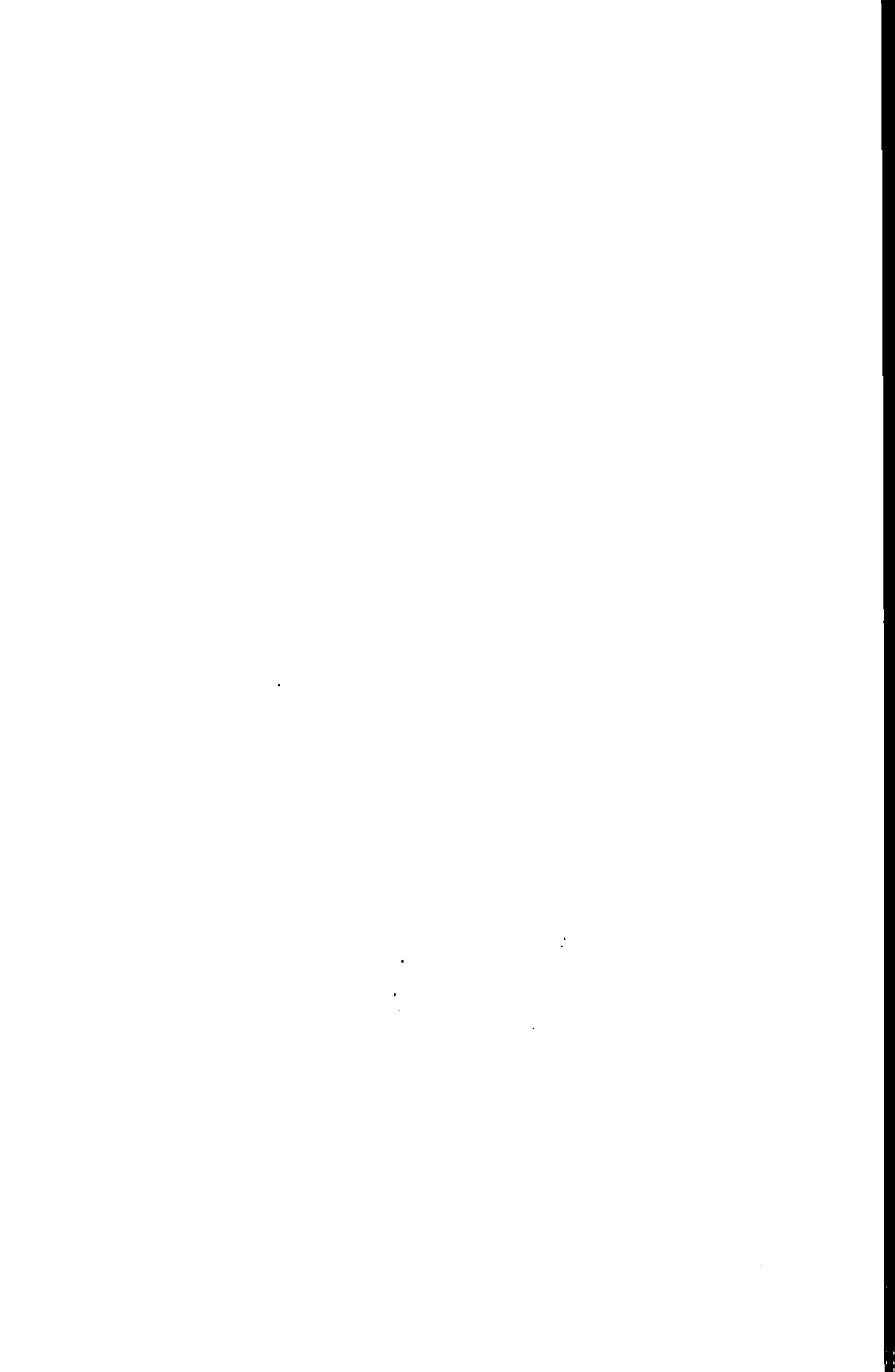


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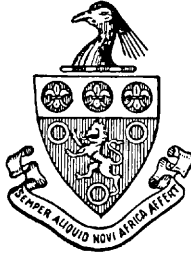
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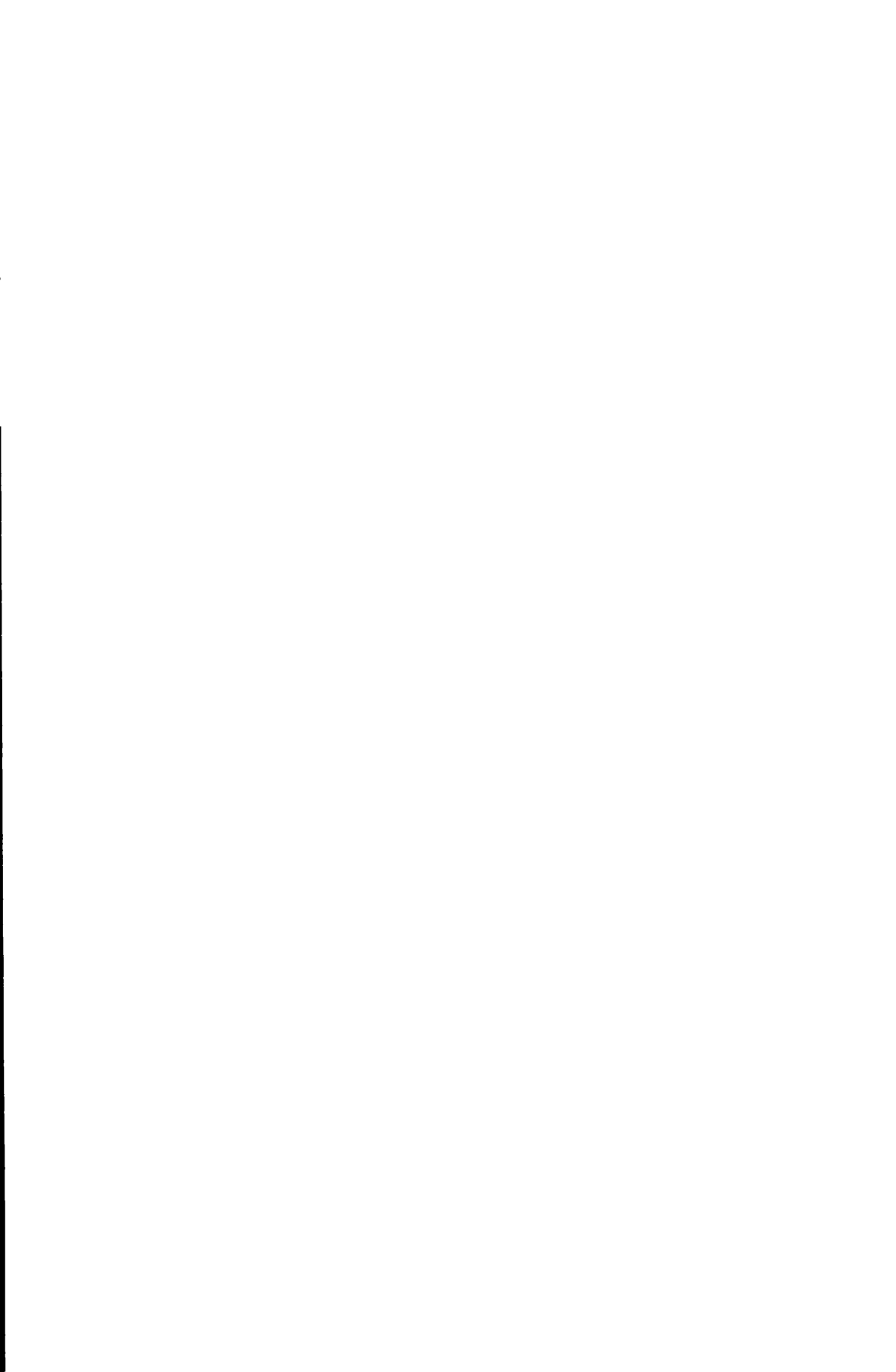
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# ANNALS OF THE SOUTH AFRICAN MUSEUM

VOLUME XXXVIII.

*Descriptive Catalogue of South African Decapod Crustacea (Crabs and Shrimps).*—By K. H. BARNARD, D.Sc., F.L.S. (With 154 Text-figures.)

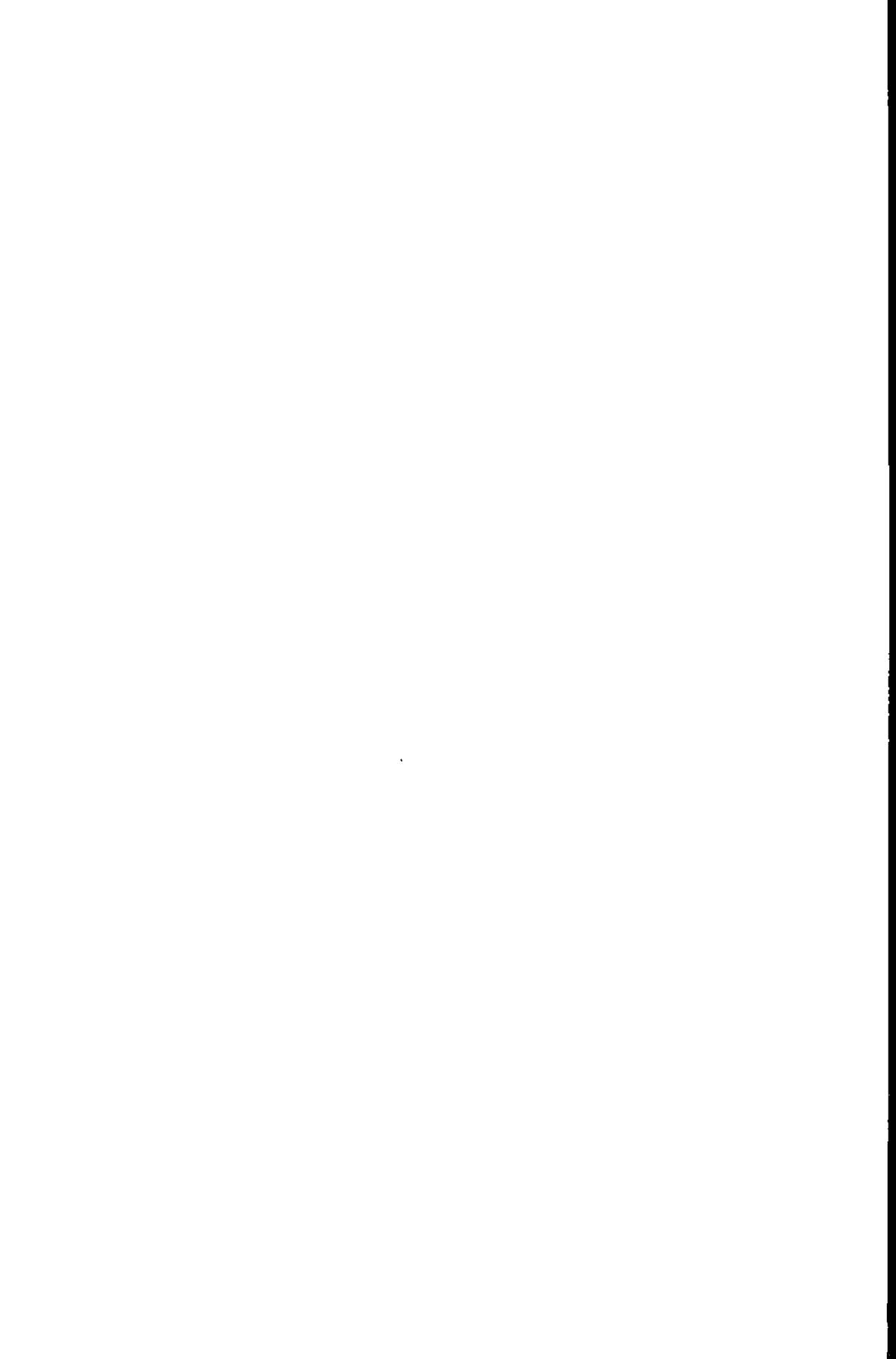
*Addenda.*

*Descriptive List of South African Stomatopod Crustacea (Mantis Shrimps).*—By K. H. BARNARD, D.Sc., F.L.S. (With 4 Text-figures.)



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VOLUME XXXVIII.

*Descriptive Catalogue of South African Decapod Crustacea.*

By K. H. BARNARD, D.Sc., F.L.S.

(With 154 Text-figures.)

A KNOWLEDGE of the Crustacean fauna of South Africa has been gradually built up, on the basis of the more or less casual collecting of early travellers and voyagers around the Cape, and by later and more intensive collecting by scientific collectors and expeditions. Students of South African Crustacea owe a debt of gratitude to the late Rev. T. R. R. Stebbing, F.R.S., for bringing all these scattered records together into a General Catalogue, which is not merely a fauna-list but has the further merit of containing abundant references to the antecedent literature.\*

Moreover, Stebbing himself contributed more to South African carcinology than any previous worker by means of his reports on the collections of the Cape Government trawler s.s. *Pieter Faure* and of the South African Museum,† and in his reports on Natal Crustacea.‡ The last of these reports was published in 1924, and altogether they record some 150 new species and new records additional to those in the 1910 Catalogue.

The Catalogue was not a descriptive catalogue, and consequently the identification of South African crabs and prawns, unless illustrated

\* Ann. S. Afr. Mus., vi, 1910, pp. 281–593 (Decapoda, pp. 283–395).

† In “Marine Investigations in South Africa,” i–iv, 1900–5 (correct date of publication printed at end of each paper, sometimes earlier than date of the bound volume; vol. vi forms part of vol. vi of Ann. S. Afr. Mus.), and Ann. S. Afr. Mus., vi–xix, 1908–24.

‡ In Annals Durban Museum, i–iii, 1917–21.

in Stebbing's papers, is a difficult matter for anyone not having access to a reference collection such as is preserved in the South African Museum.

To remedy this, the following descriptive account of the Decapod Crustaceans (Crabs, Hermit-crabs, Prawns, Shrimps) has been prepared. Although it contains a considerable number of new records, it is necessarily far from being even an approximately complete list of the actual fauna. The area off the coasts of Zululand and Portuguese East Africa, containing a wealth of Indo-Pacific species, has been very little investigated. Many additions to the fauna-list may be expected from this area. In recent years good work in the littoral and shallow waters has been done by the Zoology Departments of the Universities of the Witwatersrand and Cape Town, the former at Delagoa Bay, the latter at various localities around the coast of the Union of South Africa.

The geographical boundary here adopted is the parallel of 15° S. lat.,\* a boundary which coincides approximately with Mossamedes on the west coast and Mozambique Island on the east coast. As thus limited the South African region includes, besides a truly South African area with its own special fauna, a small portion on the west with an Atlantic facies, and a much larger portion on the east with an Indo-Pacific facies. Hard-and-fast boundaries, of course, are not to be laid down, no more than in the case of the currents which largely determine the type of fauna.

It is unfortunate if no more detailed locality can be given than merely "Cape" or "Cape of Good Hope" (these occur, *e.g.*, in Chopra, *Rec. Ind. Mus.*, xxxv, 1933, p. 32, probably translated from Balss, *Arch. Naturg.*, lxxxviii, 1922; Chopra and Das, *Rec. Ind. Mus.*, xxxix, 1937, pp. 384, 385; Balss, *Fauna Col. Franç.*, v, 1934, p. 522). It is not so vague as "S. Africa," and consequently is definitely *misleading*. For example, the species to which the above references apply, do not extend to anywhere near the locality usually understood nowadays as the Cape of Good Hope. These locality names date from the early days when they signified, for both land and sea animals, "Kaffraria," or even the greater part of the region now comprised in the Union of South Africa. To-day, however, we require for purposes of discussion of geographical distribution more precise localities.

In the present work wherever "False Bay" is mentioned, the large

\* As in the Monograph of Marine Fishes, *Ann. S. Afr. Mus.*, xxi. See also Stebbing's General Catalogue, p. 326.



bay in the south-west Cape is intended, not the subsidiary bay enclosed within St. Lucia Bay, Zululand.

As in Hilgendorf's paper,\* "Mozambique" is to be understood as the Island of Mozambique, not the whole province, which is here referred to as Portuguese East Africa. In spite of Hilgendorf's statement, his records of freshwater *Palaemon* species must refer to a locality on the mainland, as there are no freshwater streams on the island.

Certain anomalies of distribution within South African waters, or the presence of certain European and other species, may possibly be due to transportation on ships' bottoms. The most noteworthy importation seems to be the Crab *Pilumnoides perlatus* (p. 257). This is a South American species which has occurred singly or in small numbers at Plymouth (England) and Queenstown (Ireland), but which occurs in sufficient numbers to breed on the west coast of South Africa. Its occurrence here has only recently been detected, and future observers will note whether it extends its range. Possibly it is not an importation at all.

Within our waters it is possible that *Upogebia capensis* has extended its range from the west coast to Simon's Bay and Mossel Bay by the agency of ships, especially the old wooden ships.

Although the harbour areas, e.g. Table Bay, Simon's Bay, Mossel Bay, Algoa Bay, and Durban, are those in which most collecting has hitherto been done, and certain species recorded from these areas may later be found to have a wider distribution, nevertheless species collected only in or near harbours are suspect; † e.g. *Macropodia rostrata*, *Atelecyclus septemdentatus*.

It is perhaps strange that up to the present there is no record in our waters of *Carcinides maenas*, the common shore-crab of Britain, Europe, and the Atlantic coast of North America. In other parts of the world this crab has a rather remarkable distribution which leads one to think that accidental transportation may have occurred.‡

Three large and well-known West Indian Decapods, *Stenocionops furcata*, *Calappa flammea*, and *Petrochirus bahamensis*, were stated to have been captured by H.M.S. *Challenger* in Simon's Bay. But they have never again been reported from South Africa, and Odhner's

\* MB. Ak. Wiss. Berlin, 1878, p. 784.

† Stebbing, History of Crustacea, 1893, pp. 98, 99. Chilton, Trans. New Zealand Inst., xliii, 1911, p. 131.

‡ Broekhuysen, Arch. néerl. Zool., ii, pp. 257-399. Chopra and Das, Rec. Ind. Mus., xxxix, 1937, p. 381.

suggestion is eminently reasonable that the records should be regarded as due to an error in labelling, and these species omitted from the South African fauna-list.\*

For observations on the geographical distribution, and the composition of the South African fauna, see the works of Ortmann (1894), Weber (1897), Doflein (1904), Odhner (1923).

Except for minor points regarding the identity or synonymy of certain species, the present work contains no new researches. The systematic arrangement is in the main that of Borradaile (1907) and Calman (1909), with slight modifications. The diagnoses of the families, genera, etc. have been compiled from the works of previous authors so far as these have been available in South Africa. Lengthy descriptions of the species have not been given in most cases. The terminology has been kept as simple as possible, but technical terms are often unavoidable. In some places, to save space, abbreviations have been used, *e.g.* ant. for antenna, mx. for maxilla, and mxp. for maxilliped.

The identity of some species is still open to doubt, especially where the South African specimens have been "identified with" a species known from some other region without actual comparison of specimens.

References have as a rule been limited to those later than 1910, except in cases of species not hitherto recorded. References, however, to figures given by Stebbing in South African periodicals, references to McLeay and Krauss, are always given; together with certain other references which the present author has found useful.

All references have been checked as far as the original works are available to me, but in many instances references have been taken from other authors. Sometimes one author's mistake is perpetuated by later authors who have not been able to consult original works, *e.g.* Alcock (*J. Asiat. Soc. Bengal*, lxxvii, p. 101) quotes Milne Edwards' *Hist. Nat. Crust.*, i, p. 377, pl. 16, fig. 14; on referring to the latter work one finds that Milne Edwards himself has given in his text "fig. 14" instead of figs. 1-3, although the explanation of plate 16 is correct (*Atlas*, p. 15).

It is regrettable that the time (and expense) spent on photographing crabs and shrimps is in most cases wasted. Such photographs when reproduced may be handy for suggesting the family, or perhaps the

\* *Medd. Göteborg. Mus.*, xxxi, 1923, p. 32. It may be noted that the *Challenger* proceeded from the West Indies to North America, and thence via the Cape Verdes and South America to the Cape, without touching at any home port and, presumably, without disembarking any of her scientific collections.

genus, to which a specimen belongs; but unless the specific characters are very bold and the specimen has been specially set out for the purpose, they are quite useless for the serious study and comparison of specific differences.\*

On the other hand, a simple outline drawing, emphasizing the particular specific characters (and occupying perhaps 10–15 minutes to execute), may often be infinitely more helpful to the student. The present work is therefore illustrated by such freehand drawings. Although without artistic pretensions, a certain degree of accuracy may be claimed for them. They are intended to indicate the features which a student should look for when seeking to identify specimens, and which cannot always be appreciated from a verbal description, however explicit.

The material available for the present descriptive account includes pre-eminently that collected by the Cape Government trawler s.s. *Pieter Faure* between the years 1898 and 1907 (dates in the log-book when the vessel was actually at sea collecting), and forming part of the collections of the South African Museum. This collection formed the basis of Stebbing's researches and reports. Many of the actual specimens (types and co-types) named by Stebbing, and, after 1910 when the *Pieter Faure* collection was vested in the South African Museum and the Museum continued the supply of material to Stebbing, the majority of the specimens, have been returned to the Museum.

I have worked through the whole of the *Pieter Faure* material, much of which had never been submitted to Stebbing; and also other material in the Museum derived partly from correspondents and casual donations, partly from collecting by myself (including a visit to Delagoa Bay and Mozambique) and other members of the staff.

Dr. C. J. van der Horst (Witwatersrand University) submitted the material collected by him and his students in the course of several visits to Delagoa Bay. I have also seen the collection made by the late Dr. J. D. F. Gilchrist in the s.s. *Pickle* off the coast of Portuguese East Africa; † and a collection belonging to the Museu Dr. Alvaro de Castro at Lourenço Marques from the same area.

Dr. T. A. Stephenson (formerly of the University of Cape Town)

\* Odhner's photographs of Xanthid crabs (Medd. Göteborg. Mus., xxxvii, 1925), where evidently great care has been taken to employ *two* sources of lighting, thus obviating undue shadows which obscure and deform the real shape and sculpture, are an outstanding and pleasing exception to the above complaint.

† Trans. Roy. Soc. S. Afr., xiii, 1926.

submitted the material collected by him and his students in the course of an Ecological Survey around the coast of the Union of South Africa.

The Union Government Fisheries and Marine Biological Survey, under the directorship formerly of the late Dr. Gilchrist, and now of Dr. Cecil von Bonde, has continued the work of the Cape Government Marine Survey, and some of the Crustacea have been briefly reported on by Stebbing (1923), Calman and Hansen (1925).

One of the earliest collections of Crustacea made in this country was that gathered together by Dr. Sir Andrew Smith, founder and first Curator of the South African Museum.\* This collection was entrusted by Dr. Smith, on his return to England in 1837, to W. S. McLeay for description in Smith's classic publication "Illustrations of the Zoology of South Africa." McLeay's work was first published in 1838 under the title "Annulosa of South Africa." †

Under what terms the collection of Crustacea was handed over to McLeay is not known, but the collection seems to have been regarded as lost, and while some of the species described by McLeay have been readily recognized by later writers, the identity of others has remained obscure.

In 1937, however, Mr. Melbourne Ward informed me that he had discovered the Smith Collection, including all but five of McLeay's types, in the Australian Museum at Sydney. We must assume, therefore, that McLeay regarded the collection as his own property, and took it with him when he migrated to Australia in 1839, where later he became a Trustee of the Australian Museum. ‡

The discovery, after a hundred years, that McLeay's types are still extant, well preserved, and in safe keeping, is a most interesting and important event in the history of South African carcinology.

Although Mr. Ward tells me he intends to publish a report on McLeay's species, giving their modern designations, he has very kindly sent me a set of photographs, from which I have been able to satisfy myself as to the identity of McLeay's species.

Without giving a detailed history of South African Carcinology, the progress in our knowledge of the Crustacean fauna may be

\* P. Kirby, *Ann. S. Afr. Mus.*, xxxvi, 1942, p. 1.

† William Sharp Macleay, 1792-1865. R. Etheridge, jun., in *Rec. Austral. Mus.*, xi, 1916, p. 67, says: "In early official documents the family name was spelt M'Leay. . . ." The initials to the preface of the "Annulosa of South Africa" are printed thus: W. S. M'L.

‡ J. J. Fletcher, *Macleay Memorial Volume*, Linnean Society of New South Wales, p. x, 1893; R. Etheridge, jun., in *Rec. Austral. Mus.*, xii, 1919, p. 394, records W. S. Macleay as Committeeman, 1841-53; Trustee, 1853-62.

indicated by the number of "new species" collected by the more important collectors and expeditions, although, for several reasons, this is not the most reliable index of a collector's energy.

Krauss travelled for a considerable time in this country (1838-40) shore-collecting at various localities; and the Cape Government trawler s.s. *Pieter Faure* over a period of nearly ten years investigated almost the whole of the South African area from the mouth of the Orange River on the west to St. Lucia Bay and Cape Vidal on the east, deep and shallow water. On the other hand, the U.S. Exploring Expedition (1838-42), the U.S. North Pacific Exploring Expedition (1853-56), the *Challenger* (at the Cape, 1873), *Gazelle* (at the Cape, 1874), *Valdivia* (Cape, Agulhas Bank to Port Elizabeth, 1898), *Gauss* (Cape and Durban, 1901 and 1903) paid only comparatively fleeting visits to South African harbours mainly for revictualling and refitting.

Further, the majority of the species in the South African fauna-list have been first collected and described from other regions. Thus one collector may obtain a number of species merely new to the fauna-list, whereas another may just happen to find several "new species." Also progress in taxonomy may sink a supposed n.sp. as a synonym of a species known from another region, or separate the local from the extra-South African species with which it had been included or misidentified.

With these qualifications, however, it may be interesting to note that Smith (McLeay) collected 8 new species, Krauss 15, the U.S. North Pacific Exploring Expedition (Stimpson) 5, the *Valdivia* (Doflein) 2, the *Gauss* (Lenz and Strunck) 1, and the *Pieter Faure* (Stebbing, Barnard) 54 new species. (These figures include, of course, only Decapod Crustacea.)

The most notable of the *Pieter Faure* discoveries were the Giant Stone Crab from deep water off the Cape, and two Palinurids.

In many cases Mauritian species have been included in the keys to species, because some of them may eventually be collected on the South African coast. A regular steamship service between Durban and Mauritius may possibly facilitate transportation. But not all the species recorded from Mauritius have been included, as some of the literature is not available. (See A. Milne Edwards in Maillard's *Ile de Réunion*, 1862; Richters, 1880; Miers, 1880, 1882, 1884; Bouvier, 1910 and 1915; Ward, 1942.)

Colloquial names for South African crabs, prawns, and shrimps are almost non-existent. As there is such a vast variety of species, many of them indistinguishable from one another except by the specialist,

it is doubtful whether the introduction of such names would be of any practical value. The large crayfishes, and some of the larger and most striking of the commoner crabs, have been given names.

Grateful acknowledgments for assistance in many ways is herewith tendered to: Dr. W. T. Calman (formerly of the British Museum), Dr. Isabella Gordon (British Museum), Dr. Waldo L. Schmitt (U.S. National Museum), Professor C. J. van der Horst (Witwatersrand University, Johannesburg), Professor T. A. Stephenson (formerly University of Cape Town), Mr. Melbourne Ward (Australian Museum, Sydney). I am specially indebted to Dr. Gordon, who has generously devoted a considerable amount of time to checking references and making tracings for me.

To the memory of the Rev. T. R. R. Stebbing, whose unstinted help and encouragement at the beginning (1911) of my studies on South African Crustacea were invaluable, this work is but a small tribute.

As far as possible references to the more important papers, published after the completion of the MS. (31st December 1940), have been inserted. Stephenson in his work on the Brachyura of the Iranian (Persian) Gulf (1945) has given a valuable summary of the male 1st and 2nd pleopods, with a list of hitherto published descriptions and figures of the species arranged systematically. These appendages are essential for the correct identification of crabs.

K. H. B.

*31st March 1947.*

## REPTANTIA.

The 5 pairs of abdominal appendages often reduced or absent, never used for swimming. (See Borradaile, 1907.)

### BRACHYURA.

#### *Key to the Divisions (Tribes, Subtribes).*

- I. Mouth-frame (buccal cavity) more or less quadrate (figs. 1-3, 37).
  - A. Last pair of legs normal, rarely reduced, and only exceptionally dorsal in position. Female genital openings sternal. 1st pleopod ♀ absent. Gills few . . . . *Brachygnatha*, p. 9.
    - 1. Carapace triangular, narrowed in front, usually a distinct rostrum (figs. 1-15). Orbits generally incomplete . . . *Oxyrhyncha*, p. 9.
    - 2. Carapace broad in front, rostrum reduced or wanting (figs. 16-52). Orbits well developed (figs. 22, 37, 45) . . . *Brachyrhyncha*, p. 75.
  - B. Last pair of legs modified, situated dorsally. Female genital openings coxal. 1st pleopod ♀ present. Gills usually numerous . . . . *Dromiacea*, p. 305.
- II. Mouth-frame (buccal cavity) triangular (figs. 66-68, 71). Last pair of legs normal or modified. 1st pleopod ♀ absent. Gills few.
  - A. Posterior thoracic sternites broad (bases of walking legs far apart). Last pair of legs normal in position, or last two pairs dorsal. Female genital openings sternal (except in *Cyclodorippinae*) . . . . *Oxystomata*, p. 345.
  - B. Posterior thoracic sternites narrow, keel-like (bases of 2nd-4th legs close together). Last pair of legs dorsal in position. Female genital openings coxal . . . . *Gymnopleura*, p. 396.

### BRACHYGNATHA.

#### OXYRHYNCHA. SPIDER-CRABS.

1903. Borradaile, F. Geogr. Mald. Laccad. Archip., ii, p. 681 (key to families).

1907. *Id.*, Ann. Mag. Nat. Hist. (7), xix, p. 480 (key to families).

1910. Stebbing, Gen. Cat. S. Afr. Crust., p. 283.

1925. Rathbun, Bull. U.S. Nat. Mus., no. 129, pp. 1-613, pls. and text-figs. (American species).

1929. Balss, Decap. Rot. Meer. "Pola" Ergebn., xxxvi, Denkschr. Ak. Wiss. Wien. Math. Naturw. Kl., cii, pp. 1-30 figs. (classification).

Carapace more or less triangular and narrowed in front, usually produced to form a rostrum. Epistome usually large; buccal cavity quadrate, its anterior margin generally straight. Orbits mostly incomplete. 1st antennae (antennules) folded longitudinally. Female genital openings on sternite of 3rd (*i.e.* 2nd walking) legs; male openings on coxae of last legs (except in *Hymenosomatidae* where they are sternal).

*Remarks.*—The most notable feature of the great majority of the Spider-crabs is the presence of hooked setae or bristles, by means of which various extraneous substances such as seaweeds, hydroids, sponges, ascidians, polyzoans, etc. are affixed to the carapace and often also the legs, thus affording a very effective concealment (fig. 1).

#### *Key to the Families.*

- I. Carapace not flat, integument not thin. Chelipeds mobile or powerful with bent fingers. Male genital openings on the 5th coxae.
  - A. Basal joint of ant. 2 well developed, occupying all the space between socket of ant. 1 and eye (figs. 1, 2, 3, 7, *b*), generally fused with epistome and sometimes also with side of rostrum. Chelipeds usually not vastly larger than other legs.
    1. Basal joint of ant. 2 slender (figs. 1, 2, 3).  
Orbits not defined. Eye-stalks usually long, non-retractile, or retractile against sides of carapace . . . *Inachidae*, p. 11.
    2. Basal joint of ant. 2 stout (fig. 7, *b*).
      - a.* Orbits not defined. Eye-stalks very short or obsolescent, concealed beneath a supra-ocular spine or sunk in sides of the large beak-like rostrum. Basal joint of ant. 2 truncate-triangular (fig. 7, *b*) . . . . . *Acanthonychidae*, p. 35.
      - b.* Orbits partly defined. Post-ocular process always present, hollowed for reception of the short eye-stalks (figs. 11, 12) . . . . . *Blastidae*, p. 48.



- c. Eye-stalks long or short, retractile into distinctly defined orbits (fig. 13, b, c). . . . . *Mamaitidae*, p. 58.
- B. Basal joint of ant. 2 very small, not fused with epistome or front. Chelipeds usually much longer and more massive than other legs (fig. 14). . . . . *Parthenopidae*, p. 63.
- II. Carapace flat, integument thin (fig. 15). Chelipeds not long or specially mobile or with bent fingers. Male genital openings on the last thoracic sternite . . . . . *Hymenosomatidae*, p. 66.

FAMILY INACHIDAE.

1910. Stebbing, *l. c.*, p. 283.

The chief characteristic of this family as opposed to the other Oxyrhynch families is the slender basal joint of antenna 2.

*Key to the South African Genera.*

- I. Peduncle of ant. 2 composed of 2 movable joints and a basal immovable joint which is proximally fused with epistome, without distinct suture. Antennal glands more or less distant from the apparent base of ant. 2 (figs. 1, 2, 3). Eyes more or less dumbbell shaped, proximal part of stalk wider than distal part, and cornea more or less enlarged (figs. 1-5).
  - A. Eye-stalks strongly curved. Free joints of peduncle of ant. 2 densely hairy. Sockets of 1st antennae coalesced into a single cavity (fig. 1) . . . . . *Camposcia*.
  - B. Eye-stalks nearly straight. Free joints of peduncle of ant. 2 not densely hairy. Sockets of 1st antennae separate (fig. 2).
    - 1. Eyes projecting, non-retractile. No post-ocular tooth. Lower surface of basal joint of ant. 2 convex, smooth or with one or more spines (figs. 2, 3).
      - a. Rostrum of 2 more or less elongate and contiguous spines (fig. 2) . . . . . *Macropodia*.
      - b. Rostrum shortly bilobed or bifid (fig. 3) . . . . . *Achaeus*.
    - 2. Eyes retractile. Post-ocular tooth present. Lower surface of basal joint of ant. 2 channelled between 2 rows of spinules (fig. 4).
      - a. 2nd leg not markedly longer than others. Post-ocular tooth spiniform, not hollowed . . . . . *Achaepsis*.
      - b. 2nd leg markedly stronger and longer than others. Post-ocular tooth hollowed . . . . . *Inachus*.

- II. Peduncle of ant. 2 composed of 3 joints, the basal one of which has a distinct suture at junction with epistome and is more or less freely movable. Antennal glands immediately at base of ant. 2 (fig. 6, b).
- A. Margin of buccal cavity close behind antennal glands (fig. 6, b). Cornea distinctly wider than eye-stalk.
1. Inter-antennular spine very large, project-horizontally, rostrum thus appearing tri-spinose. Eye-stalk short, stout, cornea globular (fig. 6, a) . . . . . *Platymaia*.
  2. Inter-antennular spine not very large, deflexed. Eye-stalk more or less slender, cornea ovoid (fig. 6, d) . . . . . *Cyrtomaia*.
- B. Margin of buccal cavity some distance behind antennal glands. Cornea very little wider than eye-stalk . . . . . *Pleistacantha*.

Gen. CAMPOSCIA Latr.

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 184.

Carapace pyriform. Rostrum broad, very short, apically indented. A post-ocular tooth. Eye-stalks strongly curved, cornea oblique and not dilated. Sockets of 1st antennae coalesced to form a single cavity. Basal joint of ant. 2 fused to epistome, antennal gland rather near its base, the 2 free peduncular joints flattened and densely hairy. 4th joint of 3rd maxilliped narrower than 3rd, inner apical corner of latter produced, palp moderate. Chelipeds slender, legs long. Abdomen in both sexes with 7 segments, in ♂ almost as broad as in ♀, covering the greater part of sternum.

*Camposcia retusa* Latr.

Fig. 1.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 784.

1895. Alcock, *l. c.*, p. 184 (references).

1918. Stebbing, Ann. Durban Mus., ii, p. 48.

1942. Ward, Mauritius Inst. Bull., ii, p. 71.

Carapace, chelipeds, and especially the legs densely covered with hooked setae and bristles.

Length of carapace up to 40 mm., breadth 27 mm. The hairy covering more or less reddish.

*Localities.*—Durban (Stebbing); Delagoa Bay (S. Afr. Mus.); Mozambique (Hilgendorf, Miers).

*Distribution.*—Mauritius; Ibo, Portuguese East Africa; Chagos; Indo-Pacific.

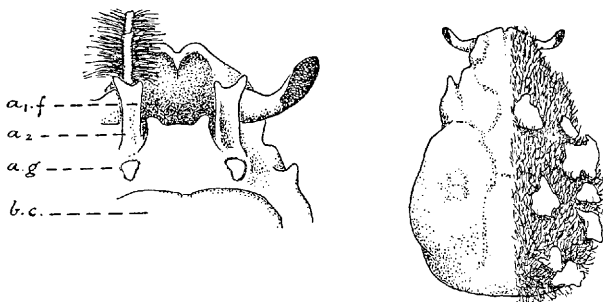


FIG. 1.—*Camposcia retusa* Latr. Lower surface of rostrum, 1st antennæ removed from socket *a*<sub>1</sub>.f. *a*<sub>2</sub>, 2nd antenna. *a.g.*, antennal gland. *b.c.*, buccal cavity. Upper surface of carapace, left side cleaned, right side with hairs and pieces of seaweed.

Gen. MACROPODIA Leach

1899. M. Edwards and Bouvier, Res. Sci. Camp. Monaco, xiii, p. 47 (*Stenorhynchus* non Lam.) (key to N. Atlantic species).

1910. Stebbing, *l. c.*, p. 284.

1911. Rathbun, Tr. Linn. Soc. Lond., xiv, p. 242.

1927. Lebour, J. Mar. Biol. Assoc. Plym., n.s., xiv, p. 806, figs. (larval stages).

Carapace pyriform or triangular, with distinct "neck" (especially in ♂) behind the projecting, non-retractile eyes. Rostrum elongate (usually), of two slender contiguous spines. Cornea oblique, with apical tubercle or seta. Abdomen with 6 segments in both sexes. Chelipeds considerably larger in ♂ than in ♀; legs very long and slender.

*Remarks.*—A genus with several very closely allied species. *Stenorhynchus* Lam. has a simple spiniform rostrum (Rathbun, 1925, *l. c.*, pp. 11, 13).

*S. seticornis* (Herbst) (= *sagittarius* Fabr.) has been recorded by Odhner from Port Alexander (Medd. Göteb. Mus., xxxi, p. 19).

*Key to the South African Species.*

1. Outer rims of antennular sockets not splayed outwards.  
 No spines on basal joint of ant. 2. Rostrum short  
 (fig. 2, a) . . . . . *rostrata*.

2. Outer rims of antennular sockets splayed outwards, partly covering basal joint of ant. 2 (fig. 2, b, j).
- a. Rostrum very long. Basal joint of ant. 2 with one spine. Dactyls of 4th and 5th legs with spines along whole inner margin . . . . . *falcifera*.
- b. Rostrum short. Basal joint of ant. 2 without or with 2 spines. Dactyls of 4th and 5th legs with spines only on proximal half of inner margin . . . . . *formosa* and var.

*Macropodia rostrata* (Linn.)

*European Long-legged Spider-crab.*

Fig. 2, a.

1849. Cuvier, Règne Anim. Crust., pl. 35, figs. 3, 3, a-g (*Stenorhynchus phalangium*).

1853. Bell, Brit. Stalk-eyed Crust., p. 2, fig. (*S. phalangium*).

1899. M. Edwards and Bouvier, l. c., pp. 48, 49 (*S. rostratus*).

1904. Doflein, Wiss. Erg. D. Tiefsee Exp., vi, p. 69 (*S. rostratus*).

1908. Lagerberg, Göteb. Vet. Samh. Handl. (4), xi, p. 82.

1914. Lenz and Strunck, D. Südpol. Exp., xv, p. 272 (*S. rostratus*).

1922. Bouvier, Res. Sci. Camp. Monaco, lxii, p. 78, pl. 5, figs. 6-8 (*S. rostratus*).

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 18.

Rostrum short, not reaching beyond last peduncular joint of ant. 2. Outer rims of antennular sockets not splayed outwards. Epistome and basal joint of ant. 2 without spines or tubercles (Bell: a very minute tubercle on epistome in front of antennal gland). 4th joint of 3rd maxilliped oval, subequal to 3rd joint (excluding internal process of latter). Basal joint of ant. 1 with a few spinules near insertion of 2nd joint. Cornea with apical seta. Dactyls of 4th and 5th legs with about 12-15 recurved spines concealed in fur along whole length of inner margin. Sternum of ♂ with a few inconspicuous tubercles as in *falcifera*.

*Length* (incl. rostrum), ♂ 17 mm., ♀ 12 mm.; breadth, ♂ 10 mm., ♀ 9 mm., cheliped ♀ 26 mm. Pink or reddish, chelipeds and legs often darker red.

*Locality*.—Simon's Bay (Lenz and Strunck).

*Distribution*.—N. Atlantic and Mediterranean, to Madeira, Canaries, Cape Verdes, Senegal, and off mouth of Congo R.; Port Alexander, Angola. 0 108 metres.

*Remarks*.—The single record from Simon's Bay (part of False Bay), albeit based on several specimens, might perhaps have been regarded

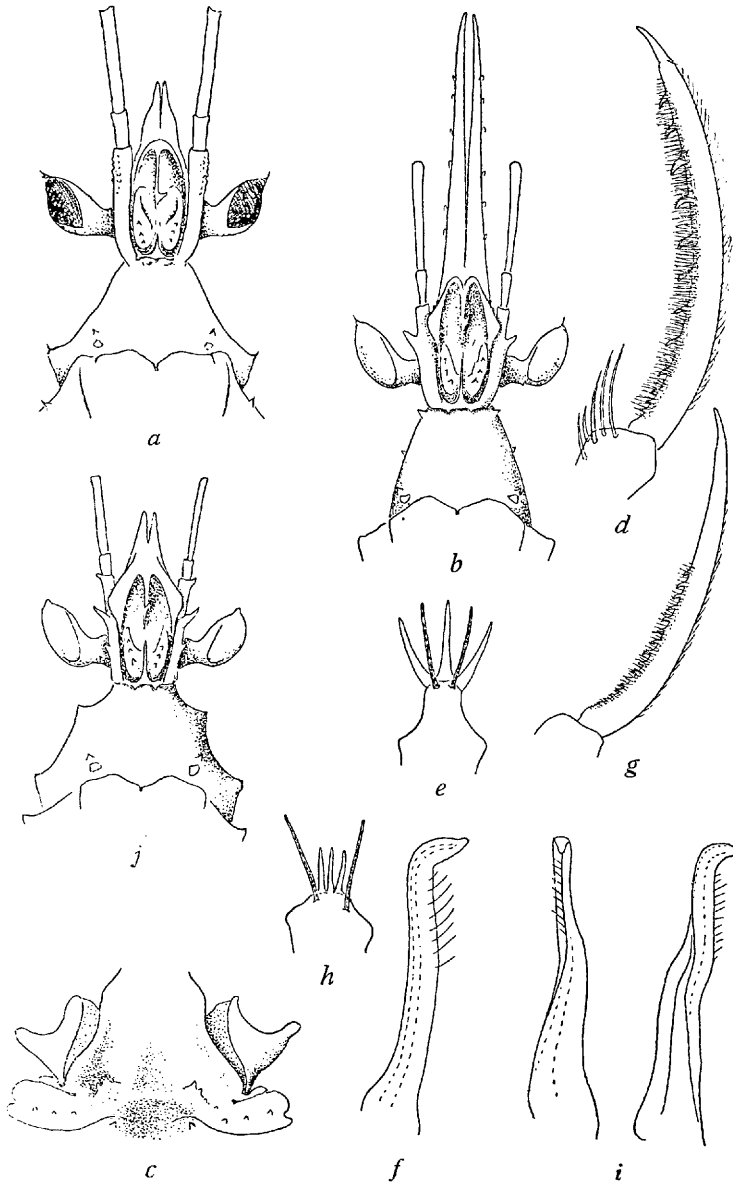


FIG. 2.—*Macropodia rostrata* (Linn.). *a*, ventral surface of rostrum.  
*Macropodia falcifera* (Stimpson). *b*, ventral surface of rostrum ♂. *c*, sternum ♂  
between chelipeds. *d*, dactyl of 4th or 5th leg (some of the setae on apex of  
6th joint omitted). *e*, apex of 4th joint of 2nd leg. *f*, 1st pleopod ♂.  
*Macropodia formosa* Rathbun. *g*, dactyl of 4th or 5th leg. *h*, apex of 4th joint  
of 2nd leg. *i*, 1st pleopod ♂.  
*Macropodia formosa* var. (S. Afr. Mus., No. A1412). *j*, ventral surface of rostrum ♀.  
(In *a*, *b*, *j* only the basal joint of 1st antenna is indicated.)

as due to transportation by ships, because the *Pieter Faure* obtained no examples during the course of a fairly intensive survey of False Bay. Recently (1946), however, the University of Cape Town Ecological Survey, under Professor J. H. O. Day, has rediscovered this species in False Bay, 4–15 fathoms; also found in Knysna harbour (1947).

*Macropodia falcifera* (Stimpson)

*Cape Long-legged Spider-crab.*

Fig. 2, b–f.

1910. Stebbing, *l. c.*, p. 284.

1913. Balss, *Schultze Reise Südafr.*, v, p. 109.

1914. Lenz and Strunck, *l. c.*, p. 273 (*Stenorhynchus f.*).

1923. Odhner, *l. c.*, p. 26.

Rostrum very long, extending well beyond end of peduncle, usually to end of flagellum, of ant. 2. Carapace with a single large erect spine on the gastric and one on the cardiac region, and smaller spines or tubercles on the other regions. Outer rims of antennular sockets splayed outwards, sometimes minutely denticulate. Two small tubercles on posterior rim of sockets, one at base of ant. 2 (usually present in ♂, usually absent in ♀) and one in front of antennal gland. Cornea with apical setiferous tubercle. Basal joint of ant. 1 with 2–3 minute tubercles. Basal joint of ant. 2 with a single spine in middle of its ventral margin. 4th joint of 3rd maxilliped oval, subequal to 3rd joint (excluding inner projection of latter). Cheliped covered with short thick fur, with longer bristles, the joints spinose along upper and lower margins, a strong spine on outer apex of 4th joint, finger and thumb channelled externally, in ♀ inner margins denticulate and contiguous, in ♂ with large gap proximally, each with a squarish tooth at base, apically denticulate and contiguous. 2nd–5th legs with curled hairs and straight bristles, a spinous process at apex of 4th joint, usually trifid in 2nd leg, trifid or bifid in 3rd and 4th, bifid or simple in 5th leg; dactyls of 2nd and 3rd legs elongate, nearly straight, with short bristles, of 4th and 5th legs slightly, sometimes strongly falcate, with about 12–15 recurved spines concealed in short fur along whole length of inner margin; apex of 6th joint of 4th and 5th legs expanded, with a brush of stiff bristles on inner side. Sternum of ♂ with 2 tubercles, often bifid, or with subsidiary denticles, between base of chelipeds, and several smaller ones on the lateral portions of the following segments.

Length (incl. rostrum), ♂ 25 mm., ♀ 20 mm.; breadth, ♂ 13 mm., ♀ 10 mm.; cheliped ♂ 46 mm., ♀ 22 mm., longest leg ♂ 82 mm., ♀ 56 mm. Brick-red (Stimpson); cream, pinkish, or reddish, the chelipeds and legs often deeper red.

*Localities.*—Simon's Bay (Stimpson, Miers, Balss, Lenz and Strunck); St. Francis and Plettenberg Bays, Agulhas Bank (Doflein); Agulhas Bank (Odhner); False Bay and Agulhas Bank eastwards to East London, 17–53 fathoms (S. Afr. Mus.).

*Remarks.*—A strongly falcate dactyl on the 4th or 5th legs is regarded by Bouvier (*l. c.*) as a variation, but in the genus *Achaeus* it is given specific value (Alcock, 1895). Of 36 specimens of this species not one has strongly falcate dactyls.

This species is common on the Agulhas Bank, extending to about East London, whence northwards its place is taken by *formosa*. At one station, 32° 53' S., 28° 11' E., two specimens of *falcifera* and one of *formosa* were taken by the *Pieter Faure* in the same haul.

#### *Macropodia formosa* Rathbun

Fig. 2, *g-i*.

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 242, fig. 1.

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120.

Rostrum short, not extending to end of last joint of ant. 2. Carapace as in *falcifera*. Outer rims of antennular sockets splayed outwards; 2 minute tubercles on posterior rim. A small tubercle in front of antennal gland. Cornea with apical tubercle. Basal joint of ant. 2 quite smooth. Basal joint of ant. 1 with minute tubercles. 4th joint of 3rd maxilliped oval, subequal to 3rd joint. Cheliped as in *falcifera*, but less strongly spinose. Apices of 4th joints of legs with 3 small spines on 2nd and 3rd, 2 or one (very small) on 4th and 5th legs. Dactyls of 4th and 5th legs slightly falcate (♀), with a dozen or more recurved spines concealed in short fur on proximal half of inner margin, distal half smooth and glabrous; in ♂ much more slender, with fewer and less conspicuous spines on proximal third of inner margin. Inner apices of 6th joint of 4th and 5th legs with brush of stiff-bristles.

Length, ♂ 12 mm., ♀ 14 mm.; breadth, ♂ 7 mm., ♀ 10 mm. One young ♂, which is unusually free from encrusting hydroids, etc., is pale biscuit colour, with a sienna-brown lateral stripe extending from base of 3rd leg to eye and along side of rostrum, peduncle and flagellum

of antenna 2 also brown; chelipeds and legs faintly pinkish. Other specimens, as far as the carapace is visible, are uniformly drab or greyish.

*Localities*.—Delagoa Bay (Barnard, 1 ♀ 1912; also coll. van der Horst, 2 ♂♂, 1 ovig. ♀ 1939); off East London, and Tugela River, Natal, 24–41 fathoms, 2 ♀♀ (S. Afr. Mus.).

*Distribution*.—Cargados Carajos (between Mauritius and Seychelles).

*Remarks*.—These specimens are assigned to *formosa* mainly on geographical reasons. The original description does not mention the basal joints of either antenna 1 or 2, nor the flange of the antennular sockets, nor the armature of the dactyls of 4th and 5th legs. The apices of 4th joints of 2nd–5th legs each have a single, apparently well-developed spine (*cf.* Rathbun's figure).

Two ♀♀, 13 × 10 and 15 × 11.5 mm., differ from the above ♀♀ in having 2 strong spines on basal joint of antenna 2, and the outer apex of the same joint somewhat spiniform (fig. 2, *j*) (S. Afr. Mus., No. A1412).

*Locality*.—Off Tugela River, Natal, 36 fathoms.

#### Gen. ACHAEUS Leach

1886. Miers, *Challenger Rep.*, xvii, p. 8.

1895. Alcock, *J. Asiat. Soc. Bengal*, lxiv, p. 169.

1902. de Man, *Abh. Senckenberg. Ges.*, xxv, p. 654.

1911. Rathbun, *Trans. Linn. Soc. Lond.*, xiv, p. 244.

1929. Balss, *l. c.*, p. 5.

Differs from *Macropodia* only in having a very short bifid or bilobed rostrum. The dactyls of 4th and 5th legs are, in some species, rather strongly falcate.

#### *Key to the South African Species.*

1. Peduncle of ant. 2 smooth or with minute denticles.
  - a. Dactyls of 4th and 5th legs falcate, inner margins spinulose.
    - i. Carapace quite smooth. Eye-stalk without tubercle on front margin . . . . . *lacertosus*.
    - ii. Carapace with slight elevation on cardiac region. Eye-stalk with strong tubercle on front margin . . . . . *affinis*.
  - b. Dactyls of 4th and 5th legs nearly straight, inner margins smooth. Eye-stalk without tubercle. Carapace tuberculate . . . . . *laeviculis*.
2. Peduncle of ant. 2 strongly spinose . . . . . *lorina*.



*Achaeus lacertosus* Stimpson

Fig. 3, *a, b*.

1857. Stimpson, Pr. Ac. Nat. Sci. Philad., p. 218.  
1884. Miers, Zool. "Alert," p. 188.  
1895. Alcock, *l. c.*, p. 172.  
1907. Stimpson (ed. Rathbun), Smithson. Misc. Coll., xlix, p. 20, pl. 3, fig. 7.  
1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 98, fig. 18, C (pl. 1, ♂).

Rostrum short, bilobed, upper surface with 2 longitudinal ridges. Supra-ocular ridge smooth. Carapace quite smooth, but the regions fairly well defined. Hepatic region with a blunt horizontal laminar tooth. Basal joint of ant. 2 smooth. Inter-antennular tooth obsolete. Eye-stalks not very stout, without tubercle on front margin. Cheliped with 4th joint considerably swollen, finger and thumb not gaping at base. 4th joint of 2nd-5th legs without apical spines. Dactyls of 4th and 5th legs very strongly falcate (semicircular), inner margins with recurved spinules. Sternum of ♂ as figured for *affinis* (fig. 3, *f*).

Length 6 mm., breadth 4 mm. Dark yellowish or brownish, a red ring around middle of finger and thumb of chelipeds.

*Localities*.—Durban Bay (S. Afr. Mus.); Delagoa Bay (coll. van der Horst).

*Distribution*.—New South Wales and N. Australia; Indian Seas and Andaman Islands; Persian Gulf.

*Remarks*.—The 1st pleopod of ♂ seems to be unusual in that the apex curves inwards towards its fellow, instead of outwards; all three ♂♂ were alike in this respect.

*Achaeus cf. affinis* Miers

Fig. 3, *d-f*.

1884. Miers, Zool. "Alert," p. 188.  
1893. Henderson, Trans. Linn. Soc. Lond., v, p. 341.  
1894. Ortmann, Semon's Austral. Reise, v, p. 37.  
1895. Alcock, *l. c.*, p. 172.  
1905. Nobili, Boll. Mus. Zool. Univ. Torino, xx, no. 506, p. 7.  
1931. Chopra, Rec. Ind. Mus., xxxiii, p. 323.  
Rostrum very short, scarcely extending beyond apex of 2nd joint of ant. 2, very shortly bifid. Carapace uneven, but the regions

not very well defined; gastric region convex but not tuberculate; cardiac region with a low elevation bearing 2 minute setiferous tubercles. Outer rims of antennular sockets splayed outwards distally. Tubercles on posterior rim of sockets very minute or obsolete. A minute tubercle in front of antennal gland. Tooth on the inter-antennular septum short and blunt, not spiniform. No spine (or a very minute one) on upper margin of orbit. Cornea with apical tubercle, a conspicuous setiferous tubercle on front margin of stalk, larger in ♀ than in ♂. Basal joint of ant. 1 with several minute tubercles. Basal joint of ant. 2 with 2-3 minute tubercles, better developed in ♀ than in ♂, 2nd joint also with 2-3 tubercles, one of which is almost spiniform. 3rd and 4th joints of 3rd maxilliped subequal in length, feebly setose, both with 2 rows of rather conspicuous spinules. Cheliped not furry, or only feebly so, feebly spinose, no strong spine at outer apex of 4th joint, finger and thumb as in *M. falcifera*, but in ♂ the finger has 2 conical teeth in the gap. 4th joints of 2nd-5th legs without spines, only bristles, at their apices; dactyls of 4th and 5th legs about half length of 6th joint, strongly falcate, with 7-8 recurved spines concealed in fur along the whole length of inner margin, the apical one immediately next the unguis. Sternum of ♂ with prominent flanges at bases of chelipeds, and a crescentic, denticulate ridge between them. 1st pleopod ♂ resembling that of *M. falcifera* (fig. 2, f).

Length, ♂ 9 mm., ♀ 75 mm.; breadth, ♂♀ 5.5 mm.

*Locality*.—Off Cape Morgan, 36 fathoms, 3 ♂♂, 1 ovig. ♀ (S. Afr. Mus.).

*Distribution*.—Australia; Malay Archipelago; Burma; Andaman Is.; Zanzibar.

*Remarks*.—These four specimens are very close to, if not actually identical with, *affinis*; Miers says the cardiac prominence is usually very much elevated, which it is not in these specimens. In one ♂ the rostrum is much blunter, almost truncate, with a short slit. Possibly these specimens are *brevifalcatus* Rathbun 1911, from the Seychelles.

*Achaeus cf. laevioctis* Miers

Fig. 3, c.

1884. Miers, Zool. "Alert," p. 520, pl. 46, fig. A.

Rostrum very short, not extending beyond apex of 2nd joint of ant. 2, in two of the specimens with slight apical notch and on dorsal

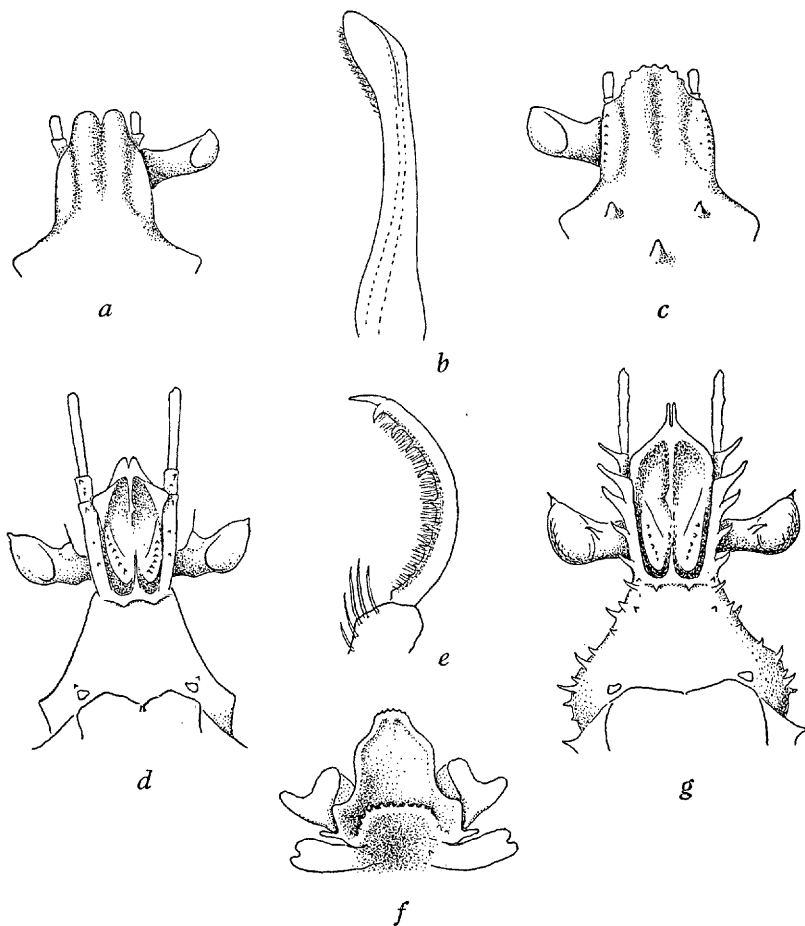


FIG. 3.—*Achaeus lacertosus* Stimpson. *a*, rostrum ♂. *b*, ventral view of left 1st pleopod ♂ (curves inwards towards its fellow).  
*Achaeus cf. laevioculis* Miers. *c*, rostrum ♀.  
*Achaeus cf. affinis* Miers. *d*, ventral surface of rostrum ♂. *e*, dactyl of 4th or 5th leg (some setae on apex of 6th joint omitted). *f*, sternum ♂ between chelipeds.  
*Achaeus cf. lorina* (Ad. & White). *g*, ventral surface of rostrum ♂.  
 (In *d* and *g* only basal joint of 1st antenna indicated.)

surface a submarginal row of minute denticles, in the 3rd specimen this denticulate ridge forms the anterior rounded margin of rostrum. Supra-ocular ridge minutely denticulate. Carapace with 3 tubercles on gastric region, 2 on each branchial region, and a double tubercle on cardiac region, with (in 2 specimens) a single median smaller tubercle behind it; hepatic region with a blunt horizontal tubercle. Basal joint of ant. 2 feebly denticulate. Interantennular tooth obsolete. Eye-stalks stout, without tubercle on front margin, apex of cornea rounded, with very feeble denticle. 4th joints of 2nd-5th legs without apical spines. Dactyls of 4th and 5th legs nearly straight, inner margins smooth.

Length 7 mm., breadth 6 mm.

*Locality.*—Off Port Shepstone, Natal, 24 fathoms, 3 ovig. ♀♀ (S. Afr. Mus.).

*Distribution.*—Seychelles, 4-12 fathoms.

*Remarks.*—These specimens appear to be nearest to this species which was described from a ♂, the figure of which shows better marked indents behind the eyes and the hepatic regions, and also longer legs.

*Achaeus cf. lorina* (Adams & White)

Fig. 3, *g*.

1848. Adams and White, Zool. "Samarang," Crust., p. 3, pl. 2, fig. 2 (*Inachus l.*).

1886. Miers, *Challenger* Rep., xvii, p. 10.

1900. Lanchester, Proc. Zool. Soc. Lond., p. 721.

1902. de Man, *l. c.*, p. 654.

1911. Rathbun, *l. c.*, p. 244.

Rostrum short, ending in two short contiguous points, dorsally with slight median groove. Supra-orbital ridge with strong spine. No post-ocular constriction. Carapace with well-defined regions, gastric region with 2 spines antero-laterally and one median posteriorly, cardiac region with 1 median, branchial region with 1 spine anteriorly, 1 posteriorly, and a smaller one behind the latter and somewhat nearer the middle line; several sharp spinules laterally on hepatic and branchial regions; one spine on pterygostomial region at end of a slight ridge from corner of buccal cavity; some small denticles on sides of epistome, and one on hind margin of each antennular socket. Inter-antennular tooth blunt. Basal joint of ant. 2 with 4 strong spines, increasing in size distally, first free joint with 1 spine on outer

apex. Eye-stalks stout, a curved tubercle on antero-inferior apex just before the cornea, and a small setiferous tubercle at apex of cornea. Cheliped stout, 4th–6th joints swollen, with numerous spines and denticles, finger and thumb gaping in basal half, each with a strong basal tooth, distal margins (where they meet) denticulate. 4th joint of 2nd–5th legs with a single conspicuous spine on apex, and also a seta. Dactyls of 4th and 5th legs slightly falcate, more so in 5th than in 4th, inner margin with about 8 denticles, and a strong one next the unguis; no brush of setae on inner apex of 6th joint. Dactyl of 3rd leg also with a strong denticle next the unguis. Sternum of ♂ similar to that figured for *affinis*, but the crescentic ridge not so well marked; abdomen and sternites between abdomen and bases of legs denticulate. 1st pleopod ♂ as in *affinis* (and *M. falcifera*).

Length 10 mm., breadth 8.5 mm.

*Locality*.—Off Hood Point (East London), 49 fathoms, 1 ♂ (S. Afr. Mus.).

*Distribution*.—Philippine Is.; Singapore; East Indies; Amirante and Seychelles.

*Remarks*.—Agrees in many respects with de Man's description of young ♂, except that the rostral points are not divergent. I have not seen the original description and figure.

#### Gen. ACHAEOPSIS Stimpson

1910. Stebbing, *l. c.*, p. 285 (and *Dorynchus*).

1914. *Id.*, Trans. Roy. Soc. Edin., 50, p. 257.

1917. *Id.*, Ann. S. Afr. Mus., xvii, p. 24.

1932. Sakai, Sci. Rep. Tokyo Zool. Inst., sect. B, no. 4.

Rostrum bispinose, better developed than in *Achaeus*. Inter-antennular tooth strong. Eyes retractile, but the post-ocular tooth is spiniform, not hollowed. Antennular sockets very large, excavated in underside of rostral spines. Basal joint of ant. 2 ventrally channelled between two rows of spinules. 4th joint of 3rd maxilliped shorter than 3rd. Chelipeds much larger in ♂ than in ♀, finger and thumb in ♂ not gaping at base. Legs long and slender, dactyls nearly straight.

#### *Key to the South African Species.*

1. Rostral spines relatively short, extending to end of peduncle of ant. 2. Spines at apices of 4th joints of 2nd–5th legs minute or obsolete. Smaller, shallow-water species . . . *spinulosus*.

2. Rostral spines longer, extending distinctly beyond apex of peduncle of ant. 2. Spines at apices of 4th joints of 2nd-5th legs well developed. Larger, deep-water species . . . . . *thomsoni*.  
*A. g untheri* is here transferred to the genus *Inachus*.

*Achaeopsis spinulosus* Stimpson

Fig. 4, *a-c, e*.

1910. Stebbing, *l. c.*, p. 285.

1921. *Id.*, Ann. S. Afr. Mus., xviii, p. 453.

Rostral spines rather short, extending to end of, or very slightly beyond, apex of peduncle of ant. 2, slightly divergent and rather widely separated proximally. A supra-ocular spine, occasionally with a subsidiary spinule in front of or behind it. A strong erect median spine on gastric region, and a stronger one on cardiac region; a smaller tubercle or spine on antero-lateral portion of gastric region; one on the branchial region and often another on the anterior branchial region; lateral margin of branchial and hepatic regions each with 2-3 spinules. Eye-stalk with 1-2 minute spinules or tubercles in middle of anterior surface, and one at anterior apex. 3rd and 4th joints of 3rd maxilliped with 2 rows of spinules, a strong spine on inner margin of 4th joint. Cheliped in fully grown ♂ may be considerably enlarged, hand inflated and longer than finger and thumb. 4th joint of 2nd-5th legs may have 1-3 minute spinules at apex, but never conspicuous. Dactyls of 4th and 5th legs with about 6 minute, widely spaced denticles on inner margin, the largest immediately next the unguis. Sternum ♂ with more or less denticulate flanges at bases of chelipeds, and a slightly crescentic transverse ridge between them, on which are 2 erect widely separated spines and a variable number of subsidiary spinules or denticles, margin of the hollow in which the abdomen lies never trilobate. 1st pleopod ♂ strongly sigmoid, apex with a membranous reflexed flap on ventral side.

Length, ♂ up to 12 mm., ♀ 10 mm.; breadth, ♂ 11 mm., ♀ 8.5 mm.; length of cheliped, ♂ up to 35 mm. Pale brownish orange, chelipeds of a deeper tint, margins of finger and thumb white.

*Localities*.—Simon's Bay, 10-20 fathoms (Stimpson, Miers); off Cape Recife, 52 fathoms, and off Port Shepstone, Natal, 24 fathoms (Stebbing); off Cape Point, 80 fathoms, off Hout Bay, False Bay, and Agulhas Bank to Durban, 23-100 fathoms (S. Afr. Mus.).

*Remarks*. A large ♂ (14 × 12 mm., cheliped 47 mm.) is labelled

“Hoets [*sic*] Bay 24/xii/97”; apparently intended for Hout Bay on the west coast of the Cape Peninsula. This single record from the west coast is linked up with the False Bay and Agulhas Bank records by an even larger ♂ (17 × 14 mm., but cheliped only 25 mm.) from off Cape Point.

This species lives in shallower water than *thomsoni*. It has been taken in association with *I. güntheri*, from which it is distinguished by the *three gastric spines*, the median one *erect* (not curving forwards), and the simply concave margin of the sternal hollow in which the abdomen lies.

*Achaeopsis thomsoni* (Norman)

Fig. 4, *d, e*.

- 1910. Stebbing, *l. c.*, p. 286.
- 1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 247 (var.).
- 1914. Stebbing, Trans. Roy. Soc. Edin., 50, p. 258.
- 1917. *Id.*, Ann. S. Afr. Mus., xvii, p. 24, pl. 1 (Crust., pl. 90).
- 1918. Rathbun, Biol. Res. “Endeavour,” v, p. 4.
- 1924. Stebbing, Ann. S. Afr. Mus., xix, p. 1.
- 1925. Rathbun, Bull. U.S. Nat. Mus., no. 129, p. 29, fig. 7 (legs too hairy), and pl. 10.
- 1927. Hale, Crust. S. Austral., pt. 1, p. 124, fig. 120 (legs too hairy).

Very closely allied to *spinulosus*, but attaining a larger size, and distinguished as follows: rostral spines longer, almost contiguous, or subparallel, or slightly divergent distally, but always closer together proximally than in *spinulosus*, and always extending distinctly (though not far) beyond apex of peduncle of ant. 2. Subsidiary denticles or spinules usually developed on sides or under surface of rostral spines, and near some or all of the major spines on the carapace, including the supra- and post-ocular spines; and the ridges from bases of rostral spines to the inter-antennular tooth are almost always denticulate. Basal joint of ant. 2 with distinct apical spine. The spines of the ♂ sternum, and on the 4th joints of 2nd–5th legs, are more prominent. 1st pleopod ♂ as in *spinulosus*.

Length up to ♂ 30 mm., ♀ 20 mm.; breadth, ♂ 21 mm., ♀ 14 mm.; length of cheliped, ♂ 75 mm., ♀ 25 mm. Fingers and thumbs of chelipeds with salmon-red spots, walking legs with wide bands of same colour but fainter. M. Edwards and Bouvier (1899, Res. Sci. Camp. Monaco, xiii, p. 46, pl. 1, fig. 6) give a coloured figure showing the

whole animal orange-salmon, deeper in tint on the carapace and chelipeds.

*Localities*.—Agulhas Bank, 150 fathoms (Miers); shallow water and 155 metres (Doflein); off Table Bay and Cape of Good Hope, 106–318 metres (Doflein); off Saldanha Bay and Cape Point, 166 fathoms

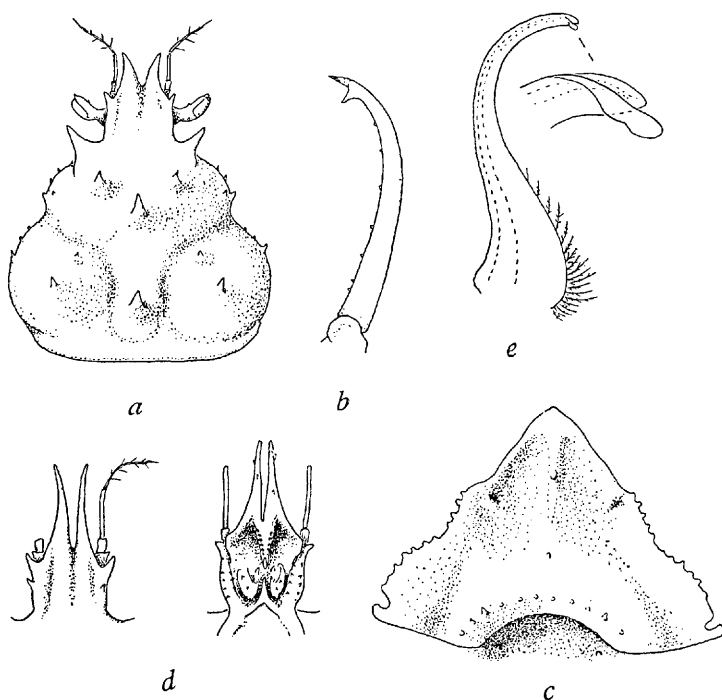


FIG. 4.—*Achaeopsis spinulosus* Stimpson. *a*, carapace. *b*, dactyl of 5th leg. *c*, sternum ♂ between chelipeds. *d*, dorsal and ventral views of rostrum; in latter only basal joint of ant. 1 is indicated, and flagellum of ant. 2 omitted. *e*, 1st pleopod ♂ (similar in both species).

(Stebbing); off Saldanha Bay, Table Bay, and Cape Point, 95–210 fathoms (S. Afr. Mus.).

*Distribution*.—Widely distributed in Atlantic and Indian Oceans, to S. and S.E. Australia (see chart in Doflein, 1904, D. Tiefsee Exp., vi, p. 273, fig. 61), from about 55 to over 1000 fathoms.

*Remarks*.—A common species on the Stock-fish grounds in the moderately deep water off the south-west coast, associated with *Scyramathia hertwigi*, and the Dromiid crabs *Exodromidia spinosa* and *bicornis*.



Gen. INACHUS Fabr.

1886. Miers, *Challenger* Rep., xvii, p. 19.  
1899. M. Edwards and Bouvier, Res. Sci. Camp. Monaco, xiii, p. 44 (key to N. Atlantic species).  
1910. Stebbing, *l. c.*, p. 284.  
? 1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 247 (*Pseudocollodes*).

Rostrum short, bilobate. Eyes retractile, post-ocular tooth hollowed. Basal joint of ant. 2 ventrally channelled between 2 rows of spinules. Chelipeds much stronger in ♂ than in ♀, finger and thumb not gaping. Legs long and slender, the 2nd pair (1st walking legs) longer and stronger than the following pairs, all dactyls nearly straight. Abdomen with 6 segments in both sexes.

*Remarks.*—A curious callosity is found on the sternum of the ♂ of two European species and in both sexes of a third species.

*Key to the South African Species.*

1. A single gastric spine, much larger than the cardiac and branchial spines . . . . . *güntheri*.
2. A row of 4 small tubercles in front of the median gastric spine, which is not much larger than the cardiac and branchial spines . . . . . *dorsettensis*.

*Inachus güntheri* (Miers)

Fig. 5, a-c.

1879. Miers, Ann. Mag. Nat. Hist. (5), iv, p. 2, pl. 4, fig. 1 (*Achaeopsis g.*).  
1904. Doflein, D. Tiefsee Exp., vi, p. 74, pl. 28, figs. 2, 3 (*I. antarcticus*).  
1910. Stebbing, *l. c.*, p. 284 (*I. antarcticus*) and p. 285 (*Achaeopsis güntheri*).  
1914. Lenz and Strunck, D. Südpol. Exp., xv, p. 273, pl. 12, figs. 1-4 (*I. antarcticus*).  
1923. Odhner, Medd. Göteb. Mus., xxxi, p. 26 (*I. antarcticus*).

Rostrum extending to about middle of last peduncular joint of ant. 2. Inter-antennular tooth not prominent, often quite blunt and inconspicuous. A small supra-ocular spinule, often very inconspicuous. A single large forwardly curving gastric spine; a small

spine or tubercle on each branchial region and on the cardiac region, the latter frequently with a low blunt transverse tubercle behind it. Lateral margin of hepatic region variably spinulose. Eye-stalk with

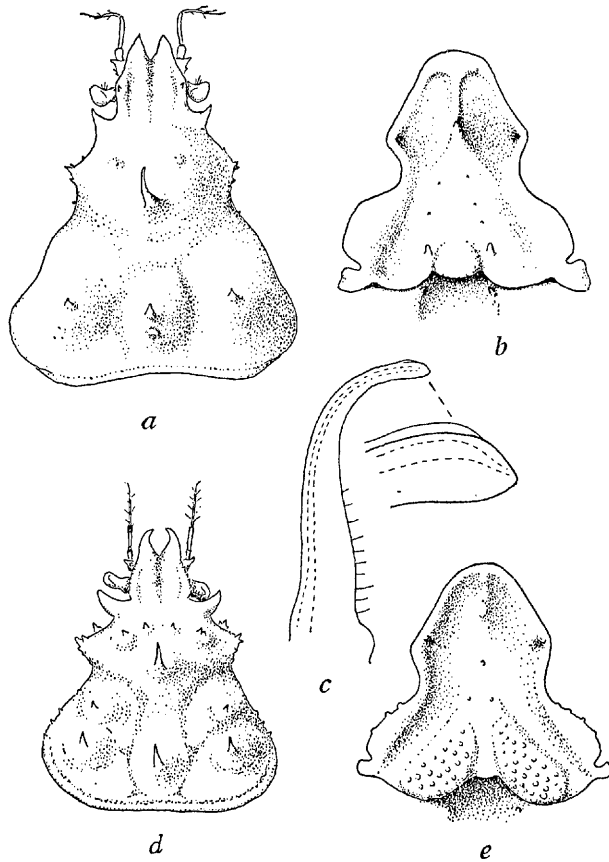


FIG. 5.—*Inachus guntheri* (Miers). *a*, carapace. *b*, sternum ♂ between chelipeds. *c*, 1st pleopod ♂.  
*Inachus dorsettensis* (Penn.). *d*, carapace. *e*, sternum ♂ between chelipeds.

2-3 setules on anterior apex, cornea subglobular. 4th joint of 3rd maxilliped oval, subequal to 3rd joint (excl. internal projection). A minute tubercle on posterior rim of each antennular socket, and usually 2-3 small tubercles on margin between base of ant. 2 and antennal gland. Cheliped in fully grown ♂ with 4th and 6th joints nearly straight and only slightly swollen, finger and thumb shorter than rest of hand, each with one large tooth near base; in younger ♂

4th and 6th joints are more distinctly swollen; 4th joint in ♀ somewhat curved. 2nd leg longer and stronger than 3rd–5th; dactyls of 4th and 5th legs with several minute denticles on inner margin and a stronger one (or two) distally. Sternum in ♂ with smooth-edged flanges at bases of chelipeds, a blunt median tubercle anteriorly, and a pair posteriorly, between the latter a more or less swollen and polished area, hind margin more or less distinctly trilobate, overhanging a rather deep depression in which the apex of the abdomen lies.

Length up to ♂♀ 19 mm., breadth 17 mm.; length of cheliped, ♂ 48 mm., ♀ 24 mm. Pale biscuit colour, eyes pale brown.

*Localities.*—Cape (Miers); Agulhas Bank, 155 metres (Doflein); Simon's Bay (Lenz and Strunck); St. Sebastian Bay and Cape Barracouda, 72 metres (Odhner); False Bay and Agulhas Bank to Cape Natal (Durban), 10–100 fathoms (S. Afr. Mus.).

*Remarks.*—It is remarkable that in spite of Miers' figure of the profile of this crab neither Doflein nor Lenz and Strunck recognized the species. No specimens were apparently submitted to Stebbing.

There is considerable variation in the size of ovigerous ♀♀, in the development of the median boss on the trilobate hind margin of ♂ sternum, and the transverse tubercle behind the cardiac spine; the latter itself is sometimes double, *i.e.* there are 2 small tubercles side by side transversely.

As Doflein remarked the species appears to be closely allied to *leptochirus*.

*Inachus dorsettensis* (Penn.)

Fig. 5, *d, e.*

1777. Pennant, *Brit. Zool.*, iv, p. 12, pl. 10, fig. 1.  
1853. Bell, *Brit. Stalk-eyed Crust.*, p. 13, fig.  
1894. M. Edwards and Bouvier, *Res. Sci. Camp. Monaco*, vii, p. 6.  
1899. *Id., ibid.*, xiii, pp. 45, 46.  
1904. Doflein, *l. c.*, p. 72.  
? 1911. Rathbun, *l. c.*, p. 248, pl. 20, fig. 4 (*Pseudocollodes complectens*).  
1920. Stebbing, *Ann. Durban Mus.*, ii, p. 264, pl. 28, fig. A (*P. complectens*, ? non Rathbun).  
1923. Odhner, *Medd. Göteborg. Mus.*, xxxi, p. 19.  
1927. Lebour, *J. Mar. Biol. Assoc. Plym.*, n.s., xiv, p. 802, figs. (larval stages).

Rostral spines curving inwards at tips. Inter-antennular tooth as a rule prominent, curving forwards. Carapace with an erect spine on each of the gastric, cardiac, and branchial regions, a transverse row of 4 tubercles in front of the gastric spine, a tubercle on the anterior branchial region, variable denticles along lateral margins, on hepatic region, and on supra-orbital ridge. 4th joint of 3rd maxilliped slightly shorter than 3rd. In fully grown ♂ 4th and 6th joints of cheliped somewhat swollen. Dactyls of 4th and 5th legs usually with a few scattered denticles, the largest one near the unguis. Sternum in ♂ with obliquely oval granulate swellings overhanging the cavity in which the abdomen lies. 1st pleopod similar to that of *güntheri* but not so strongly curved outwards apically.

Length, ♂♀ 16 mm., breadth 14 mm.; cheliped, ♂ 27 mm.

*Localities*.—Off Cape St. Blaize, 125 fathoms (Stebbing); Brown's Bank, 36° 40' S., 21° 26' E., 80–100 fathoms, and off Cape Natal (Durban), 54–62 fathoms (S. Afr. Mus.).

*Distribution*.—Eastern Atlantic from Norway to Cape Verde Is.; Mediterranean; Port Alexander, Angola. ? Seychelles.

*Remarks*.—The validity of the genus *Pseudocollodes* seems doubtful, even if the species *complectens*, the ♂ sternum of which is not described, is not conspecific with *dorsettensis*. Although Stebbing did not recognize the one specimen (♂), which was sent to him, as the European species, I have no hesitation in assigning the South African specimens to *dorsettensis*, whose distribution has already been recorded as far south as 16° S. by Odhner. I have examined Stebbing's specimen and 55 others.

*P. complectens* is recorded from the Seychelles.

Balss (1929, *l. c.*, p. 4) retains the genus, and adds another species, *demani*, from Japan.

#### Gen. PLATYMAIA Miers

1904. Doflein, D. Tiefsee Exp., vi, pp. 59, 160, 185, 271.

1910. Stebbing, *l. c.*, p. 286.

1916. Rathbun, Proc. U.S. Nat. Mus., 50, pp. 529 sqq.

1918. *Id.*, Biol. Res. "Endeavour," v, p. 7.

Carapace suborbicular or subtriangular. Rostrum trispinose, the large inter-antennular spine forming the median spine and projecting horizontally forwards. Eye-stalks short, stout, cornea large, subglobular. Basal joint of ant. 2 cylindrical, freely movable. Chelipeds in ♂ elongate. Legs very long and slender, 2nd pair strongly spinose,

6th and 7th joints of 3rd-5th pairs, or 4th and 5th pairs, flattened, more or less oar-like, thickly fringed with setae on front and hind margins. Abdomen of 7 segments in both sexes.

*Remarks.*—Three species are now recognized from the Indo-Australian and south-east African regions, and three others (Rathbun, 1916) from the Philippines and East Indies.

*Platymaia turbynei* Stebb.

Fig. 6, *a-c*.

1902. Stebbing, Mar. Invest. S. Afr., ii, p. 3, pl. 5.

1910. *Id.*, l. c., p. 286 (*wyville-thomsoni*, non Miers).

1918. Rathbun, l. c., p. 9.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 232.

1923. *Id.*, Fish. Mar. Biol. Surv. Rep. iii, Spec. Rep. 3, p. 1, pl. 10.

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120 (*wyville-thomsoni*, non Miers).

(Not fully adult.) Rostrum with lower median spine much more prominent than the true rostral spines. Carapace distinctly triangular in general shape, hind margin broadly rounded; length slightly greater than breadth, and spines equally well developed in the largest as in the smallest specimens available (*cf.* Stebbing, 1902, pl. 5); inner margin of orbit without any spines; cornea not reaching to the largest spine on hepatic region, which thus can scarcely be described as a post-ocular spine; branchial regions well separated medio-dorsally. A blunt denticulate tooth at outer angle of buccal cavity. Basal joint of ant. 2 with 1-2 spines on lower apex, and a variable number along lower margin. Cheliped with palm of hand not longer than finger or thumb in either sex. Fringes of setae on 6th joints of 4th and 5th legs along lower front margin and the upper hind margin; this joint narrow throughout its whole length.

Length (smallest and largest) 15-34 mm., breadth 13-26 mm. Stebbing (1923) had smaller specimens. Pale salmon or orange, legs with broad bands of orange.

*Localities.*—Off Cape Natal (Durban), 440 fathoms (Stebbing); off Cape Natal, 440 fathoms, and off East London, 400 fathoms (S. Afr. Mus.); off Delagoa Bay (26° 3' S., 33° 4' E.), 290 metres (Barnard).

*Remarks.*—As Miss Rathbun has shown (1918), it is difficult to identify *turbynei* with the East African and Indian Ocean form described by Doflein, who ignored both the size and the morphological peculiarities of Stebbing's species. As regards the structure and

proportions of the walking legs the present specimens correspond with what Doflein called Stage 1, whereas in size they correspond with Stage 4.

No adult of *turbynei* is known, so it is impossible to say whether the chelipeds and legs undergo changes similar to those which have been illustrated by Doflein for the species now known as *alcocki* Rathbun.

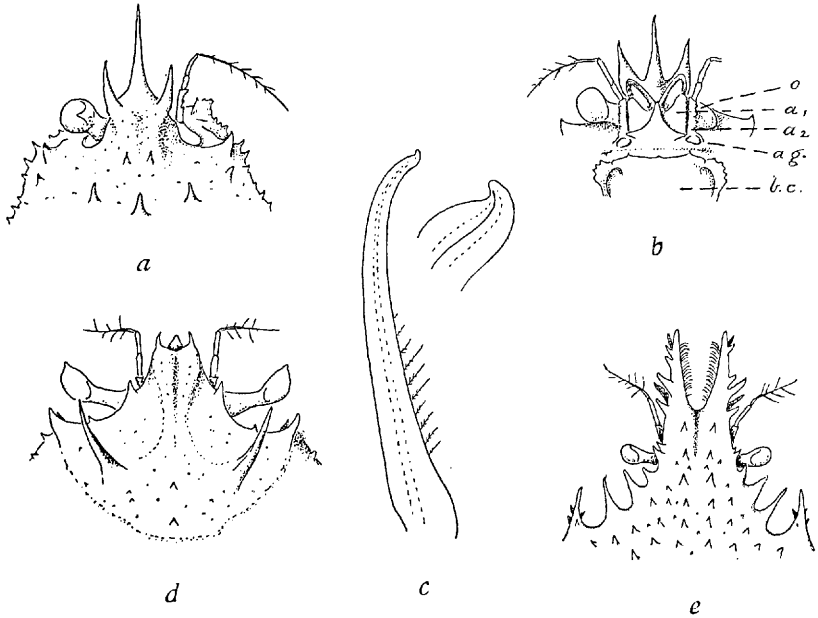


FIG. 6.—*Platymaia turbynei* Stebb. *a*, *b*, dorsal and ventral views of anterior part of carapace. In *a* right eye, in *b* left eye removed to show orbit (*o*); in *b* inter-antennular spine foreshortened in perspective. *c*, 1st pleopod ♂ (not fully adult).

*Cyrtomaia murrayi* Miers. *d*, dorsal view of anterior part of carapace.

*Pleistacantha moseleyi* (Miers). *e*, dorsal view of anterior part of carapace.

(*e* nat. size, other figures enlarged.)

In the 1st pleopod ♂ the margins of the seminal channel are separate throughout the whole length of the appendage (fig. 6, *c*).

The Delagoa Bay specimen was compared with the Natal examples at the time, but, being no longer in my hands, is not available for re-examination. (See Addenda.)

#### Gen. CYRTOMAIA Miers

1886. Miers, *Challenger Rep.*, xvii, p. 14.

1893. Rathbun, *Proc. U.S. Nat. Mus.*, xvi, p. 228 (publ. July 1893).

1899. Alcock, Deep-sea Brachyura "Investigator," p. 44.

1904. Doflein, D. Tiefsee Exp., vi, pp. 53, 158, 184, 190, 271.

1916. Rathbun, Proc. U.S. Nat. Mus., 50, pp. 532, *sqq.*

1918. *Id.*, Biol. Res. "Endeavour," v, p. 4.

1929. Balss, *l. c.*, p. 3.

Carapace broader than long, very convex. Rostrum bispinose, the inter-antennular spine not greatly exceeding the 2 rostral spines and not projecting horizontally forwards. Two very long spines on gastric region. Eye-stalks not so stout as in *Platymaia*, cornea ovoid, with apical tubercle. Basal joint of ant. 2 cylindrical, not fixed distally to side of rostrum, but scarcely (if at all) movable. Chelipeds in ♂ elongate. Legs very long and slender, 2nd pair spinose, 6th and 7th joints of hinder pairs sometimes fringed with setae. Abdomen of 7 segments in both sexes.

*Remarks.*—Five or six species from the Indo-Pacific and Australian regions.

*Cyrtomaia murrayi* Miers

Fig. 6, *d.*

1886. Miers, *l. c.*, p. 15, pl. 3, fig. 1.

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120.

Carapace with irregularly scattered granules; the 2 long gastric spines slightly divergent, 2 small median spines behind them; the anterior branchial spine larger than the posterior one; cardiac region with 2 prominences each with 2 tubercles, the hinder one slightly the larger; a small median spine on hind margin; lateral margins and hepatic regions with several small spines and tubercles. The largest hepatic spine forms the post-ocular spine; between it and the spine above insertion of eye-stalk is a small denticle lying just outside the orbit. Basal joint of ant. 2 with 2 spines distally and 2 others proximally, 2nd and 3rd joints cylindrical, non-spinose. Eye-stalks rather slender. 4th leg with 6th and 7th joints flattened and fringed with setae (chelipeds and other legs lost).

Length 15 mm., breadth 18 mm.

*Locality.*—Off coast of Portuguese East Africa (Barnard).

*Distribution.*—East Indies, 140 fathoms.

*Remarks.*—Only a single ovigerous ♀ was captured. Although Doflein described a species or subspecies (*platyceros*) from farther up the East coast of Africa, the present specimen agrees with *murrayi* in the spination and fringed 4th leg.

## Gen. PLEISTACANTHA Miers

1879. Miers, Proc. Zool. Soc. Lond., p. 24, and J. Linn. Soc. Lond., xiv, p. 646.

1881. M. Edwards, C.R. Ac. Sci. Paris, xciii (*Ergasticus*).

1886. Miers, *Challenger Rep.*, xvii, p. 29 (*Ergasticus*) and p. 31 (*Echinoplax*).

1894. M. Edwards and Bouvier, Res. Sci. Camp. Monaco, vii, p. 9 (*Ergasticus*).

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 178 (*Echinoplax*).

1899. *Id.*, Deep-sea Brachyura "Investigator," p. 42 (*Echinoplax*).

1904. Doffein, D. Tiefsee Exp., vi, p. 76.

1922. Bouvier, Res. Sci. Camp. Monaco, lxii, p. 80.

Carapace triangular, longer than broad, with very numerous, not very long, spines and tubercles. Rostrum bispinose, with subsidiary spines, the inter-antennular spine simple or bifid, projecting ventrally. Eye-stalks stout, cornea subglobular. Basal joint of ant. 2 cylindrical, not fused distally with side of rostrum, but scarcely if at all movable, not, or only partially, visible in dorsal view. Chelipeds in ♂ longer than in ♀. Legs moderately long, 2nd pair longest, all legs spinose, with spinose and furry dactyls. Abdomen of 7 segments in both sexes.

*Remarks.*—Atlantic, Mediterranean, and Indo-Pacific.

*Pleistacantha moseleyi* (Miers)

Fig. 6, e.

1886. Miers, *l. c.*, p. 32, pl. 4, figs. 2, 2, a-c.

1891. Wood-Mason and Alcock, Ann. Mag. Nat. Hist. (6), vii, p. 259 (*pungens*).

1896 and 1899. Alcock, Illustr. Zool. "Investigator," pl. 17, fig. 1 (♀), and pl. 39 (♂) (*pungens*).

1904. Doffein, *l. c.*, p. 76, pl. 24, figs. 5, 6, pls. 25, 26.

1923. Stebbing, Fish. Mar. Biol. Surv. Rep., iii, Spec. Rep. 3, p. 2.

1933. von Bonde, C., *ibid.*, Rep. 10, pp. 59, 60 (locality records).

Inter-antennular spine bifid. Spines and tubercles on carapace all more or less of same size. Chelipeds and legs more strongly spinose in ♀ than in ♂, though the chelipeds in the latter are more robust.

Length (♀) 133 mm., breadth 84 mm. (Stebbing); another ♀, in S. African Museum, measures 120 × 82 mm. Pale yellow, eggs violet.



*Localities.*—Off Umvoti River, Natal, 130 fathoms (Stebbing, and S. Afr. Mus.); off Durban, 172–205 fathoms (Fishery Survey).

*Distribution.*—Philippine Is., 375 fathoms; Andaman Sea, 112–250 fathoms; Nicobars and East coast of Africa, 296–614 metres.

FAMILY ACANTHONYCHIDAE.

1910. Stebbing, *l. c.*, p. 286.

Basal joint of ant. 2 broad, especially at base, apically truncate, and completely fused with epistome. No true orbits. Post-ocular tooth, when present, not hollowed to receive the eye.

*Remarks.*—A prominent inter-antennular spine is not developed in any of the South African species.

*Key to the South African Genera.*

- I. Rostrum very large, conical, apically notched. No salient supra-orbital spine or post-ocular tooth. Eyes completely sunk (fig. 7, *a*) . . . . . *Xenocarcinus*.
- II. Rostrum flanked by salient supra-orbital spines.
  - A. Walking legs not subchelate, 6th joint cylindrical.
    - 1. Rostrum bifid.
      - a.* A small post-ocular tubercle. Large species . . . . . *Antilibinia*.
      - b.* An outstanding post-ocular projection. Small species . . . . . *Menaethiops*.
    - 2. Rostrum simple. No post-ocular tubercle.
      - a.* Rostrum laterally compressed. Supra-orbital spine small. Eyes scarcely reaching margin of carapace. Carapace ♀ with lateral foliaceous lobes . . . . . *Huenia*.
      - b.* Rostrum dorso-ventrally depressed. Supra-orbital tooth large. Eyes short, but reaching beyond margin of carapace. Carapace ♀ without foliaceous lobes. . . . . *Menaethius*.
  - B. Walking legs subchelate, 6th joint with a setiferous projection on inner margin against which the dactyl impinges (fig. 10, *d*) . . . . . *Dehaanius*.

NOTE.—*Epialtus vetchi* Stebb. 1920 is an *Elamena* (*Hymenosomatidae*).  
*E. scutellatus* (Miers 1886 and Stebbing 1910) is a *Dehaanius*.

Gen. XENOCARCINUS White

1847. White in Jukes' Voyage H.M.S. *Fly*, ii, p. 335.

1865. M. Edwards, Ann. Soc. Entom. Fr. (4), v, p. 144 (*Huenioides*).

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 191.

1934. Gordon, Res. Sci. Ind. Néerland, iii, fasc. 15, p. 69.

1938. Balss, Medd. Göteb. Mus., lxxv, p. 20.

Carapace narrow, elongate. Rostrum stout, conical, apically notched. Eyes completely sunk in carapace. No supra- or post-ocular spines. Ant. 2 completely hidden beneath rostrum. Chelipeds not much shorter or stouter than 2nd legs; 4th and 5th legs short; dactyls of 2nd-5th legs serrate on inner margins. Abdomen in ♀ of 5 segments, the 4th-6th being fused.

*Xenocarcinus tuberculatus* White

Fig. 7, a, b.

1879. Miers, J. Linn. Soc. Lond., xiv, p. 648, pl. 12, fig. 5 (rostrum).

? 1895. Alcock, *l. c.*, p. 192.

? 1898. *Id.*, Illustr. Zool. "Investigator," pl. 33, figs. 3, 3, a.

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 248.

1934. Gordon, *l. c.*, pp. 69, 70, 72, fig. 37, b, c.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 109, fig. 21, C, D (plp. 1, 2, ♂).

Carapace with more or less strongly raised tubercles, typically in transverse rows. 4th joint of 2nd-5th legs smooth; dactyls with a single row of serrations.

Length (ovig. ♀) 23 mm., breadth 9 mm. Alcock's specimens were reddish, with a yellow median stripe from rostrum to abdomen, and a wavy yellow line on each side.

*Localities.*—Aliwal Shoal, Natal, 25 fathoms, and off Pondoland coast, 30 fathoms (S. Afr. Mus.).

*Distribution.*—Hong Kong. ? Ceylon, Andamans, Cargados Carajos, Chagos Archipelago.

*Remarks.*—Dr. Gordon points out that Alcock's specimens according to his description and figure, had nodular chelipeds and legs; in the type, and also in the South African specimens, they are quite smooth. I have seen no ♂.

Gen. ANTILIBINIA McLeay

? 1878. M. Edwards, Crust. Règne Mexico, p. 138 (*Taliepus*).

1910. Stebbing, *l. c.*, p. 287.

1916. Rathbun, Proc. U.S. Nat. Mus., 50, p. 537.

1918. *Id.*, Biol. Res. "Endeavour," v, p. 13.

? 1925. *Id.*, Bull. U.S. Nat. Mus., no. 129, p. 162 (*Taliepus*).

Large species. Carapace subcircular, dorsally smooth but more or less uneven in adult, in young with tubercles; hepatic and branchial spines near margin; glabrous in adult but covered with short thick pile in young. Rostrum short, bifid. A supra-orbital spine, and a small post-ocular tubercle which is not hollowed. Eye-stalk short, but visible in dorsal view. Movable joints of ant. 2 visible dorsally. Chelipeds stouter and usually longer than 2nd leg, especially in ♂, apices of finger and thumb slightly spooned. 2nd–5th legs strong,

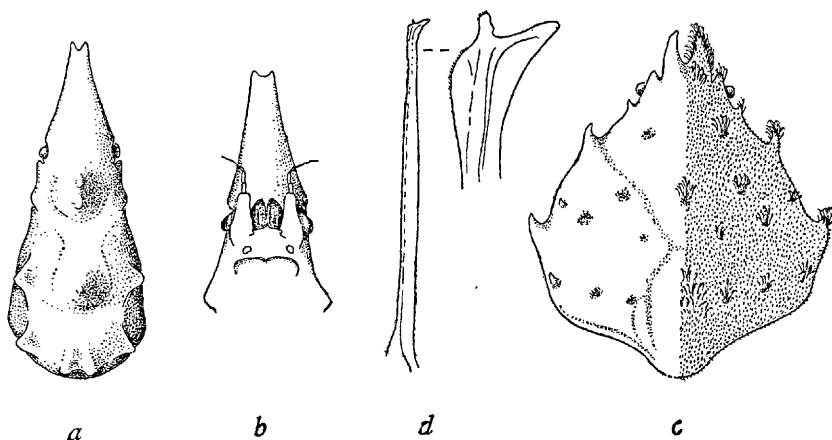


FIG. 7.—*Xenocarcinus tuberculatus* White. *a*, dorsal view of carapace. *b*, ventral view of rostral area. *Antilibinia smithii* McLeay. *c*, dorsal view of carapace of juv. 23 mm. in length, left side cleaned. *d*, 1st pleopod ♂.

dactyls with a double row of serrations on inner margin, and with strong curved unguis. Abdomen (*vide* Krauss) with 7 segments in both sexes.

*Remarks.*—The deep-water S. Australian species *lappacea* Rathbun 1918, with carapace distinctly longer than broad, and rather long rostral horns, does not seem to me to fit well into this genus, especially as the ♀ has the abdomen with 6 segments instead of 7, although I have not been able to check Krauss' statement in regard to the ♀ of the South African species.

On the other hand, there is such an obvious affinity between the Californian *Taliepus* and *Antilibinia* that I would sink the former as a synonym. Rathbun's figures (1925, *l. c.*, pls. 54, 55) of *T. dentatus* might almost be taken from a specimen of *A. smithii*, except for the smaller supra-orbital spine and the position of the tubercle behind

eye; even the peculiar sculpturing of the under surface of hand of cheliped is the same in the two species.

*Taliepus* was proposed as a subgenus of *Epialtus*, and *Antilibinia* was also regarded as such by Miers (1879, p. 650), who included *dentatus* in the latter subgenus.

*Antilibinia smithii* McLeay

*Smith's Spider-crab.*

Fig. 7, c, d.

1838. McLeay, *Annulosa S. Afr.*, p. 57, pl. 2.

1843. Krauss, *Südafr. Crust.*, p. 49, pl. 3, fig. 4, a-c.

1910. Stebbing, *l. c.*, p. 287.

1918. *Id.*, *Ann. Durban Mus.*, ii, p. 49.

Carapace with setiferous tubercles in young, but smooth in adult. Hepatic spine acute, curving forwards and inwards, 2 branchial knobs, acute in young, becoming quite blunt in adult. In large specimens middle branchial region more or less coarsely pitted, an oval rugose or pitted area on hinder branchial region each side of intestinal region. Chelipeds in ♂ robust. No tooth on inner margin of 6th joint of legs. The double row of serrations on the dactyls becomes obsolete in large specimens. Sternum and abdomen, legs and 4th and 5th joints of chelipeds sparsely punctate (large ♂).

Length up to (♂) 72 mm., breadth 67 mm. Various shades of brown, reddish, or greenish, more or less mottled, or with small black spots, chelipeds and legs with fine striae (*cf.* McLeay's figure).

*Localities.*—Natal (McLeay, Krauss, Stebbing); Winkle Spruit, Port Shepstone, Durban, East London (S. Afr. Mus.).

*Remarks.*—This crab lives in rocky habitats, exposed to the breakers; unlike most Spider-crabs it is remarkably free from growths of seaweeds, Hydroids, etc., especially when adult. It is the largest of the South African littoral and shallow-water Spider-crabs.

I have seen no ♀. Juveniles are easily distinguished from *Dehaanius dentatus* by the shape of the 6th joint of the legs.

Gen. MENAETHIOPS Alcock

1895. Alcock, *l. c.*, p. 289.

1906. Nobili, *Bull. Sci. Fr. Belg.*, xc, p. 106 (*Parahoplophrys*).

1929. Balss, *l. c.*, p. 8.

Carapace ovate-triangular, more or less constricted in front of hepatic region. Rostrum bifid. No post-ocular spine (Alcock); post-ocular spine fused with the posteriorly expanded supra-orbital ridge (Balss). Basal joint of ant. 2 expanded. Chelipeds not strongly enlarged. Abdomen with 7 segments in both sexes.

*Remarks.*—Balss recognizes 5 species from the Western Indian Ocean, including *fascicularis* after examination of Krauss' type specimens.

Stephensen (1945, Dan. Sci. Invest. Iran, pt. 4, p. 99, fig. 18, D) figures the plp. 1♂ of *M. nodulosa* (Nob.) which is similar to that of *fascicularis*.

*Menaethiops fascicularis* (Krauss)

Fig. 8.

1843. Krauss, Südafr. Crust., p. 50, pl. 3, fig. 5, *a-d* (*Pisa f.*).

1886. Miers, *Challenger* Rep., xvii, p. 56 (*Hyastenus?*).

1910. Stebbing, *l. c.*, p. 288 (*Pisa f.*, sed incert. sedis).

1918. *Id.*, Ann. Durban Mus., ii, p. 50 (*Hyastenus f.*).

1921. *Id.*, Ann. S. Afr. Mus., xviii, p. 454 (*Blastus f.*).

1929. Balss, *l. c.*, p. 9, fig. 3.

Carapace with regions well defined, covered with close short pile, and numerous tufts of hooked setae. Rostral prongs rather short and stout, porrect. Inter-antennular tooth inconspicuous. Supra-orbital ridge not very prominent, rounded or feebly angulate anteriorly, and posteriorly continued into the post-ocular tooth without any slit; post-ocular tooth flattened dorso-ventrally, denticulate, not hollowed. A small tubercle on hepatic region (easily overlooked), 2-3 flattened denticles on subhepatic region, and a row of denticles from outer angle of buccal cavity across pterygostomial region. Outer apex of the broad basal joint of ant. 2 strongly produced, visible in dorsal view; a small denticle at inner (ventral) apex, and another just external to opening of antennal gland; whole outer margin minutely serrulate. Eye-stalk well developed, for most part visible in dorsal view. Cheliped in ♂ short, 3-4 rows of tubercles on 4th and 5th joints, hand somewhat inflated, smooth and glabrous, finger and thumb gaping at base. 2nd leg not much longer than others; dactyls (incl. that of 2nd leg) with a row of rather prominent denticles on inner margin. Sternum of ♂ evenly convex, without hollows at bases of legs. Abdomen of ♂ with 6th segment wider than 5th.

Length 9 mm., breadth 7 mm. Drab with numerous red dots on carapace when cleaned, finger and thumb of chelipeds blotched or banded with bright crimson.

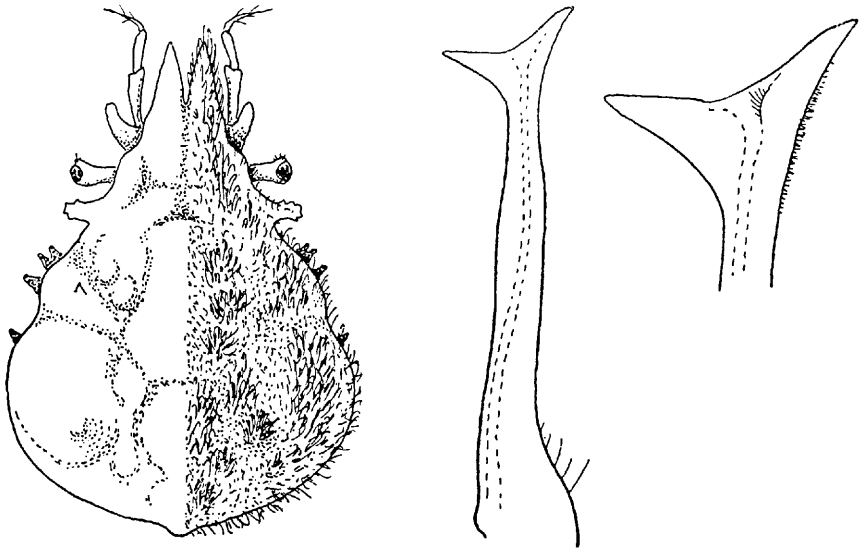


FIG. 8.—*Menaelthiops fascicularis* (Krauss). Carapace, partly cleaned, and 1st pleopod ♂.

*Localities*.—Natal (Krauss); Durban (Stebbing, and S. Afr. Mus.); Umhlali, Umtwalumi, and Impengazi (Natal and Zululand) (coll. T. A. Stephenson).

*Distribution*.—Mauritius (Richters).

*Remarks*.—Miers noticed that Krauss' figure shows the orbit entire above, which is correct, but which excludes the species from the genus *Hyastenus*.

#### Gen. HUENIA de Haan

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 194 (references).

Carapace depressed, elongate triangular in ♂, with large lateral branchial lobe, with or without lateral hepatic teeth; subquadrangular in ♀ with large foliaceous hepatic and branchial lobes. Supra-orbital spine present, post-ocular tooth absent. Rostrum simple, more or less acute, laterally compressed. Eyes very small, almost immovable. Chelipeds moderately developed in ♂. 2nd leg rather long, especially in ♂, the others short, 6th joint with tuft of setae on a slight projection

near end of inner margin, best developed on 2nd leg; dactyls short, stout, not much curved, inner margin doubly serrate. Abdomen with 7 segments in ♂, 5 in ♀ (4th-6th segments fused).

*Huenia proteus* de Haan

Fig. 9, *a-f*.

1865. Milne Edwards, Ann. Soc. Entom. Fr. (4), v, p. 143, pl. 4, fig. 2 (*grandidieri*).

1884. Miers, Crust. H.M.S. *Alert*, pp. 191 and 520 (*pacifica*).

1893. Stebbing, Hist. Crust., p. 107, figs. 5-7.

1894. Ortmann, Semon's Austral. Reise, v, p. 39 (*grandidieri* kept separate from *proteus*).

1895. Alcock, *l. c.*, p. 195.

1902. de Man, Abh. Senckenb. Ges., xxv, p. 662.

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 342, pl. 47, figs. 2, 2, *a-c* (*grandidieri*).

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 249.

1915. Stebbing, Ann. S. Afr. Mus., xv, p. 57.

1917. *Id.*, Ann. Durban Mus., i, p. 435.

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120.

1927. Hale, Crust. S. Austral., pt. 1, p. 133, fig. 132.

Carapace very variable in shape, but depressed, with 2 low prominences in middle line. Rostrum short or rather long. Finger and thumb of cheliped in adult ♂ gaping at base, in ♀ and young ♂ with their opposed margins meeting for nearly whole length.

Length up to 30 mm.

*Localities*.—Durban (Stebbing); Delagoa Bay (Barnard).

*Distribution*.—East coast of Africa, Indo-Pacific to Australia, China, Japan, Fiji Is. 0-80 fathoms.

*Remarks*.—The ♀ is mostly found on the calcareous Green Alga *Halimeda*, the segments of which it resembles in shape; the ♂ apparently roams about more freely. *Halimeda* is recorded as far south as Algoa Bay.

The closely allied *Trigonothir* (= *Simocarcinus*) *pyramidatus* occurs at Mauritius (*cf.* Balss, Medd. Göteborg. Mus., lxxv, p. 18, 1938).

Gen. MENAETHIUS M. Edw.

1834. Milne Edwards, Hist. Nat. Crust., i, p. 338.

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 197.

Carapace triangular or pyriform, ♀ without foliaceous lateral lobes, surface tuberculate. Supra-orbital tooth strong, horizontal, laminar; post-ocular tooth absent. Rostrum simple, acute, dorso-ventrally depressed. Eyes short, but projecting slightly beyond margin of

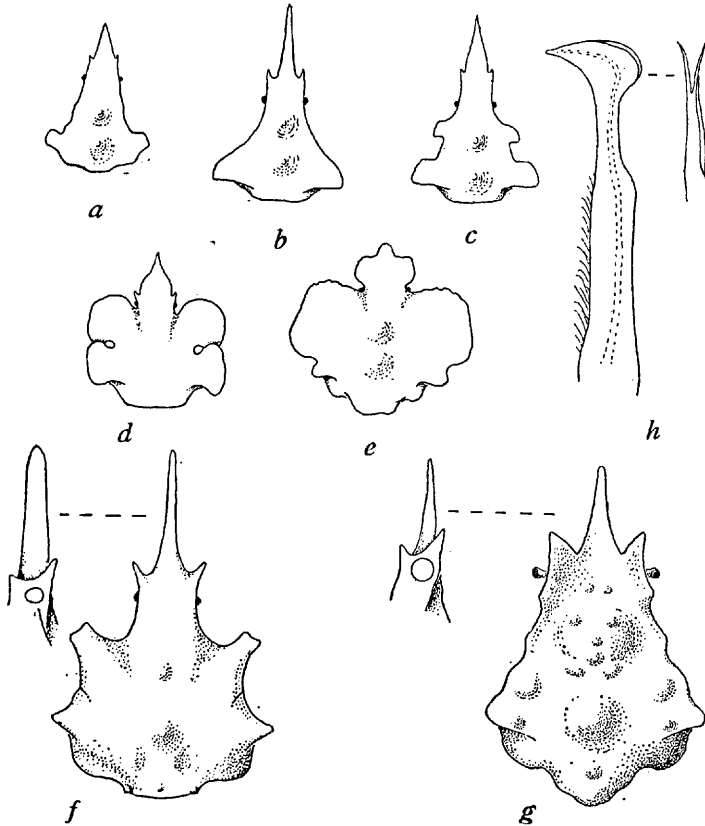


FIG. 9.—*Huenia proteus* de Haan. *a-c*, outlines of ♂. *d, e*, outlines of ♀. *f*, carapace of ♀ from Dclagoa Bay, with side view of rostrum. *Menaethius monoceros* (Latr.). *g*, carapace, with side view of rostrum. *h*, 1st pleopod (right) ♂, with internal view of apex.

(*a, c, d*, after Stebbing, 1893. *b, e*, after Borradaile, 1903. *a* is a juvenile.)

carapace. Chelipeds in ♂ well developed, finger and thumb gaping at base. Legs short, 2nd longest, 6th joint cylindrical, with tuft of setae on inner margin, dactyls not strongly curved, with double row of serrations on inner margin. Abdomen in ♂ with 7, in ♀ with 5, segments.



*Menaethius monoceros* (Latr.)

Fig. 9, *g*, *h*.

1830. Rüppell, Krab. Roth. Meer., p. 24, pl. 5, fig. 4, pl. 6, fig. 19 (*Inachus arabicus*).

1875. Paulson, Red Sea Crust., p. 6, pl. 2, figs. 2, 3, *a*, *b*, 4 (and var. *subserratus*).

1894. Ortmann, Semon's Austral. Reise, v, p. 39.

1895. Alcock, *l. c.*, p. 197 (references).

1902. de Man, Abh. Senckenb. Ges., xxv, p. 662.

1904. Doflein, D. Tiefsee Exp., vi, p. 78.

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 343.

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 25, pl. 3, fig. 6 (*subserratus* and *dentatus*), p. 26 (*depressus*).

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 249.

1931. Chopra, Rec. Ind. Mus., xxxiii, p. 324.

1942. Ward, Mauritius Inst. Bull., ii, p. 72.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 105, fig. 20, A (plp. 1 ♂).

The rather strongly tuberculate carapace and the strong laminate supra-orbital teeth distinguish this crab from triangular-shaped examples of *H. proteus*. The lateral projections are often stronger and more dentiform than in the specimen here figured, which corresponds with Ruppell's figure.

Length up to 26 mm.

*Localities*.—Mozambique Island (K.H.B. coll. 1912); Zululand coast (S. Afr. Mus.); Delagoa Bay (van der Horst coll., also Lourenzo Marques Mus.).

*Distribution*.—Red Sea, East coast of Africa, Mauritius, Indo-Pacific to Australia, China, Fiji, Sandwich Is.

Gen. DEHAANIUS McLeay

1910. Stebbing, *l. c.*, p. 287.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 99 (*Acanthonyx*) (key to Indo-Pacific species).

Carapace more or less quadrangular or shield-shaped, the lateral hepatic tooth, and the branchial tooth when present, horizontal, laminar, more or less produced; surface smooth or the regions feebly marked. Rostrum bifid. Supra-orbital tooth well developed; post-

ocular tooth present or absent. Chelipeds larger in ♂ than in ♀. Legs short, robust, subchelate, the 6th joint having a setiferous projection on inner margin against which the dactyl impinges, inner margin of dactyls with double row of serrations. Abdomen with 7 segments in ♂, 5 in ♀, 4th–6th segments fused, the sutures obsolete or indistinct.

*Remarks.*—Apparently the only difference between this genus and *Acanthonyx* is the 7 segmented ♂ abdomen. The genotype of *Acanthonyx* (*A. lunulatus*) has a 6-segmented ♂ abdomen and no post-ocular tooth. The latter character obviously has little generic value. Ortmann saw no reason for maintaining *Dehaanius*, and Stephensen inclines to the same opinion.

*Key to the South African Species.*

1. Post-ocular tooth present.
  - a. Carapace subtriangular, (antero-) lateral margins diverging posteriorly.
    - i. Two large triangular (hepatic and branchial) lateral teeth . . . . . *dentatus*.
    - ii. Three subequal teeth behind the hepatic tooth . . . . . *4-dentatus*.
  - b. Carapace shield-shaped, sides nearly parallel . . . . . *undulatus*.
2. Post-ocular tooth absent. Carapace shield-shaped, sides nearly parallel . . . . . *scutellatus*.

*Dehaanius dentatus* (M. Edw.)

Fig. 10, *a, b*.

1838. McLeay, *Annulosa S. Afr.*, pp. 57 and 58, pl. 3, figs. *a–c* (*acanthopus*).

? 1862. Milne Edwards, *F. carc. Réunion*, p. 7, pl. 17, fig. 3 (*consobrinus*).

1875. Paulson, *Red Sea Crust.*, p. 7, pl. 3, fig. 1 (*consobrinus*, ? non M. Edwards).

1894. Ortmann, *Semon's Austral. Reise*, v, p. 39.

? 1895. Alcock, *J. Asiat. Soc. Bengal*, lxiv, p. 199 (*consobrinus*) (quotes Heller).

1910. Stebbing, *l. c.*, p. 287 (references).

1914. Lenz and Strunck, *D. Südpol Exp.*, xv, p. 277.

1920. Stebbing, *Ann. Durban Mus.*, ii, p. 264, pl. 28, fig. B (*Pugetia quadridens*, non de Haan).

1923. Odhner, *Med. Göteb. Mus.*, xxxi, p. 26.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 362.

Rostral prongs rather long and usually rather slender. Carapace with regions fairly well defined in most specimens, with several small setiferous tubercles in young (Stebbing, 1920, fig.), which mostly become obsolete in adult, but 2 on anterior gastric region usually

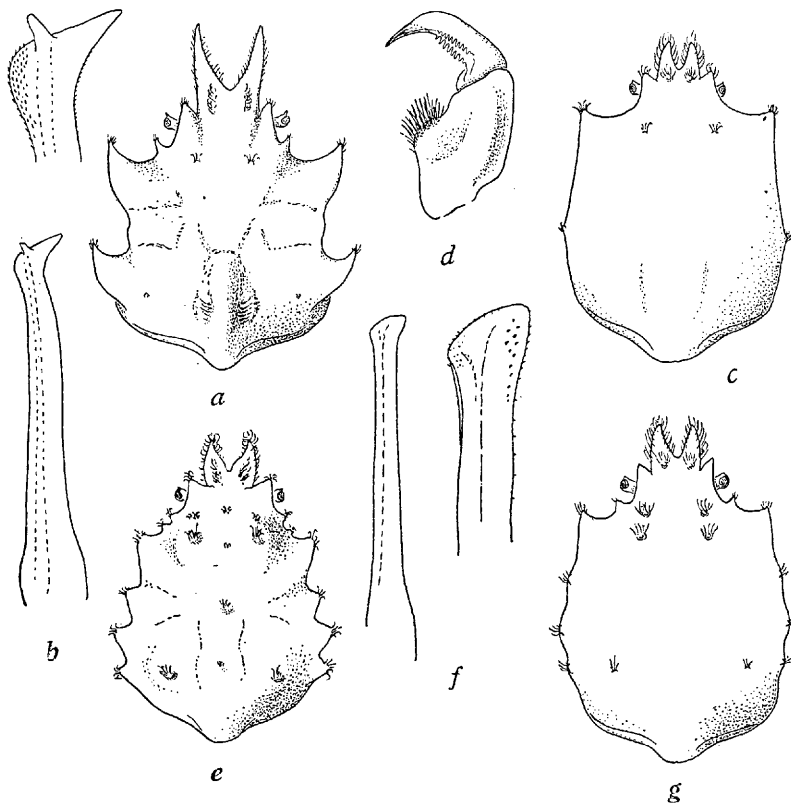


FIG. 10.—*Dehaanius dentatus* (M. Edw.). *a*, carapace. *b*, 1st pleopod ♂, apex further enlarged (*scutellatus* and *undulatus* are similar).  
*Dehaanius scutellatus* (McLeay). *c*, carapace. *d*, lower surface of 6th joint and dactyl of leg, dactyl drawn somewhat obliquely to show double serration.  
*Dehaanius 4-dentatus* (Krauss). *e*, carapace. *f*, 1st pleopod ♂, apex further enlarged.  
*Dehaanius undulatus* Brmd. *g*, carapace.

present; lateral hepatic and branchial teeth large, acute, with sometimes a small blunt projection or a sharp denticle between them. Post-ocular tooth present. Outer apex of basal joint of ant. 2 acute, shortly spiniform. Eye-stalk with small tubercle on anterior apex. Carapace, sternum, abdomen, chelipeds, and legs covered with short

close pile, the lateral points of carapace and the tubercles with hooked setae.

Length up to 25 mm., breadth 20 mm., ♀ slightly smaller. Smallest specimen examined 6 mm. Various shades of brown, olive, russet, red, or maroon, often mottled with white, legs often banded; or cream with red markings; according to the colour of the surrounding habitat.

*Localities.*—False Bay (Stimpson, Miers, Stebbing, Lenz and Strunck); Walker Bay, 43 metres (Odhner); Algoa Bay (Ortmann, Stebbing); Natal (Krauss); off Tugela R., Natal (Stebbing); False Bay to East London and Natal, 0–22 fathoms (S. Afr. Mus.); off Cape Point, 145 fathoms (S. Afr. Mus. label *sic*, obviously an error).

*Distribution* (of *consobrinus*).—Red Sea; Réunion; Madras.

*Remarks.*—Both Paulson and Stebbing regarded the Red Sea specimens as synonymous with *4-dentatus*. Paulson's figure, however, seems obviously to represent a specimen of *dentatus*. I have not seen Milne Edwards' figure of *consobrinus* from Réunion. Heller's description will not fit (*e.g.* no post-ocular tooth). The true *4-dentatus*, however, is quite distinct not only in the carapace characters, but also in the 1st pleopod ♂. In regard to this last character *dentatus*, *scutellatus*, and *undulatus* are more closely allied to each other than to *4-dentatus*.

I have seen the specimen identified by Stebbing as *Pugetia quadridens*; it is merely a young *D. dentatus*.

#### *Dehaanius 4-dentatus* (Krauss)

Fig. 10, *e, f*.

1843. Krauss, Südafrik. Crust., p. 49, pl. 3, fig. 7, *a-c* (name written as above).

1894. Ortmann, Semon's Austral. Reise, v, p. 39.

1910. Stebbing, *l. c.*, p. 288 (references, excluding Paulson's *consobrinus*).

1918. *Id.*, Ann. Durban Mus., ii, p. 49.

Rostral prongs rather short and stout. Carapace smooth, subtriangular, hepatic tooth moderately well developed, behind which 3 subequal triangular teeth, all setiferous. Post-ocular tooth present, and a small denticle between it and the hepatic tooth. Two tubercles at base of rostrum, 4 on gastric region (sometimes only 2), 2 on

posterior branchial region and 4 medio-dorsal, all bearing hooked setae. Other characters, except 1st pleopod ♂ (fig. 10f), as in *dentatus*.

Length up to 23 mm., breadth 10 mm. Yellowish brown.

*Localities*.—Natal (Krauss); Isipingo, Natal (Stebbing); East London, Durban, Delagoa Bay (S. Afr. Mus.).

*Distribution*.—Dar-es-Salaam (Ortmann); Mauritius (S. Afr. Mus.).

*Remarks*.—With the exception of Ortmann's and Stebbing's records, this species does not seem to have been reported since Krauss' time.

*Dehaanius undulatus* Brnrd.

Fig. 10, b, g.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 361.

Rostral prongs rather short and stout. Carapace smooth, shield-shaped, hepatic tooth moderately well developed, behind which the lateral margin is undulate with 3 blunt and feeble, setiferous denticles. Post-ocular tooth present. Two tubercles at base of rostrum, 4 on gastric region and 2 on posterior branchial regions, all setiferous. Other characters as in *dentatus*.

Length up to 17 mm., breadth 11–12 mm.

*Localities*.—Durban (S. Afr. Mus.); Delagoa Bay (K.H.B. coll. 1912).

*Remarks*.—Resembles *Acanthonyx lunulatus* (Risso) (see Monod, 1933, Bull. Com. Et. sci. Afr. occid. Franç., xv, fig. 7, D) in general shape, but has 3 tubercles on lateral margin and a post-ocular tooth.

*Dehaanius scutellatus* (McLeay)

Fig. 10, b, c, d.

1838. McLeay, Annulosa S. Afr., p. 57 (*Acanthonyx s.*).

1843. Krauss, Südafr. Crust., p. 47, pl. 3, fig. 6, a–c (*A. macleayi*).

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 199 (*A. macleayi*).

1910. Stebbing, l. c., p. 288 (*macleayi*).

1910. *Id.*, *ibid.*, p. 288 (*Epialtus scutellatus*).

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120 (*macleayi*).

1947. *Id.*, Ann. Mag. Nat. Hist. (xi), 13, p. 362.

Rostral prongs rather short and stout. Carapace smooth, shield-shaped, nearly parallel-sided; hepatic tooth well developed, behind which lateral margin is nearly straight with a feeble setiferous tubercle. Post-ocular tooth absent. Two setiferous tubercles at base of rostrum

and 2 feeble ones on gastric region. Outer apex of basal joint of ant. 2 blunt. Other characters as in *dentatus*.

Length up to (♀) 21 mm., breadth 15 mm.

*Localities*.—Natal (Krauss); Isipingo, Port Shepstone, Durban, and Delagoa Bay (S. Afr. Mus.).

*Distribution*.—Karachi (Alcock); Mauritius (S. Afr. Mus.).

*Remarks*.—McLeay stated that a tooth was present at the "external angle of orbit." If the specimen is viewed from the side, the anterior angle of orbit might be regarded as external. Krauss evidently assumed that the posterior angle of the orbit as seen in dorsal view was the "external" angle and consequently instituted a new species for his specimens, although he fully recognized the close similarity between them and McLeay's description. That both authors are referring to one and the same species is confirmed by the photograph of McLeay's type specimen in the Sydney Museum, for which I have to thank Mr. Melbourne Ward.

#### FAMILY BLASTIDAE.

1910. Stebbing, *l. c.*, p. 288.

The basal joint of ant. 2 is broad as in *Acanthonychidae* but the orbits are more completely developed, the post-ocular tooth being always present, and hollowed for reception of the cornea.

#### *Key to the South African Genera.*

1. Rostrum shortly triangular with apical slit . . . . . *Doclea*.
2. Rostrum with 2 long spines, separate from base, and more or less divergent apically.
  - a. Supra-orbital ridge well separated from the post-ocular tooth.
    - i. Carapace (in the S. African species) with flat-topped tubercles. Rostral spines simple (fig. 11, b) . . . . . *Scyramathia*.
    - ii. Carapace without flat-topped tubercles. Rostral spines with accessory spine on inner margin towards apex (fig. 11, d, e) . . . . . *Naxioides*.
  - b. Supra-orbital ridge closely approximate to post-ocular tooth, separated by a narrow, more or less closed, keyhole shaped slit.
    - i. Carapace with a few slender spines. Chelipeds and legs not strongly tuberculate . . . . . *Hyastenus*.
    - ii. Carapace, chelipeds, and legs strongly tuberculate, tubercles on carapace mostly flat-topped . . . . . *Eurynome*.

Gen. *DOCLEA* Leach

1895. Alcock, J. *Asiat. Soc. Bengal*, lxiv, p. 225.

1918. Rathbun, *Biol. Res.* "Endeavour," v, p. 16.

1929. Balss, *l. c.*, p. 14.

1935. Chopra, *Rec. Ind. Mus.*, xxxvii, pp. 467 *sqq.*, fig. 1  
(♂ pleopods of 4 species).

Carapace subcircular, with lateral and often also dorsal spines. Rostrum shortly triangular, apically notched or bifid. No supra-orbital tooth. Post-ocular tooth hollowed, separated from supra-orbital ridge by a narrow slit. Eyes small. Antenna 1 short; basal joint of ant. 2 produced in a sharp tooth at outer apex; flagella of both antennae much reduced. Chelipeds larger in ♂ than in ♀. Dactyls of walking legs long, especially in 2nd leg, smooth. Abdomen with 7 segments in ♂, 7 or 4 in ♀.

*Doclea muricata* (Herbst)

Fig. 11, *a.*

1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 232.

A medio-dorsal line of tubercles or short spines from base of rostrum to hind margin of carapace, the spine on the hind margin being the largest; antero-lateral margin with 4 spines; 2 spines, one behind the other, on branchial region, and some small tubercles between branchial and gastric regions. A denticulate flat tooth at angle of buccal cavity. Pterygostomial region not longitudinally channelled (external to 3rd maxilliped). Abdomen of ♀ with 4 segments (3rd-6th segments fused). Carapace, chelipeds, and legs (except hands of chelipeds and dactyls of legs) covered with very close short velvety pile.

Length 38 mm., breadth (excl. spines) 29 mm.

*Locality.*—Off Port Shepstone, Natal, 34 fathoms (Stebbing); Delagoa Bay (Lourenzo Marques Mus.).

*Distribution.*—Indo-Pacific.

Gen. *SCYRAMATHIA* M. Edw.

1910. Stebbing, *l. c.*, p. 289.

Carapace triangular or pyriform, with spines and tubercles, the lateral hepatic and branchial ones being prominent. Rostrum of 2 long, slender simple spines, separated at their bases and usually

divergent. Supra-orbital tooth or spine present. Post-ocular tooth usually not much hollowed, separated by a distinct gap from supra-orbital ridge. Eyes small. Chelipeds in adult ♂ considerably elongated; 2nd leg markedly longer than the others. Abdomen with 7 segments in both sexes.

*Remarks.*—Deep and moderately deep water in the Atlantic and Indian Oceans.

*Scyramathia hertwigi* Doflein

Fig. 11, b, c.

1902. Stebbing, Mar. Invest. S. Afr., ii, p. 7, pl. 6.

1910. *Id.*, l. c., p. 289.

Rostral spines  $\frac{1}{2}$  (very young, 8 mm. carapace length),  $\frac{2}{3}$  or  $\frac{1}{3}$  (juv. 15 mm.) to  $\frac{1}{4}$  or  $\frac{1}{6}$  (adult) length of rest of carapace, subparallel or feebly diverging. Lateral hepatic and branchial spines conical and acute in juv., becoming blunted and flattened in adult, the hepatic spine flattened on outer side, the branchial on hinder side; median anterior gastric spine and spine on hind margin of carapace remain more or less acute throughout life; the tubercles on postero-gastric, branchial and cardiac regions are flat-topped in young (12 mm. length) except the one on branchial region flanking the cardiac tubercle; in smallest specimen examined (8 mm.) the tubercles are bluntly conical and the lateral hepatic and branchial spines very slender; the externally flattened post-ocular tooth joined to the hepatic tooth by a blunt ridge in juv., by a keeled ridge in adult. Cheliped in ♂, 4th and 5th joints with 2 denticulate keels dorsally, and one ventrally on 4th joint, 6th joint with keeled upper edge; hand, finger, and thumb minutely and closely granulate; in ♀ all ridges much less developed and without denticles on 4th and 5th joints. 2nd-5th legs smooth, lower margin of dactyls of 3rd-5th legs with a row of minute spaced denticles (at all ages). Whole body, chelipeds (except finger and thumb), and legs (except ungues) closely covered with vesicular setae, mixed with ordinary setules on the dactyls; longer hooked setae on rostral prongs, on 2 patches on gastric region, and on sides below the hepatic and branchial spines. Eggs small and very numerous.

Length up to ♂ 63 mm., ♀ 43 mm., breadth (at level of, but excl. lateral branchial spines) ♂ 40 mm., ♀ 25 mm., cheliped, ♂ 160 mm., ♀ 42 mm. Buff or pale greyish.

*Localities.*—Off Cape Peninsula, 140 fathoms (Stebbing); off Cape



Point and on Agulhas Bank as far east as 23° E., 318–500 metres (Doflein); off Table Bay, Cape Peninsula and Cape Point, as far south as 36° 40' S., 21° 26' E., 140–230 fathoms (S. Afr. Mus.).

*Remarks.*—Very close to and possibly only a subspecies of *carpenteri* (Norman) which occurs in the N. Atlantic from the Shetlands to the

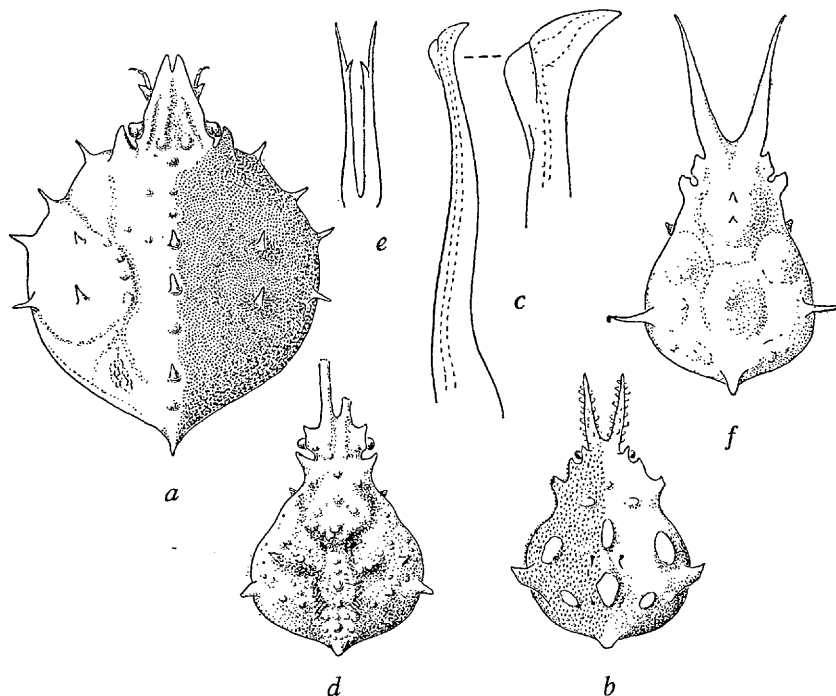


FIG. 11.—*Doclea muricata* (Herbst). *a*, carapace, pile cleaned off left side. *Scyramathia hertwigi* Doflein. *b*, carapace, partly cleaned. *c*, 1st pleopod ♂. *Nazioides hirta* M. Edw. *d*, carapace, rostral prongs broken (copy from Hilgen-dorf, 1878). *e*, rostral prongs of *N. robillardi* Miers to show accessory spinules (copy from Miers, 1882). *Hyastenus spinosus* M. Edw. *f*, carapace, cleaned.

Azores. *S. hertwigi* is distinguished by its shorter and less divergent rostral spines; in this respect the young are nearer to *carpenteri* than the adults (*cf.* figure in M. Edwards and Bouvier, 1899, Res. Sci. Camp. Monaco, xiii, pl. 1, fig. 4).

Common on the Stock-fish grounds north-west of Table Bay. Most examples are covered with Hydroids, Tunicates, or Sponges, sometimes nearly completely enveloped in a sponge.

The Bopyrid parasite *Scyrracepon levis* Brnrd. 1940 is found in the branchial cavity.

## Gen. NAXIOIDES M. Edw.

1865. Milne Edwards, Ann. Soc. entom. Fr. (4), v, p. 142.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 784 (*Podopisa*).

1894. Ortmann, Semon's Austral. Reise, v, p. 42 (*Naxia*, part, key to species).

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 216 (*Naxia*, part).

1929. Balss, *l. c.*, p. 14.

Carapace pyriform. Rostral spines subparallel or divergent, with a small accessory spine on inner (upper) margin near apex. Supra-orbital ridge prominent, anteriorly more or less spiniformly produced. Post-ocular tooth unequally bi- or tri-lobed. Cheliped larger in ♂ than in ♀; legs smooth and rather slender, 2nd leg longer than others. Abdomen in ♂ with 7 segments, in ♀ with some of the segments coalesced.

*Remarks.*—Distinguished from *Hyastenus* by the accessory spinules on the rostral spines.

Ortmann and Alcock place *Naxioides* as a synonym of *Naxia*.

*Key to the South African [Mauritian] Species.*

1. Carapace with comparatively few and rather blunt tubercles.
  - a. No spine at end of 4th joint of 2nd–5th legs . . . *hirta*.
  - b. A spine at end of 4th joint of 2nd leg, and a knob on end of 4th joint of 3rd leg . . . [*spinigera*].
2. Carapace with numerous sharp spines. A spine at end of 4th joint of 2nd–5th legs . . . [*robillardii*].

*Naxioides hirta* M. Edw.

Fig. 11, *d*.

1865. Milne Edwards, *l. c.*, p. 143, pl. 4, fig. 1.

1878. Hilgendorf, *l. c.*, p. 785, pl. 1, figs. 1–5 (*Podopisa petersii*).

1884. Miers, Zool. H.M.S. *Alert*, p. 523 (*petersii*).

1887. de Man, J. Linn. Soc. Lond., xxii, p. 19 (*petersii*).

1895. Alcock, *l. c.*, p. 218.

1903. Borradaile, F. Geogr. Mald. Laccad. Archip., ii, p. 687.

1910. Lenz. Voeltzkow Reise Ostaf., ii, p. 541 (*Naxia h.*).

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 253.

1942. Ward, Mauritius Inst. Bull., ii, p. 73.

Rostral spines nearly parallel. Carapace with regions well defined, unevenly granular and tubercular; 2 stout spines on each branchial region, a large median tubercle on hind margin, and a smaller one

laterally on pterygostomial region. Supra-orbital spine obsolete. Basal joint of ant. 2 with stout spine at outer apex and a tooth in middle of outer border. No spine at apex of 4th joint of 2nd-5th legs.

Length (to fork of rostrum) 46 mm., breadth 33 mm.

*Locality*.—Mozambique (Hilgendorf).

*Distribution*.—Mauritius, Zanzibar, Amirante Is., Seychelles, Maldives and Laccadives, Ceylon, Andaman Is., Philippine Is.

*Remarks*.—*N. robillardi* Miers (1882, Proc. Zool. Soc. Lond., p. 339, pl. 20, figs 1, 1, a-c) from Mauritius, differs in having more numerous and sharper spines on carapace, and a spine at end of 4th joint on 2nd-5th legs.

Gen. HYASTENUS White

1847. White, Proc. Zool. Soc. Lond., p. 56.

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 206.

1894. Ortmann, Semon's Austral. Reise, v, p. 41 (key to species).

1913. Calman, Ann. Mag. Nat. Hist. (8), xi, p. 313 (validity of name).

1917. Stebbing, Ann. S. Afr. Mus., xvii, p. 25.

1938. Monod, Mem. Inst. d'Égypte, xxxvii, p. 103, fig. 4 (figures of plp. 1 ♂).

[*Halimus* Rathbun 1897, Stebbing 1908 and 1910, not Latreille.]

Carapace pyriform. Rostral spines long, divergent, without accessory spinules. Supra-orbital ridge prominent, anteriorly more or less spiniformly produced, separated from the post-ocular tooth by a narrow, often half-closed or keyhole-shaped slit. Basal joint of ant. 2 broad, outer apex sometimes acutely produced. Chelipeds in ♂ enlarged; 2nd leg usually much longer than the others. Abdomen with 7 segments in both sexes.

*Hyastenus spinosus* M. Edw.

Fig. 11, f.

? 1851. Bianconi, Spec. Zool. Mosambic, fasc. 5, p. 75 (*Chorinus aries* M. Edw.).

1872. Milne Edwards, Nouv. Arch. Mus. Paris, viii, p. 250.

? 1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 786 (*C. aries*).

1895. Alcock, *l. c.*, p. 211.

1910. Stebbing, *l. c.*, p. 285 (*Halimus diacanthus*, non de Haan).

1917. *Id.*, *l. c.*, p. 25 (*uncifer* non Calman).

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120 (*diacanthus* var. *spinosus*).

Rostral spines  $\frac{1}{2}$ – $\frac{2}{3}$  length of rest of carapace, shorter in ♀. Carapace (when denuded) smooth and polished, 2 median spines, or a spine and a tubercle, on gastric region, a low truncated prominence on cardiac region, a strong median spine near hind margin, a strong spine on the branchial region projecting laterally, a tooth on subhepatic region. Supra-orbital ridge anteriorly shortly acute. Outer apex of basal joint of ant. 2 quadrate but not acutely produced. Dactyls of legs with a single row of denticles on inner margin, except on 2nd leg where there are only 2–3 apically. Sternum of ♂ with deep hollows at bases of legs.

Length up to 80 mm., breadth (incl. branchial spines) 48 mm. Reddish or brownish.

*Localities*.—Mozambique (M. Edwards); Natal (Stebbing and S. Afr. Mus.); Delagoa Bay (Barnard).

*Distribution*.—Fiji.

*Remarks*.—I have examined the specimen recorded as *uncifer* and find none of the special characters of Calman's species; it does not differ in any way from the specimen previously identified by Stebbing as *diacanthus*. The locality of this specimen was given as "Umsinduzi River, Pietermaritzburg," but it is unlikely that this species is found so far up a river in perfectly fresh water.

In the smallest specimens examined (9 mm. long) the tubercles on the gastric region are undeveloped and the median one on hind margin is very feeble; at 20 mm. the gastric tubercles are just developed.

Ward (1942) records *uncifer* from Mauritius.

#### Gen. EURYNOME Leach

1879. Miers, J. Linn. Soc. Lond., xiv, p. 659.

1884. *Id.*, Zool. H.M.S. *Alert*, p. 523.

1894. Milne Edwards and Bouvier, Res. Sci. Camp. Monaco, vii, p. 14.

1906. Baker, Trans. Proc. Roy. Soc. S. Austral., xxx, p. 108.

1910. Stebbing, *l. c.*, p. 289.

1921. *Id.*, Ann. S. Afr. Mus., xviii, p. 454.

1929. Balss, *l. c.*, p. 12.

Carapace pyriform, covered with granules and tubercles, but few spines. Rostral prongs flattened (dorso-ventrally), divergent, apically acute. Eye-socket deep, eyes completely retractile. A slight notch between base of rostrum and supra-orbital ridge, but no supra-orbital tooth. Post-ocular tooth separated from supra-orbital ridge by a

narrow slit containing a small denticle. Basal joint of ant. 2 broad at base, longitudinally grooved, outer apex not produced. Chelipeds in ♂ elongate, rather robust; walking legs short; chelipeds and legs more or less granulate or carinate. Abdomen with 7 segments in both sexes.

*Remarks.*—This genus is allied to *Hyastenus* although the chelipeds resemble those of the *Parthenopidae*.

*Key to the South African Species.*

1. Legs tuberculate and carinate. 5 tubercles on either side of the central one on cardiac region . . . . . *aspera*.
2. Legs smooth, but with a thin carina on 4th joint. Tubercles more numerous and more equal in size, without definite arrangement on cardiac region . . . . . *elegans*.

*Eurynome aspera* (Penn.)

Fig. 12, a-c.

1777. Pennant, Brit. Zool., iv, p. 13, pl. 10, fig. 3 (*Cancer asper*).  
1853. Bell, Brit. Stalk-eyed Crust., p. 46, fig.  
1857. Stimpson, Proc. Ac. Nat. Sci. Philad., ix, p. 220 (*longimana*).  
1893. Rathbun, Proc. U.S. Nat. Mus., xvi, p. 102, pl. 8, fig. 1 (*longimana*).  
1900. Milne Edwards and Bouvier, "Talisman" Crust., i, p. 125, pl. 19, figs. 7-15 (literature, synonymy).  
1904. Doflein, D. Tiefsee Exp., vi, p. 79.  
1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 27, pl. 4, fig. 2, (*longimana*).  
1910. Stebbing, *l. c.*, p. 289 (*longimana*).  
1914. Lenz and Strunck, D. Südpol Exp., xv, p. 275 (*longimana*).  
1918. Pesta, Dekapoden Adria., p. 352.  
1923. Odhner, Medd. Göteb. Mus., xxxi, p. 20.

Rostral horns rather broad. Carapace with regions well marked, with flat-topped, mushroom-like tubercles, not very numerous nor closely crowded, more or less symmetrically arranged, but variable in size; the most constant are 4 tubercles on gastric region behind a pair of conical tubercles, a row of 5 on either side of a central one on cardiac region, and a row of 5 on hind margin, the outermost one on each side somewhat projecting, with another even larger submarginal one (making a row of 7 in all); a row on the postero-lateral margin; a flattened ridge-like tubercle, capped with 2 flat-topped tubercles on

each anterior branchial region, and a more triangular one on posterior branchial region; laterally a large triangular hepatic tooth, and 3 branchial teeth, the hindmost one subspiniform and granulate, all 4 dorso-ventrally flattened. Some of the major tubercles are sometimes enlarged, those on the gastric and cardiac regions so much so as to be coalescent, forming a shield-like tubercle (var. *scutellatus*).

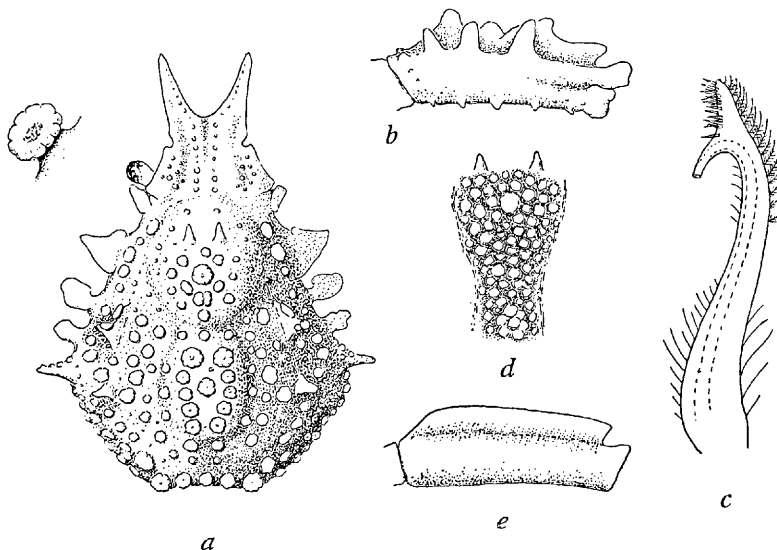


FIG. 12.—*Eurynome aspera* (Penn.). *a*, carapace ♀ (cleaned), with tubercle further enlarged. *b*, 4th joint of leg. *c*, ventral view of left 1st pleopod ♂. *Eurynome elegans* Stebb. *d*, sculpturing on portion of gastric and cardiac regions of carapace ♀. *e*, 4th joint of leg.

Supra-orbital ridge granulate, but not heavy. Chelipeds with conical tubercles and granules; legs carinate and tuberculate, 4th joint with 3 large tubercles on hind upper edge and 3–4 on front upper edge, the latter sometimes united into an undulate carina. 1st pleopod ♂ (fig. 12, *c*) with apex curving inwards (not outwards).

Length up to 14 mm., breadth 10 mm. Chalky white or pinkish, with pink or reddish specks or mottling, and bands on legs.

*Localities*.—False Bay (Stimpson, Stebbing, Lenz and Strunck); off Cape Point, 145 fathoms,\* False Bay and Agulhas Bank to Cape Natal (Durban), 24–54 fathoms (S. Afr. Mus.).

\* This specimen may be wrongly labelled; cf. *Dehaanius dentatus*; the specimens probably came from considerably shallower water.

*Distribution.*—N. Atlantic to Cape Verde Is., Mediterranean, Port Alexander, Angola, 108 metres.

*Remarks.*—Although I have made no direct comparison with European specimens of *aspera*, there seems no reason to separate *longimanus* as a distinct species. The 1st pleopod ♂ may be the crucial feature. The South African specimens, like the European ones, are very variable, and include a specimen of the var. *scutellatus* (cf. Bell, 1855, Trans. Linn. Soc. Lond., xxi, p. 305, footnote). Odhner's record from Angola bridges the gap between the West African and the Cape records.

I have seen no specimens exactly corresponding with Stimpson's figure, which shows, e.g., a V-shaped gap between the rostral horns instead of a U-shaped gap, a large triangular tooth between the lateral hepatic and branchial teeth, and the 4th joint of cheliped smooth except for 3 denticles on the inner (anterior) margin. Yet there cannot be the slightest doubt that the two forms (if the figure is correct) are identical.

*Eurynome elegans* Stebb.

Fig. 12, *d, e.*

1921. Stebbing, Ann. S. Afr. Mus., xviii, p. 454, pl. 13 (Crust., pl. 108).

♀. Rostral horns rather slender (too broad in Stebbing's figure). Carapace more oval in general outline than in *aspera*, closely covered with numerous granular tubercles (not mushroom-shaped), regions less well marked. A pair of gastric conical tubercles, a group of 3 or 4 tubercles on middle of cardiac region, not enlarged but a little more elevated than the surrounding tubercles, a pair of elevated tubercles on anterior branchial region, and one on posterior branchial region; a ridge of tubercles on hind margin. Supra-orbital ridge thickened, tabulate; post-ocular tooth more acute and projecting more forward than in Stebbing's figure. A large laminar triangular hepatic tooth laterally, followed by 4 smaller nodular projections on branchial region, the hindmost one not larger or more laterally prominent than the others. Chelipeds missing. Legs cylindrical, not tuberculate or carinate, except the 4th joint which has a thin semi-transparent keel on upper margin.

Length 10 mm., breadth 6 mm.

*Locality.*—Off Cape Vidal, Zululand, 80 fathoms (Stebbing).

*Remarks.*—Only the one ♀ known. Both in general outline and the cylindrical walking legs this species bears a likeness to the South Australian *granulosa* Baker 1906 (*l. c.*), though in the latter there are no keels on the 4th joints of the legs.

#### FAMILY MAMAIIDAE.

1910. Stebbing, *l. c.*, p. 290.

The basal joint of ant. 2 very broad, its outer apex more or less spiniformly produced. The orbits are always complete enough to conceal the retracted cornea.

#### *Key to the South African Genera.*

##### 1. Rostrum horizontal.

###### *a.* Rostral prongs short.

i. Eye-stalk slender, curved, cornea oblique, more ventral than terminal . . . . . *Mamaia*.

ii. Eye-stalk short, cornea globular, terminal (fig. 13, *b*) . . . . . *Schizophrys*.

*b.* Rostral prongs long, nearly half length of carapace . . . . . *Acanthophrys*.

##### 2. Rostrum deflexed, vertical or nearly so (fig. 13, *c*) . . . . . *Micippa*.

*Stenocionops furcata* (Oliv.) (Stebbing, *l. c.*, 1910, p. 291, and see Rathbun, *l. c.*, 1925, p. 449, pls. 160, 161) is an American species recorded by Miers from Simon's Bay. Probably an error in labelling has occurred (see Introduction, p. 3) and the species is not admitted here to the fauna-list.

#### Gen. MAMAIA Stebb.

1909. Calman in Lankester's Treatise Zool., vii, p. 316 (*Maia* Lam. 1801, non Brisson 1760, Aves).

1910. Stebbing, *l. c.*, p. 290.

Carapace broadly pyriform, regions indistinct, granular or spinose, lateral margins usually with large spines or spiniform teeth. Rostrum horizontal, of 2 rather short straight, divergent horns. Inter-antennular spine well developed. Supra-orbital ridge with hind corner produced in a spine; intermediate tooth present; post-ocular tooth strong, spiniform. Basal joint of ant. 2 with both outer and inner (ventral) apices produced in spines. Eye-stalks long, curved, cornea oval, mostly on the ventral surface. Chelipeds slender, finger and thumb styliiform. Legs not long. Abdomen with 7 segments in both sexes.



*Mamaia capensis* (Ortm.)

*Agulhas Spider-crab.*

Fig. 13, a.

1894. Ortmann, Semon's Austral. Reise, v, p. 40 (*squinado* var. *capensis*).

1908. Stebbing, Mar. Invest. S. Afr., vi, p. 3, pl. 1 (Crust., pl. 27) (*queketti*).

1910. *Id.*, l. c., p. 290 (*queketti*).

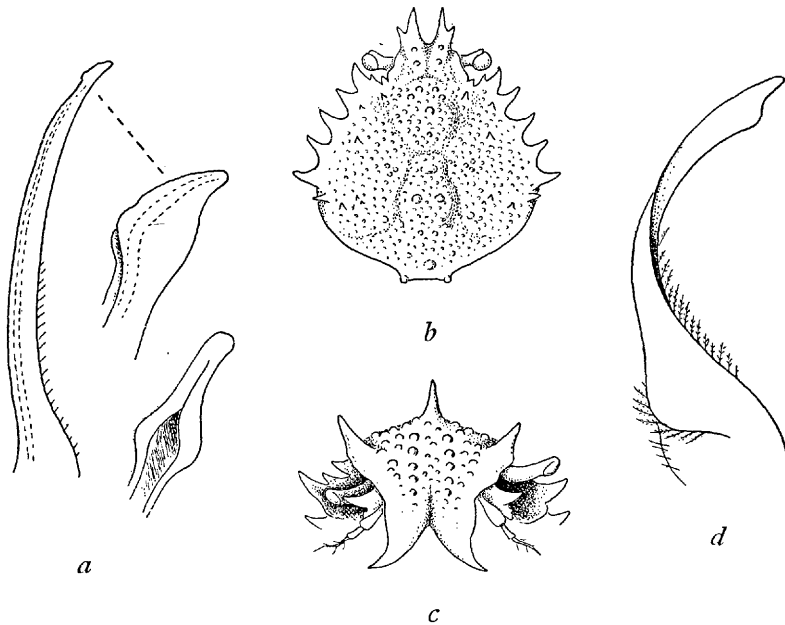


FIG. 13.—*Mamaia capensis* (Ortm.). a, 1st pleopod ♂, with inner view of apex. *Schizophrys aspera* (M. Edw.). b, carapace. *Micippa thalia* (Herbst). c, frontal view, fringe of setae on ant. 2 omitted. d, 1st pleopod ♂.

Behind the post-ocular tooth 4 marginal spine-teeth, followed by one submarginal on hinder part of branchial region; in the middle line 3 spines on gastric region, a transverse pair (Stebbing: "a stout bifid spine"), one on hinder gastric region, one on cardiac region, a transverse pair of spines and a large median one on intestinal region; an oblique row from the branchial-gastric groove; a few other irregularly placed moderate spines; rest of surface with setiferous

granules, tubercles and small spines; a pair of short spines on hind margin. Cheliped with granules on 4th and 5th joints, finger and thumb gaping at base in fully grown ♂. No prominent spine at apex of 4th joint of legs.

Length up to 145 mm., breadth (excl. lateral spines) 100 mm. Orange-red to carmine.

*Localities.*—Algoa Bay (Ortmann, Stebbing); False Bay to Algoa Bay, 16–55 fathoms (S. Afr. Mus.).

*Remarks.*—Whether this form be regarded as a variety of *squinado*, *verrucosa*, or *spinigera*, or as a separate species, Ortmann's name, which Stebbing seems to have overlooked, must be adopted in place of Stebbing's.

This crab, the largest of the South African Spider-crabs, was not obtained farther eastwards than Algoa Bay by the *Pieter Faure*, and it would seem, therefore, that Stebbing's specimen ex Durban Museum was also probably an Algoa Bay specimen (Stebbing, *l. c.*, 1908, p. 2).

*M. squinado* is recorded from as far south as the coast of Mauritania (Monod, Bull. Com. Et. sci. Afr. occid. Franc., xv, p. 52, 1933).

#### Gen. SCHIZOPHRYS White

1910. Stebbing, *l. c.*, p. 292.

Carapace broadly pyriform, regions well marked, granulate and tuberculate, lateral margins spinose. Rostrum of 2 stout spines, with 1–2 accessory spines or denticles on outer margin. Inter-antennular spine not very prominent. Intermediate tooth present, but neither it nor the supra-orbital ridge prominent. Basal joint of ant. 2 apically bifurcate. Eye-stalks short, stout, cornea globular, terminal. Chelipeds slender; legs not long. Abdomen with 7 segments in both sexes.

#### *Schizophrys aspera* (M. Edw.)

Fig. 13, *b*.

1838. McLeay, *Annulosa S. Afr.*, p. 58 (*Mithrax quadridentatus*).

1880. Richters, *Meeresf. Mauritius*, p. 143, pl. 15, figs. 8–14 (*triangularis* var. *indica*).

1910. Stebbing, *l. c.*, p. 292.

1911. Rathbun, *Trans. Linn. Soc. Lond.*, xiv, p. 254.

1917. Stebbing, Ann. Durban Mus., ii, p. 2 (references).

1927. Hale, S. Austral. Crust., pt. 1, p. 138, fig. 139.

1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 390 (*asper*).

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 108 (*dama* Herbst 1804).

Carapace breadth about  $\frac{9}{10}$  length from forking of rostrum to hind margin; surface closely and unevenly granular, with scattered acute tubercles. Post-ocular tooth bifid. Lateral margin with 5-6 spines. Corners of hind margin tuberculate, somewhat up-turned. Each rostral horn with a single accessory denticle. A conical tubercle on subhepatic region, and a smaller one in middle of lower rim of orbit. Chelipeds with 4th and 5th joints tuberculate, 6th joint smooth, finger and thumb gaping in old ♂.

Length up to 51 mm., breadth 45 mm.

*Localities*.—Durban (Stebbing); Delagoa Bay (Lourenzo Marques Mus.).

*Distribution*.—Indo-Pacific to Japan, Australia, Samoa.

*Remarks*.—A variable but easily recognized species. Ward (1942, Mauritius Inst. Bull., ii, p. 74) considers that there are several distinct species, and records Mauritian specimens under the name *serratus* White.

#### Gen. ACANTHOPHRYS M. Edw.

1834. Milne Edwards, H., Hist. Nat. Crust., i, p. 323 (*Paramithrax*).

1865. Milne Edwards, A., Ann. Soc. Entom. Fr. (4), v. p. 140 (*Acanthophrys*).

1880. Haswell, Proc. Linn. Soc. N.S.W., iv, p. 442 (*Chlorinoides*).

1906. Bouvier, Bull. Mus. d'Hist. Nat. Paris, no. 7, pp. 485 *sqq.* (*Acanthophrys*, key to species).

1929. Balss, *l. c.*, p. 19.

The above references do not indicate synonymy. I am not able to discuss whether *Acanthophrys* should be included in *Paramithrax* (*cf.* Miers, Rep. H.M.S. *Challenger*, xvii, p. 52), but it seems clear that *Chlorinoides* is a synonym of *Acanthophrys*, and that if *Chorinus aculeata* M. Edw. 1834 is included in *Acanthophrys*, as is done by Bouvier, the specific name must be changed, as the combination *Acanthophrys aculeata* is void, having been used by A. Milne Edwards in 1865, although the latter species has now become a synonym of *A. spatulifer* Hasw.

*Acanthophrys longispina* (de Haan)

1839. de Haan, Faun. Jap. Crust., p. 94, pl. 23, fig. 2 (*Maja* (*Chorinus*) *l.*).

1882. Haswell, Proc. Linn. Soc. N.S.W., vi, p. 750 (*Paramithrax coppingeri*).

1882. *Id.*, Cat. Austral. Crust., p. 15 (*Paramithrax coppingeri*).

1884. Miers, Crust. H.M.S. *Alert*, p. 522 (*Paramithrax* (*Chlorinoides*) *l.* var. *bituberculatus*).

1895. Alcock, J. Asiat. Soc. Bengal, lxiv, p. 242 (*Paramithrax* (*Chlorinoides*) *l.*).

1906. Bouvier, *l. c.*, pp. 487 (in key), 488 (and var. *spinosissima*).

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 254 (*Chlorinoides l.*).

[Not *coppingeri* Miers, 1886 = *spatulifer*. Miers misquotes the reference to *coppingeri*; the reference given is that of *Chlorinoides tenuirostris*.]

Carapace pyriform, with long (but slightly less than half length of rest of carapace) divergent rostral prongs; 5 spines in median line: 2 on gastric region, one cleft transversely on cardiac region, one on intestinal region, and one on hind margin; 2 on each branchial region; supra-ocular and pterygostomial spines prominent (for general habitus cf. *P. aculeatus* Miers, 1884, *l. c.*, pl. 18, fig. A). All the spines, including rostral prongs, terminated by button-like knobs. Upper and lower margins of 4th joint of chelipeds keeled and scalloped, upper margin of 5th joint also keeled. All walking legs with a distinct knobbed spine at apex of 4th joint. Antero-external angle of basal joint of ant. 2 produced as a curved foliaceous lobe.

*Locality*.—Mozambique, 20–25 fathoms (Bouvier: var. *spinosissima*).

*Distribution*.—Japan; Darros (Amirante) and Providence Groups (Miers and Rathbun); Ceylon, Madras, Andaman Is.; N.E. Australia; New Caledonia.

## Gen. MICIPPA Leach

1910. Stebbing, *l. c.*, p. 290.

Carapace oblong, granulate and spinose. Rostrum a broad lobe, vertically or nearly vertically deflexed, apically bifid. Supra-orbital ridge strongly arched, contiguous with post-ocular tooth, or an intermediate tooth present. Basal joint of ant. 2 broadly expanded, forming floor of orbit, and with its apex produced; mobile portion of antenna visible dorsally. Chelipeds slender; legs not long. Abdomen with 7 segments in both sexes.

*Micippa thalia* (Herbst)

Fig. 13, c, d.

1851. Bianconi,\* Spec. Zool. Mosambic, fasc. 5, p. 79 (Crust. pl. 1, fig. 2) (*aculeata*).

1869. *Id.*, *ibid.*, fasc. 19/20, p. 339 (Crust., pl. 3, fig. 1) (*pusilla*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 786 (*aculeata*), p. 787 (*pusilla*).

1910. Stebbing, *l. c.*, p. 290.

Rostrum widely notched, each lobe ending in a sharp outwardly curving tip. Carapace closely and evenly granulate; a strong spine on supra-orbital ridge, 2 in middle line on gastric region, 2 obliquely on branchial region; the hinder and outer one of the latter might be reckoned in the lateral series, which consists of 6-8 unequal and irregular spines; post-ocular tooth strongly spiniform; intermediate tooth present. All spines somewhat variable. Carapace and legs (walking) thickly covered with a woolly tomentum; margins of rostrum and the 2nd and 3rd joints of antenna 2 with thick fringe of long setae.

Length up to 40 mm., breadth (excl. lateral spines) 35 mm.

*Localities*.—Natal (Krauss, Stebbing); Mozambique (Bianconi, Miers); Delagoa Bay (coll. van der Horst).

*Distribution*.—Indo-Pacific to Japan.

*Remarks*.—*M. phillyra* var. *mascarenica* occurs at Mauritius.

FAMILY PARTHENOPIDAE.

*Calthrop Crabs.*

1910. Stebbing, *l. c.*, p. 292.

1930. Flipse, Siboga Exp. monogr., xxxix, c. 2, pp. 1-96, figs. (key to genera).

1934. Gordon, Res. Sci. Voy. Ind. orient. Néerland., iii, fasc. 15, p. 62 (*Eumedoniçae* only).

Eyes retractile in small circular orbits, whose floor is continued nearly to the front, the small gap filled by 2nd joint of ant. 2. Basal joint of latter small, embedded between lower angle of orbit and socket of ant. 1. Chelipeds usually very robust, and much larger and heavier than the walking legs.

\* Bianconi also published his species in Mem. Ac. Sci. Bologna, iii, 1851, p. 103, pl. 10, fig. 2, and ix, 1869, p. 205, pl. 1, fig. 1, respectively (references apud Alcock, 1895).

*Key to the South African Genera.*

1. Basal joint of ant. 2 nearly reaching inner angle of orbit.  
Fingers of chelipeds slightly incurved. Walking legs  
strongly tuberculate . . . . . *Parthenope*.
2. Basal joint of ant. 2 very short, not nearly reaching inner  
angle of orbit. Fingers very strongly incurved.  
Walking legs smooth or feebly tuberculate . . . . . *Platylambrus*.

## Gen. PARTHENOPE Fabr.

1905. Stebbing, J. Linn. Soc. Lond., xxix, pp. 332 *sqq.* (*Parthenope* Weber 1795 not acceptable, hence *Daldorfia* Rathbun 1904 unnecessary).

1910. *Id.*, *l. c.*, p. 292.

1930. Flipse, *l. c.*, p. 57 (key to Indo-Pacific species).

Characters as in key.

*Parthenope horrida* (Linn.)

1910. Stebbing, *l. c.*, p. 292.

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 259 (*Daldorfia h.*).

1930. Flipse, *l. c.*, p. 58.

1942. Ward, Mauritius Inst. Bull., ii, p. 76 (*Daldorfia h.*).

Carapace somewhat pentagonal, postero-lateral angles strongly produced, length nearly  $\frac{3}{4}$  the breadth; surface very rugged with deep cavities, more or less tuberculate. Rostrum short, ending below in a blunt inter-antennular tooth. Chelipeds very large and robust, one larger than the other, coarsely tuberculate. Legs stout, strongly tuberculate or spiniferous, dactyls smooth. Sternum  $\sigma$  deeply pitted, with a deep crescentic hollow between bases of chelipeds. Abdomen of  $\varphi$  with deep pits along each side.

Length up to 75 mm., breadth 102 mm. Variable in colour according to its surroundings, greyish, brownish, greenish, more or less mottled or variegated.

*Locality*.—Natal (Stebbing).

*Distribution*.—Mauritius; Indo-Pacific.

*Remarks*.—A sluggish crab, lying quietly amongst pebbles, corals, and rough ground, with which the rugged carapace and the jagged chelipeds harmonize.

Gen. LAMBRUS Leach

Subgen. *Platylambrus* Stimpson

1879. Miers, Ann. Mag. Nat. Hist. (5), iv, pp. 17, 18 (*Platylambrus* not accepted).

1910. Stebbing, *l. c.*, p. 292.

1917. *Id.*, Ann. Durban Mus., ii, p. 3.

1925. Rathbun, Bull. U.S. Nat. Mus., no. 129, p. 511 (*Parthenope* Weber, non Fabr.) and p. 516 (*Platylambrus*).

1930. Flipse, *l. c.*, p. 21 (*Lambrus*) and p. 23 (*Platylambrus*).

1939. Ward, Amer. Mus. Novit., 1049, p. 2.

Characters as in key. Particular characters of subgenus: carapace broadly triangular, broader than long, strongly carinated and tuberculate, rostrum projecting, triangular, acute, no post-ocular constriction, chelipeds with 4th and 6th joints straight (not contorted), sharply trigonal, outer margin of 4th-6th joints sharply serrated.

*Platylambrus quemvis* Stebb.

Fig. 14.

? 1851. Bianconi, Spec. Zool. Mosambic, fasc. 5, p. 81 (Crust., pl. 2, fig. 2) (*L. serratus* var. *mosambicana*).

? 1878. Hilgendorf, MB. Ac. Wiss. Berlin, p. 787 (*L. serratus* var. *mosambicana*).

1917. Stebbing, *l. c.*, p. 3, pl. 1.

1921. *Id.*, Ann. S. Afr. Mus., xviii, p. 455.

Carapace rounded behind, *i.e.* postero-lateral margins not in line with hind margin, 3 large compressed tubercles in middle line, an oblique tuberculate ridge on each branchial region, with a less distinct row of tubercles in front and another behind it; postero-lateral margin with 3 teeth decreasing in size from the outermost lateral one; hind margin with 3 teeth, the centre one usually with an accessory denticle on each side. Infra-orbital tooth entire, visible in dorsal view (when eyes are retracted). Cheliped with about 9 teeth on outer margin of 6th joint, 4 large alternating with smaller ones, 2 of the latter between the ultimate and penultimate larger ones. Legs with upper margin of 4th joint with a few (6-8) spaced denticles, the upper margin of 5th and 6th joints feebly carinate on 2nd-4th legs, but also

with a few denticles on the 5th leg (denticles obscure on 6th joint); lower margins of joints in all legs smooth. The median teeth, branchial ridge, and hollowed sternum are particularly well marked in young examples.

Length up to ♂ 28 mm., breadth 35 mm. (incl. lateral spines);

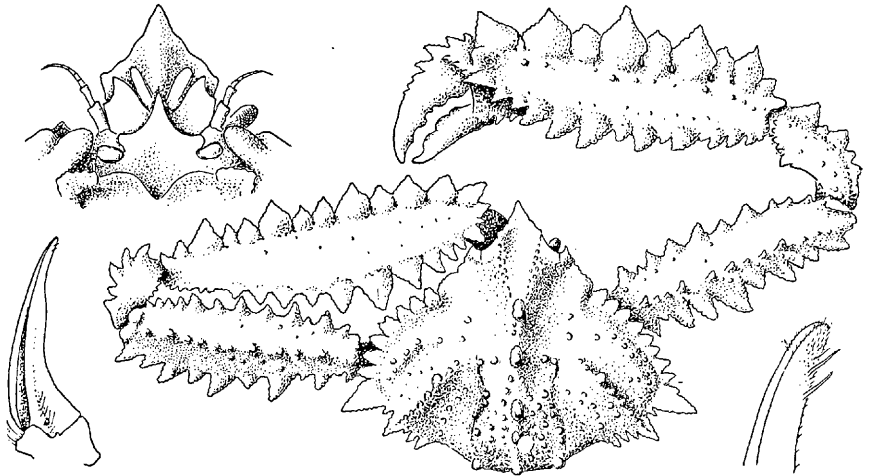


FIG. 14.—*Platylambrus quemvis* Stebb. Carapace, on left side the eye is retracted, and cheliped folded in resting position; ventral surface of rostrum; 1st pleopod ♂, with apex further enlarged.

ovigerous ♀ 19 × 24 mm. Grey or pale purplish, with lighter patches on chelipeds, finger and thumb dark, walking legs banded.

*Localities.*—Durban, and off Tongaat River, 30 fathoms (Stebbing); Natal coast from Durban to Port Durnford, 27–36 fathoms, and Delagoa Bay (S. Afr. Mus.).

*Remarks.*—This will probably prove to be a variety of *pransor* (Herbst).

Stebbing (1910, *l. c.*, p. 292) records a species of “*Lambrus*” from “Umsunduzi River, Pietermaritzburg.” This inland locality is certainly due to an error in labelling and is not acceptable (cf. *Hyaenus spinosus*).

#### FAMILY HYMENOSOMATIDAE.

1903. Borradaile, F. Geogr. Mald. Laccad. Archip., ii, pp. 682, 684 (*Hymenosomidæ*).

1910. Stebbing, *l. c.*, p. 331.



1917. Kemp, Rec. Ind. Mus., xiii, pp. 243 *sqq.* (Indian species).  
 1918. Tesch, Siboga Exp. monogr., xxxix c, p. 3 (*Hymenosomidae*).  
 1925. Rathbun, Bull. U.S. Nat. Mus., no. 129, pp. 9, 561 (*Hymenosomidae*).  
 1927. Hale, Crust. S. Austral., pt. 1, p. 115.  
 1930. Chopra and Das, Rec. Ind. Mus., xxxii, pp. 413 *sqq.*

Carapace flat, thin and not well calcified, without hooked setae, usually with horizontal rostrum. No orbits, eyes exposed and little retractile. Peduncle of ant. 2 slender. Antennular sockets shallow, ill-defined. Chelipeds not long or especially mobile. Male genital openings on last thoracic sternite (concealed beneath abdomen); female openings on sternite of 2nd (1st walking) legs.

*Remarks.*—Development sometimes without free-swimming stages, the young crabs hatching from the eggs while protected by the abdomen of mother.

*Key to the South African Genera.*

1. No epistome. Carapace with grooves. Mxp. 3 slender.  
 Dactyls smooth. All segments of abdomen in ♂ distinct . . . . . *Hymenosoma*.
2. Epistome well defined. Segments 3-5 of abdomen in ♂ fused.
  - a. Carapace with regions defined by grooves. Mxp. 3 narrow, not completely closing buccal cavity.  
 Dactyls with (usually) numerous denticles.  
 Rostrum (usually) tridentate . . . . . *Rhynchoplax*.
  - b. Carapace with regions not defined, smooth. Mxp. 3 broad, completely closing buccal cavity. Dactyls with subapical denticles only. Rostrum broadly triangular . . . . . *Elamena*.

Gen. HYMENOSOMA Desm.

1910. Stebbing, *l. c.*, p. 331.  
 1914. *Id.*, Trans. Roy. Soc. Edin., 50, p. 269.  
 1917. Kemp, *l. c.*, pp. 244, 250.  
 1918. Tesch, *l. c.*, p. 5.

Carapace subcircular, regions defined by fine grooves. No epistome. Buccal cavity not limited anteriorly by a ridge. 3rd and 4th joints of mxp. 3 slender, not meeting in middle, the underlying appendages partly visible. Dactyls of walking legs without spines or denticles on inner margin. Abdomen of ♂ short, narrow, sutures of all the

segments distinct; in ♀ suture between 6th and 7th segments often obscure. Eggs small and numerous. Development unknown.

*Remarks.*—The South African species is the only one known with certainty to belong to this genus as above defined. Another species, *H. depressum* Jacq. & Lucas, inhabiting New Zealand and the Auckland Is., was redescribed by Chilton (1907, *Ann. Mag. Nat. Hist.* (7), xix, p. 146, pl. 5), but without mention of those characters which would determine its generic position.

*Hymenosoma orbiculare* Desm.

*Crown Crab.*

Fig. 15, *a*, *b*.

1838. McLear, *Annulosa S. Afr.*, p. 68.  
 1894. Ortmann, *Semon Austral. Reise*, v, p. 37.  
 1905. Lenz, *Abh. Senckenb. Ges.*, xxvii, p. 368.  
 1910. Stebbing, *l. c.*, pp. 331, 332 (*geometricum*).  
 1913. Balss, *Schultze Reise Südafr*, v, p. 110 (var. *geometricum*).  
 1914. Stebbing, *l. c.*, p. 270, pl. 25, fig. A.  
 1914. Lenz and Strunck, *D. Südpol Exp.*, xv, p. 277.  
 1915. Stebbing, *Ann. S. Afr. Mus.*, xv, p. 58.  
 1917. Kemp, *l. c.*, p. 245 and footnote, fig. 1.  
 1918. Tesch., *l. c.*, p. 6, pl. 1, fig. 1.

The flat dorsal surface, which is longer than broad, is surrounded by a beaded and granulate rim (like the crown of a hat), continued on to rostrum, which is concave above, with slightly up-turned apex, and a granulate callosity on each margin at base; dorsal regions more or less granulate; lateral branchial and hepatic regions granulate, the latter with a tooth (variable in size) and a low rounded granulate prominence; infero-external angle of orbit produced in a bifid tooth, the upper tooth reaching to or slightly beyond apex of rostrum. Chelipeds furry, granulose on 4th and 5th joints. Legs setose, heavily fringed on hind margins of 4th-7th joints, the dactyls (7th joints) slender with sharp ungues. Carapace covered with scattered setae dorsally, more thickly on the lateral parts. 1st pleopod ♂ (fig. 15, *b*) sometimes with a few denticles on inner edge of apex beyond the fringe of setae.

Length up to 26 mm., breadth 25 mm. Reddish, yellowish, brownish or greenish, sometimes carapace mottled and legs banded.

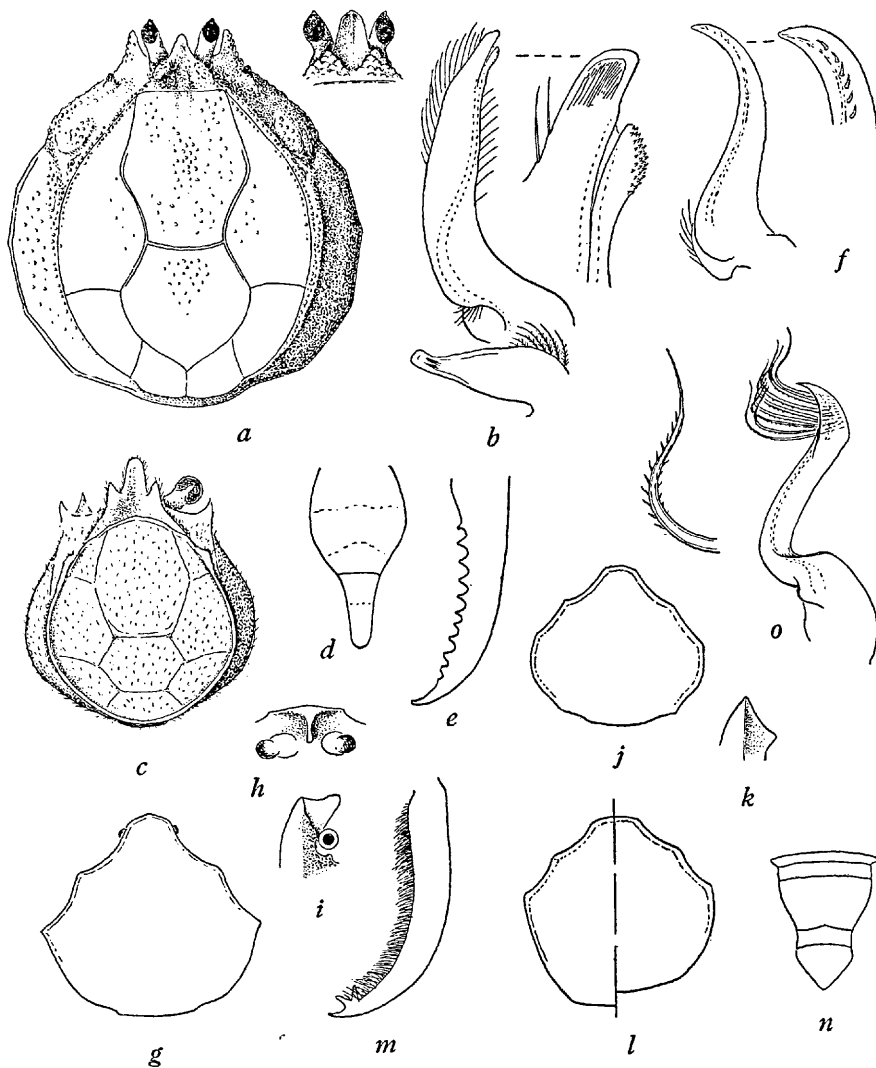


FIG. 15.—*Hymenosoma orbiculare* Desm. *a*, carapace, with variation of rostrum. *b*, 1st and 2nd pleopods ♂, apex of former further enlarged.

*Rhynchoplax bovis* Brnrd. *c*, carapace, left eye omitted to show infra-orbital tooth. *d*, abdomen of ♂. *e*, dactyl of walking leg, plumose setae omitted. *f*, 1st pleopod ♂.

*Elamena mathaei* (Desm.). *g*, carapace of ♀ (Zululand). *h*, *i*, ventral and lateral views of rostrum of this ♀. *j*, carapace of ♀ (Port Alfred). *k*, lateral view of rostrum of this ♀. *l*, carapace, ♂ left, ♀ right (Umhlali, Natal). *m*, dactyl of walking leg. *n*, abdomen of ♂. *o*, 1st pleopod ♂, with one apical seta further enlarged.

*Localities.*—Luderitzbucht (Balss); Saldanha Bay (Stebbing); Table Bay (Krauss, Balss, Lenz and Strunck, Tesch); False Bay, 0–18 fathoms (Stimpson, Miers, Stebbing, Lenz and Strunck); Agulhas Bank, St. Francis Bay, 80 metres, and Algoa Bay (Doflein); Algoa Bay (Ortmann); Natal (Stebbing); mouth of Olifants R. (van Rhyns Dorp Division), Lamberts Bay (Clanwilliam Division), Saldanha Bay, Table Bay, and False Bay to East London, 0–45 fathoms (S. Afr. Mus.).

*Distribution.*—Zanzibar (Lenz).

*Remarks.*—As Balss states, the 3rd and 4th joints of *mxp.* 3 are not so wide as shown in the figure in Cuvier's *Règne Animal Crust.*, pl. 35, fig. 1, *a*; one may reasonably suspect the dried and matted fringe of setae on the inner margin misled the artist so that he drew the joints wider than they really were.

In all the specimens I have seen I have not found any difference which might constitute a specific difference; but the 3rd maxillipeds tend to be relatively longer and more slender in the ♂ than in the ♀. Stimpson's only specimen of *geometricum* was a ♂.

On the other hand, the spines and granulation of the carapace vary to a considerable degree. The rostrum usually does not quite reach the apices of the eye-stalks, but in some specimens tends to become longer, equalling or even slightly exceeding the eye-stalks. The two callosities at the base of the rostrum, the hepatic tooth and the granulations along the rim of the carapace may also be much more prominent (*cf.* fig. 15, *a*, normal and variation; see also Stebbing, 1905, *Mar. Invest. S. Afr.*, iv, p. 51).

A remarkable development of the rostrum and the processes is shown in two ovigerous ♀♀, carapace width 6–7 mm., collected by the University of Cape Town Ecological Survey in False Bay, 19–24 metres. The whole animal is much more strongly setose than "normal" specimens, and the granulation on the crown and lateral regions of the carapace are more strongly developed and more sharply conical. The gastric region is raised into a setiferous median boss. The normal granules along the beaded rim are here conical projections, which increase in size from the hind margin to the middle of the lateral margin where there is a large conical setiferous projection; this is followed by clavate or digitiform processes; the hepatic tooth is well marked, pustulate or mammilate; the double tooth at outer orbital angle is also pustulate, and posterior to it is an additional conspicuous hepatic process. The most remarkable feature is the narrow triangular rostrum, which extends not only beyond the eye-

stalks, but also a short distance beyond the end of the peduncle of ant. 1, and is serrulate on the margins. The two low basal granulate callosities which are found in normal specimens are here developed into stout conical pustuliferous processes extending almost to apex of eye-stalks.

At first sight these specimens certainly look specifically distinct from normal *orbiculare*. But all the extraordinary features are merely exaggerations of the normal features, and cannot therefore be claimed as specific characters. The tendency to vary in this direction can be discerned in many normal specimens; but there is still a wide gap between the most strongly granulate "normal" specimens and these "abnormal" specimens. This gap may, however, be filled by the discovery of truly intermediate specimens.

Moreover, the institution of a n.sp. without a ♂ specimen would be inadvisable.

For the privilege of seeing these two specimens I am indebted to Professor J. H. Day, who is directing the University's Ecological Survey.

Although found in deeper water, this crab is a characteristic inhabitant of estuaries and lagoons all along the coast; it lives on, or buried just beneath, the surface of the sand and mud, or amongst *Zostera* and other weeds. It swims and buries itself by means of the very efficient fringed legs. It is often covered with bits of weed which disguise it. Juveniles (3-6 mm.) are less setose on the carapace and legs than adults.

#### Gen. RHYNCHOPLAX Stimpson

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 109.

1900. Alcock, J. Asiat. Soc. Bengal, lxi, p. 387 (*Hymenicus*, non Dana).

1907. Stimpson (ed. Rathbun) Smiths. Misc. Coll., xlix, p. 147.

1917. Kemp, *l. c.*, p. 251 (key to Indian species).

1918. Tesch, *l. c.*, p. 17 (key to species, excl. Kemp's species).

1930. Chopra and Das, *l. c.*, pp. 414-424.

1932. Shen. Zool. Sinica, ix, p. 58.

Carapace subcircular, flattened or slightly concave dorsally, with raised rim, regions defined by sharp-cut grooves. Rostrum (usually) tridentate. Epistome well marked. Mxp. 3 narrow, not completely closing buccal cavity. Chelipeds stouter than walking legs; dactyls of latter (usually) with numerous denticles along inner margin. Abdomen of ♂ with 3rd-5th segments fused.

*Remarks.*—Development, in the South African species, without free-swimming stage.

Tropical Indian seas to China, Japan, S.E. Australia. Entering estuaries or even fresh water permanently above tidal influence (Kemp, *l. c.*, pp. 243, 264).

*Rhynchoplax bovis* Brnrd.

Fig. 15, *c-f*.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 362.

Carapace subcircular, sparsely setose, dorsal rim continuous across base of rostrum; the latter tridentate, the median tooth larger than lateral ones, concave and somewhat spatulate dorsally. A strong, sharp post-ocular tooth, and a sharp infra-orbital tooth. No teeth on antero-lateral or lateral margins, but often a slight projection or shoulder antero-laterally. Chelipeds smooth, without keels and unarmed, inner margins of finger and thumb smooth in both sexes, in ♀ meeting along whole length, in ♂ gaping at base and meeting only in distal third, where they are somewhat spatulate. Walking legs rather stouter than in most species (but not so stout as in *demeloi* Kemp), upper apex of 4th joint slightly projecting, but not spiniform, dactyls with 9–10 subequal denticles along inner margin, obscured by plumose setae. Abdomen of ♂ pyriform, the fused 3rd–5th segments narrowing rapidly distally, the 6th and 7th (whose intersegmental suture is obscure) narrow, digitiform.

Length up to ♀ 7 mm., breadth 5.5 mm. Greyish or brownish, usually much obscured by mud.

*Localities.*—Swartkops River, Port Elizabeth and off East London (S. Afr. Mus.); Buffalo River estuary, East London (coll. T. A. Stephenson); Amanzimtoti estuary, 1–2 fathoms, and St. Lucia Bay (Univ. Cape Town Ecol. Surv., 1946 and 1948).

*Remarks.*—Well distinguished from other species, apparently, by the strong post-ocular and infra-orbital teeth, which, however, are not always as strong as represented in the figure.

One ♀ (East London) contains 13 juveniles under the abdomen, apparently ready to be cast off. Diameter 1 mm. Rostrum feebly trilobate, the median lobe a little more prominent than the lateral ones, which are blunt. Post-ocular tooth relatively small, infra-orbital tooth not apparent. Dactyls with only 2–3 denticles on inner margin. Eyes relatively large. Another ♀ (Port Elizabeth) contains about 30 embryos in a less advanced stage.

A ♂ in the s.s. *Pieter Faure* collection was caught, according to the log-book, by tow-net attached to trawl which caught ground at 37 fathoms.

Gen. *ELAMENA* M. Edw.

- 1910. Stebbing, *l. c.*, p. 332.
- 1915. Kemp, Mem. Ind. Mus., v, p. 216.
- 1917. *Id.*, *l. c.*, p. 19 (key to species).
- 1918. Tesch, *l. c.*, p. 19 (key to species).
- 1920. Stebbing, Ann. Durban Mus., ii, p. 269.
- 1930. Chopra and Das, *l. c.*, p. 424.
- 1940. Gordon, Proc. Linn. Soc. Lond., 152 sess., pt. 1, p. 60 (species of *Elamena* sensu stricto).

Carapace oval, triangular, or polygonal, greatly depressed; no dorsal grooves; lateral margins up-turned or not; rostrum triangular or truncate, with (*Elamena*) or without (*Trigonoplax*) a large vertical ridge on its lower surface. Epistome well marked and separated from buccal cavity by a ridge. Mxp. 3 with 3rd and 4th joints broad, meeting in middle line. Dactyls of walking legs with 2 denticles near unguis. Abdomen in ♂ with 3rd-5th segments fused, the sutures obsolete.

Subgen. *Trigonoplax* M. Edw.

Carapace flatter and more triangular than in *Elamena* s.s., its margin not up-turned; chelipeds similar in both sexes and not appreciably stouter than walking legs; rostrum without a ridge on its lower surface, or with only a tooth situated far from front margin.

*Key to the South African Species.*

- 1. Rostrum with strong ridge ventrally, in front view T-shaped (fig. 15, *h*) (*Elamena*). Carapace subovoid or sub-circular, or subpent-(hex-)agonal . . . . . *mathaei*.
- 2. Rostrum without ventral ridge or with only a small tooth far from front margin (*Trigonoplax*). Carapace trigonal . . . . . *unguiformis*.

*Elamena mathaei* (Desm.)

Fig. 15, *g-o*.

- 1918. Tesch, *l. c.*, p. 21.
- 1920. Stebbing, Ann. Durban Mus., ii, p. 266, pl. 29 (*Epialtus vetchi*).
- 1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120.

1938. Gurney, Proc. Zool. Soc. Lond., ser. B, cviii, p. 77, pl. 4, figs. 34-37 (larval stage).

1940. Gordon, *l. c.*, p. 63, figs. 1, *a, b*, 2, 3, *a, b, c*.

1942. Ward, Mauritius Inst. Bull., ii, p. 78.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 362.

[Not Stebbing, *l. c.*, 1920, p. 269, pl. 30 = *E. (Trigonoplax) unguiformis*.]

♂. Carapace glabrous, slightly longer than broad, margins very feebly up-turned, posteriorly rounded, antero-lateral margins with 2 shallow but distinct emarginations, rostrum well developed, subtruncate but margins meeting in a distinct angle medianly, ventrally with strong median ridge or tooth, in frontal view T-shaped. Cornea of eyes just visible dorsally beyond edge of carapace. Chelipeds slender, finger and thumb subequal to hand, dilated and denticulate apically. Legs long and slender, 4th and 5th joints each with an apical spine or knob, 6th joint with a less distinct apical swelling (represented in Stebbing's figure as on base of dactyl), dactyls falcate, 2 denticles adjoining the acute unguis, inner margins densely furry. Abdomen triangular, lateral margin rather strongly sinuous, apex narrowly rounded. 1st pleopod corkscrew-like, with 8-9 long, finely plumose, spine-setae attached to dorsal surface at apex.

Length 3.5 mm., breadth 3 mm. Dirty yellowish grey, with specks on carapace and chelipeds.

♀. Similar to ♂ but carapace slightly broader than long, the antero-lateral emarginations slightly more distinct, a small and indistinct post-ocular tooth on ventral surface.

Length (nonovig. and ovig.) 4-6 mm., breadth 4.5-7 mm. Pale green with yellow legs (Stebbing); Delagoa Bay ♀ as in ♂, but without specks.

*Localities*.—Natal (Krauss); Durban (Stebbing); Isipingo (Natal), Zululand coast, and Delagoa Bay (Barnard, and S. Afr. Mus.); East London and Port Alfred, Umhlali and Umtwalumi (Natal) (coll. T. A. Stephenson).

*Distribution*.—Red Sea and Indian Seas; Mauritius.

*Remarks*.—Dr. Gordon thinks there can be no doubt about the identity of the specimens she refers to this species. There is, however, one doubtful point, viz. the meaning of Desmarest's descriptive phrase "carapace . . . in form of an equilateral triangle" (quoted in translation by Stebbing, *l. c.*, 1920, p. 270). One would suppose that Desmarest had before him a form like *E. (Trigonoplax) unguiformis*, and evidently Stebbing in 1920 (but not in 1900) assigned an un-



deserved mathematical exactitude to Desmarest's wording. Rüppell said he convinced himself of the identity of his species with that described by Desmarest by actual comparison of specimens at the Paris Museum (Rüppell, 1830, Red Sea Crabs, p. 22); and the figure he gives is by no means shaped like an equilateral triangle.

Probably all the earlier records should be ignored, unless types, or at least specimens from the original localities, are available. Dr. Gordon has now put this species on a surer foundation by describing the ♂ abdomen and 1st pleopod.

The South African specimens which I have examined agree with Dr. Gordon's diagnosis.

Stebbing's "*Elamena mathaei*" is rightly excluded by Dr. Gordon; on the other hand, I consider that Stebbing's "*Epialtus vetchi*" is clearly synonymous.

*Elamena (Trigonoplax) unguiformis* (de Haan)

1917. Kemp, *l. c.*, p. 277, figs. 28, 29.

1918. Tesch, *l. c.*, p. 25.

1920. Stebbing, Ann. Durban Mus., ii, p. 269, pl. 30 (*mathaei*, non Desm.).

1924. Hale, Trans. Roy. Soc. S. Austral., xlviii, p. 70, fig. 1 (var. *longirostris*).

1927. *Id.* Crust. S. Austral., pt. 1, p. 120, fig. 118 (var. *longirostris* McC.).

Carapace in form of an equilateral triangle, very flat, semi-transparent. Chelipeds slender, finger and thumb nearly as long as hand, feebly dilated and apically denticulate. Legs long and slender, 4th joint with apical spine, dactyls somewhat dilated, 2 denticles adjoining the acute unguis.

Length 10 mm., breadth 11 mm.

*Locality.*—Natal coast, 50 fathoms (Stebbing).

*Distribution.*—Japan; East Indies; Andaman Is. var. *longirostris*: Southern Australia.

*Remarks.*—Stebbing's *Pieter Faure* specimen was not returned to the South African Museum, and no further specimens have come to hand.

BRACHYRHYNCHA.

1903. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 426 (key to families).

1907. *Id.*, Ann. Mag. Nat. Hist. (7), xix, p. 481 (key to families).

1910. Stebbing, *l. c.*, p. 293 (*Cyclometopa*) + p. 312 (*Catometopa*).

1918. Rathbun, Bull. U.S. Nat. Mus., no. 97, pp. 1-461, pls. and text-figs. (American Grapsoid Crabs. Key after Borradaile).

1930. *Id.*, *ibid.*, no. 152, pp. 1-609, pls. and text-figs. (American Cancroid crabs. Key after Borradaile).

Carapace not narrowed in front, rostrum reduced or absent. Epistome usually well developed. Buccal cavity quadrate. Orbits well developed, though sometimes more or less incomplete. Female genital openings on sternite of 3rd (2nd walking) legs; male openings on 5th coxae or 5th sternite.

*Key to South African Families* (adapted from Borradaile).

- I. Orbits complete. Carapace rarely elongate-oval.  
 Rostrum often wanting. Flagellum of ant. 2 usually short and not hairy.
- A. 5th joint of mxp. 3 not inserted at or near inner angle of 4th joint (fig. 16, *b*). Carapace usually squarish, sometimes round. Male genital openings sternal. (In no species is the right chela *always* larger than left.)
1. Small symbiotic crabs. Carapace more or less round, eyes and orbits very small (fig. 16) . . . . . *Pinnotheridae*, p. 77.
2. Free-living crabs.
- a.* Orbits wider, often much wider, than front (figs. 17, 18, 20, 21). 3rd maxillipeds meeting, or nearly so, in middle line. Carapace squarish or transversely oblong . . . . . *Ocypodidae*, p. 82.
- b.* Front at least as wide, usually wider than orbit (figs. 23, 25, *a*). 3rd maxillipeds not meeting.
- i.* Carapace transversely oval, strongly vaulted, sides arched (fig. 23, *a*).  
 Terrestrial . . . . . *Gecarcinidae*, p. 109.
- ii.* Carapace square, not strongly vaulted, sides straight or only feebly arched (figs. 23, *b-f*, 25, *a*). If terrestrial, an opening fringed with hairs between bases of 3rd and 4th legs . . . . . *Grapsidae*, p. 110.

- B. 5th joint of mxp. 3 inserted at or near inner angle of 4th joint (figs. 27, *a-c*). Carapace usually transversely oval or round. Male genital openings nearly always coxal. Right chela often larger than left.
1. 5th pair of legs flattened and adapted for swimming (figs. 28, *c, j, 29, d, k*) . . . *Portunidae*, p. 139.
  2. Legs not adapted for swimming.
    - a.* Freshwater crabs with branchial regions much swollen (fig. 34) . . . *Potamonidae*, p. 179.
    - b.* Marine crabs.
      - i.* 1st antennae folded longitudinally.
        - a.* Carapace subcircular. Flagellum of ant. 2 hairy . . . . . *Atelecyclidae*, p. 194.
        - β.* Carapace broadly oval or hexagonal. Flagellum of ant. 2 short, not hairy . . . . . [*Cancriidae*, p. 194].
      - ii.* 1st antennae folded obliquely or transversely. Two families not sharply separated . . . . . { *Xanthidae*, p. 198;  
*Goneplacidae*, p. 281.
- II. Orbits formed, but more or less incomplete. Carapace elongate-oval. Rostrum present. Ant. 2 with flagellum, when present, long and hairy . . . *Corystidae*, p. 302.

FAMILY PINNOTHERIDAE.

*Pea-crabs, Oyster-crabs, Mussel-crabs.*

1900. Alcock, *J. Asiat. Soc. Bengal*, lxix, pp. 284, 287, 293, 331 (*Pinnoteridae*).
1910. Stebbing, *l. c.*, p. 330 (date of Alcock misprinted as 1890).
1918. Rathbun, *Bull. U.S. Nat. Mus.*, no. 97, pp. 9, 15, 61.
1918. Tesch, *Siboga Exp. monogr.*, xxxix *c*, 1, pp. 244-287.
1924. Hyman, *Proc. U.S. Nat. Mus.*, lxiv, 7 pp., 6 pls. (larval stages).
1927. Hale, *Crust. S. Austral.*, pt. 1, p. 172.
- Carapace more or less membranous, subcircular or transversely oval. Orbits and eyes very small, cornea sometimes obsolescent, 4th joint of mxp. 3 often large, 3rd joint usually small; or 3rd and 4th fused, in which case the joint is directed obliquely or transversely inwards, and the palp is short; exopod small, more or less concealed. Male genital openings sternal.

*Remarks.*—Small crabs living commensally in bivalve molluscs, Ascidians, Holothurians, and worm-tubes, or parasitically on outer surface of Echinoids. The males are rare, free-swimming, and rarely found together with the females (Orton, *Nature*, cvi, p. 533, 1920; Kemp, *Rec. Ind. Mus.*, xxiv, p. 117, 1922). Stebbing (1893, *Hist. Crust.*, p. 99) quotes the ancient stories of the relations between the crab and the *Pinna*-shell; and Rüppell (1830, *Beschr. 24 Krabben*, p. 23) defends Hasselquist's observations on their habits.

The males, and also the young non-ovigerous females, often have long fringes of setae on the hind margins of the 3rd–5th legs, presumably in connection with their more mobile mode of life.

*Key to the South African Genera.*

1. 7th joint of mxp. 3 present (palp 3-jointed).
  - a. Margin of carapace rounded, ill-defined . . . . *Pinnotheres*.
  - b. Margin of carapace sharply up-turned, crest-like . . . . *Xanthasia*.
2. 7th joint of mxp. 3 absent (palp 2-jointed) . . . . *Ostracotheres*.

Gen. PINNOTHERES Bosc

1910. Stebbing, *l. c.*, p. 330.  
 1918. Rathbun, *l. c.*, p. 62.  
 1918. Tesch, *l. c.*, p. 247 (list of Indo-Pacific species, and key).  
 1926. Atkins, *J. Mar. Biol. Assoc. Plym.*, n.s., xiv, p. 475, pls. 1–5 and 4 text-figs (sexual dimorphism, moulting).  
 1928. Lebour, *J. Mar. Biol. Assoc. Plym.*, n.s., xv, p. 114, figs. (larval stages).  
 1931. Chopra, *Rec. Ind. Mus.*, xxxiii, pp. 312–323.  
 1932. Shen, *Zool. Sinica*, ix, p. 131.  
 1933. Monod, *Bull. Soc. Sci. Nat. Maroc.*, xii, p. 142 (dated 1932, but see Monod, *ibid.*, p. 218: publ. 1933).  
 1934. Gordon, *Res. Sci. Ind. orient. Néerland*, iii, fasc. 15, p. 19.

Carapace not well calcified, parchment-like, subcircular, margins convex and ill-defined, not up-turned, glabrous or pubescent, no longitudinal grooves. 3rd and 4th joints of mxp. 3 fused, oblique, palp 3-jointed (*i.e.* 7th joint present). Dactyls of legs not bifurcate.

*Remarks.*—No attention seems to have been paid to the 1st pleopod ♂, except by Shen and by Gordon. Gordon has also drawn attention (*Proc. Linn. Soc. Lond.*, 149th sess., pt. 1, p. 29, 1937) to the asymmetry of the legs in some species.

Key to the South African Species.

1. Dactyls of 4th and 5th legs scarcely longer than those of 2nd and 3rd legs . . . . . *dofleini*.
2. Dactyls of 4th and 5th legs distinctly longer than those of 2nd and 3rd legs . . . . . sp. ?.

*Pinnotheres dofleini* Lenz

Fig. 16, a-f.

1904. Doflein, D. Tiefsee Exp., vi, p. 124, fig. 10, and pl. 37, figs. 3, 4, ♀ (*Pinnotheres* sp.).

1914. Lenz in Lenz and Strunck, D. Südpol Exp., xv, p. 281, pl. 12, figs. 17-19, ♂.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 241 (*ostrearius* part: the specimen from St. James).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 362.

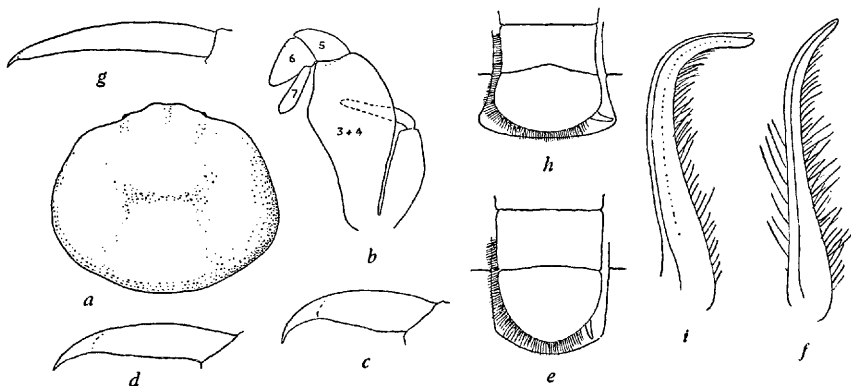


FIG. 16.—*Pinnotheres dofleini* Lenz. a, carapace. b, 3rd maxilliped. c, d, dactyls of 2nd and 5th legs. e, apex of abdomen ♂ in sternal groove, setae partly omitted to show apex of 1st pleopod. f, 1st pleopod ♂.

*Pinnotheres* sp. (Mossel Bay and Delagoa Bay). g, dactyl of 5th leg, ♀.

*Pinnotheres* ? *pisum* (Linn.)\* (Europe). h, apex of abdomen ♂ in sternal groove, setae partly omitted to show apex of 1st pleopod. i, 1st pleopod ♂.

Carapace about  $1\frac{1}{2}$  as broad as long, sparsely pilose, nearly or quite glabrous in ♀, hind margin gently convex. 7th joint of mxp. 3 inserted on proximal inner margin of 6th, and extending very slightly beyond apex of 6th, very slightly widened distally. Dactyls of 2nd

\* Last abdominal segment does not correspond with Atkins' figures of ♂ *pisum* (*l. c.*, fig. 1 and pl. 1, fig. 2).

and 3rd legs subequal, of 4th and 5th also subequal but slightly longer than 2nd and 3rd, ungues strong. 3rd-5th legs stouter in ♂ than in ♀, 5th joints of 3rd-5th legs in ♂ fringed on hind margin. In ♂ sternal groove for reception of abdomen not laterally expanded on the segment between the chelipeds, and terminal segment of abdomen is not greatly broader than long (contrast *pisum*; fig. 16, *e* and *h*).

Length up to ♀ 16 mm., breadth 19 mm. Pale buff, sometimes with a pinkish tinge.

*Localities.*—Algoa Bay (Doflein); Simon's Bay, in the Ascidian *Phallusia canaliculata* (Lenz); St. James, False Bay, in the Ascidian *Pyura stolonifera* (Stebbing, coll. K. H. B.); Algoa Bay (S. Afr. Mus.); Simonstown among Ascidiens on naval training ship in dry dock (coll. K. H. B.); False Bay, in large *Pinna*-shell (S. Afr. Mus.); Algoa Bay, in large *Pinna*-shell (Port Elizabeth Mus.).

*Pinnotheres* sp.

Fig. 16, *g*.

1920. Stebbing. *l. c.*, p. 241 (*pisum* ?, non Linn.).

1920. *Id.*, *ibid.*, p. 241 (*ostrearius* part: the Delagoa Bay specimen).

Carapace about  $1\frac{1}{4}$  as broad as long, glabrous (♀), hind margin nearly straight. 7th joint of mxp. 3 inserted on proximal inner margin of 6th, scarcely reaching beyond apex of 6th, styliform, not widening apically. Dactyls of 2nd and 3rd legs subequal, of 4th longer, of 5th longer than 4th, those of 4th and 5th subcultrate or ensiform, slender with very small ungues.

Length, ♀ 8 mm., breadth 10 mm.

*Localities.*—Mossel Bay, in pearl-oyster (*Avicula*), and Delagoa Bay in shell of *Modiola* (Stebbing).

*Remarks.*—I have compared both Stebbing's specimens with European specimens of what I think is *pisum* (but see footnote to fig. 16), and the elongate dactyls of 4th and 5th legs at once distinguish the former.

*Pinnotheres globosus* Jacqu. & Lucas

1853. Jacquinet and Lucas, Voy. Astrolabe, Crust.

1853. Milne Edwards, Ann. Sci. Nat., xx, pl. 11, fig. 6.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 809.

1918. Tesch, *l. c.*, p. 257, footnote.

*Locality*.—Mozambique (Hilgendorf).

*Distribution*.—Singapore (Jacquinot and Lucas); New Caledonia (M. Edwards).

*Remarks*.—Tesch does not agree with M. Edwards in regarding this species as synonymous with *obesus* Dana.

Gen. XANTHASIA White

1846. White, *Ann. Mag. Nat. Hist.*, xviii, p. 176.

1887. de Man, *J. Linn. Soc. Lond.*, xxii, p. 106.

1900. Alcock, *l. c.*, p. 340.

1918. Tesch, *l. c.*, pp. 245, 246.

Similar to *Pinnotheres* but the edge of the carapace is well defined, forming (except on fronto-orbital margin) an up-turned crest, thin or thickened. In the middle of the saucer-like dorsal surface a more or less mushroom-like tubercle or boss.

*Remarks*.—Alcock says the dactyl (7th joint) of mxp. 3 is wanting or represented by a tiny pencil of hairs; but Tesch includes the genus in his key under the heading of those genera, like *Pinnotheres*, in which the dactyl is present.

*Xanthasia murigera* White

1846. White, *l. c.*, p. 177, pl. 2, fig. 3.

1884. Miers, *Zool. H.M.S. Alert, Crust.*, p. 546.

1894/5. Bürger, *Zool. Jahrb. Abt. Syst.*, viii, p. 386, pl. 10, fig. 33.

1900. Alcock, *l. c.*, p. 341.

1918. Tesch, *l. c.*, p. 246.

Margin of carapace forming a thin up-turned and overhanging crest, ending in a curl on anterior part of the branchial regions. The median mushroom-like tubercle is reticulate; between it and the front 2 parallel crests. Dactyls of all legs short and subequal.

Length, ♀ 11.5 mm., breadth 15.5 mm.

*Locality*.—Mozambique, beach (Miers).

*Distribution*.—Philippines, Fiji, New Caledonia. Associated with *Tridacna*.

*Remarks*.—*X. whitei* de Man (1887, *l. c.*, p. 106, pl. 7, fig. 1), from Mergui, has a thickened, bolster-like carapace margin.

Gen. OSTRACOTHERES M. Edw.

1910. Stebbing, *l. c.*, p. 330.

1914. Lenz and Strunck, *D. Südpol Exp.*, xv, p. 283.

1915. Laurie, J. Linn. Soc. Lond., xxxi, p. 465.

1918. Tesch, *l. c.*, pp. 262.

Like *Pinnotheres*, but the palp of mxp. 3 only 2-jointed, *i.e.* the 7th joint is absent.

*Ostracotheres tridacnae* (Rüpp.)

1910. Stebbing, *l. c.*, p. 331.

1914. Lenz and Strunck, *l. c.*, pp. 282, 283.

1918. Tesch, *l. c.*, pp. 262 (in key), 287.

1924. Balss, Denkschr. Ak. Wiss. Wien., xcix, p. 14.

1938. Gurney, Proc. Zool. Soc. Lond., ser. B, cviii, p. 78, pl. 4, figs. 38–41 (larval stage).

Carapace subcircular, the front pubescent. Mxp. 3 pubescent on outer surface. Finger and thumb of chelipeds acute (not hollowed at tip). Dactyls of all legs subequal.

Length (according to Rüppell's figure) 15 mm.

*Localities*.—Natal (Krauss); Simon's Bay (Lenz and Strunck).

*Distribution*.—Red Sea.

*Remarks*.—Inhabits bivalve shells (*Tridacna*, *Pinna*).

FAMILY OCYPODIDAE.

1907. Borradaile, Ann. Mag. Nat. Hist. (7), xix, p. 485 (key to subfamilies).

1910. Stebbing, *l. c.*, p. 325.

1918 (January). Rathbun, Bull. U.S. Nat. Mus., no. 97, p. 365.

1918 (February). Tesch, Siboga Exp. monogr., xxxix, c. p. 34.

1937. Tweedie, Bull. Raffles Mus., xiii, p. 140.

Orbits occupying whole of the anterior border except the front, which is usually narrow and deflexed, their outer rims often not well developed. Eye-stalks slender, often elongate. 5th joint of mxp. 3 articulating at or near the *external* apex of 4th joint; exopod usually slender and more or less concealed. One of the chelipeds (sometimes the right, sometimes the left) often vastly larger than the other in ♂. Abdomen of ♂ narrow. Genital openings ♂ sternal.

*Remarks*.—Littoral crabs, living on sandy or muddy shores, usually burrowing and gregarious.

*Key to the South African Genera.*

- A. A cavity, with its edges thickly fringed with hairs, between bases of 3rd and 4th (2nd and 3rd walking) legs (*Ocypodinae*).



1. Carapace subquadrangular. Chelipeds very unequal in both sexes. Cornea very large, occupying greater part of ventral surface of eye-stalk . . . *Ocypode*.
  2. Carapace broader than long. Chelipeds in ♀ small and subequal, in ♂ one vastly larger than other . . . *Uca*.
- B. No cavity between legs.
1. Body deep, more or less globose. Membranous spaces on 4th joints of the legs . . . *Dotilla*.
  2. Body shallow, broader than long. No membranous spaces on legs (*Macrophthalminae*).
    - a. Mxp. 3 not meeting, leaving a lozenge-shaped gap between them, 4th joint shorter than 3rd . . . *Macrophthalmus*.
    - b. Mxp. 3 meeting in middle line, 4th joint as long as or longer than 3rd.
      - i. 4th joint of mxp. 3 convex at antero-external corner, but not dilated. Cornea normal . . . *Cleistostoma*.
      - ii. 4th joint of mxp. 3 strongly dilated at antero-external corner. Cornea very small . . . *Tylodioplax*.

Gen. OCYPODE Fabr.

*Sand-crabs ; Running-crabs.*

1897. Ortmann, Zool. Jahrb. Abt. Syst., x, p. 359.
1910. Stebbing, *l. c.*, p. 325.
1915. Kemp, Mem. Ind. Mus., v, p. 218 (*Megalopa* and juv. of one species figured).
1918. Tesch, *l. c.*, p. 35 (*Ocypoda*).
1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 418 (figs. 1st plp. ♂ of 3 species).
1940. Crane, Zoologica, xxv, p. 65 (development).
- Body deep. Carapace subquadrangular, regions ill-defined, front deflexed. Eyes large, cornea occupying most of ventral surface of stalk which is often produced beyond the cornea like a horn. Chelipeds unequal in both sexes, the palm of the larger chela usually with a stridulating ridge of granules or striae, which can be scraped against a smooth polished ridge on the 3rd joint (the latter ridge is present on both chelipeds, but less developed on the smaller cheliped which has no palmar ridge; in those species where a stridulating ridge is absent, the ridge on 3rd joint is also absent). Legs strong; 5th (4th walking) pair weaker than others; dactyls fluted. A cavity, connecting with

the branchial chamber, between bases of 3rd and 4th legs, its edges fringed with long hairs. Abdomen of 7 segments in both sexes.

*Remarks.*—The Running-crabs are typical inhabitants of sandy beaches in tropical and subtropical regions. In South Africa the genus extends on the south coast as far west as Mossel Bay, but on the west coast has not been recorded farther south than Gt. Fish Bay (Tiger Peninsula) in Angola.

During the period of ebb-tide the crabs dig out their burrows; if surprised away from their burrows they run with extraordinary swiftness (see Stebbing, 1893, *Hist. Crust.*, pp. 85 *sqq.*). For an account of the stridulating organ see Alcock, *Ann. Mag. Nat. Hist.* (6), x, 1892, p. 336. Crane (1940) shows that the peculiarities of the *Megalopa*-stage are adaptations to the habitat.

*Key to the South African Species.*

1. No stridulating ridge on palm. Eye-stalks not prolonged beyond cornea . . . . . *cordimanus*.
2. Stridulating ridge present.
  - a. Eye-stalks prolonged in a horn (at least in adult, not developed in juv.). Stridulating ridge extending across greater part of width of palm, composed of tubercles above and striae below . . . . . *ceratophthalmus*.
  - b. Eye-stalks not prolonged beyond cornea. Stridulating ridge occupying upper half only of width of palm, composed of tubercles . . . . . *kuhlii*.
  - c. Eye-stalks prolonged in a short conical process bearing a brush of hairs. Stridulating ridge extending across the palm, composed of striae . . . . . *cursor*.

*Ocypode cordimanus* Desm.

Fig. 17, *a, b*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 803.  
 1881. de Man, Notes Leyden Mus., iii, p. 248.  
 1897. Ortmann, *l. c.*, p. 362.  
 1900. Alcock, J. Asiat. Soc. Bengal, lxi, p. 349.  
 1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 110, pl. 15, fig. 2.  
 1910. Stebbing, *l. c.*, p. 326.  
 1912. Lenz, Ark. Zool., vii, no. 29, p. 6.  
 1915. Stebbing, Ann. S. Afr. Mus., xv, p. 58.  
 1918. Tesch, *l. c.*, p. 35.  
 1937. Chopra and Das, *l. c.*, p. 420, fig. 18 (1st plp. ♂).

Carapace widest in anterior third behind antero-lateral (external orbital) angles, which are acute and point forwards or slightly inwards. Eye-stalks without terminal prolongation. Lower border of orbit with a notch nearly in middle; outer border with a deep notch. Lower

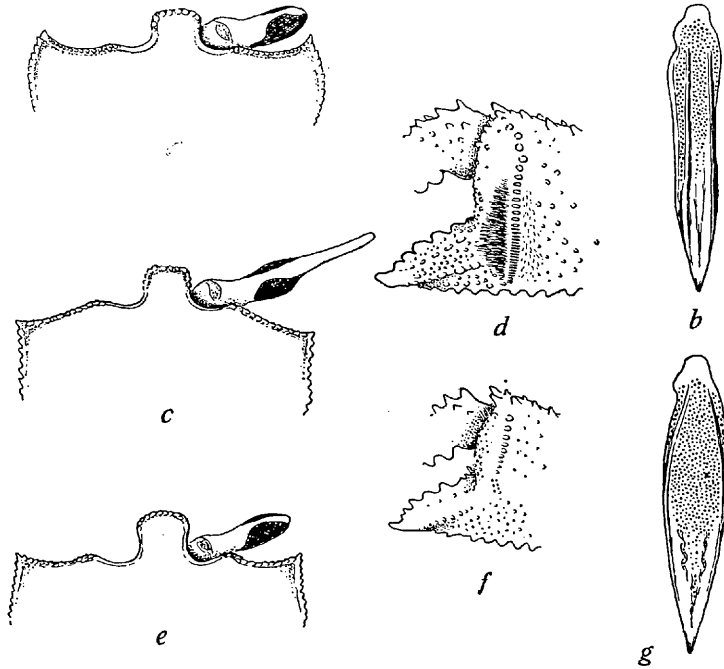


FIG. 17.—*Ocypode cordimanus* Desm. *a*, front of carapace. *b*, front view of dactyl of 2nd leg.

*Ocypode ceratophthalmus* (Pallas). *c*, front of carapace. *d*, stridulating ridge on inside of palm of larger chela.

*Ocypode kuhlii* de Haan. *e*, front of carapace. *f*, stridulating ridge on inside of palm of larger chela. *g*, front view of dactyl of 2nd leg.

(In *b* and *g* the dots represent sockets of hairs. In *d* and *f* the finger is not fully drawn in.)

margins of 4th joint, inner margin of 5th, and lower margin of 6th (hand) of chelipeds serrate; palm of larger chela with granules evenly disposed, no stridulating ridge; 3rd joint without a polished ridge, only a few granules and a polished apical knob. 6th joints of 2nd and 3rd legs more or less furry; dactyls (fig. 17, *b*) with the 2 keels on frontal surface subparallel, not concealing the lateral keels in front view. 5th segment of abdomen of ♂ distinctly broader than long (nearly twice).

Length up to 35 mm., breadth 40 mm.

*Localities.*—Natal (Krauss, Stebbing); Mozambique (Hilgendorf); Amanzemtoti, Natal (Lenz); Delagoa Bay (Lourenzo Marques Mus.).

*Distribution.*—Mauritius; east coast of Africa to Red Sea, Indo-Pacific to Japan. Sometimes in fresh water (de Man).

*Ocypode ceratophthalmus* (Pallas)

Fig. 17, *c, d.*

1838. McLeay, *Annulosa S. Afr.*, p. 64 (*cursor*, non Linn.).

1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 802.

1881. de Man, *Notes Leyden Mus.*, iii, p. 245.

1894. Ortmann, *Semon's Austral. Reise*, v, p. 60.

1897. *Id.*, *l. c.*, p. 364.

1900. Alcock, *l. c.*, p. 345.

1902. de Man, *Abh. Senckenb. Ges.*, xxv, p. 477, pl. 19, figs. 1, 1, *a* (chela).

1907. Stimpson (ed. Rathbun), *Smiths. Misc. Coll.*, xlix, p. 108, pl. 12, fig. 2 (growth of eyes).

1910. Stebbing, *l. c.*, p. 326.

1917. *Id.*, *Ann. Durban Mus.*, ii, p. 11 (*urvillei* = juv.).

1918. Tesch, *l. c.*, p. 36.

1929. Cott, *Proc. Zool. Soc. Lond.*, ii, p. 755, pl. 1, 1 text-fig. (habits).

1937. Chopra and Das, *l. c.*, p. 418, fig. 17, *a, b* (1st plp. ♂).

1947. Buitendijk, *Zool. Med.*, xxviii, p. 281, fig. 1 (1st plp. ♂).

Carapace widest sometimes across the epibranchial area, sometimes across the antero-lateral angles, which are shortly acute and slightly turned outwards. Eye-stalks produced in a long styliiform process beyond cornea, usually longer in ♂ than in ♀, but variable in both sexes; short in half-grown specimens, and quite undeveloped in juveniles. Upper orbital margin oblique, a line joining the outer orbital angles being well behind base of front; lower orbital margin with an indistinct notch in middle, no notch at outer orbital margin. Lower margins of 4th joints of chelipeds and legs, both borders of hand, and upper border of finger of chelipeds serrate; a single strong tooth on inner margin of 4th joint of chelipeds (often with smaller accessory teeth); palm of larger chela rather sparsely granulate, except near lower border, stridulating organ beginning above with a few rounded granules, followed by several rather widely spaced striae, and then more numerous close-set striae, the number of spaced and close-set striae variable, 14–20 and 15–30 respectively, that part of

the ridge occupied by striae being strongly furry in front; polished ridge on 3rd joint well developed, occupying at least half length of joint on larger cheliped, shorter on smaller cheliped. 6th joints of 2nd and 3rd legs furry; dactyls as in *cordimanus*, usually with strong fringe of hairs on anterior lateral margin. 5th segment of abdomen ♂ slightly broader than long.

Length up to 40 mm., breadth 45 mm. Milky- or greyish-white.

*Localities.*—Natal (Krauss, Kingsley); Mozambique (Hilgendorf); Port Elizabeth (Ortmann); Durban (Stebbing); Mossel Bay, Port St. Johns, Umkomaas, Scottburgh, Durban, Delagoa Bay, Chinde (S. Afr. Mus.).

*Distribution.*—Mauritius, east coast of Africa to Red Sea, Indo-Pacific.

*Ocypode kuhlii* de Haan

Fig. 17, *e-g*.

1838. McLeay, *Annulosa S. Afr.*, p. 64 (*cordimana*, non Desm.).

1881. de Man, *l. c.*, p. 250.

1882. Miers, *Ann. Mag. Nat. Hist.* (5), x, p. 384, pl. 17, figs. 8, 8 *a, b*.

1894. Ortmann, *Zool. Jahrb. Abt. Syst.*, vii, p. 761, pl. 23, fig. 19, *a*.

1894. Ortmann, *Semon's Austral. Reise*, v, p. 59.

1897. *Id.*, *l. c.*, pp. 359, 364.

1910. Stebbing, *l. c.*, p. 327.

1912. Lenz, *Ark. Zool.*, vii, no. 29, p. 6.

1918. Tesch, *l. c.*, p. 36 (*kuhli*).

1933. Rathbun, *Bull. Mus. Comp. Zool. Harv.*, lxxv, p. 260, pl. 7.

1934. Gordon, *Res. Sci. Ind. orient. Néerland*, iii, fasc. 15, p. 9 (*kuhli*).

Carapace widest across the epibranchial area, the antero-lateral angles directed outwards. Eye-stalks without terminal prolongation. Upper orbital margin not oblique, a line joining the antero-lateral angles at least as far forward as base of front; lower orbital margin with an obscure notch in middle; outer orbital margin deeply notched. Chelipeds and legs as in *cordimanus*, but hand of both chelipeds more elongate, its upper as well as lower margin serrate; palm of larger chela granulate, stridulating organ of 8–10 small round or ovoid tubercles situated in upper half of palm; polished ridge on 3rd joint occupying less than half length of joint, with a few granules proximally on smaller cheliped only a few granules and an apical polished knob

6th joints of 2nd and 3rd legs not furry; dactyls more expanded, but strongly depressed dorso-ventrally (fig. 17, *g*), the 2 frontal keels forming the lateral margins and concealing the true lateral keels in front view. 5th segment of abdomen ♂  $1\frac{1}{2}$  times as broad as long.

Length up to 38 mm., breadth 45 mm. Milky- or greyish-white, junctions of the joints of chelipeds and legs often reddish.

*Localities.*—Natal (Kingsley, *ryderi*); Amanzemtoti, Natal (Lenz); Port Elizabeth (Ortmann); Port St. Johns, Scottburgh, Mozambique Is. (S. Afr. Mus.).

*Distribution.*—East coast of Africa, Indo-Pacific to Japan.

*Remarks.*—Tesch mentions an example with only 6–7 tubercles “placed irregularly in the *ventral* part of the (stridulating) organ” [*italic mine*].

A photograph of McLeay’s specimen shows clearly that it is this species.

#### *Ocypode cursor* (Linn.)

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 802.

1910. Stebbing, *l. c.*, p. 326.

1921. Rathbun, Bull. Amer. Mus. Nat. Hist., xliii, p. 461, pl. 52 (*ippeus*).

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 23.

1927. Monod, Faune Col. franç. Cameroun, p. 609 (*ippeus*).

Carapace widest across the antero-lateral angles, which are directed outwards. Eye-stalks ending in a short conical process bearing a brush of hairs. Upper orbital margin transverse; lower border with slight median notch, outer orbital margin deeply notched. Upper margin of hand of chela not serrate; stridulating ridge formed of numerous fine striae; polished ridge on 3rd joint occupying more than half length of joint in larger cheliped, shorter in smaller cheliped. Lower surfaces of 6th joint of 2nd and 3rd legs strongly tuberculate, almost spinose, upper surfaces granulate but not furry; dactyls of 2nd and 3rd legs narrow ovate-lanceolate, those of 4th and 5th legs narrower; that of 3rd leg strongly furry on lateral and lower surfaces, that of 5th leg on its anterior margin only.

Length up to 44 mm., breadth 51 mm. (S. Afr. Mus.).

*Locality.*—Gt. Fish Bay, Angola (Doflein).

*Distribution.*—Mediterranean, west coast of Africa; Lobito Bay (S. Afr. Mus.), Port Alexander, Angola (Odhner).

Gen. UCA Leach

*Fiddler-crabs; Boxer-crabs; Calling-crabs.*

1814. Leach, Edin. Encycl., vii, p. 430.  
1817. Latreille, Nouv. Dict. Hist. Nat., xii, p. 517 (*Gelasimus*).  
1891. de Man, Notes Leyden Mus., xiii, p. 20 (*Gelasimus*) (key to Indo-Pacific species).  
1910. Stebbing, *l. c.*, p. 327.  
1918. Rathbun, Bull. U.S. Nat. Mus., no. 97, p. 374.  
1918. Tesch, Siboga Exp. monogr., xxxix c, p. 37.  
1919. Kemp, Rec. Ind. Mus., xvi, p. 307, footnote (*Gelasimus*).  
1922. Hyman, Ann. Rep. Smiths. Instit. for 1920, pp. 443 *sqq.*, 6 pls. (habits, development).  
1928. Maccagno, Boll. Mus. Zool. Turin, xli, no. 11, pp. 1-52, figs. (key).  
1934. Gordon, Res. Sci. Ind. orient. Néerland, iii, fasc. 15, p. 10 (*Gelasimus*).  
1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 421 (*Gelasimus*).  
1940. Crane, Zoologica, xxv, p. 72 (megalopa compared with that of *Ocypode*).  
1941. *Id.*, *ibid.*, xxvi, p. 145, pls. 1-9, text-figs. 1-8 (W. coast American spp., morphology, habits).  
1943. *Id.*, *ibid.*, xxviii, p. 217, fig. 1 (display, breeding).

Body deep. Carapace broader than long, regions ill-defined, front deflexed. Eyes terminal on long slender stalks. Chelipeds weak and subequal in ♀, finger and thumb apically spooned, in ♂ one of them enormously enlarged, no stridulating organ, smaller chela resembling those of ♀. Legs strong, dactyls fluted. A cavity, fringed with long hairs, between bases of 3rd and 4th legs. Abdomen with 7 segments in ♀, in ♂ with 7 or some of them coalesced.

*Remarks.*—Fiddler-crabs are gregarious on tropical and subtropical muddy shores and mangrove swamps. For the habits of these crabs see Alcock (1892, Ann. Mag. Nat. Hist. (6), x, p. 415), Stebbing (1893, Hist. Crust., pp. 89 *sqq.*), and Hyman (1922); Monod (1927, Fauna Colon. franç. Cameroun, p. 612, fig. 1) gives a picture of the ♂ and ♀ feeding.

The apparently numerous species of this genus, owing to a certain amount of variation, chiefly in the large chela of the ♂, have caused considerable taxonomic trouble, and it is only recently that the foundations for a correct discrimination of the species have been laid

by an examination of the 1st pleopods of the ♂♂. As Gordon (1934) has shown, this appendage has valuable taxonomic characters. Following up this line of investigation, I have figured the 1st pleopod ♂ of four species found in South Africa. In all these species the basal opening of the seminal channel is guarded by a setose flap on the inner side of the appendage. The apices, as will be seen from the figures, offer good specific characters (*cf.* Crane, *l. c.*, 1943, fig. 1).

The most southerly locality for Fiddler-crabs (*marionis* and *annulipes*) on the east coast, of which I have record, is 10 miles south of Port St. Johns, Pondoland; and on the west coast, St. Paul de Loanda.

*Key to the South African Species (Males).*

- A. Front narrow (fig. 18, *a, d*).
1. Inner margin of 4th joint of large chela with prominent acute tooth . . . . . *marionis*.
  2. Inner margin of 4th joint without tooth . . . . . *urvillei*.
- B. Front broad (fig. 18, *g, j*).
1. Oblique ridge on lower part of palm of large chela ♂ absent. Finger of large chela with prominent subapical tooth . . . . . *inversa*.
  2. Oblique ridge present. No subapical tooth on finger.
    - a.* Upper border of hand of large chela with raised edge, and a groove on outer surface . . . . . *chlorophthalmus*.
    - b.* Upper border of hand rounded.
      - i.* 4th joints of legs at least 3 times as long as broad . . . . . *lactea*.
      - ii.* 4th joints of legs less than 3 times as long as broad . . . . . *annulipes*.

The ♀♀ can be separated into species with narrow and species with broad fronts, but further specific characters seem to be lacking.

*Uca marionis* (Desm.)

Figs. 18, *a-c*, 19, *d*.

1880. Kingsley, Proc. Ac. Nat. Sci. Philad., pt. 1, p. 140, pl. 9, fig. 7 (*cultrimanus*), and p. 141, pl. 9, fig. 8 (*marionis*).

1891. de Man, Notes Leyden Mus., xiii, p. 23, pl. 2, figs. 5, 5, *a* (chelae) (*vocans*).

1902. *Id.*, Abh. Senckenb. Ges., xxv, p. 487 (synonymy).

? 1917. Stebbing, Ann. Durban Mus., ii, p. 15 (*arcuatus*, non de Haan).

1918. Tesch, *l. c.*, p. 38.



1920. McNeill, *Rec. Austral. Mus.*, xiii, p. 105, figs. 1-5 and pl. 19 (typical form and vars.).

1921. Stebbing, *Ann. Durban Mus.*, iii, p. 16 (*nitidus*).

1926. Barnard, *Trans. Roy. Soc. S. Afr.*, xiii, p. 120 (*vocans*).

1928. Maccagno, *l. c.*, p. 23, fig. 9, and p. 24, figs. 10, 11 (var. *nitida*).

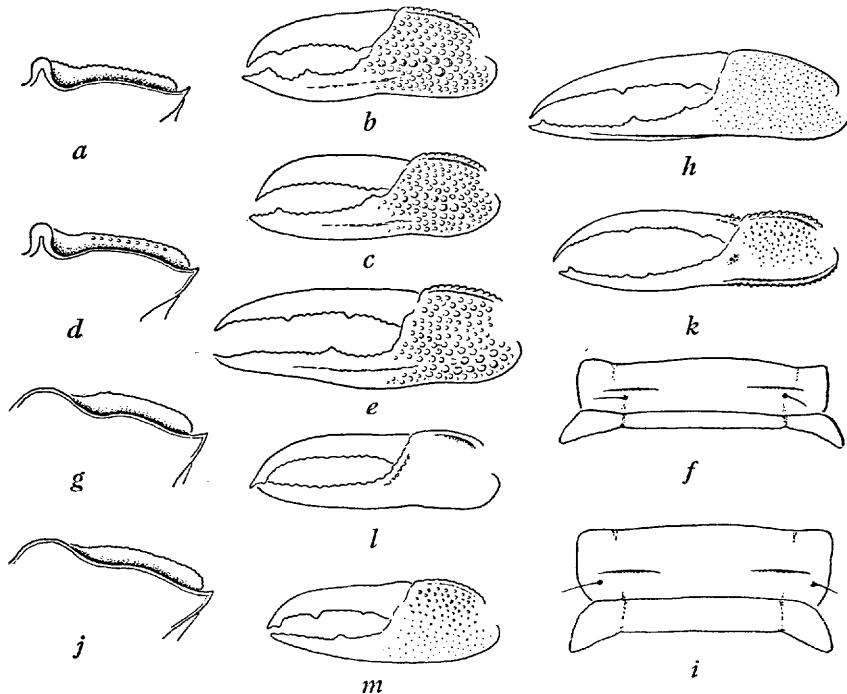


FIG. 18.—*Uca marionis* (Desm.). *a*, front of carapace. *b, c*, outer surface ♂ chela. *Uca urvillei* (M. Edw.). *d*, front of carapace. *e*, outer surface ♂ chela. *f*, 1st and 2nd abdominal segments ♂. *Uca annulipes* (M. Edw.). *g*, front of carapace. *h*, outer surface ♂ chela. *i*, 1st and 2nd abdominal segments ♂. *Uca chlorophthalmus* (M. Edw.). *j*, front of carapace. *k*, outer surface ♂ chela. *Uca inversa* (Hoffm.). *l*, inner view ♂ chela of *smithii* (after Kingsley). *m*, outer surface ♂ chela.

Front narrow. Lateral margins of carapace moderately convergent behind; no fine raised line defining the dorsal surface laterally except in front of epibranchial region. Lower border of orbit with a single row of crenulations. Large cheliped of adult ♂, 4th joint with upper margin distinct, and a prominent triangular tooth on inner margin, 5th joint with blunt spine on inner margin, hand with upper

and lower borders well defined, outer surface with large granules, inner surface with 2 prominent granulose ridges, thumb with a groove or line of pits on outer surface, cutting-edge simply sinuous, or with one or two triangular teeth, finger usually with one tooth on distal third of cutting-edge. Abdomen of ♂ with 7 segments, a transverse ridge across segment 1, segment 2 very short. 1st pleopod ♂, outer

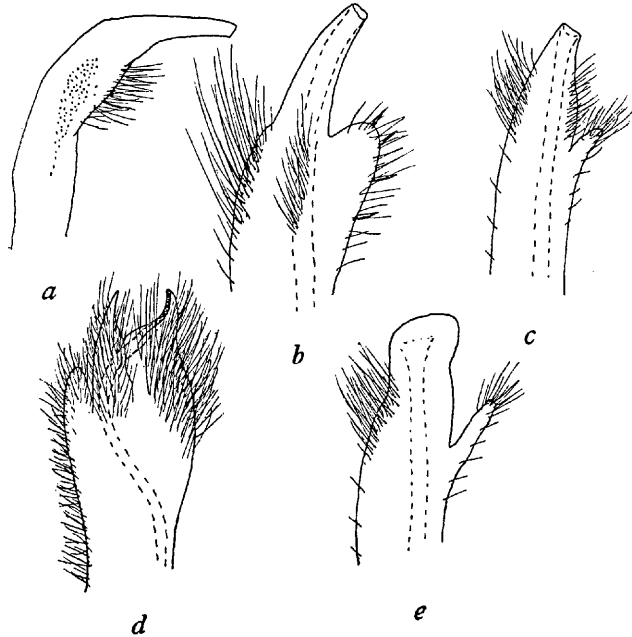


FIG. 19.—Left 1st pleopod ♂. In *a* viewed from outer side, in *b-e* from dorsal (concave) side, the internal (median) edge being on the right in *b-e*. *a, b, Uca urvillei* (M. Edw.). *c Uca chlorophthalmus* (M. Edw.). *d, Uca marionis* (Desm.). *e, Uca annulipes* (M. Edw.).

margin setose along whole length, apex trilobed, a small setose lobe on outside and 2 large lobes, the outer of which bears an acute process, and the inner one a broader channelled process, both these lobes strongly setose (only partly shown in figure), the seminal channel near apex crosses over to the outer side and then curves back again to open on the inside of the channelled process.

Length up to ♂ 16 mm., breadth 26 mm. Brownish orange, large chela ♂ pale orange below, purple above.

*Localities*.—Durban (Stebbing); Delagoa Bay (Barnard); mouth of Umgazana River, 10 miles S. of Port St. Johns (S. Afr. Mus.).

*Distribution.*—Mauritius (S. Afr. Mus.). Madagascar, east coast of Africa to Red Sea, Indo-Pacific, Queensland and New South Wales.

*Remarks.*—The lack of a demarcating line between the sides and the dorsum of the carapace, and the tooth of the 4th joint of the large cheliped ♂, distinguish this species from all other South African species.

The fact that Stebbing was inclined to include *vocans* M. Edw. (pl. 3, fig. 4), and his reference to the shape of the chela, seems to indicate that his material, or part of it, should be referred to *marionis* and not to *arcuata*.

The name *nitidus*, invoked by Stebbing (1921), is not available as it is preoccupied by Desmarest for a fossil species (Tesch, *l. c.*, p. 38).

This species seems to be rare in South Africa. At Delagoa Bay (Inyack Island) I found them in 1912 on sandy beaches; they were much shyer than the other species living in the mangrove swamps, and to capture them it was necessary to dig them out of their burrows. In front of the females the males raise themselves on the tips of their claws and then let themselves drop quickly, as if heaving a great sigh.

*Uca urvillei* (M. Edw.)

Figs. 18, *d-f*, 19, *a, b*.

- ? 1843. Krauss, Südafrik. Crust., p. 39 (*arcuatus*, non de Haan).  
1852. Milne Edwards, Ann. Sci. Nat., xviii, p. 148, pl. 3, fig. 10.  
1869. Hilgendorf, v. d. Decken's Reise, Crust., p. 84, pl. 4, fig. 1 (*dussumieri*, non M. Edw.).  
1894. Ortmann, Semon's Austral. Reise, v, p. 59.  
1900. Alcock, J. Asiat. Soc. Bengal, lxxix, p. 362.  
? 1905. Stebbing, Mar. Invest. S. Afr., iv, p. 40 (*arcuata*, non de Haan).  
1910. *Id.*, *l. c.*, p. 327 (*arcuata*, non de Haan).

Front narrow, its groove narrower than the raised margin. Lateral margins of carapace strongly convergent behind; a fine raised line from the outwardly directed antero-lateral tooth to two-thirds distance to hind margin. Lower border of orbit crenulate, with an accessory row of granules within the margin. Large cheliped ♂, 4th and 5th joints without tooth or spine, hand with upper and lower borders well defined, outer surface with large granules, inner surface with the usual oblique and double granulate ridges, thumb grooved

on outer surface, cutting-edge with a single tooth near middle, finger with cutting-edge denticulate, a few of the denticles larger than the others, but no tooth near apex. Abdomen with 7 segments in ♂, 1st segment with a short transverse ridge on each side, interrupted medianly, with a seta in a pit behind it. 1st pleopod ♂ with distal expansion on inner margin, with spines and setae, apex strongly chitinised and curving dorsally, seminal channel opening apically.

Length up to ♂ 15 mm., breadth 26 mm. Greyish blue, large chela bright red (Krauss).

*Localities.*—Durban Bay (Krauss, Stebbing); Durban Bay and Delagoa Bay (S. Afr. Mus.).

*Distribution.*—East coast of Africa, Madagascar, Madras, Nicobars, Mergui, Vanicoro.

*Remarks.*—*U. dussumieri* and *urvillei* are very closely allied species, the latter being distinguished by the accessory row of granules on lower orbital border. But de Man (1891) has recorded specimens showing traces of this accessory row, which in other respects (shape of carapace) resemble typical *dussumieri*. The fine raised dorso-lateral lines converge more rapidly in *urvillei* than in *dussumieri*. As the South African specimens have the accessory row of granules quite distinct, and the 1st pleopod ♂ unlike that figured by Gordon (1934) for *dussumieri*, they are assigned to *urvillei*.

This form is in all probability that which Krauss and Stebbing assigned to *arcuata*, a species which does not seem to exist in the western portion of the Indian region.

#### *Uca inversa* (Hoffm.)

Fig. 18, *l*, *m*.

1874. Hoffmann, Crust. . . . Madag, Réunion, p. 19, pl. 4, figs. 23–26.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 803 (*chlorophthalmus*, non M. Edw.).

1880. Kingsley, *l. c.*, p. 144, pl. 9, fig. 14 (chela) (*smithii*).

1891. de Man, *l. c.*, p. 44, pl. 4, fig. 12 (chela).

1894. Ortmann, Semon's Austral. Reuse, v, p. 59.

1900. Alcock, *l. c.*, pp. 355, 356 (var. *sindensis*).

1910. Stebbing, *l. c.*, p. 328.

1928. Maccagno, *l. c.*, p. 26, fig. 13.

1942. Chace, Bull. Mus. Comp. Zool. Harv., xci, p. 202.

Front broad. Lateral margins strongly convergent behind. Lower orbital margin (seen from above) slightly concave in middle, not crenulate except at external rounded angle, no accessory row of granules. Large cheliped ♂, 4th joint with upper outer margin dilated into a denticulate crest, 5th joint with inner margin denticulate, hand with upper margin separated from outer surface by a row of granules, outer surface granulate above, smooth (minutely granulate) below, lower margin granulate, palm without the oblique ridge found in other species, only the double transverse granulate ridge near the finger-hinge, thumb not grooved on outer surface, cutting-edge with a tooth just before middle, finger with a tooth immediately behind apex, and sometimes a second one a little farther back.

*Localities.*—Natal (Kingsley); Mozambique (Hilgendorf).

*Distribution.*—Madagascar, E. coast of Africa, Red Sea.

*Remarks.*—Although Kingsley placed his species *smithii* in the narrow-fronted group, Ortmann has identified it with *inversa* (? after inspection of Kingsley's type); Kingsley's brief description is not inconsistent, barring the width of the front.

*Uca chlorophthalmus* (M. Edw.)

Figs. 18, *j*, *k*, 19, *c*.

1902. de Man, Abh. Senckenb. Ges., xxv, p. 484, pl. 19, fig. 4.

1910. Stebbing, *l. c.*, p. 327.

1942. Ward, Mauritius Inst. Bull., ii, p. 104.

[Not *chlorophthalmus* McLeay 1838, nor Hilgendorf 1869 and 1878.]

Front broad. Lateral margins strongly convergent behind, antero-lateral angles very acute, directed obliquely outwards. Upper orbital margin rather oblique; lower orbital margin without accessory row of granules. Large cheliped ♂, outer surface of 4th joint somewhat squamose, upper margin somewhat granulate, upper border of hand margined with a raised granulate edge, with groove on its outer side, outer surface finely granulate, the granules slightly larger in the upper part, sometimes a shallow furry depression near base of thumb (*cf.* Tesch, *l. c.*, p. 40), inner surface of palm with the usual oblique granulate ridge, and 2 rather widely separated rows of granules near finger-hinge, the distal row continued more or less on to base of thumb, the more proximal row sometimes feeble, or reduced to 4-5 granules, lower edge granulate, with groove on outer side, but groove

not extending on to base of thumb, the latter not grooved on outer surface, cutting-edge with 2-4 teeth, the most distal one just before tip, finger not grooved on outer surface, only a short groove basally near upper edge, where there are a few granules, cutting-edge with 2-3 teeth. Abdomen ♂ with 7 segments, 5th segment  $1\frac{1}{2}$  times as broad as long, and slightly longer than either 4th or 6th (*cf.* de Man, 1888, *triangularis*). 1st pleopod ♂ distally with digitiform process on inner margin, apex truncate conical, the seminal channel opening apically.

Carapace bluish grey with paler mottling, large chela ♂ red, finger and thumb paler.

*Localities*.—Isipingo, Natal (Stebbing); Durban Bay, Delagoa Bay (S. Afr. Mus.).

*Distribution*.—Mauritius; East Indies.

*Remarks*.—Stebbing remarked that this species could not be included in the South African fauna-list merely on McLeay's record. In fact, McLeay's specimen is now proved (by photograph) to be *annulipes*.

The specimens above described, however, appear to be this species, or possibly *gaimardi*. de Man (1891, p. 42) separates these two species on the shape of the hand of the large chela ♂ (length including finger and thumb  $2\frac{1}{2}$  times the width in *chlorophthalmus*, 3 times in *gaimardi*). But the South African Museum specimens, otherwise identical, exhibit both "long" and "short" hands. Tesch (*l. c.*, p. 40, under *gaimardi*) makes the same observation, and doubts whether the two species are really distinct. The name *chlorophthalmus* has priority.

This species is easily distinguished from the other South African species; it is not *triangularis* as the finger of large chela is not grooved, and there are 2 (albeit variable in development; *cf.* de Man, 1891, p. 43) rows of granules on palm near the finger-hinge.

#### *Uca lactea* (de Haan)

1910. Stebbing, *l. c.*, p. 327.

1917. *Id.*, Ann. Durban Mus., ii, p. 16, pl. 4.

1928. Maccagno, *l. c.*, p. 29, fig. 15.

Front broad. Lateral margins nearly parallel, antero-lateral angles directed forwards. Lower orbital margin slightly convex, crenulate along whole margin, without accessory row of granules. Large cheliped ♂, upper outer margin of 4th joint somewhat granulate, upper surface of hand rounded, outer surface finely granulate above,

smooth (minutely granulate) below, lower border very finely granulate, palm with the usual oblique ridge near finger-hinge, outer surface of thumb without furrow near lower border, cutting-edge with a tooth just before middle, and slightly arcuate immediately before tip, which is never notched-truncate, finger with a tooth just before middle, but no tooth near tip. 4th joints of walking legs not strongly expanded, 3 to nearly 4 times as long as wide.

Sky-blue with greenish brown, or blackish blue with pale grey mottling, large chela bright red (Krauss).

*Locality*.—Durban Bay (Krauss, Stebbing).

*Distribution*.—India, East Indies, China, Japan.

*Remarks*.—Stebbing's figure of the chela shows a groove near lower margin of thumb and thus conflicts with de Man's statement (1891, p. 45); but the 4th joints of the legs appear to be narrow, this being the only character Stebbing indicates in support of his identification. The presence of this species in South Africa requires confirmation.

*Uca annulipes* (M. Edw.)

Figs. 18, *g-i*, 19, *e*.

1838. McLeay, *Annulosa S. Afr.*, p. 64 (*chlorophthalmus*, non M. Edw.).

1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 803.

1884. Miers, *Crust.*, *H.M.S. Alert*, p. 541.

1887. de Man, *J. Linn. Soc. Lond.*, xxii, p. 118, pl. 8, figs. 5-7 (chela) (*Gelasimus a.*).

1894. Ortmann, *Semon Austral. Reise*, v, p. 59.

1915. Kemp, *Mem. Ind. Mus.*, v, p. 221.

1917. Stebbing, *Ann. Durban Mus.*, ii, p. 16 (references).

1928. Maccagno, *l. c.*, p. 35, fig. 20, and var. *orientalis*, p. 36, fig. 21.

1934. Gordon, *l. c.*, p. 10.

Front broad. Lateral margins convergent behind, antero-lateral angles directed obliquely outwards. Lower orbital margin crenulate along whole length, with accessory row of granules in ♀ only, not in ♂. Large cheliped ♂, upper surface of 4th joint feebly and sparsely granulate, upper surface of hand rounded, whole outer surface smooth (minutely granulate), lower border not granulate, palm with the usual oblique ridge and double ridge near finger-hinge, thumb grooved near lower margin on outer surface, cutting-edge with 3-4 teeth, the distal subapical one sometimes strongly developed (var. *orientalis*), some-

times the edge merely arcuate at this place (de Man, 1887, pl. 8, fig. 7), finger with 2-4 teeth, but no enlarged tooth just before tip, sometimes without any enlarged teeth (de Man, pl. 8, fig. 7). Walking legs rather strongly expanded, not 3 times as long as wide. Abdomen of ♂ with 7 segments, 1st segment usually with an obscure transverse ridge on either side, interrupted medianly, with a seta in a pit behind it and near the outer margin, 5th segment twice as broad as long, slightly longer than 4th and subequal in length to 6th. 1st pleopod ♂ distally with digitiform process on inner margin, apex flattened, and rather broadly spatulate, the seminal channel opening subapically on the ventral (convex) side.

Length up to ♂ 11 mm., ♀ 9 mm., breadth ♂ 20 mm., ♀ 16 mm. Carapace blackish, or bluish black, with milk-white mottling, legs reddish, large chela salmon.

*Localities.*—Inhambane and Mozambique (Hilgendorff); mouth of Zambesi River (Miers); Durban (Miers, Stebbing); Durban, Delagoa Bay, Inhambane, and mouth of Umgazana R., 10 miles S. of Port St. Johns (S. Afr. Mus.).

*Distribution.*—East coast of Africa, Madagascar, Seychelles, Indo-Pacific.

*Remarks.*—This seems to be the commonest species in South Africa. It inhabits muddy shores and mangrove swamps. Boyce (1924, S. Afr. J. Nat. Hist., iv, p. 250) has given a popular account of its habits.

#### Gen. DOTILLA Stimpson

1900. Alcock, J. Asiat. Soc. Bengal, lxi, p. 363.

1910. Stebbing, *l. c.*, p. 329.

1917. *Id.*, Ann. Durban Mus., ii, p. 17.

1918. Tesch, Siboga Exp. monogr., xxxix c, p. 43 (key to species).

1919. Kemp, Rec. Ind. Mus., xvi, p. 324.

1940. Ramadan, Ann. Mag. Nat. Hist. (xi), 5, p. 253 (zoea stage).

Body deep, subcubical or subglobose. Carapace as broad as, or broader than long, dorsal and lateral surfaces sculptured with convoluted grooves; front narrow, deflexed. Eye-stalks long, cornea terminal. Buccal cavity and mxp. 3 very large, 4th joint of latter sculptured with convoluted grooves; penultimate joint of endopod of mx. 2 greatly expanded. Chelipeds equal in both sexes, finger and thumb slender, acute. 4th joints of chelipeds and legs with oval membranous spaces (tympana or "windows"); similar spaces sometimes also on some of the sternites. Abdomen with 7 segments



in both sexes, hind margin of 4th segment thickly fringed with setae, 5th segment not constricted in ♂. No brushes of hairs between bases of any of the legs.

*Remarks.*—Easily recognized among South African genera by the tympana or “windows” on the legs (see Kemp, 1918, Mem. Asiat. Soc. Bengal, vi, p. 228). Gregarious on muddy and sandy shores. For remarks on the sexes, and dimorphism, see Kemp (*l. c.*, 1919, pp. 324, 331 *sqq.*).

*Dotilla fenestrata* Hilg. 1869.

Fig. 20, *a, b.*

1843. Krauss, Südafr. Crust., p. 30 (*Doto sulcatus*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 806.

1904. Doflein, D. Tiefsee Exp., vi, p. 128.

1910. Stebbing, *l. c.*, p. 329.

1917. *Id.*, *l. c.*, p. 18, pl. 5 (*clepsydra*).

1919. Kemp, *l. c.*, p. 327 (references).

1921. Bigalke, S. Afr. J. Nat. Hist., iii, p. 205 (habits).

1934. Balss, Faune Col. Franç., v, p. 521 (var.).

1941. Gordon, Proc. Linn. Soc. Lond., 153 Sers., pt. 1, p. 136, fig. 11, *a* (plp. 1 ♂).

Carapace broader than long, smooth grooves in shape of a 5-rayed star, median anterior one continued to apex of front, antero-lateral ones directed towards middle of orbital margin, postero-lateral ones towards but not reaching postero-lateral angles above insertion of 5th legs; behind the latter grooves a V-shaped groove enclosing a triangular space which is pitted or feebly granulate and without cardiac grooves; hind margin straight; a lateral groove from base of 5th leg, anteriorly bifurcate, outer branch of the fork running to the short antero-lateral projection which bears a tuft of setae; rest of carapace finely granulate. Sternal tympana on 2nd and 3rd segments, sometimes also on the 1st (cheliped segment) and 4th segments, sometimes asymmetrically developed. Cheliped with a spiniform or digitiform process on under side near base of the joint in ♂, small in juv. and ♀; finger and thumb longer than palm, each with a tooth on inner edge. 1st pleopod ♂ rather slender, sinuous, distal quarter curving rather sharply outwards, outer margin setose except distally, apex slightly hooked, with a subapical fringe of plumose setae on inner anterior margin.

Length ♂ 10 mm., breadth 13 mm. Pale yellowish, with slightly darker markings on carapace.

*Localities*.—Durban Bay (Krauss, Stebbing, Gordon); Inhambane (Hilgendorf); Mozambique (Hilgendorf, Miers, Gordon); Durban,

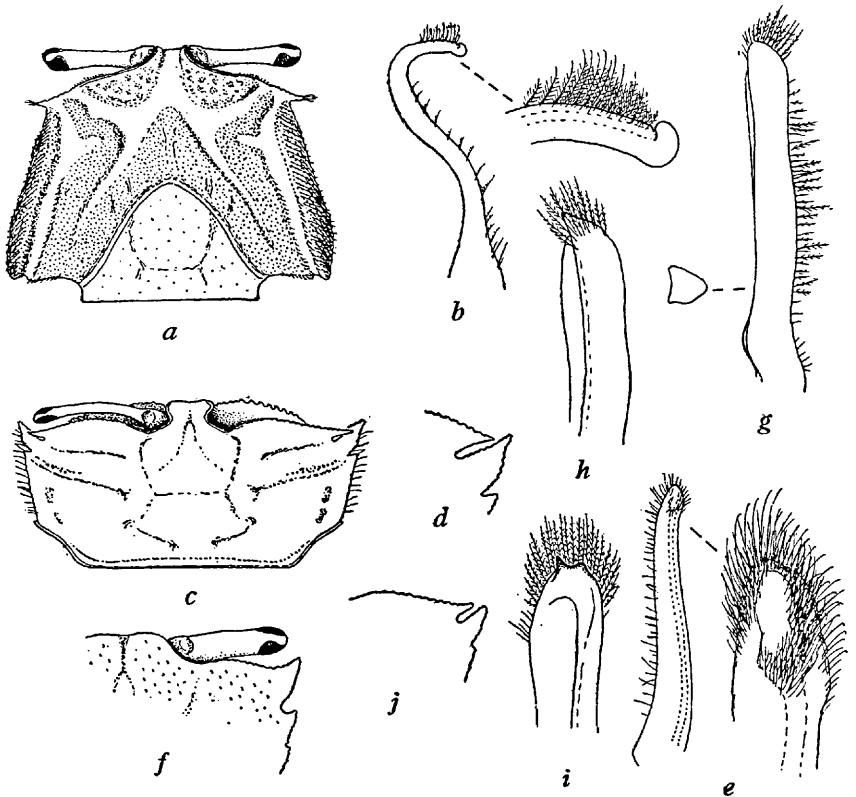


FIG. 20.—*Dotilla fenestrata* Hilg. *a*, carapace. *b*, 1st pleopod ♂, with apex further enlarged.  
*Macrophthalmus grandidieri* M. Edw. *c*, carapace ♂. *d*, part of carapace ♀.  
*e*, 1st pleopod ♂, with apex further enlarged.  
*Macrophthalmus boscii* Aud. *f*, part of carapace. *g*, *h*, *i*, ventral, median, and dorsal views respectively of 1st pleopod ♂, with cross-section.  
*Macrophthalmus hilgendorfi* Tesch. *j*, part of carapace (after Tesch).

Delagoa Bay, Inhambane, Beira, Chinde, Mozambique (S. Afr. Mus., coll. K. H. B. 1912).

*Distribution*.—Ibo; Zanzibar, Dar-es-Salaam and Mombasa; Madagascar.

*Remarks*.—Farther north this species is replaced by the closely

allied *sulcata* (Forsk.) which is distinguished by having no sternal tympana and no teeth on the inner edges of finger and thumb of chelipeds.

Gen. MACROPHTHALMUS Latr.

1915. Tesch, Zool. Med. Mus. Leiden, i, pp. 149-204.

1917. Stebbing, Ann. Durban Mus., ii, p. 12.

1918. Tesch, Siboga Exp. monogr., xxxix c, pp. 57, 58.

1919. Kemp, Rec. Ind. Mus., xvi, pp. 383-394.

Body shallow. Carapace broader than long, regions well defined, cervical and branchial grooves defining two teeth on lateral margin. Front relatively narrow, deflexed. Eye-stalks slender, elongate, sometimes extending beyond lateral margins of carapace, cornea terminal. Buccal cavity and mxp. 3 rather large, 3rd and 4th joints of latter not quite meeting in middle line, leaving a lozenge-shaped gap. Chelipeds equal or subequal, but much enlarged in ♂, short and feeble in ♀, finger and thumb bent inwards. 3rd legs longest and stoutest, 2nd and 5th short, the latter shortest. No brushes of hairs between bases of any of the legs. Abdomen with 7 segments in both sexes.

*Remarks.*—Kemp points out that the genus *Euplax* cannot be precisely defined until the rediscovery of its type species, and that the species *boscii* mentioned below might legitimately be retained in *Macrophthalmus*, where its original author, and also Krauss, placed it.

*Key to the South African [Mauritian, etc.] Species (after Tesch 1915).*

- A. Carapace about twice as broad as long. Outer surface of hand ♂ with a ridge near lower margin, inner surface (palm) with a spine.
1. External orbital tooth and 1st lateral tooth on carapace crossed, or nearly at right angles to one another (fig. 20, c, d).
    - a. Eye-stalks extending slightly beyond sides of carapace . . . . . [*sulcatus*, Mauritius].
    - b. Eye-stalks scarcely reaching inner margin of 1st lateral tooth . . . . . *grandidieri*.
  2. External orbital tooth and 1st lateral tooth pointing approximately in same direction (fig. 20, j).
    - a. Length of hand ♂ chela (without thumb) 4 times as long as high. Carapace with verrucose tubercles laterally . . . . . [*brevis*, Mauritius].

- b. Length of hand (without thumb) about twice as long as high. Carapace without verrucose tubercles . . . . . *hilgendorfi*.
- B. Carapace less than twice as broad as long, conspicuously granulate. Inner surface (palm) of hand of ♂ chela without spine.
1. 4 lateral teeth, incl. external orbital tooth [*latreillei*, Madagascar, etc.].
  2. 2 lateral teeth . . . . . *boscii*.

*Macrophthalmus grandidieri* M. Edw.

Fig. 20, c-e.

1915. Tesch, *l. c.*, p. 166, pl. 6, figs. 3, 3, a, b (references).1917. Stebbing, *l. c.*, p. 12, pl. 3.1934. Balss, *Faune Col. Franç.*, v, p. 522.1938. Monod, *Mem. Inst. d'Égypte*, xxxvii, p. 148, fig. 27.

Carapace finely granulate, rather more strongly so laterally where there are sometimes 2 feebly raised patches of granules on the branchial region, and a transverse ridge immediately in front of the branchial groove. Supra-orbital margin rather strongly sinuous. External orbital angle (tooth) directed outwards and meeting or overlapping, at least in ♂, the larger 1st lateral tooth, which points obliquely forwards and outwards. A second, smaller, lateral tooth present. Eye-stalks not reaching beyond inner margin of 1st lateral tooth. Cheliped ♂, a conical tooth on inner surface of 5th joint, and one on inner surface of hand near base, both often with subsidiary denticles; upper margin of hand denticulate, a beaded or corded ridge on outer surface near lower margin, continued as a faint smooth ridge along the thumb, lower margin of hand and thumb granulate; thumb with oblong denticulate tooth on middle of inner margin, finger with a similar tooth at base, upper margin granulate; finger and thumb strongly gaping, the distal width of hand about  $1\frac{2}{3}$  in length of upper margin of hand; in ♀ finger and thumb less gaping, inner margins finely denticulate. 1st pleopod ♂ slightly sinuous and tapering, seminal canal opening into an apical cavity on dorsal side of appendage, fringed with golden setae, a fine line (or suture) along inner edge of appendage, outer edge setose.

Length up to ♂ 16 mm., ♀ 11 mm., breadth ♂ 33 mm., ♀ 21 mm.

*Localities*.—Durban (Stebbing); Durban Bay, Delagoa Bay, Mozambique (S. Afr. Mus.).

*Distribution*.—Zanzibar, Dar-es-Salaam, Kilwa, Red Sea, Madagascar.

*Remarks.*—The crossing of the two antero-lateral teeth appears to take place only in the ♂; in young ♂ the external orbital tooth, just touches, and even in some adult ♂♂ does no more than just touch, the 1st lateral tooth; in the ♀ there is a distinct but narrow gap between the two teeth.

*Macrophthalmus hilgendorfi* Tesch

Fig. 20, *j*.

1851. Bianconi, Spec. Zool. Mosamb., fasc. 5, p. 85 (*carinimanus*, non M. Edw.).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 806 (*carinimanus*, non M. Edw.).

1915. Tesch, *l. c.*, p. 172, pl. 7, figs. 6, 6, *a, b* (references).

1934. Balss, Faune Col. Franç., v, p. 522 (as syn. of *grandidieri*).

Carapace finely granulate, without raised patches of granules (verrucose tubercles) laterally. External orbital tooth and 1st lateral tooth pointing approximately in same direction obliquely forwards; 2nd lateral tooth very feeble. Eye-stalks as in *grandidieri*. Cheliped ♂ as in *grandidieri*.

Length up to 15 mm., breadth 32 mm.

*Locality.*—Mozambique (Bianconi, Hilgendorf); Delagoa Bay (Lourenzo Marques Mus.).

*Distribution.*—Zanzibar, Red Sea, Madagascar.

*Remarks.*—I have seen only one ♀, from Delagoa Bay; my Mozambique specimens being definitely referable to *grandidieri* as regards the character of the two antero-lateral teeth. It would seem as if the species is not too well characterized, and Balss definitely regards it as a synonym of *grandidieri*. Possibly the 1st pleopod ♂ would provide better differential characters, but this appendage does not appear to have been studied in this genus.

*Macrophthalmus boscii* Audouin

Fig. 20, *f-i*.

1843. Krauss, Südafrik. Crust., p. 40, pl. 2, fig. 5, *a-c*.

1910. Stebbing, *l. c.*, p. 329 (*Euplax b.*).

1915. Tesch, *l. c.*, pp. 188, 192, 193 (*Euplax b.*).

1918. Stebbing, Ann. Durban Mus., ii, p. 55 (*Euplax b.*) (references).

1918. Tesch, *l. c.*, p. 60 (*Euplax b.*) (references).

1919. Kemp, *l. c.*, pp. 384, 391, pl. 24, fig. 6.

1938. Balss, Medd. Göteb. Mus., lxxv, p. 76.

Carapace subquadrangular, slightly broader than long, granulate, regions defined by pilose grooves, lateral margins setose, with 2 anterolateral teeth, outer margins of 1st or external orbital teeth convergent behind, *i.e.* greatest width of carapace between tips of these teeth; 3rd tooth practically obsolete. Eye-stalks a little longer than  $\frac{1}{3}$  breadth of carapace. Gap between 3rd maxillipeds a little wider than in other species of the genus. Hand of cheliped not greatly widened distally, granulate ridge on outer surface very faint, finger with tooth near base, cutting-edge of thumb crenulate; in ♂ inner surfaces of joints of chelipeds, including finger and thumb, thickly furred. Legs setose and fringed with hairs. 6th segment of abdomen ♂ slightly wider than 5th segment.

Length up to 14.5 mm., breadth 21 mm., ovig. ♀ 9 × 12 mm. Yellowish with white hairs (Krauss and K. H. B.); chelae of ♂ white on outer surface (Tesch); whitish or greyish, scattered red specks and dots on carapace and walking legs, chelae ♂ white, pterygostomial regions and anterior margin of buccal cavity more or less reddish (East London specimen, preserved in formalin).

*Localities.*—Natal (Krauss); Mozambique (Miers); Durban Bay (Stebbing); Delagoa Bay (coll. K. H. B. 1912); East London and Port Alfred (coll. T. A. Stephenson).

*Distribution.*—Madagascar, Red Sea, east coast of Africa, Malaysia, Oceania.

#### Gen. CLEISTOSTOMA de Haan

1910. Stebbing, *l. c.*, p. 328.

1918. Tesch, Siboga Exp. monogr., xxxix c, p. 61, and *Paracleistostoma*, p. 62.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 239.

1924. *Id.*, *ibid.*, xix, p. 3.

1926. Rathbun, Rec. Austral. Mus., xv, p. 178.

1931. Gordon, J. Linn. Soc. Lond., xxxvii, figs. 26–28 (1st pleopod ♂ of 3 species).

1932. Shen, Zool. Sinica, ix, p. 231 (*Paracleistostoma*) and p. 236 (figs. 1st plp. ♂ of 2 species).

1937. Tweedie, Bull. Raffles Mus., no. 13, pp. 157–160 (figs. 1st pleopod ♂ of 2 species).

Body shallow. Carapace broader than long, strongly vaulted (*Cleistostoma*) or rather flattened (*Paracleistostoma*), regions not well defined, lateral margins entire or with one tooth; front deflexed, its antero-lateral corners rounded (*Cleistostoma*) or angular and more or less produced (*Paracleistostoma*). Eye-stalks not very long, rather stout, cornea well developed, terminal. 3rd maxillipeds meeting in middle line, 4th joint as long as or longer than 3rd. Chelipeds stout in ♂, weak in ♀, 3rd and 4th legs strongest. No brushes of hairs between any of the legs. Abdomen with 7 segments in both sexes.

*Key to the South African Species.*

1. Antero-lateral corners of carapace sharp, tooth-like . . . . . *edwardsii*.
2. Antero-lateral corners rounded (♀) with small blunt point (♂) . . . . . *edwardsii* var.

*Cleistostoma edwardsii* McLeay

Fig. 21, *a-g*.

1838. McLeay, *Annulosa S. Afr.*, p. 64 (*Cleistotoma* [sic] *e.*).

1843. Krauss, *Südafrik. Crust.*, p. 40 (*Cleistotoma* [sic] *e.*).

1910. Stebbing, *l. c.*, p. 328.

1939. Buitendijk, *Zool. Medd.*, xxii, p. 76, figs. 1-5 (carapace, chela ♂♀, mxp. 3, abd., 1st plp. ♂).

Carapace quadrangular, sparsely setose, but more closely setose in the shallow grooves and hollows and on lateral margins, 1st antero-lateral (external orbital) tooth sharp, curving slightly inwards, behind it one distinct tooth and an obscure (especially so in ♀) notch, carapace widest anteriorly in ♂ posteriorly in ♀. Antero-lateral corners of front quadrate. Supra- and infra-orbital margins minutely granulate in ♀ obscurely so in young ♂, and smooth in adult ♂. Eye-stalks stout, not tapering, with a few hairs in adult ♂, cornea well developed. 3rd maxillipeds close together in middle line, 4th joint subequal to 3rd, antero-external margin somewhat strongly convex in adult ♂, exopod concealed. Anterior margin of buccal cavity somewhat sinuous, but not strongly bilobate. Cheliped ♂ robust, smooth, a row of very small granules on upper margin of hand, finger with squarish tooth (relatively smaller in adult than in young) near base, apex curved, granulate, thumb distally with a groove, bordered on inner and outer side by a denticulate ridge into which the finger apex fits, in young ♂ the inner ridge is not developed; in ♀ very weak (see fig. in Buitendijk). Legs

furry, and with fringes of longer whitish setae, 4th leg longest, 2nd and 5th shortest, dactyls flattened, fringed on both margins. Abdomen in ♂ evenly tapering, except that the lateral margins of 5th segment are concave to allow the protrusion of the folded 1st pleopods.

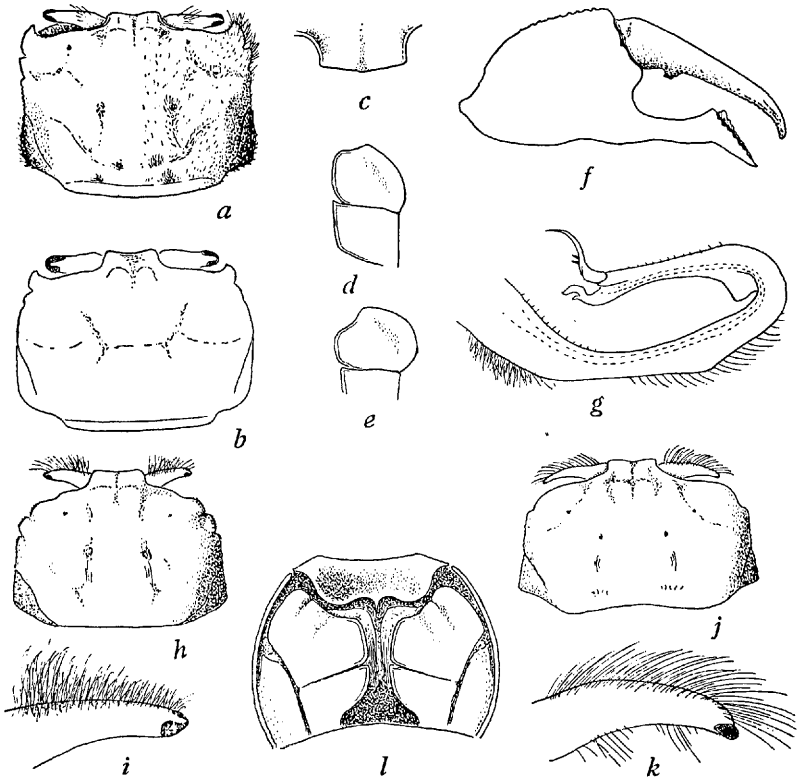


FIG. 21.—*Cleistostoma edwardsii* McLeay. *a*, carapace ♂. *b*, carapace ♀. *c*, frontal view of front. *d*, *e*, 3rd and 4th joints of mxp. 3 of smaller and larger ♂ respectively. *f*, chela ♂. *g*, 1st pleopod ♂.

*Cleistostoma edwardsii* var. *h*, carapace ♀. *i*, eye, dorsal view ♀.

*Tyloidiplax blephariskios* (Stebb.). *j*, carapace ♀. *k*, eye, ventral view. *l*, epistome and 3rd maxillipeds.

Length up to ♂ 9 mm., non-ovig. ♀ 6 mm., breadth ♂ 11 mm., ♀ 8 mm.; one ovigerous ♀ 5.5 × 7 mm.

*Localities*.—Knysna (Buitendijk, and S. Afr. Mus.); estuary of Buffalo River, East London (coll. T. A. Stephenson).

*Remarks*.—Mr. Melbourne Ward tells me (4/3/37) that the type of this species is not amongst the McLeay collection of South African Crustacea in the Australian Museum.



Buitendijk gives a brief description with useful figures, including one of the 1st pleopod ♂. The crenulation of the carapace margin in his figure is a little too strong. The shape of the front varies according to the angle from which it is viewed; it may be quite straight.

*Cleistostoma edwardsii* var.

Fig. 21, *h, i.*

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 239 (*leachii*) (not the references to McLeay, Krauss, or Stebbing, 1910).

Stebbing's ovigerous ♀ and a single ♂ from an unknown locality (ex s.s. *Pieter Faure* coll.) differ only from the normal *edwardsii*, as above described, in the following particulars.

Carapace and legs more densely setose than in any specimen of *edwardsii* that I have seen, especially on the margin of the carapace and on the legs in the ♂. External orbital corner with a very small blunt point in ♂, but quite rounded in ♀. Eye-stalks stout, but tapering distally, cornea considerably smaller than in typical *edwardsii*, but partly visible in dorsal view.

1st pleopod ♂ exactly similar to that of typical *edwardsii*.

Length 8 mm., breadth 10 mm.

*Locality.*—Zwartkops River estuary, Port Elizabeth. 1 ovig. ♀ (Stebbing); 1 ♂ without locality (S. Afr. Mus.).

*Remarks.*—The similarity of the 1st pleopod ♂ would seem to be against the institution of a separate species, though the denser setose fringes of the carapace and legs, and especially the character of the eye-stalks and cornea, are distinctive features.

Gen. TYLODIPLAX de Man

1895. de Man, Zool. Jahrb. Abt. Syst., viii, p. 598.

1900. Alcock, J. Asiat. Soc. Bengal, lxix, p. 373.

1918. Tesch, Siboga Exp. monogr., xxxix *c*, p. 69.

Body shallow. Carapace broader than long, dorsally flat, lateral borders divergent posteriorly, regions more or less defined, front not or not strongly deflexed. Eye-stalks not very long, cornea very small. Epistome with a fold on each side, causing the anterior margin of buccal cavity to appear bilobed. 3rd maxillipeds meeting in middle line except basally, 4th joint longer and wider than 3rd, antero-

external corner strongly lobed or auriculate, exopod more or less exposed. Chelipeds even in adult ♂ weak. 3rd and 4th legs longest. No brushes of hairs between any of the legs. Abdomen with 7 segments in ♀; in ♂ with 5, the 3rd-5th being fused but without obliteration of the sutures (Alcock); ♂ with 7 segments, evenly tapering (Stebbing).

*Tylodioplax blephariskios* (Stebb.)

Fig. 21, *j-l*.

1924. Stebbing, Ann. S. Afr. Mus., xix, p. 3, pl. 1 (Crust., pl. 116) (*Cleistostoma b.*).

Carapace smooth or feebly setose, antero-laterally rounded, without tooth (Stebbing's figure) or with a small blunt tooth, behind which the lateral margin minutely granulate, regions ill-defined, front deflexed, its antero-lateral corners quadrate, a median groove and a lateral groove near the inner orbital margin, two inconspicuous humps behind the front on anterior gastric region. Supra- and infra-orbital margins smooth. Eye-stalk tapering distally, with long setae on front and hind margins, cornea very small, terminal and ventral, scarcely visible dorsally, feebly pigmented (Stebbing's figure "oi" (=oc) is correct, but the representation of the eyes *in situ* in figure "car" is not good). 3rd joint of 3rd maxilliped narrow at base, 4th joint strongly dilated. Cheliped setose, strong fringes along upper and lower margins of hand, and in ♀ along middle of outer surface of hand, and along margin of finger and thumb, finger in ♂ with tooth near middle, finger and thumb in ♀ meeting along nearly whole length, apices acute. Legs setose, dactyls flattened, with strong fringe on both fore and hind edges. Abdomen (Stebbing's figure presumably ♂) with 7 segments, evenly tapering; in ♀ with 7 segments, the middle segments very broad.

Length ♂ 6 mm., ovig. ♀ 7 mm., breadth ♂ 9.5 mm., ♀ 11 mm.

*Locality*.—Delagoa Bay (Stebbing). Dredged in 3 fathoms, bottom black mud (K. H. B. 1912).

*Remarks*.—The specimen sent to, and described by, Stebbing seems to have been a ♂. It has not been returned to the South African Museum. A second specimen, an ovigerous ♀, has since been found amongst my 1912 collection of marine organisms. It is here figured and its description embodied in the above diagnosis of the species.

This species differs from *tetratylophorus* de Man (from Penang) in

its smooth carapace, and from *indica* Alcock (Karachi) in its rounded antero-lateral margin and conspicuous "eye-lashes." (See Addenda.)

FAMILY GECARCINIDAE.

*Land Crabs.*

1900. Alcock, J. *Asiat. Soc. Bengal*, lxi, pp. 283, 440 (*Geocarcinidae*).

1910. Stebbing, *l. c.*, p. 324.

1918. Rathbun, *Bull. U.S. Nat. Mus.*, no. 97, p. 339.

1918. Tesch, *Siboga Exp. monogr.*, xxxix c, p. 132.

Carapace vaulted, branchial regions inflated, lateral margins convex, not sharply defined except anteriorly, front deflexed, its width considerably less than greatest width of carapace, orbits small. 3rd maxillipeds widely separated, 5th joint inserted in middle of apical margin or at antero-external angle of 4th joint, exopod slender, exposed or partly concealed. Chelipeds robust. Legs strong, dactyls long, usually spinose. Male genital openings sternal.

*Remarks.*—Land crabs, usually brightly coloured, burrowing in mud-banks, under stones or fallen trees, often at a considerable distance away from water. Usually enters water only for spawning [see Andrews, *Monogr. Christmas Island*, 1900, p. 163 (species wrongly identified, *vide* Tesch)].

*Gecarcinus lagostoma* appears in Stebbing's 1910 Catalogue with a reference to Calman, who remarks that the history of the specimen alleged to have come from the Cape of Good Hope cannot be traced, and that there is no trustworthy evidence of the occurrence of this species outside the Atlantic region. It occurs at Ascension Is. The genus is distinguished from *Cardisoma* by the front-orbital width being less than half the greatest width of carapace.

Gen. CARDISOMA Latr.

1910. Stebbing, *l. c.*, p. 325.

1918. Rathbun, *l. c.*, p. 340.

1918. Tesch, *l. c.*, p. 136.

Fronto-orbital width much more than half the greatest width of carapace. Buccal cavity longer than wide. Exopod of mxp. 3 exposed, with flagellum. Chelipeds equal or unequal. Dactyls of legs spinose. Abdomen in both sexes with 7 segments.

*Remarks.*—The west African species *armatum* Herklots occurs as far south as Angola (Rathbun, 1921, *Bull. Amer. Mus. Nat. Hist.*, xliii, p. 456, with figs., including photograph of burrow).

*Cardisoma carnifex* (Herbst)

Fig. 23, a.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 801.

1910. Stebbing, *l. c.*, p. 325.1917. *Id.*, Ann. Durban Mus., i, p. 437.1918. Rathbun, *l. c.*, p. 343 (differences between *carnifex* and *guanhumì*).1918. Tesch, *l. c.*, p. 137.1934. Gordon, Res. Sci. Ind. orient Néerland, iii, fasc. 15, p. 5 (comparison with *hirtipes*).

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 187, pls. 97, 98.

Epibranchial tooth immediately behind outer orbital angle, lateral margin of carapace strongly and abruptly bulging behind the epibranchial tooth, carapace strongly convex, regions indistinct. Width of orbit not much more than half its length, infra-orbital border at right angles to the lateral border. 4th joints of legs with bristles only at distal end (Alcock), with a few hairs only at hind margin (Tesch).

Length up to 66 mm., breadth 87 mm. Violaceous, chelipeds bright red.

*Localities*.—Mozambique (Hilgendorf); Durban Bay (Stebbing).

*Distribution*.—Mauritius, Madagascar, east coast of Africa, and Indo-Pacific.

*Remarks*.—This crab would seem to be rare, or at least local, on the Natal coast. In the course of a collecting trip from Natal to Mozambique in 1912–13 I did not come across a single specimen. Neither Dr. C. J. van der Horst nor Professor T. A. Stephenson have obtained it in Delagoa Bay or Natal and Zululand. Being largely nocturnal in habits it may possibly have escaped observation.

## FAMILY GRAPSIDAE.

1880. Kingsley, Proc. Ac. Nat. Sci. Philad., pt. 2, p. 187.

1907. Borradaile, Ann. Mag. Nat. Hist. (7), xix, p. 485 (key, subfam. typ. err.: for "*Ocyrodinae*" read *Grapsinae*).

1910. Stebbing, *l. c.*, p. 316.

1918. Rathbun, Bull. U.S. Nat. Mus., no. 97, p. 224.

1918. Tesch, Siboga Exp. monogr., xxxix c, p. 70.

Carapace flattened or not strongly vaulted, subquadrangular, lateral margins straight or only slightly convex, front very broad, exceeding the length of the short thick eye-stalk. A gap, often wide, between the 3rd maxillipeds (fig. 25, *b*). Chelipeds robust, often furry on palm or between finger and thumb. Legs strong. Male genital openings sternal.

*Remarks.*—Essentially littoral crabs, living on rocky coasts, sandy beaches in mangrove swamps and estuaries of rivers, or even in fresh water; *Planes* is pelagic on floating timber and weeds; *Geograpsus* is terrestrial.

*Key to the South African Genera.*

- I. Ant. 1 folding beneath front in usual manner (fig. 22, *d, e*).
  - A. No oblique hairy ridge on exposed surface of mxp. 3.
    - 1. A wide gap between mxp. 3, exopod narrow.
      - Infra-orbital margin extending uninterruptedly to buccal cavity (fig. 22, *a, b*). ♂ abdomen fills all the space between bases of 5th legs . . . . . (*Grapsinae*).
      - a. Front less than half greatest width of carapace (fig. 23, *b, c*).
        - i. Finger and thumb of chela with broad spooned apices . . . . . *Grapsus*.
        - ii. Finger and thumb with acute apices. An opening, fringed with hairs, between bases of 3rd and 4th legs. Terrestrial . . . . . *Geograpsus*.
      - b. Front half or more than half the greatest width of carapace (fig. 23, *d, e*).
        - i. Ant. 2 entering orbit (fig. 22, *b, c*).
          - a. Carapace depressed, very distinctly striated right across . . . . . *Pachygrapsus*.
          - β. Carapace convex, smooth . . . . . *Planes*.
        - ii. Ant. 2 excluded from orbit by lobe or tooth at inner orbital angle (fig. 22, *a*). Carapace feebly striated laterally. No tooth behind outer orbital tooth . . . . . *Metopograpsus*.
    - 2. A moderate gap between mxp. 3, exopod broad.
      - Infra-orbital margin incomplete, supplemented by a suborbital crest (fig. 22, *c*).
      - Abdomen ♂ rarely occupying all the space between bases of 5th legs (*Varuninae*) . . . . . *Varuna*.
  - B. An oblique hairy ridge on mxp. 3, between which is a wide gap in middle line (fig. 25, *b*) (*Sesarminae*).

- 1. Lateral margin of carapace nearly straight, greatest width anteriorly (sometimes posteriorly). Pterygostomial region very distinctly reticulate (fig. 25, *b*) . . . . . *Sesarma*.
  - 2. Lateral margin convex, greatest width across middle of carapace . . . . . *Cyclograpsus*.
- II. Ant. 1 folding longitudinally in deep notches in the front, visible in dorsal view (fig. 26, *a*) (*Plagusinae*).
- A. 4th joint of mxp. 3 as broad as 3rd. Hand of cheliped not swollen, variously grooved, rugulose, or granulate (fig. 26, *b, g*) . . . . . *Plagusia*.
  - B. 4th joint of mxp. 3 much smaller and narrower than 3rd. Hand of cheliped swollen, especially in ♂, smooth (fig. 26, *j*) . . . . . *Percnon*.

Gen. GRAPSUS Lam.

- 1900. Alcock, *J. Asiat. Soc. Bengal*, lxi, p. 390.
- 1910. Stebbing, *l. c.*, p. 317.
- 1918. Rathbun, *l. c.*, p. 226.
- 1918. Tesch, *l. c.*, p. 70.

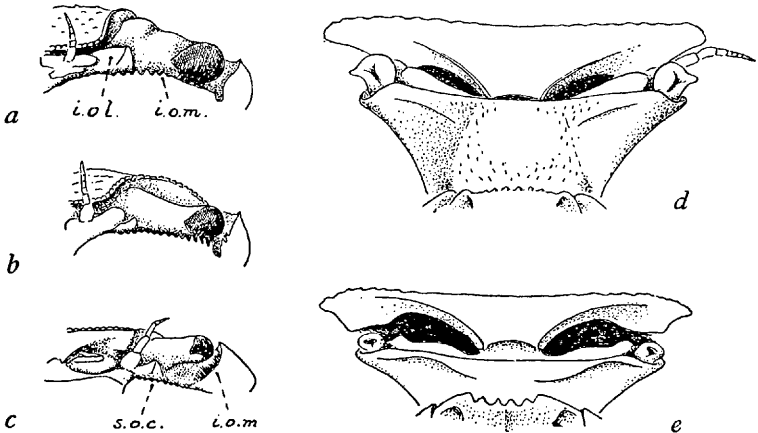


FIG. 22.—*Melopograpsus*. *a*, ventral view of orbit, to show complete infra-orbital margin (i.o.m.) and ant.2 excluded from orbit by inner orbital lobe (i.o.l.). *Pachygrapsus*. *b*, the same, showing ant. 2 entering the orbit. *Varuna*. *c*, the same, showing incomplete infra-orbital margin supplemented by the sub-orbital crest (s.o.c.). *Grapsus maculatus* (Catesby). *d*, ventral view of front and epistome, ant. 1 removed, socket narrow. *Grapsus strigosus* (Herbst). *e*, the same, socket broad.

Carapace little broader than long, depressed, branchial groove distinct, hepatic and branchial regions with regular *obliquely* transverse ridges, lateral margin convex with one tooth behind outer

orbital angle; front strongly deflexed. Orbit divided into 2 fossae. Chelipeds subequal, shorter than legs, finger and thumb apically spooned. Legs with broad and compressed joints, especially the 4th joints, dactyls spinose.

*Remarks.*—Common on rocky coasts.

*Key to the South African Species.*

1. Front much deflexed, its height half the distance between eye-stalks. Sockets of ant. 1 very narrow, almost closed by front. Epistome 3 times as wide as its median length (fig. 22, *d*). 5th+6th joints of 4th leg together longer than 4th joint. 2nd leg much shorter than 5th . . . . . *maculatus*.
2. Front less deflexed, its height less than half distance between eye-stalks. Sockets of ant. 1 wide open. Epistome scarcely  $\frac{1}{4}$  as long as wide, a strong transverse ridge on its lateral portions (fig. 22, *e*). 5th+6th joints of 4th leg together equal to or only slightly longer than 4th. 2nd and 5th legs subequal . . . *strigosus*.

*Grapsus maculatus* (Catesby)

Figs. 22, *d*, 23, *b*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 807.  
1910. Stebbing, *l. c.*, p. 317.  
1912. Lenz, Ark. Zool., vii, no. 29, p. 6 (*grapsus*).  
1918. Rathbun, *l. c.*, p. 227, fig. 135, and pls. 53, 54 (*grapsus*).  
1918. Tesch, *l. c.*, p. 71, pl. 4, figs. 2, 3.  
1921. Rathbun, Bull. Amer. Mus. Nat. Hist., xliii, p. 441, pl. 38 (*grapsus*), and pl. 56, fig. 1, pl. 57, fig. 2 (habitats).  
1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 178, pl. 90 (*grapsus*).  
1945. Stephensen, Dan. Sci. Invest. Iran. pl. 4, p. 194, fig. 59, A-D (plp. 1, 2 ♂).

Alcock and Tesch have summarized the differences between this and the next species. Both are somewhat variable, and both have a slender-legged variety (*gracilipes* and *longitarsis* respectively).

The Atlantic (typical) form of *maculatus* has the lobe on the wrist of cheliped very broad and ending in a short point, while the Indo-Pacific form (*tenuicrustatus* Herbst) has the lobe narrow and ending in a long slender spine.

Length up to 64 mm., breadth 68 mm. Dark green mottled with yellow, red or yellow chelae, and mottled legs; or dark green with

yellow lines between the oblique ridges, reddish-yellow legs and blood-red chelae (Krauss).

*Localities.*—Natal (Krauss, Kingsley); Amanzemtoti, Natal (Lenz);

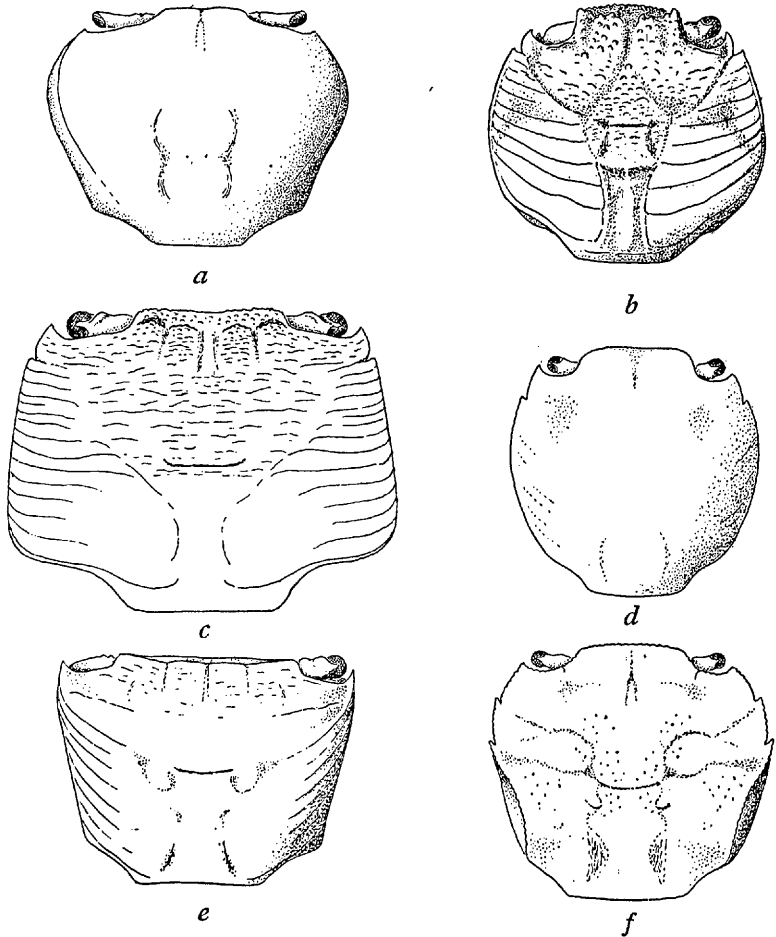


FIG. 23.—*a*, *Cardisoma carnifex* (Herbst). *b*, *Grapsus maculatus* (Catesby). *c*, *Geograpsus lividus* (M. Edw.). *d*, *Planes minutus* (Linn.). *e*, *Metopograpsus messor* (Forsk.). *f*, *Varuna litterata* (Fabr.).

Mozambique (Hilgendorf and S. Afr. Mus.); Umhlali, Natal (coll. T. A. Stephenson).

*Distribution.*—Mauritius, Madagascar, east coast of Africa, Indo-Pacific. Typical form; tropical and subtropical America, Atlantic, Ascension Is.



*Grapsus strigosus* (Herbst)

Figs. 22, e, 24, a.

1838. McLeay, *Annulosa S. Afr.*, p. 66 (*strigosa* and *flavipes*).

1910. Stebbing, *l. c.*, p. 317.

1918. Tesch, *l. c.*, p. 71, pl. 4, figs. 1, 4.

See key and remarks under *maculatus*. 1st pleopod ♂ stout, with apical, strongly chitinized process concealed in a dense brush of setae and bristles.

Dark brown, or greenish brown, mottled.

*Localities*.—Natal (Krauss, Kingsley, Miers, Stebbing); Mozambique (Hilgendorf, Miers); East London, Natal coast, Delagoa Bay, Mozambique (S. Afr. Mus.); Umhlali, Natal (coll. T. A. Stephenson).

*Distribution*.—Madagascar, east coast of Africa, Indo-Pacific.

*Remarks*.—According to material at hand, this species seems to be commoner in Natal than *maculatus*.

Gen. GEOGRAPSUS Stimpson

1858. Stimpson, *Proc. Ac. Nat. Sci. Philad.*, p. 101.

1900. Alcock, *J. Asiat. Soc. Bengal*, lxi, p. 394.

1918. Rathbun, *l. c.*, p. 231.

1918. Tesch, *l. c.*, p. 74.

1942. Ward, *Mauritius Inst. Bull.*, ii, p. 105.

Carapace flattened, lateral margins nearly straight; front not strongly deflexed; ridges on hepatic and branchial regions *transverse*. Epistome very short. Chelipeds more massive than legs, in adult ♂ at least as long as the longest leg, finger and thumb with acute apices. Between the 3rd and 4th legs a narrow opening, fringed with hairs, leading to the branchial chamber. Terrestrial.

*Key to the South African [Mauritian] Species.*

1. Lateral margins of carapace covering behind epibranchial teeth, obtuse and not keeled in their posterior half . . . [*grayi*, Mauritius].
2. Lateral margins subparallel or slightly diverging posteriorly, sharply keeled throughout . . . . . *lividus*.

*Geograpsus lividus* (M. Edw.)

Fig. 23, c.

1837. Milne Edwards, Hist. Nat. Crust., ii, p. 85.

1895. de Man, Zool. Jahrb. Abt. Syst., ix, p. 88, and subsp. *stormi* de Man.1898. *Id.*, *ibid.*, x, pl. 28, fig. 18, a, c.1900. Alcock, *l. c.*, p. 396 (*crinipes*, non Dana; see Tesch, p. 74, footnote).1918. Rathbun, *l. c.*, p. 232, pl. 55.1918. Tesch, *l. c.*, pp. 74, 75 (subsp. *stormi*).

1921. Rathbun, Bull. Amer. Mus. Nat. Hist., xliii, p. 442, pl. 15, fig. 1, pl. 22, figs. 2, 3, and pl. 56, fig. 1, pl. 57, fig. 2 (habitats).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 362.

Lateral margins of carapace diverging posteriorly and sharply keeled throughout. Cardiac and intestinal regions smooth except for a few transverse striae immediately behind cervical groove. Width of 4th joints of legs more than half their length; hind margin of 4th joints of 2nd-4th legs distinctly dentate distally; last 3 joints of legs with long bristles.

Length up to 40 mm., breadth 45 mm.

*Localities.*—Natal and Delagoa Bay (S. Afr. Mus.).

*Distribution.*—Typical form; east and west coasts of tropical America, West Indies, Cape Verde Is., Congo River mouth. Subsp. *stormi*: Madagascar, east coast of Africa, Indo-Pacific.

*Remarks.*—The first specimen, on which this species was included in the South African fauna-list, was supplied by Mr. Bell Marley in 1926, and was stated to have come from the Natal coast. I have since seen a specimen from Delagoa Bay, thus confirming its occurrence on the South African coast.

The subsp. *stormi* is distinguished by having the sharp keel from antero-lateral corner of buccal cavity convex instead of straight or slightly sigmoid.

## Gen. PACHYGRAPSUS Randall

1910. Stebbing, *l. c.*, p. 319.1918. Rathbun, *l. c.*, p. 240.1918. Tesch, *l. c.*, p. 75 (key to Indo-Pacific species).

1921. Stebbing, Ann. S. Afr. Mus., xviii, p. 458.

1934. Gordon, Res. Sci. Ind. orient. Néerland, iii, fasc. 15, p. 7 (1st plp. ♂ of 2 species).

Carapace quadrate, little convex, regions ill-defined, with transverse ridges, lateral margin with 1-3 teeth, or none, behind outer orbital tooth, front deflexed, half or more than half maximum width of carapace. Lobe at lower inner angle of orbit small, so that ant. 2 is not excluded from orbit. Chelipeds equal or unequal, massive, finger and thumb apically spooned.

*Key to the South African Species.*

1. No tooth behind outer orbital tooth . . . . . *plicatus*.
2. Three teeth behind outer orbital tooth . . . . . *polydous*.

*Pachygrapsus plicatus* (M. Edw.)

Fig. 22, b, 24, b.

1843. Krauss, Südafrik. Crust., p. 43, pl. 3, fig. 1, a-c.

1910. Stebbing, *l. c.*, p. 319 (*kraussii*).

1918. Tesch, *l. c.*, p. 77 (references).

1934. Balss, Faune Col. Franç, v, p. 524.

Lateral margins feebly convergent posteriorly, without any tooth behind outer orbital angle; transverse ridges well developed, extending right across carapace, each ridge fringed anteriorly with hairs. Cheliped, 4th joint with a dentate inner lower margin, 5th joint with a strong spine on inner margin and some granules on upper surface, 6th joint granulate above, outer surface with 4-5 finely beaded longitudinal ridges, two of which are continued on to thumb, finger granulate above at base. 4th joints of legs with transverse ciliate ridges, 2 denticles at upper apex and 2 at lower apex, the former obscure in 5th leg, the 4th joint of which has in addition a third tooth on hind margin just before the middle (this is only the accentuated end of one of the transverse ridges, and may explain how Krauss came to figure the hind margin with several denticles); 5th and 6th joints with longitudinal ciliate ridges, dactyls with numerous golden spines, 4th-7th joints with scattered long bristles.

1st pleopod ♂ tapering distally and ending in 2 cowl-like lobes, between which the seminal canal opens.

Length 11 mm., breadth 15 mm. Reddish, mottled with yellowish, hand, finger and thumb whitish, hairs on the transverse ridges white.

*Localities.*—Natal (Krauss); Isipingo, Natal (S. Afr. Mus.); Umtwalumi, Natal (coll. T. A. Stephenson).

*Distribution.*—Mauritius, Réunion, and Indo-Pacific, but apparently rare in western portion; Maldives (Borradaile), Seychelles (Rathbun).

*Pachygrapsus polyodous* Stebb.

1921. Stebbing, *l. c.*, p. 458, pl. 16 (Crust., pl. 111).

Lateral margin with 3 acute teeth behind the outer orbital tooth. Transverse ridges absent?. Cheliped, 4th joint with 2 strongly dentate ridges on inner side.

Length 18 mm., breadth 22 mm.

*Locality.*—Off Umhlangakulu River mouth, Natal, 50 fathoms (Stebbing).

*Remarks.*—Only one ♂ specimen was captured. It has not been returned to the South African Museum, so I am unable to check Stebbing's description or give further details.

Gen. METOPOGRAPSUS M. Edw.

1910. Stebbing, *l. c.*, p. 319.

1918. Tesch, *l. c.*, p. 78 (key to species).

Distinguished from *Pachygrapsus* by the large lobe at inner orbital angle which excludes ant. 2 from the orbit. No tooth, or one tooth, on lateral margin behind outer orbital angle.

*Metopograpsus messor* (Forsk.)

Figs. 22, a, 23, e, 24, c.

1888. de Man, J. Linn. Soc. Lond., xxii, p. 144, pl. 9, fig. 11 (*chela*).

1891. *Id.*, Notes Leyden Mus., xiii, p. 49, pl. 4, fig. 14 (leg) (var. *gracilipes*).

1910. Stebbing, *l. c.*, p. 319.

1917. *Id.*, Ann. Durban Mus., i, p. 438.

1918. Tesch, *l. c.*, p. 79.

1945. Stephenson, Dan. Sci. Invest. Iran. pt. 4, p. 195, fig. 59, E-G (plp. 1, 2 ♂).

Carapace about  $\frac{2}{3}$  as long as broad (across outer orbital angles), sides convergent posteriorly, no lateral tooth behind outer orbital

angle, front about  $\frac{2}{3}$  maximum breadth of carapace; fine oblique lines laterally and some fine transverse lines on post-frontal region. Lobe at inner orbital angle adnate along nearly whole of its margin

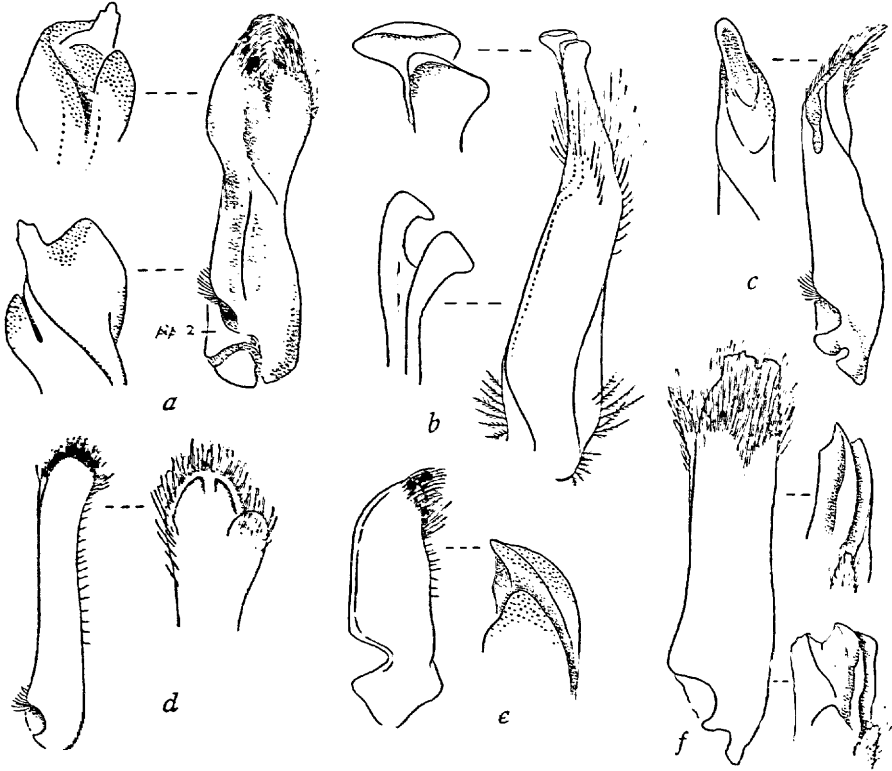


FIG. 24.—1st pleopod ♂ (whole appendage shown in ventral view).  
*Grapsus strigosus* (Herbst). *a*, with apex in ventral (above) and dorsal (below) view, hairs removed. Base of 2nd pleopod *in situ*.  
*Pachygrapsus plicatus* (M. Edw.). *b*, with apex further enlarged, and in median view.  
*Metopograpsus messor* (Forsk.). *c*, with dorsal view of apex, hairs removed.  
*Varuna litterata* (Fabr.). *d*, with dorsal view of apex.  
*Planes minutus* (Linn.). *e*, with dorsal view of apex, hairs removed.  
*Cyclograpsus punctatus* M. Edw. *f*, with median (above) and dorsal (below) views of apex.

with the front, sharp and keeled. Chelipeds somewhat unequal, 4th, 5th, and 6th joints with transverse striae or ridges, inner margin of 4th denticulate, 5th with 1 or 2 spines, hand granulate on upper and lower margins, smooth on outer surface except near lower margin where there are a few oblique striae, and a fine ridge subparallel to

lower margin and continued on to thumb. Legs with stiff outstanding hairs, dactyls (including ungues) nearly as long as 6th joints. Abdomen in ♂ evenly tapering.

1st pleopod ♂ stout, with apical strongly chitinized spatulate process, partly concealed in setae, and surrounded by membranous (mobile) integument.

Length 23 mm., breadth 30 mm. Mottled and speckled with dark reddish brown on a pale ground-colour, legs banded, hand of cheliped pink or crimson.

*Localities.*—Mouth of Umlaas River, Natal (Krauss); Natal (Kingsley); Durban (Stebbing); East London (coll. T. A. Stephenson); Delagoa Bay (Lourenzo Marques Mus.).

*Distribution.*—Mauritius, Madagascar, east coast of Africa, Seychelles, Red Sea, Indo-Pacific.

#### Gen. PLANES Bowdich

1910. Stebbing, *l. c.*, p. 320.

1918. Rathbun, *l. c.*, p. 253.

1918. Tesch, *l. c.*, p. 83 (in key) and footnote 2.

Carapace about as long as broad, evenly convex, front not deflexed, regions scarcely defined, usually a slight notch behind outer orbital tooth. Lobe at inner orbital angle small, not excluding ant. 2 from orbit. Chelipeds robust, subequal. Legs flattened, fringed with setae, semi-natatory.

*Remarks.*—Tesch includes this genus in his key to the genera of *Varuninae*, but the lower orbital border and the ♂ abdomen occupying all the space between the bases of the 5th legs indicate that it is more properly included in the *Grapsinae*, as is done by Rathbun.

Pelagic crabs, widely distributed, found on Sargassum weed and other floating objects, turtles and jelly-fishes. Frequently washed up on shore.

*Planes minutus* (Linn.)

*Sargassum, or Gulf-weed Crab.*

Figs. 23, *d*, 24, *e*.

1838. McLeay, *Annulosa S. Afr.*, p. 66 (*Nautilograpsus major*) and p. 67 (*N. smithii*).

1843. Krauss, *Südafrik. Crust.*, p. 44 (*Nautilograpsus m. and s.*).

1880. Kingsley, Proc. Ac. Nat. Sci. Philad., pt. 2, p. 202 (*Nautilograpsus m.*).

1904. Doflein, D. Tiefsee Exp., vi, p. 130.

1910. Stebbing, *l. c.*, p. 320 (part: not the specimens no. 15070 which = *Litocheira kingsleyi*).

1914. Lenz and Strunck, D. Südpol Exp., xv, p. 284.

1918. Rathbun, *l. c.*, p. 253, pl. 63.

1922. Bouvier, Res. Sci. Camp. Monaco, lxii, p. 74, pl. 2, fig. 2 (coloured).

1927. Hale, Crust. S. Austral., pt. 1, p. 181, fig. 182.

1941. Hitchcock, Biol. Bull. Woods Hole, lxxx, p. 26 (colour changes).

1942. Ward, Mauritius Inst. Bull., ii, p. 106 (*major*).

1944. Lebour, Zoologica, xxix, p. 114, fig. 4 (larval stages).

Carapace almost glabrous, but faintly punctate and with faint oblique lines laterally. The notch behind outer tooth may be almost or quite obsolete. 1st pleopod ♂ very short and stout, apical point concealed in setae.

Length up to ♂ 25 mm., breadth 24 mm. Reddish, pinkish, or greyish, often with a white or cream patch in middle of carapace, sometimes pale bluish, cobalt-blue, or lilac.

*Localities*.—Natal (Kingsley); False Bay (Stebbing); Table Bay, False Bay, Knysna (S. Afr. Mus.); Chinde, Portuguese East Africa, washed ashore (coll. K. H. B. 1912).

*Distribution*.—Tropical and temperate seas, but mainly Atlantic. Not recorded by Alcock (1900) as a member of the Indian fauna, but recorded from the southern Indian Ocean by Doflein, and from Mauritius by Ward.

*Remarks*.—The unusually large ♂, whose measurements are given above, was washed ashore on the west coast of the Cape Peninsula, near Cape Point, September 1913 (K. H. B.).

Gen. VARUNA M. Edw.

1910. Stebbing, *l. c.*, p. 319.

1918. Tesch, *l. c.*, p. 84.

Carapace about as broad as long, depressed, with sharp edges, lateral borders convex, toothed anteriorly, regions fairly well defined, especially the gastric-cardiac and cardiac-branchial grooves, front a little more than  $\frac{1}{2}$  maximum width of carapace, straight, little deflexed. Chelipeds equal, in adult ♂ robust. Legs with 5th–7th joints flattened,

dilated, and fringed with hairs, natatory. Abdomen of 7 segments in both sexes, in ♂ not covering whole width between bases of 5th legs.

*Varuna litterata* (Fabr.)

Figs. 22, *c*, 23, *f*, 24, *d*.

1897. Weber and de Meijere, Zool. Jahrb. Abt. Syst., x, p. 157.

1902. de Man, Abh. Senckenb. Ges., xxv, p. 504.

1910. Stebbing, *l. c.*, p. 319.

1915. Kemp, Mem. Ind. Mus., v, p. 232.

1918. Tesch, *l. c.*, p. 85.

1933. Hora, Proc. Zool. Soc. Lond., pt. 4, pp. 881 *sqq.*, pl. 1 (bionomics).

Carapace pitted, but glabrous; lateral border with 2 sharp teeth behind outer orbital tooth; a well-defined H-shaped mark in middle of carapace. Upper orbital margin notched. Legs not hairy, except for the fringes on last three joints. 1st pleopod ♂ apically bilobed, with 2 strongly chitinized ridges on inner (dorsal) surface of the larger lobe.

Length up to 50 mm., breadth 56 mm. Reddish brown.

*Localities.*—Illovo, Umbilo, and Umhloti Rivers, Isipingo, Natal (Weber and de Meijere); Natal (Stebbing); off Durnford Point, Zululand, 45 fathoms (S. Afr. Mus.).

*Distribution.*—Mauritius, east coast of Africa, Indo-Pacific.

*Remarks.*—Ascends estuaries, even into fresh water, and is also found at sea on floating timber.

Gen. SESARMA Say

*Marsh Crabs.*

1902. de Man, Abh. Senckenb. Ges., xxv, p. 506.

1910. Stebbing, *l. c.*, p. 320.

1917. Tesch, Zool. Med. Leyden Mus., iii, pp. 127, 235.

1918. Rathbun, Bull. U.S. Nat. Mus., no. 97, p. 284.

1918. Tesch, Siboga Exp. monogr., xxxix *c*, p. 109.

1933. Hora, Proc. Zool. Soc. Lond., pt. 4, pp. 881 *sqq.*, pl. 2 (bionomics of *tetragonum* Fabr.).

1937. Gordon, Proc. Linn. Soc. Lond., p. 150.

1940. Tweedie, Bull. Raffles Mus., xvi, p. 88.

Carapace squarish, sides nearly straight and usually nearly parallel,



with or without a tooth behind outer orbital tooth, front wide, deflexed, usually with 4 more or less prominent post-frontal bosses, dorsal regions usually well defined, oblique lines laterally, pterygostomial region and vertical walls of carapace reticulated with intersecting lines of fine hairs. Ant. 2 not excluded from orbit. Chelipeds subequal, robust, especially in ♂. Legs rather slender, except the 4th joints. 7th abdominal segment in ♂ usually shorter than its basal width; in ♀ narrow and deeply embedded in 6th segment.

*Remarks.*—Alcock's (1900, p. 410) reluctance to accept the subgenera proposed by de Man seems well founded.

In the descriptions the distinction between a *pectinate* and a *granulate* ridge should be noted: the pectinate ridge consists of a number of closely set, palisade-like, stout horny spines, sometimes subacute, sometimes blunt (fig. 25, *g*). One of the two ridges in *catenata* is definitely pectinate, while the other has rather elevated, closely set granules, which are sometimes horny at their apices, thus forming a transition between the two kinds of ornamentation (fig. 25, *c*).

As the records of *picta*, except those from Japan and China, have been doubted (Tesch, 1917, *l. c.*, p. 187), this species is not admitted here. Possibly Krauss' specimens are still available, and if so should be re-examined. See also Gordon's remarks (1937) on *maculata*.

Tropical and subtropical, living in mud-banks, marshes, and mangrove-swamps. On the west coast of Africa the genus occurs as far south as Angola (Rathbun, 1921, Bull. Amer. Mus. Nat. Hist., xliii, p. 446).

*Key to the South African Species.*

1. Two teeth on lateral margin behind outer orbital tooth.  
Carapace longer than broad . . . . . *smithii*.
2. One tooth behind outer orbital tooth.
  - a. Lateral margins divergent posteriorly . . . . . *longipes*.
  - b. Lateral margins subparallel or slightly convergent posteriorly.
    - i. Inner margin of 4th joint of cheliped without tooth. No *pectinate* ridges on upper margin of hand (fig. 25, *e*) . . . . . *meinerti*.
    - ii. Inner margin of 4th joint of cheliped with a sharp tooth. Two *pectinate* ridges on upper margin of hand (fig. 25, *g*) . . . . . *guttata*.
3. No tooth behind outer orbital tooth.
  - a. Upper surface of hand of cheliped with 2 obliquely transverse *pectinate* ridges; inner margin of 4th joint with large spine, 5th joint with smaller one . . . . . *plicata*.

- b. Upper surface of hand with only *one pectinate* ridge;  
no sharp spines on 4th or 5th joints of cheliped.
- i. Upper margin of finger of cheliped with longi-  
tudinally-oval, milled tubercles (fig. 25, c).  
Finger and thumb widely gaping, but less so  
in ♀ than in ♂, furry at their junction . *catenata*.
- ii. Upper margin of finger with transversely-oval  
tubercles proximally, and longitudinally-  
oval tubercles distally (fig. 25, i). Finger  
and thumb not widely gaping, not furry . *eulimene*.

*Sesarma (Sesarma) smithii* M. Edw.

1853. Milne Edwards, Arch. Mus. Paris, vii, p. 149, pl. 9, fig. 2.  
1853. *Id.*, Ann. Sci. Nat. (3), xx, p. 187.  
1880. Kingsley, Proc. Ac. Nat. Sci. Philad., pt. 2, p. 217.  
1893. Bürger, Zool. Jahrb. Abt. Syst., vii, p. 618, pl. 21, fig. 2.  
1917. Tesch, *l. c.*, pp. 199, 249 (references).

Carapace longer than its width across outer orbital angles, dorsally convex and uneven, lateral margins convex only anteriorly, 2 teeth behind outer orbital tooth, the 1st one with long outer margin. Cheliped in adult ♂ with 2 black blunt spines on upper margin of finger. Length of 6th abdominal segment ♂ distinctly greater than width of its posterior margin.

*Locality*.—Natal (M. Edwards).

*Distribution*.—Madagascar, Zanzibar, East Indies, Philippine Is., Fiji, Queensland.

*Remarks*.—Not included in Stebbing's 1910 Catalogue. I have not seen any of the above-mentioned references except Tesch, from whose key the above description has been taken.

*Sesarma (Sesarma) longipes* Krss.

1843. Krauss, Südafrik. Crust., p. 44, pl. 3, fig. 2, *a-d*.  
1907. Borradaile, Trans. Linn. Soc. Lond., xii, p. 64.  
1910. Stebbing, *l. c.*, p. 322.  
1917. Tesch, *l. c.*, pp. 170, 241.

Carapace glabrous, lateral margins diverging posteriorly, one tooth behind outer orbital tooth, hind margin subequal to width of front, which is half the anterior width of carapace, anterior margin of front nearly straight, its antero-external angles rounded; post-frontal lobes obsolete (Krauss) or distinct, the middle pair larger than the outer pair (Alcock), median groove deep. Chelipeds subequal, no

tooth on inner margin of 4th or 5th joints, though inner angle of latter is pronounced, almost dentiform (Alcock), inner and outer surfaces of hand granulate (Alcock) (Krauss' figure shows outer surface smooth), a row of granules along lower margin continued to apex of thumb, upper margin without granulate or pectinate ridges (Alcock) or with a feeble keel (Krauss) or with a sharp rough ridge (Borradaile); upper margin of finger with a few sharp granules (Alcock) (smooth in Krauss' figure), finger and thumb not widely gaping, not furry at junction. Legs long, 4th leg about  $2\frac{1}{2}$ –3 times anterior width of carapace, lower margins of 4th joints smooth. 6th abdominal segment ♂ twice as broad as long.

Length 18 mm., breadth (posteriorly) 20 mm. Bright brownish red, with 8 yellowish spots, of which 2 are behind each orbit and the other 4 in middle of the carapace (Krauss).

*Locality.*—Umlaas River mouth (Krauss).

*Distribution.*—Andaman Is. and Seychelles.

*Remarks.*—Up to the present has not been rediscovered in South Africa.

*Sesarma (Sesarma) meinerti* de Man

Fig. 25, e, f.

1843. Krauss, Südafrik. Crust., p. 44 (*tetragona* M. Edw., non Fabr.).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 809 (*tetragona?* Fabr. M. Edw.).

1887. de Man, Zool. Jahrb. Abt. Syst., ii, pp. 648, 668.

1894. Ortmann, Semon's Austral. Reise, v, p. 56.

1900. Alcock, J. Asiat. Soc. Bengal, lxi, p. 417.

1910. Stebbing, *l. c.*, p. 321 (*tetragonum*, non Fabr.).

1917. *Id.*, Ann. Durban Mus., i, p. 438 (*tetragonum*, non Fabr.) (25th July).

1917. Tesch, *l. c.*, pp. 171, 246 (references and synonymy) (28th July).

1917. Stebbing, Ann. Durban Mus., ii, p. 10 (*tetragonus*, non Fabr.) (December 1917).

1942. Chace, Bull. Mus. Comp. Zool. Harv., xci, p. 201.

Carapace dorsally with numerous little tufts of hair (easily rubbed off), lateral margins slightly converging posteriorly, with a tooth (and sometimes indications of a second tooth) behind and usually projecting further outwards than outer orbital tooth, hind margin shorter than

width of front, which is a little greater than half maximum width of carapace, its antero-lateral angles sharply quadrate, its anterior margin sinuous (emarginate medianly). Chelipeds subequal, front margin of 4th joint denticulate, but no tooth on either 4th or 5th joints, outer surface of latter squamose-rugulose, outer and lower surfaces of 6th joint pitted, with a few granules, chiefly near lower surface, inner surface granulate, with a curved row of larger tubercles subparallel to distal margin, upper surface without any pectinate ridges but a few irregular and variable sublongitudinal rows of granules; upper surface of finger with a row of inconspicuous serrations; finger and thumb widely gaping in large ♂, not furry at junction. Legs with upper surfaces of 5th and 6th joints furry. Length of 6th abdominal segment ♂ only a little less than proximal width.

Length up to 43 mm., breadth 47 mm. Dark violet above, pterygostomial regions also violet (sealing-wax red, *apud* Krauss), chelae bright red.

*Localities.*—Mozambique (Hilgendorf); Durban Bay (Krauss, Stebbing, and S. Afr. Mus.).

*Distribution.*—Mauritius, Madagascar, east coast of Africa, Indo-Pacific.

*Remarks.*—Chace quotes Loveridge that crocodiles feed on these crabs.

*Sesarma (Chiromantes) guttata* M. Edw.

Fig. 25, *g*, *h*.

1869. Milne Edwards, *Nouv. Arch. Mus. Paris*, v, p. 26.

1887. de Man, *Zool. Jahrb. Abt. Syst.*, ii, p. 658.

1888. *Id.*, *J. Linn. Soc. Lond.*, xxii, p. 177.

1917. Tesch, *l. c.*, pp. 155, 255.

Carapace with tufts of hair, lateral margins subparallel, one tooth behind outer orbital tooth, hind margin  $\frac{3}{4}$  width of front which is a little more than half anterior width of carapace, anterior margin of front sinuous, its antero-lateral angles sharply quadrate, post-frontal lobes prominent, subequal. Chelipeds subequal, inner margin of 4th joint with a prominent acute tooth, rest of margin denticulate proximally and distally to the tooth, inner and outer surfaces of hand granulate, upper surface with 2 oblique pectinate ridges, a granulate ridge between inner and upper surfaces, outer surface of thumb more or less flattened with a slight ridge near lower margin, upper margin of finger with 12 transversely-oval tubercles, each with 1-3 transverse

striae, a row of smaller tubercles on inner side of and alternating with the larger one, finger and thumb not widely gaping, not furry at junction. 4th leg twice *length* of carapace; 4th joints of legs twice (or almost) as broad as long, lower (hind) margins smooth or feebly serrulate. Length of 6th abdominal segment ♂ twice in its proximal and  $1\frac{1}{4}$  in its distal width. Horny apex of 1st pleopod ♂ sharply bent outwards.

Length 19 mm., breadth (anteriorly) 24 mm.

*Locality*.—Delagoa Bay (coll. K. H. B. 1912, and Lourenzo Marques Mus.).

*Distribution*.—Zanzibar.

*Remarks*.—Only one ♂ specimen was obtained by me in 1912; it seems to agree with *guttata* according to the comparison between it and other near species given by de Man in 1888. I have not seen his 1887 description. A second ♂, presumably from Delagoa Bay, was submitted by the Lourenzo Marques Museum (1940).

Distinguished from *plicata* by the tooth on lateral margin behind outer orbital tooth.

*Sesarma (Parasesarma) plicata* (Latr.)

1843. Krauss, Südafrik. Crust., p. 45 (*affinis*) (? and *picta*, non de Haan).

1900. Alcock, J. Asiat. Soc. Bengal, lxi, p. 413 (*quadratum*).

1910. Stebbing, *l. c.*, p. 321 (*quadratum*).

1917. Tesch, *l. c.*, pp. 187, 252 (references and synonymy).

1917. Stebbing, Ann. Durban Mus., ii, p. 10 (*quadratus*).

1932. Shen, Zool. Sinica, ix, p. 191, figs. 119, 120, and pl. 7, fig. 8.

Carapace with lateral margins slightly converging posteriorly, no tooth behind outer orbital tooth, front more than half greatest width of carapace, its anterior margin slightly sinuous; post-frontal lobes prominent, subequal, rugulose and setose. Chelipeds subequal, inner margin of 4th joint with a large subterminal spine, upper margin ending in a much smaller spine, upper surface of hand with 2 pectinate ridges and some short oblique granulate ridges (pectinate ridges absent in ♀; Alcock), upper surface of finger with 11–14 (–19) transversely oval milled tubercles, finger and thumb not widely gaping, not furry at junction. 4th joints of legs with hind margins smooth.

Length 16 mm., breadth 20 mm.

*Localities*.—Natal (Krauss): Durban Bay (Stebbing).

*Distribution*.—Mauritius, Madagascar, east coast of Africa, Indo-Pacific.

*Remarks*.—I have seen no specimens.

*Sesarma (Parasesarma) catenata* Ort.

Fig. 25, a-d.

1838. McLeay, *Annulosa S. Afr.*, p. 65 (*reticulata*, non Say).

1843. Krauss, *Südafrik. Crust.*, p. 45 (*reticulata* quoted from McLeay).

1897. Ortmann, *Zool. Jahrb. Abt. Syst.*, x, p. 334, pl. 17, fig. 9.

1905. Stebbing, *Mar. Invest. S. Afr.*, iv, p. 44 (*catenatum*).

1910. *Id.*, l. c., p. 321 (*reticulatum*) and p. 322 (*catenatum*).

1917. Tesch, l. c., pp. 141, 253.

1917. Stebbing, *Ann. Durban Mus.*, ii, p. 10 (*Parasesarma catenatus*).

1921. *Id.*, *ibid.*, iii, p. 16, pl. 3 (*Parasesarma catenatus*; part: the Durban specimens).

Carapace glabrous, lateral margins slightly convergent posteriorly, no tooth behind outer orbital tooth, hind margin scarcely  $\frac{3}{4}$  width of front, which is distinctly more than half greatest width of carapace, anterior margin of front slightly convex and sinuous, its antero-external angles rounded-quadrate; post-frontal lobes not very prominent, the middle pair slightly the larger. Chelipeds subequal, 4th joint with inner margin laminately expanded and denticulate, 5th joint without spine, inner surface of hand with tiny granules and some larger ones near finger-hinge, outer surface also with tiny granules, larger towards upper margin, often almost smooth, a fine beaded line at the lower third, subparallel to lower margin, and extending to about middle of cutting-edge of thumb, upper surface with a flat rhomboidal area bounded distally by a pectinate ridge, on either side by a granulate ridge, and crossed in middle by a row of close-set, often horny granules which might almost be termed a 2nd pectinate ridge, some additional granules proximally, finger with 5-6 longitudinally-oval milled tubercles flanked on inner side by a row of granules, finger and thumb widely gaping and proximally densely furry in ♂; in ♀ apparently not distinguishable from *eulimene*, without the distinctive rhomboidal area, and sculpture of finger indistinct. 4th joint of legs smooth on hind margins. Length of 6th abdominal segment ♂ subequal to distal width and a little less than half proximal width. Apex of 1st pleopod ♂ curving slightly, but not markedly outwards.

Length up to ♂ 20 mm., ♀ 13 mm.; breadth ♂ 25 mm., ♀ 17 mm.

Dark brownish, legs rather reddish, speckled, chelae more or less orange, or orange-brown, finger and thumb paler.

*Localities.*—Keurbooms River, Plettenberg Bay (Stebbing); Durban Bay (Stebbing); East London, and Umkomaas, Natal (S. Afr. Mus.).

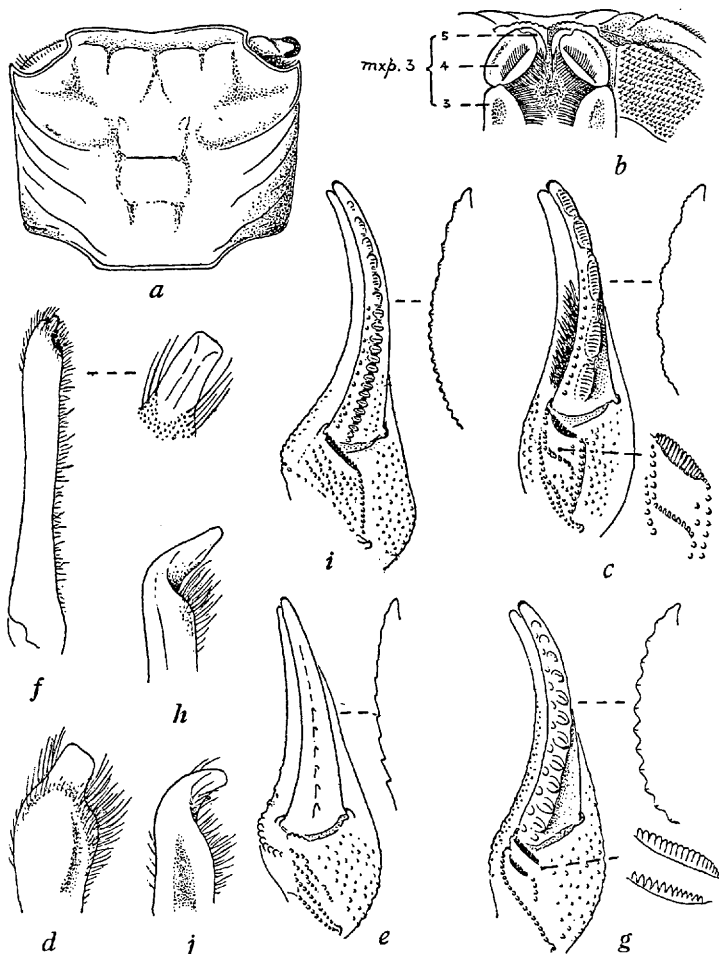


FIG. 25.—*Sesarma catenata* Ort. *a*, carapace. *b*, ventral surface showing 3rd maxillipeds and part of pterygostomial region. *c*, upper surface of hand and finger of chela ♂, with rhomboidal area further enlarged, and profile of upper margin of finger. *d*, apex of 1st pleopod ♂.

*Sesarma meinerti* de Man. *e*, upper surface of hand and finger of chela ♂, with profile of finger. *f*, 1st pleopod ♂ with apex further enlarged, most of the hairs removed.

*Sesarma guttata* M. Edw. *g*, upper surface of hand and finger of chela ♂, with pectinate ridge further enlarged, and profile of finger. *h*, apex of 1st pleopod ♂.

*Sesarma eulimene* de Man. *i*, upper surface of hand and finger of chela ♂, with profile of finger. *j*, apex of 1st pleopod ♂.

*Remarks.*—The Keurbooms River is the most westerly locality on the southern coast of South Africa yet recorded for any species of this genus. Its presence there I was personally able to confirm in 1931.

Males are easily recognizable by the gaping and furry finger and thumb of the chela; and the rhomboidal area with the two ridges (one pectinate, the other partly so) on the hand of ♂ is very characteristic. Females are indistinguishable from those of *eulimene*.

*Sesarma (Holometopus) eulimene* de Man

Fig. 25, *i, j*.

1897. de Man in Weber and de Meijere, Zool. Jahrb. Abt. Syst., x, p. 157, pl. 15, fig. 1, *a-g*.

1910. Stebbing, *l. c.*, p. 322.

1917. Tesch, *l. c.*, pp. 150, 237.

1921. Stebbing, Ann. Durban Mus., iii, p. 16 (*catenatus* part: specimen from Delagoa Bay).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 363.

Carapace pitted, glabrous except for scattered setules, lateral margins parallel, no tooth behind outer orbital tooth, hind margin  $\frac{3}{4}$  width of front, which is a little more than half greatest width of carapace, anterior margin of front slightly convex, rarely slightly sinuous, its antero-external angles quadrate but not sharply so; post-frontal lobes not very prominent, subequal or middle pair the larger. Chelipeds subequal, inner margin of 4th joint denticulate, but not expanded, and without spine, 5th joint without spine, inner and outer surface of hand granulate, upper margin with a nearly longitudinal sinuous ridge which is pectinate distally and granulate proximally, some additional short rows of granules, upper margin of finger with about 14 transversely-oval tubercles in proximal half and about 6 longitudinally-oval milled tubercles in distal half, transition between the two kinds gradual, the transverse tubercles symmetrical, but the longitudinal ones incline forwards (the distal slope shorter and steeper than the proximal slope), on the inner side proximally an irregular row of tiny granules, finger and thumb not gaping and not furry at junction; in ♀ similar but sculpturing on finger less distinct. 4th joints of legs with hind margin smooth. Length of 6th abdominal segment ♂ subequal to its distal width and half or not quite half its proximal width. Apex of 1st pleopod ♂ bent outwards.

Length 15 mm., breadth 19–20 mm. Brown, chelae of ♂ bright orange-red.



*Localities.*—Umbilo River, Natal (de Man); Delagoa Bay (Stebbing, as *catenata* part); Delagoa Bay and Beira (coll. K. H. B.).

*Remarks.*—Unless found in conjunction with their respective males, it seems impossible to distinguish the females of this species and *catenata*.

Gen. CYCLOGRAPUS M. Edw.

1910. Stebbing, *l. c.*, p. 318.

1918. Rathbun, Bull. U.S. Nat. Mus., no. 97, p. 325.

1918. Tesch, Siboga Exp. monogr., xxxix c, p. 125 (key to Indo-Pacific species).

Carapace broader than long, with convex (in *punctatus*) lateral margins, without tooth (or a very feeble one) behind outer orbital angle, front about half width of carapace, more or less deflexed, post-frontal lobes inconspicuous, dorsal regions ill-defined, no oblique lines (or only one short one in posterior third), pterygostomial regions with setae arranged in orderly lines but not so conspicuously reticulate as in *Sesarma*. Ant. 2 not excluded from orbit. Chelipeds robust, especially in ♂, subequal. Legs strong. Abdomen with 7 segments in both sexes, in ♂ not occupying whole space between bases of 5th legs, 7th segment in ♀ much wider than long, not embedded in 6th segment.

*Remarks.*—Littoral and estuarine. On the west coast of Africa *C. occidentalis* extends as far south as Angola (Rathbun, Bull. Amer. Mus. Nat. Hist., xliii, p. 455).

*Cyclograpsus punctatus* M. Edw.

Fig. 24, *f*.

1838. McLeay, Annulosa S. Afr., p. 65, pl. 3 (*Gnathochasmus barbatus*).

1843. Krauss, Südafrik. Crust., p. 45, pl. 3, fig. 3, *a-c* (*Sesarma barbata*).

1894. Ortmann, Semon's Austral. Reise, v, p. 57.

1910. Stebbing, *l. c.*, p. 318.

1914. Lenz and Strunck, D. Südpol Exp., xv, p. 283.

1914. Stebbing, Trans. Roy. Soc. Edin., 50, p. 265.

1915. *Id.*, Ann. S. Afr. Mus., xv, p. 58.

1918. Rathbun, *l. c.*, p. 328, fig. 153 (mxp. 3) and pl. 99.

1918. Tesch, *l. c.*, p. 126 (in key).

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 26.

1941. Broekhuysen, Trans. Roy. Soc. S. Afr., xxviii, pp. 331-366, figs., charts, pls. 56, 57 (life-history).

Carapace widest at anterior third (middle of gastric region), some

specimens as in McLeay's figure with sides behind the greatest width nearly parallel, whole carapace with a finely beaded rim, a deep groove from outer orbital margin below the antero-lateral margin, dorsal surface smooth and even, though somewhat uneven in large specimens, 6-8 small circular or oval depressions, 2 on each hepatic region, 2 on gastric region, and often 2 more behind the latter forming the ends of the gastric-cardiac groove (*cf.* McLeay's figure), often indistinct in small specimens, and in large ones often one or two additional pairs on the frontal and post-frontal region; the short (true) infra-orbital margin, the long anterior margin of the pterygostomial region and the oblique ridge across it, and the anterior margin of buccal cavity conspicuously granulate. Chelipeds smooth in ♂, in ♀ minutely granulate, chiefly on upper parts of wrist and hand, middle of inner surface of hand somewhat gibbous with 1-3 (or 4) low blunt tubercles, often inconspicuous, a moderate gap between bases of finger and thumb in ♂ and large ♀. Legs smooth, but in ♀ minutely granulate, chiefly on upper and lower margins of joints, patches of dark felt on upper and lower apex of 6th joint of 2nd leg, and on upper apices in 3rd-5th legs, 6 stripes of felt on dactyls of all legs, the 3 stripes on upper surface thicker than the others; legs otherwise glabrous. Abdomen of ♂ tapering from 3rd to 6th segment, distal angles of latter bevelled off, and 7th segment abruptly narrower. 1st pleopod ♂ stout, with setose lobe on inner edge, apex with 2 horny laminae, which are coalesced along outer margin, seminal canal opening between them.

Length up to ♂ 30 mm., ♀ 21 mm.; breadth ♂ 38 mm., ♀ 26 mm. Smallest ovigerous ♀ seen: 8 mm. in breadth. Greyish, buff, orange, salmon, deep red, brownish, greenish brown, violaceous, more or less mottled or speckled, chelipeds and legs uniform or more or less conspicuously spotted or speckled. Those living amongst rocks on the shore are lighter in colour; the brown, greenish, or violaceous tints are found in those burrowing in mud in estuaries (Krauss, and K. H. B.).

*Localities.*—Brak River, Uitenhage Division, and Natal (Krauss); Port Elizabeth (Ortmann); Simon's Bay (Stimpson); False Bay (Stebbing); Cape Town (Rathbun); Table Bay and Natal (Stebbing); Dyer's Island (Odhner); around whole coast from Port Nolloth on west coast to Durban and Uhlamli, Natal, and Zululand (S. Afr. Mus.).

*Distribution.*—Chile, Juan Fernandez, Indian Ocean, Hong Kong.

*Remarks.*—The Australasian *audouinii* (see Tweedie, Pap. Proc. Roy. Soc. Tasman. for 1941, p. 18, fig. 4, 1942) is very closely related to *punctatus* (the latter has line precedence) and, as Milne Edwards

himself said (1837, *Hist. Nat. Crust.*, ii, p. 78), may only be a variety of *punctatus*. Balss (*J. Roy. Soc. W. Austr.*, xxi, p. 142) records it as such. Rathbun (1918, *l. c.*, p. 329), however, gives some points of difference, which probably can only be appreciated by a direct comparison of specimens from both regions. As this author has compared Cape and Chilian specimens and pronounced them identical, it is probable that the Australian form does not merit specific rank, and that the species is circum-subantarctic, like *Plagusia chabrus* (*infra*) and the Crayfish *Jasus lalandei*.

This is one of the commonest shore-crabs around the South African coast, inhabiting both rocky coasts and muddy estuaries.

Broekhuysen found that the principal breeding season was in winter at the Cape.

Gen. PLAGUSIA Latr.

1906. Laurie, *Rep. Pearl Oyster Fish, Ceylon*, pt. v, p. 429.

1910. Stebbing, *l. c.*, p. 322.

1918. Rathbun, *Bull. U.S. Nat. Mus.*, no. 97, p. 331.

1918. Tesch, *Siboga Exp. monogr.*, xxxix c, p. 128 (key to species).

Carapace subcircular, more or less depressed, interorbital space with 2 deep notches for reception of 1st antennae. Inter-antennular septum broad. Anterior margin of buccal cavity prominently projecting, crenate or dentate. Eye-stalks short and stout. 4th joint of mxp. 3 as broad as 3rd joint. Chelipeds and legs rugose-granulose, with furry grooves; the former robust in ♂, weak in ♀; legs strong, dactyls short, spinose. Abdomen with 7 segments, but in both sexes 3rd–5th segments may be more or less firmly coalesced. 1st pleopod ♂ stout.

*Remarks.*—The difference between the 1st pleopods ♂ of two apparently so closely allied species as *chabrus* and *depressa* is remarkable. In the former the course of the seminal groove (formed by the juxtaposition of the curled edges of the appendage) is nearly normal, *i.e.* on the inner and dorsal surfaces; but in *depressa* it takes a spiral course over the *ventral* surface and on to the *outer* surface before opening between the apical lobes (*cf.* fig. 26, *c, d, and h*).

Temperate and tropical seas, including the Mediterranean. Frequently found clinging to ships.

*Key to the South African Species.*

1. 4th joints of legs with one subapical tooth on upper margin  
Carapace squamose-tuberculate . . . . . *depressa*.

2. 4th joints of legs with numerous teeth on upper margin.

Carapace smooth, covered with short pile . . . *chabrus*.

*Plagusia depressa* (Fabr.)

var. *tuberculata* Lam.

Natal Rock-crab.

Fig. 26, *g*, *h*.

1910. Stebbing, *l. c.*, p. 323 (*squamosa*).

1915. Kemp, Mem. Ind. Mus., v, p. 241.

1918. Rathbun, *l. c.*, pp. 332, 334, fig. 154, pls. 101, 102 (and var. *tuberculata*).

1918. Tesch, *l. c.*, p. 128 (in key, and footnote), p. 129 (var. *tuberculata*).

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 22 (and var. *tuberculata*).

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120 (*squamosa*).

Carapace moderately convex, covered (including gastric region) with conical or squamiform tubercles, each fringed anteriorly with short close-set bristles. Lobes on posterior margin of coxae of 3rd and 4th legs cut into 2-3 teeth (*depressa*) or entire (var. *tuberculata*). 4th joints of legs with a single subterminal tooth on upper margin; and a fringe of setae near both the upper and lower margins on the hinder surface. Wrist and hand of chelipeds rugulose-granulose, with setose grooves. Upper surface of hand with 3, of finger with 2, such grooves. 1st pleopod ♂, see *supra*, and fig. 26, *h*.

Length up to 54 mm., breadth 56 mm. Reddish, with darker blood-red dots and speckles.

*Localities*.—Mouth of Umlaas River (Krauss); Durban (Odhner); Isipingo, Natal (S. Afr. Mus.); Delagoa Bay (Barnard).

*Distribution*.—Typical *depressa*: both sides of Atlantic, west coast of Africa as far south as Port Alexander, Angola (Odhner), St. Helena.

var. *tuberculata*: Mauritius, east coast of Africa, Indo-Pacific, Chile.

*Remarks*.—Only var. *tuberculata*, distinguished by the entire coxal lobes, is found in the Indo-Pacific region. The use of Herbst's name *squamosa*, used by Alcock and Stebbing, has been criticized by Laurie (*l. c.*, pp. 429, 430).

Found on rocky coasts, and also on drift-wood, and clinging to ships.

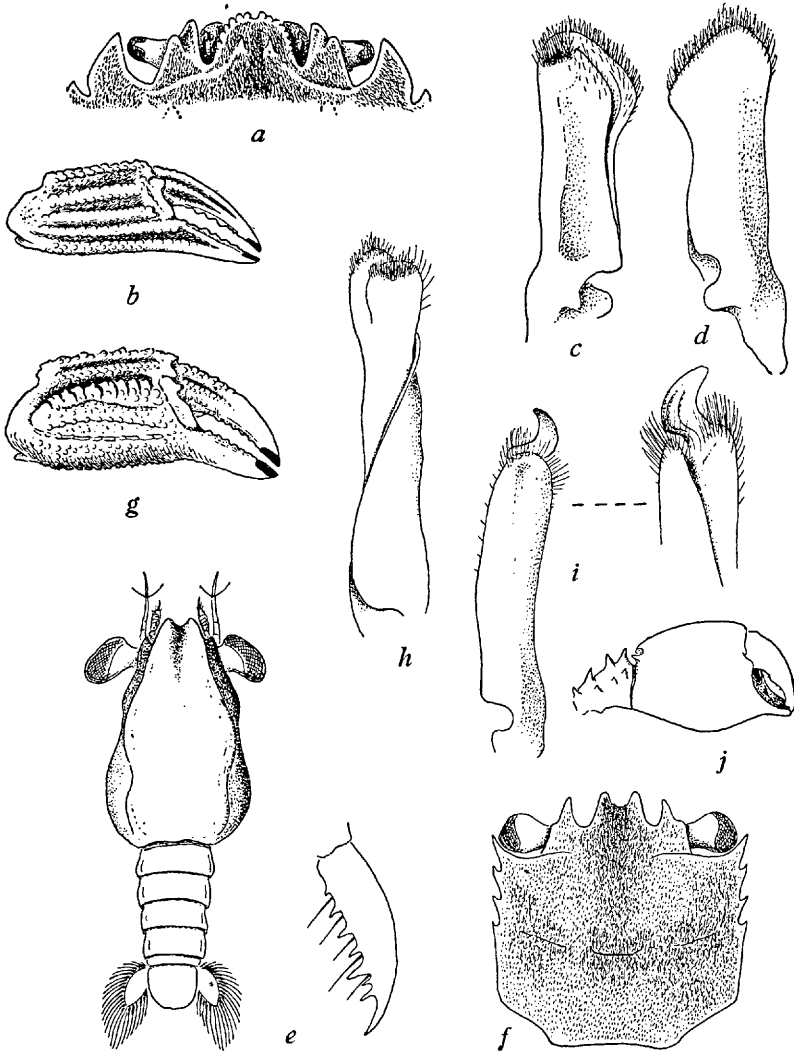


FIG. 26.—*Plagusia chabrus* (Linn.). *a*, front of carapace. *b*, outer surface of chela ♂. *c*, *d*, dorsal and ventral views of 1st pleopod ♂. *e*, Megalopa stage, with dactyl of walking leg. *f*, carapace of juvenile in 1st post-larval stage. *Plagusia depressa* (Fabr.). *g*, outer surface of chela ♂. *h*, ventral view of 1st pleopod ♂. *Percnon planissimum* (Herbst). *i*, ventral view of 1st pleopod ♂, with dorsal view of apex. *j*, upper surface of left chela ♂.

*Plagusia chabrus* (Linn.)

## Cape Rock-crab.

## Fig. 26, a-f.

1838. McLeay, Annulosa S. Afr., p. 66 (*tomentosa* and *spinosa* = juv.).  
 1843. Krauss, Südafr. Crust., p. 42, pl. 2, fig. 6 (*tomentosa*).  
 1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 809.  
 1905. Stebbing, Mar. Invest. S. Afr., iv, p. 47 (*capensis*, discussion of specific name).  
 1910. *Id.*, l. c., p. 322.  
 1914. Lenz and Strunck, D. Südpol Exp., xv, 285.  
 1918. Rathbun, l. c., p. 336, pl. 104.  
 1927. Hale, S. Austral. Crust., pt. 1, p. 185, fig. 186.  
 1929. Chilton and Bennet, Trans. N. Zeal. Inst., lix (1928), p. 774.  
 1942. Tweedie, Pap. Proc. Roy. Soc. Tasman. for 1941, p. 22, fig. 8 (*capensis*).

*Megalopa* stage.

## Fig. 26, e.

1843. Krauss, Südafrik. Crust., p. 54 (*Megalops mutica*).  
 1852. Dana, U.S. Expl. Exp., xiii, p. 488, pl. 31, fig. 2, a-i (*Marestia elegans*).  
 1910. Stebbing, l. c., p. 348 (*Marestia paederus*).  
 ? 1918. Rathbun, Australas. Antarct. Exp. Rep., ser. C, v, pt. 2, p. 4, fig. 1 (*Marestia mawsoni*).  
 1930. Bennett, Rec. Canterb. Mus., iii, p. 257 (*Marestia mawsoni* = megalopa of *P. chabrus*).

Carapace slightly convex, smooth, non-tuberculate (1 tubercle behind orbit and 2-3 elongate ones near outer angle of branchial region: Rathbun's description of Australasian specimens; not seen in any South African specimens, except a faint indication of the post-orbital one in large examples (dotted in fig. 26 a)), covered with a fine close tomentum. Sternum, ventral surface of abdomen, and the grooves and depressed areas on legs and chelipeds also covered with tomentum. Posterior coxal lobes on 3rd and 4th legs each ending in a single sharp tooth. 4th joints of legs with a row of spines on upper margin, less strongly developed on 5th leg than on the preceding ones; and a fringe of setae near lower margin only. Wrist and hand of chelipeds tuberculate, tubercles longitudinally arranged on hand

and upper surface of fingers; upper and outer surface of hand with 6, of finger with 3, setose grooves. 1st pleopod ♂, see *supra*, and fig. 26, *c, d*.

Length up to 45 mm., breadth 50 mm. (a Tasmanian ♂ in S. Afr. Mus. measures 68 × 74 mm.). Deep reddish brown, the bare stripes on legs and margins of carapace brighter reddish than the parts covered with brown tomentum.

*Localities.*—Table Bay (Krauss, Lenz, Stebbing); Simon's Bay (Stimpson, Lenz and Strunck); East London (Stebbing); numerous localities around coast from Luderitzbucht and Port Nolloth on west coast to Port Shepstone, Natal, 0–35 fathoms (S. Afr. Mus.).

*Distribution.*—Chile, Juan Fernandez; S. and S.E. Australia, Tasmania, New Zealand.

*Remarks.*—This crab is the commonest shore-crab around the south-west coast, and is found on all rocky situations, clinging with great pertinacity and hiding in crevices; also on the jetties and quays in docks, and on ships' bottoms.

The life-history has not been studied, but there is no doubt that the large Megalopas found so abundantly in in-shore waters, and washed up on the beach together with very small post-larval stages, are the early stages of this species. These Megalopas have been found in the months of April, June, August, and September, especially the latter two months. Some were taken from the stomach of a Sun-fish (*Ranzania truncata*) stranded on the Cape Peninsula in August 1934.

The Megalopa measures 6–7 mm. in length and 4–5 mm. in width. The front is prominent and deeply grooved above, and almost vertically deflexed. The notches for the 1st antennae lie at a lower level laterally. The upper and outer surface of the hand of cheliped shows indications of the same ridges and grooves as are found in the post-larval and adult stages. Similar indications are found on the 6th and, less conspicuously, on the 5th joints of the legs. The dactyls are strong with 6–7 teeth, of which the 4th or 5th is larger than the others; long setae in the intervening notches (fig. 26, *e*).

The smallest crabs, exhibiting the adult form, measure 6 × 6 mm., and represent presumably the 1st post-larval stage. The carapace is approximately square, the outer orbital teeth projecting laterally slightly farther than the dentate lateral margins. Except at the margins the carapace is covered with fine pile (fig. 26, *f*) (cf. *spinosa* McLeay).

*Marestia mawsoni* Rathbun 1918 is probably the Megalopa of this species, as already suggested by Bennett (1930).

## Gen. PERCNON Gistel

1900. Alcock, J. *Asiat. Soc. Bengal* lxi, p. 439 (*Liolophus*).

1910. Stebbing, *l. c.*, p. 324.

1918. Rathbun, *Bull. U.S. Nat. Mus.*, no. 97, p. 337.

1918. Tesch, *Siboga Exp. monogr.*, xxxix c, p. 129.

1939. Schmitt, *Smithson. Misc. Coll.*, xcvi, 6, p. 23 (key to species).

Carapace subcircular, strongly depressed, inter-orbital space with 2 deep notches for 1st antennae. Inter-antennular septum narrow. Epistome linear. Anterior margin of buccal cavity a toothed ridge, not prominently projecting. Eye-stalks very short and stout. 4th joint of mxp. 3 much smaller and narrower than 3rd. Chelipeds and legs spinose, but not rugose; legs slender, especially the distal joints. Abdomen with 5 segments in both sexes, segments 3-5 being completely fused. 1st pleopod ♂ ending in a hook.

*Percnon planissimum* (Herbst)

Fig. 26, *i, j*.

1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 809.

1902. de Man, *Abh. Senckenb. Ges.*, xxv, p. 543, pl. 20, fig. 12 (*Liolophus p.*), and pp. 544, 545 (contrast with *abbreviatum*).

1910. Stebbing, *l. c.*, p. 324.

1917. *Id.*, *Ann. Durban Mus.*, ii, p. 11.

1918. Tesch, *l. c.*, p. 130.

1929. Hale, *Trans. Roy. Soc. S. Austral.*, liii, p. 70, pl. 5.

1942. Ward, *Mauritius Inst. Bull.*, ii, p. 108.

Carapace dorsally covered with short close tomentum, leaving margins and certain slightly raised stripes bare; whole ventral surface, sternum, abdomen, chelipeds, and legs glabrous; upper surface of legs with alternate bare and tomentose stripes. A flat, but sharp-pointed tubercle behind each orbit. Anterior margin of buccal cavity with a sharp median spine, and one at each lateral corner. Edge of the pleural groove across pterygostomial region fringed with setae. Chelipeds with spines on upper and outer border of 4th and 5th joints, one spine at upper outer basal corner of hand directed proximally, hand smooth, not sulcate on upper border, and without tuft of setae on inner surface, feebly enlarged in ♀, but strongly so in ♂. 4th joints of legs with row of spines on front margin, with a subsidiary



submarginal row of denticles, and fringes of hairs near both front and hind margins. Abdomen of ♂ broad, 7th segment subtriangular.

Length 25 mm., breadth 23 mm. Reddish or orange brown, the margins and bare stripes on carapace and legs brighter, a median dorsal stripe and an oblique stripe on each side of it emerald green, suborbital ridge and anterior margin of buccal cavity also emerald green, joints of legs and some patches or bands on the 4th joints buff, lower half of eyes bright red, ventral surface of carapace and legs pale creamy (K. H. B.) (*cf.* also Krauss, Stimpson, Stebbing).

*Localities.*—Mozambique (Hilgendorf); Durban (Krauss, Stebbing); Scottburgh, Isipingo, Durban, Port St. Johns (S. Afr. Mus.).

*Distribution.*—Mauritius, Amirante Is., east coast of Africa, Indo-Pacific. Rathbun (1918, *l. c.*, p. 337) now regards the Atlantic form, *gibbesi* (M. Edw.), as distinct from the Indo-Pacific form, but does not discuss the differences. Bouvier (1922, Res. Sci. Camp. Monaco, lxii, p. 75) records a specimen from Grand Salvage (N. des Canaries) as Herbt's species.

*Remarks.*—Krauss' record from Table Bay is not acceptable; this species has not since been found anywhere on the Cape coast, and it is very unlikely that it occurs here except as a casual inhabitant of a ship's hull in transit.

This crab is exceedingly quick and difficult to catch, because, when a rock is lifted up, it slides away underneath, and gets into narrow crevices from which it is with difficulty dislodged, and then only with the loss probably of most of its legs. In form and movements it is thus analogous to the terrestrial crab-spider (*Selenops*).

#### FAMILY PORTUNIDAE.

1907. Borradaile, Ann. Mag. Nat. Hist. (7), xix, p. 483 (key to subfamilies).

1910. Stebbing, *l. c.*, p. 305.

1927. Palmer, J. Mar. Biol. Assoc. Plym., n.s., xiv, p. 877 (revision of "Portunus," discussion of name).

1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 13.

Carapace depressed or slightly convex (seldom strongly convex), usually wider than long, and widest at the last antero-lateral tooth, front broad, not deflexed, usually cut into lobes or teeth. The 5th pair of legs, with few exceptions, natatorial, with at least the last 2 joints flattened, broad, strongly fringed with hairs. Male genital

openings coxal. Eye-stalks short, except in *Podophthalmus*, where they are very elongate (cf. *Ommatocarcinus*, *Goneplacidae*).

*Remarks.*—The great majority of crabs of this family are at once recognized by the paddle-like last pair of legs. One of the exceptions, in which the dactyls of this pair of legs are acutely lanceolate and not distinctly natatorial, is *Carcinides maenas* (Linn.), a common edible shore crab in Europe and North America. This crab has also been found in the Suez Canal and Red Sea, Ceylon, Australia, and Hawaiian

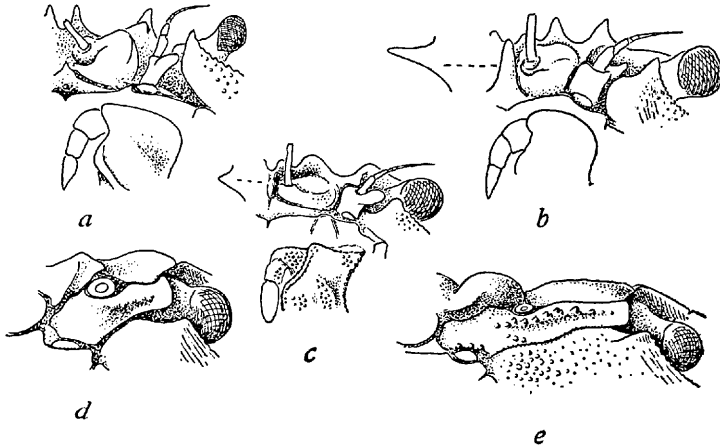


FIG. 27.—Ventral views of front. In *a-c* the 2nd antenna enters the orbit; in *d, e*, the apical process of the basal joint excludes the rest of the antenna (cut off and represented by an oval blank space) from the orbit. 3rd maxilliped shown in *a-c*.

*a*, *Ovalipes punctatus* (de Haan). *b*, *Lupa pelagica* (Linn.). *c*, *Monomia argentata* (White, M. Edw.). *d*, *Charybdis merguensis* (de Man). *e*, *Thalamita crenata* (Latr.) M. Edw.

Islands; it may eventually find its way to South Africa (see Rathbun, *l. c.*, p. 15, fig. 4, also Chopra and Das, *Rec. Ind. Mus.*, xxxix, 1937, pp. 381, 391.

The family has been divided into subfamilies, but as these have been employed with different connotations by various authors (Alcock, Borradaile, Rathbun) they are not indicated here.

#### Key to the South African Genera.

I. Basal joint of ant. 2 narrow, without apical process (figs. 28, i, 29, f, j).

A. Front with median tooth (fig. 28, a, g).\* Ant. 1 oblique.

1. 5th pair of legs not natatorial . . . [Carcinides].

\* But see *Lissocarcinus Laevis*.

2. 5th pair of legs natatorial. 5 antero-lateral teeth (incl. outer orbital tooth).
- a. Flagellum of ant 2 entering orbit (cf. fig. 27, a-c) . . . . . *Portumnus*.
- b. Flagellum of ant. 2 excluded from orbit (cf. fig. 27, d) . . . . . *Lissocarcinus*.
- B. Front with median notch (figs. 28, h, 29, e, i). Ant. 1 transverse.
1. Carapace with 9 antero-lateral teeth.
- a. Antero-lateral teeth subequal (fig. 28, h). 4th joint of 5th leg without spine on hind margin . . . . . *Carupella*.
- b. Antero-lateral teeth alternately larger and smaller (fig. 29, e). 4th joint of 5th leg with spine on hind margin (fig. 29, h) . . . . . *Lupocyclus*.
2. Carapace with 5 antero-lateral teeth . . . . . *Parathranites*.
- II. Basal joint of ant. 2 moderately broad or very broad, with apical process (figs. 27, a-e, 31, e).
- A. Flagellum of ant. 2 entering orbit (figs. 27, a-c, 31, e).
1. 5 antero-lateral teeth. Basal joint of ant. 1 visible dorsally (fig. 29, a) . . . . . *Ovalipes*.
2. 9 antero-lateral teeth. Basal joint of ant. 1 not visible (figs. 30, a, e, 31, a, b).
- a. Chelipeds elongate, hand costate.
- i. 4th joint of mxp. 3 apically rounded (fig. 27, b). Dactyl of 5th leg glabrous . . . . . *Lupa*.
- ii. 4th joint of mxp. 3 apically square and produced outwards (figs. 27, c, 31, g).
- α. 9th antero-lateral tooth much larger than the others. Carapace subhexagonal (figs. 30, a, e). Dactyl of 5th leg with pilose stripes (fig. 30, d).
- \* Postero-lateral angles of carapace rounded . . . . . *Monomia*.
- \*\* Postero-lateral angles spiniform . . . . . *Hellenus*.
- β. 9th antero-lateral tooth not larger than others. Carapace subcircular (fig. 31, a). Dactyl of 5th leg glabrous . . . . . *Achelous*.
- b. Chelipeds robust, hand inflated and smooth (not costate) . . . . . *Scylla*.
3. 6 antero-lateral teeth (fig. 31, d, j) . . . . . *Gonioneptunus*.

B. Flagellum of ant. 2 excluded from orbit by process of the very broad basal joint (fig. 27, *d, e*).

1. Distance between outer orbital teeth considerably less than greatest width of carapace; 6 antero-lateral teeth (2nd sometimes small) (fig. 32) . . . . . *Charybdis*.
2. Distance between outer orbital teeth not much less than greatest width of carapace; 5 antero-lateral teeth (4th often small or obscure) (fig. 33) . . . . . *Thalamita*.

#### Gen. PORTUMNUS Leach

1853. Bell, Brit. Stalk-eyed Crust., p. 82.

1910. Stebbing, *l. c.*, p. 305.

Carapace nearly as long as broad or longer than broad, front with median tooth, antero-lateral margin with 5 teeth. Ant. 1 oblique; ant. 2 not excluded from orbit, basal joint narrow. Upper margin of orbit with 1 or 2 fissures. Eye not larger than eye-stalk, which is slightly curved. 5th leg with 6th and 7th joints expanded, the latter rather narrow, ovate-lanceolate, apically acute or subacute, with or without distinct unguis. Abdomen with 5 segments in ♂, the ultimate segment not abruptly narrower than penultimate, in ♀ with 7 segments, 2nd-4th short, 6th and 7th evenly tapering.

#### *Key to the South African Species.*

1. Carapace slightly broader than long, with transverse ridges or rows of tubercles. Hand of cheliped with 3 ridges on outer upper surface . . . . . *biguttatus*.
2. Carapace about as broad as long, smooth. Hand of cheliped with one ridge on outer upper surface . . . . . *mcleayi*.

#### *Portumnus biguttatus* Risso.

Fig. 28, *e, f*.

1816. Risso, Hist. Nat. Crust., p. 31 (*Portunus b.*).

1825. Latreille, Encycl. Meth., x, p. 151 (*Platyonichus nasutus*).

1838. McLeay, Annulosa S. Afr., p. 62, pl. 3 (*Xaiva pulchella*).

1894. Ortmann, Semon's Austral. Reise, v, p. 44 (*pulchellus*).

1897. Garstang, J. Mar. Biol. Assoc., n.s., iv, p. 402.

1902. Bohn, Bull. Sci. Fr. Belg., xxxvi, p. 447 (*Portumniodes garstangi*).

1910. Stebbing, *l. c.*, p. 305 (*pulchellus*).

1921. Balss, Beitr. Kennt. Meeresf. Westaf., iii, p. 56 (*pulchellus*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 363.

Carapace slightly broader than long, front prominent, with blunt median tooth, sides undulate, antero-lateral margin with 4 teeth behind the broad feebly bilobed outer orbital tooth, a small tooth on upper orbital margin external to the fissure, a transverse row of 8 rounded tubercles across middle of gastric and hepatic regions, and an interrupted ridge between the last antero-lateral teeth across hinder part of gastric and epibranchial regions. Outer surface of 3rd and 4th joints of mxp. 3 glabrous, but anterior margin of 4th joint with conspicuous bristles. Cornea ovoid, with small apical tubercle. Cheliped, wrist with a triangular tooth on inner upper margin and 3 ridges on upper surface, hand with keeled inner upper margin, and 3 ridges on upper half of outer surface, finger and thumb ridged and grooved, apices crossed; tufts of bristles along inner upper margin (sub-marginal) of wrist and hand, and lower inner margin of hand. 5th leg with 6th joint ovate, 7th lanceolate, nearly 3 times as long as broad, with distinct acute unguis. 1st pleopod ♂, see fig. 28, *f*.

Length up to ♂ 22 mm., ♀ 21 mm., breadth ♂ 25 mm., ♀ 24 mm. Pinkish with deeper orange-red irroration and speckling, some small dark red circular spots in various places, 2 on the cardiac region being the only ones which are symmetrical (in S. Afr. Mus. specimens).

*Localities*.—Port Elizabeth (Ortmann). Swakopmund and Luderitzbucht (Balss); Lambert's Bay, Dassen Island, Wilderness (George district), Port Elizabeth, Port Alfred, littoral (S. Afr. Mus.).

*Distribution*.—Plymouth, west coast of France, Mediterranean, Cape Verde Is.

*Remarks*.—Milne Edwards (1861) remarked that *pulchellus* was closely related to *biguttatus*. Balss (1921) kept them separate. Dr. Gordon, to whom I owe the above references, regards them as identical (in litt. 18/vi/37).

*Portumnus mcleayi* Brnrd.

Fig. 28, *a-d*.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 363.

Carapace about as broad as long, or slightly longer than broad, smooth except for 4 or 6 very low and obscure tubercles in middle, minutely granulate and with scattered pits; front prominent, blunt with undulate sides, antero-lateral margin with 4 teeth behind the incurved outer orbital tooth, the 1st low and truncate, the others

triangular; upper orbital margin with 2 small fissures but no tooth. Inner margin of 3rd and 4th joints, outer surface of 4th joint, and palp of mxp. 3 densely setose. Cornea globular. Cheliped, wrist

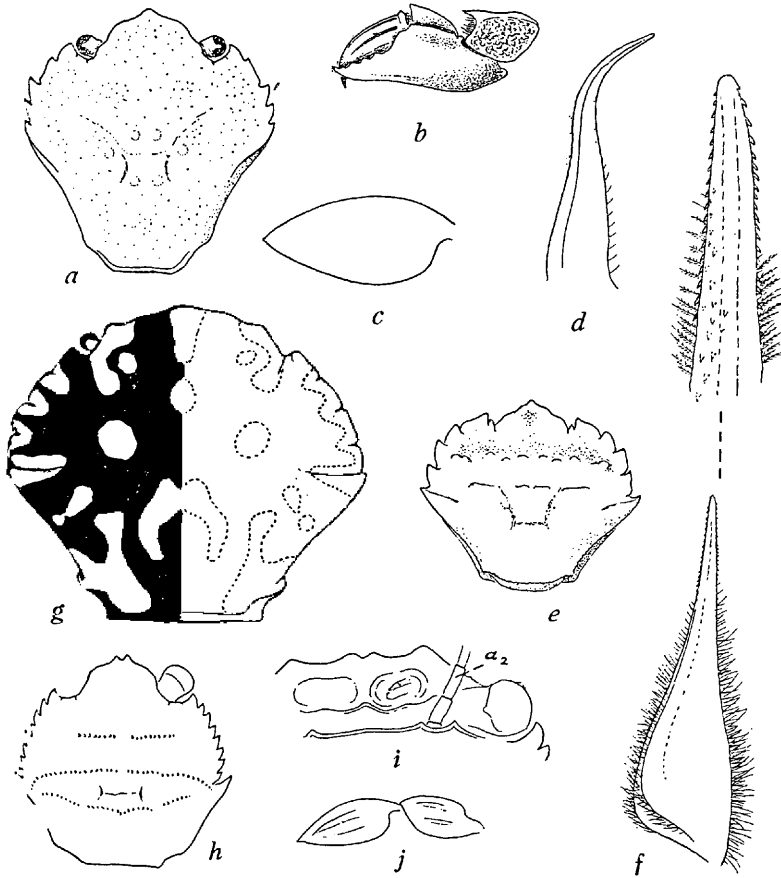


FIG. 28.—*Portumnus mcleayi* Brnrd. *a*, carapace. *b*, outer view of chela. *c*, dactyl of 5th leg (marginal setae omitted). *d*, 1st pleopod ♂. *Portumnus biguttatus* Risso. *e*, carapace. *f*, 1st pleopod ♂, with apex further enlarged, ventral view, spines on dorsal surface dotted. *Lissocarcinus orbicularis* Dana. *g*, carapace (the dark area on left side is maroon in life). *Curupella natalensis* Lenz. *h*, carapace. *i*, ventral surface of front. *j*, 5th leg. (*h-j* after Lenz.)

granulate externally, with sharp tooth on inner upper margin, hand smooth, glabrous, inner upper edge sharply keeled, a low ridge on outer upper surface, finger grooved on upper and outer surfaces,

finger and thumb apically crossed. 5th leg with 7th joint ovate-lanceolate, twice as long as broad, apex subacute, without distinct unguis.

Length up to 13 mm., breadth 13 mm.

*Localities.*—Algoa Bay to Port Shepstone (Natal), 24–27 fathoms (S. Afr. Mus.).

*Remarks.*—Quite distinct from the species described by McLeay, which seems to be a purely littoral form.

Gen. LISSOCARCINUS Ad. & White

1848. Adams and White, Voy. "Samarang," Crust., p. 45.

1877. Streets, Bull. U.S. Nat. Mus., vii, p. 110 (*Assecla*).

1886. Miers, *Challenger* Rep., xvii, p. 204.

1899. Alcock, J. Asiat. Soc. Bengal, lxxviii, p. 18.

1923. Kemp, Rec. Ind. Mus., xxv, p. 405.

1931. Chopra, *ibid.*, xxxiii, p. 307.

Carapace not or very little broader than long, smooth, or with a single ridge running inwards from last antero-lateral tooth, or with numerous transverse grooves; front prominent, with or without median notch; antero-lateral border not strongly arched, cut into 5 more or less distinct blunt teeth or lobes (incl. outer orbital angle). Basal joint of ant. 2 not very broad, outer apex produced in a lobe meeting the front and excluding flagellum from orbit. Chelipeds short, but a little longer than legs. Abdomen in ♂ with 3rd–5th segments fused.

*Lissocarcinus orbicularis* Dana

Fig. 28, *g*.

1852. Dana, Proc. Ac. Nat. Sci. Philad., p. 86, and U.S. Expl. Exp. Crust., pt. 1, p. 288, pl. 18, fig. 1, *a–e*.

1887. Müller, Verh. Nat. Ges. Basel, viii, pp. 475, 482, pl. 5, fig. 6 (*pulchellus*).

1899. Alcock, *l. c.*, p. 20.

1902. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 200.

1906. Rathbun, Bull. U.S. Fish. Comm. for 1903, pt. 3, p. 868.

1911. *Id.*, Trans. Linn. Soc. Lond., xiv, p. 204.

1931. Chopra, *l. c.*, pp. 310, 311.

1942. Ward, Mauritius Inst. Bull., ii, p. 81 (*pulchellus*) (reference to Müller's fig. is given as "pl. 1, figs. 6–6, *b*").

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 363.

Carapace slightly broader than long, convex, with thin edges, smooth, glabrous, a more or less distinct ridge from last antero-lateral tooth, front not medianly notched, antero-lateral margin with very shallow notches or clefts separating the 5 broad flat lobes. Chelipeds, inner angle of wrist with blunt tooth, 2 low somewhat oblique ridges on upper and outer surfaces, hand with 2 ridges on upper surface, a blunt tubercle at base of outer one, an obscure ridge on middle of outer surface, finger with upper margin sharply keeled, tips of finger and thumb acute, crossing. Legs stout, dactyl of 5th leg with sharp unguinal point.

Length up to 10 mm., breadth 11.5 mm. Carapace maroon or chocolate-coloured, with yellow or creamy clearly defined markings; chelipeds and legs banded, dactyls of 2nd-4th legs dark, dactyl of 5th leg dark in basal half, white in distal half; sternum and abdomen (♀) paler maroon or chocolate, 3 cream longitudinal bands distinct on proximal segments but passing into the general paler tint of the two distal segments.

*Locality*.—Delagoa Bay (coll. Dr. C. J. van der Horst, 1 ♀, 1939).

*Distribution*.—Maldive and Laccadive Archipelago; Chagos; Seychelles; Hawaiian Is.

*Remarks*.—Usually found associated with Holothurians (Borradaile, *l. c.*). *L. holothurica* (Streets) 1877 is possibly synonymous. *L. ornatus* Chopra 1931, from the Andaman Is., and also found in a Holothurian, is probably also synonymous. The front as shown in Chopra's figure seems to be asymmetrically and presumably abnormally notched. The relative proportions of light and dark colouring: light markings on a dark ground as in *orbicularis*, *holothurica*, and the Delagoa Bay specimen, or dark markings on a light ground as in *ornatus*, is probably not a specific character. When material is available the 1st pleopods of ♂ might be compared.

See Addenda.

#### Gen. CARUPELLA Lenz

1914. Lenz in Lenz and Strunck, D. Südpol Exp., xv, p. 278.

Carapace as long as broad, front with median notch, antero-lateral margin with 9 teeth (incl. outer orbital tooth). Ant. 1 transverse; ant. 2 not excluded from orbit, basal joint narrow. 4th joint of mxp. 3 as in *Lupa*. Upper margin of orbit with 2 fissures. Cornea globular. Chelipeds not elongate or slender. 5th leg with 6th and 7th joints expanded, latter ovate-lanceolate. Abdomen of ♂ with 5 segments, tapering.



*Carupella natalensis* Lenz

Fig. 28, *h-j*.

1914. Lenz in Lenz and Strunck, *l. c.*, p. 279, pl. 12, figs. 8-16.

Carapace flat, smooth, frontal and upper orbital margin finely granulate, 3 transverse rows of granules, front prominent, apically notched, margins undulate, 8 somewhat unequal teeth behind the outer orbital tooth, the last but one the smallest, the last one the largest. Cheliped, 4th joint with 3 serrations on inner margin, hind margin unarmed, wrist with a sharp spiniform tooth on inner margin and 3 rows of granules each ending in a flattened denticle on outer surface, hand with a flat tooth proximally and 2 double rows of granules each ending in a flat tooth on upper surface, outer surface with 3 smooth ridges, finger and thumb apically crossing. Legs, 4th joints without spine on hind margin; dactyl of 5th leg ovate-lanceolate. 2nd and 3rd abdominal segments transversely keeled.

Length 15 mm. (indirectly stated in comparison with *Lupocyclus rotundatus*).

*Locality*.—Natal (Lenz).

*Remarks*.—This species is compared and contrasted with *Lupocyclus rotundatus* and *whitei*. Lenz had only ♂♂.

Gen. LUPOCYCLUS Ad. & Wh.

1899. Alcock, *J. Asiat. Soc. Bengal*, lxxviii, p. 22.

1906. Rathbun, *Bull. U.S. Fish. Comm. for 1903*, pt. 3, p. 869.

1937. Shen, *Bull. Raffles Mus.*, no. 13, p. 98.

1938. Gordon, *ibid.*, no. 14, p. 175.

1942. Ward, *Mauritius Inst. Bull.*, ii, p. 41.

Carapace subcircular, or a little broader than long, convex, with granular ridges and elevations, tomentose, front prominent, cut into 4 teeth, not including the rounded and ill-defined inner orbital tooth; antero-lateral margin with 5 major teeth (incl. outer orbital tooth) and a smaller denticle in each intervening notch (*i.e.* 9 in all), some or all of these denticles sometimes obscured (and easily overlooked) by the marginal setae; upper orbital margin with 2 fissures. Cornea globular. Basal joint of ant. 2 not very stout, without apical process, not excluding rest of antenna from orbit. Chelipeds longer than legs, often rather slender. Legs slender, 4th joint of 5th leg with spine on hind margin, dactyl ovate. Abdomen of ♂ with 5 segments, 2nd and 3rd segments keeled.

*Lupocyclus tugelae* n.sp.

Fig. 29, e-h.

♀. Only one transverse granular ridge, viz. across the branchial region; an oblique line of granules near postero-lateral corner; gastric, cardiac, and branchial regions, and antero-lateral margins with *groups* of granules, which are closely aggregated and often sub-imbricate; granules of the branchial ridge pointing forwards and appearing as elongate granules. Chelipeds missing. Anterior margin of 4th joint of mxp. 3 flatly rounded. Basal joint of ant. 2 longitudinally grooved where it fits against the suborbital tooth.

Length 11 m., breadth 15 mm.

*Locality*.—Off Tugela River mouth, 36 fathoms (S. Afr. Mus.).

*Remarks*.—Distinguished apparently from other described species by having clusters of granules instead of transverse granular ridges; but it may nevertheless be only a variant of *rotundatus* Ad. & Wh. (for figure of carapace see Shen, *l. c.*; and of ♂ abd. Gordon, *l. c.*). Only the one non-ovigerous ♀ was taken by the s.s. *Pieter Faure*; in the same haul were numerous examples of *Gonioneptunus africanus*.

## Gen. PARATHRANITES Miers

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 237.

Carapace broader than long, convex, with well-defined regions and tubercles, front not prominently projecting, cut into 4 teeth, antero-lateral margin with 5 teeth (incl. outer orbital angle); the last one projecting laterally, upper orbital margin with 2 fissures. Ant. 1 transverse; basal joint of ant. 2 narrow. 4th joint of mxp. 3 produced in a rounded lobe beyond insertion of palp. Chelipeds spinose. Legs slender, dactyl of 5th leg broadly ovate. Abdomen of ♂ with 5 segments (3rd-5th fused, but positions of sutures indicated), tapering.

*Parathranites orientalis* Miers

Fig. 29, i-l.

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 204.

1920. Stebbing, *l. c.*, p. 238.

Carapace granulate, one small tubercle on each anterior gastric region, one larger median one in middle of gastric region, one on each branchial region in line with the gastric tubercle and last lateral tooth,

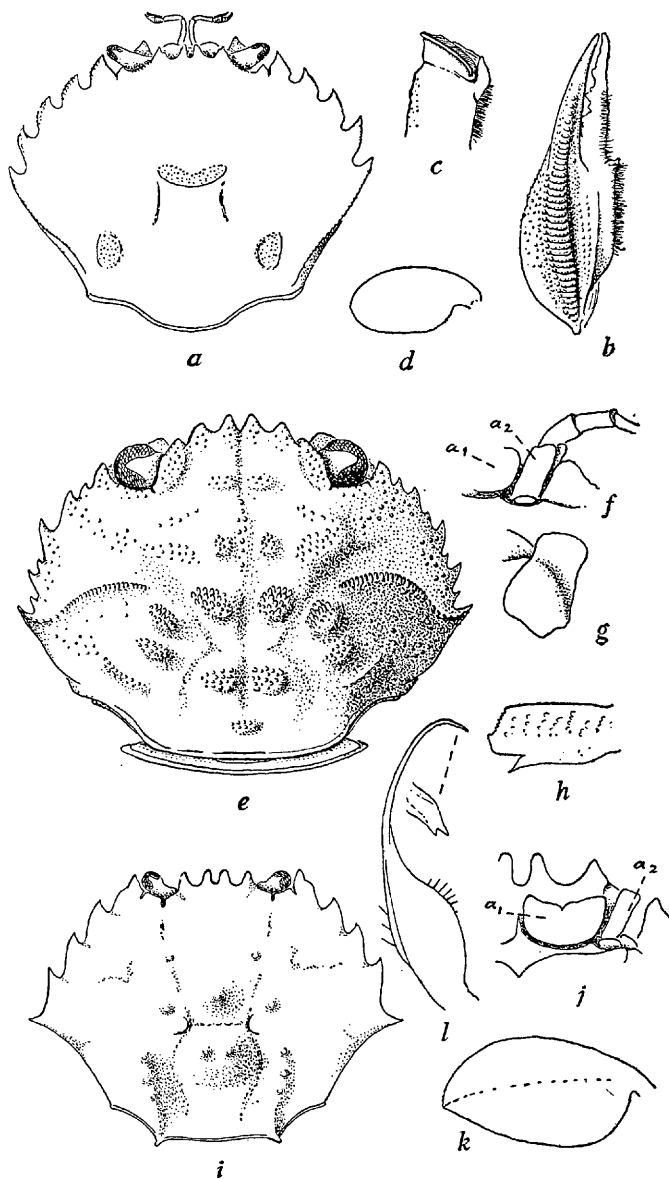


FIG. 29.—*Ovalipes punctatus* (de Haan). *a*, carapace, red marks dotted. *b*, lower surface of chela, showing stridulating rasp. *c*, apex of 4th joint of 2nd leg, showing stridulating ridge. *d*, dactyl of 5th leg, marginal setae omitted.

*Lupocyclus tugelae* n.sp. *e*, carapace, tomentum removed (4th tooth obsolete on left side). *f*, ventral view of base of ant. 2. *g*, 4th joint of mxp. 3 (with base of 5th). *h*, 4th joint of 5th leg.

*Parathranites orientalis* Miers. *i*, carapace. *j*, ventral view of front with bases of ant. 1 and 2. *k*, dactyl of 5th leg, marginal setae omitted. *l*, 1st pleopod ♂.

2 side by side transversely on cardiac region (Alcock: sometimes only one), just external to the cardiac-branchial groove a longitudinal ridge with small tubercles (anterior one the largest) and extending posteriorly to a sharp, slightly up-turned point on hind margin, which is nearly straight. Cheliped, 4th joint with one spine on inner margin and one (Miers: 2) on hind margin, wrist with one large spine on inner margin and 2-3 smaller ones on outer surface, hand with one spine on upper margin at base and 2 distally. Legs smooth, 4th joint of 5th leg twice as long as broad. dactyl ovate, twice as long as broad, upper and lower surfaces glabrous. Abdomen with 2nd and 3rd segments transversely keeled, terminal segment longer than broad, and a little narrower at base than distal margin of penultimate segment. Sternum of ♂ hollowed between bases of chelipeds.

Length 12.5-13 mm., breadth 18-19 mm. (incl. lateral spines). (Miers gives 15 × 18 mm. to base of lateral spines.) Salmon-pink (Alcock).

*Locality.*—Off Umhloti River mouth, Natal, 100 fathoms (Stebbing).

*Distribution.*—Kei and Admiralty Is., 140-150 fathoms; Malabar and Coromandel coasts, 33-68 fathoms; Andaman Is.; Seychelles.

#### Gen. OVALIPES Rathbun

1902. Stebbing, Mar. Invest. S. Afr., ii, p. 12.

1910. *Id.*, l. c., p. 305.

1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 18.

Carapace a little broader than long, front not prominent, cut into 3 or 4 teeth, antero-lateral margin with 5 teeth (incl. outer orbital angle). Basal joint of ant. 1 advanced, and visible dorsally between the frontal teeth. Ant. 2 entering orbit, basal joint broad. Cornea ovoid, not wider than eye-stalk, which is slightly curved. Dactyl of 5th leg broadly oval, apically rounded. Abdomen of ♂ oblong, with 5 or 7 segments.

#### *Ovalipes punctatus* (de Haan)

##### *Red Spot Swimming-crab.*

Figs. 27, a, 29, a-d.

1838. McLeay, Annulosa S. Afr., p. 62 (*Anisopus trimaculatus*).

1894. Ortmann, Semon's Austral. Reise, v, p. 44 (*Platyonychus bipustulatus*).

1910. Stebbing, l. c., p. 306 (*trimaculatus*).

1921. Balss, Beitr. Kennt. Meeresf. Westafr., iii, p. 57 (*trimaculatus*).

1924. Balss in Skottsberg. Nat. Hist. Juan Fernandez and Easter Is., iii, p. 336 (date *apud* Zool. Rec., 1929).

1927. Hale, Crust. S. Austral., pt. 1, p. 147, fig. 148 (*bipustulatus*).

1929. Chilton and Bennett, Trans. N. Zeal. Inst., lix (1928), p. 755 (*bipustulatus*).

1930. Rathbun, *l. c.*, p. 24, pls. 5-8.

Carapace finely granulate, front with 4 teeth, a tooth on upper orbital margin, and 4 teeth on antero-lateral margin behind outer orbital tooth, lateral margins converging posteriorly, hind margin arcuate. No stridulating ridge on pterygostomial region (only a line of small granules and a furry band). Cheliped with fringe of shaggy hair on inner side of upper margin, outer surface of wrist and hand granulate, upper and outer surface of hand with 5 ridges, the uppermost ending in a spine, the lowermost feeble, 2 feeble ridges on middle of inner surface, lower surface with a series of transverse granulate rugae (fig. 29, *b*), finger with 3 granulate or denticulate ridges distally. 2nd leg with a transverse horny ridge on distal margin of 4th joint (fig. 29, *c*), antagonizing against the rugae on cheliped to form a stridulating mechanism, especially well developed in old ♂♂; dactyl in adult ♂ larger than that of 3rd or 4th legs, falcate, its upper edge deeply grooved; dactyl of 5th leg regularly oval, scarcely twice as long as broad, upper and lower surfaces glabrous. Abdomen ♂ with 7 segments, 2nd and 3rd transversely keeled.

Length up to ♂ 55 mm., ♀ 42 mm., breadth ♂ 70 mm., ♀ 54 mm. (Rathbun gives 85 × 109.5 mm. for an Argentine ♂). Creamy-grey or pale buff, speckled with reddish dots, a median crescentic red mark and an oval red spot near each postero-lateral corner, hands of chelipeds tinged with red or pink inside surface (K. H. B.). Stimpson (1907) and Hale (*l. c.*) give the colour of the three marks as blue and violet respectively in Japanese and South Australian examples. I have never seen South African specimens with other than red or russet-red spots, and Krauss gave the same colour.

*Localities.*—Table Bay (Krauss, Rathbun); Port Elizabeth (Ortmann); Simon's Bay (M. Edwards); False Bay (Stebbing); Agulhas Bank and Algoa Bay, 40-80 metres (Doflein); Luderitzbucht, 0-10 metres (Balss); Table Bay, and False Bay to Port St. Johns, 0-50 fathoms (S. Afr. Mus.).

*Distribution.*—Juan Fernandez, Peru, Chile, Uruguay, Argentine, China, Japan, South and South-east Australia, New Zealand.

*Remarks.*—Hale's statement that the carapace is "longer than

wide" would appear to be a slip. The smallest specimen I have seen measures 6.5 mm. in length by 7.5 mm. in breadth. At this size the rugae on lower surface of chela are already present, but the horny ridge on 4th joint of 2nd leg does not reach its full development until maturity, and even then is not nearly so strongly developed in ♀♀ as in large ♂♂.

Doflein (1904) describes and figures (photographically) the dactyl of 5th leg of juveniles 7 mm. in length as finely pointed. Enlargement of the photograph shows that the appearance is mainly due to matting together of the apical setae, though it is true that the apex is less broadly rounded than in the adult.

Common in sandy bays, and buries itself rapidly after being disturbed.

#### Gen. LUPA Leach

1902. Stebbing, Mar. Invest. S. Afr., ii, p. 11.

1908. *Id.*, Ann. S. Afr. Mus., vi, p. 11.

1910. *Id.*, l. c., p. 307.

1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 33 (*Portunus* Weber, Fabr. non Leach).

Carapace glabrous, moderately or very broad, including the lateral spines as much as twice as broad as long, little convex, front with 3-6 teeth (usually 4) excluding inner orbital teeth, antero-lateral margin with 8 teeth behind outer orbital tooth, the last one strong and projecting laterally, postero-lateral angles rounded. Upper orbital margin usually with 2 fissures. Ant 1 transverse; basal joint of ant. 2 short and broad, its outer apex produced in a more or less spiniform process entering the orbit but not excluding rest of antenna from orbit (fig. 27, *b*). Antero-external margin of 4th joint of mxp. 3 rounded, not produced (fig. 27, *b*). Epistome produced in a strong spine between bases of ant. 1 (fig. 27, *b*). Chelipeds elongate, usually longer than legs. Legs compressed; distal margin of 4th joint of 5th leg smooth; dactyl of 5th leg ovate, upper and lower surfaces of 6th joint and dactyl of 5th leg glabrous. Abdomen of 5 segments in ♂, triangular and evenly tapering.

#### *Key to the South African Species.*

1. A spine at end of hind margin of 4th joint of cheliped.  
Carapace reticulated and mottled . . . . . *pelagica*.
2. No spine on hind margin of 4th joint of cheliped. Carapace  
with 3 red spots near hind margin . . . . . *sanguinolenta*.

*Lupa pelagica* (Linn.)

Blue Swimming-crab; Chinaman.

Fig. 27, b.

1878. Hilgendorf, MB Ak. Wiss. Berlin, pp. 799 and 849 (native name).

1910. Stebbing, *l. c.*, p. 307.

? 1921. *Id.*, Ann. Durban Mus., iii, p. 13 (*pubescens*, ? non Dana).

1927. Hale, S. Austral. Crust., pt. 1, p. 149, fig. 150 (*Portunus p.*).

1930. Monod, Zool. Anz., cxii, p. 140, fig. 6 (*Neptunus p.*).

1932. Shen, Hong Kong Natural., iii, p. 32, fig. 1 and pl. 6 (*Portunus trituberculatus*).

1932. *Id.*, Zool. Sinica, ix, p. 64, figs. 37, 38, and pl. 4, fig. 1 (*Portunus trituberculatus*).

1934. *Id.*, Hong Kong Natural., Suppl. no. 3, p. 37, fig. 1.

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 63, pls. 21-24 (*Neptunus p.*).

1935. Chopra, Rec. Ind. Mus., xxxvii, p. 476, fig. 3 (1st plp. ♂) (*Neptunus p.*).

1942. Ward, Bull. Mauritius Inst., ii, p. 79, pl. 5, fig. 4 (*Portunus mauritianus*).

1945. Stephensen, Dan. Sci. Invest. Iran. pt. 4, p. 124, fig. 26, E (plp. 2 ♂).

Carapace about twice as broad as long (incl. lateral spines), granulate, 2 humps on cardiac and one on hinder gastric region, but these variable in size and distinctness, front with 4 teeth but the middle pair often small, or confluent, or obsolete; a transverse granular line across gastric region, and another across branchial region from the large lateral spine. Upper orbital margin with 2 fissures, the outer corner of the lobe between them often dentiform. Chelipeds, 4th joint with 3-4 spine-teeth on front margin, and one distally on hind margin, hand with granulate costae and 3 spines, one at base and 2 distally. A small spine at apex of hind margin of 5th joint of 2nd and 3rd legs.

Length up to 74 mm., breadth (incl. spines) 162 mm. Carapace, chelipeds, and 5th legs mottled and reticulated with brownish grey, greenish, bluish, or purplish red on a pale cream ground, finger and thumb of chelipeds maroon or purplish, tubercle on inner and outer sides of finger-hinge bright red, dactyls of legs more or less reddish.

*Localities.*—Durban Bay (Krauss); Inhambane and Mozambique (Hilgendorf); Natal (Stebbing); Delagoa Bay, Inhambane, Beira, Mozambique (coll. K. H. B.).

*Distribution.*—East coast of Africa, Mauritius, Indo-Pacific to China, Japan, Australia, New Zealand.

This species has migrated through the Suez Canal into the Mediterranean (Fox, 1924, *Nature*, cxiii, p. 714, and 1927, *Trans. Zool. Soc. Lond.*, xxii, p. 217); and has reached the Gulf of Alexandrette, Syria (Monod, *l. c.*).

*Remarks.*—Varietal names have been given to several forms according to the distinctness of the tubercles and the shape and sharpness of the anterolateral spines; *cf.* Ward (1942, *Mauritius Inst. Bull.*, ii, p. 79).

Stebbing's small specimen, recorded as *pubescens* (1921), was probably a juvenile of the present spines.

A common edible crab, frequently seen on the markets in Portuguese East Africa.

*Lupa sanguinolenta* (Herbst)

*Blood-spot Spiny Swimming-crab.*

1905. Lenz, *Abh. Senckenb. Ges.*, xxvii, p. 359 (*Neptunus s.*).

1910. Stebbing, *l. c.*, p. 307.

1914. Lenz and Strunck, *D. Südpol Exp.*, xv, p. 278.

1927. Hale, *l. c.*, p. 150, fig. 151 (*Portunus s.*).

1932. Shen, *Hong Kong Natur.*, iii, p. 34, figs. 2, 3, and pl. 7, fig. *a* (*Portunus s.*).

1935. Chopra, *l. c.*, p. 474, fig. 2 (1st plp. ♂) (*Neptunus s.*).

1938. Boone, *Bull. Vanderbilt Mar. Mus.*, vii, p. 223, pls. 81–83 (*Neptunus s.*).

1945. Stephensen, *Dan. Sci. Invest. Iran.* pt. 4, p. 123, fig. 26, D (plp. 2 ♂).

[Not Krauss, *Südafrik. Crust.*, p. 11 = *sayi*. See Rathbun, 1930, *l. c.*, p. 37.]

Carapace very broad, about twice as broad as long, granulate, but hinder part more or less smooth and nitidulous in adult, a fine transverse granulate line across gastric region, and another across branchial region from the large lateral spine, front with 4 teeth. Upper orbital margin with 2 fissures. Chelipeds, 4th joint with 3–4 spine-teeth on front margin, but none on hind margin, hand with smooth or very finely granulate costae (the granules more noticeable in juv. than in



adult), and 2 spines, one at base and one distally. A small spine at apex of hind margin of 5th joint of 2nd and 3rd legs.

Length up to 67 mm., breadth 168 mm. (incl. spines). Salmon-pink with 3 red spots near hind margin of carapace, chelipeds more or less reddish and mottled above, finger and thumb on inner surface and the tubercle on inside and outside of finger-hinge maroon, dactyls more or less reddish.

*Localities.*—Cape St. Blaize and Durban (Stebbing); Mozambique channel (Lenz); Agulhas Bank from Mossel Bay eastwards to Natal and Zululand, 0–30 fathoms (S. Afr. Mus.); Delagoa Bay (coll. K. H. B.).

*Distribution.*—Réunion, south of Madagascar on Sargassum weed, east coast of Africa, Indo-Pacific to China, Japan, Australia, Hawaiian Is.

Gen. MONOMIA Gistel

1833. de Haan, Fauna Jap. Crust., pp. 3, 8 (*Amphitrite*, nom. preocc.).

1848. Gistel, Naturgesch. Thierr., p. viii.

1899. Alcock, J. Asiat. Soc. Bengal, lxxviii, p. 30 (*Amphitrite*, subgen. of *Neptunus*).

1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 33 (as syn. of *Portunus*).

1939. Ward, Amer. Mus. Novit., 1049, p. 3.

Carapace tomentose, moderately broad, little convex, the 9th antero-lateral tooth strong. Basal joint of ant. 2 produced in a blunt lobe-like process (fig. 27, c). Epistome not strongly spiniform. Apex of 4th joint of mxp. 3 truncate, thickened and produced outwards (fig. 27, c). Abdomen ♂ with the composite 3rd (fused 3rd–5th) segment narrowing rapidly distally, the penultimate and ultimate segments narrow with sinuous lateral margins. Distal margin of 4th joint of 5th leg granulate, 6th joint and dactyl with longitudinal ribs and intervening bands of fine pile (fig. 30, d). Otherwise as in *Lupa*.

*Key to the South African Species.*

1. Suborbital notch with a distinct fissure. Beading on postero-lateral margin of carapace composed of one row of granules . . . . . *gladiator*.
2. Suborbital notch with only a trace of a fissure. Beading composed of 2–3 rows of granules . . . . . *argentata*.

*Monomia gladiator* (Fabr.)

1899. Alcock, *l. c.*, p. 35 (*Neptunus (Amphitrite) g.*).

1915. Stebbing, Ann. S. Afr. Mus., xv, p. 58 (*Callinectes gladiator* Fabr.).

1937. Shen. Bull. Raffles Mus., 13, p. 101, fig. 2, *a-c*.

[Not *Callinectes gladiator* Benedict 1893. West Africa.]

Carapace tomentose, with low granulate elevations, front with 4 teeth, the middle pair smaller, upper orbital margin with 2 fissures, outer angle of the intervening lobe dentiform, last antero-lateral tooth not more than  $2\frac{1}{2}$  times larger than any of the others. Epistomal projection moderate. Chelipeds, 4th joint with 4 spine-teeth on inner margin, 2 on outer margin distally, granules on upper surface of 4th joint and lower surface of hand more or less in squamose lines, wrist and hand with granulate ridges, 2 spines on upper surface of hand, one at base, one at apex, ridge forming the outer edge of lower surface of hand very prominent. No spine on outer margin of 5th joint on 2nd and 3rd legs; distal and hind margin of 4th joint of 5th leg granulate. Abdomen ♂ with sinuous margins, 6th segment widest in middle; 2nd and 3rd segments with strong transverse keel in both sexes. 1st pleopods ♂ crossing, the narrow distal portion about as long as the broader basal portion. Sternum very flat, tomentose, the anterior segment (between bases of chelipeds) with numerous irregularly arranged granules. Outer surface of 3rd-6th joints of mxp. 3 and the exopod granulate.

Length up to 37 mm., breadth 67 mm. Brownish orange, chelipeds with crimson spots.

*Locality*.—Natal (Stebbing, and S. Afr. Mus.).

*Distribution*.—Mauritius, Indian Seas, East Indies.

*Remarks*.—The postero-lateral border of carapace, which has its angles rounded, of the single large ♂ in the South African Museum collection has a *single* row of granules. The suborbital notch is continued at its apex into a distinct fissure.

*Monomia argentata* (White, M. Edwards)

Figs. 27 *c*, 30, *a-d*.

1861. Milne Edwards, Arch. Mus. Paris, x, pp. 332, 339, pl. 31, fig. 4 (*Neptunus a.*).

1899. Alcock, *l. c.*, p. 36 (*Neptunus (Amphitrite) a.*).

1902. de Man, Abh. Senckenb. Ges., xxv, p. 642 (*Neptunus (Amphitrite) a.*).

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120 (*Neptunus a.*).

Very closely allied to *gladiator*, and often regarded merely as a variety. Distinguished as follows: a smaller species, carapace slightly longer in proportion to its breadth, granulate elevations rather more prominent, outer angle of middle lobe of upper orbital

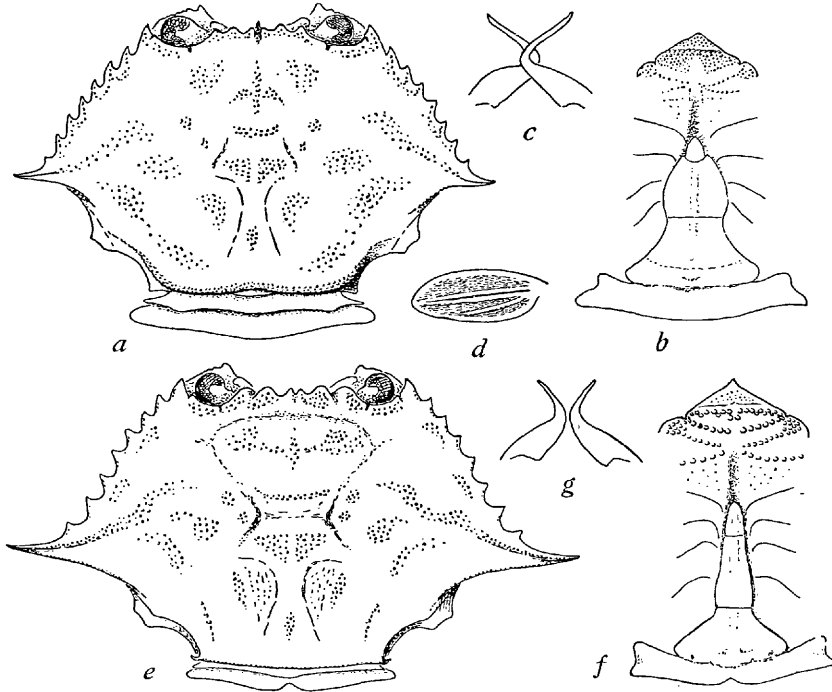


FIG. 30.—*Monomia argentata* (White, M. Edw.). *a*, carapace and 1st-3rd abdominal segments ♂. *b*, sternum between chelipeds and 3rd-7th abdominal segments ♂. *c*, 1st pleopods ♂. *d*, dactyl of 5th leg, marginal setae omitted.  
*Hellenus hastatoides* (Fabr.). *e*, carapace and 2nd and 3rd abdominal segments (1st segment invisible) ♂. *f*, sternum between chelipeds, and 3rd-7th abdominal segments ♂. *g*, 1st pleopods ♂.

margin blunter, the ridge on outer surface of hand and that on thumb of cheliped not only more salient but with a pearly sheen, the keel on 3rd abdominal segment likewise more salient, and pearly; often (but not always) a dark spot near top of dactyl of 5th leg.

Length up to 18 mm., breadth 31 mm.

*Localities*.—Delagoa Bay (Barnard); off Umvoti River mouth, Natal, 27 fathoms (S. Afr. Mus.).

*Distribution*.—The same as that of *gladiator*. ? Hawaiian Is. (Rathbun, 1906).

*Remarks.*—Both the Delagoa Bay ♂ and the Natal ovigerous ♀ have 2–3 rows of granules along the postero-lateral margin of carapace. The suborbital notch has only the merest trace of a fissure at its apex. Not only the keels mentioned above, but the whole carapace and chelipeds of these specimens when dried and cleaned show the pearly lustre (*cf. de Man, l. c.*).

Gen. HELLENUS M. Edw.

1879. Milne Edwards, *Crust. Mexique*, pp. 210, 221.

1887. de Man, *J. Linn. Soc. Lond.*, xxii, p. 70.

1899. Alcock, *J. Asiat. Soc. Bengal*, lxxviii, pp. 30, 31.

Carapace tomentose, moderately broad, little convex, 9th antero-lateral tooth strong. Postero-lateral margin with angular or uncinatc angles. Abdomen ♂ with ultimate and penultimate segments very narrow, so that the abdomen is T-shaped. Otherwise as in *Monomia*.

*Remarks.*—de Man says M. Edwards grouped under this subgenus species in which the postero-lateral angles of the carapace were acute and often armed with a short spine. Alcock follows this arrangement. But Rathbun (1930, *Bull. U.S. Nat. Mus.*, no. 152, p. 33) gives *spini-carpus*, a species with rounded postero-lateral angles, as the type of the genus *Hellenus* (*cf. her figure, pl. 45, and description, p. 92*).

*Hellenus hastatoides* (Fabr.)

Fig. 30, e–g.

1899. Alcock, *l. c.*, p. 38 (*Neptunus (Hellenus) h.*).

1935. Chopra, *Rec. Ind. Mus.*, xxxvii, p. 477, fig. 4 (1st plp. ♂) (*Neptunus h.*).

1937. Shen, *Bull. Raffles Mus.*, 13, p. 107, figs. 5 a–c, 8, g, h.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 363.

Carapace tomentose, flattened, but with low granulate elevations, front with 4 teeth, the middle pair much smaller than the outer pair, which is blunt, upper orbital margin with 2 fissures, the outer corner of the intervening lobe shortly dentiform, postero-lateral margin finely beaded (middle portion with 2–3 rows of granules), postero-lateral angles acute, up-turned or claw-like. Epistomal projection very short. Suborbital notch not wide, narrowing rapidly to a fissure. Chelipeds and legs as in *gladiator*; distal margin of 4th joint of 5th leg denticulate. Abdomen in ♂ with the fused 4th and 5th segments narrowing very rapidly, 6th segment twice as long as its middle width;

in both sexes 2nd segment transversely keeled, but not as strongly as in *gladiator*, 3rd strongly keeled, usually with slight median indent. 1st pleopods ♂ not crossing, the distal portion shorter than the broader basal portion. Sternum very flat, tomentose, the anterior segment (between the chelipeds) in ♀ as in *gladiator*, but in ♂ with few and larger granules (almost tubercles) in transverse rows. Outer surface of mxp. 3 scarcely or only feebly granulate.

Length up to ♂ 19 mm., ♀ 18 mm., breadth ♂ 37 mm., ♀ 36 mm.

*Locality*.—Coast of Zululand, 25 fathoms (S. Afr. Mus.).

*Distribution*.—Indian Seas, Persian Gulf, Hong Kong.

*Remarks*.—The s.s. *Pieter Faure* took 85 specimens of this species in two hauls in the above area, including juveniles 7 mm. in length, and ovigerous ♀♀. The large lateral spine, and the uncinat spine at the postero-lateral angle, are relatively larger in the young than in the adult.

Gen. ACHELOUS de Haan.

1899. Alcock, J. *Asiat. Soc. Bengal*, lxxviii, p. 30 (subgen. of *Neptunus*).

1910. Stebbing, *l. c.*, p. 307.

1920. *Id.*, *Ann. S. Afr. Mus.*, xvii, p. 236.

1938. Gordon, *Bull. Raffles Mus.*, no. 14, p. 179.

[Not Rathbun, 1930, *l. c.* pp. 33, 35, subgen. of *Portunus*.]

Carapace glabrous, subcircular or not very broad, flat, postero-lateral angles rounded. Antero-lateral teeth subequal, the 9th either very little larger, or even smaller than, the others. Epistome feebly produced. Apex of 4th joint of mxp. 3 truncate, thickened, produced laterally. Dactyl of 5th leg glabrous.

*Remarks*.—Rathbun gives *spinimanus* Latr. as the genotype, but her description of that species will not fit into Alcock's definition. Ward (1942, *Mauritius Inst. Bull.*, ii, p. 79) creates a new genus *Cycloachelous* for the Indo-Pacific forms.

*Achelous orbicularis* Richters

Fig. 31, a.

1920. Stebbing, *l. c.*, p. 236.

1942. Ward, *Mauritius Inst. Bull.*, ii, p. 51 (*Cycloachelous o.*).

Carapace glabrous and nitidulous, feebly granulate in places, with patches of distinct granules mostly near the periphery and on the gastric and cardiac regions. Middle pair of frontal teeth smaller than

outer pair; upper orbital margin with only one fissure, antero-lateral teeth subequal, the 1st (outer orbital tooth) longest, the 9th smallest. Suborbital notch rapidly narrowing to a fissure. 4th joint of mxp.3, *cf.* figure 27, *c* of *argentata*, but outer apical angle sharper. Cheliped, 4th joint broad, hind margin strongly convex, with 2 spines, front margin with 4 spines, wrist and hand with smooth ridges except the uppermost one on hand which is granulate. No spine on outer apex of 5th joint of 2nd and 3rd legs; 4th joint of 5th leg longer than wide, hind margin smooth. Abdomen ♀ 2nd segment feebly, 3rd strongly transversely keeled. Abdomen and sternum glabrous and smooth.

Length ♀ 18 mm., breadth 24 mm.

*Locality.*—Off Umkomas River mouth, Natal, 13 fathoms (Stebbing).

*Distribution.*—Mauritius, Laccadives, and Andaman Is.

*Remarks.*—Only the one non-ovigerous ♀ has been discovered in South African waters.\* The species is easily recognized by its shape.

#### Gen. SCYLLA de Haan

1910. Stebbing, *l. c.*, p. 308.

Carapace glabrous (except around margins), broad, moderately convex and nearly even, front with 4 teeth (excl. inner orbital teeth), antero-lateral margin with 9 (incl. outer orbital tooth) subequal teeth, the last not enlarged or laterally outstanding, postero-lateral angles rounded. Upper orbital margin with 2 fissures. Basal joint of ant. 2 with subacute process, not excluding rest of antenna from orbit. Epistome not produced. Outer surface of mxp. 3 smooth, apex of 4th joint rounded-quadrate. Chelipeds robust, wrist and hand smooth, without ridges (except feeble ones in juvenile), hand inflated. Legs smooth; 4th joint of 5th leg longer than broad, dactyl glabrous, ovate, the hinder half projecting apically in a minute point (unguis) (fig. 31, *c*). Abdomen of ♂ triangular, evenly tapering, 3rd–5th segments coalesced; 2nd and 3rd segments not strongly keeled in either sex.

#### *Scylla serrata* (Forsk.)

Fig. 31, *b, c*.

1838. McLeay, *Annulosa S. Afr.*, p. 61 (*Achelous crassimanus*).

1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 799.

1910. Stebbing, *l. c.*, p. 308, and *ibid.* (*A. crassimanus*).

1917. *Id.*, *Ann. Durban Mus.*, ii, p. 9.

\* One juv. ♂, 28° 28' S., 32° 25' E., 27 m., Fisheries Survey, 1948.

1932. Shen, Hong Kong Natural., iii, p. 36, figs. 4, 5, and pl. 7, fig. *b*.

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 68, pls. 25-30.

1940. Arriola, J. Philipp. Sci., lxxiii, p. 437, pls. 1-3 (habits, etc.).

Carapace finely granulate, with a faint transverse granular line across gastric region, and one across each branchial region from the 9th lateral tooth. Cheliped, 4th joint with 3 spines on front margin, 2 on hind margin, hand with one spine-tooth on upper surface at base, and 2 at apex. No spines on legs.

Length up to 140 mm., breadth 220 mm. Dark brownish or greenish, chelipeds and legs more or less mottled with paler brown or reddish or whitish markings.

*Localities*.—Plettenberg Bay (Pt. Elizabeth Mus.); Zwartkops River, Algoa Bay (McLeay, Miers); Durban Bay (Krauss, Miers, Stebbing); Mozambique (Miers); Delagoa Bay, Inhambane, Beira, Chinde, Mozambique (coll. K. H. B. 1912).

*Distribution*.—East coast of Africa, Mauritius, Indo-Pacific to Japan and Australia.

*Remarks*.—This large and powerful crab inhabits mud-banks in estuaries, bays, and mangrove swamps, where it digs deep burrows. It is edible, and is to be seen in all markets on the east coast.

McLeay's species is obviously the common *serrata*, as there is no other crab in South African waters of the size given by him. Stebbing hesitated to accept the synonymy on account of McLeay's statement that the abdomen ( $\sigma$ ) had 7 segments; but the sutures of 7 segments are discernible in specimens, and McLeay did not notice, or did not attach any importance to, the fact that segments 3-5 are not actually articulated or movable *inter se*. Mr. Ward informs me that McLeay's type is not in the McLeay collection in the Australian Museum.

#### Gen. GONIONEPTUNUS Ortm.

1893/4. Ortmann, Zool. Jahrb. Abt. Syst., vii, p. 79.

1899. Alcock, J. Asiat. Soc. Bengal, lxxviii, pp. 48, 67 (subgen. of *Charybdis*).

1935. Shen, Ann. Mag. Nat. Hist. (10), xv, p. 404 (subgen. of *Charybdis*).

Carapace tomentose, broad, little convex, regions fairly well defined, front with 4 teeth (excl. inner orbital teeth), antero-lateral margin with 6 teeth (incl. outer orbital tooth), the 2nd one usually smaller than the others, the 6th not very prominent, postero-lateral angles

more or less rounded. Upper orbital margin with 2 fissures. Basal joint of ant. 2 with lobe-like subtruncate process, not meeting front and not excluding rest of antenna from orbit. Epistome not produced.



FIG. 31.—*Achelous orbicularis* Richters. *a*, carapace ♀. *Scylla serrata* (Forsk.). *b*, carapace. *c*, dactyl of 5th leg, marginal setae omitted. *Gonioneptunus africanus* (Shen). *d*, carapace. *e*, ventral view of front. *f*, cheliped. *g*, 4th joint of (left) mxp. 3. *h*, 4th joint of 5th leg, marginal setae omitted. *i*, dactyl of 5th leg, marginal setae omitted. *Gonioneptunus smithii* (McLeay). *j*, outline of carapace drawn from photograph of McLeay's type forwarded by Mr. Melbourne Ward.

Apex of 4th joint of mxp. 3 produced in a thin rounded lobe (fig. 31, *g*). Chelipeds moderately elongate, hind margin of 4th joint usually ending in a spine, wrist and hand costate. 4th joint of 5th leg with spine on hind margin, dactyl ovate, with small but distinct unguis,



and pilose stripes (fig. 31, *i*). Abdomen with 3rd-5th segments completely fused in ♂; 2nd and 3rd segments keeled in both sexes, the 3rd more strongly so than 2nd.

*Remarks.*—Although usually regarded as a subgenus of *Charybdis*, it is clearly distinguished by the non-exclusion of the distal part of antenna 2 from the orbit, if importance be attached to this character. Alcock makes *subornatus* Ortm. a synonym of *truncatus* (Fabr.), but Shen does not refer to the latter species.

*Key to the South African Species.*

1. Outer orbital tooth not reaching the level of any of the notches between frontal teeth. 6th lateral tooth scarcely projecting beyond (laterally) the 5th tooth (fig. 31, *j*) . . . . . *smithii*.
2. Outer orbital tooth reaching at least to the level of apex of inner orbital tooth. 6th lateral tooth projecting a little, but definitely, beyond the 5th tooth (fig. 31, *d*) . . . *africanus*.

*Gonioneptunus smithii* (McLeay)

Fig. 31, *j*.

1838. McLeay, *Annulosa S. Afr.*, p. 61 (*Charybdis s.*).

1910. Stebbing, *l. c.*, p. 307 (*Charybdis s.*).

Carapace glabrous (McLeay), with very faint fine granular transverse lines, with patches of granules on cardiac and inner branchial regions, 4 acute frontal teeth, with shallow notches between the pair on either side of the deeper median notch, a deeper notch between the outermost frontal and inner orbital teeth, which latter is widely bifid; the upper orbital margin oblique so that the apex of outer orbital tooth lies far behind level of inner orbital tooth or any of the frontal notches; suborbital tooth not projecting beyond level of frontal teeth; 2nd antero-lateral tooth smaller than the others, 6th scarcely projecting beyond the 5th, 1st-5th teeth somewhat squarish, externally granulate-serrate, the outer margin of first 4 teeth *diverging* backwards, that of 5th tooth perpendicular to transverse axis of carapace. Cornea (apparently) not enlarged. Chelipeds, 4th joint granulate, 4-5 (McLeay: 3) spines on front margin, hind margin ending in a spine, wrist and hand with granulate costae, the granules being especially well developed on inner upper margin and on both inner and outer surfaces of hand, hand with one spine at base, one at apex. 4th joint of 5th leg longer than broad, with spine on hind margin, 6th joint with smooth hind margin, dactyl with unguial point.

Length 41 mm., breadth 56 mm. (*fide* M. Ward).

*Locality*.—South Africa (McLeay).

*Remarks*.—The present description and figure taken from a photograph of McLeay's type forwarded by Mr. Melbourne Ward. McLeay's species is considered by Mr. Ward to be the same as *truncatus* M. Edw., non Fabr.

*Gonioneptunus africanus* (Shen)

Fig. 31, *d-i*.

1935. Shen, *l. c.*, p. 405, figs. 1 and 2, *d*.

Carapace tomentose, with transverse lines of granules on gastric and branchial regions, patches of granules on frontal, orbital, and antero-lateral margins, and on cardiac and inner branchial regions; the 4 frontal teeth rounded or subacute, the middle pair slightly more prominent, separated by a deeper notch than that between the inner and outer tooth on each side; inner orbital tooth angular, not so prominent as outer frontal tooth; upper orbital margin semicircular, outer orbital tooth extending forwards to level of inner orbital or outer frontal tooth; suborbital tooth projecting beyond level of frontal teeth; 2nd antero-lateral tooth the smallest, 6th projecting beyond 5th laterally, 1st-5th teeth somewhat squarish, externally granulate-serrate, outer margin of first 3 teeth *diverging* backwards, that of 4th and 5th *converging* backwards. Process of basal joint of ant. 2 subquadrate, subtruncate. Cornea globular, wider than stalk. Chelipeds, 4th joint granulate, with 3 (major) spines on front margin, hind margin ending in a spine (not large and usually adpressed), wrist and hand with granulate costae, granules especially well developed on inner upper margin and on outer surface of hand, inner surface of hand smooth with a low smooth or only feebly granulate ridge, upper surface with one spine at base and 2 at apex. 4th joint of 5th leg longer than broad (nearly twice as long as broad in juv., but only  $1\frac{1}{2}$  times in adult), with spine on hind margin, 6th joint with smooth hind margin, dactyl with unguis point, and pilose stripes. 6th abdominal segment ♂ shorter than its basal width, lateral margins gently convex. 1st pleopods ♂ not crossing, distal portion shorter than the stouter basal portion (*cf.* *H. hastatooides*).

Length up to ♂ 20 mm., ♀ 17 mm., breadth ♂ 30 mm., ♀ 25 mm.

*Localities*.—Off Gt. Fish Point, and off Tugela River mouth, 30-63 fathoms (Shen); several other localities between these localities, 25-65 fathoms (S. Afr. Mus.).

*Remarks.*—The s.s. *Pieter Faure* captured about 85 specimens of this species in the above area, including juveniles from 5 × 8 mm. upwards; smallest ovigerous ♀ 10 × 16 mm.

Gen. CHARYBDIS de Haan

1899. Alcock, J. *Asiat. Soc. Bengal*, lxxviii, p. 47 (part: excl. *Gonioneptunus*).

1910. Stebbing, *l. c.*, p. 306.

1935. Chopra, *Rec. Ind. Mus.*, xxxvii, pp. 482 *sqq.* (figs. 1st plp. ♂).

1936. Leene, *Zool. Mededeel.*, xix, p. 117.

1937. *Id.*, *ibid.*, xix, p. 165.

1937. Shen, *Bull. Raffles Mus.*, xiii, p. 116 (key to species).

1938. Leene, *Siboga Exp. monogr.*, xxxix c. 3.

1941. Ward, *Amer. Mus. Novit.*, 1104, p. 3.

Carapace more or less regularly hexagonal, the antero-lateral margins diverging backwards, so that the extent of the fronto-orbital margin is much less than maximum width of carapace; front cut into 6 teeth (excl. inner orbital teeth), usually 6 (sometimes 5 or 7) antero-lateral teeth incl. outer orbital tooth, transverse ridges more or less distinct; postero-lateral and hind margins either evenly curved (*Charybdis sensu stricto*) or meeting in a distinct projecting angle (*Goniohellenus*). Upper orbital margin with 2 fissures. Basal joint of ant. 2 broad, with an apical lobe meeting inner orbital tooth and completely excluding rest of antenna from orbit (fig. 27, *d*). Chelipeds massive, hind margin of 4th joint without (*Charybdis*) or with (*Goniohellenus*) a spine. Legs compressed; 4th joint of 5th leg with or without a spine on hind margin, dactyl ovate, with minute unguis point. Abdomen of ♂ with 3rd–5th segments fused, 2nd and 3rd with moderately salient keels.

*Remarks.*—The frontal teeth are often blunter and more rounded in juveniles than in adults (*cf.* de Man, *J. Linn. Soc. Lond.*, xxii, p. 84, 1887).

*Key to the South African Species.*

(All the species belong to *Charybdis s.s.*)

A. No (distinct) transverse ridges *behind* level of last antero-lateral tooth.

1. 1st antero-lateral tooth truncate and notched (fig. 32, *a*). Hind margin of 5th joint of 5th leg without spine, of 6th joint smooth (juv. with 2–3 minute denticles) . . . . . *cruciata*.

2. 1st antero-lateral tooth acute (fig. 32, *b*). Hind margin of 6th joint of 5th leg denticulate.
- a.* Hind margin of 5th joint of 5th leg with spine . . . *merguiensis*.
- b.* Hind margin of 5th joint of 5th leg without spine. Hand of cheliped with 3 spines on upper surface (fig. 32, *h*) . . . . . *annulata*.
- B. A transverse ridge on cardiac region, and one or 2 ridges on hinder half of each branchial region (fig. 32, *c*).
1. Two ridges on hinder branchial region. All the antero-lateral teeth well developed.
- a.* Last antero-lateral tooth not enlarged . . . . . *natator*.
- b.* Last antero-lateral tooth twice as long as any of the others (fig. 32, *c*). A stout tooth on lobe of basal joint of ant. 2 . . . . . *variegata*.
2. One ridge on hinder branchial region. 2nd antero-lateral tooth rudimentary (fig. 32, *d, e*) . . . . . *orientalis*.

*Charybdis cruciata* (Herbst)Fig. 32, *a*.

1910. Stebbing, *l. c.*, p. 306.
1929. McNeill, *Rec. Austral. Mus.*, xvii, p. 149, pl. 37, fig. 5.
1931. Gordon, *J. Linn. Soc. Lond.*, xxxvii, p. 538, fig. 13, *e* (1st plp. ♂).
1932. Shen, *Hong Kong Natural.*, iii, p. 38, fig. 6 and pl. 8.
1934. Boone, *Bull. Vanderbilt Mar. Mus.*, v, p. 53, pl. 17 (*crucifera*).
1935. Chopra, *l. c.*, p. 482, fig. 7 (1st plp. ♂).
1945. Stephensen, *Dan. Sci. Invest. Iran*, pt. 4, p. 114, fig. 24, A (plp. 2 ♂).

Carapace about  $\frac{3}{4}$  as long as broad, glabrous in adult, sparsely setose in juv., nearly smooth; 1st antero-lateral (outer orbital) tooth truncate and feebly notched or bifid, last tooth scarcely more prominent than the others; a fine granular line joining the last antero-lateral teeth but interrupted or obsolete medianly, and 2 lines on gastric region, the anterior one widely interrupted medianly, all lines becoming faint in adult; the curved costate hind and postero-lateral margins prominent in juv., less so (medianly) in adult. Lobe of basal joint of ant. 2 with a granulate ridge. Chelipeds, 4th joint with 3 large spines on anterior margin, hand with 4 spines on upper surface, only 2 costae on upper surface, the lower of which is continued on to thumb, costae granulate in juv., smooth in adult, intervening surfaces somewhat wrinkled. 5th leg, 4th joint  $\frac{3}{4}$  as broad as long, with spine on hind

margin, 5th joint without spine, 6th joint with smooth entire hind margin in adult, but with 2-3 minute denticles in juv. Lateral margins of 6th abdominal segment ♂ gently convex and gradually converging distally. 1st pleopods ♂ curving evenly outwards, not crossing.

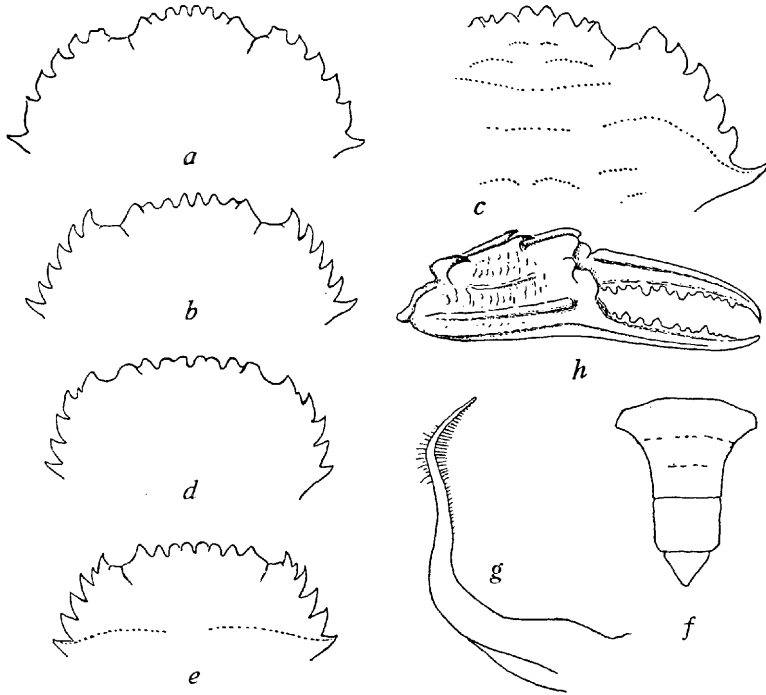


FIG. 32.—*Charybdis cruciata* (Herbst). *a*, outline of anterior part of carapace. *Charybdis merguensis* (de Man). *b*, the same. *Charybdis variegata* (Fabr.). *c*, the same (after Shen). *Charybdis orientalis* Dana. *d*, the same (after Rathbun). *e*, the same, ♂ from Delagoa Bay. *f*, 3rd-7th abdominal segments ♂. *g*, 1st pleopod ♂. *Charybdis annulata* (Fabr.). *h*, chela, outer view slightly from above.

Length up to 80 mm., breadth 122 mm. Buff or cream-coloured, with bands and patches of carmine or maroon, usually a more or less distinct pale cross on gastric region, chelipeds and legs banded or reticulated or spotted with rose-red, finger and thumb mostly pale, tips dark reddish or violet-brown.

*Localities*.—Port Alfred (Stebbing); Durban and Delagoa Bay (S. Afr. Mus.).

*Distribution*.—Indo-Pacific to Japan and Australia.

*Charybdis merguensis* (de Man)Figs. 27, *d*, 32, *b*.

1830. Rüppell, Beschreib. 24 Krabben, p. 4, pl. 1, fig. 1, pl. 6, fig. 1 (*Talamita sexdentata* Herbst).

1887. de Man, J. Linn. Soc. Lond., xxii, p. 82, pl. 5, figs. 3, 4 (*Goniosoma m.*).

1899. Alcock, *l. c.*, p. 55.

1908. Stebbing, Ann. S. Afr. Mus., vi, p. 10 (*sexdentata* Herbst).

1910. *Id.*, *l. c.*, p. 306 (*sexdentata* Herbst).

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120.

1930. Monod, Zool. Anz., xcii, p. 140, fig. 7.

1935. Chopra, *l. c.*, p. 484, fig. 8 (1st plp. ♂).

1937. Leene, *l. c.*, p. 165.

1937. Shen, Bull. Raffles Mus., 13, p. 121, fig. 12, *a-d*.

Like *cruciata*, but frontal teeth more acute, antero-lateral teeth all more claw-like or spiniform, the 1st acute; hand of cheliped with 5 spines; 4th joint of 5th leg half as broad as long, hind margin of 5th joint (as well as 4th) with a spine, hind margin of 6th with 6–12 denticles. 6th abdominal segment ♂ with parallel (or slightly divergent) sides until within a quarter of distal margin, where they converge rapidly; 1st pleopods considerably more slender and somewhat sinuous in their distal half; tips of finger and thumb pale in colour.

Length up to 46 mm., breadth 69 mm. Buff or cream or dirty grey, with reddish or crimson patches medianly on hinder half of carapace, and on either side of median line anteriorly, chelipeds and legs mottled and banded, finger and thumb red basally, dark brown distally with white tips.

*Localities*.—Natal (Stebbing, and S. Afr. Mus.); Delagoa Bay (Barnard).

*Distribution*.—Indian Seas, East Indies to Hong Kong. Also recorded from Palestine (migrated via Suez Canal).

*Remarks*.—The coloration is very like that given by Rüppell for Red Sea specimens as regards the finger and thumb of chelipeds. Monod's specimen had 3 blackish-red spots on carapace.

Leene (*l. c.*, p. 168) states that the type of *sexdentata* Herbst 1783 (not *sexdentata* de Haan 1850 = *japonica* M. Edw. 1861) seems to be lost, so that its identity cannot be established. It is therefore preferable to use de Man's name for this species, which is well characterized by the spine on 5th joint of 5th leg.

*Charybdis annulata* (Fabr.)

Fig. 32, *h*.

1899. Alcock, *l. c.*, p. 54.

1937. Leene, *l. c.*, p. 167, fig. 1.

1937. Chopra and Das, *Rec. Ind. Mus.*, xxxix, p. 393, fig. 4 (♂ abd. and 1st plp.).

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 363.

Resembling *merguiensis*, but upper margin of hand has only 3 spines, the apical pair being reduced to mere blunt, feebly prominent knobs; 5th joint of 5th leg has no spine on hind margin. 1st pleopods as in *merguiensis*.

Length up to 47 mm., breadth 70 mm. (Alcock). Dull rosy-red, carapace symmetrically mottled (more or less cruciate markings), finger and thumb of chela maroon, legs banded (Stephenson's specimen).

*Localities*.—Scottburgh, Natal (coll. K. H. B.); Durban (coll. Professor T. A. Stephenson); also one other specimen without locality in South African Museum.

*Distribution*.—Madagascar, Indian Seas, Malay Archipelago.

*Charybdis natator* (Herbst)

1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 801.

1908. Stebbing, *Ann. S. Afr. Mus.*, vi, p. 9, pls. 2; 3 (Crust., pls. 28, 29).

1910. *Id.*, *l. c.*, p. 307.

1932. Shen, *Hong Kong Natural.*, iii, p. 40, figs. 7, 8, and pl. 9, fig. *a*.

Carapace rather coarsely tomentose, a transverse granular ridge between the last antero-lateral teeth (interrupted by the cardiac-branchial grooves) and 2 in front, the anterior one medianly interrupted, one across the cardiac region and 2 short ones on each hinder branchial region; 1st antero-lateral (outer orbital) tooth blunt or truncate, the last smaller than preceding teeth. Lobe of basal joint of ant. 2 with a granulate ridge. Chelipeds granulate-tuberculate on under surface, especially of hand, granules arranged in transverse squamose ridges, front margin of 4th joint with 3 large spines (as well as smaller ones), hand with 5 spines on upper margin. 5th leg, 4th joint with spine on hind margin, 5th joint without spine, hind margin

of 6th joint denticulate (not conspicuously so in large examples). Lateral margins of 6th abdominal segment ♂ convex, slightly diverging until quite near distal margin; 2nd-4th segments in both sexes transversely keeled. 1st pleopods ♂ very slender in apical half.

Length up to 84 mm., breadth 123 mm., cheliped ♂ 230 mm. Mottled reddish or crimson, finger and thumb of chelae maroon-red basally, blackish apically, denticles on finger and thumb mostly blackish.

*Localities*.—Durban (Krauss, Miers, Stebbing); Inhambane (Hilgen-dorf); Delagoa Bay (coll. van der Horst).

*Distribution*.—Indian Seas, East Indies to Philippine Is., and China.

*Remarks*.—One ♂ specimen in South African Museum has no trace of the transverse squamae on underside of hand of the right cheliped, but is covered quite irregularly with granules of varying sizes.

*Charybdis variegata* (Fabr.)

Fig. 32, c.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 237.

1935. Chopra, *l. c.*, p. 488, fig. 10 (1st plp. ♂).

1937. Leene, *l. c.*, p. 169, and var. *brevispinosa*, p. 170, figs. 2, 4, a, b.

1937. Shen, Bull. Raffles Mus., 13, p. 127, fig. 15, a-c.

As in *natator*, but last antero-lateral tooth twice as large as preceding one, salient and spiniform as in the species of *Lupa*; and lobe of basal joint of ant. 2 with a prominent tooth. 6th joint of 5th leg with 1-2 inconspicuous spinules distally on hind margin. 6th abdominal segment ♂ broader than long, with strongly convex sides.

Length up to 21 mm., breadth 36 mm.

*Locality*.—Off Tugela River mouth, 47 fathoms (Stebbing).

*Distribution*.—Red Sea, Indian Seas, China, Japan.

*Remarks*.—This small species is distinguished by the prominent tooth on basal joint of 2nd antenna, and the salient last antero-lateral tooth.

*Charybdis orientalis* Dana

Fig. 32, d-g.

1906. Rathbun, Bull. U.S. Fish. Comm. for 1903, pt. 3, p. 872, fig. 32 (abd. ♂) and pl. 13, fig. 1.

1918. Stebbing, Ann Durban Mus., ii, p. 50.



Like *natator* and *variegata*, but only one ridge on hinder half of each branchial region, the 2nd antero-lateral tooth is reduced to a denticle at base of 1st tooth, and last antero-lateral tooth is not enlarged (at least in adult; it may be in juv.). Lobe of basal joint of ant. 2 with a smooth (or nearly so) ridge. 6th joint of 5th leg denticulate on hind margin. 6th abdominal segment ♂ with parallel sides (fig. 32, *f*).

Length up to 37 mm., breadth 56 mm.

*Localities.*—Durban (Stebbing); Delagoa Bay (coll. van der Horst).

*Distribution.*—Indian Seas, Philippine Is., Society Is., and Hawaiian Is.

Gen. THALAMITA Latr.

1902. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 201.

1910. Stebbing, *l. c.*, p. 309.

1938. Gordon, Bull. Raffles Mus., no. 14, p. 176.

1939. Schmitt, Smithson. Misc. Coll., xcvi, 6, p. 16.

Carapace more or less hexagonal, but the antero-lateral margins are subparallel or diverge very little posteriorly owing to the width of the fronto-orbital margin, which is not much less than maximum width of carapace; front cut into 2, 4, or 6 rounded or subquadrate lobes, not including the rather broad inner orbital tooth, 5 (sometimes only 4) antero-lateral teeth including the outer orbital tooth (the penultimate tooth sometimes rudimentary or obsolete), transverse ridges usually distinct, hind and postero-lateral margins evenly curved. Upper orbital margin with 2 fissures. Basal joint of ant. 2 very broad, apical lobe long and in contact for its whole length with inner orbital tooth, thus completely excluding rest of antenna from orbit (fig. 27, *e*). Chelipeds strong. Abdomen of ♂ with 3rd–5th segments fused, 2nd and 3rd feebly or not strongly keeled.

*Key to the South African Species.*

I. Length of basal joint of ant. 2 (from base to apex of lobe) much greater than major diameter of orbit.

A. Front cut into 6 subequal lobes (excl. inner orbital tooth). No transverse ridges behind level of last antero-lateral tooth (fig. 33, *a*). Hind margin of 6th joint of 5th leg spinulose.

1. 5 subequal antero-lateral teeth (fig. 33, *a*).

a. Transverse ridges faint. Outer surface of hand of cheliped nearly smooth . . . *crenata*.

b. Transverse ridges very distinct. Outer surface of hand costate . . . *danae*.

2. 4th antero-lateral tooth rudimentary (cf. fig. 33, c).
- a. Crest on lobe of basal joint of ant. 2 with large spines . . . . . *prymna.*
- b. Crest smooth . . . . . *picta.*
- B. Front cut into 2 lobes (fig. 33, b, c). An additional ridge across cardiac and branchial regions behind level of last antero-lateral tooth (sometimes interrupted or faintly indicated).
1. Front margin of inner orbital tooth convex, much narrower than either of frontal lobes (fig. 33, b). Hind margin of 6th joint of 5th leg smooth . . . . . *sima.*
2. Front margin of inner orbital tooth straight (or nearly so), not much narrower than frontal lobes. 4th antero-lateral tooth small or rudimentary (fig. 33, c). Hind margin of 6th joint of 5th leg spinulose.
- a. Crest on basal joint of ant. 2 serrate . . . . . *admete.*
- b. Crest smooth . . . . . *integra.*
- II. Length of basal joint of ant. 2 subequal to major diameter of orbit. Front cut into 4 lobes, the middle ones much wider than outer ones (fig. 33, d, g).
- A. 5 antero-lateral teeth, the 4th one small. Transverse ridges distinct (fig. 33, d).
1. 5 spines on upper surface of hand of cheliped. Sternum and abdomen ♂ glabrous but pitted. 1st pleopod ♂ stout (fig. 33, f) . . . . . *wood-masoni.*
2. 6 spines on upper surface of hand. Sternum and abdomen ♂ with setose grooves. 1st pleopod ♂ slender distally (fig. 33, i) . . . . . *delagoae.*
- B. 4 antero-lateral teeth, the 3rd one small. Only the branchial transverse ridge distinct (fig. 33, g) . . . . . *inhacae.*

*Thalamita crenata* (Latr.), M. Edw.

Figs. 27, e, 33, a.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 800.

1910. Stebbing, *l. c.*, p. 309.

1937. Shen, Bull. Raffles Mus., 13, p. 129, fig. 16, a-d.

Carapace more or less tomentose, about  $\frac{2}{3}$  as long as broad, with fine granular transverse ridges, 4 short ones in a crescent on anterior border of gastric region, one straight across middle of gastric region, and one joining the last antero-lateral teeth (interrupted medianly and at cardiac-branchial grooves), all 5 antero-lateral teeth subequal; front with 6 subequal rounded-quadrangle lobes. Total length of basal

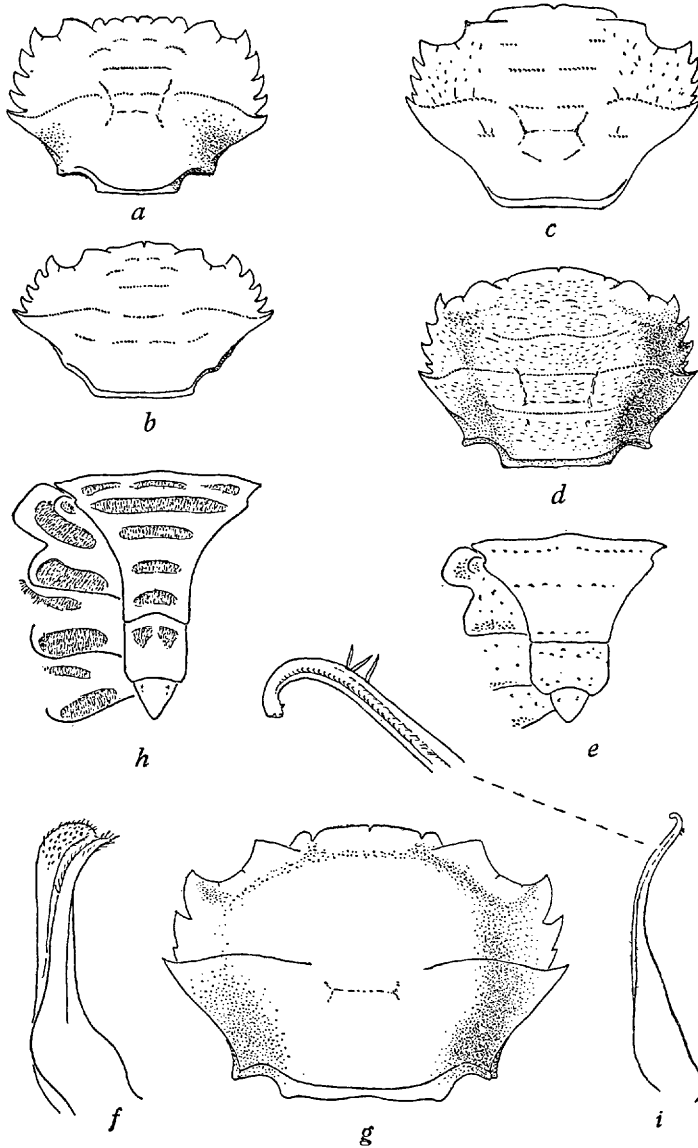


FIG. 33.—*Thalamita crenata* (Latr.), M. Edw. a, carapace.  
*Thalamita sima* M. Edw. b, carapace (after Shen).  
*Thalamita admete* (Herbst). c, carapace.  
*Thalamita wood-masoni* Alc. d, carapace. e, 3rd-7th abdominal segments ♂.  
 f, 1st pleopod ♂.  
*Thalamita inhacae* n. sp. ♀. g, carapace.  
*Thalamita delagoae* n.sp. ♂. h, 3rd-7th abdominal segments ♂. i, 1st pleopod ♂,  
 with apex further enlarged.

joint of ant. 2 much greater than major diameter of orbit, lobe with a granulate crest. Cheliped, front margin of 4th joint with 3 major spines, outer surface of wrist with 3 adpressed teeth, upper surface of hand with 5 spines, the outer apical one, or all of them, blunt, outer surface smooth except for a feebly granulate ridge near lower margin, continued on to thumb. 5th leg, 4th joint with spine on hind margin, hind margin of 6th joint more or less denticulate. 6th abdominal segment ♂ with slightly convex and converging sides. 1st pleopod ♂ slender, especially in its distal third.

Length up to 47 mm., breadth 72 mm.

*Localities*.—Durban Bay (Krauss, Miers); Mozambique (Bianconi, Hilgendorf, Miers); Delagoa Bay and Mozambique (coll. K. H. B.).

*Distribution*.—Mauritius, Madagascar, Indo-Pacific.

#### *Thalamita danae* Stimpson

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 800.

1887. de Man, J. Linn. Soc. Lond., xxii, p. 78, pl. 4, figs. 8, 9.

1899. Alcock, J. Asiat. Soc. Bengal, lxxviii, p. 77 (references).

1902. Borradaile, *l. c.*, p. 201 (var. of *prymna*).

1934. Shen, Hong Kong Natural., Suppl., no. 3, p. 52, figs. 15, 16.

Differs from *crenata* thus; carapace about  $\frac{3}{4}$  as long as broad, transverse ridges very prominent, upper and outer surfaces of 4th–6th joints of cheliped granulate, 6–7 ridges on hand and the spines much sharper, 6th abdominal segment ♂ much broader than long, its sides divergent for  $\frac{2}{3}$  their length, then rapidly converging.

Length up to 39 mm., breadth 64 mm. Purplish or brick-red (Stimpson).

*Locality*.—Mozambique (Hilgendorf).

*Distribution*.—As for *crenata*.

#### *Thalamita prymna* (Herbst)

1887. de Man, J. Linn. Soc. Lond., xxii, p. 75, pl. 4, figs. 5, 6.

1902. Borradaile, *l. c.*, p. 201.

1910. Stebbing, *l. c.*, p. 309.

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120.

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 73, pls. 31–34.

1937. Shen, Bull. Raffles Mus., 13, p. 133, fig. 18 *a-d*.

1942. Ward, Mauritius Inst. Bull., ii, p. 81.

Carapace more or less tomentose, transverse ridges very distinct, the middle gastric ridge continued, following the curve of the orbits,

to the notch between 1st and 2nd antero-lateral teeth, the 4th antero-lateral tooth rudimentary or absent, the 4 middle frontal lobes quadrate, front margin of inner orbital tooth convex. Lobe of basal joint of ant. 2 with a row of spines of which some (1-3) are large. Chelipeds similar to those of *danae*, but without faint ridge separating inner and lower surfaces of hand. 6th joint of 5th leg denticulate. 6th abdominal segment ♂ about as long as broad, with gently convergent sides.

Breadth up to 62 mm. (Hilgendorf).

*Localities*.—Durban Bay (Krauss); Delagoa Bay (Barnard).

*Distribution*.—Indo-Pacific.

*Thalamita picta* Stimpson

? 1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 800 (juv. *crenata* or *picta*).

1884. Miers, Crust. H.M.S. *Alert*, p. 540.

1887. de Man, *l. c.*, p. 76.

1899. Alcock, *l. c.*, p. 79.

1902. Borradaile, *l. c.*, p. 201 (var. of *prymna*).

1937. Shen, Bull. Raffles Mus., 13, p. 135, fig. 19, *a-d*.

1942. Ward, Mauritius Inst. Bull., ii, p. 81.

Differs from *prymna* thus: the 2 middle frontal lobes project more than the others, the ridge on lobe of basal joint of ant. 2 is tooth-like with a smooth entire edge.

*Locality*.—Mozambique (Hilgendorf).

*Distribution*.—Red Sea, Amirante Is., Andaman Is., Japan, New Caledonia.

*Thalamita sima* M. Edw.

Fig. 33, *b*.

? 1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 800 (juv.).

1884. Miers, Crust., H.M.S. *Alert*, pp. 231, 539.

1887. de Man, *l. c.*, p. 75.

1899. Alcock, *l. c.*, p. 81.

1902. Borradaile, *l. c.*, p. 201.

1927. Hale, S. Austral. Crust., pt. 1, p. 151.

1934. Shen, Hong Kong Natural., Suppl., no 3, p. 54, figs. 17, 18.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 126, fig. 27, A-G.

Carapace pilose, with a transverse ridge across the cardiac and branchial regions additional to those found in the preceding species, front with 2 broad lobes, each wider than the inner orbital tooth, the front margin of which is convex; 5 antero-lateral teeth, the 4th somewhat smaller, and the 5th distinctly larger than the others. Lobe of basal joint of ant. 2 with a low smooth crest. Chelipeds granulate, lower surface especially covered with transverse squamae, hand also with squamae on all surfaces, 6-7-costate, with 5 spines, one of which may be blunt. Hind margin of 6th joint of 5th leg smooth.

Length 32 mm., breadth 54 mm.

*Localities.*—? Inhambane (Hilgendorf); Mozambique (Miers).

*Distribution.*—Indo-Pacific to Australia and New Zealand.

*Remarks.*—According to Shen (*l. c.*, fig. 18, *b*) the abdomen of ♂ has transverse pilose bands.

*Thalamita admete* (Herbst)

Fig. 33, *c*.

1902. Borradaile, *l. c.*, p. 202 (*admeta*).

1906. Rathbun, Bull. U.S. Fish. Comm. for 1903, pt. 3, p. 874.

1910. Stebbing, *l. c.*, p. 309.

1915. Laurie, J. Linn. Soc. Lond., xxxi, p. 440.

1942. Ward, Mauritius Inst. Bull., ii, p. 80.

Carapace pilose, about  $\frac{3}{5}$  (or less) as long as broad, with the additional transverse ridge as in *sima*, frontal lobes not much wider than the inner orbital teeth, the anterior margin of which is straight (or nearly so), 4th antero-lateral tooth much smaller than the others and often rudimentary. Lobe of basal joint of ant. 2 with serrated crest (? smooth in juv.). Chelipeds unequal in adult ♂, hand with 5 ridges on upper and outer surfaces, the 3 costae on outer surface granulate, 6 spines above (the 2 distal ones often small), other surfaces smooth or faintly costate or granulate. Hind margin of 6th joint of 5th leg denticulate. 6th abdominal segment ♂ not much broader than long, sides slightly but gradually convergent.

Length up to 15 mm., breadth 24 mm. Reddish orange, more or less mottled, finger and thumb of chela partly brown, tips whitish.

*Localities.*—Durban Bay (Krauss); Umtwalumi, Natal (coll. Stephenson); Delagoa Bay (coll. van der Horst).

*Distribution.*—Mauritius, east coast of Africa, Indo-Pacific.

*Thalamita integra* Dana

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 799.

1884. Miers, Crust., H.M.S. *Alert*, p. 540.

1899. Alcock, *l. c.*, p. 85.

1915. Laurie, J. Linn. Soc. Lond., xxxi, p. 441.

Differs from *admete* as follows; carapace not quite so broad, distinctly convex, glabrous, transverse ridges indistinct, especially the hindmost one, crest of basal joint of ant 2 *smooth* and *entire*, chelipeds more smooth and polished, less strongly spinose, 6th abdominal segment ♂ much broader than long.

*Localities*.—Mozambique (Hilgendorf); Delagoa Bay (coll. van der Horst).

*Distribution*.—Indo-Pacific.

*Remarks*.—The West African form, *africana* Miers, was originally described as a variety of *integra*. For its distinguishing features see Rathbun, 1921, Bull. Amer. Mus. Nat. Hist., xliii, p. 402.

*Thalamita wood-masoni* Alc.

Fig. 33, *d-f*.

1899. Alcock, *l. c.*, p. 90, and var. *taprobatica*, p. 91.

1900. *Id.*, Illustr. Zool. "Investigator," pl. 48, figs 1, 1, *a*, and var. *taprobatica*, figs. 2, 2, *a*.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 363.

Carapace rather sparsely setose, the setae arising from numerous tiny transverse squamae which cover the whole upper surface (not mentioned or figured by Alcock), transverse ridges well defined, the cardiac-branchial one medianly interrupted in the typical form but continuous in the variety (according to the figures); front arched, cut into 4 teeth separated by clefts (not notches), the middle ones twice as wide as outer ones, inner orbital tooth convex, antero-lateral teeth moderately acute, the 4th very small and more or less concealed by the lateral setae. Length of basal joint of ant. 2 equal to major diameter of orbit, with a finely granulate low crest. Chelipeds slightly unequal (♂), sparsely pilose, front margin of 4th joint with 3 spines (the proximal one rather small), upper and outer surfaces squamose-granulate, wrist granulate and costate, with 3 spines on outer surface, hand granulate on upper surface and on upper parts of inner and outer surfaces, 5 spines and 2 granulate costae on upper surface, one granulate costa in middle of inner surface, and 2 on lower outer surface,

both the latter continued on to thumb, finger subequal to upper edge of hand in smaller chela, shorter in the larger chela. 5th leg, 4th joint at least twice as long as broad, with spine on hind margin, 6th joint spinulose on hind margin, dactyl ovate-lanceolate, rather rapidly narrowed towards the sharp unguinal point. Sternum and abdomen glabrous, but pitted. 6th abdominal segment ♂ nearly twice as broad as long, sides parallel for  $\frac{2}{3}$  its length, then rapidly converging (fig. 33, e), 1st pleopod ♂ stout (fig. 33, f).

Length up to 12.5 mm., breadth 18 mm. Ovig. ♀ 8 × 11 mm.

*Locality*.—Delagoa Bay (coll. K. H. B.).

*Distribution*.—Andaman Is. and Palk Strait; the variety from Ceylon.

*Remarks*.—A single ♂ and an ovigerous ♀ appear to belong to this species, although no mention was made by Alcock of the surface sculpture. The distinctly granulate chelipeds are like those of the typical form (the variety has much smoother chelipeds), but the cardiac-branchial ridge is continuous as figured for the variety.

*Thalamita delagoae* n. sp.

Fig. 33, h, i.

♂. Carapace setose, transverse ridges well defined, but both the cardiac-branchial and the additional one behind it interrupted by the cardiac-branchial grooves; front with 4 lobes, the outer ones much smaller than the inner ones (smaller than in fig. 33, g); antero-lateral teeth sharp, spiniform, the 4th one very small. Length of basal joint of ant. 2 slightly greater than orbit, with granulate crest. Cheliped (left one only), front margin of 4th joint with 3 spines and some denticles proximally, its upper outer surface finely granulate, wrist granulate and setose, with 4 spines on upper and outer surfaces, hand granulate and setose on upper, and upper outer surfaces only, 6 spines on upper surface, 3 on inner edge, 3 (incl. the basal one) on outer edge, 3 granulate costae on outer surface, the lower 2 continued on to thumb, finger subequal to upper edge of hand, grooved. 5th leg, 4th joint twice as long as broad, with spine on hind margin, 6th joint spinulose on hind margin, dactyl ovate-lanceolate. Sternum and abdomen with transverse setose foveolae or grooves (fig. 33, h). 6th segment of abdomen ♂ as broad as long, narrowing slightly distally. 1st pleopod ♂ very slender in distal half, with curved apex (fig. 33, i).

Length 9 mm., breadth 15 mm.

*Locality*.—Delagoa Bay (coll. van der Horst, 1939. 1 ♂).



*Remarks.*—Judging from tracings and notes kindly supplied by Dr. Gordon (Brit. Mus.), this specimen has a different front from *invicta* Thallwitz, 1890/91; there is some similarity with de Man's "invicta," = *demani* Nobili, but the latter has only 4 antero-lateral teeth (not 5, the 4th being minute). *T. cooperi* Borradaile, 1902 also has only 4 antero-lateral teeth, and a differently shaped 1st pleopod ♂.

*Thalamita inhacae* n. sp.

Fig. 33, g.

♀. Carapace nearly glabrous, a few scattered setae, all transverse ridges obsolete except the one on each branchial region running to the last antero-lateral tooth; front cut into 4 lobes separated by small notches, the quadrate middle ones twice as broad as the rounded outer ones, front margin of inner orbital tooth nearly straight; only 4 antero-lateral teeth (incl. outer orbital tooth), acute, the 3rd small. Length of basal joint of ant 2 equal to major diameter of orbit, lobe with a smooth crest. Chelipeds glabrous, all joints smooth and shagreened only, front margin of 4th joint with 3 spines (and some denticles proximally), wrist with 3 adpressed spines (mere ridges without free apices) on outer surface, hand with 5 blunt spines on upper surface, a single smooth ridge on lower part of outer surface continued on to thumb, finger grooved. 5th leg, 4th joint slightly more than twice as long as broad, with spine on hind margin, hind margin of 6th joint spinulose, dactyl ovate, with small unguis point. Sternum and abdomen smooth but pitted.

Length 14 mm., breadth 21 mm. As preserved, pinkish with minute red dots on carapace, legs pale with greyish transverse bands.

*Locality.*—Inhaca (Inyak) Island, Delagoa Bay (coll. van der Horst, 1937. 1 ♀).

*Remarks.*—This ♀ specimen resembles *hanseni* Alcock, 1899, and *pilumnoides* Borradaile, 1902 (*l. c.*, p. 207, fig. 38), in having only 4 antero-lateral teeth, of which the 3rd is small. Alcock's figures (1900, pl. 47) of *investigatoris* and *imparimanus* show bands across the legs. But all these species differ in the shape and number of the frontal lobes.

FAMILY POTAMONIDAE.

*Freshwater Crabs.*

1897. Ortmann, Zool. Jahrb. Abt. Syst., x, p. 297.

1902. *Id.*, Proc. Amer. Philos. Soc., xli, pp. 267–400, esp. pp. 296–306 (geograph. distribution).

1910. Stebbing, *l. c.*, p. 293.  
 1910. Alcock, *Rec. Ind. Mus.*, v, p. 253.  
 1917. Bouvier, *C.R. Ac. Sci.*, clxv, pp. 620, 753.  
 1921. Rathbun, *Bull. Amer. Mus. Nat. Hist.*, xliii, p. 404.  
 1929. Balss, *Zool. Jahrb. Abt. Syst.*, lviii, pp. 339 *sqq.* (East Africa and Madagascar).  
 1936. *Id.*, *Rev. Zool. Bot. Afr.*, xxviii, pp. 200-202 (relationship to S. American forms).

Carapace broader than long, or subcircular, antero-lateral margins convex and not longer (often much shorter) than the convergent postero-lateral margins, regions usually not well defined, branchial regions inflated, front broad. Chelipeds in ♂ unequal, often very much so, in ♀ subequal. Abdomen with 7 segments in both sexes. Male genital openings coxal.

*Remarks.*—Freshwater crabs distributed over the Old and New Worlds and Australia, tropical and subtropical. For classic discussion of their distribution see Ortmann (*l. c.*, 1902). His conclusions, however, have been criticized (Balss, 1936).

Only one genus or subgenus occurs in South Africa. The genus *Trichodactylus* (Stebbing, 1910, *l. c.*, p. 295) is South American.

A key to the subfamilies, and to the genera of *Potamoninae*, will be found in Alcock (*l. c.*, 1910).

#### Subfam. POTAMONINAE.

See Alcock and Rathbun, *l. c.*, *supra*.

Front exceeding  $\frac{1}{8}$  width of carapace. Mandibular palp 2- or 3-jointed, the terminal joint consisting of a single lobe, sometimes thickened and setose at base, but never distinctly bilobed. Mxp. 3 with 4th joint broader than long. 1st antennae transverse. Efferent branchial channels not produced to edge of front. Dactyls of walking legs spinose. Old World forms.

#### Gen. POTAMON Savigny

See Alcock and Rathbun, *l. c.*, *supra*.

#### Subgen. *Potamonantes* McLeay

1910. Stebbing, *l. c.*, p. 293.  
 1918. Calman, *Ann. Mag. Nat. Hist.* (9), i, p. 234.

1921. Rathbun, *l. c.*, pp. 405, 406.

1929. Gordon, *Ann. Mag. Nat. Hist.* (10), iii, p. 405.

1935. Barnard, *Ann. Transv. Mus.*, xvi, p. 482.

1936. Balss, *Rev. Zool. Bot. Afr.*, xxviii, pp. 165 *sqq.* (Congo species).

1942. Chace, *Bull. Mus. Comp. Zool. Harv.*, xci, pp. 186 and 203 (list of African species).

This subgenus is wholly African. Post-frontal crest distinct and continuous, or nearly so, across the epigastric region to the epigastric angle or tooth, sometimes not actually reaching the latter. Front entire. Antero-lateral margins with an epigastric tooth, or at least an obtuse angle, usually granulate or denticulate, but sometimes strongly dentate or spinose. Sometimes (but not in South African species) a tooth between the epibranchial tooth and the outer orbital tooth.

*Remarks.*—As Miss Rathbun points out (1921, *l. c.*, p. 405), it is almost impossible to frame any strict definitions of the subgenera. And the same applies to the species. The more typical forms of certain species may be defined up to a point; or, in other words, a form from a more or less circumscribed locality or area may be found to exhibit more or less constant features; *e.g.* the typical *perlatus* from the S.W. Cape, typical *sidneyi* from Natal, typical *warreni* from the Orange River system.\*

Single specimens often cause difficulty in identification, and when examples from intermediate localities are examined, transitional forms are found. In fact, the more abundant the material and the more numerous the localities, the greater the difficulties (*cf.* Barnard, 1935, *l. c.*, p. 482).

An intensive collecting and examination of material, the tracing of morphological changes in the crab communities, either within a river system or between neighbouring systems, would provide a most interesting biological study, albeit one of considerable magnitude. An examination of the 1st pleopods of ♂ is essential (*cf.* Balss, 1936, and Chace).

The following key is submitted in the hope that it may help in the identification of Museum specimens.

\* *Cf.* Pesta, 1946, *Ark. Zool.*, xxxvii, 2, B, pp. 1-6. *Potamon potamios* is to be regarded as a highly variable species exhibiting within its extensive area of distribution a tendency to the formation of aberrant individuals, which are, however, not strictly isolated geographically, nor amenable to a hard and fast taxonomic diagnosis.

*Key to the South African Species.*

- I. Post-frontal crest continuous, sharply raised (fig. 34, a).  
 4th joint of larger cheliped with only the antero-inferior granulate margin ending in a tooth or spine.
- A. A more or less distinct groove on 3rd joint of mxp. 3.
1. 4th joint of 5th leg (adult)  $2-2\frac{1}{2}$  (less than 3) times as long as broad.
- a. Epibranchial corner obtusely angular, without projecting tooth or denticle (fig. 34, a, b).
- i. Carapace not strongly inflated.
- a. Epibranchial and frontal regions smooth (fig. 34, a).  
 \* No strong keel on terminal portion of 1st pleopod ♂ (fig. 35, c) . . . *perlatus*.  
 \*\* A strong keel on terminal portion of 1st pleopod ♂ (fig. 35, e) . . . sp. *Beira*.
- β. Epibranchial region granulate-corrugate, frontal region granulate (fig. 34, b) . . . *sidneyi*.
- ii. Carapace strongly inflated, epibranchial corners bent downwards . . . *inflatus*.
- b. Epibranchial corner with a distinct, but sometimes small, tooth (fig. 34, c, d, e).
- i. Antero-lateral margin more or less dentate or spinose, post-frontal crest running straight into epibranchial tooth without sinus (fig. 34, c) . . . *warreni*.
- ii. Antero-lateral margin merely granulate or denticulate, post-frontal crest with a distinct sinus just internal to the epibranchial tooth (fig. 34, d, e).
- a. Carapace not strongly inflated. Epibranchial tooth strong (fig. 34, d).
- \* Lateral margin projecting for a distance less than width of orbit.  
 † Antero-lateral margin strongly denticulate . . . *dubius*.  
 †† Antero-lateral margin finely granulate . . . *dubius jallae*.

- \*\* Lateral margin projecting  
for a distance equal  
to width of orbit . . . . . *bayonianus*.
- β. Carapace inflated. Epibranchial  
tooth small (fig. 34, *e*) . . . . . *obesus*.
2. 4th joint of 5th leg 3-3½ times as long as broad . . . . . *depressus*.
- B. No groove on 3rd joint of mxp. 3 . . . . . *bottegoi*.\*
- II. Post-frontal crest not sharply raised or projecting forwards  
(fig. 34, *h*), more or less discontinuous. No groove on  
3rd joint of mxp. 3. 4th joint of larger cheliped with  
*both* antero- and postero-inferior granulate margins  
each ending in a tooth or spine . . . . . *calcaratus*.

*Potamon (Potamonautes) perlatus* (M. Edw.)

*Cape River Crab.*

Figs. 34, *a*, 35, *a-c*.

1838. McLeay, *Annulosa S. Afr.*, p. 64.
1843. Krauss, *Südafrik. Crust.*, p. 37, vars. *b* and *c*.
1897. Weber and de Meijere, *Zool. Jahrb. Abt. Syst.*, x, p. 156.
1910. Stebbing, *l. c.*, p. 293.
1912. Lenz, *Ark. Zool.*, vii, no. 29, p. 8 (compared with *sidneyi*).
1921. Rathbun, *l. c.*, p. 417 (compared with Congo species).
1922. Balss, *Beitr. Kenntn. Land. Süssw. S.W.A.*, ii, p. 71.
1924. Colosi, *Ark. Zool.*, xvi, no. 1, p. 2, fig. 1 (sternum, 1st plp. ♂).
1929. Barnard, *J. South West Afr. Sci. Soc.*, iii, p. 62.
1935. *Id.*, *l. c.*, p. 482, fig. 1, *a-b*, and chart.
1936. Balss, *l. c.*, p. 184, fig. 21 (apex. 1st plp. ♂) and chart, fig. 20.
- [Not 1920. Colosi, *Boll. Mus. Zool. Torino*, xxxv, no. 734, p. 33.  
= *odhneri* Colosi 1924, *Equatorial Africa*.]
- [Probably not: 1889. Pfeffer, *Jahrb. Wiss. Anst. Hamburg*, vi,  
p. 33.
1912. Lenz, *D. Zentralaf. Exp.*, iii, zool. i, p. 124.

Both records from Tanganyika.]

Carapace flattish, branchial regions gently convex, epibranchial corner not strongly curving downwards; post-frontal crest well developed, more or less sharp and overhanging, continuous to the obtuse epibranchial angle, almost straight and very little inclined backwards from median line (in adult), sometimes slightly concave between middle line and epibranchial angle. Frontal and orbital margin, post-frontal crest, and antero-lateral margin more or less

\* Balss (1929, *l. c.*, p. 348) regards this as a synonym of *obesus*.

beaded-granulate, feebly so in old examples, in which also the hinder continuation of the antero-lateral margin on to the dorsal surface becomes obsolete. Dorsal surface typically quite smooth (microscopically granulate), sometimes with scattered, short and stiff

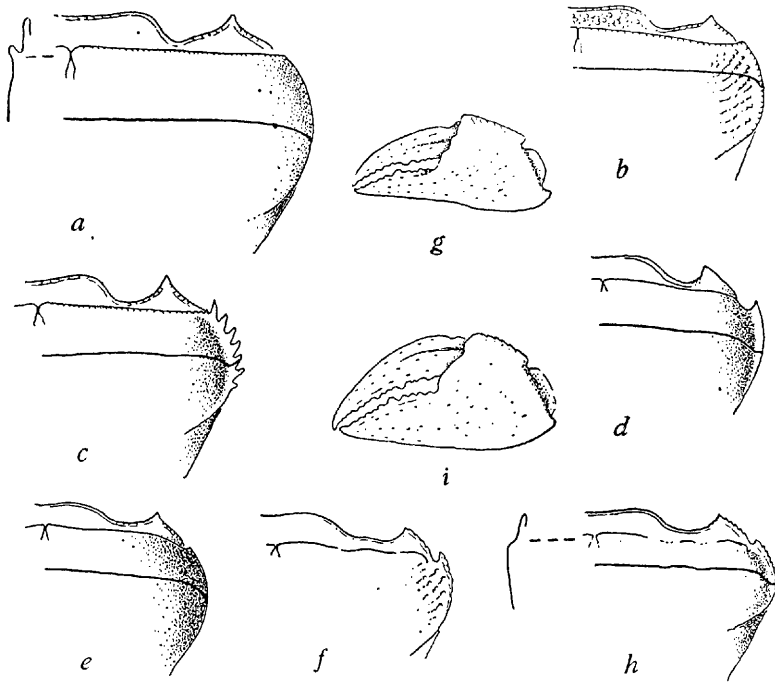


FIG. 34.—*Potamon (Potamonautes) perlatius* (M. Edw.). *a*, carapace, with profile of front and post-frontal crest in longitudinal section.

*P. sidneyi* Rathb. *b*, carapace.

*P. warreni* Calman. *c*, carapace.

*P. dubius jallae* Nob. *d*, carapace.

*P. obesus* (M. Edw.). *e*, carapace.

*P. bottegoi* de Man. *f*, carapace, and *g*, chela (both after de Man).

*P. calcaratus* Gordon. *h*, carapace, with profile of front and post-frontal crest in longitudinal section. *i*, chela.

(The heavy line in *a*, *b*, *c*, *d*, *e*, and *h* represents the profile of the carapace in transverse section.)

bristles in the middle on the carapace, pterygostomial region coarsely but feebly granulate. Outer surfaces of 4th and 5th joints of chelipeds coarsely and feebly squamulose-granulate; lower surface of 4th joint with 2 rows of granules, but only the inner (anterior) row ends in a larger tubercle or tooth; inner margin of wrist with 2 teeth, the

proximal one often small, blunt, or obsolete; finger of the larger chela ♂ sometimes strongly curved (*cf.* Krauss' figure of *depressus*). Middle of the apical margin on inner (anterior) surface of 5th joint of 2nd and 3rd legs with a denticle, sometimes indicated also on the 4th and even the 5th leg. 4th joint of 5th leg 2-2½ times as long as broad (adult). A shallow longitudinal groove on 3rd joint of mxp. 3. Sternum between bases of 3rd maxillipeds ending in a blunt or sharp point (contrary to Colosi's statement and figure, 1924); 2 transverse grooves, the hinder one shallower and often indistinct medianly. Apical piece of 1st pleopod ♂ with a low ridge on the external (ventral) side (fig. 35, c).

Length up to 70 mm., breadth 100 mm. Light or dark brown, often with reddish or greenish tinge, chelipeds often violaceous, especially in large specimens.

*Localities.*—See Stebbing, 1910, and Barnard, 1935. In general the species occurs on the Cape Peninsula and Cape Flats, and northwards to Clanwilliam and Calvinia, and eastwards along the coastal belt to Natal, with extensions inland; and there are isolated records from the Orange Free State, Transvaal, Bechuanaland, and South West Africa. The gaps (see chart) will probably be filled in by later collecting. The (apparent) absence of Crabs from Ovamboland may be due to Bull-frogs (see Barnard, 1929, Journ. S.W.A. Sci. Soc., iii, p. 62. Windhoek, S.W.A.).

Records from Equatorial Africa, Zanzibar, Tanganyika, Angola are open to doubt (specimens recorded by Colosi in 1920 as *perlatus* were later described by him as *odhneri* 1924; and see Balss, 1929, *l. c.*, pp. 347, 348, for other erroneous identifications; also Balss, 1936, for remarks on the *perlatus-johnstoni* group).

While I accept without reserve Balss' (1936) identification of Upper Congo specimens as *perlatus*, on morphological grounds, I am hesitant about accepting the implication that the Cape and Congo communities are *phylogenetically* conspecific.

The typical form is characteristic of the south west Cape, where it shows only very slight variation, and where no other forms occur. Towards Natal and the North and North-east, however, transitional forms occur linking up with *sidneyi* and *warreni*, and making sharp definitions of the species utterly impossible (*cf.* Barnard, 1935).

*Distribution.*—Upper Congo (Balss, 1936).

*Remarks.*—In small mountain streams breeding females only 25 mm. in width may be found. A ♀, 50 mm. wide, from the Cape Flats had about 300 embryos nearly ready to hatch (December); a

Natal specimen (species?), 50 mm. wide, was stated to have been carrying 486 juveniles (A. C. Harrison, Inland Fisheries Adviser), and a ♀ 67 mm. wide (Pinetown, Natal, transition *perlatus*-*sidneyi*) had 435 juveniles.

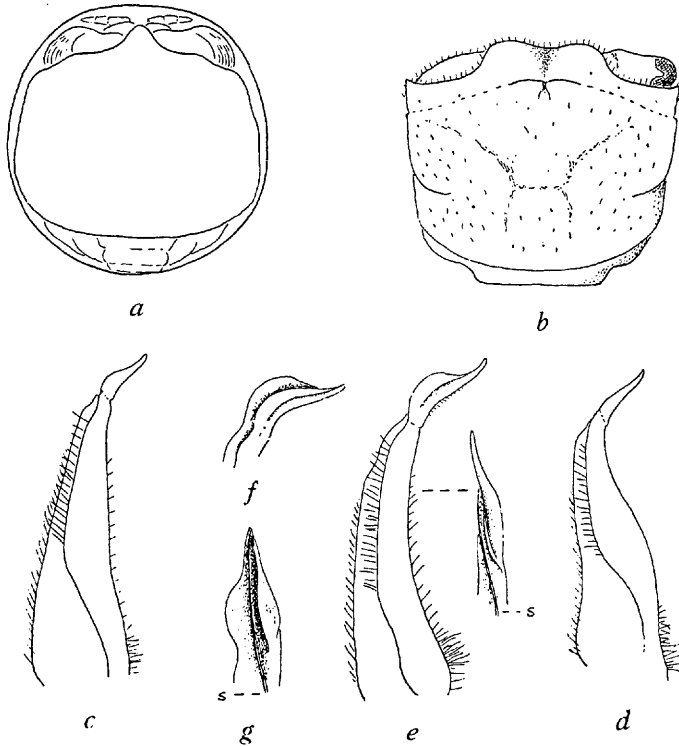


FIG. 35.—*Potamon* (*Potamonautes*) *perlatus* (M. Edw.). *a*, embryo within egg-membrane, 3 mm. diameter. *b*, juvenile from beneath abdomen of mother, 3 × 3.3 mm. *c*, 1st pleopod ♂. *P. calcaratus* Gordon. *d*, 1st pleopod ♂. *P. sp.* from Beira. *e*, 1st pleopod ♂ ventral view, with apex in median view. (Cf. Balss, 1936, fig. 17, *johnstoni*.) *P. sp.* from Tanganyika. *f*, *g*, 1st pleopod ♂ apex in ventral and median views. (Cf. Balss, 1936, fig. 18, *orbitospinus*.) (*s* = groove of seminal canal.)

The embryos of the Cape Flats specimen, still folded up within the egg-membrane, measure 3 mm. across the carapace. The carapace of the Pinetown juveniles is 3 mm. in length and 3.3 mm. in breadth. In the embryo the front is narrow and rostriform (fig. 35, *a*). In the juvenile (fig. 35, *b*) the front is about  $\frac{2}{3}$  width of carapace, which is



greatest between the outer orbital angles; epibranchial tooth indicated by a minute notch; post-frontal crest developed only near the middle line, but indicated laterally; margins and dorsal surface with scattered setules. The 4th joint of 5th leg is 4 times as long as broad.

The smallest *free-living* juvenile I have seen measures  $3.5 \times 4$  mm. (Potteberg, Bredasdorp Distr., May 1936, A. C. Harrison). The front is about  $\frac{4}{5}$  the width of carapace, and still retains a rather conspicuous median groove; post-frontal crest distinct, nearly straight, and sloping backwards from the middle line to a minute epibranchial denticle; carapace widest anteriorly between outer orbital angles and the epibranchial denticles, the antero-lateral margins being straight. The 4th joint of 5th leg is  $3\frac{1}{2}$  times as long as broad.

At a later stage,  $5 \times 6.5$  mm., the carapace has assumed the adult shape, *i.e.* it is widest *behind* the level of the epibranchial angles, and the antero-lateral margins are convex. The 4th joint of 5th leg is 3 times as long as broad. The frontal, orbital, and antero-lateral margins are finely beaded.

The largest specimens actually seen by me are from East London.

*Potamon (Potamonautes) sidneyi* Rathbun

*Natal River Crab.*

Fig. 34, b.

1843. Krauss, Südafrik. Crust., p. 37 (*perlata* var. a).

1910. Stebbing, *l. c.*, p. 295.

1912. Lenz, *l. c.*, p. 7.

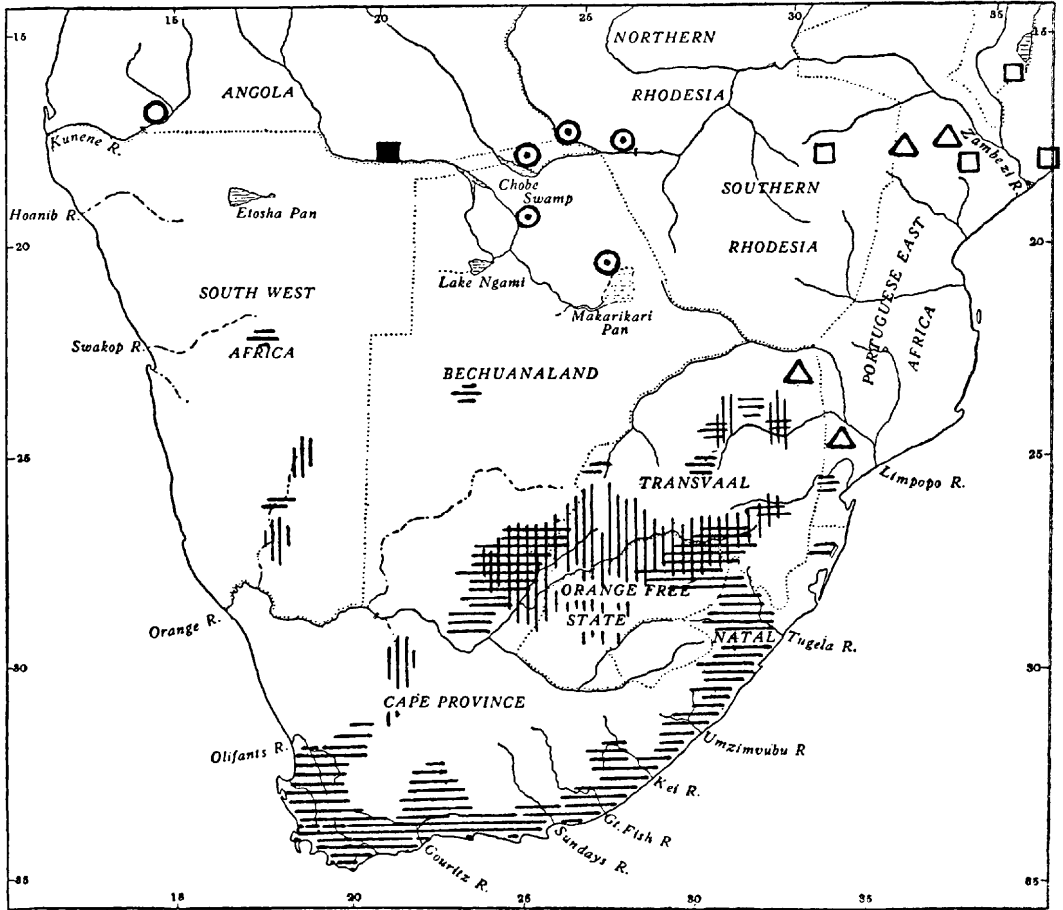
1922. Balss, *l. c.*, p. 71.

1935. Barnard, *l. c.*, p. 483, fig. 1, c, and chart (as form of *perlatus*).

The typical form is easily distinguished from typical *perlatus* by the stronger granulation of the frontal, orbital, and antero-lateral margins and post-frontal crest, the strongly granular frontal area, the granulate-corrugate epibranchial regions and outer surfaces of 4th and 5th joints of chelipeds. The pterygostomial regions and the margins of the walking legs are also more strongly granulate, the latter (especially the upper margins of the 4th joints) being sometimes distinctly spinulose.

There is, however, a complete transition between the *perlatus* and *sidneyi* forms (*cf.* Barnard, 1935). Whereas the typical smooth *perlatus* occurs as far eastwards as Natal, the typical rough *sidneyi*

has not yet been noted farther west than Kaffirkuis River, Still Bay: *sidneyi* is the form characteristic of Natal, and *perlatus* the form characteristic of the S.W. Cape.



Approximate distribution, as far as at present known, of some of the distinctive species of Freshwater Crabs, *Potamon* (*Potamonantes*), in South Africa.

*P. perlatus* ≡, passing eastwards into the *sidneyi* form.

*P. warreni* ||||, where the vertical and horizontal lines cross transitional forms are found.

*P. dubius* ○. *P. dubius jallae* ○. *P. bayonianus* ■. *P. obesus-bottegoi* □. *P. calcaratus* △.

Length up to 40 mm., breadth 55 mm.

*Localities.*—See Barnard, 1935. Specimens from the northern part of the Cape Province (Calvinia, Victoria West, Griquatown, Postmasburg) tend towards the rough *sidneyi* form; I have seen specimens with slight indications of the epibranchial corrugations but without the frontal granulations from Sevenweeks Poort (Ladismith, Cape) and Zoetendals Vlei (Bredasdorp), and also nearly typical *sidneyi* from Kaffirkuils River, Still Bay (Transvaal Mus.). Extends north-eastwards to Lake Sibayi in Zululand (Lenz), Bulawayo (Balss), and possibly Umtali (Barnard); I have seen a specimen from Chinteche, Nyasaland (Transvaal Mus.).

*Remarks.*—Krauss regarded his var. *a* as being the true *perlatus* of Milne Edwards.

*Potamon (Potamonautes) warreni* Calman

*Transvaal River Crab.*

Fig. 34, *c*.

1894. Lenz, Ber. Senckenb. Ges., p. 97 (*nilotica*, non M. Edw.).

1918. Calman, Ann. Mag. Nat. Hist. (9), i, p. 234, fig.

1922. Balss, Beitr. Kennt. Land. Süsw. S.W.A., ii, p. 71 (*dubius*, non Br. Cap.).

1924. Colosi, Ark. Zool., xvi, no. 1, p. 9, fig. 6, and pl. 1, figs. 1, 1, *a*.

1935. Barnard, *l. c.*, pp. 483, 484, fig. 1, *d-j*, and chart.

1936. Balss, *l. c.*, p. 179.

Carapace flattish, branchial regions gently convex, post-frontal crest well developed, straight or very slightly concave or sinuous, and sloping gently backwards from middle line to the epibranchial tooth; antero-lateral margin typically with 5–10 teeth, better developed in large than in small examples, often reduced to denticles which decrease in size and pass gradually into granules posteriorly. Otherwise as in *perlatus*. 1st pleopod ♂ as in *perlatus* (fig. 35, *c*).

Length up to 56 mm., breadth 78 mm.

*Localities.*—See Barnard, 1935. Typical large examples from Potchefstroom (Calman), Kroonstad and Glen (S. Afr. Mus.), Barkly West (Kimberley Mus.); Zak River, Williston (S. Afr. Mus.). The specimen from van Wyk's Vlei (Lenz, 1894, as *niloticus*) is probably *warreni*. Balss (1936) confirms my suggestion (1935) that the Seeheim (Gt. Fish River, S.W.A.) specimens formerly identified by him as

*dubius* should more correctly be assigned to *warreni*. All these localities are in the Orange River system.

Colosi described specimens collected by Wahlberg at "Port Natal"; as I have not yet seen any specimen approaching *warreni* from anywhere in Natal, and as Wahlberg travelled to the Transvaal, it is reasonable to assume that his specimens were collected farther north than Durban.\*

*Potamon (Potamonautes) depressus* (Krauss)

1843. Krauss, *l. c.*, p. 38, pl. 2, fig. 4, *a-c* (*Thelphusa d.*).

1910. Stebbing, *l. c.*, p. 294.

1912. Lenz, *l. c.*, p. 7.

1935. Barnard, *l. c.*, p. 484.

Resembling *perlatus* but legs more slender; 4th joint of 5th leg 3-3½ times as long as broad.

Length about 26 mm., breadth 36 mm.

*Localities*.—Near Pietermaritzburg (Krauss); Beenen [*sic* = Weenen] (Lenz); Tugela Gorge, below Mont-aux-Sources (Barnard).

*Remarks*.—Although the very strongly curved finger of the larger cheliped ♂ renders this form distinct from the great majority of specimens of *perlatus*, it must be noted that this character is not specific (*cf.* Barnard, 1935, p. 483), and there is no other character distinguishing *depressus* from *perlatus* except the more slender legs. As shown above, the legs of very young *perlatus* are more slender than those of the adult, and consequently I am inclined to regard *depressus* as merely a local or perhaps casual variation of *perlatus*. Sometimes the epibranchial corner is very well rounded, and if the carapace is at all inflated in that region, a transition is formed to *inflatus*.

*Potamon (Potamonautes) inflatus* (M. Edw.)

1910. Stebbing, *l. c.*, p. 294.

1935. Barnard, *l. c.*, p. 484.

Distinguished by the strongly inflated carapace, which causes the epibranchial corner to appear as if bent downwards. Possibly only a casual variation of *perlatus*.

*Localities*.—Durban (Milne Edwards); Belfast, Haenertsburg, Maricskop (Barnard).

\* See Barnard, 1929, *Ann. S. Afr. Mus.*, xxix, p. 214. Note on locality given by Loven for some of Wahlberg's specimens.

*Potamon (Potamonautes) dubius* (Br. Cap.)

1873. Brito Capello, J. Sci. Lisbon, iv, p. 254, pl. 1, figs. 1, a, 2, a (quoted from de Man).

1905. Rathbun, Nouv. Arch. Mus. Paris, vii, p. 179.

[Not 1922. Balss, *l. c.*, p. 71 = *warreni*. See Balss, 1936.]

Post-frontal crest sloping slightly backwards from middle line, with a distinct sinus immediately internal to the rather strong epi-branchial tooth; epibranchial region moderately but not strongly convex.

*Locality*.—Kunene River, Angola (Brito Capello).

*Potamon (Potamonautes) dubius jallae* Nob.

*Zambesi River Crab.*

Fig. 34, d.

1896. Nobili, Boll. Mus. Zool. Torino, xi, no. 262, pp. 1, 2.

1898. de Man, Ann. Mus. Civ. Genova, ser. 2, xix (xxxix), p. 268 (compared with *bottegoi*).

1905. Rathbun, *l. c.*, p. 179, pl. 15, fig. 6.

? 1922. Balss, *l. c.*, p. 72.

1935. Barnard, *l. c.*, p. 486, fig. 1, k, l, and chart.

1936. Balss, *l. c.*, p. 177, figs. 14, 15, and chart.

Margins less strongly granulate than in the typical form. Balss' fig. 14 (1936) shows a specimen from the Victoria Falls with much more strongly beaded antero-lateral margins than in my specimens from the same locality.

*Localities*.—Kazungula on Zambesi River (Nobili); Victoria Falls, Chobe River, and Makarikari Pan (Barnard).

*Distribution*.—Upper Congo system (see chart in Balss, 1936).

*Remarks*.—In 1935 I doubted whether Balss' specimen from Howick Natal, was correctly assigned, but Balss, 1936, maintains his identification.

*Potamon (Potamonautes) bayonianus* (Br. Cap.)

1864. Brito Capello [not seen by me].

1905. Rathbun, *l. c.*, p. 178, pl. 15, fig. 1.

1922. Balss, *l. c.*, p. 72.

Differs from *dubius* and *obesus* by having the antero-lateral margin projecting laterally for a distance equal to the width of orbit (in the two species mentioned this distance is less than width of orbit).

*Locality*.—Okawango River, South West Africa (Balss).

*Distribution*.—Kwanza River system, and Benguella district, Angola (Brito Capello).

*Potamon (Potamonautes) obesus* (M. Edw.)

Fig. 34, *e*.

1868. Milne Edwards, *Nouv. Arch. Mus. Paris*, iv, p. 86, pl. 20, figs. 1-4.

1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 801.

1898. *Id.*, *Deutsch Ostaf. iv, Crust. Decap.*, p. 16.

1905. Rathbun, *l. c.*

1929. Balss, *Zool. Jahrb. Abt. Syst.*, lviii, p. 348.

1935. Barnard, *l. c.*, p. 484.

1942. Chace, *l. c.*, p. 190.

Post-frontal crest sloping slightly backwards from middle line, with a small sinus internal to the small epibranchial tooth; epibranchial region strongly convex, the epibranchial corner sloping downwards.

*Localities*.—Quilimane (Hilgendorf); Salisbury, Rhodesia (Barnard).

*Distribution*.—Zanzibar (M. Edwards); Tanganyika; Nyasaland (Balss).

*Potamon (Potamonautes) bottegoi* de Man

Fig. 34, *f, g*.

1898. de Man, *Ann. Mus. Civ. Genova*, ser. 2, xix (xxxix), p. 262, pl. 3.

1929. Gordon, *Ann. Mag. Nat. Hist.* (10), iii, p. 410, fig. 5, *b* (1st plp. ♂).

1933. Rathbun, *Bull. Mus. Comp. Zool. Harv.*, lxxv, p. 258.

Post-frontal crest continuous, nearly straight, curving abruptly backwards just internal to the small epibranchial tooth; frontal margin not emarginate medianly.\* No groove on 3rd joint of mxp. 3. In the larger chela basal width of thumb (at beginning of teeth) more than twice ( $2\frac{1}{2}$ ) in greatest width of hand; lower margin with indication of slight concavity between thumb and hand; 4th joint of larger

\* This feature may perhaps vary according to the angle from which it is viewed.

cheliped with only the antero-inferior granulate margin ending in a spine or tooth. 5th joint of 2nd and 3rd legs with at most a small blunt tubercle in middle of distal anterior margin. Epibranchial regions rugulose-granulose (but not strongly so).

*Locality.*—Lower Zambesi valley, Portuguese East Africa (Gordon).

*Distribution.*—Italian Somaliland and Tanganyika.

*Remarks.*—Regarded by Balss (1929, *l. c.*, p. 348) as a synonym of *obesus*.

*Potamon (Potamonautes) calcaratus* Gordon

Figs. 34, *h, i*, 35, *d*.

1929. Gordon, *Ann. Mag. Nat. Hist.* (10), iii, p. 405, figs. 1–4, 5, *a*.

Very similar to *bottegoi*, but post-frontal crest less sharp and conspicuous, and more or less interrupted; frontal margin medianly emarginate; \* basal width of thumb of larger chela half (in Gordon's figure slightly exceeding half) the greatest width of hand, lower margin of hand and thumb convex throughout (or at least not concave), finger and thumb compressed, upper margin of finger and lower margin of thumb being narrowly rounded or almost sharp-edged; 4th joint of larger cheliped with *both* the antero- and the postero-inferior granulated margins ending in a spine or tooth; 5th joint of 2nd and 3rd legs with a distinct spine in middle of distal anterior margin; epibranchial regions quite smooth.

Length up to 28 mm., breadth 40 mm.

*Localities.*—Lower Zambesi valley, Portuguese East Africa, and Chirinda Forest, S. Rhodesia (Gordon); Wanetsi River, north of Lourenço Marques, P.E.A. (S. Afr. Mus.); Pafuri River (Limpopo system), near Punda Maria, N.E. Transvaal (Transvaal Mus.).

*Remarks.*—This species is apparently closely allied to *bottegoi*, though distinguished by certain characters. The value of these characters, and the specific distinctness of the two forms, is rendered somewhat doubtful by the fact that both are found in approximately the same locality. Further investigation on the spot would be desirable.

On Miss Rathbun's 1921 definitions of the subgenera *Potamonautes* and *Potamon* this species should really belong to the latter, but as the authoress herself remarks, there are so many intergrading forms that strict definitions of subgenera are impossible. As Dr. Gordon placed her species in *Potamonautes*, it is left there.

\* This feature may perhaps vary according to the angle from which it is viewed.

*Potamon (Potamonautes)*, cf. *johnstoni* (Miers)

Cf. 1929. Balss, *l. c.*, p. 343, and 1936, *l. c.*, p. 180, fig. 17 (1st plp. ♂).

1942. Chace, *l. c.*, pp. 190 and 214.

Three ♂♂ from Beira (23, 28, and 50 mm. in breadth), as regards the ordinary external features, are typical *perlatus*, and illustrate how in former years *perlatus* came to be recorded from Tanganyika and other East African localities. The terminal piece of the 1st pleopod ♂, however, is quite different from that of *perlatus*; it bears a sharp convex keel, on the external (ventral) surface of which is a less conspicuous ridge; the seminal groove, in which the 2nd pleopod lies runs behind (dorsal) to the sharp keel (fig. 35, *e*). In this respect these Beira specimens differ also from two specimens from Kilimanjaro and Tanganyika (no detailed locality for the latter), which externally resemble *perlatus* just as closely; here there are *two* sharp and even more prominent keels, *between* which the seminal groove runs (fig. 35, *f, g*).

Balss (1929, p. 344) said of a specimen of *johnstoni* from Lindi (Tanganyika) that, if it had had no locality label, he would unhesitatingly have identified it as *perlatus*!

## FAMILY ATELECYCLIDAE.

1899. Alcock, *J. Asiat. Soc. Bengal*, lxxviii, pp. 4, 5, 95, 96 (subfam. of *Cancridae*).

1907. Borradaile, *Ann. Mag. Nat. Hist.* (7), xix, pp. 481, 484.

1910. Stebbing, *l. c.*, p. 310 (*Cancridae*).

1930. Rathbun, *Bull. U.S. Nat. Mus.*, no. 152, p. 148.

Carapace subcircular or suboval, never very broad, regions sometimes defined, sometimes not; front entire or dentate. 1st antennae folding longitudinally; flagellum of 2nd antennae setose (when well developed), sometimes rudimentary, or absent.

*Remarks.*—Stebbing evidently preferred to follow Alcock's arrangement in which the *Atelecyclinae* were regarded merely as a subfamily of the *Cancridae*. It must be admitted that the reasons for separating them as independent families are rather unimportant. The *Cancridae* have a broad, transversely oval carapace, and a short glabrous flagellum on the 2nd antenna. The family includes *Cancer pagurus* the edible Great Crab of Europe.



Key to the South African Genera.

Flagellum of ant. 2 present in both genera.

1. Regions not defined. Front bilobed. Peduncle of ant. 2 not visible in dorsal view, flagellum short . *Kraussia*.
2. Regions fairly well defined. Front tridentate. Peduncle of ant. 2 visible in dorsal view, flagellum long . *Atelecyclus*.

Gen. KRAUSSIA Dana

1902. Rathbun, Bull. Mus. Comp. Zool. Harv., xxxix, p. 132.

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 87.

1910. Stebbing, *l. c.*, p. 310.

1938. Balss, Medd. Göteb. Mus., lxxv, p. 26 (key to species).

Carapace subcircular, but antero-lateral margins much longer than the strongly convergent postero-lateral margins, regions not defined, front (between inner orbital teeth) prominent, broadly bilobed, each lobe may be divided into two lobules. Basal joint of ant. 2 fixed, only the 3rd peduncular joint and the short flagellum visible in dorsal view. Chelipeds short, massive, finger and thumb stumpy, apices blunt, Legs stout, dactyls cultrate. Sternum and abdomen narrow, the latter with 5 segments in ♂, and first 2 segments visible in dorsal view in both sexes. Genital openings in ♂ coxal.

*Remarks.*—The dactyls of the legs are reminiscent of those of *Matuta*, *Ranina*, and *Nautilocorystes*.

*Kraussia rugulosa* (Krauss)

Fig. 36, a-c.

1843. Krauss, Südafr. Crust., p. 26, pl. 1, fig. 5, a-d (*Platyonichus r.*).

1887. de Man, Arch. Naturg., liii, p. 343, pl. 14, fig. 2.

1910. Stebbing, *l. c.*, p. 310.

1935. Ward, Bull. Raffles Mus., no. 9, p. 10, pl. 1, fig. 7 (*porcellana*).

1938. Balss, *l. c.*, p. 27, fig. 10 (cheliped).

Carapace shiny, setose only around margins, with numerous transverse lines of minute granules, in places close enough together to give a squamose appearance; front bilobed, each lobe truncate, finely denticulate; upper orbital margin with one fissure in middle and another near outer orbital tooth; antero-lateral margin serrate, 4 of the serrae being larger than the others. A small tubercle on anterior border of eye-stalk near the cornea. Cheliped, upper margin of 4th joint denticulate, with long setae, wrist with 2 denticles on inner

apex and granules on upper distal portion, outer surface of hand with lines of fine granules and a few scattered larger granules, finger with grooves and serrulate ridges above, finger and thumb gaping in both sexes, their apices spooned. Legs setose, dactyls cultrate, the outer (anterior) margin thickened and flattened only at base in 2nd-4th legs, but along whole margin in 5th leg. 1st pleopod ♂ very slender,

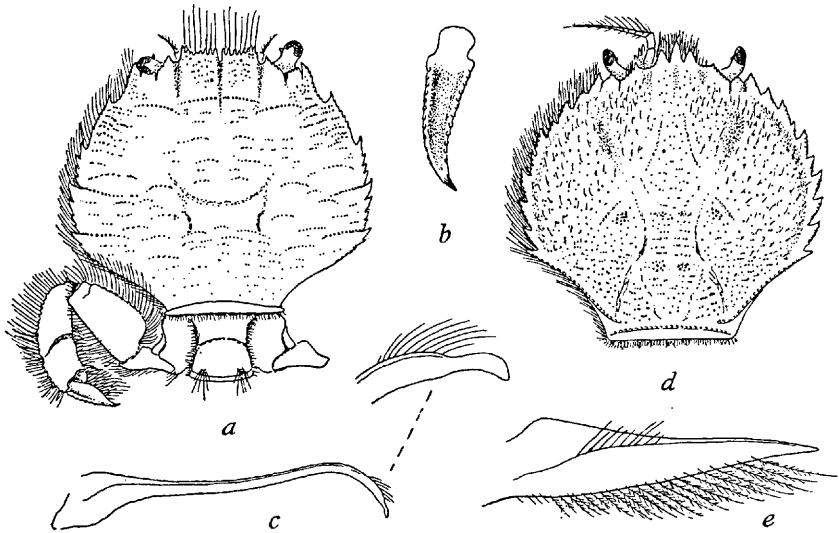


FIG. 36.—*Kraussia rugulosa* (Krauss). *a*, carapace, with 1st and 2nd abdominal segments, and left 5th leg. *b*, outer surface of dactyl of left 5th leg. *c*, 1st pleopod ♂, with apex further enlarged.

*Atelecyclus septemdentatus* (Mont.). *d*, carapace. *e*, 1st pleopod ♂.

2nd pleopod very short, only just entering groove at base of 1st pleopod. Abdomen of ♀ not nearly covering the numerous eggs; in both sexes two tufts of setae on the 2nd segment.

Length ♂ 13 mm., ovig. ♀ 11 mm.; breadth ♂ 15 mm., ♀ 12 mm. Greyish.

*Localities*.—Durban (Krauss); Durban and Scottburgh, Natal (S. Afr. Mus.); mouth of Umgazana River, 10 miles south of Port St. Johns (S. Afr. Mus.).

*Distribution*.—East coast of Africa, Indo-Pacific to Hawaiian Is.

#### Gen. ATELECYCLUS Leach

1910. Stebbing, *l. c.*, p. 310.

1933. Monod, Bull. Et. Sci. Afr. occid. Franç., xv, p. 45 (with fig. 11, A, B).

Carapace subcircular, postero-lateral margins shorter than the antero-lateral margins, and strongly convergent, regions fairly well defined, front tridentate. Basal joint of ant. 2 fixed, its denticulate distal margin and the 2 following peduncular joints and the long flagellum visible in dorsal view. Chelipeds short, finger and thumb rather short, apices acute. Legs short, dactyls strong. Sternum and abdomen narrow, the latter with 5 segments in ♂, and first 2 segments visible dorsally in both sexes. Genital openings in ♂ coxal.

*Atelecyclus septemdentatus* (Mont.)

Fig. 36, *d, e.*

1853. Bell, *Hist. Brit. Stalk-eyed Crust.*, p. 153, fig. (*heterodon*).

1904. Doflein, *D. Tiefsee Exp.*, vi, p. 90.

1910. Stebbing, *l. c.*, p. 310.

Carapace granulate, granules in places aggregated in twos and threes or small groups, with scattered setae, and thickly setose around margins; front tridentate, the median tooth usually larger than the others; upper orbital margin with 2 fissures, the lobe between them somewhat dentiform; antero-lateral margin with 10 teeth (incl. outer orbital tooth), alternatively larger and smaller, but the 4 hindmost ones subequal, or gradually decreasing backwards; the whole margin (incl. front) finely denticulate-granulate, the postero-lateral margin ending on the dorsal surface and not continuous with the hind margin. Sometimes an indication of a granule on anterior margin of eye-stalk. Cheliped setose, wrist with a tooth on inner margin, 2 knobs on upper surface, and granulate on outer surface, hand with 4 lines of granules on outer surface, lower and upper surfaces granulate, the latter also with 2-5 larger conical tubercles, finger granulate on upper surface. Legs more or less granulate on upper surfaces, setose, the setae on outer surfaces of 6th joint and dactyls short, close, bristly. 1st pleopod ♂ stout, straight, tapering evenly; 2nd pleopod subequal in length to 1st.

Length up to ♂ 28 mm., breadth 29 mm., ♀ smaller. Pinkish or reddish, with red spots, chelipeds red, finger and thumb blackish.

*Localities.*—False Bay (Stebbing); False Bay, Mossel Bay, Algoa Bay, 19-55 fathoms (S. Afr. Mus. 5 ♂♂).

*Distribution.*—North Atlantic south to Bay of Biscay, Mediterranean.

*Remarks.*—As Stebbing remarked, the finding of this species in South African waters greatly extended its known southward range. Whether or not any significance is to be attached to the fact, it should

be noted that all the South African localities are in bays where large numbers of ships anchor, and not in any intermediate localities.

A second species, *cruentatus* Desm., occurs as far south as the Cape Verdes and Senegal; and it has been suggested that the two species are merely extreme forms of one species (Balss, 1921, Beitr. Kennt. Meeresf. Westafr., iii, p. 55). *A. cruentatus* has the carapace distinctly broader than long, with blunter and more rounded antero-lateral teeth.

I have not been able to trace the reference given by Doflein: "1798. Montagu, Trans. Linn. Soc. Lond., vol. 2, pl. 1." In the 1813 paper, although the description is headed *Cancer Hippa septemdentatus*, the explanation of the plate has *Cancer septemdentatus*.

#### FAMILY XANTHIDAE.

1898. Alcock, J. Asiat. Soc. Bengal, lxxvii, p. 69.

1907. Borradaile, Ann. Mag. Nat. Hist. (7), xix, pp. 482, 484.

1910. Stebbing, *l. c.*, p. 296.

1925. Odhner, Medd. Göteb. Mus., xxxvii (Göteb. K. Vet. Handl., xxix), pp. 1-92 (part 1).

1925. Hyman, Proc. U.S. Nat. Mus., lxxvii, 22 pp., 14 pls. (larval stages).

1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 233 (American genera).

Carapace transversely oval, hexagonal, or subquadrate, rarely subcircular, front broad or very broad, never rostriform. 1st antennae folding transversely or obliquely; flagellum of antenna 2 short, slender. Genital openings in ♂ coxal (nearly always).

*Remarks.*—Not sharply separated from the *Goneplacidae* (Borradaile, p. 482). A very large family of mostly shallow-water and littoral species, particularly abundant in tropical and subtropical regions, and, as regards habitat, dwelling under or among rocks and coral reefs. In general they are compact in shape, with hard and solid carapace, robust and powerful chelipeds, and short walking legs (for general remarks see Borradaile, 1902, F. Geogr. Mald. Laccad. Archip., i, pp. 237 *sqq.*).

The correct identification of the species is often a matter of difficulty, and a large amount of synonymy has arisen in the past (*cf.* Odhner, *l. c.*). A satisfactory division of the family into subfamilies has not been made, as Miss Rathbun remarks (*l. c.*); Alcock's and Borradaile's divisions do not quite coincide. So far as the South African fauna is concerned, a key to the comparatively few genera will meet the case; but even here there are three genera the differences between which are

difficult or impossible to state in words in a key (*Xantho* s.s., *Actaea*, and *Lachnopodus*).

*Maxillothrix* Stebb. 1921, as Odhner (1925, p. 85) has stated, does not belong to this family.

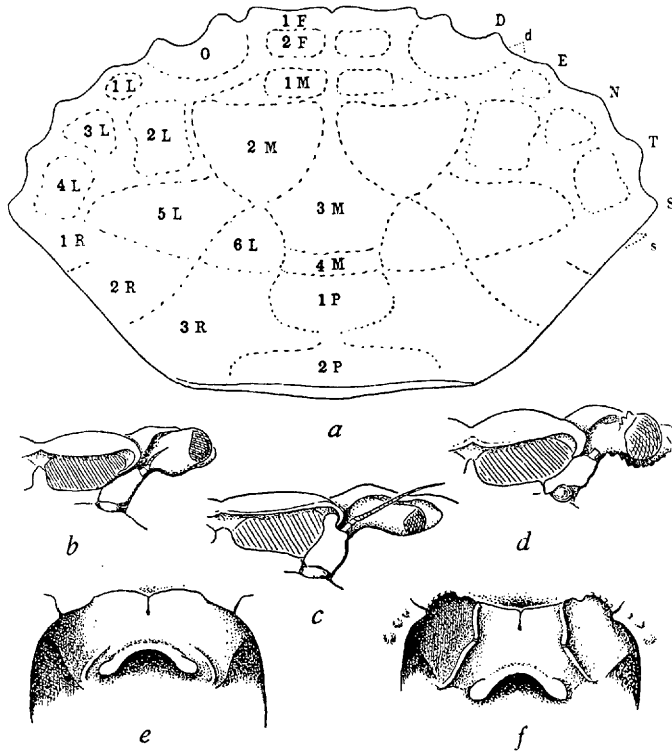


FIG. 37.—*a*, diagram of a Xanthid crab to show areoles (after Dana).

F=frontal. L=antero-lateral (anterior branchial). M=median (gastric). O=orbital. P=posterior (cardiac-intestinal). R=postero-lateral (posterior branchial). *d* and *s*, occasional teeth.

Ventral views of front, socket of antenna 1 (diagonally shaded), antenna 2, and orbit. *b*, *Liomera bellus* (Dana). *c*, *Neoliomera sabaea* (Nob.). *d*, *Actaea rüppellii* (Krss.).

Ventral view of buccal cavity, appendages removed. *e*, *Hyperolissa* (e.g. *Carpilius*), endostome ridges absent or confined to hind part of cavity only. *f*, *Hyperomerista* (e.g. *Eriphia*), endostome ridges extending to anterior margin of buccal cavity.

The main regions of the Brachyuran carapace are in this family frequently subdivided into areoles, which are of some systematic importance (fig. 37, *a*).

Alcock (*l. c.*), following Dana, has divided the family into two main sections:

*Hyperolissa*, in which the ridges defining the efferent branchial canals are either absent, or confined to the hinder part of the buccal cavity (fig. 37, e). Key to genera, p. 201.

*Hyperomerista*, in which these endostomal ridges are continued up to the anterior border of the buccal cavity (fig. 37, f). Key to genera, p. 247.

It is usually easy to tell to which section a specimen belongs, but not always (e.g. *Parapilumnus pisifer* and *Pilumnus hirsutus*).

As a quick guide to preliminary identification, some of the genera having certain outstanding features in common may be grouped together.

		<ul style="list-style-type: none"> <li><i>Zosimus.</i></li> <li><i>Zozymodes.</i></li> <li><i>Xantho (Leptodius).</i></li> <li><i>Chlorodiella.</i></li> </ul>
Tips of finger and thumb of chelipeds spooned . . . . .		<ul style="list-style-type: none"> <li><i>Phymodius.</i></li> <li><i>Chlorodopsis.</i></li> <li><i>Actaea tomentosa.</i></li> <li><i>Etisus.</i></li> <li>[<i>Daira Mauritius</i>].</li> <li><i>Chlorodopsis</i> adult.</li> </ul>
		<ul style="list-style-type: none"> <li><i>Etisus.</i></li> <li><i>Eurüppellia.</i></li> </ul>
Flagellum of antenna 2 excluded from orbit . . . . .		<ul style="list-style-type: none"> <li><i>Eriphia.</i></li> <li><i>Trapezia.</i></li> <li><i>Tetralia.</i></li> <li><i>Quadrella.</i></li> <li>[<i>Daira.</i>]</li> </ul>
	<ul style="list-style-type: none"> <li>on 4th joint only . . . . .</li> </ul>	<i>Medaeus granulosus.</i>
Upper edge of legs keeled	<ul style="list-style-type: none"> <li>on 4th-6th joints, and some</li> <li>times also hand of chelipeds . . . . .</li> </ul>	<ul style="list-style-type: none"> <li><i>Atergatis.</i></li> <li><i>Zosimus.</i></li> <li><i>Lophozozymus.</i></li> <li><i>Platypodia.</i></li> </ul>
Upper edge of 5th and 6th joints of legs bicarinate . . . . .		<ul style="list-style-type: none"> <li><i>Zozymodes.</i></li> <li><i>Actaea cavipes.</i></li> </ul>
	<ul style="list-style-type: none"> <li>strongly so . . . . .</li> </ul>	<i>Phymodius monticulosus.</i>
Walking legs "biunguiculate"	<ul style="list-style-type: none"> <li>not so strongly . . . . .</li> </ul>	<ul style="list-style-type: none"> <li><i>Etisus laevimanus.</i></li> <li><i>Chlorodiella niger</i></li> <li>(<i>fide Krauss</i>).</li> </ul>
		<ul style="list-style-type: none"> <li><i>Phymodius.</i></li> <li><i>Chlorodopsis.</i></li> </ul>
Dark colour of thumb of chelipeds extending on to palm of hand . . . . .		<ul style="list-style-type: none"> <li><i>Xantho quinque-dentatus.</i></li> <li><i>Etisus laevimanus.</i></li> <li><i>Actaea tomentosa.</i></li> </ul>

Pleopod 2 ♂ as long as, or longer than, pleopod 1 . . . . .	{	<i>Carpilius.</i>
		<i>Menippe.</i>
		<i>Dairades.</i>
		<i>Epixanthus.</i>
		<i>Eriphia.</i>
Abdomen of ♂ of 7 distinct segments . . . . .	{	<i>Actumnus.</i>
		<i>Pilumnoides.</i>
		<i>Menippe.</i>
		<i>Pilumnus.</i>
		<i>Tetralia.</i>

*Key to the South African Genera of Hyperolissa.*

- I. Flagellum of ant. 2 not excluded from orbit (figs. 37, b, c, d).\*
  - A. Hind margin of carapace not costate, *i.e.* without a raised rim (or only a very feeble one) (fig. 38, a, c, e, f).
    - 1. Walking legs cylindrical.
      - a. A single large molariform tooth on cutting-edge of thumb of larger cheliped . . . . . *Carpilius.*
      - b. Three large teeth on thumb of larger cheliped . . . . . *Atergatopsis.*
    - 2. Upper margin of 4th-6th joints of legs keeled, and sometimes also 4th and 6th joints of cheliped.
      - a. Carapace smooth . . . . . *Atergatis.*
      - b. Carapace granulate . . . . . *Platypodia.*
  - B. Hind margin of carapace costate (fig. 39, d, etc.).
    - 1. Pterygostomial region with a cavity . . . . . *Hypocolpus.*
    - 2. Pterygostomial region without cavity.
      - a. Tips of finger and thumb of chelipeds spooned.
        - i. Hand of chelipeds and 4th-6th joints of legs keeled on upper margin . . . . . *Zosimus.*
        - ii. 5th and 6th joints of legs bicarinate (fig. 39, b) . . . . . *Zozymodes.*
        - iii. Legs and chelipeds not keeled.
          - a. Fronto-orbital border about half width of carapace.
            - \* Carapace with uniform vesicular granules concealed by short black felt . . . . . *Actaea tomentosa.*
            - \*\* Carapace feebly and irregularly granulate . . . . . *Xantho (Leptodius).*

\* In the adult of *Chlorodopsis* the prolongation of the basal joint usually completes, and almost or quite excludes the flagellum from, the orbit.

- $\beta$ . Fronto-orbital border more than half width of carapace.
- \* Basal joint of ant. 2 running up between front and suborbital tooth. Carapace not granular or hairy.
  - † Regions faintly marked . . . *Chlorodiella*.
  - †† Regions well marked (fig. 40, a, e) . . . *Phymodius*.
  - \*\* Basal joint of ant. 2 prolonged into orbit. Carapace granular and hairy, regions and areoles well marked . . . *Chlorodopsis*.
- b. Tips of finger and thumb of chelipeds pointed.
- i. 4th and 6th joints of chelipeds keeled on upper and lower margins, 4th-6th joints of legs keeled on upper margin . . . . . *Lophozozymus*.
  - ii. Chelipeds and legs not keeled.
    - a. Fronto-orbital border half or less than half width of carapace.
      - \* Antero-lateral margin continued beneath orbit to buccal cavity . . . *Medaeus*.
      - \*\* Antero-lateral margin not so continued.
        - † Length of carapace  $\frac{2}{3}$ - $\frac{3}{4}$  the width. Differences not possible to state in words (see figs. 41 and 43) . . .  $\left\{ \begin{array}{l} \textit{Xantho} (\textit{Xantho}). \\ \textit{Actaea}. \\ \textit{Lachnopusus}. \end{array} \right.$
        - †† Length of carapace nearly twice in width.
          - § Basal joint of ant. 2 between front and sub-orbital tooth (fig. 37, b) . . . *Liomera*.



- §§ Basal joint of  
 ant. 2 embracing the  
 down-turned  
 lateral edge  
 of front (fig.  
 37, c) . *Neoliomera*.
- β. Fronto-orbital border more than  
 half width of carapace . *Xanthias*.
- II. Flagellum of ant. 2 excluded from orbit (fig. 45, c). Finger  
 and thumb of chelipeds apically spooned . . . *Etisus*.

Gen. *CARPILIUS* Leach

1898. Alcock, *l. c.*, p. 78.

1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 234.

1930. Rathbun, *l. c.*, p. 239.

Large and heavily built. Carapace broad, very convex, smooth, without any indication of regions, antero-lateral margin thick, arched, entire, a prominent knob at junction of antero- and postero-lateral margins, hind margin not costate; front shallowly 3-lobed, the middle lobe more or less bilobed. Basal joint of ant. 2 entering cleft between front and inner suborbital tooth, flagellum shorter than orbit. Chelipeds massive, unequal, a single large molariform tooth on cutting-edge of thumb. Legs smooth, cylindrical. Abdomen of ♂ with 3rd-5th segments fused, but only the suture between 3rd and 4th segments obliterated. Pleopod 2 ♂ slender, longer than pleopod 1 (fig. 38, b).

*Key to the South African Species.*

1. Front deflexed, median lobe definitely bilobed. Large pale-edged red spots symmetrically arranged on carapace . *maculatus*.
2. Front strongly deflexed, median lobe feebly bilobed.  
 Irregular marbling of red on a lighter ground-colour . *convexus*.

*Carpilius maculatus* (Linn.)

*Spotted Rock Crab.*

Figs. 37, e, 38, a, b.

1849. Milne Edwards in Cuvier, *Règne Anim. Crust. Atlas*, pl. xi, figs. 2 (coloured), 2, a.

1898. Alcock, *l. c.*, p. 79 (references).

1926. McNeill, *Austral. Zoolog.*, iv, p. 312, pl. 41.

1934. Boone, *Bull. Vanderbilt Mar. Mus.*, v, p. 86, pls. 39-42.

[Not Stebbing 1920 = *convexus*.]

Carapace pitted and foveolate in anterior and antero-lateral parts; 2 gastro-cardiac depressions; otherwise quite smooth and glabrous. Front obliquely deflexed, just visible on dorsal view, median lobe decidedly bilobate and separated by a deep hollow from each lateral lobe.

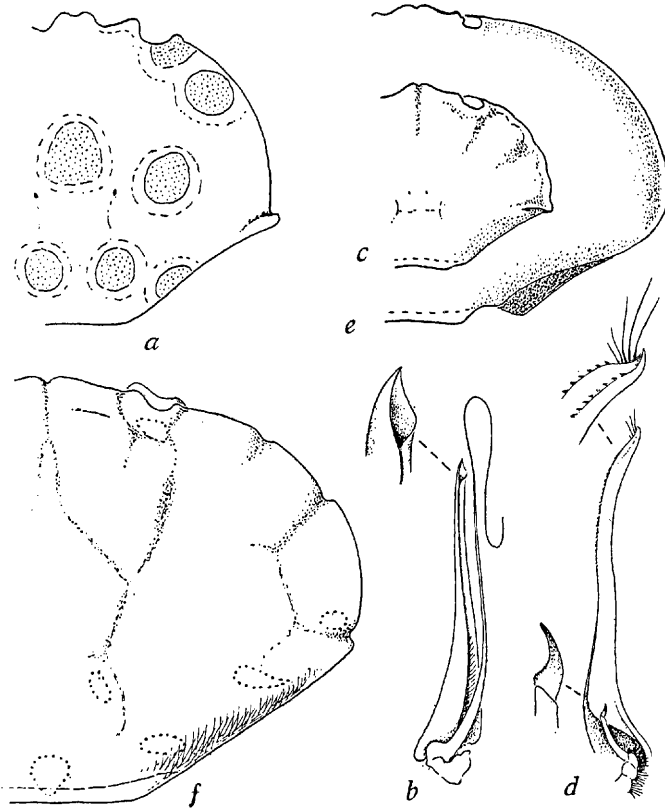


FIG. 38.—*Carpilius maculatus* (Linn.). *a*, carapace. *b*, right 1st and 2nd pleopods ♂, with apex of 1st further enlarged.  
*Atergatis floridus* (Linn.). *c*, carapace. *d*, left 1st and 2nd pleopods ♂, with apex of 2nd further enlarged.  
*Atergatis roseus* (Rupp.). *e*, carapace.  
*Atergatis signata* (Ad. & Wh.). *f*, carapace.

Length up to 85 mm., breadth 115 mm. Buff or orange, with eleven (or more) blood-red spots symmetrically arranged, each surrounded by a pale yellow or cream border: one spot on hind margin of orbit, one near antero-lateral margin, 3 across middle of carapace,

and 4 across hinder part. These spots apparently do not fade in specimens kept long in spirit.

*Locality.*—Durban (S. Afr. Mus.).

*Distribution.*—Mauritius, Indo-Pacific.

*Carpilius convexus* (Forsk.)

1775. Forskal, *Descr. Anim.*, p. 88.

1830. Rüppell, *Beschr. 24, Krabben roth. Meer.*, p. 13, pl. 3, fig. 2, pl. 6, fig. 6.

1834. Milne Edwards, *Hist. Nat. Crust.*, i, p. 382, pl. 16, figs. 9, 10.

1898. Alcock, *l. c.*, p. 80 (references).

1920. Stebbing, *l. c.*, p. 235 (*maculatus*, non Linn.).

1934. Boone, *Bull. Vanderbilt Mar. Mus.*, v, p. 89, pls. 43-45.

1945. Stephensen, *Dan. Sci. Invest. Iran*, pt. 4, p. 156, fig. 40 (plp. 1, 2 ♂).

Scarcely worthy of specific distinction from *maculatus*, but separated by the coloration, and: front vertically deflexed, in fact almost curving ventrally, invisible in dorsal view, median lobe very shallowly or scarcely at all bilobed, and separated from each lateral lobe by only a shallow emargination.

Length up to 65 mm., breadth 88 mm. Orange or reddish, irregularly marbled with darker red, which fades entirely in specimens kept long in spirit.

*Localities.*—Mozambique (Stebbing); Durban and Delagoa Bay (S. Afr. Mus.).

*Distribution.*—Mauritius, Red Sea, east coast of Africa, Indo-Pacific.

*Remarks.*—The small specimen referred by Stebbing to *maculatus* has the front, and had (when caught) the coloration, of *convexus*. Paulson considered *convexus* as only a variety of *maculatus*.

Gen. ATERGATOPSIS M. Edw.

1920. Stebbing, *Ann. Durban Mus.*, ii, p. 267.

1939. Ward, *Amer. Mus. Novit.*, 1049, p. 5.

Carapace broad, convex, smooth or somewhat lumpy, but not areolate, front narrow, sinuate or indistinctly 4-lobate, antero-lateral margin regularly arched, neither keeled nor lobulate, with a knob at junction with the shorter postero-lateral margin; hind margin feebly costate. Basal joint of ant. 2 touching side edge of front. Chelipeds subequal, hand not keeled on upper margin, 3 large teeth on cutting-

edge of thumb. Legs nearly cylindrical, somewhat compressed but not keeled, moderately long. Abdomen of ♂ with 3rd-5th segments usually fused.

*Remarks.*—Very similar to *Carpilius*.

*Atergatopsis signata* (Ad. & Wh.)

Fig. 38, *f*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 787.

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 349, pl. 47, fig. 7 (♂ abd.) (*flavo-maculatus*).

1910. *Id.*, Voeltzkow's Reise, ii, p. 546 (*flavo-maculatus*).

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 214, pl. 17, fig. 7.

1920. Stebbing, *l. c.*, p. 267.

1942. Ward, Mauritius Inst. Bull., ii, p. 86.

Front with deep median notch. Cheliped, outer surface of hand with smooth and feeble longitudinal ridge separating the upper rugose portion from the smooth lower portion; 3 large teeth on cutting-edge of thumb, more noticeable in the larger cheliped than in the smaller one.

Length up to 60 mm., breadth 88 mm. Deep red with white dots or patches, finger and thumb of chelipeds black with white tips, dactyls of legs with brown felt, unguis blackish.

*Localities.*—Mozambique (Hilgendorf); Europa Is., Mozambique Channel (Lenz); Durban (Stebbing).

*Distribution.*—Mauritius, Zanzibar, Seychelles, Chagos.

Gen. ATERGATIS de Haan

1898. Alcock, *l. c.*, p. 94.

1910. Stebbing, *l. c.*, p. 296.

1917. *Id.*, Ann. Durban Mus., ii, p. 6.

1920. *Id.*, *ibid.*, ii, p. 267.

1925. Odhner, Medd. Göteb. Mus., xxxvii, p. 83.

Carapace very broad, convex, smooth, regions only very faintly, if at all, indicated, antero-lateral margin arched, either sharply keeled or blunt, but definitely demarcated by a rim, front narrow, more or less deflexed, shaped like a cupid's bow, hind margin not or only feebly costate. Basal joint of ant. 2 touching the front, flagellum

shorter than orbit. Chelipeds subequal. Legs with upper margin of 4th-6th joints, and lower margin of 5th and 6th joints keeled. Abdomen of ♂ with 3rd-5th segments fused. Pleopod 2 ♂ very short (fig. 38, *d*).

*Key to the South African Species.*

1. Antero-lateral margin forming a tooth at junction with postero-lateral margin. Upper margin of hand of cheliped keeled . . . . . *floridus*.
2. No tooth at junction of antero- and postero-lateral margins. Upper margin of hand of cheliped rounded . . . . . *roseus*.

*Atergatis floridus* (Linn.)

Fig. 38, *c, d*.

1705. Rumph, Amboinsch. Raritetkam, p. 16, pl. 8, fig. 5.  
1838. McLeay, Annulosa S. Afr., p. 59 (*compressipes*).  
1898. Alcock, *l. c.*, p. 98 (references).  
1910. Stebbing, *l. c.*, p. 296 (*ocyroe*).  
1917. *Id.*, *l. c.*, p. 7, pl. 2.  
1930. McNeill and Ward, Rec. Austral. Mus., xvii, p. 382 (*ocyroe*).  
1934. Gordon, Res. Sci. Ind. Néerland, iii, fasc. 15, p. 25, fig. 14 (1st plp. ♂).  
1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 94, pls. 47, 48.

Carapace somewhat lumpy, the regions faintly defined by broad shallow depressions, antero-lateral margin sharp, ending in a tooth at junction with postero-lateral margin. Upper edge of 4th joint of cheliped and hand sharply keeled.

Length up to 37 mm., breadth 54 mm. Yellowish, orange, or greenish, more or less symmetrically marbled or spotted with darker red or brown, the blotches often surrounded by a fine white line; chelipeds, legs, external maxillipeds, sternum and abdomen also more or less spotted; finger and thumb of cheliped black with white tips.

*Localities.*—Mouth of Umlaas River (Krauss); Isipingo (Stebbing); Port St. Johns, Durban, and Delagoa Bay (S. Afr. Mus.).

*Distribution.*—Mauritius, Red Sea, Indo-Pacific to Japan and Australia.

*Atergatis roseus* (Rüpp.)

Fig. 38, *e*.

1830. Rüppell, Besch. 24 Krabben, p. 13, pl. 3, fig. 3, pl. 6, fig. 7 and p. 15, pl. 3, fig. 4 (*marginatus*).

1843. Krauss, Südafrik, Crust., p. 28 (*marginatus*).  
 1910. Stebbing, *l. c.*, p. 297.  
 1917. *Id.*, Ann. Durban Mus., i, p. 437.  
 1917. *Id.*, *ibid.*, ii, p. 7, footnote.  
 1920. *Id.*, *ibid.*, ii, p. 267.

Carapace smooth, without any indication of regions, antero-lateral margin passing into the postero-lateral margin without any projection. Upper margin of hand of cheliped rounded; inner surface of wrist with several tufts of short bristles.

Length up to 61 mm., breadth 102 mm. Pinkish, rose-red, or salmon, with or without a whitish border around the carapace, finger and thumb of cheliped black with white tips.

*Localities.*—Natal (Krauss); Durban (Stebbing, and S. Afr. Mus.); Port St. Johns (S. Afr. Mus.).

*Distribution.*—Mauritius, Red Sea, Indo-Pacific.

*Remarks.*—I have seen a specimen (Port Elizabeth Mus.) said to have been caught at Humewood, Algoa Bay.

#### Gen. PLATYPODIA Bell

1835. Bell, Trans. Zool. Soc. Lond., i, p. 336.  
 1862. Milne Edwards, Ann. Sci. Nat. (4), xviii, p. 43 (*Lophactaea*).  
 1898. Alcock, J. Asiat. Soc. Bengal, lxxvii, p. 99 (*Lophactaea*).  
 1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 246.

Carapace moderately broad, regions usually well defined, granulate (except in *anaglypta*); antero-lateral margin crest-like, cut into blunt lobes by narrow fissures. Basal joint of ant. 1 touching front, flagellum in orbital gap. Chelipeds subequal, tips of finger and thumb pointed. Legs with upper margins of 4th–6th joints keeled. Abdomen of ♂ with 3rd–5th segments fused.

#### *Platypodia granulosa* (Rüpp.)

1830. Rüppell, Beschr. 24 Krabben, p. 24, pl. 5, fig. 3, pl. 6, fig. 18 (*Xantho g.*).  
 1834. Milne Edwards, Hist. Nat. Crust., i, p. 377, pl. 16, figs. 1–3 (not 14, as M. Edw. himself gives) (*Cancer limbatus*).  
 1851. Bianconi, Spec. Zool. Mosambic., fasc. 5, p. 82 (*Cancer limbatus*).  
 1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 787 (*Lophactaea g.*).  
 1898. Alcock, *l. c.*, p. 101 (references) (*Lophactaea g.*).  
 1922. Balss, Arch. Naturg., lxxxviii, p. 125.

1934. Gordon, Res. Sci. Ind. orient. Néerland, iii, fasc. 15, p. 27, fig. 15, a (1st plp. ♂).

1938. Balss, Medd. Göteb. Mus., lxxv, p. 37.

Carapace with regions well defined, and numerous evenly spaced, more or less pearly granules. Outer surface of wrist and hand of chelipeds with granules arranged more or less in longitudinal rows.

Length *ca.* 25 mm. Brown-yellow, finger and thumb of chelipeds horn colour (Rüppell).

*Locality.*—Mozambique (Bianconi, Hilgendorf).

*Distribution.*—Red Sea, east coast of Africa, Indo-Pacific.

*Remarks.*—I have seen no specimens. The assumption that the hind margin of carapace is not costate is based on Rüppell's and Milne Edwards' figures; the position of the genus in the key on p. 201 is perhaps incorrect.

#### Gen. HYPOCOLPUS Rathbun

1861. Heller, Abh. zool-bot. Ges. Wien, p. 7 (*Hypocoelus*, nom. preocc.).

1897. Rathbun, Proc. Biol. Soc. Wash., xi, p. 164.

1898. Alcock, *l. c.*, p. 111 (*Hypocoelus*).

1924. Stebbing, Ann. S. Afr. Mus., xix, p. 2.

1934. Balss, Faune Col. Franç., v, pp. 510–513.

A large oval or reniform cavity in each pterygostomial region.

#### *Hypocolpus divarticulatus* (Strahl)

1834. Milne Edwards, Hist. Nat. Crust., i, p. 376 (*sculptus*, nom. preocc. Herbst 1794).

1861. Strahl, Archiv Naturg., xxvii, p. 101.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 788 (*sculptus* M. Edw.).

1910. Bouvier, Bull. Mus. Paris, no. 7, p. 376 (*sculptus* M. Edw.).

1924. Stebbing, *l. c.*, p. 2 (*exsculptus*, non Herbst 1790).

1934. Balss, Faune Col. Franç., v, p. 510 (synonymy).

Length.—21 mm., breadth 29 mm. (Stebbing); 53 × 74 mm. (Heller).

*Locality.*—Mozambique (Stebbing).

*Distribution.*—Mauritius, Madagascar, Ibo (Portuguese East Africa), Red Sea, east coast of Africa, Indo-Pacific.

*Remarks.*—The correct S. Afr. Mus. Reg. no. for the specimen recorded by Stebbing is A2211. The specimen was not returned by Stebbing, and I have seen no specimens.

## Gen. ZOSIMUS Leach

1825. Leach in Desmarest. Consid. Crust., p. 105.  
 1834. Milne Edwards, Hist. Nat. Crust., i, p. 383 (*Zozymus*).  
 1898. Alcock, *l. c.*, p. 103 (*Zozymus*).  
 1917. Stebbing, Ann Durban Mus., i, p. 436.  
 1925. Odhner, Medd. Göteb. Mus., xxxvii, p. 83 (*Zozymus*).  
 1938. Balss, *ibid.*, lxxv, p. 38 (*Zoozymus*).

Carapace moderately convex, regions distinct and subdivided into numerous areoles and lobules; antero-lateral margin scalloped, sharp-edged, but not forming an up-turned rim, postero-lateral margins straight, strongly convergent; orbit subcircular, with 4 suture lines on outer rim. Basal joint of ant. 2 produced at inner apex and more or less embracing the deflexed side margin of front (*cf.* fig. 37, *c*), flagellum shorter than orbit. Chelipeds equal, finger and thumb apically blunt and hollowed. Legs with upper margin of 4th–6th joints sharp-edged. Abdomen ♂ with 3rd–5th segments fused.

*Zosimus aeneus* (Linn.)Fig. 39, *a*.

1875. Paulson, Red Sea Crust., p. 16, pl. 4, figs. 3, 3, *a, b* (*Atergatis a.*).  
 1898. Alcock, *l. c.*, p. 104.  
 1917. Stebbing, *l. c.*, p. 437.  
 1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 99, pls. 50–53 (*Zozimus a.*).

Areoles smooth and polished, but variable in development, the intervening grooves mostly smooth and naked except in the marginal areas; 4th antero-lateral lobe somewhat dentiform. Wrist and hand of cheliped rugose, the furrows more or less wrinkled or meandering, upper margin of hand keeled, with a longitudinal groove along base of keel. 5th and 6th joints in 2nd–4th legs, and 4th–6th joints of 5th leg with longitudinal and transverse grooves on outer surfaces, inner upper edge fringed with longish hairs, lower edge of 6th joint and unguis setose; hind margin of 2nd–5th coxae produced in a rounded lobe.

Length up to 55 mm., breadth 83 mm. Reddish or scarlet, more or less mottled, some of the tubercles on outer surface of hand white, finger and thumb brown, the colour not extending on to hand.

*Localities.*—Durban (Stebbing); Umhlali, Natal, and Impengazi, north of St. Lucia Bay (coll. T. A. Stephenson); Port St. Johns (S. Afr. Mus.).

*Distribution.*—Mauritius, east coast of Africa, Indo-Pacific.



Gen. ZOZYMODES Heller

1861. Heller, SB. Ak. Wiss. Wien, xliii, p. 327 (*fide* Neave).  
1925. Odhner, Medd. Göteb. Mus., xxxvii, p. 82.  
1938. Balss, *ibid.*, lxxv, p. 38 (*Zooszymodes*).

Like *Zozimus*, but antero-lateral margin of carapace forming an up-turned rim, and chelipeds unequal, legs keeled, with small coxal lobes, basal joint of ant. 2 touching but only very slightly embracing side-edge of front, 2nd pleopod ♂ very short.

*Zozymodes xanthoides* (Krauss)

Fig. 39, *b, c*.

1843. Krauss, Südafrik. Crust., p. 32, pl. 1, fig. 6, *a-e*. (*Pilumnus x.*)  
1861. Heller, SB. Ak. Wiss. Wien, xliii, p. 328, pl. 2, figs. 16-18 (*carinipes*).  
1875. Paulson, Red Sea Crust., p. 18, pl. 4, figs. 4, 4, *a-d* (*carinipes*).  
1910. Stebbing, *l. c.*, p. 301 (*Pilumnus x.*).  
1912. Lenz, Ark. Zool., vii, no. 29, p. 6 (*carinipes*).  
1917. Stebbing, Ann. Durban Mus., ii, p. 9 (*Pilumnus x.*).  
1925. Odhner, *l. c.*, p. 82.  
1938. Monod, Mem. Inst. d'Égypte, xxxvii, p. 124, fig. 15.  
1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 156, fig. 39, C, D (plp. 1, 2 ♂).

Front  $\frac{1}{3}$  the greatest width of carapace, slightly arcuate, with median notch and a notch at junction with supra-orbital margin; antero-lateral margin cut into 4 blunt teeth, the first two especially blunt; main regions fairly distinct, feebly subdivided, 2 M incompletely divided; whole surface granulate, the granules of uniform size but slightly larger laterally. Wrist and hand of cheliped granulate, the latter with a blunt ridge at basal angle of upper margin, no longitudinal furrow, outer surface pilose. Legs with upper margins of 4th-6th joints sharply keeled, the 5th and 6th joints in addition with a second keel along hinder surface; hinder surface of 5th distally, and the whole of 6th joint and dactyl setose. Pterygostomial regions, external maxillipeds, sternum and abdomen with short close pile.

Length 9 mm., breadth 13 mm. Smallest ovig. ♀ 6.5 mm. in length. Reddish or orange (Krauss: violet), with yellowish spots on margins of carapace and on legs, finger and thumb of cheliped blackish.

*Localities*.—Durban (Krauss, Stebbing); Amanzemtoti (Lenz);

Scottburgh, Port Shepstone, Isipingo, Durban, Port St. Johns and East London (S. Afr. Mus.).

*Distribution*.—Red Sea.

*Remarks*.—Krauss' measurements and figure give a greater proportional length than is found in the South African Museum specimens.

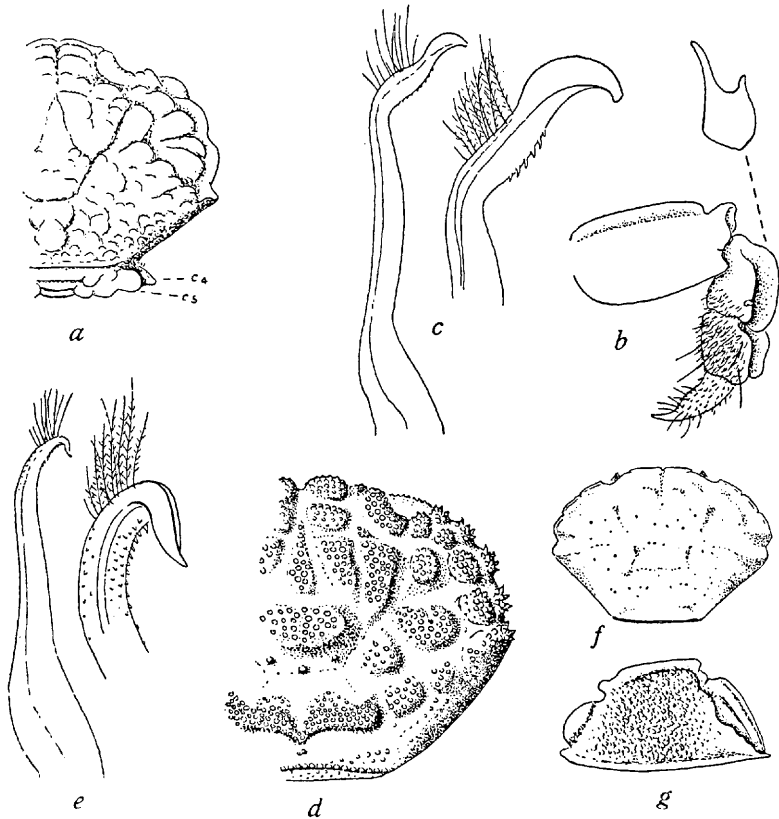


FIG. 39.—*Zosimus aeneus* (Linn.). *a*, carapace; *c*<sub>4</sub>, *c*<sub>5</sub>, coxal lobes of 4th and 5th legs.

*Zozymodes xanthoides* (Krass.). *b*, hind view of right 2nd leg with cross-section of 5th joint. *c*, 1st pleopod ♂.

*Chlorodopsis areolata* (M. Edw.). *d*, carapace. *e*, 1st pleopod ♂.

*Lophozozymus dodone* (Herbst). *f*, carapace. *g*, outer surface of chela.

Odhner makes no mention of the possible identity of Heller's and Krauss' species; but it is clear that Lenz's specimens should be identified with Krauss' species; and Balss quotes *xanthoides* from the Red Sea.

Gen. CHLORODIELLA Rathbun

1897. Rathbun, Proc. Biol. Soc. Wash., xi, p. 157.  
1898. Alcock, *l. c.*, p. 159 (*Chlorodius*).  
1925. Odhner, Medd. Göteb. Mus., xxxvii, p. 85 (*Chlorodius*).  
1934. Gordon, Res. Sci. Ind. orient. Néerland, iii, fasc. 15, p. 49.  
1938. Balss, *ibid.*, lxxv, p. 51.

Carapace depressed, flat, hexagonal, regions faintly or not at all demarcated, fronto-orbital width more than  $\frac{3}{4}$  greatest width, front broad,  $\frac{1}{3}$ – $\frac{1}{2}$  greatest width (of carapace), straight with median notch, its lateral angles separated by grooves from supra-orbital margin; antero-lateral margin with 4 teeth or lobes, a little shorter than postero-lateral margin. Basal joint of ant. 2 extending into cleft between front and inner suborbital tooth, flagellum subequal to orbit. Chelipeds unequal, rather long, finger and thumb apically spooned. Legs not keeled. Abdomen ♂ with 3rd–5th segments fused.

*Chlorodiella niger* (Forsk.)

1775. Forskal, Descr. Anim., p. 89.  
1830. Rüppell, Beschr. 24 Krabben, p. 20, pl. 4, fig. 7, and pl. 6, fig. 14 (*Clorodius n.*).  
1843. Krauss, Südafrik. Crust., p. 34, pl. 2, fig. 1, *a-c* (*Menippe martensii*).  
1898. Alcock, *l. c.*, p. 160 (references).  
1910. Stebbing, *l. c.*, p. 300 (*Pilodius martensii*).  
1915. Laurie, J. Linn. Soc. Lond., xxxi, p. 447 (growth-changes).  
1925. Odhner, *l. c.*, p. 85.  
1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 135, pl. 71 (figure blurred and useless).  
1937. Chopra and Das. Rec. Ind. Mus., xxxix, p. 402, fig. 8, and pl. 6, fig. 2.  
1938. Balss, *l. c.*, p. 52.  
1938. Gurney, Proc. Zool. Soc. Lond., ser. B, cviii, p. 75, pl. 1, figs. 1–4 (larval stage).  
1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 156, fig. 38, D, E (plp. 1, 2 ♂).

Carapace with gastric region faintly subdivided into 3–5 areoles, surface non-granulate except near anterior borders, antero-lateral margin with 4 teeth, the 3rd the largest, the 1st very near outer orbital tooth. Wrist of cheliped with strong tooth on inner side, hand smooth or feebly granulate. Legs denticulate on anterior

margin, setose and with long bristles, dactyls spinulose on inner margin, and according to Krauss biunguiculate.

Length 15 mm., breadth 25 mm. Brownish yellow to dark violaceous, sometimes mottled, chelipeds and legs brown (Krauss: with reddish bands), finger and thumb of chelipeds black with white tips.

*Locality*.—Natal (Krauss).

*Distribution*.—Zanzibar, Seychelles, Red Sea, Indo-Pacific, Australia.

Gen. CHLORODOPSIS M. Edw.

1910. Stebbing, *l. c.*, p. 300.

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 226.

1938. Balss, Medd. Göteb. Mus., lxxv, p. 58.

Differs from *Chlorodius*: carapace with well-defined regions and areoles, granular or hairy, or both; basal joint of ant. 2 extending up between front and suborbital tooth, its outer angle projecting into the orbit, from which the flagellum is thus excluded, at least in adult.

*Chlorodopsis areolata* (M. Edw.)

Fig. 39, *d, e*.

1838. McLeay, Annulosa S. Afr., p. 59 (*Chlorodius perlatus*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 790.

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 354, pl. 47, fig. 8.

1910. Stebbing, *l. c.*, p. 300.

1918. *Id.*, Ann. Durban Mus., ii, p. 52 (*caelata*).

1942. Ward, Mauritius Inst. Bull., ii, p. 88 (*Actaea perlata*).

1942. *Id.*, *ibid.*, p. 97, pl. 6, fig. 3 (subsp. *brandonensis*).

Carapace flattish, length about  $\frac{2}{3}$  width, areoles separated by broad shallow grooves, and covered with pearly granules, which on the lateral margins are more conical; covered with very short thick brownish fur; external frontal lobe distinct from supra-orbital ridge; 1 M separate, 2 M completely divided (the divisions subequal in width anteriorly but the inner division narrowing posteriorly more than the outer division), 3 M more or less tripartite, 4 M sometimes with very few granules, 1 P with the granules usually forming a transverse patch shaped like a cupid's bow, 2 P with a very regular transverse row of granules, with other granules in front and behind it. Chelipeds and legs granulate; wrist knobby; upper margins of 2nd-5th legs also

spinulose, dactyls bi-unguiculate but not strongly so. Sternum pitted, feebly granulate along edges of abdominal furrow in ♂.

Length 15 mm., breadth 22 mm. Brownish, granules pearly-white, finger and thumb of cheliped black, the black colour extending along underside and on inner and outer surfaces of hand.

*Locality*.—Durban, Port St. Johns (S. Afr. Mus.).

*Distribution*.—East coast of Africa, Mauritius, Indo-Pacific.

*Remarks*.—A photograph of McLeay's specimen of *C. perlatus* shows the hand as well as the wrist knobby, also the area 4 M seems well developed (as in Lenz's figure) and confluent with 1 P. Ward places McLeay's species in the genus *Actaea*, close to *A. speciosa*, giving the differential character of the two species.

Stebbing, contrary to Alphonse Milne Edwards and Rathbun, kept *caelata* separate from *areolata*; but Miss Rathbun presumably based her opinion on an examination of Dana's type.

Gen. PHYMODIUS M. Edw.

1852. Dana, U.S. Expl. Exp. Crust., p. 126 (*Cyclodius* ? = juv.).

1910. Stebbing, *l. c.*, p. 299.

1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 294.

1934. Gordon, Res. Sci. Ind. Or. Néerl., iii, fasc. 15, p. 32 (revision).

1938. Balss, Medd. Göteb. Mus., lxxv, p. 54.

Carapace transversely oval or hexagonal, but not very broad, regions and areoles well defined, smooth or finely granulose, fronto-orbital margin about half width of carapace, antero-lateral margin 4-lobed. Basal joint of ant. 2 between front and suborbital angle. Chelipeds stout, unequal (not greatly so), finger and thumb curved, tips spooned. Legs with upper margin of 4th-6th joints spinose, dactyl with strong apical tooth next to the unguis thus appearing bi-unguiculate. Abdomen ♂ with 5 segments.

*Remarks*.—Strictly speaking, if *Cyclodius* was based on juveniles of *Phymodius* as Balss considers it was, Dana's name should be employed in preference to the later one of Milne Edwards.

*Key to the South African Species.*

1. Sculpture of carapace sharper, front more arcuate (fig. 40, *i*).  
Chelipeds with more numerous tubercles as far as finger . . . *ungulatus*.
2. Sculpture more worn-looking, front less arcuate (fig. 40, *h*).  
Chelipeds with fewer tubercles, extending usually only  
half-way along hand . . . . . *monticulosus*.

*Phymodius ungulatus* (M. Edw.)Fig. 40, *i, j*.

1843. Krauss, Südafrik. Crust., p. 29, pl. 1, fig. 2, *a-c* (*Xantho dehaanii*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 790.

1894. Ortmann, Semon's Austral. Reise, v, p. 51.

1910. Stebbing, *l. c.*, p. 299.

1934. Gordon, *l. c.*, p. 36, figs. 17, *b, b'*, 18, *b, 19, c*.

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 140, pl. 73.

Carapace smooth, microscopically granulate, antero-lateral teeth sharply conical, areole 2 M longitudinally divided, 2 F oval and

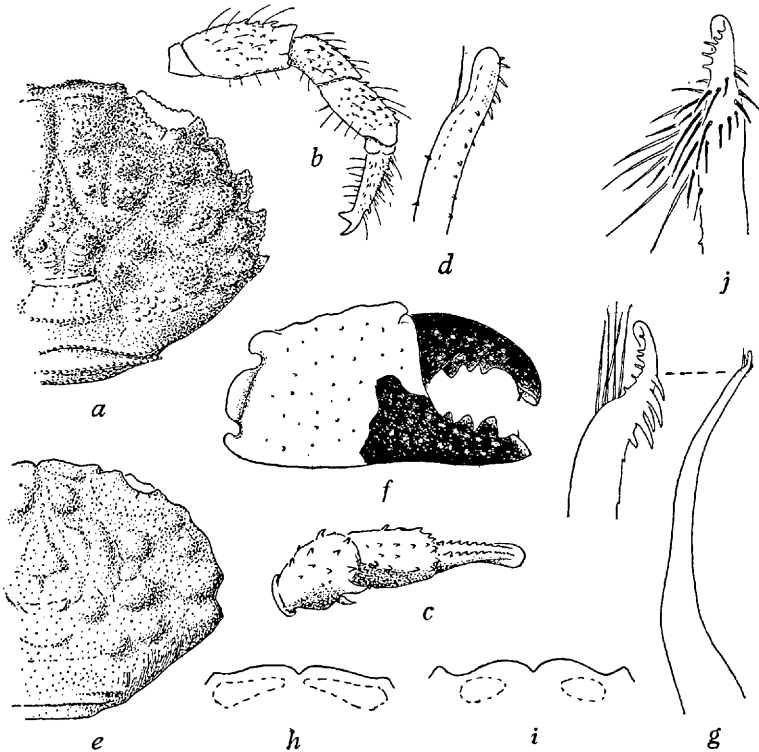


FIG. 40.—*Phymodius monticulosus* (Dana). *a*, carapace of juv. ♂  $7 \times 10$  mm. *b*, leg of juv. *c*, upper view of chela of juv. *d*, apex of 1st pleopod ♂ juv. *e*, carapace of a specimen  $17 \times 23$  mm. *f*, chela. *g*, 1st pleopod ♂, with apex further enlarged. *h*, diagram of frontal area (after Gordon).

*Phymodius ungulatus* (M. Edw.). *i*, diagram of frontal area (after Gordon). *j*, apex of 1st pleopod ♂ (after Gordon).

(In *a* the two rows of granules near hind margin are drawn rather too far apart.)

widely separated from its fellow, front with outer lobe well developed and deeply separated from the markedly convex median lobe, areoles 2 P reaching almost to median line. Penultimate abdominal segment ♂ with distal margin slightly less than proximal margin, ultimate segment very slightly longer than its basal width. Apex of 1st pleopod ♂ with long, backwardly directed spines.

Breadth 23 mm. (Gordon).

*Locality*.—Natal Point (=Durban) (Krauss).

*Distribution*.—Mauritius, east coast of Africa, Red Sea, Indo-Pacific.

*Phymodius monticulosus* (Dana)

Fig. 40, *a-h*.

1852. Dana, Proc. Ac. Nat. Sci. Philad., p. 79, and U.S. Expl. Exp. Crust., pt. 1, p. 206, pl. xi, fig. 9, *a-f* (*Chlorodius m.*).

1853. Jacquinot and Lucas, Voy. Pôle Sud. Astrolabe. zool., iii, p. 26, pl. 3, fig. 4 (*Chlorodius obscurus*).

1898. Alcock, *l. c.*, p. 163.

1934. Gordon, *l. c.*, p. 34, figs. 17, *a, a'*, 18, *a, 19, a*.

1947. Barnard, Ann. Mag. Hist. (xi), 13, p. 364.

Carapace as in *ungulatus* but more convex, though the areoles have a "worn" appearance, antero-lateral teeth blunter (at least in adult), 2 F transversely elongate and extending to median groove, frontal margin less convex, outer lobe less deeply separated from median lobe, areoles 2 P only present laterally. Dactyls of legs strongly bi-unguiculate. Penultimate segment of abdomen ♂ with distal margin slightly greater than proximal margin, ultimate segment slightly shorter than its basal width. Apex of 1st pleopod ♂ with forwardly directed setae.

Breadth 33 mm. (Gordon). Brown or chestnut-brown, finger and thumb of cheliped black, the colour extending on to palm.

*Locality*.—Delagoa Bay (coll. van der Horst, and Lourenzo Marques Mus.).

*Distribution*.—Mauritius, Madagascar, Indo-Pacific.

*Remarks*.—Young specimens have a strongly nodular carapace, granulate all over, and sharper antero-lateral teeth (fig. 40, *a*). The denticles and granules on the chelipeds are also much sharper (fig. 40, *c*).

## Gen. LOPHOZOYIMUS M. Edw.

1863. Milne Edwards, *Ann. Sci. Nat.* (4), xx, p. 276.

1898. Alcock, *l. c.*, p. 106 (as subgen. of *Zozymus*).

1925. Odhner, *l. c.*, p. 82.

Like *Zosimus*, but tips of finger and thumb of cheliped acute, not hollowed; antero-lateral margin very sharp; basal joint of ant. 2 touching side-edge of front.

*Lophozoyimus dodone* (Herbst)

Fig. 39, *f, g*.

1865. Heller, "Novara" *Crust.*, p. 7, pl. 1, fig. 3 (*Atergatis elegans*).

1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 789.

1884. Miers, *Zool. H.M.S. Alert*, p. 527.

1894. Ortmann, *Semon's Austral. Resie*, v, p. 50.

1898. Alcock, *l. c.*, p. 108 (references).

1925. Odhner, *l. c.*, p. 82.

Carapace very smooth, glabrous, with scattered pits, regions only faintly indicated, and with no subdivision into areoles; antero-lateral margin trenchant, somewhat wavy, shallowly 4-lobate, the first lobe confluent with orbit, front with very feeble median notch; infra-orbital tooth prominent. Cheliped, outer surface of wrist and hand granulose-rugulose, upper margin of 4th joint and inner margin of wrist cristate, upper and lower margins of hand both sharply keeled, the lower continued on to thumb, upper margin of finger also keeled. Legs smooth, upper margins of 4th-6th joints, and lower margin also of 4th, cristate, lower margin of 6th and both outer and inner surfaces of dactyls shortly pilose.

Length (♀) 14 mm., breadth 21 mm. Carapace brownish, mottled, stone-grey towards antero-lateral margins, wrist and hand of cheliped pale buff with pink mottling, finger and thumb black, legs reddish.

*Localities*.—Mozambique (Miers); Port Elizabeth (Ortmann); Port St. Johns (S. Afr. Mus.); off Port Shepstone, Natal, 24 fathoms (S. Afr. Mus.); Delagoa Bay (Lourenzo Marques Mus.).

*Distribution*.—Mauritius, east coast of Africa, Indo-Pacific.

## Gen. MEDAEUS Dana

1898. Alcock, *l. c.*, p. 123.

1925. Odhner, *l. c.*, p. 81.

1930. Rathbun, *Bull. U.S. Nat. Mus.*, no. 152, p. 273.

1935. Balss, *Rec. Ind. Mus.*, xxxvii, pp. 45, 46.



Differs from *Xantho* (*infra*) in having the antero-lateral margins continued (Alcock says "very distinctly") beneath the orbits to the buccal cavity.

*Remarks.*—In the following species the sternum is broader than in the South African species of *Xantho*, and the sternal plates between the 4th legs project backwards beyond the lateral projections of the 3rd abdominal segment in ♂ (*cf.* fig. 42, *a, c, f*).

*Medaeus granulatus* (Haswell)

Figs. 41, *a*, 42, *a, b*.

1882. Haswell, *Cat. Austral. Crust.*, p. 61 (*Leptodius g.*).

1884. Miers, *Zool. H.M.S. Alert Crust.*, p. 211, pl. 20, figs. C, *c* (*Xantho macgillivrayi*).

1918. Stebbing, *Ann. Durban Mus.*, ii, p. 51 (*Xantho distinguendus*, non de Haan).

1925. Odhner, *l. c.*, p. 81.

1931. Gordon, *J. Linn. Soc. Lond.*, xxxvii, p. 543, figs. 19, 22, A.

1938. Monod, *Mem. Inst. d'Egypte*, xxxvii, p. 127, fig. 17, A (pl. 1 ♂).

1945. Stephensen, *Dan. Sci. Invest. Iran*, pt. 4, p. 148, fig. 37, A, B (pl. 1, 2 ♂).

Carapace length  $\frac{2}{3}$  breadth, regions very well marked, numerous short transverse rows of bead-like granules on anterior half, granules more scattered on hinder part, granules distinct on hind margin and between the 4 antero-lateral acute teeth; pterygostomial region granulate and sparsely setose. Chelipeds unequal, wrist and upper surface of hand foveolate, and with raised patches and rows of granules, inner surface of hand smooth; tips of finger and thumb pointed. Legs sparsely setose, upper margin of 4th joint keeled (but not sharply), 5th and 6th joints with raised granulate ridges separated by grooves. Abdomen and 1st pleopod ♂ (see fig. 42, *a, b*); 1st and 2nd abdominal segments and lateral corners of 3rd granulate; width of sternum ♂ between insertion of 2nd legs  $1\frac{3}{4}$  in length (to bases of 4th legs).

Length up to 16 mm., breadth 24 mm. Brownish, finger and thumb of cheliped blackish, the colour not extending on to hand.

*Localities.*—Durban (Stebbing, and S. Afr. Mus.); Algoa Bay (Port Elizabeth Mus.).

*Distribution.*—Australia, Japan.

*Remarks.*—If this species be placed in *Xantho*, Miers' name *macgillivrayi* must be used, as *granulosus* is preoccupied by Rüppell. The

antero-lateral margins are, however, continued below the orbit to the buccal cavity, albeit inconspicuously so, and the species can thus be placed in *Medaesus*, following Odhner and Gordon.

Gordon has given a tabular conspectus of the differences between this species and *Xantho exaratus* (= *hydrophilus*) and the true *distinguendus* de Haan.

Thanks to Gordon, who figured the 1st pleopod ♂, the identity of the South African specimens with Miers' specimens seems to be certain.

#### Gen. XANTHO Leach

1910. Stebbing, *l. c.*, p. 297.

1925. Odhner, *l. c.*, p. 79.

Carapace broad, moderately convex anteriorly, flat posteriorly, regions and areoles usually well defined, antero-lateral margin lobed or dentate, postero-lateral margin not concave, fronto-orbital width not more than half width of carapace. Inner suborbital angle of orbit usually prominently dentiform. Basal joint of ant. 2 meeting front, flagellum as long as orbit. Chelipeds usually unequal, tips of finger and thumb pointed (*Xantho* sensu stricto) or spooned (*Leptodius*). Abdomen ♂ with 3rd-5th segments fused (but the sutures may be distinct). 2nd pleopod ♂ very short.

*Remarks.*—Several of the species, and varieties, are very much alike, and an examination of the 1st pleopods ♂ is essential.

#### Key to the South African Species.

1. Finger and thumb of chelipeds pointed (*Xantho*). Chelipeds equal in both sexes. Carapace much pitted, antero-lateral lobes blunt . . . . . *impressus*.
2. Finger and thumb spooned. Chelipeds unequal in both sexes (*Leptodius*).
  - a. Four antero-lateral teeth.
    - i. Carapace in hinder third almost smooth . . . . . *hydrophilus*.
    - ii. Carapace more or less granulate, and the areoles 2 R, 3 R, 1 P, 2 P more or less distinct . . . . . cf. *voeltzkowii*.
  - b. Five antero-lateral teeth . . . . . { *quinquedentatus*.  
[*sanguineus*  
Mauritius].

#### *Xantho (Xantho) impressus* (Lam.)

Figs. 41, *e-h*, 42, *i-k*.

1873. Milne Edwards, *Nouv. Arch. Mus. Paris*, ix, p. 198, pl. 6, fig. 2.

1921. Stebbing, Ann. Durban Mus., iii, p. 13, pl. 1.

1942. Ward, Mauritius Inst. Bull., ii, p. 91 (*Neoxanthias i.*).

Adult (fig. 41, *f*) Carapace very short and broad, much pitted, gastric and cardiac regions separated by very broad and deep furrows

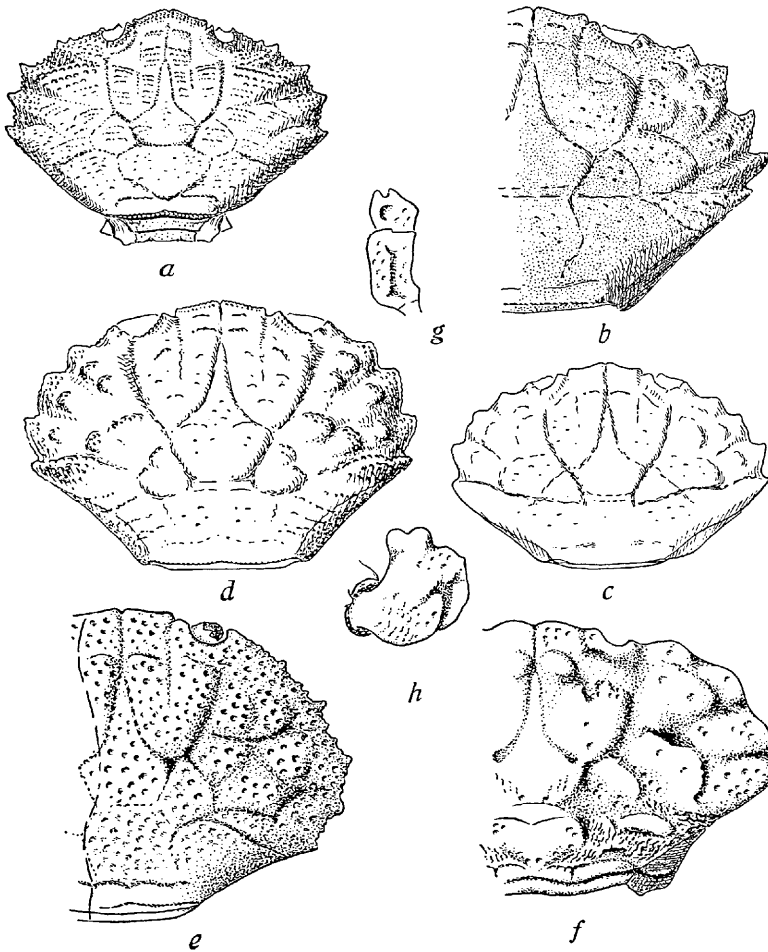


FIG. 41.—*Medaesus granulatus* (Hasw.). *a*, carapace.  
*Xantho quinquedentatus* Krauss. *b*, carapace.  
*Xantho hydrophilus* (Herbst). *c*, carapace.  
*Xantho*, cf. *voeltzkowii* Lenz. *d*, carapace.  
*Xantho impressus* (Lam.). *e*, carapace of ♂ 12 × 18 mm. The broken line marks the left side of a median pale band. *f*, carapace of large ♀ 37 × 65 mm. *g*, outer view of 3rd and 4th joints mxp. 3 of large ♀. *h*, upper view of right wrist of large ♀.

from the lateral portions, which are broadly undulate with shallow grooves; antero-lateral margin with 4 thickened and blunt lobes, the 1st below level of orbit. Chelipeds equal in both sexes, upper surface of hand with incomplete longitudinal pitted furrow. Sutures of abdominal segments 3-5 ♂ persistent. Sternum more conspicuously pitted than carapace.

Juv. (Natal) (fig. 41, *e*). Carapace closely and rather coarsely shagreened (almost granulate) all over, in addition numerous pits which become shallower and less conspicuous posteriorly, pitting continued below outer angle of orbit; grooves between M and L deep, most of the other grooves distinct, cardiac region the least well defined; antero-lateral margin with 5 rather conspicuous denticles with intervening smaller denticles. Chelipeds subequal, upper surface of wrist and hand with a corroded appearance due to shallow depressions, on the hand in about 5 longitudinal series, tips of finger and thumb *narrowly* spooned. Upper margin of 4th joints of legs serrulate, with plumose setae; lower margin of 6th joint granulate, setose, dactyl granulate, causing margins to appear finely denticulate, inner margin setose. Sutures of abdominal segments 3-5 more or less persistent. Sternum and abdomen shagreened, but very inconspicuously pitted.

Length up to 37 mm., breadth 65 mm. Adult waxy white, finger and thumb of cheliped blackish brown, ungues of legs horny. Juv. reddish, with a broad median longitudinal creamy band from front to hind margin (fig. 41, *e*), ventral surface pale, with red spots.

*Localities.*—Umkomaas (Stebbing); Umtwalumi, Natal (coll. T. A. Stephenson, 1 juv.); Delagoa Bay (Lourenzo Marques Mus. ad. ♀).

*Distribution.*—Mauritius, Andaman Is., Mergui Archipelago.

*Remarks.*—A ♀ presumably from Delagoa Bay (L.M. Mus.) and a ♀ from Mauritius (S. Afr. Mus.) agree with Alcock's most excellent description. Stebbing's figure of a specimen 16 × 27 mm. is recognizable but does not do justice to the animal.

The 12 × 18 mm. specimen from Umtwalumi is a ♂, and though at first sight it looks very different, it has certain features which point to its being really this species. Whether the differences are sexual or merely due to differences in age remains to be determined on more abundant material.

This species was made the type of *Neoxanthias* by Ward (1932, Austral. Zoologist., vii, p. 249).

*Xantho* (*Leptodius*) *hydrophilus* (Herbst)

Figs. 41, c, 42, c-e.

1843. Krauss, Südafrik. Crust., p. 30 (*affinis*).  
1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 790 (*exaratus*).  
1884. Miers, Crust. H.M.S. *Alert*, pp. 214, 530 (*exaratus* and var. *gracilis*).  
1908. Stebbing, Ann. S. Afr. Mus., vi, p. 7 (synonymy).  
1910. *Id.*, l. c., p. 297.  
1915. Laurie, J. Linn. Soc. Lond., xxxi, p. 444, pl. 43, fig. 1 (leg).  
1917. Stebbing, Ann. Durban Mus., ii, p. 8.  
1921. Balss, Beitr. Kennt. Meeresf. Westaf., iii, p. 60.  
1925. Odhner, l. c., p. 80.  
1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120.  
1931. Gordon, J. Linn. Soc. Lond., xxxvii, p. 544, figs. 20, 22, B (*exaratus*).  
1932. Shen, Zool. Sinica, ix, figs. 57, 58, c, d (*exaratus*) (sine descr.).  
1934. Gordon, Rec. Sci. Ind. Orient. Néerl., iii, fasc. 15, p. 29, fig. 16, a-c (1st plp. ♂) (*exaratus* var.).  
1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 110, pl. 58 (*exaratus*).  
1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 398 (*exaratus*).  
1938. Monod, Mem. Inst. d'Égypte, xxxvii, p. 125, fig. 17, B (plp. 1 ♂) (*exaratus*).  
1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 149, fig. 37, C (plp. 1 ♂) (*exaratus*).

Carapace length about  $\frac{3}{4}$  breadth, regions and areoles distinct in anterior two-thirds, smooth and flat in hinder third, shagreened, tiny granules distinct only on anterior margins of front, supra-orbital ridge, and areoles 2 M and 1-5 L; antero-lateral margin with 4 fairly sharp teeth (in addition to outer orbital angle), pterygostomial region densely pilose. Chelipeds unequal, upper and lower margins of 4th joint densely setose, wrist and hand minutely and closely granulate or shagreened, upper and outer surfaces usually with some ill-defined wrinkles or rugosities, finger and thumb spooned. Legs, upper margin of 4th joint not keeled, densely fringed with somewhat shaggy hair, 5th and 6th joints smooth, feebly granulate and setose. Abdomen ♂ 1st-3rd segments feebly granulate on lateral parts only, 6th segment as long as broad (or a trifle longer), 7th bluntly rounded. Width of sternum between bases of 2nd legs (*i.e.* 1st walking legs)  $1\frac{1}{2}$  in length (to insertion of 4th legs).

Length up to 22 mm., breadth 30 mm. Whitish or yellowish or

brownish, sometimes mottled, or with a red blotch on gastric region, or with violet bands and loops, chelipeds violaceous, finger and thumb blackish, the colour not extending on to hand.

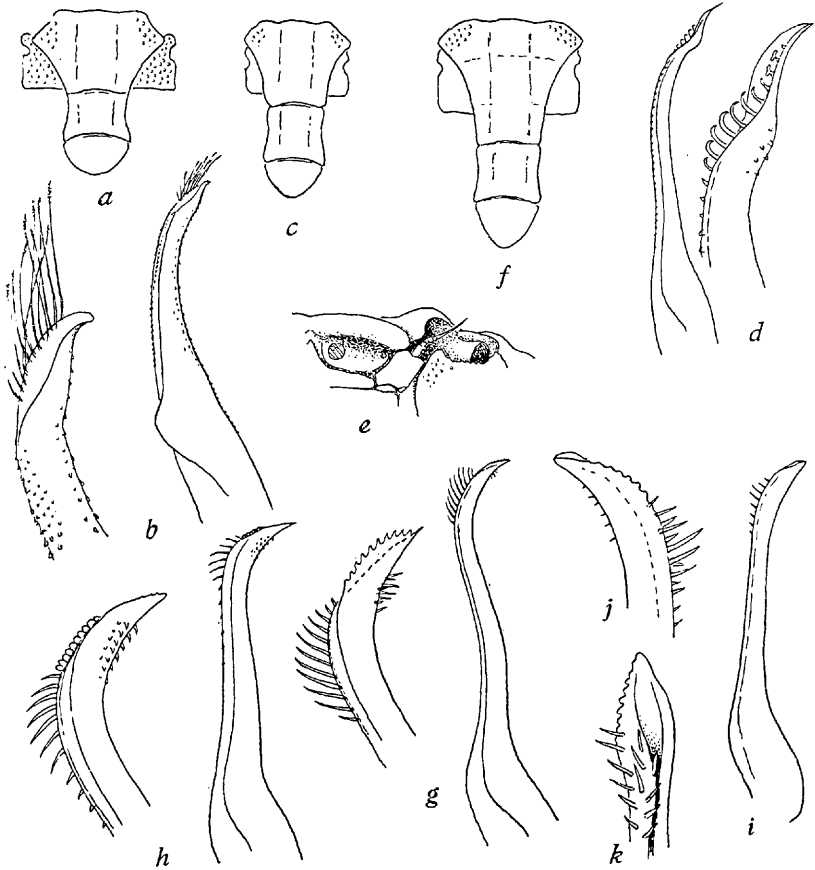


FIG. 42.—*Medaeus granulatus* (Hasw.). *a*, 3rd-7th abdominal segments and sternal plates between 4th legs ♂. *b*, 1st pleopod ♂, with apex further enlarged. *Xantho hydrophilus* (Herbst). *c*, abdomen ♂. *d*, 1st pleopod ♂, with apex further enlarged. *e*, ventral view of front, 1st antenna removed. *Xantho quinquedentatus* Krss. *f*, abdomen ♂. *g*, 1st pleopod ♂, with apex further enlarged. *Xantho*, cf. *voeltzkowii* Lenz. *h*, 1st pleopod ♂, with apex further enlarged. *Xantho impressus* (Lam.). *i*, *j*, *k*, ventral, dorsal and inner (median) views respectively of 1st pleopod ♂ (12 × 18 mm.).

*Localities*.—Durban (Krauss, Stebbing); Mozambique (Hilgendorf, Miers: var. *gracilis*); Delagoa Bay (coll. K. H. B., and Lourenzo Marques Mus.).

*Distribution.*—Mauritius, east coast of Africa, Indo-Pacific. Also N. Atlantic, Mediterranean, Canary Is., Angola.

*Remarks.*—Stimpson (1907, *Smiths. Misc. Coll.*, xlix, pp. 52 *sqq.*, pl. 6, figs. 3, 4, 6–9) discusses this species and several varieties, some of which have a “supplementary tooth” on the antero-lateral margin, making 5 in all (as in *quinquedentatus*). At that time the importance of the 1st pleopod ♂ as a specific character was not realized, so that it is not only impossible to recognize any of his varieties from the descriptions, but it is also quite probable that several distinct species are confused.

At first glance somewhat like *Etisus laevimanus* (*q.v.*).

The name *hydrophilus* seems to be employed for the Atlantic form (as in Balss, 1921) and *exaratus* for the Indo-Pacific form (*auctores*).

*Xantho* (*Leptodius*) *quinquedentatus* Krauss

Figs. 41 *b*, 42, *f*, *g*.

1843. Krauss, *Südafrik. Crust.*, p. 30, pl. 1, fig. 3, *a-d*.

1910. Stebbing, *l. c.*, p. 298.

1917. *Id.*, *Ann. Durban Mus.*, ii, p. 8.

1918. *Id.*, *ibid.*, ii, p. 51.

1925. Odhner, *l. c.*, p. 80.

1943. Buitendijk, *C.R. Soc. Néerland, Zool. Séance*, 17th October 1942, p. 289.

Carapace length about  $\frac{2}{3}$  breadth, regions and areoles distinct in anterior two-thirds, but indistinct in hinder third, shagreened or closely and minutely granulate, granules more distinct on the tops and anterior margins of the areoles and on the frontal and antero-lateral margins, also some scattered pits; antero-lateral margin with 5 teeth (in addition to outer orbital angle), the 1st rather blunt, the others dentiform, 5th smaller than 4th, pterygostomial region granulate and setose. Chelipeds unequal, upper and lower margins of 4th joint setose, wrist and hand closely and minutely granulate with some irregular wrinkles and rugosities on upper and outer surfaces, finger and thumb spooned. Legs, upper margin of 4th joints granulate (almost denticulate in large specimens) and fringed with setae, upper surfaces of 5th–7th joints strongly granulate, the granules on 7th (dactyl) conical. Abdomen ♂ 1st–3rd segments granulate only on lateral parts (in large specimens 1st segment may be entirely granulate) 6th segment as long as wide. Anterior margin of 4th joint of mxp. 3 notched (slightly so in young specimens).

Length up to 20 mm., breadth 33 mm. Yellowish, reddish, or brownish, uniform or mottled, finger and thumb of cheliped blackish, the colour extending along lower surface of hand.

*Localities*.—Durban (Krauss, Stebbing); Port Edward, Natal (coll. T. A. Stephenson); Port St. Johns (S. Afr. Mus.).

*Distribution*.—Mauritius (S. Afr. Mus.).

*Remarks*.—Compare *hydrophilus*. The Mauritius specimens agree with those from Natal, but having been stuffed (ex-coll. Robillard) the 1st pleopod ♂ is not available as a check.

Alcock and Stebbing have mentioned that Krauss described his species as having the finger and thumb of cheliped pointed. It is evident that Krauss made a slip. *X. euglyptus* Alck. is probably synonymous (see Odhner, 1925), but the 1st pleopod ♂ should be examined. Both may possibly be synonymous with *sanguineus* M. Edw., which has been recorded from Mauritius.

*Xantho (Leptodius)*; cf. *voeltzkowii* Lenz

Figs. 41, *d*, 42, *h*.

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 353, pl. 47, figs. 6, 6, *a* (chela).

1925. Odhner, *l. c.*, p. 80.

1938. Monod, Mem. Inst. d'Egypte, xxxvii, p. 125, figs. 16 (whole animal), 17, C-E (plp. 1 ♂).

Carapace length about  $\frac{2}{3}$  breadth, regions and areoles distinct, including 2 R and 3 R, and 1 P and 2 P, shagreened and granulate, the granules larger and more distinct near the frontal and anterolateral margins and the anterior margins of the areoles; anterolateral margin with 4 teeth, the 4th rather smaller than 2nd and 3rd, pterygostomial region granulate and pilose. Chelipeds unequal, upper and lower margin of 4th joint fringed, wrist and hand closely granulate and with blunt tubercles or knobs, those on upper margin of hand forming more or less 2 parallel rows, one or two lines of larger granules on outer surface of hand, tips of finger and thumb spooned. Legs, upper margin of 4th-6th joints finely granulate, fringed with setae, a rather conspicuous ridge along hinder surface of 5th joint. Abdomen ♂ segments 1-3 feebly granulate in lateral parts only. Pleopod 1 ♂ (see fig. 42, *h*).

Length 8.5 mm., breadth 13 mm.

*Localities*.—Durban, Delagoa Bay, and Mozambique Island (coll. K. H. B.).



*Remarks.*—Two juveniles (3 and 2 mm. in length) were submitted to Odhner and identified by him as possibly *voeltzkowii* Lenz. Lenz distinguished his Zanzibar species from *edwardsii* (Heller) by the 2 rows of knobs on hand of cheliped, and both species from *sanguineus* (M. Edw.) by having only 4 antero-lateral teeth instead of 5. Alcock makes *edwardsii* a synonym of *sanguineus*.

Until the 1st pleopod ♂ of the species of *Xantho* have been described it is impossible to assign the present specimens to any species; but the 1st pleopod corresponds closely with Monod's figure.

Gen. ACTAEA de Haan

1851. Dana, Amer. J. Sci. (2), xii, p. 126 (*Actaeodes*).  
1869. Milne Edwards, Ann. Soc. entom. Fr. (4), ix, p. 168 (*Banareia*).  
1879. *Id.*, Crust. Reg. Mexique, p. 253 (*Glyptoxanthus*).  
1894. Ortmann, Semon's Austral. Reise, v, p. 53 (*Cycloblepas*).  
1898. Alcock, *l. c.*, p. 137.  
1905. Stebbing, Mar. Invest. S. Afr., iv, p. 29 (references).  
1910. *Id.*, *l. c.*, p. 298.  
1925. Odhner, *l. c.*, p. 35.  
1930. Rathbun, *l. c.*, pp. 250 and 263 (*Glyptoxanthus*).

Carapace convex, transversely oval, regions and areoles well marked, usually convex and granulate, antero-lateral margin usually shallowly 4-lobate, postero-lateral margin usually concave, front deflexed, usually bilobed with distinct median notch. Basal joint of ant. 2 usually stopping at the deflexed lateral margin of front, sometimes projecting into gap between front and inner suborbital angle, flagellum subequal to orbit. Chelipeds equal in both sexes, tips of finger and thumb usually pointed, though sometimes blunt (spooned in *tomentosa*). Abdomen ♂ with 3rd–5th segments fused. Pleopod 2 ♂ short.

*Remarks.*—A large genus of small crabs, which are mostly difficult to separate specifically.

For *A. angolensis* Br. Cap. 1866, see Monod, Bull. Com. Étud. sci. Afr. occif. Fr., xv, 1933, p. 70.

*Key to the South African [Mauritian] Species.*

- I. Carapace length  $\frac{3}{4}$  breadth, flattened, especially posteriorly, anteriorly setose. Areole 2M incompletely divided (fig. 43, a) . . . . . *depressa*.  
II. Carapace convex, length less than  $\frac{3}{4}$  breadth (usually about  $\frac{2}{3}$ ), but antero-lateral margin always longer than postero-lateral margin.

- A. Legs with 5th and 6th joints dorsally bicarinate, with an intervening groove or a series of cup-like hollows *cavipes*.
- B. Legs not bicarinate.
1. Carapace and legs with conical tubercles, sometimes spiniform.
    - a. Carapace with simple (mostly) isolated tubercles . . . . . [*nodulosa*].
    - b. Carapace and legs with compound, closely-set tubercles, like a raspberry (fig. 43, b), nearly obliterating the ordinary areolation . . . . . *savignyi*.
  2. Carapace, and legs when granulate, with miliary or bead-like, or vesiculous granules of nearly uniform size (fig. 43, e).
    - a. Unguis on dactyl of 2nd (1st walking) leg concealed in a brush of golden hairs (fig. 43, d) . . . . . *speciosa*.
    - b. Unguis on dactyl of 2nd leg not concealed.
      - i. Carapace length  $\frac{2}{3}$  (or less) breadth. Areole 3 M tripartite.
        - a. Carapace and legs with short black felt. Finger and thumb of chelipeds spooned *tomentosa*.
        - $\beta$ . Carapace and legs with short black bristles . . . . . *hirsutissima*.
      - ii. Carapace length more than  $\frac{2}{3}$  breadth.
        - a. Finger and thumb of cheliped compressed, scissor-like (fig. 43, g) . . . . . *parvula*.
        - $\beta$ . Finger and thumb normal.
          - \* Areoles feebly developed posteriorly . . . . . *variolosa*.
          - \*\* Areoles more or less well developed.
            - † Areole 2 M incompletely divided (cf. fig. 43, a).
              - § 4-6 L separated [*pulchella*].
              - §§ 4-6 L not separated . [*helleri*].
            - †† Areole 2 M completely divided (cf. fig. 43, i).
              - § 3 M undivided . *rüppellii*.
              - §§ 3 M tripartite . [*rufopunctata*].

[*Note on Mauritian Species.*—*A. nodulosa* and *pulchella* are figured (carapace) in Odhner, 1925. Pleopod 1 ♂ of Mauritian specimen of *rufopunctata* is similar to that of *savignyi* (fig. 43, c).]

*Actaea depressa* (White)

Fig. 43, a.

1843. Krauss, Südafrik. Crust., p. 33, pl. 1, fig. 7, a-d (*Pilumnus granulatus*).

1847. White, Proc. Zool. Soc. Lond., xv, p. 225 (*Xantho d.*).

1887. de Man, J. Linn Soc. Lond., xxii, p. 27 (*parvula*, non de Haan, Krauss).

1898. Alcock, l. c., p. 146 (*parvula*, non de Haan, Krauss).

1925. Odhner, l. c., p. 38, pl. 2, fig. 19.

Carapace length  $\frac{3}{4}$  breadth, flattened, especially posteriorly, regions and areoles in low relief anteriorly, indistinct posteriorly, only the bristly or setose front and antero-lateral margins being somewhat deflexed, granulate, the granules on the edge of front and antero-lateral margin somewhat conical, especially on the lobes E, N, T, S (see fig. 37, a); 1 M not separate, 2 M incompletely divided; postero-lateral margin straight, the sides steep. Chelipeds equal, hand covered with short thick pile, with some longer hairs, with lines of granules which dorsally become conical or spiniform. Legs moderately setose, with conical granules on upper margins. Pleopod 1 ♂ similar to that of *savignyi* (fig. 43, c).

Length 30 mm., breadth 45 mm. Violaceous or yellowish, orange or reddish, mottled and speckled with white on carapace, chelipeds and legs, finger and thumb of cheliped brown in ♀, black in ♂, the colour extending on to palm, hairs yellowish.

*Localities*.—Durban (Krauss); Durban and Isipingo (S. Afr. Mus.); Impengazi, north of St. Lucia Bay (coll. T. A. Stephenson).

*Distribution*.—Andaman Is., Mergui Archipelago, Philippine Is., Bonin Is.

*Remarks*.—Although Krauss' name is earlier, the combination *Actaea granulata* is preoccupied (Audouin = *savignyi* M. Edw. v. *infra*), hence White's name is adopted (Odhner, 1925).

This species is distinguished from others by the greater length compared with its breadth, and the markedly flattened hinder part of the carapace. The latter feature renders it liable to be confused with *Pilumnus longicornis* (q.v., p. 265).

*Actaea cavipes* (Dana)

1852. Dana, U.S. Expl. Exp., xiii, Crust., p. 199, pl. xi, fig. 5, a, b (*cellulosa*).

1859. Girard, Ann. Soc. entom. Fr. (3), vii, p. 149, pl. 4, figs. 2-2, b (*Cancer fossulatus*).

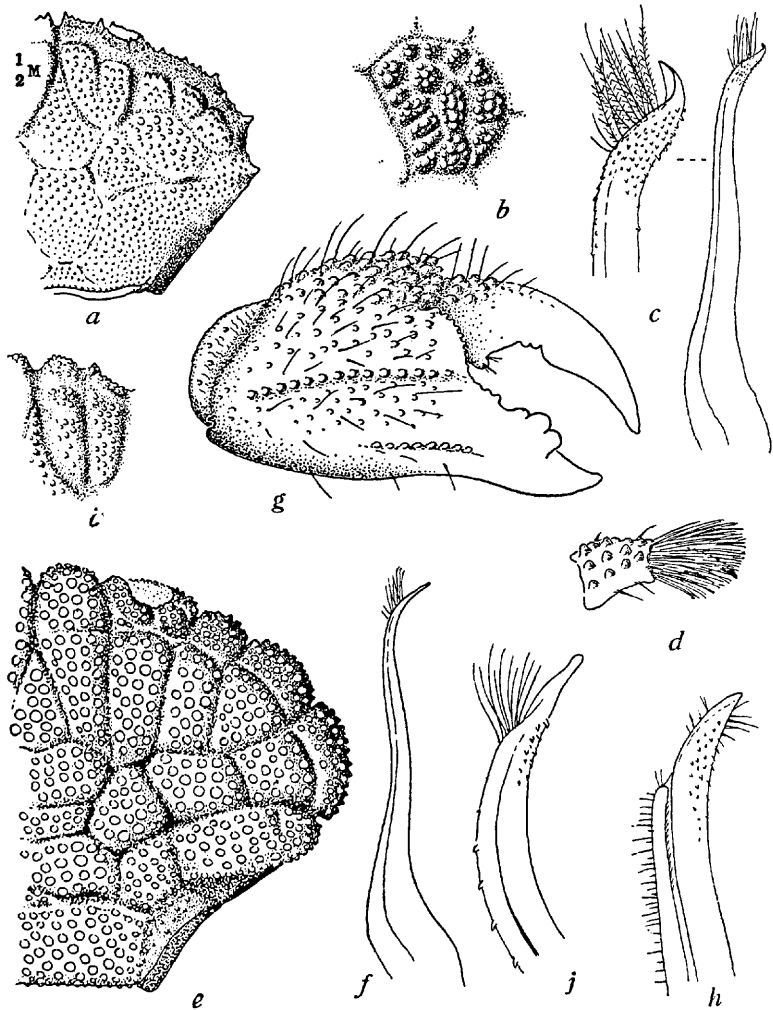


FIG. 43.—*Actaea depressa* (White). *a*, carapace (1 M not separate, 2 M incompletely divided).  
*Actaea savignyi* (M. Edw.). *b*, areole 5 L to show compound tubercles. *c*, 1st pleopod ♂, with apex further enlarged.  
*Actaea speciosa* (Dana). *d*, dactyl of 2nd leg.  
*Actaea tomentosa* (M. Edw.). *e*, carapace, denuded. *f*, 1st pleopod ♂.  
*Actaea parvula* (Krauss). *g*, chela. *h*, apex of 1st pleopod ♂.  
*Actaea rüppellii* (Krauss). *i*, areole 2 M (completely divided) and frontal region. *j*, apex of 1st pleopod ♂.

1877. Kossmann, *Reise Roth. Meer. Crust.*, p. 27, pl. 1, fig. 3 (*Psaumis* f).  
1894. Ortmann, *Semon's Austral. Reise*, v, p. 50.  
1898. Alcock, *l. c.*, pp. 147 and 148 (*fossulata*).  
1907. Rathbun, *Mem. Mus. Comp. Zool. Harv.*, xxxv, p. 44, pl. 1, fig. 2.  
1913. Klunzinger, *Nova Acta Leop. Carol. Ak.*, xcix, p. 190, pl. 6, fig. 7.  
1914. Rathbun, *Proc. Zool. Soc. Lond.*, ii, p. 658, pl. 1, fig. 6, pl. 2, fig. 7 (*Glyptoxanthus cymbifer*).  
1924. Balss, *Denksch. Ak. Wiss. Wien*, xcix ("Pola" Exp.), p. 8 (*fossulata*).  
1925. Odhner, *l. c.*, p. 68.  
1934. Boone, *Bull. Vanderbilt Mar. Mus.*, v, p. 128, pl. 68.

Carapace length  $\frac{3}{2}$  breadth, completely areolated and covered with miliary granules, areoles separated by broad but shallow grooves, 2 M more or less completely divided; postero-lateral margin very short, concave, antero-lateral margin 4-5-lobed, lobes variable in size and prominence; carapace often with an eroded or worm-eaten appearance, likewise the wrist and hand of cheliped. Legs with 5th and 6th joints dorsally bicarinate, the crests enclosing a trough or groove which is sometimes (*fossulata*) divided up into cup-like hollows.

Length 12.5 mm., breadth 20 mm.

*Locality*.—Europa Is., Mozambique Channel (Lenz).

*Distribution*.—Mauritius, Red Sea, east coast of Africa, Indo-Pacific.

*Remarks*.—Ward (1942, *Mauritius Inst. Bull.*, ii, p. 87) finds small differences between specimens from Australasia and from Chagos Archipelago, and uses the name *fossulata* for the latter.

*Actaea savignyi* (M. Edw.)

Fig. 43, b, c.

1826. Audouin, *Expl. Planches Savigny Crust. Egypt*, pl. 6, fig. 2 (*Cancer granulatus*, non Linn.).  
1833. de Haan, *Crust. Jap.*, decas prima, p. 18, decas secunda (1835), p. 47 (*Cancer (Actaea) g.*).  
1834. Milne Edwards, *Hist. Nat. Crust.*, i, p. 378.  
1851. Bianconi, *Spec. Zool. Mosambic*, fasc. 5, p. 82 (*Cancer s.*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 787.

1910. Stebbing, *l. c.*, p. 299 (*granulata*).

1922. Balss, Arch. Naturg., p. 122.

1924. *Id.*, Denksch. Ak. Wiss. Wien, xcix ("Pola" Exp.), p. 8.

1925. Odhner, *l. c.*, p. 52.

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 151, fig. 38, C (plp. 1 ♂).

Carapace length  $\frac{4}{5}$ – $\frac{3}{4}$  breadth, but the strongly concave postero-lateral margin shorter than antero-lateral, whole surface covered with close-set tubercles (like a raspberry) so as to obscure the ordinary areolation, each tubercle itself composed of a number of small granules or tubercles, tubercles more conical, even spiniform, in juv. than in adult; front distinctly bilobed. Chelipeds and legs with similar compound tubercles, upper margins of 4th–6th joints of legs cristate. Sternum and abdomen granulate. Basal joint of ant. 2 reaching as far as (or almost) inner suborbital angle.

Length 20 mm., breadth 26 mm. As preserved pinkish white, with darker patches on gastric, branchial, and orbital regions, finger and thumb of cheliped dark brown. Alcock says: uniform purplish black.

*Localities.*—Off Umhloti River, 25 fathoms (Stebbing); off Umtwalumi River, 25 fathoms (S. Afr. Mus.); Delagoa Bay (Barnard); Mozambique (Bianconi, Odhner).

*Distribution.*—East coast of Africa, Red Sea, Indo-Pacific to China, Japan, Australia.

*Remarks.*—Among the South African species this one is very readily distinguished by the compound tubercles. There is a superficial resemblance to *Dairodes margaritatus* (*infra*, p. 258, fig. 47, *g*), which, however, has fissures on the carapace and a rostriform front.

#### *Actaea speciosa* (Dana)

Fig. 43, *d*.

1852. Dana, U.S. Expl. Ex., xiii. Crust., p. 198, pl. xi, fig. 4, *a-c*.

1861. Heller, Abh. zool. bot. Ges. Wien, xi, p. 9, and SB. Ak. Wien, xliii, p. 329, pl. 2, fig. 19 (*Actaeodes nodipes*).

1865. Milne Edwards, Nouv. Arch. Mus., i, p. 274.

1877. Kossmann, Reise Roth. Meer. Crust., p. 27, pl. 1, fig. 4 (*Psaumis glabra*).

1898. Alcock, *l. c.*, p. 143.

1902. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 254, fig. 42, c (dactyl 2nd leg).

1913. Klunzinger, Nov. Act. Leop. Carol. Ak., xcix, p. 181 (p. 179, pl. 1, fig. 3, pl. 6, fig. 3; *vide* Balss, 1924).

1925. Odhner, *l. c.*, p. 62.

Carapace length  $\frac{3}{4}$  breadth, apparently glabrous but covered with a very fine and short felt, completely areolated and covered with bead-like or vesicular granules of nearly uniform size, 1 M separated (rather indistinctly so), 2 M incompletely divided, 3 M tripartite, antero-lateral margin shallowly lobate, longer than the concave postero-lateral margin. Chelipeds and legs knobby and granulate. Unguis on dactyl of 2nd (1st walking) leg concealed in a brush of stiff golden hairs (both sexes). Basal joint of ant. 2 entering gap between front and inner suborbital angle, though the latter nearly meets the front, flagellum shorter than orbit, which is subcircular. Abdominal segments 1-3 in ♂ granulate.

Length 9 mm., breadth 12 mm. Brown, some of the areoles on anterior part of carapace, and some of the knobs on chelipeds reddish.

*Localities.*—Durban (Odhner); Delagoa Bay (S. Afr. Mus.).

*Distribution.*—Mauritius, Red Sea, Indo-Pacific.

*Remarks.*—The "cleansing claw" is characteristic of this species. What special use it may have, however, has not been observed.

*Actaea tomentosa* (M. Edw.)

Fig. 43, e, f.

1834. Milne Edwards, Hist. Nat. Crust., i, p. 385 (*Zozymus t.*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 788.

1898. Alcock, *l. c.*, p. 140 (references).

1925. Odhner, *l. c.*, p. 70.

Carapace length less than  $\frac{2}{3}$  breadth, covered, as are the exposed portions of chelipeds and legs, with a short dense blackish felt, more or less completely concealing the large vesicular granules but not the areolation; antero-lateral margin (when denuded) shows 4 deep narrow notches which are continued as grooves on the pterygostomial region; postero-lateral margin short and very concave. Ventral surface granulate and covered with felt. Chelipeds not knobby, tips of finger and thumb spooned. Legs granulate and tuberculate, fringed with shaggy hair.

Length 19 mm., breadth 31 mm. Blackish; when denuded the carapace is marbled with red and whitish; finger and thumb dark, the dark colour extending on to inner and lower surface of palm.

*Localities.*—Mozambique (Hilgendorf); Europa Is., Mozambique Channel (Lenz); Durban (Odhner, and S. Afr. Mus.).

*Distribution.*—Mauritius, east coast of Africa, Red Sea, Indo-Pacific.

*Actaea hirsutissima* (Rüpp.)

1830. Rüppell, Besch. 24 Krabben, p. 26, pl. 5, fig. 6, pl. 6, fig. 21 (*Xantho h.*).

1898. Alcock, *l. c.*, p. 141 (references).

1904. Doffein, D. Tiefsee Exp., vi, p. 102, pl. 32, figs. 1, 2.

1921. Stebbing, Ann. S. Afr. Mus., xviii, p. 455.

1925. Odhner, *l. c.*, p. 69, pl. 4, fig. 13.

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 124, pl. 66 (photo, not good).

Carapace length  $\frac{2}{3}$  breadth, similar to *tomentosa* but with numerous short black bristles not forming a felt or coat or concealing the surface; 1 M separated, 2 M completely divided, the two divisions of equal width, 3 M tripartite. Chelipeds and legs bristly like the carapace; tips of finger and thumb blunt but not hollowed.

Length 20 mm., breadth 30 mm.

*Locality.*—Mozambique (Stebbing).

*Distribution.*—Mauritius, east coast of Africa, Red Sea, Indo-Pacific.

*Remarks.*—The specimens identified by Stebbing were not returned to the South African Museum, and I have seen no others.

*Actaea parvula* (Krauss)

Fig. 43, *g, h.*

1843. Krauss, Südafrik. Crust., p. 34, pl. 2, fig. 2, *a-c* (*Menippe p.*).

1910. Lenz, Voeltzkow Reise, ii, p. 549.

1910. Stebbing, *l. c.*, p. 299.

1925. Odhner, *l. c.*, p. 51, pl. 3, fig. 13.

[Not *parvula* de Man 1887, Alcock 1898, Stebbing 1924.]

Carapace length about  $\frac{3}{4}$  breadth, covered with granules and with rather long scattered hairs, 1 M not separated, 2 M completely divided, 3 M indistinctly tripartite, all six L areoles present, 6 L indistinctly separated posteriorly. Chelipeds and legs granulate, with longish



bristles and hairs; finger and thumb compressed, scissor-like (as in subgen. *Banareia*), finger closing inside thumb, cutting-edge of latter with a trilobate tooth.

Length 12 mm., breadth 16–17 mm. Orange-yellow, anterior part of 3 M reddish, some of the granules on carapace red, chelipeds and legs yellow, with a few scattered red dots, abdomen pale yellowish, sternum white, hairs glistening whitish.

*Localities.*—Natal (Krauss); Durban (Odhner); Delagoa Bay (coll. van der Horst).

*Distribution.*—Madagascar, Red Sea, Ceylon, East Indies, Marquesas Is.

*Remarks.*—The scissor-like finger and thumb of the chelipeds render this species easily recognizable.

*Actaea variolosa* Borradaile.

1902. Borradaile, F. Geog. Mald. Laccad. Archip., i, p. 256, fig. 54.

1925. Odhner, *l. c.*, p. 63.

Carapace length  $\frac{3}{4}$  (description; figure shows  $\frac{2}{3}$ ), bristly, areoles distinct in anterior portion but obsolete posteriorly, with bead-like granules.

Length 6 mm., breadth 8 mm.

*Locality.*—Durban (Odhner).

*Distribution.*—Maldives; Indo-Pacific.

*Actaea rüppellii* (Krauss)

Figs. 37, *d*, 43, *i*, *j*.

1843. Krauss, Südafrik. Crust., p. 28, pl. 1, figs. 1, *a-d* (*Aegle r.*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 787.

1898. Alcock, *l. c.*, p. 144 (references).

1910. Stebbing, *l. c.*, p. 299.

1925. Odhner, *l. c.*, p. 45, fig. 4, and pl. 3, fig. 6 (*rüppellii, sic.*).

1937. Shen, Contr. Inst. Zool. Ac. Peiping, iii, p. 291, fig. 7, *a-d* (*rüppellii orientalis* Odhner).

Carapace length  $\frac{3}{4}$  breadth, covered with short bristles and long silky hairs forming a shaggy coat; 1 M not separated, 2 M completely divided (the inner division usually narrower than outer division), 3 M undivided; anterior margin distinctly 4-lobate, longer than postero-lateral margin.

Length up to 22 mm., breadth 30 mm. Yellowish, with orange-red spots or patches, a large one on the gastric region being characteristic.

*Localities.*—Umlaas River mouth (Krauss); Durban and Port St. Johns (S. Afr. Mus.); Delagoa Bay (Lourenzo Marques Mus.); Mozambique (Hilgendorf, and S. Afr. Mus.).

*Distribution.*—East coast of Africa, Mauritius, Indo-Pacific to China, Japan, Australia.

*Remarks.*—Potts records a specimen from South Africa infested with *Thompsonia*, a parasitic Rhizocephalid Cirripede (1915, Carnegie Inst. Wash. Dept. Mar. Biol., viii, p. 8, pl. 1, fig. 4).

#### Gen. LACHNOPODUS Stimpson

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 32.

1898. Alcock, *l. c.*, p. 89.

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 40.

1925. Odhner, *l. c.*, p. 82.

1941. Gordon, Proc. Linn. Soc. Lond., 153 Sess., pt. 1, p. 127.

Carapace very broad, more or less convex, smooth, regions feebly defined, antero-lateral margin feebly lobed, fronto-orbital width less than half maximum width of carapace. Basal joint of ant. 2 meeting front. Chelipeds more or less unequal. Legs not keeled, 4th joints either smooth or spinose on upper margins.

#### *Lachnopus subacutus* (Stimpson)

1858. Stimpson, *l. c.*, p. 32 (*Liomera s.*).

1865. Heller, "Novara" Crust., p. 11, pl. 2, fig. 1 (*Xantho arcuatus*).

1867. Milne Edwards, Ann. Soc. Ent. Fr. (4), vii, p. 266 (*Xantho bidentatus Xanthodes pachydactylus*, non M. Edw.).

1907. Stimpson, *l. c.*, p. 39, pl. 5, fig. 1 (*Liomera s.*).

1910. Lenz, Voeltzkow Reise, ii, p. 545 (*Carpilodes tristis*, non Dana).

1925. Odhner, *l. c.*, p. 83 (synonymy).

1934. Balss, Faune Col. Franç, v, p. 509 (synonymy).

1938. *Id.*, Medd. Göteb. Mus., lxxv, p. 36.

1942. Ward, Mauritius Inst. Bull., ii, p. 93 (*Lioxantho s.*).

[Not *subacutus* de Man 1902.]

Carapace transversely elliptical, about  $\frac{2}{3}$  as long as wide, smooth and glossy, somewhat punctate anteriorly; antero-lateral margin with 5 feeble lobes, the hindmost one being the largest. Chelipeds subequal, smooth, tips of finger and thumb pointed. Legs smooth, glabrous.

Length 15 mm., breadth 23 mm.

*Locality.*—Europa Is., Mozambique Channel (Lenz).

*Distribution.*—Chagos; Red Sea; Madagascar; Pacific.

Gen. LIOMERA Dana

1851. Dana, Amer. J. Sci. (2), xii, p. 124 (genotype: *cinctimanus* White).  
 1851. *Id.*, *ibid.*, p. 126 (*Carpilodes*, genotype: *tristis* Dana 1852).  
 1910. Stebbing, *l. c.*, p. 296.  
 1917. *Id.*, Ann. Durban Mus., ii, p. 5.  
 1925. Odhner, *l. c.*, pp. 6 and 8 (*Carpilodes*) (key to species).  
 1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 241 (*Carpilodes*).  
 1934. Gordon, Res. Sci. Ind. Orient. Néerland, iii, fasc. 15, p. 24 (*Carpilodes*).

Carapace very broad, barrel-shaped, convex, regions usually well marked and, especially anteriorly, subdivided into areoles, antero-lateral margin usually divided into 4 broad shallow lobes, postero-lateral margins strongly convergent; front from  $\frac{1}{3}$  to  $\frac{1}{2}$  greatest width of carapace, deflexed, medianly grooved and slightly notched. Basal joint of ant. 2 partly filling gap between front and inner suborbital angle (fig. 37, *b*). Chelipeds equal or subequal in both sexes, finger and thumb pointed but distinctly grooved near tips. Abdomen of ♂ with 3rd-5th segments fused.

*Remarks.*—Odhner, while recognizing the priority of *Liomera*, deprecates the substitution of this name for *Carpilodes*, and Miss Rathbun follows the same course.

Doflein (1904) records a young ♀ from the Agulhas Bank, 102 metres (Stebbing, *l. c.*, p. 296).

*Key to the South African [Mauritian and Zanzibar] Species.*

- I. Legs not keeled.  
 A. Areole 2M incompletely or not at all divided (fig. 44, *a*).  
     1. Carapace without strong granulation, appearing smooth to the naked eye.  
         *a.* Main regions not well marked. Usually a dark ring on hand of cheliped . . . *cinctimanus*.  
         *b.* Main regions well marked. No dark band on hand . . . . . [*tristis*].\*  
     2. Carapace strongly granulate. Legs not knobably,  
         *a.* Granulation confined to anterior and lateral parts (fig. 44, *a*) . . . . . *bellus*.  
         *b.* Whole surface granulate. 4 L and 5 L joined, forming a transverse ridge . . . [*rugatus*].\*

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\* Figured in Odhner, *l. c.* Also Monod, Mem. Inst. d'Égypte, xxxvii, 1938, p. 121, fig. 13.

- B. Areole 2 M completely divided (fig. 44, c). All regions well marked.
1. Regions in high relief, strongly granulate. Legs knobbly . . . . . *monticulosus*.
  2. Regions in low relief, feebly granulate. Legs smooth . . . . . [*ruber*].\*
- II. Legs keeled . . . . . [*lophopus*].\*

*Liomera cinctimanus* (White)

1917. Stebbing, Ann. Durban Mus., ii, p. 5.

1925. Odhner, *l. c.*, p. 14.

1930. Rathbun, *l. c.*, p. 242, pl. 100.

Carapace nearly twice as broad as long, antero-lateral margin with 3 very flat lobes, the one following the orbit scarcely or only very feebly convex, 2 M incompletely divided; surface smooth, non-granulate, closely punctate. Basal joint of ant. 2 touching front (Rathbun's figure). Legs not keeled, smooth.

Length 22 mm., breadth 37.5 mm. Odhner mentions a specimen 64 mm. in breadth. Bright red, edges of carapace whitish, in some ♂♂ a black band around hand of cheliped, the finger and thumb of which are brownish black with white tips, dactyls of legs red basally, white distally with black ungues.

*Localities*.—Europa Is., Mozambique Channel (Lenz); Durban (Stebbing); Delagoa Bay (Coll. K. H. B. 1912).

*Distribution*.—Mauritius, Indo-Pacific, Japan, and California.

*Remarks*.—The black band round the hand is sometimes absent in the young (Henderson); Odhner says it is only found in *some* male specimens.

*Liomera bellus* (Dana)

Figs. 37, b, 44, a, b.

1843. Krauss, Südafrik. Crust., p. 31 (*Xantho obtusus*, non de Haan).

1852. Dana, U.S. Expl. Exp., xiii. Crust., p. 196, pl. xi, fig. 2.

1865. Milne Edwards, Nouv. Arch. Mus. Paris, i, p. 261 (*vaiillantianus*).

1910. Stebbing, *l. c.*, p. 297 (*Xantho obtusus*, non de Haan).

1924. Stebbing, Ann. S. Afr. Mus., xix, p. 2 (*Actaea parvula*, non Krauss).

1925. Odhner, *l. c.*, p. 16, pl. 1, fig. 9.

\* Figured by Odhner, *l. c.*

Carapace  $1\frac{2}{3}$  as broad as long, antero-lateral margin feebly lobate, 2 M incompletely divided, surface strongly granulate anteriorly and laterally, becoming smooth and more or less pitted medianly and posteriorly. Basal joint of ant. 2 nearly filling gap between front

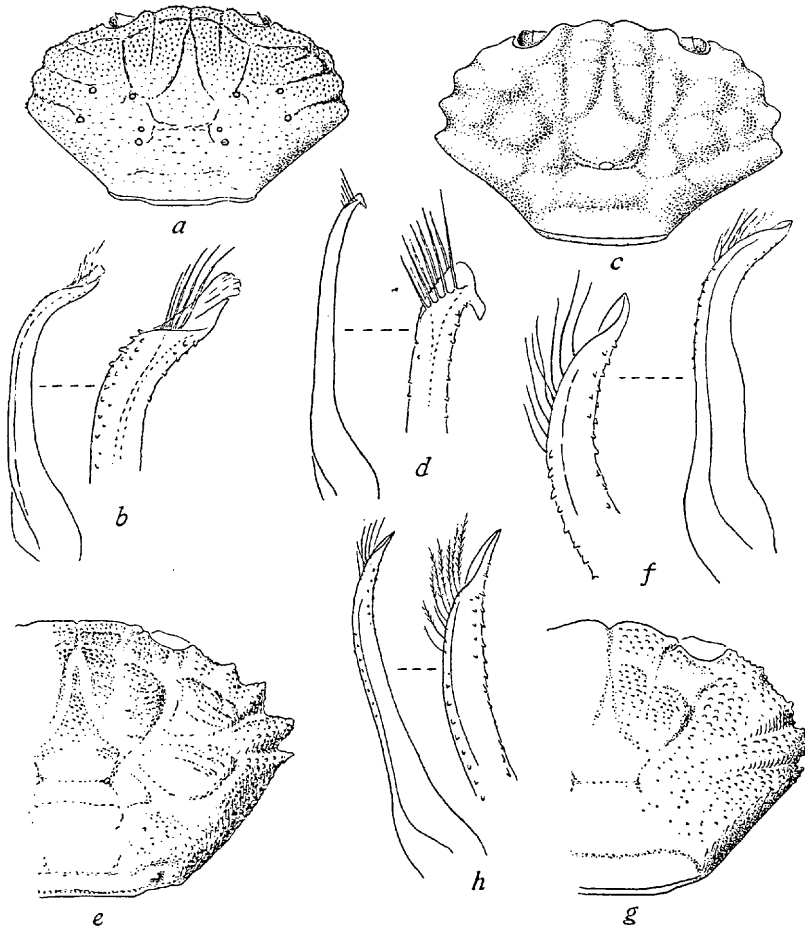


FIG. 44.—*Liomera bellus* (Dana). *a*, carapace. *b*, 1st pleopod ♂, with apex further enlarged.  
*Liomera monticulosus* (M. Edw.). *c*, carapace. *d*, 1st pleopod ♂, with apex further enlarged.  
*Xanthias tuberculidens* Rathbun. *e*, carapace. *f*, 1st pleopod ♂, with apex further enlarged.  
*Xanthias lamareckii* (M. Edw.). *g*, carapace. *h*, 1st pleopod ♂, with apex further enlarged.

The rings in *a* and the oval in *c* represent pale spots (not tubercles).

and inner suborbital angle (fig. 37, b). Eye-stalk granulate anteriorly. Legs not keeled, smooth.

Length 9.5 mm., breadth 15 mm. Pink, reddish, or crimson, with 4 or 5 small pale dots on each branchial region as shown in figure, finger and thumb of chelipeds dark brown, with whitish tips, dactyls of legs with distal half white, unguis horn-coloured.

*Localities*.—Natal (Krauss, Odhner); Europa Is., Mozambique Channel (Lenz); Mozambique (Stebbing); Delagoa Bay (coll. van der Horst).

*Distribution*.—Mauritius, Indo-Pacific.

*Liomera monticulosus* (M. Edw.)

Fig. 44, c, d.

1873. Milne Edwards, *Nouv. Arch. Mus.*, Paris, ix.

1898. Alcock, *l. c.*, p. 86 (*Carpilodes cariosus*, sed non *monticulosus*).

1925. Odhner, *l. c.*, p. 21, pl. 1, fig. 18.

Carapace  $1\frac{3}{4}$  as broad as long, antero-lateral margin rather strongly 4-lobate, 2 M completely divided, and all the areoles in high relief, but 1 L, 2 L, and 3 L forming a single areole, 6 L triangular in shape; whole surface strongly granulate. Legs not keeled, but knobbyly.

Length 3.5 mm., breadth 6.5 mm. (Odhner's figure). "Yellowish with red spots, legs red" (M. Edwards' text, on plate: uniform deep violet). Uniform crimson-red, finger and thumb of cheliped brown with whitish tips, dactyls of legs with distal one-third white, unguis brown (Delagoa Bay specimen).

*Localities*.—Durban (Odhner); Delagoa Bay (coll. van der Horst).

*Distribution*.—Seychelles, India, East Indies to Pacific.

*Remarks*.—Odhner remarks on the discrepancy in colour between Milne Edwards' text and his coloured figure. The former agrees with Alcock's *cariosus*, the latter is not very different from the present Delagoa Bay specimens, which have been in alcohol for about six months.

Gen. NEOLIOMERA Odhner

*Liomera* Dana, auctorum, part.

1925. Odhner, *l. c.*, p. 25 (genotype: *pubescens*) (key to species).

Like *Liomera*, but basal joint of ant. 2 embracing the lateral downward-projecting margin of the front, and thus entering the socket of ant. 1 (fig. 37, c).

Key to the South African [Mauritian] Species.

1. Areoles well developed. Hand of chela short,  $1\frac{1}{2}$  as long as broad . . . . . *sabaea*.
2. Areoles scarcely developed. Hand of chela rather long,  $2-2\frac{1}{2}$  as long as broad . . . . . [*pubescens*].\*

*Neoliomera sabaea* (Nob.)

Fig. 37, c.

1905. Nobili, Bull. Mus. Hist. Nat. Paris, xi, p. 403 (*Actaea s.*).

1906. *Id.*, Ann. Sci. Nat. Zool. (9), iv, p. 254, pl. 10, fig. 3 (*Actaea s.*).

1925. Odhner, *l. c.*, p. 31, pl. 2, fig. 11.

Carapace a trifle over  $1\frac{1}{2}$  as broad as long, with well-developed areoles separated by moderately deep smooth grooves, 1 M and 2-6 L distinctly separated, 2 M completely divided; whole carapace with scattered hairs, and densely granulate, the granules smaller on the hinder portion. Chelipeds and legs granulate, the granules on the former somewhat pointed or conical. Anterior margins of legs hairy, the hairs (as are those on carapace) somewhat thickened or clavate.

Length 12 mm., breadth 20 mm. Reddish, finger and thumb of cheliped brownish purple.

*Locality*.—Durban (Odhner).

*Distribution*.—Red Sea, Djibouti, Gulf of Aden, Moluccas.

*Remarks*.—I have seen only the one ♀ sent to and identified by Odhner.

Gen. XANTHIAS Rathbun

1852. Dana, Proc. Ac. Nat. Sci. Philad., vi, p. 75 (*Xanthodes*, preocc.).

1897. Rathbun, Proc. Biol. Soc. Wash., xi, p. 165.

1898. Alcock, *l. c.*, p. 156 (*Xanthodes*).

1925. Odhner, *l. c.*, p. 84.

1930. Rathbun, *l. c.*, p. 464.

1938. Balss, Medd. Göteb. Mus., lxxv, p. 47.

Fronto-orbital width greater than half maximum width of carapace. Basal joint of ant. 2 broad and short, but touching deflexed side-margin of front, flagellum subequal to or rather longer than orbit. Chelipeds equal or subequal, tips of finger and thumb pointed.

\* Figured by Odhner, *l. c.*

Abdomen ♂ with 3rd–5th segments fused or partially so. 2nd pleopod ♂ very short.

*Remarks.*—Odhner places *X. lividus* (M. Edw.), from Mauritius, in this genus.

*Key to the South African Species.*

- Antero-external angle of 4th joint of mxp. 3 quadrate.  
 Antero-lateral teeth of carapace obtuse . . . . *lamarckii*.  
 2. Antero-external angle of 4th joint of mxp. 3 produced  
 laterally. Antero-lateral teeth acute . . . . *tuberculidens*.

*Xanthias lamarckii* (M. Edw.)

Fig. 44, *g*, *h*.

1834. Milne Edwards, *Hist. Nat. Crust.*, i, p. 391 (*Xantho l.*).  
 1847. White, *Proc. Zool. Soc. Lond.*, xv, p. 225 (*Xantho cultrimanus*).  
 1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 789 (*Xanthodes l.*).  
 1884. Miers, *Zool. H.M.S. Alert Crust.*, p. 529 (*Xanthodes l.*).  
 1898. Alcock, *l. c.*, p. 157 (*Xanthodes l.*).  
 1925. Odhner, *l. c.*, p. 84.  
 1934. Boone, *Bull. Vanderbilt Mar. Mus.*, v, p. 131, pl. 70.

Anterior and antero-lateral portions of carapace granulate, the granules becoming very small or obsolete centrally and posteriorly; gastric-branchial groove, and 2 grooves across branchial region distinct, but the other grooves faint or more or less obsolescent; antero-lateral margin with 4 granulate obtuse teeth. Chelipeds equal, lower surface of 4th joint granulate, whole of wrist and hand except inner surfaces closely covered with pearly granules, outer surface of hand with 3 parallel furrows (granulate, not smooth). Legs with upper edge of 4th joint finely serrulate, of 5th and 6th joints granulate. Abdomen ♂ with 3rd–5th segments fused. 4th joint of mxp. 3 nearly smooth, antero-external angle quadrate, not produced.

Length 6.3 mm., breadth 10 mm. Yellowish white (Alcock: with bluish-green blotches), finger and thumb of cheliped blackish, the colour not extending on to hand.

*Locality.*—Mozambique Island (coll. K. H. B. 1912).

*Distribution.*—East coast of Africa, Mauritius, Amirante Is., Seychelles, Indo-Pacific.

*Remarks.*—The single specimen was identified by Odhner.



*Xanthias tuberculidens* Rathbun

Fig. 44, e, f.

? 1904. Doflein, D. Tiefsee Exp., vi, p. 101 (*Xantho* sp. juv.).

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 224, pl. 18, fig. 9.

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 26.

1925. *Id.*, l. c., p. 85.

Carapace conspicuously granulate, the granules becoming feebler in the central portion, where they are more like fine squamulae; regions better defined than in *lamarckii*; antero-lateral margin with 4 granulate and conspicuous acute teeth; frontal lobes very slightly convex; a noticeable tubercle near postero-lateral corner. Chelipeds unequal, as in *lamarckii*, but more strongly granulate, especially on wrist and hand, where the granules are more or less nodose, lower surface of hand rugulose. Legs with upper margin of 4th and 5th joints distinctly denticulate, a rather sharply demarcated apical tooth on 4th joint, and a truncate tooth proximally on 5th, outer surface of 5th and 6th granulate and pilose. 4th joint of mxp. 3 granulate, the antero-external angle laterally produced. Abdomen ♂ with 3rd-5th segments fused.

Length up to 17 mm., breadth 24 mm. Finger and thumb of cheliped blackish, the colour not extending on to hand.

*Localities.*—? Agulhas Bank, 102-155 metres (Doflein); St. Sebastian Bay, 72 metres (Odhner); False Bay and Agulhas Bank as far east as Algoa Bay, 23-100 fathoms (S. Afr. Mus.).

*Distribution.*—Saya de Malha, N.E. of Madagascar, 125 fathoms.

*Remarks.*—From the locality and depth it is highly probable that Doflein's specimens belong to this species, rather than to the littoral *Xantho exaratus* (*hydrophilus*).

Gen. ETISUS M. Edw.

1834. Milne Edwards, Hist. Nat. Crust., i, p. 410.

1851. Dana, Amer. J. Sci. (2), xii, p. 126 (*Etisodes*).

1910. Stebbing, l. c., p. 298.

1925. Odhner, l. c., p. 83.

1938. Balss, Medd. Göteb. Mus., lxxv, p. 43.

1941. Gordon, Proc. Linn. Soc. Lond., 153 Sess. pt. 1, p. 130.

1942. Ward, Mauritius Inst. Bull., ii, p. 89 (*Etisodes*) and p. 98 (*Etisus*).

Carapace broad, regions moderately well marked, front laminar and prominent, separated from supra-orbital margin by a notch, with median slit; antero-lateral margin with 4-8 lobes or spiniform projections. Basal joint of ant. 2 meeting front, its outer angle produced, flagellum excluded from orbit either by the produced lobe of basal joint, or by the meeting of the upper and lower inner orbital margins (fig. 45, c). Chelipeds strong, slightly unequal in ♂, tips of finger and thumb strongly spooned. Abdomen ♂ with 3rd-5th segments fused.

*Remarks.*—The only South African genus in the group *Hyperolissa* in which the flagellum of 2nd antenna is excluded from the orbit.

*Key to the South African Species.*

1. 7-8 unequal claw-like teeth on antero-lateral margin.  
Upper and lower inner orbital angles separated by the process of basal joint of ant. 2. Legs spiny . . . . [*dentatus*].
2. 4 teeth on antero-lateral margin.
  - a. Front nearly straight. Upper and lower inner orbital angles in contact. Cheliped smooth. Legs smooth, but setose . . . . . *laevimanus*.
  - b. Front 4-dentate. Upper and lower inner orbital angles not in contact. Chelipeds granulate, wrist and hand knobby on upper surface. Legs smooth, margins with shaggy fur . . . . . *electra*.

*E. dentatus* (Herbst) was included in Stebbing's Catalogue (p. 298) on a statement by Miers that it occurred in Natal. Its presence in South Africa has not been confirmed, but it is included in the key on the possibility that it may be found here. Ward (1942) records it from Chagos Archipelago.

*Etisus laevimanus* Randall

Fig. 45, c, d.

- \* 1839. Randall, J. Ac. Nat. Sci. Philad., p. 115.
- 1851. Bianconi, Spec. Zool. Mosambic, fasc. 5, p. 83, Crust., pl. 1, figs. 1, 1, a-b (*macrodactylus*).
- 1875. Paulson, Red Sea Crust., p. 29, pl. 5, figs. 4, 4, a-f (*sculptilis*).
- 1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 791 (synonymy).
- 1898. Alcock, l. c., p. 131 (references).
- 1902. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 262, fig. 57 (*Chlorodius espinosus*).

\* For note on date, see Laurie, J. Linn. Soc. Lond., xxxi, p. 425.

1934. Gordon, Res. Sci. Ind. orient. Néerl., iii, fasc. 15, p. 30, fig. 14, A, c (plp. 1 ♂).

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 121, pls. 64, 65.

1934. Balss, Faune Col. Franç., v, p. 508 (synonymy).

Gastric region well defined, anteriorly distinctly lobulated. Surface of carapace shagreened, microscopically granulate only on the frontal, orbital, and antero-lateral edges. Chelipeds smooth and unsculptured. Upper and lower margins of legs more or less setose, chiefly on upper margin of 4th joints and lower margins of 6th and 7th joints; upper margins of 5th-7th joints more or less granulate; dactyls with tooth at base of unguis, thus appearing bi-unguiculate, but more conspicuous on last two than on first two legs.

Length up to 32 mm., breadth 50 mm. Brownish or reddish, often somewhat mottled, finger and thumb of cheliped black, the colour more or less continued on to palm.

*Localities.*—Mozambique (Bianconi); Inhambane (Hilgendorf); Delagoa Bay (S. Afr. Mus., Lourenzo Marques Mus., and coll. van der Horst).

*Distribution.*—Mauritius; Réunion; east coast of Africa; Red Sea; Indo-Pacific.

*Remarks.*—At first sight very like *Xantho hydrophilus*, but distinguished by the smoother carapace, the smooth chelipeds, 1st pleopod ♂, and of course the exclusion of flagellum of antenna 2 from the orbit; also the dark colour of thumb extends on to palm.

*Etisus electra* (Herbst)

Fig. 45, a, b.

— Herbst, Krabben, III, ii, pp. 34, 36, pl. 51, fig. 6 (quoted from Alcock).

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 34 (*Chlorodius dentifrons*).

1875. Paulson, Red Sea Crust., p. 27, pl. 5, figs. 3, 3, a, b (*Actaeodes frontalis*).

1884. Miers, Zool. H.M.S. *Alert* Crust., pp. 217, 532 (*Etisodes e.*).

1898. Alcock, *l. c.*, p. 133 (*Etisodes e.*).

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 51, pl. 6, fig. 5 (*Chlorodius dentifrons*), and footnote by editor.

1925. Odhner, *l. c.*, p. 83.

1938. Balss, Medd. Göteb. Mus., lxxv, p. 44.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 158, fig. 41, A (plp. 1 ♂).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 364.

Gastric and other regions well defined. Surface of carapace granulose-rugulose, more distinctly granulate on frontal lobes and antero-lateral margins; 2 M, 2 L, and 3 L with larger but low warts

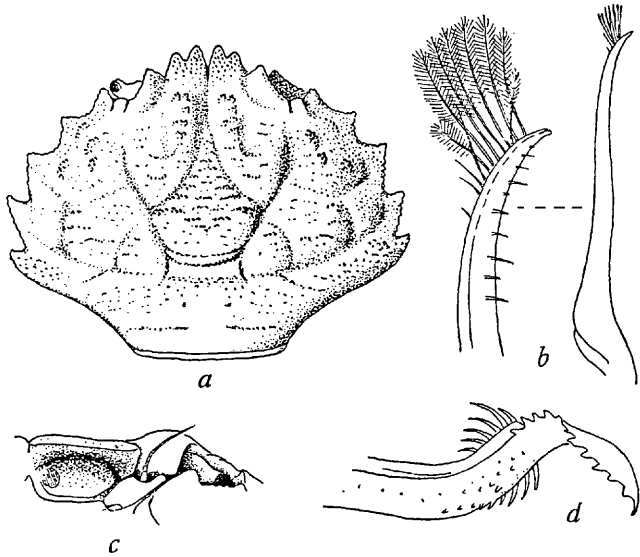


FIG. 45.—*Etisus electra* (Herbst). *a*, carapace. *b*, 1st pleopod ♂, with apex further enlarged.  
*Etisus laevimanus* Randall. *c*, ventral view of front, 1st antenna removed, flagellum of 2nd antenna excluded from orbit. *d*, apex of 1st pleopod ♂.

each composed of several granules. Chelipeds with upper margins of wrist and hand knobby, upper and outer surfaces distinctly granulate. Upper and lower margins of legs with thick fringe of shaggy hairs, upper edges of 4th–7th joints granulate.

Length up to 15 mm., breadth 20 mm.

*Locality*.—Delagoa Bay (coll. van der Horst).

*Distribution*.—Mauritius, Seychelles, Red Sea, Indo-Pacific.

*Remarks*.—Our specimens correspond excellently with Stimpson's description and figure of his *dentifrons*. They also correspond with Paulson's figure of *A. frontalis*, but not so well with his figure of *E. sculptilis* Heller as regards the frontal margin. Neither Miers nor Alcock quote Paulson.

It would appear that this is a species in which the shape of the

frontal margin is somewhat variable; in fact it might be considered a variety of *anaglyptus* (M. Edw.) (*cf.* Balss, *l. c.*, p. 43).

*Key to the South African Genera of Hyperomerista.*

- I. Flagellum of ant. 2 not excluded from orbit (fig. 47, *h*).
  - A. Chelipeds shorter and more slender than the legs . *Lybia*.
  - B. Chelipeds longer and stouter than the legs.
    - 1. Fronto-orbital border half or less than half width of carapace.
      - a.* Basal joint of ant. 2 not touching the front.
        - i. Carapace oval, antero-lateral margin more or less sharply defined.
          - α.* Carapace smooth, regions ill-defined.
            - \* Front, on either side of median notch, cut into 2, or 3 lobules.
              - † Distal margin of 4th joint of 3rd maxilliped nearly straight . } *Menippe* and subgen. *Myomenippe*.
              - †† Distal margin of 4th joint of mxp. 3 notched . *Pseudozius*.
            - \*\* Front, on either side of median notch, entire (fig. 47, *a*) . *Sphaerozius*.
          - β.* Carapace with regions well defined. Antero-lateral margin continued inwards as a ridge across branchial region (dorsally) . . . . *Pilumnoides*.
        - ii. Carapace subhexagonal, antero-lateral margin rounded, not defined . . . . *Dairoides*.
      - b.* Basal joint of ant. 2 touching front . *Epixanthus*.
    - 2. Fronto-orbital border exceeding half width of carapace.
      - a.* Carapace glabrous, regions ill-defined. Basal joint of ant. 2 not touching front . . . . *Eurycarcinus*
      - b.* Carapace more or less pilose or hairy, regions more or less well marked. Basal joint of ant. 2 touching (or almost) front.

- i. Antero-lateral margin with 4 large dentiform spines (incl. outer orbital angle).
    - a. Front with 2 large and 2 small lobes. Chelipeds not very unequal . . . *Pilumnus*.
    - β. Front without the small lobes (or with only very feeble ones). Chelipeds very unequal . . . *Parapilumnus*.
  - ii. Antero-lateral margin with blunt lobes . . . *Actumnus*.
- II. Flagellum of ant. 2 excluded from orbit, either by a process of basal joint of ant. 2 and/or the meeting of the upper and lower inner orbital angles.
- A. Tips of finger and thumb of cheliped spooned. Anterior margin of 4th joint of mxp. 3 deeply notched . . . [*Daira*].\*
  - B. Tips of finger and thumb pointed. Anterior margin of 4th joint of mxp. 3 not notched.
    - 1. Fronto-orbital width about  $\frac{2}{3}$  width of carapace. Front denticulate (fig. 51) . . . *Eriphia*.
    - 2. Fronto-orbital width nearly equal to width of carapace, which is subquadrilateral or subhexagonal, smooth, and polished (fig. 52, a, c, e).
      - a. Front shallowly lobed . . . *Trapezia*.
      - b. Front finely denticulate . . . *Tetralia*.
      - c. Front acutely 4-dentate . . . *Quadrella*.

*Eurüppellia* (or *Lydia*) *annulipes* (M. Edw.) is recorded, as *Euxanthus rugulosus*, by Heller from the Cape (Stebbing, *l. c.*, p. 297). Odhner (1925, *l. c.*, p. 85) doubts the locality, as *E. annulipes* is an inhabitant of coral-reefs. "The Cape" does not necessarily mean the south-west corner of South Africa (see Introduction, p. 2), but the species has not been recorded again from Natal or any other part of South Africa.

*Menippe rumphii* is a well-known Indian and East Indian species, which, however, has not yet been recorded from South Africa. A specimen in the South African Museum measures 45 × 65 mm. But see Addenda.

#### Gen. LYBIA M. Edw.†

1827. Berthold in Latreille, *Fam. Thierr*, pp. 255, 584 (*Melia*, nom. preocc. Risso, 1813).

\* Mauritius. For figure see Boone, 1934, *Bull. Vanderbilt Mar. Mus.*, v, p. 129, pl. 69.

† Not to be confused with *Lydia* Gistel, = *Eurüppellia*, another Xanthid genus.

1834. Milne Edwards, *Hist. Nat. Crust.*, i, p. 431, footnote, pl. 18, and explanation, p. 16.

1898 and 1899. Alcock, *l. c.*, p. 230 (*Melia*), *Illustrat. Zool. "Investigator," Crust.*, pl. 38, figs. 4, 5.

1934. Balss, *Faune Col. Franç.*, v, p. 519.

Carapace rather depressed, hexagonal, regions not strongly defined; fronto-orbital width about  $\frac{3}{4}$  maximum width of carapace, front nearly straight, orbits shallow. Basal joint of ant. 2 scarcely reaching front, flagellum rather long. Chelipeds slender, shorter than walking legs, which are strong, 3rd pair longest; chela slender, finger and thumb with sharp denticles on inner edges for holding the sea-anemones which usually mask the hand. First 2 or 3 segments of abdomen visible dorsally; in ♂ 3rd-5th segments fused.

*Remarks.*—This Indo-Pacific genus contains about 4 species, including the new one here described. They live amongst corals, and carry a small sea-anemone in each chela; these they hold up in front of them, seemingly as a protection (whence the popular name of Boxing-crab); but the anemone may disable small animals, which the crab thereupon appropriates for its own food.

*Key to the South African [Mauritian] Species.*

1. Carapace with a single sharp denticle on antero-lateral margin; almost glabrous; red lines forming a polygonal tessellated pattern. Legs ringed. Flagellum of ant. 2 glabrous . . . . . [*tessellata*].
2. Carapace with lobate antero-lateral margin, more or less covered with shaggy (plumose) hairs. Flagellum of ant. 2 setose.
  - a. Carapace sparsely furred, with black lines and ocelli . . . . . *leptochelis*.
  - b. Carapace densely furred, without colour pattern . . . *plumosa*.

*Lybia tessellata* (Latr.)

Fig. 46, a, b.

1834. Milne Edwards, *l. c.*, p. 431, pl. 18, figs. 8, 9 (*M. tressellata*, *sic* typ. err. after Latreille).

1880. Richters, *Beitr. Meeresf. Mauritius, Seych.*, p. 150, pl. 16, figs. 19-22.

1902. Borradaile, *F. Geogr. Mald. Laccad. Archip.*, i, p. 250, fig. 49.

1906. Rathbun, Bull. U.S. Fish. Comm. for 1903, pt. 3, p. 866  
(colour var.).

1911. *Id.*, Trans. Linn. Soc. Lond., xiv, p. 236.

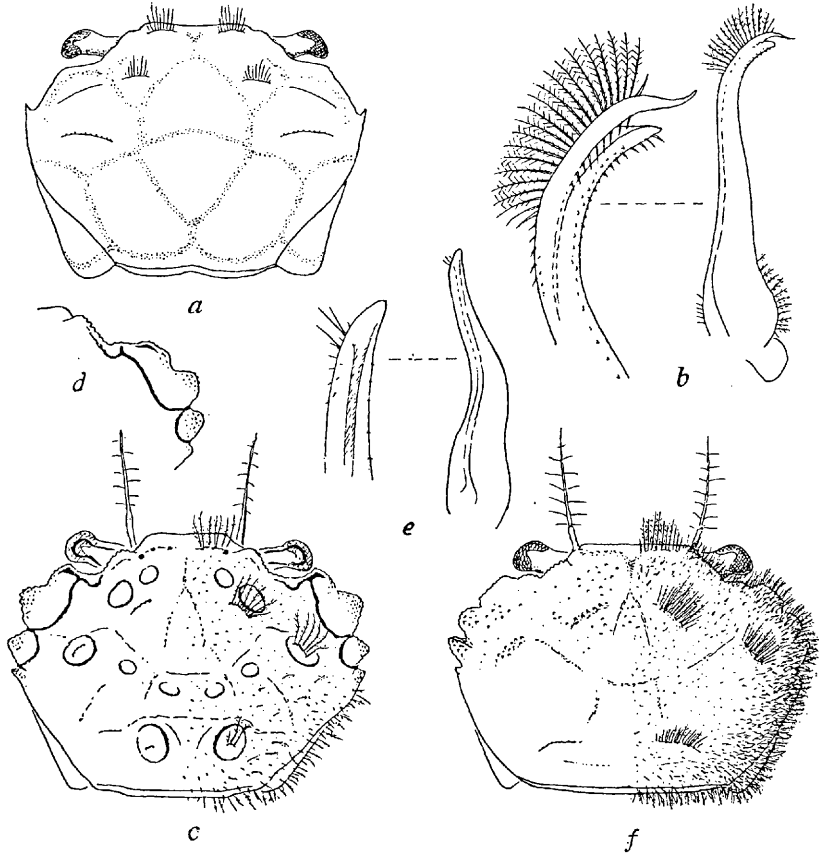


FIG. 46.—*Lybia tessellata* (Latr.). *a*, carapace ♂, Mauritius; dotted bands indicate the colour pattern. *b*, 1st pleopod ♂, with apex further enlarged. *Lybia leptochelis* (Zehntner). *c*, carapace ♀. *d*, antero-lateral portion of carapace ♂. *e*, 1st pleopod ♂, with apex further enlarged. *Lybia plumosa* Brnd. *f*, carapace ♀.

Carapace almost glabrous, broader than long, antero-lateral margin with one sharp denticle, regions very obscurely marked; 2 weak transverse ridges across hepatic region, the hinder one minutely setulose; a ridge bearing a fringe of plumose setae on either side of the gastric region, and a similar ridge, medianly interrupted, behind the frontal margin. Flagellum of ant. 2 non-setose. Hand of



cheliped with long stiff setae. Legs with long setae and bristles. Abdomen ♂ narrowest at junction of 5th and 6th segments; 6th and 7th segments broader than long, 6th widening slightly distally, 7th subcircular.

Length 10 mm., breadth 14 mm. Creamy, with narrow orange or reddish bands forming polygonal patterns on carapace; abdomen with a longitudinal line on each side of segments 1-4, a transverse line on base of 6th, and a curved line on 7th segment; legs banded with narrow lines.

*Distribution.*—Mauritius, Seychelles, Hawaiian Is. Although not yet found in South Africa, this species is included for comparison with the following two species.

*Lybia leptochelis* (Zehntner)

Fig. 46, *c-e*.

1894. Zehntner, *Rev. Suisse Zool.*, ii, p. 174, pl. 7, fig. 9 (*Ceratoplax l.*).

1898. Alcock, *l. c.*, p. 231 (*Melia pugil*).

1899. *Id.*, *Illustr. Zool. "Investigator," Crust.*, pl. 38, fig. 5 (*Melia pugil*).

1911. Rathbun, *Trans. Linn. Soc. Lond.*, xiv, p. 236 (*pugil*).

1934. Balss, *l. c.*, p. 519.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 364.

Carapace broader than long, with the regions fairly well marked, more or less tuberculous, tubercles tipped with 1-3 plumose setae, the two most conspicuous ones with tufts of plumose setae; minutely granulate near and on antero-lateral margin, postero-lateral and hind margins more or less setose (plumose setae); antero-lateral margin with 3 lobes, 1st small and more or less confluent with the much larger triangular 2nd, 3rd triangular, rounded in ♂, almost dentiform in ♀, behind which a small denticle or granulate projection. Flagellum of ant. 2 setose. Chelipeds and legs sparsely covered with plumose setae, setae more numerous on the hinder legs. Bases of legs, and also abdomen setose.

Length, ♂ 5.5 mm., ♀ 4 mm., breadth, ♂ 7.25 mm., ♀ 5.5 mm. (Alcock: 5 × 7 mm.). Pale buff, rather dirty or greyish over most of carapace except the centres of the ocelli, antero-lateral lobes clear with a pinkish tinge, black lines (more distinct in ♀ than in ♂) along lobes and around ocelli, on eyes, proximal third of flagellum of ant. 2, mandibles, epistome, and pterygostomial region.

*Locality*.—Inyack Is., Delagoa Bay (coll. van der Horst, 1 ♂, 1 non-ovig. ♀, with anemone in each claw).

*Distribution*.—Ceylon, 26 fathoms; Seychelles, 34–47 fathoms; Madagascar.

*Lybia plumosa* Brnrd.

Fig. 46, *f*.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 364.

♀. Carapace broader than long, regions faintly defined, covered with a tomentum, which towards and around the margins is composed of longish plumose setae, giving a shaggy or matted appearance; antero-lateral margin with 3 lobes, the 1st broad and flattened, the 2nd semicircular, the 3rd bluntly dentiform, behind the latter a small denticle; supra-orbital margin finely denticulate, antero-lateral margin less noticeably so; a transverse ridge behind the frontal margin, notched in middle with fringe of long plumose setae; a similar fringed ridge on antero-lateral part of gastric region (proto-gastric), another on the antero-branchial region, and another posteriorly on either side of the cardiac-intestinal region; numerous minute granules, especially on the antero-lateral lobes and anterior regions. Flagellum of ant. 2 setose. Cheliped with shaggy plumose setae except on finger and thumb (a sea-anemone in each chela). Legs thickly covered with shaggy plumose setae. Bases of legs and the abdomen thickly furry.

Length 6.5 mm., breadth 9 mm. Dirty pale buff, without any markings, with brown fur.

*Locality*.—Umtwalumi, Natal (coll. T. A. Stephenson, 1 non-ovig. ♀).

*Remarks*.—Resembles the Indian species *caestifer* (Alck.) and *leptochelis* (Zehntner) in the setose antennae and the lobate antero-lateral margin, but differs in the relative shapes and sizes of the lobes, the less defined and non-areolated regions of the carapace, and the denser furry covering on the carapace and legs.

Gen. PSEUDOZIUS Dana

1898. Alcock, J. Asiat. Soc. Bengal, lxxvii, p. 180.

1902. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 241.

1939. Ward, Amer. Mus. Novit., no. 1049, p. 10.

Carapace transversely oval, very nearly flat or feebly convex, regions not demarcated, antero-lateral border shorter than postero-lateral, obtusely divided into 4 very shallow lobes. Front rather

broad, more than  $\frac{1}{4}$  greatest breadth, separated by a notch from the orbit, shallowly 4-lobed. Orbit almost entire, the upper and lower inner angles with only a narrow cleft between them. Basal joint of ant. 2 short, next joint reaching front, flagellum lodged in a notch between front and orbital wall (Alcock says it is excluded from orbit, but it can fold into the cleft between inner orbital angles). Distal margin of 4th joint of mxp. 3 notched. Chelipeds robust, unequal, tips of finger and thumb pointed. Abdomen of ♂ with 7 distinct segments. Pleopod 2 ♂ short.

*Pseudozius caystrus* (Ad. & White)

Fig. 47, *j-l*.

1848. Adams and White, Voy. "Samarang," Crust., p. 42, pl. 9, fig. 2.

1898. Alcock, *l. c.*, p. 181 (references).

1902. de Man, Abh. Senckenb. Ges., xxv, p. 627.

1902. Borradaile, *l. c.*, p. 241.

1906. Rathbun, Bull. U.S. Fish. Comm. for 1903, p. 861.

1911. *Id.*, Trans. Linn. Soc. Lond. (2), xiv, p. 227.

1942. Ward, Mauritius Inst. Bull., ii, p. 95.

Carapace length a little more than  $\frac{1}{2}$  the breadth, front  $3\frac{1}{2}$  times in greatest breadth; fronto-orbital width  $\frac{1}{2}$  breadth of carapace; smooth, almost flat behind the deflexed and rather coarsely punctate fronto-orbital region; antero-lateral border fairly sharp on the last 3 lobes, but obsolete on the 1st (external to orbit). Chelipeds smooth to the naked eye, but sparsely pitted, inner angle of wrist with 2 tubercles, finger and thumb of larger chela ♂ meeting only at tips. Legs smooth, with a few longish marginal setae on 4th (hind margin), 5th, and 6th joints, dactyls furry. Pleopod 1 ♂, fig. 47, *l*.

Length 11.5 mm., breadth 19 mm. Dark blackish brown, somewhat castaneous posteriorly with dark vermiculate markings, 2 pale dots on each antero-branchial region, chelipeds blackish above, castaneous below, finger and thumb black, the black colour not extending on to palm, legs castaneous, setae golden.

*Locality*.—Port St. Johns (S. Afr. Mus.).

*Distribution*.—Mauritius, Indo-Pacific.

Gen. SPHAEROZIUS Stimpson

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 35.

1886. Miers, Rep. H.M.S. *Challenger*, xvii, p. 144.

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 62.

1932. Balss, Zeitsch. wiss. Zool., cxlii, p. 512.

Carapace transversely oval, convex; regions, except the gastric, feebly defined; front rather prominent, bilobed, each lobe separated by a very feeble notch from the inner supra-orbital tooth; antero-lateral margin with 4 teeth. Basal joint of ant. 2 not nearly reaching front. Chelipeds stout, unequal, tips of finger and thumb pointed. Abdomen ♂ broad, with all 7 segments distinct. Pleopod 2 ♂ elongate.

*Sphaerozius nitidus* Stimpson

Fig. 47, *a-d*.

1858. Stimpson, *l. c.*, p. 35 (juvenile).

1886. Miers, *l. c.*, p. 144, pl. 12, figs. 4, 4, *a-c*.

1893. Rathbun, Proc. U.S. Nat. Mus., xvi, p. 239 (*Menippe convexa*).

1899. de Man, Notes Leyden Mus., xxi, p. 60, pl. 5, figs. 2, 2, *a-d* (*M. ortmanni*).

1906. Rathbun, Bull. U.S. Fish. Comm. for 1903, pt. 3, p. 861, pl. xi, fig. 4 (*M. convexa*).

1907. Stimpson (ed. Rathbun), *l. c.*, p. 62, pl. 7, figs. 5, 5, *a* (juvenile).

1910. Rathbun, Mem. Ac. R. Sci. Denmark, ser. 7, v, p. 354, fig. 38 (*M. convexa*).

1913. de Man, Bull. Mus. d'Hist. Nat. Paris, p. 12, pl. 1 (♂ abd.) (*M. ortmanni* = *convexa*).

1913. Klunzinger, Nov. Act. K. Leop. Carol. Ak., xcix, p. 285, pl. 7, fig. 9.

1922. Balss, Arch. Naturg., lxxxviii, p. 115.

1934. *Id.*, Faune Col. Franç., v, p. 517 (synonymy).

1936. Shen, Contr. Inst. Zool. Ac. Peiping, iii, p. 62, figs. 1, *a, b* (*M. convexa*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 364.

Carapace strongly convex longitudinally, especially anteriorly, less convex transversely, length a little more than  $\frac{2}{3}$  width, smooth, shagreened, the median groove in front of gastric region distinct, with a very indistinct convexity on either side of it, other regions not marked; front prominent, deflexed, minutely granulate, lobes oblique, without demarcated lateral lobes, but separated from inner supra-orbital angle; antero-lateral teeth not prominent, bluntly rimmed, the last one continued backwards as a distinct (rounded) ridge;

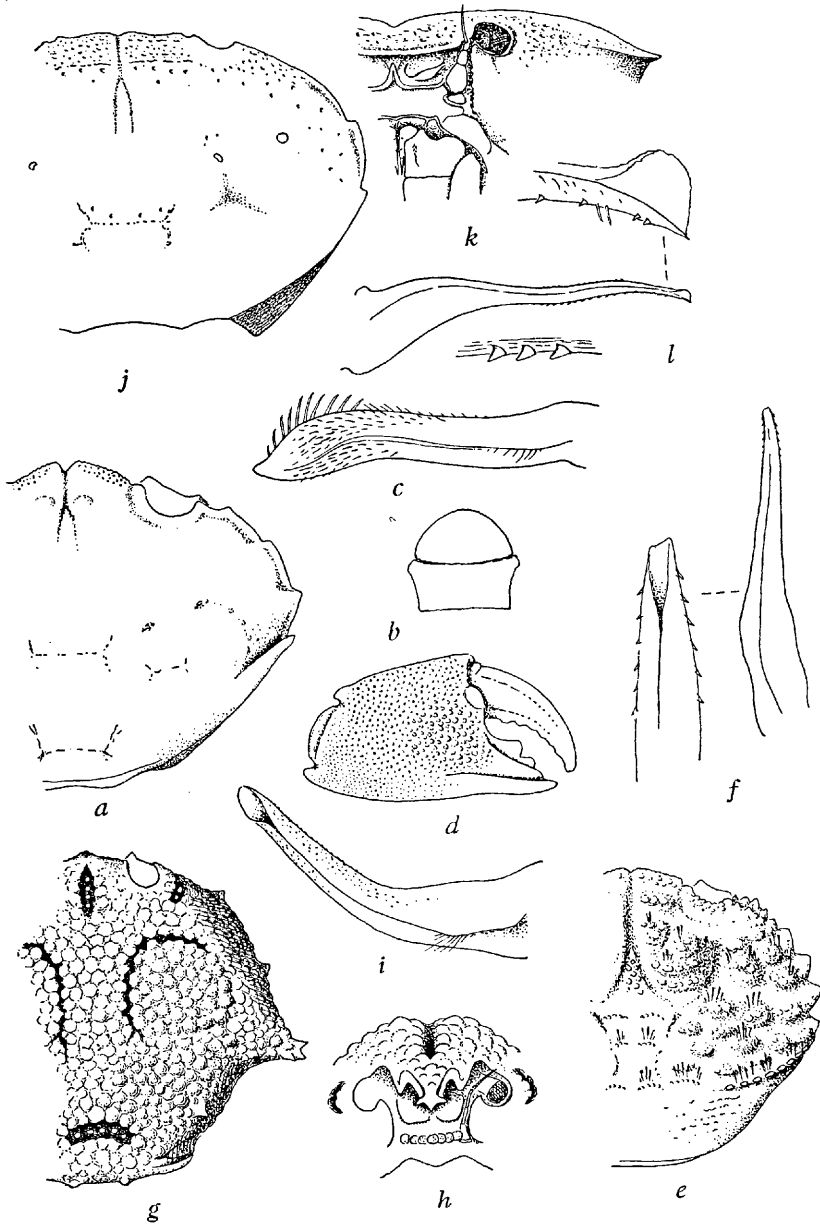


FIG. 47.—*Sphaerozoius nitidus* Stimpson. *a*, carapace. *b*, 6th and 7th abdominal segments ♂. *c*, 1st pleopod ♂. *d*, outer view of chela. *Pilmnoides perlatus* (Poeppig). *e*, carapace. *f*, 1st pleopod ♂, with apex further enlarged. *Dairoides margaritatus* Stebb. *g*, carapace. *h*, frontal view. *i*, 1st pleopod ♂. *Pseudozoius caystrus* (Ad. & White). *j*, carapace. *k*, ventral view of front, with mxp. 3. *l*, 1st pleopod ♂, with apex further enlarged.

grooves in orbit not present, but upper and lower orbital teeth separated by a shallow notch. Inner upper angle of wrist of chelipeds and inner basal margin of hand of larger cheliped bluntly prominent; upper and outer surfaces of hand of both chelipeds closely and finely granulate; proximal tooth on thumb of larger cheliped large, a marked groove from near tip of thumb parallel with lower margin in both chelipeds. Legs with distal joints setose. Pleopod 1 ♂ stout (apex sometimes blunter than in figure); pleopod 2 slender, longer than pleopod 1, doubled up apically.

Length up to ♂ 16, ♀ 19 mm., breadth ♂ 21, ♀ 26 mm. Reddish or brownish salmon, more or less mottled, the mottling formed of tiny dots, or closely dotted all over carapace; chelipeds, legs, and abdomen also dotted, sternum uniform pale creamy, finger and thumb of chelipeds dark brown, colour not extending on to palm (K. H. B.). Yellow with minute purple dots on carapace and chelipeds (Miers).

*Locality*.—Delagoa Bay (coll. K. H. B. 1912, and van der Horst, 1939).

*Distribution*.—Red Sea, Madagascar, Borneo, Siam, China, Japan, Hawaii.

*Remarks*.—Two specimens have been compared with the type of *convexa* by Dr. Waldo L. Schmitt, to whom my thanks are given. The antero-lateral teeth are slightly more prominent than in the type.

*Menippe (Myomenippe) fornasinii* (Bianconi) (1851, Spec. Zool. Mosambic, p. 84, Crust., pl. 2, figs. 1, 1, a-c) is recorded from Ibo, Portuguese East Africa, by Hilgendorf (1878, MB. Ak. Wiss. Berlin, p. 795). It closely resembles *S. nitidus*, but has each of the frontal lobes cut into 3 lobules (see also de Man, 1899, Notes Leyden Mus., xxi, p. 57, pl. 7, fig. 1).

#### Gen. PILUMNOIDES M. Edw. & Lucas

1843. Milne Edwards and Lucas, d'Orbigny Voy. Amer. Merid., vi, p. 21.

1930. Rathbun, Bull. U.S. Nat. Mus., no. 152, p. 534.

Carapace convex, ovoid or subcircular, regions well marked, fronto-orbital width about half width of carapace, front bilobed, antero-lateral margin prolonged inwards and backwards by a small crest behind the last tooth. Endostomial ridges (in buccal cavity) moderately distinct. Chelipeds subequal, stout, tips of finger and thumb pointed. Abdomen with 7 distinct segments. Pleopod 2 ♂ short.

*Remarks*.—Pacific and Atlantic coasts of South America. The

species mentioned below has been recorded from England, and its presence in South Africa may possibly also be due to accidental transportation.

*Pilumnoides perlatus* (Poëppig)

Fig. 47, e, f.

1910. Rathbun, Proc. U.S. Nat. Mus., xxxviii, p. 544, pl. 50, fig. 2.

1930. *Id.*, l. c., p. 535, pl. 216, pl. 217, fig. 3, pl. 218, fig. 3 (references).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 364.

Soft hairs, singly or in small tufts, scattered over surface of carapace. The continuation of the antero-lateral margin across the branchial region almost transverse. Carapace with tubercles more or less forming short transverse ridges or bosses, posterior third nearly smooth medianly. Antero-lateral margin with 5-6 irregular teeth. Chelipeds tuberculate, inner upper edge of hand with 3 large almost dentiform (but blunt) tubercles; on lower half of outer surface of hand (both chelipeds) the tubercles form 3 longitudinal lines, the lower 2 of which are continued as ridges on to the thumb.

Length up to ♀ 26 mm., breadth 36 mm. Smallest ovig. ♀ 15 × 19 mm. Salmon or orange-red, finger and thumb of chelipeds black, the colour not extending on to palm.

*Localities.*—Bottom of S.A.T.S. *Gen. Botha* in dry-dock Simonstown, June 1933, after lying in Simon's Bay for 4 years (K. H. B. 3 juv.); whaler *Spilla* in dry-dock Cape Town, March 1934, after lying in Saldanha Bay for 3 years (K. H. B. 1 juv.); s.s. *Agnar*, Cape Town, July 1934, after lying in Table Bay for 2 years (K. H. B. 1 juv.); Oudekraal, west coast of Cape Peninsula (some 7 miles from Table Bay), July 1934 (coll. T. A. Stephenson, 1 ♂); Port Nolloth, 1935 (coll. T. A. Stephenson, 1 ♀); Lambert's Bay and Paternoster, 1938 (coll. T. A. Stephenson, ♂♂ and ovig. ♀♀).

*Distribution.*—Panama to Chile. Specimens, evidently transported by ships, have been recorded from Queenstown, Ireland, and Plymouth, England.

*Remarks.*—Whether the occurrence of this species in South Africa was originally due to accidental transportation cannot be proved, but it certainly breeds freely, and would probably be found to be quite common if more collecting were done. No specimens were taken by the s.s. *Pieter Faure*. The collections of later Fishery Survey vessels have not been fully examined as yet.

Gen. *DAIROIDES* Stebb.

1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 233.

Endostomial ridges extending to anterior border of buccal cavity. Carapace hexagonal, convex; outer layer with perforate and vesicular tubercles covering entire upper surface except for several narrow fissures, through which the inner layer is visible; surface lumpy but regions obliterated by the granules; front deflexed, narrow tridentate, almost rostriform, separated by deep notches from inner upper orbital angles, inner lower orbital tooth prominent; antero-lateral margin rounded; orbits subcircular. Basal joint of ant. 2 small, separated from front by basal joint of ant. 1, flagellum short. 4th joint of mxp. 3 strongly toothed on outside of base of 5th joint, but with straight anterior margin (not notched as in *Daira*). Chelipeds unequal, tips of finger and thumb pointed, bluntly so in the larger, acutely in the smaller cheliped. Legs slender, spinosely tuberculate, dactyls felted. Abdomen ♂ with 7 distinct segments. Pleopod 2 ♂ longer than pleopod 1, very slender.

*Dairoides margaritatus* Stebb.

Fig. 47, *g-i*.

1920. Stebbing, *l. c.*, p. 234, pl. 18 (*Crust.*, pl. 98).

Length of carapace (in dorsal view)  $\frac{3}{4}$  maximum width, fronto-orbital width  $\frac{1}{3}$  maximum width; inner upper and lower orbital angles and the 3 points of the front sharply conical in a 27 mm. long specimen, but blunted in one 33 mm. long (both ♂♂); whole upper surface covered with large rounded vesicular granules or tubercles except for the fissures, which are as follows: one medio-longitudinal near the front, one lateral and external to the orbit, a crescentic pair situated more or less in the position of the gastro-branchial grooves, one transverse between 1 P and 2 P, one crescentic on the upper pterygostomial region; through these fissures the inner layer of the carapace is visible, from which arise tabulate or mushroom-like tubercles. Similar tabulate tubercles are present on the eye-stalks, basal joint of ant. 1, epistome, mxp. 3, ventral surface of carapace, and on the chelipeds and legs; on the wrist and hand of the chelipeds may be observed how the tabulate tubercles coalesce and gradually pass into the vesicular tubercles, eventually concealing the inner layer of the integument. The short felt, which completely covers the dactyls of the legs (except the ungues), is present also as a ring around



the distal ends of the 6th joints, and is continued as a narrow band along under side of 6th joint, about half-way on 2nd and 3rd legs, about one-third on 4th leg (only the distal ring is present on 6th joint of 5th leg). Pleopods 1 and 2 ♂ as figured for *Daira perlata* by Gordon (1934, Res. Sci. Ind. or. Néerl., iii, fasc. 15, p. 50, fig. 27).

Length up to 33 mm., breadth 42 mm. Uniform pale pinkish, finger and thumb of chelipeds slightly darker (as preserved).

*Localities.*—Durnford Point, Zululand, 90 fathoms (Stebbing; also another not seen by Stebbing, 33 mm. in length); coast of Portuguese East Africa (S. Afr. Mus.). All three specimens are ♂♂.

Gen. EPIXANTHUS Heller

1910. Stebbing, *l. c.*, p. 301.

Carapace transversely oval, flat or moderately convex, regions very obscurely marked; antero-lateral border with a thin sharp edge, regularly fissured or dentate; fronto-orbital margin not exceeding half width of carapace, 4-lobed, separated from orbital margin by a notch. Orbits subcircular. Anterior margin of buccal cavity with a deep narrow (efferent) notch. Basal joint of ant. 2 broad and short, in contact with front, flagellum very short. Chelipeds strong, unequal, finger of smaller cheliped markedly slender, tips of finger and thumb pointed. Abdomen ♂ with distinct segments. Pleopod 2 ♂ elongate.

*Epixanthus frontalis* (M. Edw.)

Fig. 48, *a, b.*

1891. de Man, Notes Leyden Mus., xiii, pp. 14–17, pl. 2, fig. 4.

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 60, pl. 7, fig. 4 (*Ozius f.*).

1910. Stebbing, *l. c.*, p. 301.

1921. *Id.*, Ann. S. Afr. Mus., xviii, p. 456 (*Galene natalensis*, non Krauss).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 365.

Carapace nearly flat, nearly smooth, shagreened or microscopically granulate, antero-lateral margin divided by 4 narrow and shallow fissures into 4 very shallow lobes; front double-edged. Chelipeds and legs smooth; upper edges of 6th joints and whole of dactyls with short stiffish fur.

Length up to 40 mm., breadth 62 mm. Brownish, finger and thumb of chelipeds usually darker.

*Localities.*—Natal Point (=Durban) (Krauss); Delagoa Bay (Stebbing, as *Galene natalensis*; coll. K. H. B., and Lourenzo Marques Mus.).

*Distribution.*—Mauritius, Indo-Pacific.

*Remarks.*—In the small (breadth 30 mm.) Delagoa Bay specimens there are only 3 antero-lateral lobes, the hindermost (4th) being not

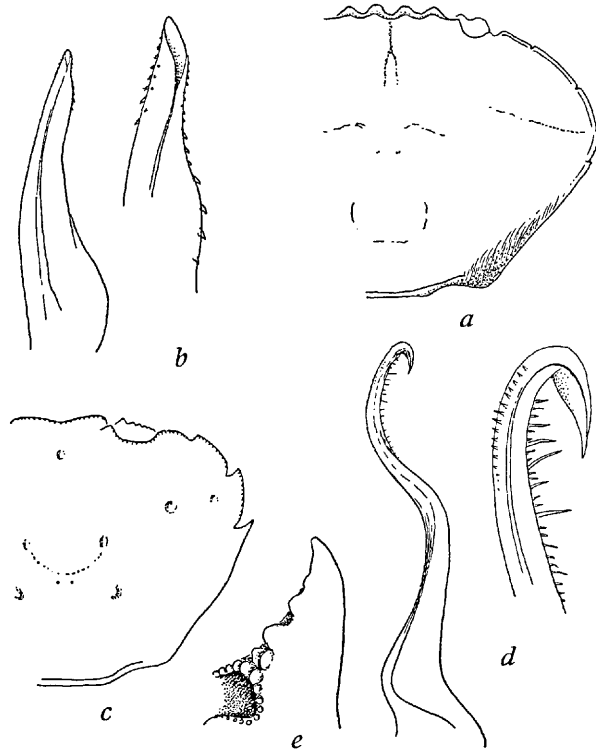


FIG. 48.—*Epixanthus frontalis* (M. Edw.). *a*, carapace. *b*, 1st pleopod ♂, with apex further enlarged (from a specimen 25 mm. in width). *Eurycarcinus natalensis* (Krauss). *c*, carapace. *d*, 1st pleopod ♂, with apex further enlarged. *e*, thumb of larger cheliped, finger removed from socket.

developed or only indicated. The epibranchial beaded line which runs to the 3rd lobe varies in distinctness both in the small specimens and in large Mauritian ones.

#### Gen. EURYCARCINUS M. Edw.

1867. Milne Edwards, Ann. Soc. entom. Fr. (4), vii, p. 276.

1887. de Man, J. Linn. Soc. Lond., xxii, p. 43.

1910. Stebbing, *l. c.*, p. 302.

1921. *Id.*, Ann. S. Afr. Mus., xviii, p. 456 (*Galene*).

Carapace transversely oval, smooth, regions not defined, front moderately broad, nearly straight, antero-lateral margin with 3 notches. Basal joint of ant. 2 short, not reaching front. Chelipeds unequal, tips of finger and thumb pointed. Abdomen ♂ with 7 distinct segments. Pleopod 2 ♂ ?.

*Remarks.*—Stebbing (1921) said he could find no reasons for replacing *Galene* by the much later *Eurycarcinus*. *Galene* de Haan, however, belongs to the *Hyperolissa* group and, moreover, has a subquadrilateral carapace.

The specimen described by de Man (*l. c.*, p. 44, pl. 2, figs. 2 and 3 [not 4 and 5]) does not appear from the figure to be the same as *Pilumnopus maculatus* M. Edw.; compare the direction of the 2nd antero-lateral tooth.

*Eurycarcinus natalensis* (Krauss)

Fig. 48, *c-e*.

1843. Krauss, Südafrik. Crust., p. 31, pl. 1, figs. 4, 4, *a-d* (*Galene n.*).

1867. Milne Edwards, *l. c.*, p. 277 (*grandidieri*).

1868. *Id.*, Nouv. Arch. Mus. Paris, iv, p. 80, pl. 19, figs. 13-16 (*grandidieri*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 792.

1894. Ortmann, Semon's Austral. Reise, v, p. 49 (references).

1898. Alcock, *l. c.*, p. 211 (*grandidieri*).

1910. Stebbing, *l. c.*, p. 302.

1917. *Id.*, Ann. Durban Mus., i, p. 436, and ii, p. 7, footnote.

[Not Stebbing, 1921, = *Epixanthus frontalis*.]

Front with median emargination, and separated from inner upper orbital angle by a notch; antero-lateral margin with 3 notches; 1st lobe continuous with outer orbital angle, gently rounded, 2nd flat (the lobes of the two sides *converging* anteriorly), 3rd and 4th lobes acutely pointed; fronto-orbital and antero-lateral margin beaded, lower orbital margin more strongly granulate; a shallow pit in each branchio-cardiac groove, and 2 on each branchio-hepatic region, more or less conspicuous. Chelipeds smooth, thumb of larger cheliped with 2 pairs of blunt teeth (4 in a double row) near base followed by a larger tooth, this again by a smaller one (M. Edwards' figure is better than Krauss'). Pleopod 1 ♂ slender, spirally curved.

Length up to 26 mm., breadth 38 mm. Carapace and chelipeds

reddish or violaceous, finger and thumb of chelipeds dark; legs greyish.

*Localities*.—Mouth of Umlaas River, Natal (Krauss); Durban (Stebbing, and S. Afr. Mus.); Inhambane and Ibo (Hilgendorf); Delagoa Bay (coll. van der Horst).

*Distribution*.—Madagascar, east coast of Africa, Red Sea, Nicobar Is.

#### Gen. PILUMNUS Leach

1910. Stebbing, *l. c.*, p. 301.

1923. Rathbun, Biol. Res. "Endeavour," v, p. 108 (key to Australian species).

1930. *Id.*, *l. c.*, p. 481.

1931. Gordon, J. Linn. Soc. Lond., xxxvii, pp. 526, 539 *sqq.*

1933. Balss, *Capita Zool.*, iv, 3, p. 10 (sensu restricto).

Carapace transversely oval or subquadrilateral, regions usually, but moderately, well marked; front bilobed, each lobe laterally with a small notch which is separate from the inner supra-orbital tooth; antero-lateral margin dentate, the teeth often spiniform; inner suborbital angle often prominent; supra-orbital margin with one or two notches. Basal joint of ant. 2 short, not or only just reaching front. Chelipeds stout, not very unequal, tips of finger and thumb pointed. Legs usually stout. Abdomen ♂ with distinct segments. Pleopod 2 ♂ short. Carapace, chelipeds, and legs usually thickly covered with short pile, with or without longer bristles or hairs.

*Remarks*.—As Gordon indicates, a revision of this genus with particular attention to the 1st pleopod ♂ is very desirable.

Hale (1931, Rec. S. Austr. Mus., iv, p. 321, figs.) has shown that *P. vestitus* Hasw. hatches at an advanced stage of development.

#### Key to the South African Species.

1. A subhepatic tubercle.
  - a. Very thickly covered with dark shaggy and matted hairs. Carapace with low rounded granules . . . *vespertilio*.
  - b. With fine golden pubescence and longer bristles. Carapace smooth. Flagellum of ant. 2 not longer than orbit . . . . . *hirsutus*.
2. No subhepatic tubercle. Flagellum of ant. 2 considerably longer than orbit.
  - a. With short pile and longer scattered bristles. Finger and thumb of chelipeds smooth, glabrous. Upper margin of 4th joint of 2nd-4th legs spinose . . . . . *longicornis*.

- b. With long thick silky hairs anteriorly on carapace, chelipeds, and legs. Finger and thumb granulate and setose almost to tips. Upper margin of 4th joint of legs smooth . . . . . *trichophoroides*.

*Pilumnus vespertilio* Fabr.

Fig. 49, a, b.

1849. Milne Edwards in Cuvier, Règne Anim. Crust., pl. 14, figs. 3, 3, a, b.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 793.

1898. Alcock, *l. c.*, p. 192 (references).

1933. Balss, *l. c.*, p. 21.

Carapace nearly  $\frac{3}{4}$  as long as wide; front bilobed, with median fissure and fairly distinct lateral tooth; supra-orbital margin with 2 deep notches; 3 sharp teeth on antero-lateral margin behind outer orbital angle; a subhepatic tooth; low rounded granules over whole carapace, but larger anteriorly (when denuded showing pits for insertion of the hairs); infra-orbital margin entire, inner suborbital tooth distinct but not very sharp. Endostomial ridges distinct up to anterior margin of buccal cavity. Upper and outer surfaces of wrist and hand of chelipeds granulate, granules extending on to lower surface of hand of smaller, sometimes also of larger, cheliped. Legs granulate. Carapace, chelipeds, legs, and under surface covered with a thick coat of dark shaggy, matted hairs, the longest hairs being on the chelipeds (except the non-granulate part of larger one), legs and margins of carapace.

Length up to 17 mm., breadth 22 mm.

*Localities*.—Ibo and Mozambique (Hilgendorf); Delagoa Bay (S. Afr. Mus.).

*Distribution*.—Mauritius, east coast of Africa, Red Sea, Indo-Pacific.

*Pilumnus hirsutus* Stimpson

Fig. 49, d, f, g.

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 37.

1898. Alcock, *l. c.*, p. 197 (with ?).

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 69, pl. 9, fig. 1.

1918. Stebbing, Ann. Durban Mus., ii, p. 53 (*spinifer*, non M. Edw.).