EURYPLACINAE Stimpson, 1871

Genus *Machaerus* Leach, 1818

Machaerus Leach, 1818, in 1817-1818:413 [a genus established without included nominal species; type-species: *Pilumnoplax oxyacantha* Monod, 1956, by present designation; gender: masculine].

DEFINITION.—Carapace smooth, convex anteroposteriorly, broader than long, with 3 or 4 pairs of anterolateral teeth, outer orbital tooth distinct from first anterolateral tooth. Frontal margin straight, short, less than $\frac{1}{3}$ carapace width, transversely grooved, with median notch. Supraorbital margin with 2 closed incisions. Basal antennal segment not fused to front, lacking lateral projection into orbit, flagellum in orbit. Male abdomen with 7 somites, third covering width of sternum, terminal somite elongate triangular. Chelipeds stout, slightly unequal. Walking legs slender, compressed, elongate, distal 3 segments setose dorsally and ventrally. Male first pleopod stout, curved, tapering distally, spinulose subapically.

REMARKS.—Leach (1818, in 1817-1818:413) introduced the generic name *Machaerus* with the following remarks: "*Machaerus*; a new genus allied to *Gonoplax*, but differing in having short peduncles to its eyes, which are inserted into the same part of the shell as in that genus." The name apparently has been overlooked by most carcinologists; it was mentioned by Monod (1956:351, footnote). We believe that two West African goneplacid crabs placed in *Pilumnoplax* by Monod (1956), *P. atlantica* Miers, 1881, and *P. oxyacantha* Monod, 1956, but subsequently excluded from *Pilumnoplax* and the related *Neopilumnoplax*, should be assigned to *Machaerus*.

The genus *Pilumnoplax* Stimpson, 1858, in which the two species here assigned to *Machaerus* were placed by Monod (1956), has as its type-species *Pilumnoplax sulcatifrons* Stimpson, 1858 (designated by Rathbun, 1918:21). Tesch (1918: 154, 155) assigned *P. sulcatifrons* to *Eucrate* de Haan, 1835, making *Pilumnoplax* Stimpson a subjective junior synonym of *Eucrate* de Haan. As

noted by Guinot (1969c:688) carcinologists, including Balss (1957:1656) and Glaessner (1969: R527) have continued to employ *Pilumnoplax* sensu Miers, 1886.

Serène recognized that a new genus was required for *Pilumnoplax* sensu Miers, and in his checklist of the Indo-West Pacific Brachyura, Serène (1968:90) first introduced *Neopilumnoplax* as a manuscript name; it is a nomen nudum. Serène considered that five Indo-West Pacific species belonged to *Neopilumnoplax*: *Pilumnus heterochir* Studer, 1882, *Pilumnoplax sinclairi* Alcock, 1899, *Pilumnoplax abyssicola* Miers, 1886, *Pilumnoplax cooki* Rathbun, 1911, and, with a question mark, *Pilumnoplax acanthomerus* Rathbun, 1911.

Neopilumnoplax Serène, 1969, was named in Guinot (1969c:689, footnote); its type-species is *Pilumnus heterochir* Studer, 1882. *Neopilumnoplax* was "established to include the species [of *Pilumnoplax*] described after Stimpson (1858)" (Serène, in Guinot, 1969c:689, footnote). Guinot noted that Serène included several species in this genus. She, however, restricted it to *Pilumnus heterochir*, *Pilumnoplax americana* Rathbun, 1898, and, possibly, to *Pilumnoplax sinclairi* Alcock, 1899 (erroneously spelled *sainclairi* throughout Guinot). Of the five species listed in *Neopilumnoplax* by Serène in 1968, two, *P. heterochir* and *P. sinclairi*, were retained in *Neopilumnoplax* by Guinot (1969c:689, footnote), two, *Pilumnoplax abyssicola* Miers, 1886, and *P. cooki* Rathbun, 1911, were transferred to *Carcinoplax*, and one, *Pilumnoplax acanthomerus* Rathbun, 1911, was not assigned to any genus. Guinot (1969c:689) made the following comment about that species: "C'est un Crabe énigmatique dont nous nous demandons s'il s'agit d'une Goneplacidae."

Guinot (1969b:517) studied the two West African species here assigned to *Machaerus* and noted that "les deux espèces ouest-africaines décrites dans le genre *Pilumnoplax* Stimpson à savoir *P. atlantica* Miers, 1881 (p. 259; cf. MONOD, 1956, p. 341, fig. 442-449) et *P. oxyacantha* Monod, 1956 (p. 346, fig. 450-455), offrent tous les caractères communs à *Euryplax-Eucrate-Frevillea* et doivent être rattachés aux Euryplacinae." She went on to

discuss differences between these two species and those genera and concluded that "pour le moment, nous laisserons *atlantica* et *oxyacantha* sans attribution générique: en effet, ni *Eucrate*, ni *Heteroplax*, ni *Euryplax*, ni *Frevillea* ne peuvent vraiment convenir."

Machaerus appears to show closest affinities with *Neopilumnoplax* Serène, differing primarily in having the outer orbital tooth distinct from the first anterolateral tooth and a much slenderer male abdomen, the terminal somite of which resembles a slender isosceles triangle, much longer than broad.

*** *Machaerus atlanticus* (Miers, 1881),
new combination**

Pilumnoplax atlantica.—Monod, 1956:341, figs. 442–449.—Buchanan, 1958:24.—Longhurst, 1958:88.—Gauld, 1960:70.—Forest and Guinot, 1966:85.—Crosnier, 1969:531.—Guinot, 1969b:517, 518 [discussion]; 1969c:688 [discussion].—Uschakov, 1970:455 [listed].

"*Pilumnoplax*" *atlantica*.—Guinot, 1969b:507, 508 [discussion], figs. 36, 53 [*atlantica* Stimpson in legends]. [*Pilumnoplax*] *atlantica*.—Guinot, 1971:1081 [listed].

MATERIAL EXAMINED.—*Pillsbury Material*: Ivory Coast: Sta 46, 38–42 m, mud with dense *Jullienella*, 1♂, 1♀ ov, 1 juv (W). Sta 62, 46 m, brown, branching and foliate Foraminifera, 1♂ (L).

Ghana: Sta 24, 35–37 m, dark red bryozoans, 1♂, 2♀ (L).

DESCRIPTION.—Monod, 1956:343.

Figures: Monod, 1956, figs. 442–449; Guinot, 1969b, figs. 36, 53.

Male Pleopod: Monod, 1956, fig. 448 (Senegal); Guinot, 1969b, fig. 53 (Senegal).

Color: Monod (1956:345) gave the following color account taken from a specimen, preserved in alcohol, one day after capture:

Une large bande transversale brune, convexe en avant, rectiligne en arrière, séparée du bord fronto-orbitaire, à points rouges, par une zone courbe plus claire correspondant à la gouttière post-frontale; partie postérieure de la carapace blanc-jaunâtre. Pattes blanchâtres proximale, jaune orange à partir de la région distale du mérus. Chélicères blancs tachetés de carmin à la face supérieure du carpe et de la main; doigt fixe blanc à apex brun-clair; doigt mobile rose à la base, avec de points carmin, brun-clair ensuite. Face inférieure blanchâtre, avec des taches pourpres arron-

dies: sur le bord infraorbitaire, la région ptérygostomienne, le bord antérieur du cadre buccal, le bord infra-antennulaire de l'épistome et l'article basal antennulaire.

In his section on material, Monod (1956:342) made the following observations on two different lots of specimens:

Une tache rouge sur le bord supérieur du doigt mobile [♂, 7 × 8 mm, Guinea]; carapace grise, surtout en avant (à l'exception d'une bande post-frontale plus claire), pattes plus ou moins annelées de sombre, doigt mobile avec 2 anneaux oranges, doigt fixe incolore [5 specimens, Îles de Los].

MEASUREMENTS.—Our specimens have carapace widths of 3 to 8 mm; the single ovigerous female examined has a carapace width of 5 mm.

BIOLOGY.—*Machaerus atlanticus* is a sublittoral, shallow shelf species, generally occurring in depths of less than 50 m. Of 26 recent depth records, 25 are from depths of less than 46 m; one, from off Ghana, is from a depth of 90–100 m (Forest and Guinot, 1966). Seventeen of the 26 records are from depths of less than 30 m. The *Pillsbury* specimens were taken on mud with *Jullienella* or bottom with bryozoans; the *Calypso* specimens were taken on mud and shells in 90–100 m, and mud with *Arca* in 32 m (Forest and Guinot, 1966). Buchanan (1958) considered the species to be a representative of the infauna in the sandy silt community in 15 to 37 m off Ghana. The species was relatively common off Sierra Leone, where Longhurst (1958) collected 32 specimens: one was taken from an estuary on muddy sand, and 31 were taken on the shelf, in depths between 6 and 30 m. Of this latter group, 22 were collected on shelly sand, 9 on shelly mud.

This species seems to prefer the same kinds of habitat as does *Machaerus oxyacantha*; the species were taken together by the *Pillsbury* at Sta 46, off the Ivory Coast in 38–42 m.

Ovigerous females have been collected in January, February, March, and May (Monod, 1956; *Pillsbury*).

DISTRIBUTION.—West Africa, from Senegal to the Congo; in moderate depths, between 4 and 90–100 m, usually in less than 50 m. Monod (1956) studied material from Senegal, Guinea,

Sierra Leone, and Ghana. Since 1956 the species has been recorded from the following:

Senegal: Joal, 10–11 m (Guinot, 1969b).

Guinea: No specific locality (Uschakov, 1970). 09°40'N, 14°05'W, 18 m (Forest and Guinot, 1966).

Sierra Leone: Off Sierra Leone, 6–30 m (Longhurst, 1958).

Ghana: Off Accra, 8–20 fm (15–37 m) (Buchanan, 1958); 10 and 36 m (Gauld, 1960). 04°37'N, 00°50'W, 90–100 m (Forest and Guinot, 1966).

Nigeria: Off the mouths of the Niger River, 04°03'N, 06°12'E, 32 m (Forest and Guinot, 1966).

Congo: Pointe-Noire, 5–10 m (Crosnier, 1969).

****Machaerus oxyacantha* (Monod, 1956),
new combination**

Pilumnoplax atlantica.—Capart, 1951:166, fig. 63 [not *Pilumnoplax atlantica* Miers, 1881].

Pilumnoplax oxyacantha Monod, 1956:346, figs. 450–455.—Gauld, 1960:70.—Rossignol, 1962:118.—Guinot and Ribeiro, 1962:63.—Crosnier, 1964:38, fig. on pl. A.—Forest and Guinot, 1966:85.—Le Loeuff and Intès, 1968:31, table 1.—Guinot, 1969b:517, 518 [discussion]; 1969c:688 [discussion].

“*Pilumnoplax*” *oxyacantha*.—Guinot, 1969b:507, 508 [discussion], figs. 38, 42, 54, 55.

[*Pilumnoplax*] *oxyacantha*.—Guinot, 1971:1081 [listed].

MATERIAL EXAMINED.—*Pillsbury Material*: Ivory Coast: Sta 46, 38–42 m, mud with dense *Jullienella*, 4♂ (W). Sta 47, 37 m, bottom with *Jullienella*, 1♂, 1 juv (L). Sta 48, 22 m, 1♂ (L).

Ghana: Sta 16, 46 m, mud with Foraminifera, shells, several specimens (L). Sta 28, 49–53 m, 1♀, 1 carapace (W).

Nigeria: Sta 241, 59–63 m, mud and shell, 3♂, 1♀ (W). Sta 250, 24 m, brackish water, 1♂, 1 juv (L). Sta 251, 27 m, mud, 1♂, 1♀ (W). Sta 252, 30 m, mud, 2♂, 1♀ (W).

Other Material: Ghana: Shama Bay, 29 Jan 1961, Amegah: 1♂, 1♀ ov (W).

Dahomey: Off Grand-Popo, 30 m, Petersen grab, 23 Feb 1964, Guinean Trawling Survey, Tr 34, Sta 2, 2♂ (L).

DESCRIPTION.—Monod, 1956:348.

Figures: Capart, 1951, fig. 63; Monod, 1956, figs. 450–455.

Male Pleopod: Monod, 1956, figs. 454, 455 (Ghana); Guinot, 1969b, figs. 54, 55 (Senegal).

Color: “Couleur beige claire avec taches brunâtres” (Capart, 1951:167); “plus ou moins rose saumon à grisâtre ou blanchâtre” (Monod, 1956:350).

MEASUREMENTS.—Our specimens have carapace widths of 7 to 27 mm; the single ovigerous female has a carapace width of 26 mm.

BIOLOGY.—*Machaerus oxyacantha*, like *M. atlanticus*, is a sublittoral, shallow shelf species that prefers various types of mud bottoms including sandy mud and mud with Foraminifera or shells, in depths between 7–8 m and 73 m. Of 50 depth records available, only one (7–8 m) is shallower than 10 m and only five are deeper than 50 m; 88% of the depth records fall between 13 m (13–26 m) and 50 m. The species may occur in brackish water but it apparently prefers normal sea water: It was collected by the *Pillsbury* in brackish water off Nigeria, and Monod (1956) reported one specimen from Ghana taken in a river seine.

Ovigerous females have been recorded in January, April, May, and December, suggesting that the species may spawn all year (Monod, 1956).

DISTRIBUTION.—West Africa, from Mauritania to Angola, possibly including Principe Island in the Gulf of Guinea; sublittoral, from 7–8 m to 73 m. Monod (1956) recorded material from Senegal and Ghana. Records in the literature since 1956 include the following:

Senegal: Gorée, 20 m (Guinot, 1969b).

Guinea: between Île Tamara and Île Cassa, Îles de Los, 7–8 m; 09°36'N, 13°57'W, 18–30 m (Forest and Guinot, 1966).

Sierra Leone: 07°20'N, 12°39'W, 30–34 m (Forest and Guinot, 1966).

Liberia: 06°40'N, 11°23'W, 51 m (Forest and Guinot, 1966).

Ivory Coast: Off Sassandra, off Fresco, off Grand Bassam, 18–40 m (Le Loeuff and Intès, 1968).

Ghana: Off Accra and Takoradi, 16–44 m (Gauld, 1960).

Cameroon: No specific locality (Crosnier, 1964).

?Principe: 01°37'N, 07°22'E, 30 m (Forest and Guinot, 1966).

Congo: W of Pointe-Noire, 20–50 m (Rossignol, 1962).

Angola: No specific locality; Benguela, 24 m and 13–26 m (Guinot and Ribeiro, 1962).

Subfamily GONEPLACINAE MacLeay, 1838

Genus *Goneplax* Leach, 1814

Goneplax Leach, 1814:393, 430 [type-species: *Cancer angulatus* Pennant, 1777, a subjective junior synonym of *Cancer*

- rhomboides* Linnaeus, 1758, by monotypy; gender: feminine; name 313 on *Official List*.—Guinot, 1969b:520 [comments on genus]; 1971:1081 [list of species].
- Goneplat* Leach, 1814:393, 430 [invalid original spelling for *Goneplax* Leach, 1814; name 482 on *Official Index*].
- Goneplax* Leach, 1816:409, 413 [invalid spelling of *Goneplax* Leach, 1814; name 483 on *Official Index*].
- Frevillea A. Milne Edwards, 1880:15 [type-species: *Frevillea barbata* A. Milne Edwards, 1880, by subsequent designation by Rathbun, 1918:25; gender: feminine].

Goneplax rhomboides (Linnaeus, 1758)

- Cancer rhomboides* Linnaeus, 1758:626.
- Goneplax angulata*.—Capart, 1951:168, fig. 64, pl. 3: figs. 4, 9 [England], 10.—Barnard, 1954:126 [discussion].—Monod, 1956:354, figs. 462–465.—Pérès, 1964:27, 28, 29.—Maurin, 1968a:19 [Spain]; 1968b:482, 489.
- Goneplax rhomboides*.—Capart, 1951, pl. 3: fig. 11 [Nice].—Forest and Gantès, 1960:353.—Guinot and Ribeiro, 1962:63.—Forest and Guinot, 1966:86.—Zariquiey Alvarez, 1968:414, figs. 1e, 138a,b [Spain; references].—Crosnier, 1970:1215 [listed], 1216.—Türkay, 1976a:25 [listed], 38, fig. 28 [Portugal, in part]; 1976b:61 [listed], 71.
- Goneplax*.—Maurin, 1968a:14 [Spain].
- Goneplax rhomboides*.—Le Loeuff and Intès, 1968, table 1.

SYNONYMS.—*Cancer angulatus* Pennant, 1777; *Ocypode bispinosa* Lamarck, 1801; *Ocypode longimana* Latreille, 1803.

MATERIAL EXAMINED.—*Pillsbury Material*: None.

Undaunted Material: Angola: Sta 94, 90 m, 1♂ (L). Sta 95, 126 m, 1♂ (L).

Other Material: Madeira: S of Madeira, 32°38'N, 16°49'W, 300 m, triangular and quadrangular dredges, 16 Mar 1976, *Onversaagd* Sta 102, 1♂ (L).

Morocco: Off Cap de Mazagan, 33°38'N, 08°45'W, 420 m, Agassiz trawl, 28 Mar 1976, *Onversaagd* Sta 150, 1♀ (L). Off Cap Hadid, 31°54'N, 09°54'W, 85 m, muddy sand, 5m beam trawl, 25 Mar 1976, *Onversaagd* Sta 126, 13♂, 8♀ (L).

DESCRIPTION.—Capart, 1951:168.

Figures: Capart, 1951, fig. 64, pl. 3: figs. 4, 9, 10, 11; Monod, 1956, figs. 462–465.

Male Pleopod: Capart, 1951, pl. 3: figs. 9 (England), 10 (Angola), 11 (Nice); Monod, 1956, figs. 463–465 (Senegal).

Color: “Couleur général rose, la moitié antérieure de la carapace violacée et plus foncée; pince brun-rouge clair, les doigts violacés, partiellement noirs” (Capart, 1951:169).

REMARKS.—Capart (1951) considered that *G. angulata* and *G. rhomboides* were distinct “varieties,” the former inhabiting the Atlantic, the latter the Mediterranean. He noted (1951:169):

Il serait intéressant de pouvoir déterminer si cette variété [*G. rhomboides*] n'est pas plutôt une espèce différente de la première [*G. angulata*]. Les pléopodes sont nettement différents. . . . En tous cas il est curieux de constater qu'il n'y a pratiquement aucune différence entre les spécimens de *G. angulata* récoltés sur les côtes de l'Angleterre et ceux provenant des côtes du Congo et de l'Afrique du Sud.

Monod (1956) did not comment on these observations in his account of the species, based on two specimens taken from stomach contents of fishes. Unfortunately, there is not enough material available to us for an evaluation of the differences observed by Capart. The identity of the Mediterranean and Atlantic populations of *Goneplax*, following recent practice (Zariquiey Alvarez, 1968), are here considered to represent one species, *G. rhomboides*.

BIOLOGY.—*Goneplax rhomboides* is a sublittoral species, occurring off West Africa on the outer shelf and upper slope; the shallowest record in the recent literature is 33 m, but the majority of records are from depths in excess of 100 m. It was recorded by Capart (1951) on muddy sand or sandy mud in depths between 85 and 215–220 m, by Forest and Guinot (1966) on rocks and shells in 90–100 m, by Maurin (1968b) on sandy mud in 400–700 m and muddy detritic fine sand in 200 to 400 m, and by Pérès (1964) on yellow terrigenous coastal mud in 175 to 185 m and on bathyal mud in 333 to 360 m.

Off West Africa, ovigerous females have been collected in January (Forest and Gantès, 1960).

DISTRIBUTION.—Eastern Atlantic, from the English Channel to South Africa, including the Mediterranean, in depths from about 30 m to more than 700 m. Monod (1956) reported material from Senegal; since 1956 the species has been recorded from the following:

Madeira: Funchal (Türkay, 1976b).

Morocco: 35°19'N, 06°32'W to 35°28.8'N, 06°39.2'W, 333–360 m; 34°37.4'N, 06°49'W, 180 m; and 34°33.5'N, 06°52'W to 34°39'N, 06°50'W, 175–185 m (Pérès, 1964).

33°19.3'N, 08°39'W, 85 m; 33°17.2'N, 08°34.5'W, 65 m; 31°01'N, 10°16'W, 360–375 m; and 30°20'N, 10°03'W, 255–355 m (Türkey, 1976a). Off Agadir, 60–130 m; off Essaouira, 32°08'N, 09°02'W, 33 m; and 31°37'N, 09°54'W, 70 m (Forest and Gantès, 1960).

Spanish Sahara: Off Cabo Garnet, 400–700 m (Maurin, 1968b).

Mauritania: Off Tamzak (as Tamxat), 200–400 m (Maurin, 1968b).

Ivory Coast: Off Grand-Bassam, 200 m (Le Loeuff and Intès, 1968).

Ghana: 04°37'N, 00°50'W, 90–100 m (Forest and Guinot, 1966).

Angola: Baía dos Tigres, 110 m (Guinot and Ribeiro, 1962). 16°27'S, 11°35'E, 90 m; and 16°37'S, 11°22'E, 126 m (Crosnier, 1970).

Subfamily RHIZOPINAE Stimpson, 1858

Genus *Acidops* Stimpson, 1871

Acidops Stimpson, 1871b:110 [p. 137 on separate] [type-species: *Acidops fimbriatus* Stimpson, 1871, by monotypy; gender: masculine].

Epimelus A. Milne Edwards, 1878:227 [p. 8 on separate] [type-species: *Epimelus cessacii* A. Milne Edwards, 1878, by monotypy; gender: masculine; name 147 on *Official List*].

Acidops cessacii (A. Milne Edwards, 1878)

Acidops cessacii.—Monod, 1956:359, figs. 469, 470 [Senegal].—Guinot and Ribeiro, 1962:64, figs. 27, 28 [Cape Verde Islands].—Ribeiro, 1964:13 [Cape Verde Islands].—Forest and Guinot, 1966:88 [São Tomé, Annobon].

Epimelus cessacii.—Garth, 1968:314 [discussion].

DISTRIBUTION.—West Africa, from the Cape Verde Islands, Senegal, and São Tomé and Annobon islands in the Gulf of Guinea; intertidal to 10–30 m.

Subfamily TYPHLOCARCINOPINAE Rathbun, 1909

Genus *Typhlocarcinodes* Alcock, 1900

Typhlocarcinodes Alcock, 1900:326 [a genus established without included nominal species; type-species: *Typhlocarcinus integrifrons* Miers, 1881, by subsequent designation by Tesch, 1918:227; gender: masculine].

REMARKS.—Alcock (1900) established this genus for an Indian species that he did not name and that he compared with the West African *Typhlocarcinus integrifrons* Miers, 1881. The genus was established without any included nominal species. Tesch (1918:226, 227) considered that *Typhlocarcinodes* included four species: *T. integrifrons* (Miers, 1881), *Caecopilumnus hirsutus* Borradaile, 1903, *Typhlocarcinops piroculata* Rathbun, 1911, and *Typhlocarcinodes crassipes* Tesch, 1918; he designated *T. integrifrons* as the type-species. According to Article 69(a)(ii) of the *International Code of Zoological Nomenclature*, “if no nominal species were included at the time the genus was established, the nominal species-group taxa that were first subsequently and expressly referred to it are to be treated as the only original included species.” Thus Tesch’s designation of *Typhlocarcinus integrifrons* Miers as the type-species of *Typhlocarcinodes* is valid.

Monod (1956:365) questioned whether the Indo–West Pacific species were congeneric with *T. integrifrons*. Tesch (1918:227) and Serène (1964b:237) pointed out differences between *T. integrifrons* and Indo–West Pacific species, and Takeda (1973:52) accepted the possibility that two genera might be involved.

Those authors who consider the three Indo–West Pacific species assigned to this genus, *Typhlocarcinodes hirsutus* (Borradaile, 1902), *T. piroculatus* (Rathbun, 1911), and *T. crassipes* Tesch, 1918, to be generically distinct from the eastern Atlantic *T. integrifrons* (Miers, 1881) should refer those species to *Caecopilumnus* Borradaile (1902b:267; type-species: *Caecopilumnus hirsutus* Borradaile, 1902, by monotypy; gender: masculine).

**Typhlocarcinodes integrifrons* (Miers, 1881)

Typhlocarcinodes integrifrons.—Monod, 1956:356, 632, figs. 466–468.—Longhurst, 1958:88.—Forest and Guinot, 1966:87, fig. 8.—Crosnier, 1967:334.

MATERIAL EXAMINED.—*Pillsbury Material*: Ghana: Sta 24, 35–37 m, dark red bryozoans, 1♂, 1♀ (L).

DESCRIPTION.—Miers, 1881a:260.

Figures: Monod, 1956, figs. 466–469; Forest and Guinot, 1966, fig. 8.

Male Pleopod: Forest and Guinot, 1966, fig. 8 (Principe).

MEASUREMENTS.—Our specimens have carapace widths of 6 to 9 mm.

BIOLOGY.—*Typhlocarcinodes integrifrons* is a sublittoral species, known to occur in depths between 12 and 90–100 m. It may prefer shallower water, as suggested by the only depth records available, viz. 16–44, 18, 30, 30–34, 35–37, 48, 51, and 90–100 m.

Bottom types on which it is known to occur include: dark red bryozoans, 35–37 m (*Pillsbury*); shelly mud (2 specimens) and shelly sand (4 specimens) in 16–44 m (Longhurst, 1958); sand and mud in 12 m, mud and shells in 30 m, and rocks and shells in 90–100 m (Forest and Guinot, 1966); and coarse sand in 30 m and green mud in 48 m (Crosnier, 1967).

Ovigerous females have been collected in May (Forest and Guinot, 1966).

DISTRIBUTION.—West Africa, from localities between Senegal and Dahomey as well as Principe Island in the Gulf of Guinea; sublittoral, from 12 m to 90–100 m. Records in the literature include the following:

Senegal: Gorée (Miers, 1881a; Monod, 1956).

Guinea: 1 mi [1.6 km] SE of Île Blanche, off Conakry, 18 m (Monod, 1956).

Sierra Leone: No specific locality, in 44 m (Monod, 1956); in 16–44 m (Longhurst, 1958).

Ivory Coast: 04°36'N, 06°50'W, 48 m (Crosnier, 1967).

Ghana: 04°37'N, 00°50'W, 90–100 m (Forest and Guinot, 1966).

Dahomey: 06°04'N, 02°26'E, 30 m (Crosnier, 1967).

Principe: 01°39'35"N, 07°26'53"E, 12 m, and 01°37'N, 07°22'E, 30 m (Forest and Guinot, 1966).

Family HEXAPODIDAE Miers, 1886

HEXAPODINAE Miers, 1886:275.

EASTERN ATLANTIC GENERA.—Four, *Hexapinus*, new genus, *Parahexapus*, *Pseudohexapus*, and *Thaumastoplax*, each of which is represented by a tropical West African species.

EASTERN ATLANTIC SPECIES.—Four, all occur-

ring off West Africa. This family was not represented in the *Pillsbury* collections. The following name changes have occurred since Monod (1956):

Name in Monod	Current Name
<i>Hexapus (Thaumastoplax) anomalipes</i>	<i>Thaumastoplax anomalipes</i>
<i>Hexapus (Pseudohexapus) platydactylus</i>	<i>Pseudohexapus platydactylus</i>
<i>Hexapus (Parahexapus) africanus</i>	<i>Parahexapus africanus</i>
<i>Hexapus (Hexapus) buchamani</i>	<i>Hexapinus buchamani</i>

REMARKS.—The subfamily Hexapodinae was established within the Family Pinnotheridae by Miers (1886), who included four genera: *Hexapus* de Haan, 1833; *Amorphopus* Bell, 1859; *Thaumastoplax* Miers, 1881; and *Asthenognathus* Stimpson, 1858. The latter genus is now considered to be a pinnotherid (Schmitt, McCain and Davidson, 1973:128). Ortmann (1894:690) retained the Hexapodinae within the Pinnotheridae. Alcock (1900:287) recognized the affinities of the Hexapodinae with the Goneplacidae and included it as one of five subfamilies of the latter. He was followed in this by Borradaile (1907) and subsequent authors.

We believe that the complete suppression of the last pair of pereopods in members of this subfamily is a fundamental character which warrants the recognition of the Hexapodidae as a family distinct form but related to the Goneplacidae. We treat it as a family here.

The following genera and species have been named in the family: *Hexapus* was erected by de Haan (1833:5; 1835:63) for *Cancer sexpes* Fabricius, 1798; it is apparent that several different species have erroneously been identified with *H. sexpes* by subsequent authors. Other species described in *Hexapus* include: *H. williamsi* Glassell, 1938, eastern Pacific; *H. stebbingi* Barnard, 1947, South Africa; *H. buchamani* Monod, 1956, West Africa; *H. granuliferus* Campbell and Stephenson, 1970, Australia; and *H. estuarinus* Sankarankutty, 1975, India. Each of these latter species are assigned to different genera below.

Amorphopus (Bell, 1859:27) was established for a single species from an unknown locality, *A. cylindraceus* Bell. According to Bell, it differs from *Hexapus* in having a rudimentary pair of fifth legs, a feature shared with no other member of the family. Rathbun (1897b:163) pointed out that this name was preoccupied twice [according to Neave, *Nomenclator Zoologicus*, the oldest name is *Amorphopus* Audinet-Serville, 1838 (Insecta)] and substituted *Paeduma* for it. Rathbun's name apparently has been overlooked by nearly all zoologists dealing with this group; Gordon (1971:108) pointed out that *Amorphopus* was preoccupied. *Amorphopus* Bell has been recognized by Alcock (1900:293), Stebbing (1910:315) (who suggested that "there seems little justification for the separation either of *Amorphopus* or *Thaumastoplax* from *Hexapus*."), Tesch (1918:238), Balss (1957:1658), and Serène (1968:93). We recognize *Paeduma* Rathbun (p. 173).

Thaumastoplax Miers (1881a:261) was established for a single species from Senegal, *T. anomalipes* Miers; it was distinguished from *Hexapus* in having a slender third maxilliped with the propodus dilated distally. Rathbun (1910:113) described two additional species from Thailand, *T. orientalis* and *T. chuenensis*. A fourth species, *T. spiralis* Barnard (1950:301), was described from South Africa. Although Monod (1956:362, 363) treated *Thaumastoplax* as a subgenus of *Hexapus*, Tesch (1918:238), Balss (1957:1658), Glaessner (1969:R527) and Sakai (1976:555) all considered it to be a distinct genus. We also consider *Thaumastoplax* to be a valid genus; species described in it subsequent to 1881 are assigned to other genera below.

Lambdophallus Alcock (1900:329) was based on an Indian species, *L. sexpes* Alcock, in which the apices of the male pleopods extended laterally well beyond the abdomen, lying in deep lateral, transverse grooves in the sternum. A second species, *Lambdophallus anfractus*, was described on material from Thailand by Rathbun (1909:113). Stephensen (1945:182) considered *Lambdophallus* to be a synonym of *Hexapus* and synonymized both *L. sexpes* and *L. anfractus* with *H. sexpes*.

Monod (1956:362) and Sakai (1976:554) both considered *Lambdophallus* to be a subgenus of *Hexapus*; Tesch (1918:239) and Balss (1957:1658) both considered it to be a distinct genus, as we do.

Hexaplex Doflein (1904:122) was established for a deep water species from India, *H. megalops* Doflein. It is characterized by long slender walking legs and very large, hammer-shaped eyes. It has been considered a distinct genus by all subsequent authors (see Sakai, 1976:556, for synonymy).

Parahexapus was erected by Balss (1922:77) for *P. africanus* from Cabinda; one of its distinguishing features is its slender third maxilliped. Balss (1957:1658) retained *Parahexapus* as a distinct genus, but Monod (1956:362) considered it to be a subgenus of *Hexapus*. We believe that it is generically distinct.

Pseudohexapus was recognized by Monod (1956:362, 365) as a subgenus of *Hexapus*. It included but one species from West Africa, *Hexapus (Pseudohexapus) platydactylus*, characterized by broadened, flattened dactyli on the walking legs. We recognize *Pseudohexapus* here.

Monod (1956), who studied four species representing four different subgenera, reviewed the literature and pointed out numerous discrepancies in accounts in the literature purporting to deal with the same species. He pointed out that Stephensen's (1945:182) *H. sexpes* probably was not the same species reported by de Haan and provided diagnoses of five subgenera within *Hexapus*: *Hexapus*, *Thaumastoplax*, *Parahexapus*, *Pseudohexapus*, and *Lambdophallus*.

West African material available to us includes representatives of only two species, *Thaumastoplax anomalipes* and *Parahexapus africanus*. The collections of the Smithsonian Institution, however, include specimens identified with several additional species from Indo-West Pacific localities: *Hexapus sexpes* (Fabricius) from Japan and the Philippine Islands, *Thaumastoplax orientalis* (Rathbun) from Japan, paratypes of *Lambdophallus anfractus* Rathbun from Thailand, and *Hexapus williamsi* Glassell from Mexico. Examination of this relatively rich material, which proved to be nec-

essary in order to determine the status of the species known from West Africa, has suggested to us that all of the subgenera recognized by Monod should be recognized as distinct genera, that several new genera should be recognized, and that several name changes are required for known species. All existing genera and the new genera that we believe should be recognized are characterized below.

Monod's (1956:361) excellent review of the subgenera of *Hexapus* stressed the importance of several characters that appear to have been overlooked in the past; several of these have not been described for all species. They include: the shape of the third maxillipeds, whether slender or broad, and especially the shape of the propodus,

slender or distally dilated, and the presence or absence of a flagellum on the exopod; eye shape; relative length of walking legs; shape and configuration of the male abdomen; the shape and extent of sternal grooves in the male, and structure of the male pleopod. These characters appear to us to afford reliable features for differentiation of genera.

Gordon (1971:108) was correct in stating that "the taxonomy of the Hexapodinae poses some problems which can only be solved by a careful re-examination of all of the available material." We believe that all records in the literature require verification. Descriptions of several new species and a redescription of the type of *Cancer sexpes* Fabricius are in preparation by Manning.

Key to Genera of Hexapodidae

1. Eye hammer-shaped, cornea very large [carpus, propodus, and dactylus of third maxilliped slender; walking legs long, slender, merus of longest pair longer than carapace] **Hexaplax**
 Eye small, reduced, cornea scarcely or not at all broader than stalk ... 2
2. Eyes fixed. Walking legs (Figure 34a) long, slender, merus of longest pair longer than carapace. Male with long, narrow transverse grooves in sternum extending laterally from abdominal fossa beyond bases of third maxillipeds (Figure 34b) (carpus, propodus, and dactylus of third maxilliped slender) **Lambdophallus**
 Eyes movable. Walking legs short, merus of longest pair shorter than carapace. Male lacking long, narrow transverse grooves in sternum extending laterally from abdominal fossa beyond bases of third maxillipeds 3
3. Propodus of third maxilliped strongly dilated distally (Figure 37b, 39a) . 4
 Propodus of third maxilliped not strongly dilated distally, slender, like carpus and dactylus (Figures 31a, 33a) 6
4. Male pleopod stout, strongly twisted into a tight spiral (Figure 37e) **Spiroplax**, new genus
 Male pleopod variously shaped, not twisted into a tight spiral 5
5. Third to fifth abdominal somites fused in male. Male pleopod (Figure 39c) slender, sinuous, apex directed anteriorly **Thaumastoplax**
 Third and fourth and fourth and fifth abdominal somites fused in male. Male pleopod (Figure 35b) slender, strongly recurved posteriorly, apex directed posteriorly or recurved anteriorly, shaped like a figure 8 **Paeduma**
 8
6. Male abdomen with second through sixth somites fused. **Stevea**, new genus

- Male abdomen with third to fifth somites fused 7
7. Dactylus of each walking leg enlarged, triangular, strongly flattened dorsoventrally (male pleopod stout, with proximally directed subapical spines) **Pseudohexapus**
 Dactyli of walking legs not enlarged or strongly flattened dorsoventrally 8
8. Terminal somite of male abdomen (Figure 40*a,d*) trilobed or trefoil in shape, with distinct lateral angular projections (sixth abdominal somite divided longitudinally in type-species; male pleopod stout, bent laterally, apex directed anteriorly) **Tritoplax**, new genus
 Terminal somite of male abdomen (Figures 31*b*, 32*c*) broadly rounded, not trilobed 9
9. Third maxilliped (Figure 36*a*) slender, almost pediform, ischium width about $\frac{2}{3}$ merus length. Male pleopod (Figure 36*c*) slender, sinuous, tapering abruptly to almost filiform apex, with strong, recurved spines near midlength (sixth and seventh somites of male abdomen (Figure 36*b*) very slender, width half that of first fused somite) . **Parahexapus**
 Third maxilliped broad, ischium width usually subequal to or greater than merus length 10
10. Sternum in male (Figure 33*b*) with broad, deep grooves extending anterolaterally from end of abdominal fossa to bases of third maxillipeds. Male pleopods bent laterally, apices lying in sternal grooves . **Hexapus**
 Sternum in male (Figure 32*c*) lacking broad, deep grooves extending anterolaterally from end of abdominal fossa to bases of third maxillipeds, with at most triangular anterolateral projections on abdominal fossa, not extending laterally beyond border of first fused somite. Male pleopods not bent, apices concealed under abdomen or visible on either side of terminal somite **Hexapinus**, new genus

Genus *Hexapinus*, new genus

FIGURES 31, 32*c,d*

TYPE-SPECIES.—*Hexapus latipes* de Haan, 1835, pl. D.

ETYMOLOGY.—The masculine name *Hexapinus* is derived from the name *Hexapus* and the Latin suffix *-inus*, pertaining to.

DIAGNOSIS.—Eyes very small, cornea subglobular. Third maxilliped (Figure 31*a*) with broad ischium and merus, inner margin of ischium concave proximally, straight or convex distally, carpus, propodus, and dactylus slender, cylindrical, dactylus longer than propodus; exopod with flagellum. Walking legs short, stout, merus of longest pair shorter than carapace. Male pleopods (Figure 31*c,d*) stout, sinous but not strongly angled

distally, apices concealed under abdomen or scarcely visible next to seventh somite. Male abdomen (Figure 31*b*) with third to fifth somites fused, terminal somite rounded apically, smooth laterally. Female abdomen of 7 somites.

INCLUDED SPECIES.—*Hexapus latipes* de Haan, 1835, from Japan; *Hexapus buchanani* Monod, 1956, from West Africa; *Hexapus granuliferus* Campbell and Stephenson, 1970, from Australia; and one or more species identified with *Hexapus sexpes* by various authors: A. Milne Edwards, 1873b:253, pl. 12: fig. 1 (New Caledonia); De Man, 1888:322, pl. 13: fig. 3 (Amboina); Zehntner, 1894:159 (Amboina); Nobili, 1906a:146 (Persian Gulf); Tesch, 1918:240, pl. 17: fig. 1 (Indonesia); Balss, 1938:74 (Marshall Islands); Stephensen, 1945:182, fig. 53 (Persian Gulf); Guinot-

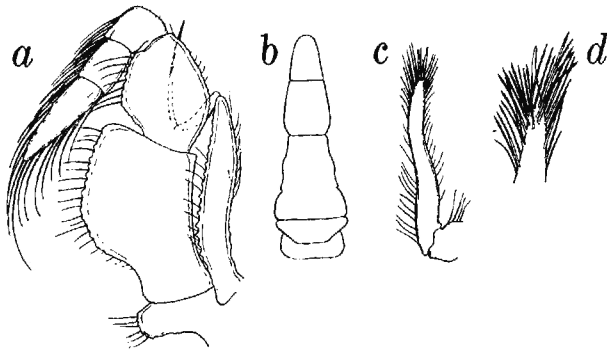


FIGURE 31.—*Hexapinus buchanani* (Monod): *a*, third maxilliped; *b*, male abdomen; *c*, male pleopod; *d*, apex of male pleopod (all from Monod, 1956, figs. 498–500).

Dumortier and Dumortier, 1960:130, fig. 9 (no locality); Griffin, 1972:85 (Australia).

Hexapus sexpes sensu A. Milne Edwards, 1873(b) (Figure 32*a,b*) from New Caledonia differs from our material of *Hexapinus latipes* from Japan in having a narrow cornea and the surface of the carapace covered with setae. It may well represent a new genus. Unfortunately, the female holotype could not be located at the Muséum national d'Histoire naturelle, Paris, in October 1977 (J. Forest, pers. comm.).

We suspect that two distinct Japanese species have been referred to *H. sexpes* by various authors. De Haan (1835) reported that his material measured 3×5 lines (1 line = 2.12 mm) or 6×11 mm; thus it was a relatively small species. Sakai (1976) noted that some specimens from Japan measured as large as 18×29.2 mm. Available material of both forms in the collection of the Smithsonian Institution exhibit specific differences.

An examination of the Japanese specimen that de Haan (1835:35, 63, pl. 11: fig. 5) described and figured as *Hexapus sexpes* (Fabricius, 1798) and which still is preserved dry in the collection of the Rijksmuseum van Natuurlijke Historie, Leiden (a male, cl 6.7 mm, cb 10.0 mm, Crust. D. 31783), shows that it is different from Fabricius' type of *Cancer sexpes* and should be referred to the genus *Hexapinus*. For it the specific epithet *latipes* de Haan is available. On plate D of *Fauna Japonica*, namely, de Haan (1835) used the name

Hexapus latipes for a figure of the mouthparts of his Japanese *Hexapus*, which he named *H. sexpes* in his text and on pl. 11: fig. 5. That the word *latipes* is not a typographical error is shown by the fact that the piece of cardboard on which de Haan glued the mouthparts of this specimen, and which is also present in the collection of the Leiden Museum, bears the following inscription in de Haan's handwriting: "Hexapus latipes Faun. Jap." Evidently de Haan at first considered the species new and gave it the name *Hexapus latipes*, and when he later changed his mind and identified the species with *Cancer sexpes*, the name *latipes* had already been engraved on plate D and could not be changed. It is peculiar that de Haan under *Hexapus sexpes* nowhere referred to plate D and did not correct the name *latipes* in the erratum.

The specific epithet *latipes*, published in the combination *Hexapus latipes* with a figure, is an available name and must be used for the present Japanese *Hexapinus*.

Hexapinus latipes has been discussed under the name *Hexapus sexpes* by Tesch (1918), Sakai (1934, 1936, 1939, 1976), and Odawara (1965).

Although de Haan identified his species with *Cancer sexpes*, he noted that in his specimens the

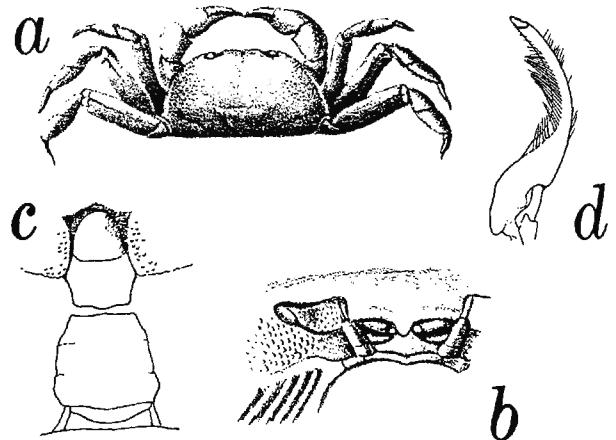


FIGURE 32.—*Hexapus sexpes* sensu A. Milne Edwards: *a*, dorsal view; *b*, front (from A. Milne Edwards, 1873b, pl. 12: fig. 1, 1a). *Hexapinus granuliferus* (Campbell and Stephenson): *c*, abdomen of male; *d*, gonopod (apex broken?) (from Campbell and Stephenson, 1970, fig. 49g,h).

front was truncate and deflexed and further noted (1835:64) that "Fabricius dicit frontem emarginatam."

Hexapinus differs from the other hexapodid genera with short legs, broad maxillipeds, and the third to fifth abdominal somites fused in males, *Hexapus* and *Tritoplax*, as follows: In *Hexapus* sternal grooves extend anterolaterally from the abdominal fossa almost to the level of the bases of the third maxillipeds, and the male pleopods are bent laterally and are situated in these grooves; in *Hexapinus* these grooves are restricted to the end of the abdominal fossa and the male pleopods are more or less straight and are concealed under the abdomen (Figure 32c,d). In *Tritoplax* the terminal somite of the male abdomen is trilobed or trefoil in shape, whereas in *Hexapinus* it is evenly rounded.

We are not certain that *Hexapus granuliferus* Campbell and Stephenson, 1970, should be assigned here, although superficially it resembles *Hexapinus latipes*. Their figure (49g) of the male pleopod (Figure 32d herein) may have been based on a broken one, for the apex appears to be unusually broad; it tapers to a slender tip in both *H. latipes* and *H. buchanani* (Figure 31c,d); it is sinuous and much less curved in the latter species than in either *H. latipes* or *H. granuliferus*.

***Hexapinus buchanani* (Monod, 1956),
new combination**

FIGURE 31

Hexapus (Hexapus) buchanani Monod, 1956:372, figs. 497-501 [Ghana, Sierra Leone]; 1963, fig. 38 [no material].
Hexapus buchanani.—Gauld, 1960:71 [Ghana].

DISTRIBUTION.—West Africa, from Sierra Leone, Ghana, and Dahomey; sublittoral in 7 to 10 m.

Genus *Hexaplax* Doflein, 1904

Hexaplax Doflein, 1904:122 [type-species: *Hexaplax megalops* Doflein, 1904, by monotypy; gender: feminine].

DIAGNOSIS.—Eyes large, hammer-shaped, cor-

nea much broader than stalk. Third maxilliped with broad ischium and merus, mesial margin of ischium concave proximally, convex distally, carpus, propodus and dactylus slender, dactylus longer than propodus; exopod with flagellum. Walking legs slender, elongate, merus of longest pair longer than carapace. Apices of male pleopods concealed under abdomen, pleopods straight or faintly sinuous, tapering to slender apex, directed anteriorly, with few minute subdistal spinules. Male abdomen with 6 visible somites, third to fifth fused but distinct, terminal somite triangular, rounded distally.

INCLUDED SPECIES.—*Hexaplax megalops* Doflein, 1904.

REMARKS.—*Hexaplax megalops* has been reported from Indonesia, Thailand, the Philippines, and off Japan in moderately deep water. The female abdomen has not been described. Serène (1964b, fig. 21) has illustrated the male pleopod as well as the third maxilliped, and Sakai (1976:556) provided a synonymy for the species.

In an adult male from the collection at Leiden examined by us (cl 9.8 mm, cb 14 mm, *Siboga* Sta 12), the first abdominal somite is concealed by the carapace, so that the first visible somite is the second and the abdomen seems to comprise six somites: 2, 3-4-5, 6, and 7. Sutures are clear between the third and fourth and the fourth and fifth somites, but the somites seem to be immovable.

Genus *Hexapus* de Haan, 1833

FIGURE 33

Hexapus de Haan, 1833:5 [a genus established without included nominal species; type species: *Cancer seipes* Fabricius, 1798, by designation in Opinion 85, 1925, *Smithsonian Miscellaneous Collections*, 73(3):15; gender: masculine; name 317 on *Official List*].

DIAGNOSIS.—Eyes short and stout, cornea not broader than stalk. Third maxilliped (Figure 33a) with broad ischium and merus, mesial margin of ischium distally straight or sinuous, carpus, propodus and dactylus slender, subcylindrical; dac-

tylus longer than propodus; exopod with flagellum. Walking legs short, merus of longest leg (third) shorter than carapace. Male pleopods (Figure 33c) not concealed under abdomen, lying in deep, oblique grooves (Figure 33b) on anterior part of sternum, apices setose, directed anterolaterally. Male abdomen (Figure 33b) with third to fifth somites fused, terminal somites rounded, not trilobed. Female abdomen with 7 free somites.

INCLUDED SPECIES.—*Cancer saxes* Fabricius, 1798, from southern India; *Lambdophallus anfractus* Rathbun, 1909, from Thailand and Japan; and *Hexapus estuarinus* Sankarankutty, 1975, from India.

REMARKS.—De Haan (1835:35, 63, pl. 11: fig. 5, pl. D) included in the genus *Hexapus* (which he had established in 1833 without nominal species) two nominal species: *Cancer saxes* Fabricius, 1798, and his new *Hexapus latipes*. On plate D, de Haan used the name *Hexapus latipes* for the specimen, which in his text (pages 35 and 63, and pl. 11: fig. 5), he had indicated with the name *Hexapus saxes* (Fabricius). *Hexapus latipes* is an available name, and the epithet *latipes* has to be used for the species of *Hexapinus* to which de Haan's specimen belongs. This specimen, namely, is specifically (and generically) distinct from the type-specimen of *Cancer saxes* Fabricius, 1798. As *Cancer saxes* is the type-species of the genus *Hexapus* it should be known as *Hexapus saxes* (Fabricius,

1798); for de Haan's Japanese species the name *Hexapinus latipes* (de Haan, 1835) is correct.

De Haan (1835:64) did note differences between his Japanese specimen, of which he described the front as deflexed and truncate, and the description of *Cancer saxes* in which "Fabricius dicit frontem emarginatam."

Fabricius (1798:334) gave the following description of *Cancer saxes*:

C. thorace laevi integerrimo, fronte emarginata, pedibus senis.

Habitat in India orientali Dom. Daldorff.

Parvus thorax laevis in medio lineolis duabus impressis. Frons deflexa, emarginata. Pedes omnino sex inermes. Chelae breves, laeves altera maiore.

The type of *Cancer saxes* Fabricius, in the Universitetets Zoologiske Museum, Copenhagen (see Zimsen, 1964:650), was examined by Manning in Copenhagen in 1977. It is a male, cl 6.2 mm, cb 9.5 mm, preserved dry, and in very good condition. As mentioned by Fabricius, the front is faintly emarginate. It was compared with the holotype of *Lambdophallus anfractus* Rathbun, and differs from the latter in having the carapace less granular, the fingers of the chela longer than the palm, and the walking legs are slenderer and less setose. There is no doubt, however, that the two species are congeneric. Both share the deep, oblique sternal grooves, figured well by Rathbun (1910, fig. 36a; see Figure 33b herein), with similar male pleopods. The abdomen of the male in both species has the third to the fifth somites fused. A redescription of the type-specimen of *Hexapus saxes* is in preparation.

Hexapus estuarinus Sankarankutty, 1975, from the Cochin region, SW India, may well prove to be synonymous with *Hexapus saxes*. In both species the chelae are unequal and the second leg is the longest of the walking legs.

This genus has deep sternal grooves like *Lambdophallus* sensu stricto, but differs in having very short pereopods, as in most other genera in the family. The sternal grooves are deep and well defined but extend anterolaterally almost to the base of the maxillipeds rather than extending laterally as in *Lambdophallus* (Figure 34b). In *H.*

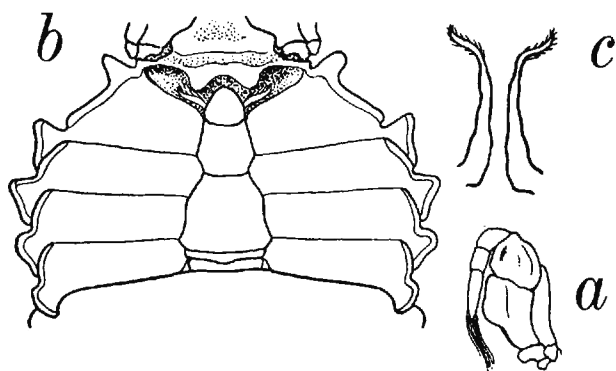


FIGURE 33.—*Hexapus anfractus* (Rathbun): a, third maxilliped; b, sternum of male; c, male pleopod. (All from Rathbun, 1910, fig. 36.)

anfractus the third legs are the longest, the male abdomen extends almost to the level of the insertion of the third maxillipeds, and the carapace is relatively broad (width = 1.5 times length).

We do not agree with Campbell and Stephenson (1970:291) that *Hexapus anfractus* (Rathbun) can be identified with *Hexapinus latipes* from Japan. The sternal grooves in our material of *H. anfractus* are much better developed than they are in our Japanese material of *H. latipes*, in which the grooves are represented only by an emargination in the lateral margins of the sternal abdominal trench. We refer Japanese specimens previously assigned to *H. sexpes* to a new genus, *Hexapinus*. In *L. anfractus* the grooves extend anterolaterally from the terminal segment of the abdomen to the bases of the articulations of the third maxillipeds. The size and extent of development of these grooves are completely different in the two forms, and different from that found in *Lambdophallus*, sensu stricto, in which they extend laterally from the last abdominal somite.

Genus *Lambdophallus* Alcock, 1900

FIGURE 34

Lambdophallus Alcock, 1900:329 [type-species: *Lambdophallus sexpes* Alcock, 1900, by monotypy; gender: masculine].

DIAGNOSIS.—Eyes small, immovable, cornea slightly broader than stalk. Third maxilliped (Figure 34*b*) broad, ischium slightly convex distally, carpus, propodus, and dactylus slender, subcylindrical, dactylus as long as propodus; flagellum of exopod not described. Pterygostomian region with row of oblique striae. Walking legs (Figure 34*a*) elongate, merus of longest pair longer than carapace. Transverse grooves on sternum (Figure 34*b*) for reception of male pleopods present. Male pleopods (Figure 34*b,c*) with apices not concealed under abdomen, each bent at right angle, distal part of each lying in deep transverse groove on sternum, apices naked, with subterminal setae, directed laterally. Male abdomen (Figure 34*b,c*) with 5 segments, third to fifth fused,

terminal segment rounded apically, smooth laterally.

REMARKS.—This genus contains only the type-species, *L. sexpes* Alcock. The fixed eyes, long pereopods, and long, L-shaped male pleopods extending laterally into transverse grooves in the anterior part of the sternum are diagnostic for the genus.

In *L. sexpes* the third and fourth legs are subequal in length, the male abdomen falls short of the level of insertion of the third maxillipeds, and the carapace is relatively broad (width = 1.6 times length).

Another species subsequently described in this genus, *L. anfractus* Rathbun, 1909, from Thailand, is transferred to *Hexapus* (p. 171).

Genus *Paeduma* Rathbun, 1897

FIGURE 35

Amorphopus Bell, 1859:27 [invalid junior homonym of *Amorphopus* Audinet-Serville, 1838 (Insecta); type-species: *Amorphopus cylindraceus* Bell, 1859, by monotypy; gender: masculine].

Paeduma Rathbun, 1897b:163 [substitute name for *Amorphopus* Bell, 1859; type-species: *Amorphopus cylindraceus* Bell, 1859; gender: neuter].

DIAGNOSIS.—Eyes small, movable, cornea about as broad as stalk. Third maxillipeds slender, ischium convex mesially, propodus dilated distally, as broad as merus, longer than carpus or dactylus; exopod with flagellum. Pterygostomian region lacking oblique striae. Walking legs short, merus of longest pair (second) shorter than carapace. Sternal grooves absent. Apices of male pleopods (Figure 35*b*) concealed under abdomen, pleopods slender, recurved posteriorly or doubly recurved into a figure 8, apices apparently naked or nearly so. Male abdomen (Figure 35*a*) with third and fourth and fifth and sixth somites fused, terminal somite short, subtriangular, rounded apically, not trilobed.

INCLUDED SPECIES.—*Amorphopus cylindraceus* Bell, 1859, locality unknown, and *Thaumastoplax orientalis* Rathbun, 1909 and *T. chuenensis* Rathbun, 1909, both from Thailand.

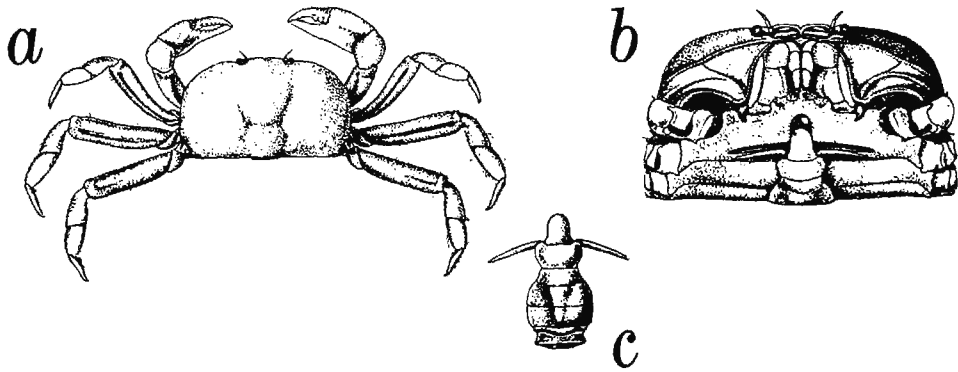


FIGURE 34.—*Lambdophallus sexpes* Alcock: *a*, dorsal view; *b*, ventral view; *c*, male abdomen and apices of pleopods. (From "Illustrations of the Zoology of H. M. Indian Marine Surveying Steamer *Investigator*," *Crustacea*, 10 (1902), pl. 62: fig. 1-1b.)

REMARKS.—The genus *Amorphopus* was recognized by Bell (1859:27) for a single species, *A. cylindraceus*, from an unknown locality. Bell's name *Amorphopus* is preoccupied, as pointed out by Rathbun (1897b:163), who substituted *Paeduma* for it. As we noted above, with the exception of Gordon (1971:108) and Sankarankutty (1975:4), subsequent authors apparently have overlooked *Paeduma*.

Paeduma has remained unidentifiable since its introduction by Bell; no subsequent workers on the group have been able to identify any species with it. As Gordon (1971:108) pointed out, one of the characters mentioned by Bell, the fusion of segments of the abdomen, is unusual (i.e., the third and fourth segments and the fifth and sixth segments are fused, rather than the third, fourth, and fifth, as we have found in all other genera of the family, save two: in *Stevea*, new genus, the second through the sixth segments are fused and in *Hexaplax* some segments are indistinctly fused).

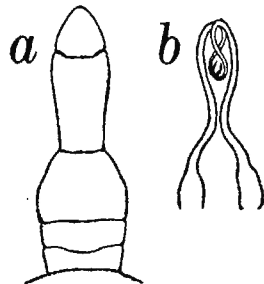


FIGURE 35.—*Paeduma orientale* (Rathbun), male: *a*, abdomen; *b*, pleopod. (Both from Rathbun, 1910, fig. 33.)

However, in her expanded account of *Thaumastoplax orientalis* Rathbun, 1909, Rathbun (1910:347) reported an identical configuration of the abdomen in that species, and Sakai (1939:579) mentioned it in material from Japan identified with *T. orientalis*. Further, Bell (1859:28) also had noted: "the abdomen very long and narrow, the first and second joint transversely linear, the third and fourth united and forming a triangle truncated anteriorly at the articulation of . . . the fifth and sixth joints united, and which with the seventh form a very narrow and linear piece extending forwards to the posterior margin of the oral aperture." This is precisely the condition figured by Rathbun (1910, fig. 33) (Figure 35*a* herein) for *T. orientalis*. In Rathbun's species, the fused third and fourth somites taper abruptly, forming a truncated triangle anteriorly, and the slender terminal sections of the abdomen extend forward to a point between the maxillipeds. Inasmuch as all other hexapodid genera, with the exception of *Stevea* and possibly *Hexaplax*, have the third to fifth somites of the male abdomen fused, we believe that Rathbun's species, *T. orientalis*, must be assigned to *Paeduma*. This genus also now includes *P. chuenense* (Rathbun, 1909), based on a juvenile male, and a species from Japan, identified by earlier workers with *T. orientalis*, which we believe represents a new species, the description of which is in preparation. *Paeduma cylindraceus* (Bell), with its unequal chelipeds, remains un-

identifiable; the holotype, long thought to be lost, has been rediscovered in the Bell collection at the University Museum, Oxford, England, by Angelo A. DiMauro, Jr., of the University of Connecticut. His study of the Bell collection should allow us to be able to identify Bell's species.

Paeduma resembles *Thaumastoplax* in having the propodus of the third maxillipeds dilated distally, in having the second walking legs strongest, and, in *P. orientale* at least, in lacking the oblique striae on the pterygostomial region. *Paeduma* differs from other hexapodid genera in having the third and fourth and the fifth and sixth somites of the abdomen fused in males.

Genus *Parahexapus* Balss, 1922

Parahexapus Balss, 1922:77 [type-species: *Parahexapus africanus*, Balss, 1922, by monotypy; gender: masculine].
Hexapus (*Parahexapus*).—Monod, 1956:362, 370.

DIAGNOSIS.—Eyes small, movable, cornea slightly broader than stalk. Third maxillipeds (Figure 36a) slender, pediform, ischium convex mesially, carpus, propodus and dactylus slender, cylindrical, dactylus longer than propodus; exopod with flagellum. Pterygostomial region with transverse granulate ridge. Walking legs short, merus of longest pair shorter than carapace. Sternal grooves absent. Apices of male pleopods concealed by abdomen, pleopods (Figure 36c) sinuous, slender, abruptly tapering distally to slender apex, directed anteriorly, with large spines near midlength directed proximally. Male abdomen (Figure 36b) with third to fifth somites fused, slender, subterminal and terminal somites long, latter rounded distally, not trilobed.

INCLUDED SPECIES.—*Parahexapus africanus* Balss, 1922.

REMARKS.—*Parahexapus* shares slender third maxillipeds with *Thaumastoplax*, *Spiroplax*, and *Paeduma*; but in *Parahexapus* the propodus of the third maxilliped is very slender, not dilated distally. The first male pleopod (Figure 36c) of *Parahexapus africanus* differs from those of known species in the other three genera in having strong

spines near midlength and in abruptly tapering distally.

In *P. africanus* the interantennular septum is scarcely discernible in anterior view, the male abdomen extends anteriorly between the bases of the third maxillipeds, and the carapace is rather broad (width = 1.5–1.9 times length). Although the sutures in the abdomen of the single male available to us are very indistinct, it appears that the third to fifth somites are fused and the sixth somite is elongated, as figured by Crosnier (1967, fig. 33) (Figure 36b herein), as in *Thaumastoplax anomalipes*.

Parahexapus africanus Balss, 1922

FIGURE 36a–c

Hexapus (*Parahexapus*) *africanus*.—Monod, 1956:370, figs. 494–496.—Rossignol, 1962:118.—Crosnier, 1967:337, figs. 30, 33.

Hexapus africanus.—Longhurst, 1958:88.—Gauld, 1960:71.

MATERIAL EXAMINED.—*Pillsbury Material*: None.

Other Material: Congo: Baie de Pointe-Noire, A. Crosnier, 2♂, 1♀ (W).

DESCRIPTION.—Monod, 1956:370.

Figures: Monod, 1956, figs. 494–496; Crosnier, 1967, figs. 30, 33.

Male pleopod: Crosnier, 1967, fig. 30 (Congo).

MEASUREMENTS.—The carapaces of our males measure 3.4 × 5.6 and 2.8 × 4.9 mm; that of the female measures 3.0 × 4.6 mm. Monod (1956) reported ovigerous females measuring 4 × 7 mm and 5 × 7.5 mm, and Crosnier (1967) reported males measuring 3.2 × 5 mm and 3.4 × 5.6 mm and a female as large as 3.4 × 5.6 mm. Balss (1922) reported that the female holotype measured 4 × 7.5 mm.

BIOLOGY.—*Parahexapus africanus* is a sublittoral species, which has been collected in depths between 5 m and about 25 m (16–27 m; 22–25 m). Longhurst (1958) found the species off Sierra Leone in 16–27 m on shelly sand and sandy mud. Crosnier (1967) found it on sandy mud in 22–25 m off the mouth of the Congo River.

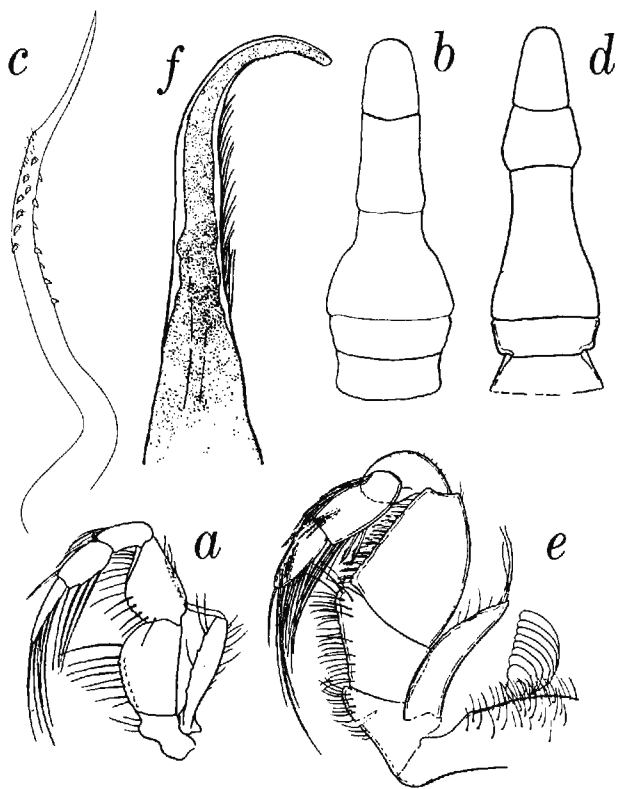


FIGURE 36.—*Parahexapus africanus* Balss: *a*, third maxilliped (from Monod, 1956, fig. 496); *b*, abdomen of male; *c*, male pleopod (*b, c*, from Crosnier, 1967, figs. 30, 33). *Pseudohexapus platydactylus* Monod: *d*, abdomen of male; *e*, third maxilliped; *f*, male pleopod (*d-f*, from Monod, 1956, figs. 481, 484, 488).

Ovigerous females have been collected in February (Monod, 1956).

DISTRIBUTION.—West Africa, where it has been recorded from localities on the mainland between Sierra Leone and Cabinda, in depths between 5 m and about 25 m (16–27 m is the deepest record). Records in the literature include the following:

Sierra Leone: No specific locality, in 16–27 m (Longhurst, 1958).

Ghana: Off Accra, 5 m (Monod, 1956; Gauld, 1960).

Congo: Baie de Pointe-Noire (Rossignol, 1962; Crosnier, 1967). Off the mouth of the Congo River, 05°56'S, 12°07'E, 22–25 m (Crosnier, 1967).

Cabinda: Landana, 6 m (Balss, 1922).

Genus *Pseudohexapus* Monod, 1956

Hexapus (*Pseudohexapus*) Monod, 1956:362, 365 [type-species: *Hexapus* (*Pseudohexapus*) *platydactylus* Monod, 1956, by monotypy; gender: masculine].

DIAGNOSIS.—Eyes small, movable, cornea as broad as stalk. Third maxilliped (Figure 36*e*) broad, ischium short, mesial margin concave, projecting distally, carpus, propodus and dactylus slender, cylindrical, propodus longer than dactylus; exopod without flagellum. Pterygostomian region lacking oblique striae, with hairy ridge. Walking legs short, merus of longest pair (fourth) shorter than carapace. Dactyli of walking legs flattened dorsoventrally. Sternal grooves absent (?). Apices of male pleopods completely concealed by abdomen; pleopods (Figure 36*f*) stout, apices curved mesially, with terminal spinules and few subterminal setae. Male abdomen (Figure 36*d*) with 5 free somites, third to fifth fused, terminal somite elongate, rounded apically, not trilobed.

INCLUDED SPECIES.—*Pseudohexapus platydactylus* Monod, 1956.

REMARKS.—In *Pseudohexapus* the carapace is subquadrate (width = 1.2–1.3 times length), the pterygostomian region lacks a row of oblique striae, the propodus of the third maxilliped is slender and the exopod lacks a flagellum, the sternal grooves are absent, and the male pleopod is stout with its apex turned mesially. The flattened dactyli of the walking legs apparently are unique within the family.

Pseudohexapus platydactylus Monod, 1956

FIGURE 36*d-f*

Hexapus (*Pseudohexapus*) *platydactylus* Monod, 1956:365, figs. 478–493 [Senegal, Gambia, Ghana].—Gordon, 1971:107, fig. 2 [Ghana].

Hexapus platydactylus.—Gauld, 1960:71 [Ghana].—Longhurst, 1958:88 [Sierra Leone].

DISTRIBUTION.—West Africa, from Senegal, Gambia, Sierra Leone, and Ghana, sublittoral, in 5–15 m.

Genus *Spiroplax*, new genus

FIGURE 37

TYPE-SPECIES.—*Thaumastoplax spiralis* Barnard, 1950:301, fig. 56*h-l*, South Africa.

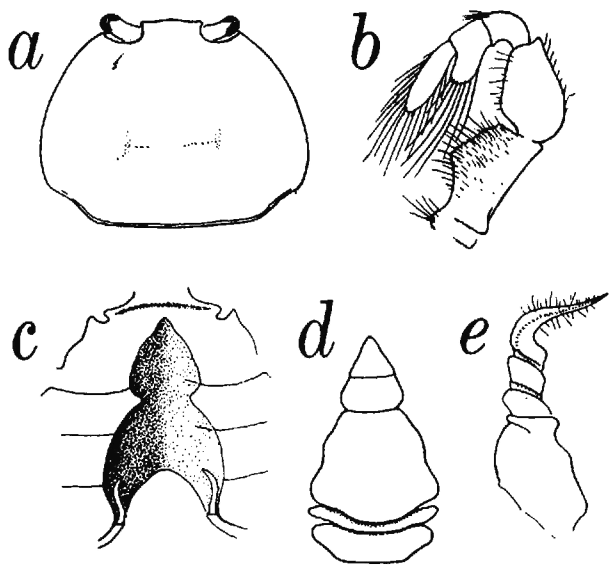


FIGURE 37.—*Spiroplax spiralis* (Barnard): a, carapace; b, third maxilliped; c, sternum; d, abdomen of male; e, male pleopod. (All from Barnard, 1950, fig. 56h-1.)

ETYMOLOGY.—From the Greek, *speira* (coil, twist), in combination with the noun *plax* (a plate), alluding to the form of the male pleopod; the gender of the name is feminine.

DIAGNOSIS.—Eyes movable, cornea slightly broader than stalk. Third maxilliped (Figure 37b) slender, ischium with obtuse mesial projection, propodus shorter than dactylus, with mesial expansion distally; exopod flagellum not described. Pterygostomian region not described. Walking legs not described. Sternal grooves not described. Male pleopods (Figure 37e) apparently concealed under abdomen, strongly calcified, stout, spiral, apices setose. Male abdomen (Figure 37d) with third to fifth somites fused, very broad, terminal somite triangular, not trilobed.

REMARKS.—The dilated propodus of the third maxillipeds suggests affinities with both *Thaumastoplax* and *Paeduma*, but in *Spiroplax* the carapace is much more oval (Figure 37a) (width = 1.3 times length), the male abdomen is much broader, and the stout, spiral male pleopods are very different from the slender, almost filamentous male pleopods of representatives of the other two genera. *Spiroplax* includes only the type-species.

Genus *Stevea*, new genus

FIGURE 38

TYPE-SPECIES.—*Hexapus williamsi* Glassell, 1938:445, pl. 35, Guatemala (type locality) and Gulf of Tehuantepec, W coast of Mexico (♀, 9.4 × 14.4 mm, W).

ETYMOLOGY.—The genus is named for Steve A. Glassell, the first carcinologist to record a hexapodid crab from the Americas; the gender of the generic name is feminine.

DIAGNOSIS.—Carapace suboval (Figure 38a). Eyes small, movable, cornea subglobular, narrower than stalk. Third maxilliped (Figure 38c) broad, ischium flattened or slightly concave distally, carpus, propodus and dactylus slender, subcylindrical, dactylus longer than propodus; exopod with flagellum. Pterygostomian region with row of oblique striae. Walking legs short, merus of longest pair (third) shorter than carapace. Sternal grooves absent. Apices of male pleopods completely concealed by abdomen; structure of male pleopod not described. Male abdomen (Figure 38d) with three free somites, second through sixth fused, terminal somite triangular, not trilobed.

REMARKS.—In the only species assigned to this genus, *Stevea williamsi* (Glassell, 1938) (incorrectly spelled *Hexapus williamsoni*, in Stephensen, 1945:182), there is a distinct median lobe on the front, visible in anterior view, the interantennular septum is poorly developed, the male abdomen extends beyond the bases of the third maxillipeds, and the carapace is relatively broad (width = 1.5 times length).

The presence of only three free somites in the male abdomen will distinguish this genus from all others in the family.

Genus *Thaumastoplax* Miers, 1881

Thaumastoplax Miers, 1881a:261 [type-species: *Thaumastoplax anomalipes* Miers, 1881, by monotypy; gender: feminine].

DIAGNOSIS.—Eyes small, movable, cornea rounded, only slightly broader than stalk. Third maxilliped (Figure 39a) slender, ischium convex

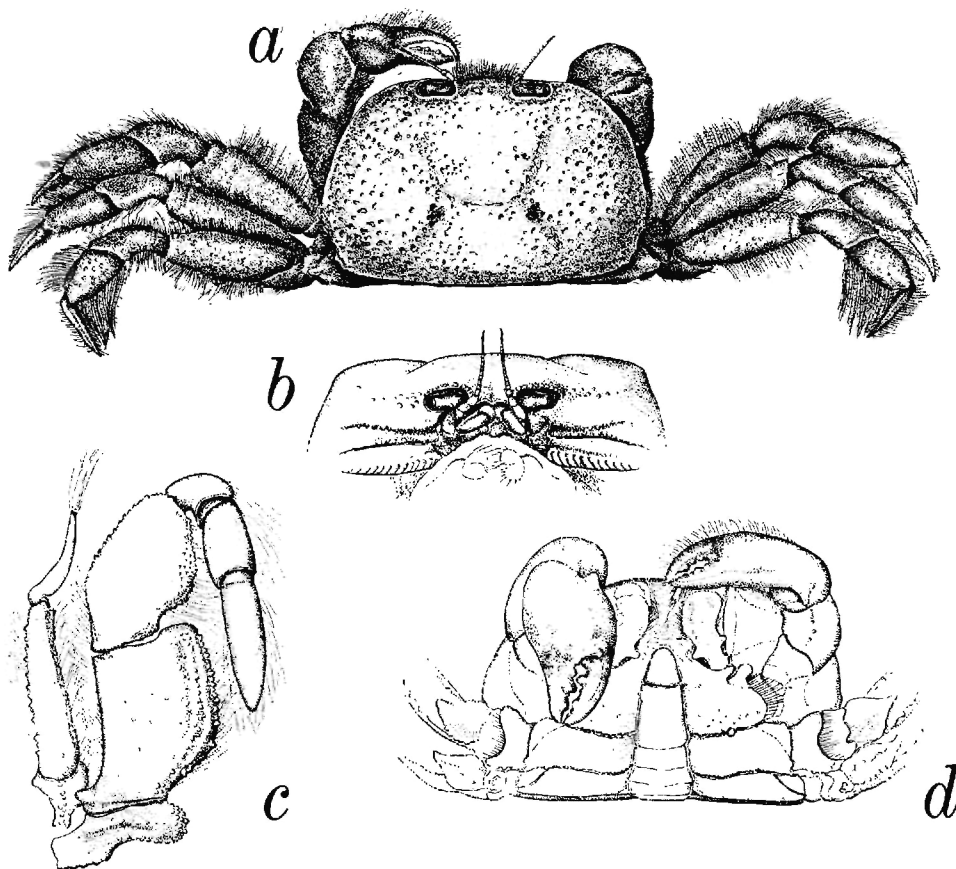


FIGURE 38.—*Stevea williamsi* (Glassell): *a*, dorsal view; *b*, front; *c*, third maxilliped; *d*, ventral view. (All from Glassell, 1938, pl. 35.)

mesially, propodus strongly dilated distally, almost as broad as merus, longer than carpus or dactylus; exopod with flagellum. Pterygostomian region lacking row of oblique striae. Walking legs short, merus of longest pair (second) shorter than carapace. Sternal grooves absent. Male pleopods (Figure 39*c*) slender, sinuous, apices directed anteriorly, completely concealed under abdomen, armed with minute spinules. Male abdomen (Figure 39*b*) with third to fifth somites fused, terminal somite elongate, sinuous laterally, rounded apically, not trilobed.

INCLUDED SPECIES.—*Thaumastoplax anomalipes* Miers, 1881, from West Africa. Two other species assigned to this genus, *T. orientalis* Rathbun, 1909, and *T. chuenesis* Rathbun, 1909, are here transferred to *Paeduma* (p. 173). The fourth species assigned to this genus, *T. spiralis* Barnard, 1950, is transferred to *Spiroplax* (p. 176).

REMARKS.—Several features appear to be diagnostic for this genus, now known to include only a single species from tropical West Africa. The third maxilliped is slender and the propodus is strongly dilated distally, being almost as broad as the merus; the pterygostomian region is not ornamented with oblique striae; the second pair of walking legs is much the strongest of the three; the interantennular septum is very low, scarcely visible in frontal view; and the male pleopod is slender, sinuous, and directed anteriorly.

Two other genera, *Paeduma* and *Spiroplax*, share the maxilliped with the distally dilated propodus, but both can be differentiated readily from *Thaumastoplax*. In *Paeduma* the third and fourth and fifth and sixth, rather than the third to fifth, abdominal somites in the male are fused, and the male pleopods are strongly recurved posteriorly