

1922. Balss, Arch. Naturg. Abt. Syst., lxxxviii, p. 117 (references).

1923. Rathbun, Biol. Res. "Endeavour," v, p. 122, pl. 28.

1933. Balss, *l. c.*, p. 20.

1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 407, fig. 11 (1st plp. ♂).

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 146, figs. D-F (orbit, abd., plp. 1 ♂).

[? 1902. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 247, fig. 47 (*maldivensis*).

? 1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 229, pl. 16, figs. 14, 15 (*orbitospinis*).

? 1916. Parisi, Atti Soc. Ital. Milan, lv, p. 185 (*orbitospinis*).]

Carapace convex, declivous anteriorly, length $\frac{3}{4}$ width, smooth, regions scarcely distinguishable, but the anterior median groove distinct; front not quite $\frac{1}{3}$ width of carapace, bilobed, lobes slightly oblique, with small feebly demarcated lateral lobule, separated from the blunt inner orbital tooth by a well-marked groove; upper orbital margin smooth, without or with very feeble trace of notch, outer orbital tooth spiniform; infra-orbital margin denticulate, inner angle sharp, spiniform and prominent; antero-lateral margin with 3 spiniform teeth, the spine-like tips distinct; one denticle and some granules on subhepatic region. Endostomial ridges indistinct near anterior margin of buccal cavity. Flagellum of ant. 2 not longer than orbit. Chelipeds with 2 strong spiniform teeth, preceded by some denticles, on upper margin of 4th joint; upper and outer surfaces of wrist and hand, except lower portion of hand in the larger one, with tubercles (mostly conical), forming on upper margin of hand 2 rows, each with 4-5 tubercles in larger, 3-4 in smaller cheliped. Legs with a small spine at apex of upper margin of 4th and 5th joints, and 1 or sometimes 2 about in middle of upper margin of 4th joint (except on last leg.) Terminal abdominal segment ♂ slightly shorter than its basal width. Pleopod 1 ♂ with 1-2 large spines below the out-curved tip. Carapace, chelipeds, and legs with short golden pubescence and longer hairs, the latter especially on the anterior half of carapace, and on chelipeds and legs.

Length up to (ovig. ♀) 8 mm., breadth 10 mm. (11 mm. if spines incl.). Largest ♂ 7.5 × 9 mm. Pale yellowish, finger and thumb of chelipeds brownish, dark colour not extending on to hand.

Localities.—False Bay (Buffels Bay near Simonstown, and Somerset Strand), Algoa Bay, off East London, off Port Shepstone, 0-85 fathoms (S. Afr. Mus.); Durban (Stebbing).

Distribution.—*hirsutus*: Amirante Is., Andaman Is., East Indies, China, Japan.

maldivensis: Maldive Archipelago.

orbitospinis: Chagos Archipelago and Japan.

Remarks.—The above description is based solely on the South African specimens. The armature of the legs corresponds with Borradaile's description of his *rotundus* (1902). Rathbun does not mention the armature on the legs of *orbitospinis*, and Parisi mentions only the 4th joint as having an apical spine. Neither Borradaile, Rathbun, nor Parisi refer to the subhepatic region; Stimpson and Alcock state definitely that there is no subhepatic tooth in *hirsutus*. One has a strong suspicion that Alcock's, Borradaile's, and Rathbun's specimens are all one species, probably *hirsutus*; but a strict comparison is not possible on the published descriptions.

The incidence of the localities in South Africa is notable: all are where ships have called and anchored for many years. Port Shepstone was open to small coasting vessels in former days.

Pilumnus hirsutus var.

Fig. 49, *e*.

Four specimens collected at "Hoetjes Bay" [*sic*, see note, p. 322] by the s.s. *Pieter Faure*, the largest a non-ovigerous ♀ 8.5 × 10 mm. These differ only as follows: the median groove is less well marked, but the gastric-hepatic groove is slightly more distinct, the frontal lobes are slightly less oblique, especially in the largest specimen, the spiniform tips to the antero-lateral teeth are less prominent (fig. 49, *e*, right side), sometimes uncinately procurved, but in most cases absent (fig. 49, *e*, left side), the outer orbital tooth is either subacute or blunt, the inner suborbital tooth is blunt in all cases, the chelipeds in the juv. are less strongly tuberculate.

These specimens are clearly only a variety of the species above described as *hirsutus*. They are given separate mention because the locality, if "Hoetjes" Bay means Saldanha Bay, is on the west coast. It is likewise a shipping harbour.

Pilumnus longicornis Hilg.

Fig. 49, *c*.

1838. McLeay, *Annulosa S. Afr.*, p. 61 (*Curtonotus vestitus*, non de Haan).

- ? 1843. Krauss, Südafrik. Crust., p. 33 (*Curtonotus vestitus*).
 1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 794, pl. 1, figs. 8, 9.
 1886. Miers, Rep. H.M.S. *Challenger*, xvii, p. 157.
 1887. de Man, J. Linn. Soc. Lond., xxii, p. 59, pl. 3, figs. 5, 6 (*andersoni*).
 1898. Alcock, *l. c.*, p. 193.
 1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 228.
 1933. Balss, *l. c.*, p. 15, and subspp., pp. 16, 17, pl. 2, figs. 10, 11.
 1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 406, pl. 6, fig. 3.
 1938. Monod, Mem. Inst. d'Egypte, xxxvii, p. 135, fig. 17, F (pl. 1 ♂).
 1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 144, fig. 36, A (pl. 1 ♂).
 1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 365.

Carapace nearly $\frac{3}{4}$ as long as wide (Alcock's $\frac{7}{8}$ seems too high); front $\frac{2}{7}$ – $\frac{1}{3}$ width of carapace, declivous, bilobed, with median notch and distinct lateral tooth; supra-orbital margin with 2 not very distinct notches; 3 sharp spinate teeth, often with subsidiary granules, on antero-lateral margin; some conical granules, but no tooth or tubercle, on subhepatic region; numerous but scattered granules anteriorly and laterally; infra-orbital margin denticulate, especially the inner orbital tooth. Endostomial ridges moderately distinct up to anterior margin of buccal cavity. Flagellum of ant. 2 (if not injured) nearly half length of carapace, with a few outstanding setae. Upper margin of 4th joint of chelipeds with 2 large, more or less sharp, teeth, upper surface of wrist and hand granulate; outer surface of hand of larger cheliped granulate on its upper and basal portions, smooth below, of smaller cheliped with granules extending on to lower surface, more or less in longitudinal rows; finger and thumb smooth and glabrous. Legs finely granulate, upper margin of 4th joint spinose (feebly so in 5th leg). Pleopod 1 ♂ as in *vespertilio* (fig. 49, b). Carapace, chelipeds (except the non-granulate part of larger one), legs, and under surface covered with short thick fur, with scattered longer bristles and hairs, especially on anterior part of carapace, chelipeds, and legs.

Length up to 21 mm., breadth 31 mm. Reddish, non-granulate part of hand of larger cheliped paler, finger and thumb blackish (dark colour not extending on to hand).

Localities.—Inhambane (Hilgendorf); Durban and Delagoa Bay (S. Afr. Mus.).

Distribution.—Mauritius (S. Afr. Mus.), Seychelles, Indian Seas, East Indies, Pacific.

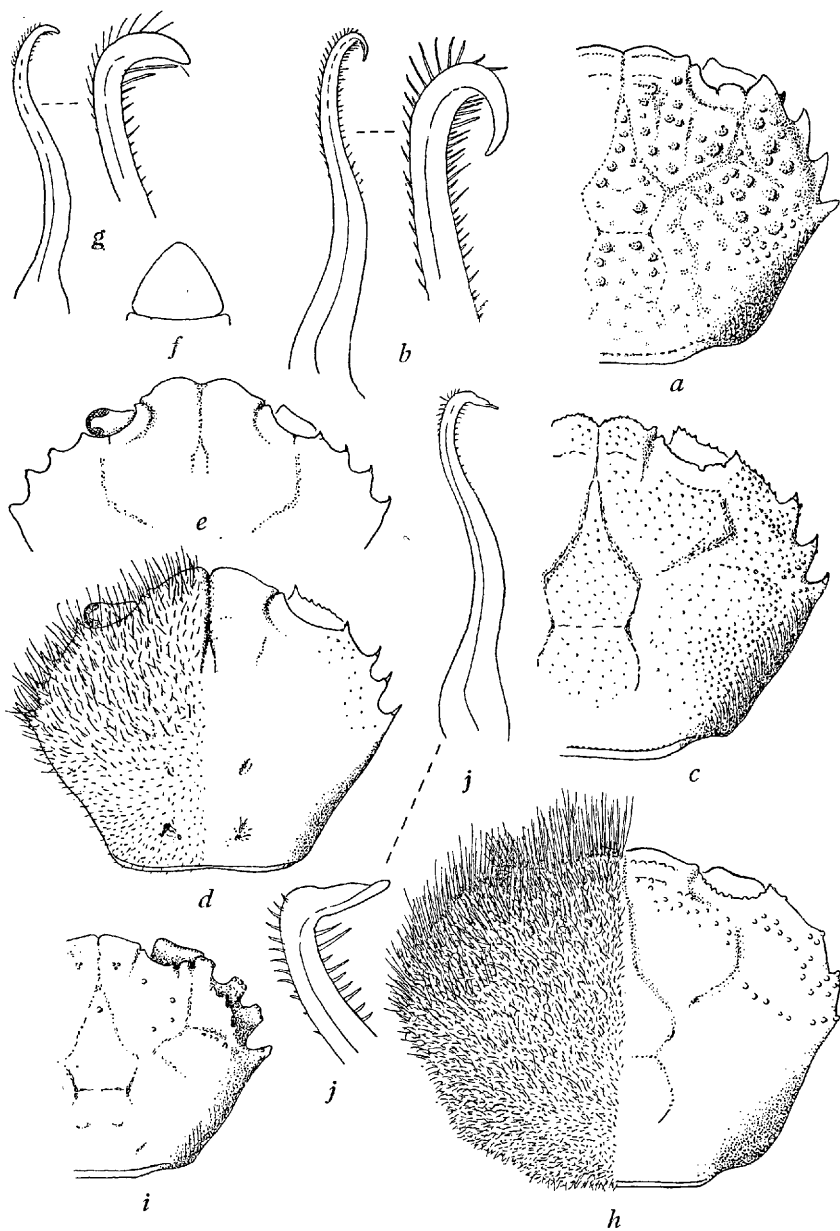


FIG. 49.—*Pilumnus vespertilio* Fabr. *a*, carapace, denuded. *b*, 1st pleopod ♂, with apex further enlarged.
Pilumnus longicornis Hilg. *c*, carapace, denuded (front declivous, but drawn as if fully visible in dorsal view).
Pilumnus hirsutus Stmps. *d*, carapace, partly denuded. *e*, carapace of Hoetjes Bay specimens, showing variation in antero-lateral teeth. *f*, 7th abdominal segment ♂. *g*, 1st pleopod ♂, with apex further enlarged.
Pilumnus trichophoroides de Man. *h*, carapace, partly denuded (front declivous, but drawn as if fully visible in dorsal view).
Parapilumnus pisifer (McLeay). *i*, carapace, denuded. *j*, 1st pleopod ♂, with apex further enlarged.

Remarks.—The correct identification of McLeay's specimen is due to Mr. Ward, who has sent me an excellent photograph of it. The identity of Krauss' specimen can only be determined by re-examination of the original.

de Man (*l. c.*, p. 65) says that *longicornis* may be easily distinguished from *andersoni* by its non-spiniform antero-lateral teeth. The three specimens at hand, and also one from Mauritius (coll. Robillard), seem to indicate that this is merely a variable feature, or an accidental difference: de Man's words "dark-pointed, spiniform teeth" apply except where these spiniform tips have been broken off.

The resemblance of this species to *Actaea depressa*, due mainly to the flatness of the hinder part of the carapace, is striking enough to be confusing on a cursory glance, especially if the specimen is not denuded of its covering. The differences lie in the greater length of 2nd antennae, and greater width of front in *longicornis*; the closer and more regular granulation of the carapace, with conical granules on the front; and the more strongly marked delimitation of the regions in *A. depressa*. The 1st pleopods of the ♂♂ are quite distinct.

Pilumnus (Heteropilumnus) trichophoroides de Man

Fig. 49, *h*.

See 1933. Balss, *l. c.*, p. 42. Cf. also *P. digitalis*: 1923. Rathbun, Biol. Res. "Endeavour," v, p. 112, pl. 22.

Carapace about $\frac{3}{4}$ as long as wide, front bilobed, declivous, about $\frac{3}{10}$ width of carapace, with median notch but without distinct lateral lobes; inner orbital angle scarcely distinct from lateral angle of front, supra-orbital margin granulate, but without distinct notches; 3 inconspicuous denticles on antero-lateral margin, each tipped with a granule; no subhepatic tubercle or granules; a few granules scattered near anterior part of front (proto)-gastric and hepatic regions, and a curved line of granules from the last antero-lateral denticle; infra-orbital margin quite smooth. Flagellum of ant. 2 nearly half length of carapace, glabrous. Upper margin of 4th joint of chelipeds smooth, upper surface of wrist and hand granulate, whole outer surface of hand in both chelipeds granulate, finger and thumb granulate and setose almost to tips; inner surface of hand (palm) and finger and thumb smooth. Legs smooth, upper margin of 4th joint not spinose. Carapace, chelipeds, and legs with short thick fur, and especially anteriorly on carapace, chelipeds, and legs long dense silky hairs.

Length 12 mm., breadth 16.5 mm. Carapace when denuded dirty white, fur drab, silken fringes pale golden.

Locality.—Delagoa Bay (coll. van der Horst, 1938, 1 ♀).

Distribution.—*trichophoroides*: Red Sea, Chagos, East Indies, Siam, China Sea.

digitalis: Queensland.

Remarks.—This ♀ specimen appears to be *trichophoroides*, but the ♂ is necessary for a certain identification.

Gen. PARAPILUMNUS de Man

1895. de Man, Arch. Naturg. Abt. Syst., viii, p. 537.

1933. Balss, *l. c.*, p. 38.

Scarcely distinct from *Pilumnus*, but distinguished by the very unequal chelipeds.

Parapilumnus pisifer (McLeay)

Fig. 49, *i, j*.

1838. McLeay, Annulosa S. Afr., p. 60 (*Halimede p.*).

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 36 (*Pilumnus verrucosipes*).

1873. Milne Edwards, J. Mus. Godeffroy, i, p. 80, pl. 1, fig. 4 (*Pilumnus fragifer*).

1881. Miers, Ann. Mag. Nat. Hist. (5), viii, p. 216, pl. 13, fig. 5 (hand of cheliped) (*verrucosipes*).

1894. Ortmann, Semon's Austral. Reise, v, p. 49, pl. 3, fig. 7 (*infraciliaris*).

1904. Doffein, D. Tiefsee Exp., vi, p. 100, pl. 32, figs. 3, 4 (photos, not good) (*verrucosipes*).

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 67, pl. 8, fig. 5 (*verrucosipes*).

1910. Stebbing, *l. c.*, p. 298 (*Halimede pisifer*) and p. 302 (*verrucosipes*).

1914. Lenz and Strunck, D. Südpol. Exp., xv, p. 281 (*verrucosipes*).

1921. Balss, Beitr. Kennt. Meeresf. Westaf., iii, p. 64 (*verrucosipes*).

1921. Rathbun, Bull. Amer. Mus. Nat. Hist., xliii, p. 437, fig. 18, and pl. 35, fig. 3, pl. 36, fig. 1 (*verrucosipes*).

1933. Monod, Bull. Com. Afr. occid. Fr., xv, p. 76 (*verrucosipes*).

1933. Balss, *l. c.*, p. 39 (*verrucosipes*).

1934. Gordon, Res. Sci. Ind. orient. Néerl., iii, fasc. 15, p. 59, fig. 31, f (endostom. ridges) (*verrucosipes*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 365.

Carapace about $\frac{2}{3}$ as long as wide; front glabrous, slightly oblique on either side of median fissure, lateral lobule obscure but separated by a shallow groove from the blunt inner supra-orbital tooth; supra-orbital margin with 2 deep notches; 3 teeth on antero-lateral margin behind outer orbital tooth, the latter often blunt and apically granulate, as are the first 2 antero-lateral teeth; the hindmost tooth, however, is always sharp; small isolated granules on antero-gastric, hepatic, and branchial regions, the anterior gastric pair often represented by a group of 2-4 granules, the 2-4 hepatic granules rather prominent, one or two of them sometimes multiple; infra-orbital margin thick and protuberant, sausage- or dumb-bell-shaped, blunt at both ends. Endostomial ridges obscure or petering out before reaching anterior margin of buccal cavity. Upper margin of wrist and hand of chelipeds with large, spaced, rounded tubercles, each one granulate on top, outer surface of hand of larger cheliped with rounded granules on upper and basal part, in smaller cheliped with more numerous sub-conical granules. Upper margins of 5th and 6th joints of legs each with 2 large granulate warts. Carapace, chelipeds, legs, and under surface covered with short close pile, with scattered longer shaggy hairs on chelipeds and carapace.

Length up to 12 mm., breadth 18 mm. Smallest example examined 4 mm. in length. Smallest ovigerous ♀ 6.5 mm. in length. Salmon-red, orange-red, brownish red or brownish purple, more or less mottled, finger and thumb of chelipeds blackish (dark colour not extending on to hand), tips whitish.

Localities.—Simon's Bay, 12 fathoms (Stimpson, also Lenz and Strunck); Port Elizabeth (Ortmann); Plettenberg Bay, shallow water (Doflein); Mossel Bay, 10 fathoms (Stebbing); False Bay to Algoa Bay, East London, and Durban, 0-18 fathoms (S. Afr. Mus.); Durban and Umhlali (coll. T. A. Stephenson); St. Lucia Bay, Zululand (S. Afr. Mus.).

Distribution.—Goree Is., Senegambia, Port Etienne (Mauretania), French Congo, St. Paul de Loanda.

Remarks.—Comparison of a photograph of McLeay's type (for which I am indebted to Mr. Ward) with the reproduction of a photograph of Rathbun's Belgian Congo specimen leaves no doubt of the synonymy; McLeay's type specimen is not cleaned, and Rathbun's photographic reproduction is not very sharp, but with a slight re-arrangement of the legs one might think that the two photographs had been taken from the same specimen! McLeay's description "three great tubercles surrounding each orbit, one occupying its

external angle, and the two others the lower edge of orbit," is very apt; in some specimens the thick infra-orbital ridge is so strongly dumb-bell-shaped that one could well describe it as two tubercles.

It was only to be expected that a specimen of this very common crab was included in Sir Andrew Smith's or Verreaux's collection (described by McLeay), but it is a pity that McLeay did not illustrate his *pisifer*, which would then not have remained so long unrecognized.

This little crab, unmistakable on account of the pea-like verrucosities on its chelipeds and the sausage-like infra-orbital ridge, is one of the commonest littoral and shallow-water species from False Bay eastwards. It is impossible to say whether it has spread eastwards by the help of ship transport. It has not yet been found in Table Bay or anywhere on the west coast of South Africa, but reappears from Loanda northwards.

Gen. ACTUMNUS Dana

1898. Alcock, *l. c.*, p. 200.

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, pp. 230 *sqq.*

1923. *Id.*, Biol. Res. "Endeavour," v, p. 126.

1933. Balss, *Capita Zool.*, iv, p. 35.

1942. Ward, Mauritius Inst. Bull., ii, p. 43.

Carapace strongly convex, regions moderately well defined; front bilobed, usually with a small notch near inner supra-orbital tooth; antero-lateral margin with blunt lobes. Basal joint of ant. 2 touching front. Chelipeds stout, more or less unequal, tips of finger and thumb spooned or bluntly pointed. Sternum narrow. Abdomen ♂ with 7 distinct segments, the first trapezoidal, 2nd somewhat widened, following segments gradually narrowing to apex. Plp. 1, 2 ♂, see Stephensen, *l. c.*, *infra*, fig. 35, C, D (*A. asper*).

Actumnus setifer (de Haan)

Fig. 50.

1898. Alcock, *l. c.*, p. 202 (*tomentosus*) (*setifer* Alck. = *obesus* Dana).

1927. Hale, S. Austral. Crust., pt. 1, p. 167, fig. 168.

1933. Balss, *l. c.*, p. 38.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 143.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 365.

Carapace very convex, covered with a very short, close, velvety pile composed of stout, spinate setae, which almost conceals (*v. infra*:

colour) the scattered granules; slightly longer bristles on margins and front; regions well marked by wide shallow grooves; front declivous with median notch, and a faint notch at inner orbital angle; antero-lateral margin divided into 4 broad shallow lobes separated by 3 small notches which are nearly concealed by the pile and marginal setae; supra-orbital margin granulate. Eye-stalk covered with spinate setae. Basal joint of ant. 2 just touching front, flagellum in the orbital hiatus. Chelipeds stout, slightly unequal, outer and upper surfaces of wrist and hand covered with pile, upper surface of wrist and outer and upper surfaces of hand granulate, the granules becoming larger on middle of outer surface of hand, and towards bases of finger and thumb, where

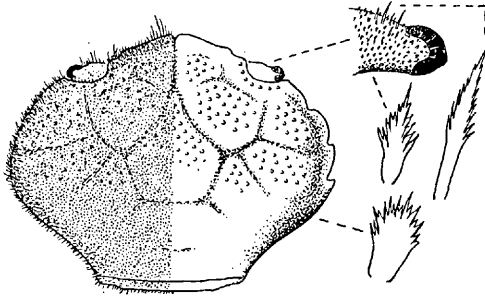


FIG. 50.—*Actumnus setifer* (de Haan). Carapace, partly denuded, with eye and setae further enlarged. Ovig. ♀.

they are also more closely set; base of finger granulate; tips of finger and thumb bluntly pointed (not spooned). Upper margin of 4th–6th joints of legs keeled, upper and lower margins setose, bristly, outer surface of 5th and 6th joints pilose, with a few scattered granules, dactyl setose.

Length 10 mm., breadth 13.5 mm. Carapace pale (dirty) biscuit-colour, shading into red on frontal and antero-lateral margins, and hepatic and branchial regions; on the pale portions the granules show through the pile as little white dots, and on the reddish portions as deeper red dots. Front part of eye-stalk reddish, upper part whitish. Chelipeds deep red, finger and thumb brownish red, with white tips. Legs reddish on outer surfaces, pale pinkish on inner surfaces.

Locality.—Impengazi, north of St. Lucia Bay (coll. T. A. Stephenson, 1939, 1 ovig. ♀).

Distribution.—Mauritius, Red Sea, Zanzibar, Indo-Pacific to Australia and Japan.

Gen. ERIPHIA Latr.

1910. Stebbing, *l. c.*, p. 302.

1930. Rathbun, *l. c.*, p. 545.

Carapace deep, subquadrilateral, not very convex, only the gastric region defined; lateral margin convex, without any well-marked division into anterior and posterior portions; fronto-orbital margin very wide, front deflexed, externally in contact with the very broad inner lower angle of orbit, which is overlapped by the inner upper angle, thus completely closing the orbit. Basal joint of ant. 2 small. flagellum excluded from orbit. Chelipeds massive, unequal, finger and thumb strong, tips pointed. Abdomen ♂ with 7 distinct segments. Endostomial ridges strong (fig. 37, *f*). Pleopod 2 ♂ elongate.

Key to the South African Species.

1. Front cut into blunt teeth. Carapace dorsally without hairs.
 - a.* Both chelae smooth (to the naked eye) *laevimanus.*
 - b.* Both chelae, or at least the smaller one, tuberculate . . . *smithii.*
2. Front not cut into teeth. Carapace dorsally with numerous scattered hairs *scabricula.*

Eriphia laevimanus Guérin

1803. Shaw in Shaw and Nodder, Nat. Misc., xv, p. 591 (*sebana*) (*fide* Rathbun).

1829-44. Guérin, Icon. Règne Anim. Crust., pl. 3, fig. 1.

1838. McLeay, Annulosa S. Afr., p. 60 (*fordii*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 797.

1898. Alcock, *l. c.*, p. 214 (references).

1930. McNeill and Ward, Rec. Austral. Mus., xvii, p. 381.

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 159, pls. 81-84 (*sebana*).

1939. Ward, Amer. Mus. Novit., no. 1049, p. 11, figs. 13, 14 (*sebana hawaiiensis*).

Front dentate. Carapace dorsally granulate and tuberculate in anterior half, becoming smooth (to the naked eye) but really minutely granulate (or shagreened) in centre and posterior half, without hairs. Chelipeds smooth to the naked eye, but minutely granulate, with indications (at least in the smaller cheliped) of larger, depressed granules on outer surface of wrist and hand.

Length up to 30 mm., breadth 40 mm. Reddish orange, with darker spots and vermiculations on a paler ground-colour on the lateral and hinder parts of carapace; pterygostomial region, 3rd maxillipeds and epistome white with orange markings; outer surface of hand of larger cheliped with rows of orange spots on a paler ground; finger and thumb of chelipeds more or less brownish black.

Localities.—Natal (Krauss, and S. Afr. Mus.); Mozambique (Hilgendorf).

Distribution.—Mauritius, east coast of Africa, Indo-Pacific, Australia.

Remarks.—I have seen only one ♀ (size as given above) of this form.

Eriphia smithii McLeay

Figs. 37, f, 51.

1838. McLeay, *Annulosa S. Afr.*, p. 60.

1843. Krauss, *Südafr. Crust.*, p. 36, pl. 2, figs. 3, a-e.

1878. Hilgendorf, *MB. Ak. Wiss. Berlin*, p. 797.

1894. Ortmann, *Semon's Austral. Reise*, v, p. 54.

1910. Stebbing, *l. c.*, p. 303.

1930. McNeill and Ward, *Rec. Austral. Mus.*, xvii, p. 382, pl. 59, figs. 1, 2.

1934. Gordon, *Res. Sci. Ind. orient. Néerl.*, ii, fasc. 15, p. 52, fig. 29 (1st and 2nd plp. ♂).

1945. Stephensen, *Dan. Sci. Invest. Iran*, pt. 4, p. 140, fig. 34, C, D (plp. 1, 2 ♂) (*sebana smithi*).

Probably only a variety of *laevimanus*, from which it is distinguished by having the wrist and hand of the smaller and usually also the larger cheliped covered with larger granules or conical tubercles. On the outer surface of hand of larger cheliped the granules are often less numerous and confined to the upper half, especially in large specimens; sometimes the wrist and hand of larger cheliped are almost smooth.

Length up to 47 mm., breadth 60 mm. Coloration as in *laevimanus*, large specimens with dorsal surface of carapace violaceous.

Localities.—Natal (Krauss, Miers, S. Afr. Mus.); Mozambique (Hilgendorf, Miers, S. Afr. Mus.); Isipingo and Durban (S. Afr. Mus.); Umhlali, Natal (coll. T. A. Stephenson); Port Elizabeth (Ortmann); Delagoa Bay (coll. van der Horst).

Distribution as for *laevimanus*.

Remarks.—Most authorities regard this form as a variety of *laevimanus*. All the South African specimens which I have seen have

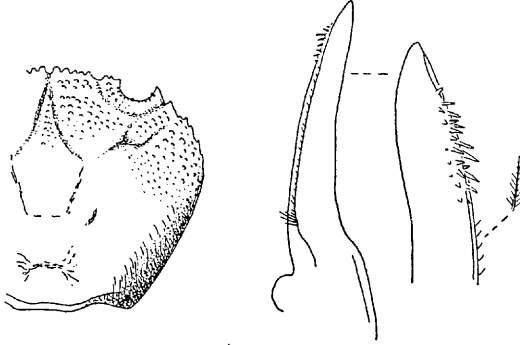


FIG. 51.—*Eriphia smithii* McLeay. Carapace, ventral view of left 1st pleopod ♂, and dorsal view of apex further enlarged.

either the one (the smaller) or both chelipeds definitely granulate and tuberculate, except the one specimen referred above to *laevimanus*.

It seems doubtful whether Ortmann's specimen came actually from Port Elizabeth.

Eriphia scabricula Dana

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 798.

1910. Stebbing, *l. c.*, p. 303.

1918. *Id.*, Ann. Durban Mus., ii, p. 53.

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 156, pl. 80 (not good).

1942. Ward, Mauritius Inst. Bull., ii, p. 99, pl. 6, fig. 4 (subsp. *garciaensis*).

Front entire, only very finely or microscopically beaded. Carapace dorsally as in *laevimanus*, but with numerous hairs anteriorly and laterally. Wrists and hands of both chelipeds granulate and tuberculate, with numerous hairs.

Length 20 mm., breadth 30 mm. Reddish with yellow or yellowish-brown mottling, legs pale with reddish cross-bands (Krauss, Hilgendorf); reddish violet, bands on legs not conspicuous, finger and thumb of chelipeds dark (K. H. B.).

Localities.—Mouth of Umlaas River (Krauss); Durban (coll. K. H. B.); Mozambique (Hilgendorf, Miers); Impengazi, north of St. Lucia Bay (coll. T. A. Stephenson).

Distribution.—Mauritius, Indo-Pacific.

Remarks.—I have seen only four specimens: two collected by myself at the Cave Rock, Bluff, Durban, 1912, and two collected by Professor Stephenson in 1939. One of the latter is an ovigerous ♀, 10 mm. in length.

Gen. TRAPEZIA Latr.

1898. Alcock, *l. c.*, p. 217.

1902. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 264.

1910. Stebbing, *l. c.*, p. 303.

1930. Rathbun, *l. c.*, p. 556.

1939. Ward, Amer. Mus. Novit., no. 1049, p. 12.

Carapace subquadrilateral, nearly as long as broad, not very convex, smooth, without trace of regions, antero-lateral margins subparallel, postero-lateral margins convergent, fronto-orbital margin nearly equal to width of carapace, front wide, 4-lobed (with the inner orbital angles appearing 6-lobed). Basal joint of ant. 2 very short, not nearly reaching front, whole antenna excluded from orbit by the meeting of the inner supra- and sub-orbital teeth, flagellum at least as long as orbit. Chelipeds subequal, long and strong, anterior margin of arm (4th joint) usually cristate and serrate, finger and thumb with sharp cutting-edges, tips pointed. Abdomen ♂ with 3rd–5th segments fused. Pleopod 2 ♂ short.

Remarks.—Inhabitants of coral-reefs.

Key to the South African Species.

I. A distinct spine or tooth in middle of lateral margin of carapace (fig. 52, *a*).

A. Lower border of hand of chela sharp, entire.

1. Outer surface of hand (and wrist) covered with tangled woolly hairs (fig. 52, *a*).

Carapace and legs unicolorous . . . *cymodoce*.

2. Outer surface of hand polished and glabrous.

i. Carapace and legs unicolorous or with meshwork of fine brown lines . . . } [*ferruginea*, Mauritius].

ii. Carapace and legs with small red spots . . . *guttata*.

B. Lower border of hand of chela granulate or bluntly

serrulate. With red spots *rufopunctata*.

II. A mere notch or kink on lateral margin *digitalis*.

Trapezia cymodoce (Herbst)

Fig. 52, *a*, *b*.

1838. McLeay, Annulosa S. Afr., p. 67, pl. 3 (*Grapsillus dentatus*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 798.

1910. Stebbing, *l. c.*, p. 304.
1915. Laurie, J. Linn. Soc. Lond., xxxi, p. 460, fig. 2.
1934. Boone, Bull. Vanderbilt Mar. Mus., p. 168, pl. 87.
1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 410.
1938. Gurney, Proc. Zool. Soc. Lond., ser. B, cviii, p. 76, pl. 2, figs. 23–28 (larval stage).
1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 161, fig. 42, C, D (plp. 1, 2 ♂).

A distinct spine or tooth in middle of lateral margin of carapace. Arm (4th joint) of cheliped with 6–7 teeth on anterior margin, lower margin of hand sharp, entire, outer surface of hand, and usually also of wrist, with a tangled mass of downy or woolly hairs.

Length up to 12 mm., breadth 14 mm. Smallest ovig. ♀ 5.5 mm. in length. Yellowish or reddish, portions of the carapace often darker or violaceous, but not spotted.

Localities.—San Juan de Nova and Europa Is., Mozambique Channel (Lenz); Isipingo, Natal (S. Afr. Mus.); Durban and Delagoa Bay (coll. K. H. B. 1912).

Distribution.—Ibo, Portuguese East Africa; Zanzibar; Red Sea; Indo-Pacific.

Trapezia guttata Rüppell

1830. Rüppell, Besch. 24 Krabben, p. 27.
1842. Eydoux and Souleyet, Voy. Bonite, i, p. 232, pl. 2, fig. 4 (*tigrina*).
1898. Alcock, *l. c.*, p. 221 (*maculata*, non McLeay).
1906. Rathbun, Bull. U.S. Fish. Comm. for 1903, pt. 3, p. 865 (*maculatus*, non McLeay).
1939. Ward, Amer. Mus. Novit., no. 1049, p. 13, figs. 15, 16 (*tigrina*).

Differs from *cymodoce* in having shorter chelipeds, front margin of arm with 5 teeth, a stronger spine on inner angle of wrist, outer surface of hand (and wrist) hairless.

Length 9 mm., breadth 11 mm. Carapace, legs, chelipeds, and lower surface with numerous *small* round red spots on a paler ground-colour.

Locality.—Delagoa Bay (coll. K. H. B. 1912).

Distribution.—Andaman Is., Sandwich Is.

Remarks.—Only one ♀ and one juv. seen. In the juvenile, 3.5 mm. in length, the hand of the cheliped is hairy. The size and number of spots correspond with the figure in Eydoux and Souleyet.

Trapezia rufopunctata (Herbst)

1801. Herbst, Krabben and Krebse, iii, p. 54, pl. 47, fig. 6.

1838. McLeay, Annulosa S. Afr., p. 67 (*Grapsillus maculatus*).

1841. Eydoux and Souleyet, Voy. Bonite, i, p. 230, pl. 2, fig. 3 (*flavopunctata*).

1843. Krauss, Südafrik. Crust., p. 36.

1886. Miers, Rep. H.M.S. *Challenger*, xvii, p. 165.

1887. de Man, Arch. Naturg., liii, p. 318, pl. 13, figs. 1, 2 (*rufopunctata* and *maculata* Dana).

1894. Ortmann, Semon's Austral. Reise, v, p. 54.

1898. Alcock, *l. c.*, p. 222.

1910. Stebbing, *l. c.*, p. 304 (*maculata*).

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 166, pl. 86.

Distinguished by the granulate or bluntly serrulate lower border of hand.

Length 17 mm., breadth 18 mm. Carapace, chelipeds, and legs with rather *large* round red spots, or numerous *small* spots.

Locality.—"Cape of Good Hope" (McLeay); Delagoa Bay (coll. van der Horst and Lourenzo Marques Mus.).

Distribution.—East coast of Africa, Mauritius, Indo-Pacific.

Remarks.—From the photograph of McLeay's specimen sent me by Mr. Ward, it appears that Krauss' surmise that this was *rufopunctatus* was correct. The photograph shows traces of large spots on the cheliped, which has a serrulate lower border. Miers also referred McLeay's species to *rufopunctata*.

Trapezia digitalis Latr.

1825. Latreille, Encycl. Meth., x, p. 696.

1830. Rüppell, Beschr. 24 Krabben, p. 28 (*leucodactyla*).

1838. McLeay, Annulosa S. Afr., p. 67 (*Grapsillus subinteger*).

1898. Alcock, *l. c.*, p. 222.

1910. Stebbing, *l. c.*, p. 304 (*G. subinteger* under *ferruginea*).

1930. Rathbun, *l. c.*, p. 559, pl. 228, figs. 5, 6.

1942. Ward, Mauritius Inst. Bull., ii, p. 100 (*subinteger*).

At once distinguished by the absence of a tooth or spine on the lateral margin; in its place a mere notch or kink in the profile. Cheliped with arm shorter than in other species, broader than long, its anterior margin with 3 teeth (McLeay), lower border of hand sharp, outer surface glabrous.

Length 11 mm., breadth 13 mm. (McLeay's specimen, *fide* Ward).

Locality.—“Cape of Good Hope” (McLeay).

Distribution.—Red Sea, Indo-Pacific to California and Panama.

Remarks.—It seems strange that Alcock should have assigned McLeay’s species to a species (*ferruginea*) with a definite tooth on the

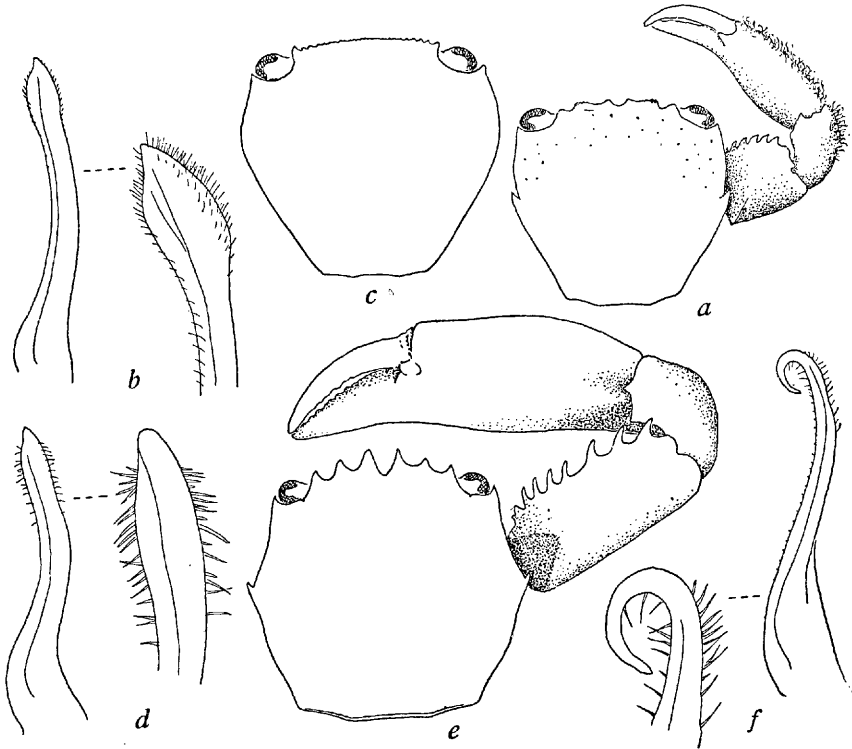


FIG. 52.—*Trapezia cymodoce* (Herbst). *a*, carapace, with cheliped.

b, 1st pleopod ♂, with apex further enlarged.

Tetralia glaberrima (Herbst). *c*, carapace. *d*, 1st pleopod ♂, with apex further enlarged.

Quadrella coronata Dana. *e*, carapace, with cheliped. *f*, 1st pleopod ♂, with apex further enlarged.

lateral margin. The photograph of McLeay’s specimen confirms the accuracy of McLeay’s diagnosis: “thoracis lateribus versus vix emarginatus.” Ward has compared Chagos material with McLeay’s type, and maintains *subinteger* as a distinct species.

Gen. TETRALIA Dana

1910. Stebbing, *l. c.*, p. 305.

Carapace similar to that of *Trapezia* but with the front straight or

slightly convex, finely denticulate and hardly separate from inner orbital angles, with lateral margins evenly convex. Basal joint of ant. 2 produced in a narrow process between upper and lower inner orbital angles, thus excluding flagellum from orbit. Chelipeds unequal. Legs stout. Abdomen ♂ with 7 distinct segments. Pleopod 2 ♂ short.

Remarks.—Inhabitants of coral reefs.

Tetralia glaberrima (Herbst)

Fig. 52, *c, d.*

1875. Paulson, Red Sea Crust., p. 51, pl. 7, fig. 7, pl. 9, figs. 1-1, *d* (*cavimana*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 798 (var. *nigrifrons* Dana).

1884. Miers, Zool. H.M.S. *Alert*, Crust., p. 537 (*cavimanus*).

1902. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 265.

1910. Lenz, Voeltzkow Reise, ii, p. 553.

1910. Stebbing, *l. c.*, p. 505.

1924. *Id.*, Ann. S. Afr. Mus., xix, p. 1.

1934. Boone, Bull. Vanderbilt Mar. Mus., v, p. 174, pl. 89.

1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 411.

1938. Gurney, Proc. Zool. Soc. Lond., ser. B, cviii, p. 77, pl. 3, figs. 29-33 (larval stage).

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 161, fig. 42, A, B (plp. 1, 2 ♂).

Carapace nitidulous. Arm of cheliped with anterior margin sharp, distally denticulate, more so in larger than in smaller cheliped, a fur-lined pit at base of outer upper surface of hand of larger cheliped. Ungues of legs short and stout.

Length 12 mm., breadth 13 mm. Pinkish red, often with a more or less conspicuous blackish bar across the front.

Localities.—Natal (Krauss); Europa Is., Mozambique Channel (Lenz); Mozambique (Stebbing); Delagoa Bay (S. Afr. Mus.).

Distribution.—Ibo, Portuguese East Africa; Red Sea; Seychelles; Indo-Pacific.

Gen. QUADRELLA Dana

1898. Alcock, *l. c.*, p. 225.

1902. Borradaile, F. Geogr. Mald. Laccad. Archip., 1, p. 266.

1930. Rathbun, *l. c.*, 560.

Carapace subhexagonal, nearly as long as broad, smooth, without

trace of regions; fronto-orbital border nearly as wide as carapace, front cut into 4 spiniform teeth, the inner orbital angle similar in shape ("front" thus appearing 6-dentate); a short spine or tooth at junction of antero- and postero-lateral margins. Basal joint of ant. 2 very short, excluded from orbit by the meeting of the upper and lower inner orbital angles; the long flagellum, however, folds back in a small notch between the spiniform apices of the orbital angles. Chelipeds unequal, strong, elongate, the arm especially long, tips of finger and thumb pointed. Legs rather slender, dactyls serrate on lower margin. Abdomen ♂ with 3rd-5th segments fused. Pleopod 2 short.

Key to species: see Addenda.

Quadrella coronata Dana

Fig. 52, e, f.

1898. Alcock, *l. c.*, p. 226, with vars.

1902. Borradaile, *l. c.*, p. 266.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 365.

Carapace smooth, but minutely shagreened and pitted (not highly polished like *Tetralia*); only one tooth on lateral margin. Anterior border of arm of chelipeds with 9-10 spiniform teeth; hand more or less covered with minute granulations.

Length 13 mm. (incl. frontal teeth), breadth 14 mm. Milky or pale pinkish.

Locality.—Durban, washed up on ocean beach (S. Afr. Mus.).

Distribution.—Seychelles and Indian Seas, to 88 fathoms.

Remarks.—*Q. cyrenae* Ward (1942, *Mauritius Inst. Bull.*, ii, p. 45, pl. 3, figs. 5, 6) from Mauritius is probably to be regarded as a variety.

FAMILY GONEPLACIDAE.

1907. Borradaile, *Ann. Mag. Nat. Hist.* (7), xix, pp. 482, 485.

1910. Stebbing, *l. c.*, p. 312.

1918. Rathbun, *Bull. U.S. Nat. Mus.*, no. 97, p. 15 (January).

1918. Tesch, *Siboga Exp. monogr.*, xxxix, c, pp. 152-243 (August).

1937. Rathbun, *Bull. U.S. Nat. Mus.*, no. 166, p. 265.

Carapace usually subquadrilateral. Orbits complete, often elongate. 5th joint of mxp. 3 inserted at or near antero-internal angle of 4th joint. 1st antennae folding obliquely or transversely (figs. 53, 54). Genital openings in ♂ sternal, or if coxal the membranous external prolongations of the vasa deferentia pass along

grooves protected by the penultimate sternal plate (in *Goneplax*, etc., but not in *Pilumnoplax heterochir*).

Remarks.—Not sharply separated from the *Xanthidae* (Borradaile, *l. c.*, p. 482; Tesch, *l. c.*, p. 153).

Key to the South African Genera.

- I. Fifth pair of legs present.
 - A. Genital openings of ♂ coxal. Eyes movable.
 - 1. Fronto-orbital margin forming the greatest, or nearly the greatest, width of carapace (fig. 53, *a, b*).
 - a.* Eyes not projecting beyond the forwardly directed outer orbital angle. No stridulating ridge on pterygostomial region *Goneplax*.
 - b.* Eyes projecting beyond the laterally directed outer orbital angle. A stridulating ridge on pterygostomial region *Ommatocarcinus*.
 - 2. Fronto-orbital margin not nearly equal to greatest width of carapace, lateral margins more or less convex (figs. 53, *g, 54, a, d, f*).
 - a.* 3rd abdominal segment ♂ covers whole sternum between 5th coxae.
 - i. Flagellum of ant. 2 in the orbit (fig. 54, *b*).
 - a.* Front straight (or slightly concave).
 - * Lateral border of carapace strongly convex, without definite teeth (except in juvenile) . . . *Carcinoplax*.
 - ** Lateral border nearly straight, with definite teeth *Pilumnoplax*.
 - β.* Front usually 4-dentate, if straight then only one antero-lateral tooth behind outer orbital angle . . . *Geryon*.
 - γ.* Front bilobed, with long bristles . . . *Litocheira*.
 - ii. Flagellum of ant. 2 excluded from orbit by a process of basal joint (fig. 54, *e*) *Eucrate*.
 - b.* 3rd abdominal segment ♂ not covering whole sternum between 5th coxae . . . [Euryplax].
 - B. Genital openings ♂ sternal. Eyes immovable, often reduced. 3rd abdominal segment ♂ not covering whole sternum between 5th coxae *Xenophthalmodes*.

II. Fifth pair of legs absent. Genital openings ♂ sternal.

A. 6th joint of mxp. 3 cylindrical *Hexapus*.

B. 6th joint of mxp. 3 distally expanded and produced . . . *Thaumastoplax*.

The genus *Euryplax* is an American (Atlantic and Pacific coasts) genus, and further and better evidence for its occurrence in South Africa than Stebbing's record (*Euryplax bevisi* Stebb. 1921, Ann. Durban Mus., iii, p. 15, pl. 2) is required. Stebbing's figure reminds one very much of a *Thalamita*, but the shape of the 6th abdominal segment is against this interpretation. Stebbing says nothing about the legs, particularly the 5th leg. Perhaps the nearest approach is Rathbun's *Pilumnoplax acanthomerus* (1911, Trans. Linn. Soc. Lond., xiv, p. 237, pl. 18, fig. 13) from the Amirante Is.

Gen. GONEPLAX Leach

1910. Stebbing, *l. c.*, p. 312.

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

1918. Tesch, *l. c.*, p. 181.

Carapace broader than long, subquadrilateral, antero-lateral angles acute, lateral borders convergent behind; front and orbits occupying whole anterior width of carapace. Eye-stalks moderately long and slender. Chelipeds much longer in adult ♂ than in ♀ and juv., in both sexes stronger than the slender legs. Abdomen in both sexes with 7 segments; in ♂ 3rd segment widest, usually reaching coxae of 5th legs, 1st and 2nd segments not reaching the coxae leaving a portion of the sternum uncovered; in ♀ broadly oval, covering the sternum. Genital openings ♀ extraordinarily large. In ♂ external continuation of vas deferens from the coxal opening runs in a groove protected by the penultimate sternal plate. Pleopod 2 ♂ as long as pleopod 1. No stridulating organ.

Goneplax angulata (Pennant)

Fig. 53, a. Cf. also fig. 53, f.

1910. Stebbing, *l. c.*, p. 312.

1914. *Id.*, Trans. Roy. Soc. Edin., 50, p. 264.

1923. Odhner, Medd. Göteborg. Mus., xxxi, p. 26.

Carapace with sharp spine-tooth on lateral margin behind the rather blunt outer orbital tooth; front square-cut, width about $\frac{1}{4}$ greatest width of carapace, anterior margin straight or slightly concave, the thickened costate margin widened at the inner orbital border; ptery-

gostomial ridge finely and closely granulate. Cheliped, 4th joint with a spine-tooth in distal third of upper margin, a denticle (δ) or strong spine (φ) on inner side, and a smaller denticle on outer side, of wrist; right hand in adult δ more massive than left, finger and thumb

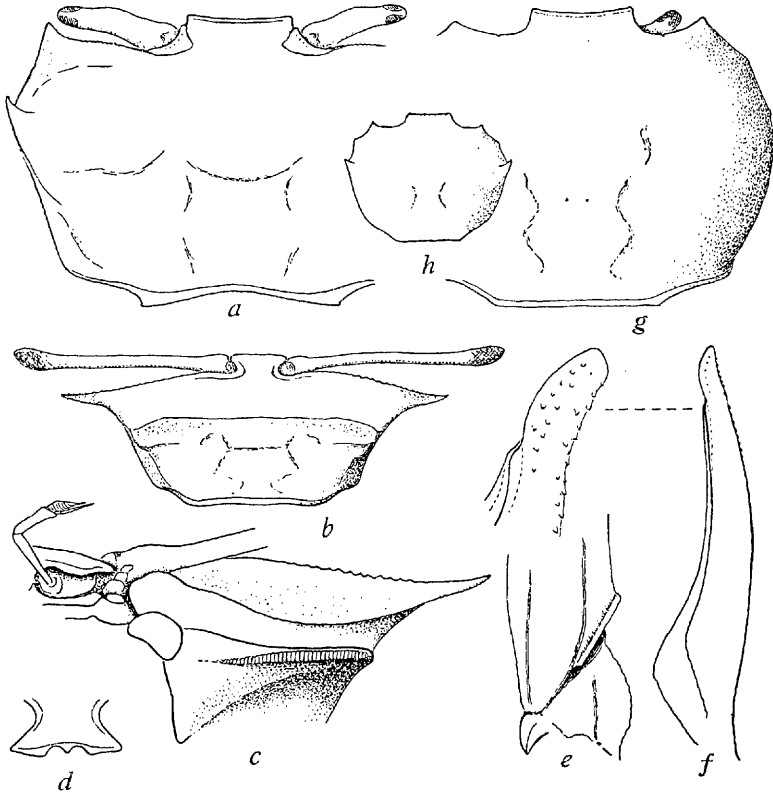


FIG. 53.—*Goneplax angulata* (Pennant). *a*, carapace. *Ommatocarcinus pulcher* n. sp. *b*, carapace. *c*, ventral view of pterygostomial region showing stridulating ridge. *d*, front. *e*, base of 4th joint of cheliped showing stridulating ridge. *f*, 1st pleopod δ , with apex further enlarged. *Carcinoplax longimanus* (de Haan). *g*, carapace of adult. *h*, carapace of juvenile.

stronger and widely gaping at base. Fourth joint of all legs with subapical spine on upper margin, 6th joint fringed on upper and lower margins, 6th joint of 5th leg not expanded, dactyls fringed on front and hind margins, stronger on front margin, dactyl of 2nd leg evenly tapering, of 3rd–5th legs widest in its distal third. Pleopod 1 δ nearly straight, scabrous on dorsal and other surfaces, and also slightly on ventral surface distally (cf. fig. 53, *f*).

Length up to 27 mm., breadth 45 mm., cheliped ♂ 135 mm., ♀ 55 mm. Pale pink, or salmon, or pinky-cream, carapace and chelipeds more or less vermiculate or mottled.

Localities.—Off Cape St. Blaize (Stebbing); Agulhas Bank and Algoa Bay, 40–117 metres (Doflein); Agulhas Bank, 61–72 metres (Odhner); Dassen Island, 35 fathoms (Stebbing); Table Bay, and False Bay to East London, 15–60 fathoms (S. Afr. Mus.).

Distribution.—North Atlantic south to Gulf of Cadiz, Mediterranean.

Remarks.—Although the South African Museum had specimens from Table Bay in 1887, the species was not actually recorded from the Cape until 1902 (Stebbing); according to the collection of the s.s. *Pieter Faure* it is one of the commonest crabs on the Agulhas Bank.

There is apparently a big gap in its distribution between the Gulf of Cadiz and the Mediterranean on the one hand, and the Cape on the other hand. The possibility of transportation by ship is rather remote, as this is not a clinging rock-crab (such as is *Plagusia*) but a sand-burrower.

Among the very numerous specimens examined not one shows any approach to the Mediterranean *rhomboides*, in which the lateral spine behind the outer orbital tooth is reduced to a mere knob or a very slight swelling.

Gen. OMMATOCARCINUS White

1852. White, Append. in Stanley's Voy. H.M.S. *Rattlesnake*, ii, p. 393.

1885. Filhol, Mission file Campbell, Rec. Mem. Ac. Sc. Paris, iii, p. 384.

1918. Tesch, *l. c.*, p. 186.

1929. Chilton and Bennett, Trans. N. Zeal. Inst., lix (1928), p. 757.

1933. Yokoya, J. Coll. Agric. Tokyo Univ., xii, p. 198.

Close to *Goneplax*, but the outer orbital tooth forms a spine directed laterally, behind which the lateral margins are concave and strongly convergent; no epibranchial tooth; front constricted at base; a stridulating ridge on pterygostomial region with an opposing ridge on base of 4th joint of cheliped (? in all species); antenna 2 very short; eye-stalk very long, the cornea extending beyond outer orbital spine. Penultimate sternal plate in ♂ as in *Goneplax*.

Distribution.—Australia, New Zealand, and Malay Archipelago.

Ommatocarcinus pulcher n. sp.

Fig. 53, b-f.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 365 (*Ommatocarcinus* sp.).

Carapace convex longitudinally, with a transverse ridge extending from side to side, upper orbital margin feebly crenulate, outer orbital spine granulate, a milled ridge across the pterygostomial region stridulating. Antenna 2 very small, 3-jointed (on both sides, and flagellum also apparently absent). Cheliped (♂) elongate, 4th joint triquetral, all three surfaces flat and distinctly delimited by the blunt but angular edges; a smooth ridge at base on upper surface opposing the stridulating ridge on pterygostomial region, but otherwise without any spines or denticles; wrist rounded externally, with a small denticle internally; hand like that of *G. angulata*, the right slightly larger than left, finger and thumb gaping at base. Fourth joint of legs fusiform, twice as broad in middle as at either end, no subapical spine on upper margin, dactyls with subparallel margins or evenly tapering. Abdomen as in *G. angulata*, 1st segment more or less concealed, 2nd not quite concealing all the sternal surface, 3rd widest and almost meeting coxae of 5th legs, following segments evenly tapering. Pleopods 1 and 2 as in *G. angulata*.

Length 15 mm., breadth (incl. lateral spines) 37 mm., hind margin of carapace between bases of 5th coxae 12 mm., cheliped (♂) 70 mm. As preserved pale pinkish with indications of darker spots on upper surfaces of hands and fingers of chelipeds.

Locality.—Natal coast, from stomach of fish (S. Afr. Mus. 1 ♂).

Remarks.—This beautiful specimen was obtained in January 1933. The stridulating ridge appears similar to that in *Trizocarcinus* (Rathbun, *l. c.*, 1918, p. 17, fig. 3). *O. orientalis* Tesch 1918 appears to be a juvenile.

Gen. CARCINOPLAX M. Edw.

1910. Stebbing, *l. c.*, p. 313.

1918. Tesch, *l. c.*, p. 154 (list of species only).

Carapace broader than long, convex, regions not defined, lateral margin arched, front straight, distance between outer orbital teeth considerably less than maximum width of carapace. Flagellum of ant. 2 not excluded from orbit. Eye-stalks short, stout. Chelipeds in ♂ usually much longer than in ♀. Legs slender, unarmed, with

fringes of setae, 6th joint and dactyl of 5th leg compressed and somewhat widened. Abdomen with 7 distinct segments in ♂, 2nd and 3rd segments occupying whole width between 5th coxae. Genital openings in adult ♀ very large. Penultimate sternal plate forming a protective covering to the external genital duct in ♂. Pleopod 2 ♂ as long as pleopod 1.

Remarks.—Considerable growth-changes take place in the shape of the carapace and chelipeds (Alcock, 1900, p. 303. Doflein, 1904, pp. 114–117). Thus it would seem doubtful whether all the seven species described from one area by Rathbun in 1914 are valid.

Key to the South African Species.

1. Carapace glabrous *longimanus*.
2. Carapace covered with soft thick fur *vestita*.

Carcinoplax longimanus (de Haan)

Fig. 53, *g, h*.

1904. Doflein, D. Tiefsee Exp., vi, p. 114, pl. 35, figs. 1, 2, pl. 36 (subsp. *indicus* and *japonicus*).

1910. Stebbing, *l. c.*, p. 313.

1923. *Id.*, Fish. Mar. Biol. Surv., Rep. iii (for 1922), Spec. Rep. 3, p. 3.

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

Carapace ovoid, finely granulate, glabrous, antero-lateral margin with 2 slight knobs or indications of teeth behind outer orbital tooth in adult, in juv. 12–19 mm. in length the hinder of these knobs is sharp and dentiform. Orbit about $\frac{2}{3}$ width of front. A granulate ridge across pterygostomial region (but this is not a stridulating ridge). Cheliped, 4th joint with a spine (or tooth or tubercle) in distal third of upper margin, wrist with a spine or tooth on both outer and inner margins, the latter the stronger and usually curving uncinately forwards, hand with a prominent rounded smooth knob at base dorsally, and a blunt ridge ending in a knob (blunt or dentiform) on middle of inner surface, more pronounced in adult ♂. Margins of legs fringed with setae, especially 5th and 6th joints and dactyl of 5th leg. Pleopod 1 ♂ as in *G. angulata* and *O. pulcher*.

Length up to ♂ 50 mm., ♀ 40 mm., breadth ♂ 64, ♀ 50 mm., cheliped ♂ 215, ♀ 80 mm. Smallest specimen examined 12 × 16 mm. (incl. lateral spines). Buff or pale salmon.

Localities.—Off Kowie, 40 fathoms (Stebbing); Natal, 130 fathoms (Stebbing); Portuguese East Africa (25° 17' S., 33° 29' E.) 117 metres (Barnard); Algoa Bay to off Tugela River mouth, 40–63 fathoms, mostly on muddy bottom (S. Afr. Mus.).

Distribution.—Japan, Andaman Is., Burma, Nicobar Is.

Remarks.—In view of the growth-changes, the institution of a subspecific name (*indicus* Doflein, 1904) seems scarcely necessary.

During the course of the s.s. *Pieter Faure* investigations this crab became known to the crew as the Kowie Crab. About 50 specimens were obtained on the trawling grounds between Algoa Bay and the Kowie.

Carcinoplax vestita (de Haan)

1910. Stebbing, *l. c.*, p. 313 (*Pilumnoplax v.*, part references).

1918. Tesch, *l. c.*, pp. 155, 156 (*Pilumnoplax v.*).

1932. Shen, *Zool. Sinica*, ix, p. 110, figs. 63–65, and pl. 5, fig. 1.

[Not *Curtonotus vestitus* McLeay.]

Carapace covered with fine dense fur, oval, antero-lateral margin with 2 small denticles, usually concealed in the fur. Pterygostomial region with ridge (not stridulating). Chelipeds not greatly elongate in ♂, furry, wrist with a tooth on both outer and inner margins, inner surface of hand bare, smooth and turgid in middle. Legs slender, setose.

Length ♂ 18, ♀ 22 mm., breadth ♂ 26, ♀ 29 mm. (Shen). Salmon-coloured with brownish fur.

Locality.—Natal (Krauss) (sed ?).

Distribution.—Japan, China, Australia.

Remarks.—The shape of the carapace seems to indicate more affinity to *Carcinoplax* than to the species of *Pilumnoplax*.

McLeay's "*Curtonotus vestitus*" is not this species but *Pilumnus longicornis* (p. 265); and it is very likely that Krauss' record also refers to the latter.

Gen. PILUMNOPLAX Stimpson

1910. Stebbing, *l. c.*, p. 313.

1918. Rathbun, *l. c.*, p. 21.

1918. Tesch, *l. c.*, p. 154 (key to species).

Carapace depressed, flat, a little broader than long, more or less hexagonal, regions faintly indicated; front straight, antero-lateral margin oblique, toothed. Supra-orbital margin with 1 or 2 furrows. Chelipeds more or less unequal. Legs slender. Abdomen with 7

segments, 1st-3rd in ♂ covering whole sternal width between 5th coxae. Hind margin of penultimate sternal plate not projecting to form a protective covering to the external genital duct in ♂. Genital openings in ♀ not large. Pleopod 2 ♂ elongate, very slender.

Pilumnoplax heterochir (Studer)

Fig. 54, a-c.

1910. Stebbing, *l. c.*, p. 314.

1914. *Id.*, Trans. Roy. Soc. Edin., 50, p. 265.

1918. Tesch, *l. c.*, p. 156 (in key).

1923. Rathbun, Biol. Res. "Endeavour," v, p. 99, pl. 17, figs. 1, 2.

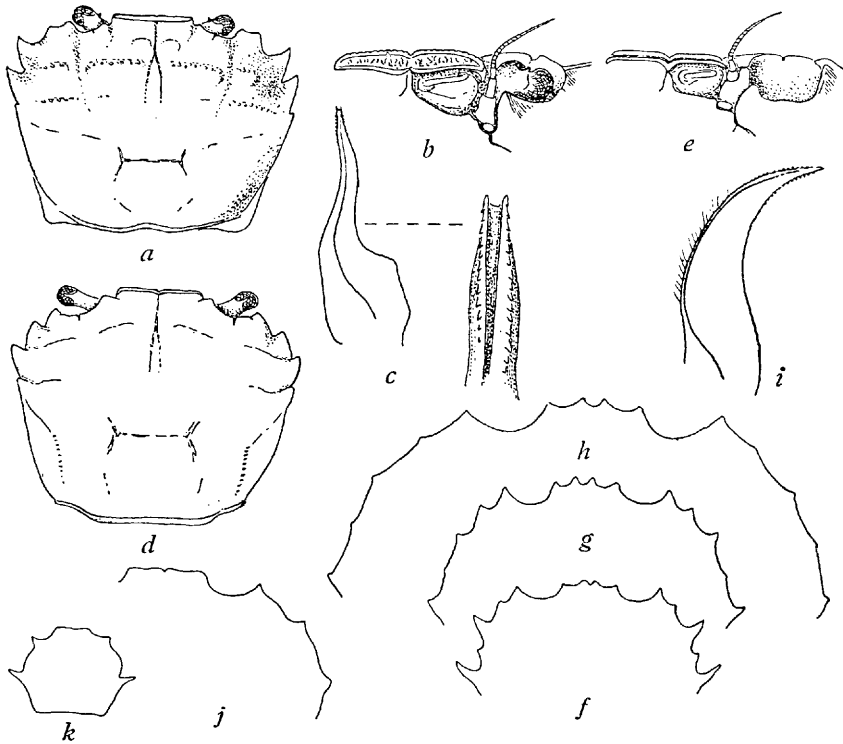


FIG. 54.—*Pilumnoplax heterochir* (Studer). a, carapace. b, ventral view of front. c, 1st pleopod ♂, with apex further enlarged.

Eucrate sulcatifrons (Stimpsn.). d, carapace. e, ventral view of front.

Geryon quinquedens S. I. Smith. f, g, h, anterior profile of carapace of specimens 19 × 27, 52 × 63, and 85 × 100 mm. in size respectively. i, 1st pleopod ♂ (apical scabrosities exaggerated).

Geryon trispinosus (Herbst). j, anterior profile of specimen ca. 70 × 90 mm. (after de Man).

Geryon ischurodous Stebb. k, outline of specimen 16 × 26 mm. (after Stebbing).

Carapace glabrous, minutely shagreened, larger granules on the transverse ridges, frontal and orbital margins more or less beaded, front nearly vertically truncate, inner orbital tooth almost obsolete, 2 very slight supraorbital fissures (the outer one often obsolete), outer orbital tooth truncate or sometimes feebly bilobed, 2 well-developed antero-lateral teeth behind outer orbital tooth, with a very minute and often obscure third tooth. No pterygostomial ridge. A row of 3-4 granules on anterior surface of eye-stalk near cornea. Chelipeds, wrist with 2 teeth on inner margin near base, the larger (usually the right) cheliped with wrist, hand, finger and thumb smooth, except a few granules on outer surface of wrist and at base of outer surface of hand (these granules more conspicuous in juv.); the smaller cheliped with wrist and hand strongly granulate, finger and thumb grooved and ridged. Legs, 4th-6th joints more or less granulate on upper margins, dactyls terete, distal joints sparsely setose. Terminal abdominal segment ♂ much wider than long, apically rounded.

Length up to 14 mm., breadth 20 mm., ♀ slightly smaller than ♂; smallest ovig. ♀ 6.5 × 8.5 mm.; smallest specimen examined 4 × 6 mm. Orange-red, fingers and thumbs of chelipeds black (persistent in alcohol).

Localities.—34° 13' S., 15° E., 117 fathoms (Studer); 35° 4' S., 18° 37' E., 150 fathoms (Miers); southern slopes of Agulhas Bank and off Cape Point, 155-500 metres (Doflein); off Cape Point, and along south-eastern slopes of Agulhas Bank as far east as East London, 100-320 fathoms (S. Afr. Mus.).

Distribution.—Atlantic Ocean: Tristan d'Acunha, 100 fathoms, and Gough Is., 75-100 fathoms.

Indian Ocean: St. Paul, 672 metres, and New Amsterdam, 496 metres.

South Australia and Tasmania, 127-270 fathoms.

Gen. GERVON Kröyer

1910. Stebbing, *l. c.*, p. 313.

1922. Bouvier, *Res. Sci. Camp. Monaco*, fasc. lxii, p. 68.

1937. Rathbun, *l. c.*, p. 265.

Carapace subquadilateral, very little broader than long, regions obscurely defined, frontal and antero-lateral margins usually dentate; inner angle of lower border of orbit usually prominent. Basal joint of ant. 2 movable, flagellum not excluded from orbit. Chelipeds subequal, strong. Legs strong, dactyls bare. Abdomen with 7

segments in both sexes, completely covering sternum between 5th coxae, 3rd segment wider than 1st and 2nd, abruptly so in ♂. Genital openings in ♂ coxal; in ♀ not enlarged. Pleopod 2 ♂ nearly as long as pleopod 1.

Remarks.—A genus of deep-water crabs (with the exception possibly of *trispinosus* and *ischurodous*), which has been assigned to different families by various authors (see Stebbing, 1905, p. 35). Doflein (1904, pp. viii, ix, and 105) placed it along with freshwater crabs in the family *Potamonidae*.

Key to the South African Species.

1. Antero-lateral margin with 5 teeth *quinquedens*.
2. Antero-lateral margin with 2 teeth *ischurodous*.

Geryon quinquedens S. I. Smith

Fig. 54, *f-i*.

1894. Milne Edwards and Bouvier, Res. Sci. Camp. Monaco, fasc. vii, p. 41, figs. A, C, and pl. 1, fig. 1 (*affinis*).

1899. *Id.*, *ibid.*, fasc. xiii, p. 35 (*affinis*).

1904. Doflein, D. Tiefsee Exp., vi, p. 106, pls. 3, 4, 33, 34, 38, figs. 1-6; 41, figs. 3-7; 43, figs. 2, 8, and p. 273, fig. 62 (distribution) (*affinis*).

1904. *Id.*, *ibid.*, p. 112, pl. 31, figs. 1, 2 (*paulensis*, = juv.).

1910. Stebbing, *l. c.*, p. 313.

1922. Bouvier, *l. c.*, p. 70, pl. 6, fig. 7, and p. 70 (*affinis*).

1937. Rathbun, *l. c.*, p. 271, pls. 85, 86.

Carapace dorsally somewhat uneven, smooth but becoming granulate in adult, especially on the cardiac, intestinal, and hinder branchial regions; front quadridentate, the 2 inner teeth rather close together, the outer ones forming the inner orbital angles, orbit about $\frac{3}{4}$ width of front, antero-lateral margin with 5 teeth or denticles (incl. outer orbital tooth), 2nd and 4th teeth always smaller than the others, 3rd and 5th in juv. prominent, almost spiniform (*paulensis*), becoming blunt and obscure in old examples; postero-lateral margin longer than antero-lateral, nearly straight. Chelipeds, a strong spine (relatively stronger in juv. than in adult) on inner margin of wrist, upper surface of wrist and all surfaces of hand granulose-squamulose, both finger and thumb with a line of deep pits along both inner and outer surfaces. Legs, anterior margin of 4th-6th joints more or less strongly

denticulate or spinulose-granulose, dactyls slender, upper and ventral surfaces grooved, or with a line of pits. Abdomen ♂ from 3rd segment onwards triangular with nearly straight sides, 3rd-5th segments with a tendency to coalesce, but the sutures remaining distinct, 1st-3rd transversely ridged (bluntly). Pleopod 1 ♂ stout, falcate, apically acute and very minutely scabrous; pleopod 2 slender, almost as long as 1st.

Length up to 125 mm., breadth 140 mm. (130 × 152 mm., S. I. Smith). Smallest specimen examined 10 × 14 mm. (incl. spines, 11 mm. excl. spines). Brownish- or russet-red.

Localities.—Off Cape Point, 470 fathoms (Stebbing); off Cape Point, 250-760 fathoms, and off East London, 300 fathoms (S. Afr. Mus.).

Distribution.—*quinquedens*: Azores, and east coast of North America, also (*fide* Doflein, fig. 62, chart) east coast of South America.

affinis: Azores, Cape Verdes, South Atlantic (25° 27' S., 6° 8' E.), off east coast of Africa, Indian Seas.

paulensis: Southern Indian Ocean (30° 6' S., 87° 50' E.).

Remarks.—There is no question that *paulensis* represents the young form; even the very small series in the South African Museum indicates as much; on one occasion adults and juveniles were taken in the same haul.

Also both Doflein and Bouvier were disposed to make *affinis* a synonym of *quinquedens*, but apparently considered the difference in the dactyls of 2nd-5th legs to be constant. The small series in the South African Museum, however, shows that this is not constant, or at least that both forms occur in the same locality. In some specimens the upper and lower surfaces of the dactyls are quite flat, with a longitudinal row of pits; in others there is a shallow but distinct longitudinal depression or groove; and in others a definite groove bordered on each side by a ridge (*affinis*, M. Edw. and Bouvier, 1894, text-fig. A).

Geryon ischurodous Stebb.

Fig. 54, *k*.

1923. Stebbing, Fish. Mar. Biol. Surv., Rep. iii (for 1922), Spec. Rep. 3, p. 2, pl. xi.

(Carapace with only 2 teeth (incl. outer orbital tooth) on antero-

lateral margin, the margin between them sigmoidally curved; front "smooth," its central point (*sic*) not visible in dorsal view; straight according to figure, without indication of median notch, or a pair of denticles, and inner orbital angle bluntly rounded. Cheliped, 4th joint with small tooth near base, and a strong one on (middle of) inner margin, wrist with small tooth on outer, and a large bidentate tooth on inner margin. Legs smooth, dactyls subequal to 6th joints.

Length 16 mm., breadth 26 mm.

Locality.—Durban, from coral washed up on beach (Stebbing).

Remarks.—Although not referred to by Stebbing, there is an obvious similarity between this specimen and *trispinosus* (Herbst) (see de Man, 1890, Notes Leyden Mus., xii, p. 69, pl. 4, fig. 6, and Ortmann, 1894, Zool. Jahrb., vii, p. 685), from the East Indies and Japan. The front is nearly straight, with a slight median notch between 2 very blunt lobules (scarcely teeth), and rounded inner orbital angles. The antero-lateral margin has 3 teeth (incl. outer orbital tooth). de Man says of Herbst's type specimen: "the lateral margin is quite straight between the 1st and 2nd teeth, slightly convex between the 2nd and 3rd," and "the anterior margin of the 3rd tooth forms almost a right angle with the lateral margin"; a description which fits Stebbing's figure, barring the absence in the latter of the intervening (2nd) denticle.

de Man gives the size of Herbst's type as $76\frac{1}{2} \times 99$ mm.

There seems little doubt that *ischurodous* should become a synonym of *trispinosus*.

Gen. LITOCHEIRA Kinahan

1910. Stebbing, *l.c.*, p. 314.

1918. Tesch, *l. c.*, p. 163 (key to species).

1933. Balss, *Capita Zool.*, iv, p. 43.

Carapace rather deep, dorsally convex, squarish, regions ill-defined; front with free edge, somewhat deflexed, convex, more or less bilobed; antero-lateral margin straight. Flagellum of ant. 2 not excluded from orbit. Eye-stalk short, stout. Chelipeds slightly unequal. Abdomen of 7 segments, but in the South African species segments 3-6 are more or less completely fused and move as one piece, segments 1-3 in ♂ covering whole space between 5th coxae. Hind margin of penultimate sternal plate strongly projecting, so that genital opening appears to be sternal. Pleopod 2 ♂ very short, only just entering base of groove in 1st pleopod. Genital opening ♀ not large.

Remarks.—Balss has suggested that several of the species placed in

this genus by Tesch and other authors are more properly placed in other genera, chiefly *Heteropilumnus* (*Xanthidae*). The typical species of *Litocheira* has well-developed endostomial ridges (not so in *Heteropilumnus*).

Carapace and legs in the South African species with outstanding bristly hairs.

Litocheira kingsleyi (Miers)

Fig. 55.

1910. Stebbing, *l. c.*, p. 314, and p. 320 ("*Planes minutus*" part: the specimen no. 15070).

1918. Tesch, *l. c.*, p. 164 (in key).

1933. Balss, *l. c.*, p. 44.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 365.

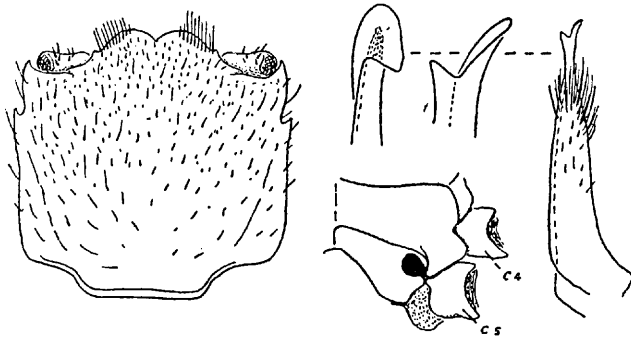


FIG. 55.—*Litocheira kingsleyi* (Miers). Carapace; 4th and 5th sternites with genital opening ♂; c4, c5 = 4th and 5th coxae; 1st pleopod ♂, with apex in ventral, and inner (median) views further enlarged.

Carapace setose, square, length and breadth subequal, front distinctly bilobed in dorsal view, inner orbital tooth small, supra-orbital margin without a fissure, but the beaded margin is interrupted by a shallow oblique groove, outer orbital tooth prominent, acute, one acute spiniform tooth on lateral margin. No pterygostomial ridge. Eye-stalk setose. Basal joint of ant. 2 movable. Chelipeds, lower front margin of 4th joint serrulate, wrist and hand granulate. Legs, 4th joint with a single subapical spine on upper margin, dactyls compressed, with a double row of strong spine-setae on lower margin, the subapical pair being as strong as, or even stronger than, the unguis; all joints with scattered outstanding bristle-hairs.

Length and breadth up to 13 mm. Yellowish, the hairs amber-coloured.

Localities.—35° 4' S., 18° 37' E., 150 fathoms (Miers); 34° 33' S., 18° 21' E., 318 metres (Dofflein); 38 miles N.W. of Table Bay (Stebbing, as "*Planes minutus*"); N.W. of Table Bay, off Cape Point, southeastern slope of Agulhas Bank off East London, 95–300 fathoms (S. Afr. Mus.); Algoa Bay (Port Elizabeth Mus.).

Remarks.—Stebbing's identification and record of a specimen of this species as *Planes minutus* was evidently an accidental slip.

Gen. EUCRATE de Haan

1918. Tesch, *l. c.*, p. 157 (key to species).

1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 238 (Feb.).

1920. *Id.*, *Ann. Durban Mus.*, ii, p. 268 (Aug.).

Carapace a little broader than long, smooth or with feeble ridges, regions ill-defined; front straight; antero-lateral margin convex, toothed, postero-lateral margins convergent. Flagellum of ant. 2 completely excluded from orbit by a process of basal joint. Eye-stalk short, stout. Chelipeds robust, slightly unequal. Legs unarmed, dactyls slender; 6th joint and dactyl of 5th leg often slightly enlarged. Abdomen with 7 segments in both sexes, 3rd segment in ♂ covering whole sternal width between 5th coxae. Genital openings ♀ not large. Pleopod 2 ♂ ?.

Eucrate sulcatifrons (Stimpson)

Fig. 54, *d, e.*

1902. Borradaile, *F. Geogr. Mald. Laccad. Archip.*, i, p. 243, fig. 45 (*Pseudozius (Platyozius) laevis*).

1906. Rathbun, *Bull. U.S. Fish. Comm. for 1903*, p. 861, pl. xi, fig. 7 (*Platyozius laevis*).

1918. Tesch, *l. c.*, p. 158 (references and synonymy).

1920. Stebbing, *l. c.*, p. 238 (*affinis*).

1920. *Id.*, *l. c.*, p. 268.

1921. *Id.*, *Ann. S. Afr. Mus.*, xviii, p. 458, pl. 15 (Crust., pl. 110) (*affinis*).

1945. Stephensen, *Dan. Sci. Invest. Iran*, pt. 4, p. 167, fig. 45, A, B (plp. 1, 2 ♂).

Carapace nearly smooth or with low transverse ridges running from the last, and sometimes also the 2nd, antero-lateral tooth; sometimes

a more or less distinct beaded ridge nearly parallel with the postero-lateral margin; front notched in middle, free edge sulcate; inner orbital tooth not prominent, squarish, a feeble notch in middle of supra-orbital margin; antero-lateral margin with 4 teeth (incl. outer orbital tooth), the 4th one the smallest. Cheliped, one or two teeth on upper inner margin of 4th joint, a blunt tooth on inner margin of wrist, wrist and hand smooth or nearly so, distal end of wrist more or less covered with thick fur, an impressed line or groove near lower margin of thumb. Last 3 joints of legs more or less setose, the 6th joint and dactyl of 5th leg slightly broader than those of the other legs, dactyl with stronger spines, as well as the fringe of setae.

Length up to 12 mm., breadth 15 mm.

Localities.—Off Port Shepstone, Natal, 24 fathoms, and Durban (Stebbing).

Distribution.—Indian Seas, Andaman Is., Mergui Archipelago, to China, Australia and Hawaiian Is.

Remarks.—Tesch decides to maintain this form as a species separate from the Japanese *crenata* de Haan on the grounds that Indian specimens are constantly smaller than Japanese, slightly more sculptured, and have the wrist of the cheliped less furry.

No examination of the 1st pleopod ♂ seems to have been made, even by Shen (1932, *Zool. Sinica*, ix, p. 116, fig. 67, *crenata*). Unfortunately the ♂ specimen mentioned by Stebbing (1921) was not returned to the South African Museum. But see Stephensen, 1945.

Gen. XENOPHTHALMODES Richters

1880. Richters, *Beitr. Meeresf. Mauritius*, p. 155.

1890. de Man, *Notes Leyden Mus.*, xii, p. 68.

1900. Alcock, *J. Asiat. Soc. Bengal*, lxix, p. 323.

1918. Tesch, *l. c.*, pp. 202 (in key), 215.

Carapace subsemicircular, widest posteriorly across hind margin, front moderately wide, more or less bilobed, orbits small. Eye-stalks immovable, very short, stout, cornea obsolete or nearly so (in adult, distinct in juv.). Chelipeds equal or unequal, hand compressed. Dactyls successively decreasing on 2nd to 5th legs. Abdomen with 7 segments in both sexes, in ♂ 2nd segment much narrower than either 1st or 3rd, neither of which cover whole space between 5th coxae. Pleopod 1 ♂ sometimes very long, extending beyond 7th abdominal segment.

Xenophthalmodes moebii Richters

Fig. 56, a-c.

1880. Richters, *l. c.*, p. 155, pl. 16, fig. 29, pl. 17, figs. 1-5.
1890. de Man, *l. c.*, p. 68, pl. 3, fig. 5.
1900. Alcock, *l. c.*, p. 324.
1918. Tesch, *l. c.*, pp. 215, 216.
1926. Barnard, *Trans. Roy. Soc. S. Afr.*, xiii, p. 120 (*Typhlocarcinus rubidus*, non Alcock).
1947. *Id.*, *Ann. Mag. Nat. Hist.* (xi), 13, p. 366.

Carapace smooth except for 2 crescentic impressions, minutely granulate near antero-lateral and lateral margins, bare except for some rather longish and matted hairs on antero-lateral margins (pile, if it was present, is now worn off the single specimen examined); front distinctly bilobed. Free edge of epistome thin, prominent, with slight median groove. Maxilliped 3 with 4th joint slightly narrower than 3rd, its lateral and anterior margins forming an even curve (shape of 3rd joint as in de Man's figure, not as in Tesch's, *i.e.* the inner margin proximally slopes away to the point of attachment at outer corner), 3rd joint longitudinally grooved, 3rd and 4th and exopod minutely granulate. Chelipeds unequal, left larger than right, wrist angular (but not prominently so) on inner margin in right cheliped, distinctly dentiform in left, upper surface smooth and polished, but minutely granulate around margins, and probably setose in life, hand with sharp granulate upper and lower margins (probably setose in life), inner and outer surfaces smooth, finger with longitudinal setose groove on outer surface, apices of finger and thumb acute, crossed when closed. Legs unarmed, setose, dactyls terete, acuminate. Abdomen as figured for *dolichophallus* by Tesch. Sternite between the chelipeds minutely granular along border of the median groove. Pleopod 1 ♂ straight, slender, very long, projecting beyond 7th abdominal segment almost to the buccal cavity.

Length 6 mm., breadth 8 mm. Dirty whitish.

Locality.—Delagoa Bay (Barnard).

Distribution.—*moebii*: Mauritius, Red Sea, Persian Gulf, coast of India, Burma, Andaman Is.

dolichophallus: East Indies.

Remarks.—Re-examination of the specimen in the light of Tesch's work, which was inaccessible to me in 1926, shows that my identification was erroneous. The present specimen (on which the above

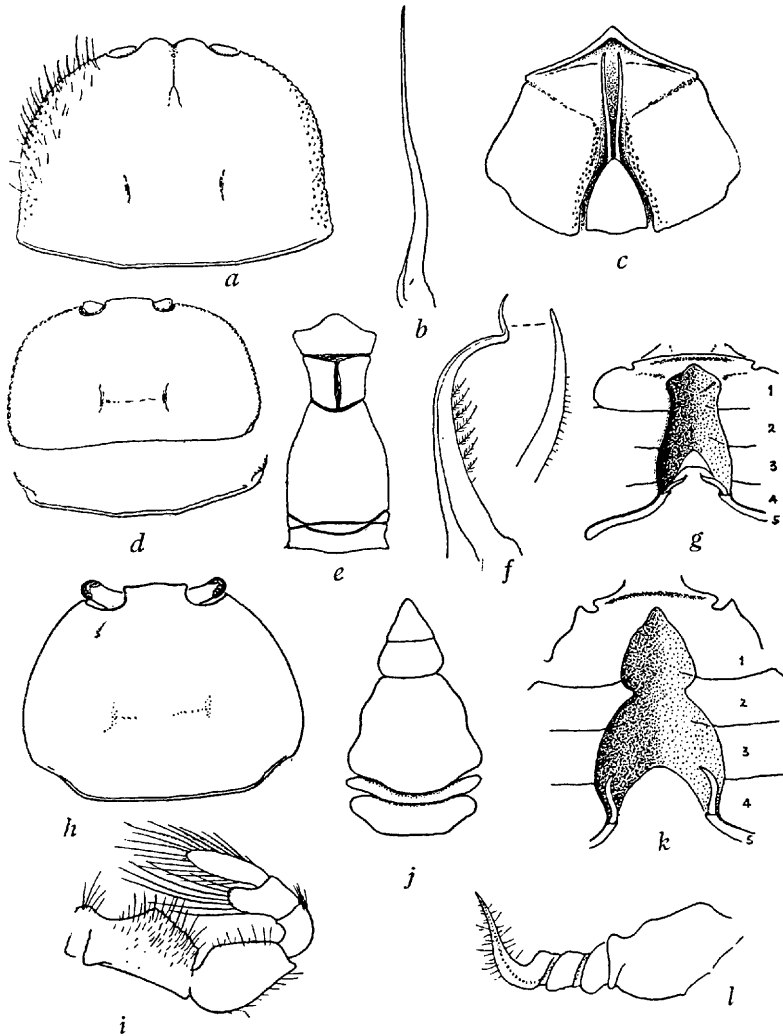


FIG. 56.—*Xenophthalmodes moebii* Richters. *a*, carapace. *b*, 1st pleopod ♂. *c*, sternite between chelipeds, with 7th abdominal segment and projecting apices of 1st pleopods, ♂ (owing to its convexity the 7th abdominal segment appears in the figure slightly shorter than it actually is).

Hexapus stebbingi Brnd. *d*, carapace in dorsal view, with the true hind margin shown separately, because it is not seen in the dorsal view owing to the convexity of the carapace. *e*, abdomen ♂. *f*, 1st pleopod ♂, with apex further enlarged. *g*, sternum ♂, after removal of abdomen, showing external genital duets.

Thaumastoplax spiralis n. sp. *h*, carapace. *i*, 3rd maxilliped. *j*, abdomen ♂. *k*, sternum ♂, after removal of abdomen, showing external genital duets. *l*, 1st pleopod ♂.

description is solely based) agrees best with Alcock's description, though Alcock makes no mention of the elongate 1st pleopods. I consider it likely that the Delagoa Bay specimen is the same as Richters' and Alcock's material, but I am not yet absolutely convinced of its identity.

Gen. HEXAPUS de Haan

1910. Stebbing, *l. c.*, p. 315.

1910. Rathbun, K. Dansk. Vid. Selsk. Skr., 7 R., 5 Afd., no. 4, p. 348.

1918. Tesch, *l. c.*, p. 239.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, pp. 182-185.

Carapace much broader than long, convex longitudinally, regions not defined, front rather narrow, orbits small, antero-lateral margin convex, entire. Eye-stalks very short. Flagellum of ant. 2 not excluded from orbit. Palp of mxp. 3 rather long, 6th joint not expanded. Chelipeds robust and unequal in ♂, weaker and subequal in ♀. Legs strong, only 3 pairs. Abdomen with 5 segments in ♂, 3rd-5th being fused, 2nd shorter than 1st or 3rd, the 6th longitudinally divided by a suture; in both sexes basal segments not nearly covering whole width of sternum, fitting into a deep groove.

Hexapus stebbingi Brnrd.

Fig. 56, *d-g*.

1910. Stebbing, *l. c.*, p. 315, pl. 15 (Crust., pl. 41) (*sexpes*, non Fabr.).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 366.

Carapace setose laterally, smooth, with slightly depressed H-mark in middle, closely pitted, about $1\frac{1}{2}$ times as broad as long, very convex longitudinally, front straight, twice as wide as one orbit, obscurely beaded, antero-lateral and lateral margin from orbit to postero-lateral angle (not actually confluent with postero-lateral margin) minutely but often obscurely beaded, postero-lateral margin on either side of the short hind margin straight. Cornea small. 7th joint of mxp. 3 almost as long as 5th and 6th together. Chelipeds furry, more robust in ♂ than ♀, left cheliped in ♂ larger than right, in ♀ subequal, hand of left chela in ♂ with an obscure ridge on middle of outer surface. Legs furry, dactyls slender, with very sharp ungues. Abdomen in ♂ lying in a very deep trench extending almost to buccal cavity, 5-segmented,

hour-glass shaped, 2nd segment shorter and narrower than 1st, 3rd-5th fused, 6th narrowest, longitudinally divided, 7th transversely pentagonal; 7-segmented in ♀, 3rd segment (or 3rd and 4th) widest, thence tapering evenly, 7th segment triangular. Pleopod 1 ♂ somewhat corkscrew-shaped, tapering to a fine acute apex; 2nd pleopod short, only entering base of groove on 1st. There is a short 5th sternite, at the inner end of which emerges the external continuation of the vas deferens (owing to defective preservation the internal connection with the testis could not be traced).

Length 10 mm., breadth 15 mm. Smallest ovig. ♀ 8 × 12 mm. As preserved, dirty white, cornea feebly pigmented.

Localities.—P.F. 7058 = St. Sebastian Bay, 34 fathoms (Stebbing); Agulhas Bank, from St. Sebastian Bay to Algoa Bay, 15-35 fathoms (S. Afr. Mus.).

Remarks.—The single ♀ specimen described and figured by Stebbing was acquired from the *Pieter Faure* collection by the late Dr. Peringuey, who at the time had not access to the *Pieter Faure* log-books, and thus could not inform Stebbing of the exact locality of no. P.F. 7058. The words used by Stebbing, however, led Tesch to interpret the record as meaning that there was some doubt as to the specimen having come from Cape waters. There is no doubt about the origin of the specimen, but it does not, in fact, seem to belong to de Haan's species *sexpes*.

Tesch has examined de Haan's original specimen of *H. sexpes* in the Leiden Museum, confirming the identity of the Siboga examples. He gives a figure of the ♂ abdomen showing the 1st and 2nd segments very short but equally wide, 6th segment undivided, 7th segment subtriangular and not wider than 6th; thus absolutely different from that of the present specimens. (See also Stephensen, *l. c.*, p. 183, fig. 53, B.) Tesch does not state the sex of de Haan's example, but expresses the opinion that Milne Edwards' and de Man's determinations are correct; he makes no reference to Fabricius beyond crediting the species to him.

Gen. THAUMASTOPLAX Miers

1881. Miers, Ann. Mag. Nat. Hist. (5), viii, p. 261.
 1909. Rathbun, Proc. Biol. Soc. Wash., xxii, p. 113.
 1910. *Id.*, K. Dansk. Vid. Selsk. Skr., R. 7, Afd. 5, no. 4, p. 346.
 1918. Tesch, *l. c.*, p. 238.

Similar to *Hexapus*, except palp of mxp. 3 rather long, 6th joint with inner distal corner expanded; 6th segment of abdomen ♂ without longitudinal suture.

In addition to Miers' original species from Goree Island, Senegambia, Miss Rathbun has described two Siamese species. The specimens described below do not appear to belong to any of these.

Thaumastoplax spiralis n. sp.

Fig. 56, *h-l*.

Carapace with very short pile, longer on lateral margins and pterygostomial region, smooth, closely and finely pitted when pile removed, the H-mark in middle very feebly indicated (visible only when pile removed), moderately convex; front straight, longer than (not quite $1\frac{1}{2}$ times) one orbit, hind margin wide, costate. Eye-stalks stout, setose on hind (orbital) surface, cornea well developed. Chelipeds shortly furry, with some longer plumose setae on margins, right and left subequal in both sexes, or left slightly larger than right in ♂, stouter in ♂ than ♀, hand smooth, finger and thumb not gaping, cutting-edges feebly denticulate. Legs densely furry and with fringes of longer plumose setae, dactyls with very sharp ungues. Abdomen in ♂ lying in a deep trench, 5-segmented, triangular, with well-marked indent at junction of 6th segment with the fused 3rd-5th; in ♀ 7-segmented, 3rd and 4th segments widest. Pleopod 1 ♂ strongly calcified, stout basally, then twisted like a corkscrew, then curving outwards and ending in a fine acute apex. Pleopod 2 short. A short 5th sternite, with external continuation of vasa deferentia at inner ends (cf. *Hexapus*).

Length 5.5 mm., breadth 7 mm. As preserved, with faint reddish mottling, more or less ocellate, two red spots each surrounded by a pale ring in the position of the H-mark on carapace.

Localities.—Off St. Helena Bay, without precise locality or depth (S. Afr. Mus. ex s.s. *Pieter Faure* coll. 3 ♂♂, 1 non-ovigerous ♀); Saldanha Bay (University Cape Town, ♂♂, ♀♀).

Remarks.—The specific name is taken from the 1st pleopod. Dr. Gordon of the British Museum has kindly sent me sketches of the ♂ abdomen and 1st pleopod of Miers' type species *anomalipes*, and, as she remarks, there is no resemblance. The 1st pleopod of *anomalipes* is slender and only slightly sinuous, the abdomen is very much narrower (narrower even than that of *Hexapus stebbingi*), the 6th segment longer than wide.

FAMILY CORYSTIDAE.

1899. Alcock, J. *Asiat. Soc. Bengal*, lxxviii, pp. 5, 103.

1910. Stebbing, *l. c.*, p. 311.

1930. Rathbun, *Bull. U.S. Nat. Mus.*, no. 152, p. 10 (*Euryalidae*).

Carapace longitudinally oval, convex from side to side, regions not well defined; front bilobed or tridentate. Orbits more or less incomplete. First antennae small, folding longitudinally; 2nd antennae with the flagellum (when present) very long and hairy. No epistome. Mxp. 3 elongate, extending almost to the 1st antennae. Legs either all gressorial, or the last pair modified for swimming. Sternum and abdomen narrow, the latter with 5 segments in ♂, in both sexes the basal segments visible dorsally; in ♀ not covering the genital openings and not nearly covering the egg-mass. Genital openings in ♂ coxal.

Key to the South African Genera.

1. Anterior part of carapace dentate. Dactyls of legs dissimilar, 2nd, 3rd, and 5th lamellate *Nautilocorystes*.
2. Whole lateral margin of carapace dentate. Dactyls of legs similar, styliform *Gomezia*.

Gen. NAUTILOCORYSTES M. Edw.

1910. Stebbing, *l. c.*, p. 311.

Carapace moderately convex, anterior half of the lateral margin dentate; front broad, bilobed; suborbital region produced forwards beyond level of apex of front and visible in dorsal view. Orbits directed forwards, eyes retractile. Ant. 2 with long hairy flagellum. Mxp. 3 with 4th joint longer than broad, but considerably shorter than 3rd joint; palp inserted on its oblique apex. Chelipeds slightly unequal, in ♂ not much larger than in ♀. Dactyls of 2nd and 3rd legs depressed (rather than compressed) and folding transversely under body, dactyl of 4th leg triquetral in section, dactyl of 5th leg compressed, ovate-lanceolate, inner margin convex. The fused 3rd-5th abdominal segments in ♂ not narrower than 2nd segment.

Remarks.—Burrowing in sand with only the tips of the antennal flagella projecting. The flagella form a tube conveying a current of water to the gill chamber; the outgoing current leaves the chamber beneath the branchiostegite; thus the normal course of the respiratory current in crabs is here reversed (see Garstang, 1896, *J. Mar. Biol. Assoc. Plymouth*, n.s., iv, p. 223).

Nautilocorystes ocellata (Gray)

Masked Crab.

Fig. 57, *a-c.*

1910. Stebbing, *l. c.*, p. 311 (*octodentatus*).

1914. *Id.*, Trans. Roy. Soc. Edin., 50, p. 264 (references).

Carapace with 4 spaced and sharp teeth on antero-lateral margin

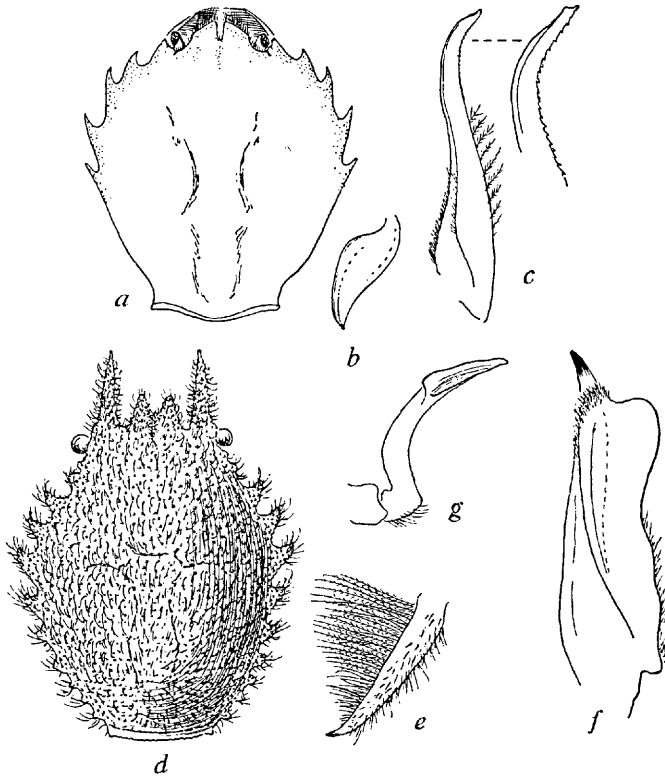


FIG. 57.—*Nautilocorystes ocellata* (Gray). *a*, carapace, suborbital processes showing in front. *b*, dactyl of right 5th leg. *c*, 1st pleopod ♂, with apex further enlarged.

Gomeza bicornis Gray. *d*, carapace. *e*, dactyl of right 5th leg. *f*, 1st pleopod ♂. *g*, 2nd pleopod ♂.

(5 if the blunter outer orbital angles are included), front broadly triangular, divided into 2 lobes by a median notch, surface closely pitted, pits replaced by granules on front, upper orbital margin, and antero-lateral margin. Flagella of ant. 2 longer than carapace in

young, but relatively shorter in adult. Chelipeds granulate, wrist with sharp spine on inner upper margin, hand with the upper outer and inner margins bluntly angular, the outer more distinct than the inner, finger with setose groove on upper surface, and another on upper outer surface. Dactyls of 2nd and 3rd legs narrow lanceolate, dactyl of 4th leg grooved on outer surface, dactyl of 5th leg ovate-lanceolate with convex inner and straight or slightly sinuous outer margin. Pleopod 1 ♂ moderately slender, curving outwards apically, outer distal margin and dorsal surface serrulate or scabrous; 2nd pleopod about half length of 1st.

Length up to ♂ 34, ♀ 28 mm., breadth ♂ 30, ♀ 24 mm. (incl. teeth). Sand-coloured, with thin reddish-brown lines forming ovals or circles.

Localities.—Simon's Bay, 12 fathoms (Stimpson); Cape St. Blaize and Saldanha Bay (Stebbing); Saldanha Bay, False Bay, Agulhas Bank, Knysna, Plettenberg Bay, to Algoa Bay, 10–45 fathoms (S. Afr. Mus.).

Remarks.—No definite record from Table Bay exists, although possibly the original specimens collected by Delalande were from here.

Stebbing (1900) remarks that the ♀ was then apparently unknown. In the South African Museum there are 3 ♀♀ (2 ovigerous). The chelipeds proportionately to the carapace are not much smaller than those of the ♂; the genital openings on the sternum between the 3rd legs are not covered by the abdomen (even in the non-ovigerous ♀), but only by the long shaggy hair on the apex of the abdomen.

The Indian species, *investigatoris* Alek. 1899, has a tridentate front and 2 spines on upper surface of hand of cheliped.

Gen. GOMEZA Gray

1831. Gray, *Zool. Miscell.*, p. 39.

1833. de Haan, *Fauna Japon. Crust.*, pp. 4, 15 (*Oeidea*).

1886. Miers, *Rep. H.M.S. Challenger*, xvii, p. 211.

1930. Rathbun, *l. c.*, p. 10.

1935. Chopra, *Rec. Ind. Mus.*, xxxvii, p. 500.

Carapace strongly convex, whole lateral margin dentate; front moderately broad, with triangular, apically truncate or notched, rostrum, flanked on either side by the supra-orbital spine, which is usually strong. Orbits directed laterally, eyes retractile. Antenna 2 with long hairy flagellum. Mxp. 3 with 4th joint about as broad as long. Chelipeds somewhat unequal. Dactyls of legs all alike, more or less styliform. Abdomen small, fused 3rd–5th abdominal segments in ♂ not narrower than 2nd segment.

Gomeza bicornis Gray

Fig. 57, *d-g*.

1831. Gray, *l. c.*, p. 39.

1835. de Haan, *l. c.*, p. 44, pl. 2, fig. 5 (*O. viginispinosa*) (reference quoted from Miers, *l. c.*).

1886. Miers, *l. c.*, p. 212.

1906. Laurie, Herdman's Ceylon Pearl Fish. Rep., v, p. 421.

1927. Hale, S. Austral. Crust., pt. 1, p. 145, fig. 147.

1935. Chopra, *l. c.*, p. 505, footnote.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 366.

Regions of carapace very faintly indicated; no bosses or swellings on carapace; lateral margin with 9 teeth, rostrum dorsally grooved, deeply emarginate; supra-orbital tooth spiniform, extending beyond apex of rostrum; sub-orbital tooth extending to upper margin of orbit (on under side of supra-orbital tooth). Whole carapace, including lateral teeth and orbital spines, and pterygostomial region and sternum covered with rounded miliary granules, each one on the upper surface of carapace and on sternum bearing a seta or bristle. Chelipeds similarly granulate and setose; a strong spine or tooth on inner apex of wrist. Legs thickly setose; inner margin of 6th joint and proximal two-thirds of inner margin of dactyl of 5th leg with a fringe of long plumose setae.

Length (to median notch of rostrum) ♂ 22 mm., breadth (excl. lateral teeth) 16 mm. Hale: up to 35 mm. in length. Colour in life (see Hale) red, anteriorly brown, branchial regions yellow, antennae and chelipeds brown, legs yellow.

Locality.—Delagoa Bay (coll. van der Horst, 1939, 1 ♂, presumably washed up on beach, with soft parts decomposed).

Distribution.—East Indies, 10 fathoms (Miers), Japan, Ceylon, South Australia.

DROMIACEA.

1907. Borradaile, Ann. Mag. Nat. Hist. (7), xix, pp. 477, 479.

1910. Stebbing, *l. c.*, p. 341 (*Brachyura Anomala*).

1913. Ihle, Siboga Exp. monogr., xxxix, b, pp. 1-96.

1937. Rathbun, Bull. U.S. Nat. Mus., no. 166, p. 27.

Carapace subglobose, subquadrate, or pyriform; front narrow. Last pair, or last two pairs of legs more or less reduced in size and modified, dorsal in position. Buccal cavity squarish. Female genital openings

coxal. First abdominal appendages of ♀ present but reduced. Gills usually numerous.

Key to the Tribes, and South African Families.

- I. Eyes and 1st antennae retractile into sockets (fig. 59, *g, h*).
 Sternum of ♀ traversed more or less completely by 2 obliquely longitudinal grooves *DROMIIDEA*.
 A. Last 2 pairs of legs reduced, subdorsal, usually prehensile. Epipods may be present on chelipeds but not on any of the legs. (5th legs sometimes as long as 3rd, but more slender) *Dromiidae*.
 B. Only the last pair of legs reduced. Epipods on chelipeds and (usually) the following two pairs of legs *Dynomenidae*.
- II. Eyes and 1st antennae not retractile. Basal joint of eye-stalk visible, slender (fig. 65, *d, g, h*). Sternum of ♀ not traversed by any special grooves.
 A. Basal joint of eye-stalk about same length as terminal joint (fig. 65, *d*). Epipods on chelipeds and often also on following two pairs of legs. Gills 13-14
 B. Basal joint of eye-stalk much longer than terminal joint (fig. 65, *g, h*). No epipods on chelipeds or any of the legs. Gills 8
- THELXIO-PEIDEA (HOMOLIDEA)*
Thelxiopeidae (Homolidae)
Latreilliidae.

Ihle unites the *Latreilliidae* with the *Homolidae*. Rathbun keeps them separate, and adopts the old name *Thelxiope* Raf. 1814 in place of *Homola* Leach 1815.

FAMILY DROMIIDAE.

Sponge-crabs.

1910. Stebbing, *l. c.*, p. 342.
 1913. Ihle, *l. c.*, pp. 4-96, pls. 1-4 (morphology, etc.).
 1923. Rathbun, Biol. Res. "Endeavour," v, p. 144.
 1924. Gurney, "Terra Nova" Rep., viii, pp. 188 *sqq.* (larval forms).
 1937. Rathbun, *l. c.*, p. 30.

Carapace usually subglobular, but sometimes flat. Sternum of ♀ with 2 obliquely longitudinal grooves, of varying length. Last two pairs of legs reduced, subdorsal in position; 6th joint with a more or less stout spine opposing the (usually) short 7th joint (dactyl plus unguis) (fig. 58, *e*). Epipods may be present on the chelipeds, but not on any of the following legs. Vestiges of uropods usually present on sternal surface of 6th abdominal segment.

Remarks.—For the history of the inappropriate name *Dromia* (running crab) see Stebbing, 1893, *Hist. Crust.*, p. 135.

Nearly all the representatives of this family conceal themselves by carrying about with them a piece of shell, sponge, or Ascidian, which is held in position on their backs by the last pair of legs, or sometimes the penultimate pair. To achieve this, not only has the position of the last two pairs of legs become dorsal or subdorsal, but there has also been a torsion of the dactyl on the last pair, so that instead of impinging against the lower end of the 6th joint it impinges more or less against the upper apex (*cf.* Ihle, *l. c.*, p. 18).

Certain species with large-sized eggs have an abbreviated larval development, *i.e.* the free-swimming stage is suppressed (see Hale, 1925, *Proc. Linn. Soc. N.S.W.*, 50, p. 405). Growth-changes in the shape and armature of the carapace may also occur (Hale, *ibid.*).

The 1st pleopod ♂ does not offer such decisive specific characters as in some other groups of crabs.

For correct identification of a specimen it is usually necessary to denude the carapace, at least in part, of its furry covering.

Key to the South African Genera.

- I. Carapace flat. 4th leg shorter than 3rd, ending in a large talon-like dactyl (fig. 58, *b*); 5th leg slender. Epipods on chelipeds. Sternal grooves in ♀ ending apart . . . *Conchoecetes.*
- II. Carapace more or less globose. Dactyl of 4th leg not remarkably large or talon-like (fig. 59, *c*).
 - A. Epipods on chelipeds (fig. 58, *f*).
 - 1. Legs not ridged or knobbed.
 - a.* Sternal grooves ♀ ending apart . . . *Dromia.*
 - b.* Sternal grooves ♀ ending together . . . *Dromidiopsis.*
 - 2. Legs ridged or knobbed. Sternal grooves ♀ ending apart . . . *Petalomera.*
 - B. No epipods on chelipeds.
 - 1. Legs smooth. Sternal grooves ♀ ending together.
 - a.* Front deeply bifid (fig. 59, *f, g*) . . . *Eudromidia.*
 - b.* Front tridentate (S. Afr. species) (fig. 60, *a*).
 - i. 5th leg much longer than 4th . . . *Pseudodromia.*
 - ii. 5th leg subequal to 4th.
 - a.* Chelipeds alike in both sexes . . . *Dromidia.*
 - β.* Chelipeds much larger in ♂ than in ♀ . . . *Exodromidia.*
 - 2. Legs ridged or knobbed.
 - a.* Sternal grooves ♀ ending apart . . . *Cryptodromia.*

b. Sternal grooves ♀ ending together.

- i. Subbranchial region without a cavity . *Cryptodromiopsis*.
- ii. Subbranchial region with a deep cavity causing a strong dorsal gibbosity of the branchial region (fig. 64) *Speodromia*.

Gen. CONCHOECETES Stimpson

1893. Henderson, Trans. Linn. Soc. Lond., v, p. 407.

1910. Stebbing, *l. c.*, p. 346.

1913. Ihle, *l. c.*, pp. 50, 87, 91.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 253.

Carapace depressed, subpentagonal, the grooves defining the regions well developed, but obscured under a covering of short close pile. Front tridentate, median tooth at a lower level than the others. Sternal grooves in ♀ ending apart, each on a conical tubercle between bases of 2nd legs (*i.e.* 1st walking legs). Fourth leg robust, dactyl large, curved, talon-like, closing against a blunt process of the 6th joint; 5th leg slender, dactyl small, no spine on either outer or inner apex of 6th joint. Epipods on chelipeds only.

Conchoecetes artificiosus (Fabr.)*Shell-carrying Crab* .

Fig. 58, a, b.

1910. Stebbing, *l. c.*, p. 346.

1920. *Id.*, *l. c.*, p. 253.

1933. Chopra, Rec. Ind. Mus., xxxv, p. 28.

Antero-lateral and lateral margins of carapace more or less granulate, a short supra-orbital tooth, and 2 teeth on lateral margin, one behind cervical groove (fig. 58, a), one behind branchial groove; subhepatic region often granulate. Terminal abdominal segment ♂ triangular, but not ending in a sharp point. Hand of chelipeds with scattered granules, its outer surface with 2 blunt tubercles at base of finger-hinge; 2 tubercles on outer apex of wrist; chelipeds more massive in ♂ than in ♀. 2nd-4th legs more or less granulate, including coxal joints, a blunt tubercle on 5th joint; no spine on coxal joint of 2nd leg ♂. The long hairs on the outer surface of dactyl of 2nd leg form 3 divergent crests, with intervening bare strips, and those on 3rd leg form 2 divergent crests. Dactyl of 5th leg small, uncinatè, without long setae. Eggs very small and numerous.

Length up to 27 mm. Smallest specimen examined 7 mm. Whitish, with drab-coloured pile, fringes on the dactyls of legs more or less reddish, tips of finger and thumb of chelipeds pinkish.

Localities.—Zululand coast, 26 fathoms (Stebbing); off Tugela River, 12–47 fathoms (S. Afr. Mus.).

Distribution.—Indian Seas to Hong-Kong, N. Australia, Japan.

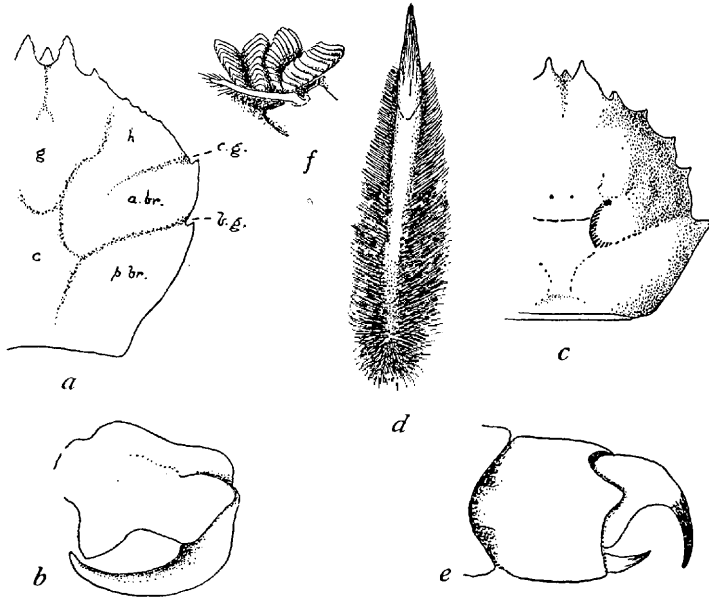


FIG. 58.—*Conchoecetes artificiosus* (Fabr.). *a*, carapace, denuded, showing regions: *a.br.*, *p.br.*, *c.*, *g.*, *h.*, anterior and posterior branchial, cardiac, gastric (mesogastric), and hepatic; and grooves: *b.g.*, *c.g.*, branchial and cervical. *b*, 6th and 7th (dactyl) joints of 4th leg (ventral surface).

Dromia dormia (Linn.). *c*, carapace, denuded. *d*, 7th joint (dactyl) of 3rd leg. *e*, 6th and 7th joints of 5th leg. *f*, base of right cheliped, with epipod, the two arthrobranchs cut off short.

Remarks.—This crab protects itself by holding one valve of a Lamellibranch mollusc over its back by means of the talon-like claws of the 4th legs.

Stebbing's record of a specimen from 460 fathoms off the Cape Point is certainly due to a misplaced label.

Gen. DROMIA Fabr.

1910. Stebbing, *l. c.*, p. 342.

1913. Ihle, *l. c.*, pp. 21, 86, 89.

1937. Rathbun, *l. c.*, p. 30 (credited to Weber; unacceptable).

Carapace convex, slightly broader than long, regions more or less distinct; front tridentate, median tooth at a lower level. Sternal grooves ♀ ending apart on prominent tubercles between bases of 2nd legs. Legs not ridged or knobbed; 4th and 5th legs short, with a horny spine on inner apex of 6th joint opposing the dactyl, but none on outer apex. Epipods on chelipeds only.

Dromia dormia (Linn.)

Sleepy Sponge-crab.

Fig. 58, *c-e*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 812 (*rumphi*).

1903. Borradaile, F. Geogr. Mald. Laccad. Archip., ii, p. 576, pl. 33, fig. 1, *a-d* (*rumphi*).

1905. Stebbing, Mar. Invest. S. Afr., iv, p. 61.

1910. *Id.*, *l. c.*, p. 342 (part, not the False Bay specimen).

1923. Rathbun, Proc. Biol. Soc. Wash., xxxvi, p. 65 (*Dromidiopsis d.*).

1931. Shen, Hong-Kong Natur., ii, p. 96, figs. 3, 4, and pl. 4.

1942. Ward, Mauritius Inst. Bull., ii, p. 70 (*Dromidiopsis d.*).

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 61, fig. 3 (plp. 1, 2 ♂).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 366.

[Not *D. dornica* (typ. err.) Balss, Schultze Reise, v, 1913, p. 109, = *Dromidia aegibotus*, p. 322.]

All parts except tips of fingers and thumbs and dactyls of legs covered with a rather harsh tomentum, with tufts of longer bristles scattered over the carapace. Antero-lateral margin of carapace with 3 pointed subequal teeth, lateral margin with one tooth immediately behind branchial groove; a very small supra-orbital denticle. Abdomen ♂ with median longitudinal ridge between shallow grooves; terminal segment about as broad as long. Chelipeds with 2 blunt tubercles on outer side of wrist. Dactyls of 2nd and 3rd legs bare above, the hairs forming a divergent crest on either side. Eggs very small and numerous.

Length up to 65 mm., breadth 70 mm. (Alcock: 5 $\frac{3}{4}$ in. in breadth). Brownish, tips of finger and thumb of chelipeds pink.

Localities.—Imhambane, P.E.A. (Hilgendorf); Durban (Stebbing, and S. Afr. Mus.); off Tugela River, 25 fathoms (S. Afr. Mus.); Delagoa Bay (coll. van der Horst).

Distribution.—Mauritius, east coast of Africa, Red Sea, Indian Seas to Japan.

Remarks.—Originally named “dormia” in allusion to its supposed soporific and narcotic properties (Stebbing, *Hist. Crust.*, 1893, p. 135).

Under the name of this species Stebbing (1914, *Trans. Roy. Soc. Edin.*, 50, p. 273) mentions some small specimens from Saldanha Bay (“Scotia” Exp.) whose systematic position he did not further elucidate. They are certainly not this species.

Gen. DROMIDIOPSIS Borradaile.

1900. Borradaile, *Proc. Zool. Soc. Lond.*, p. 572.

1903. *Id.*, *Ann. Mag. Nat. Hist.* (7), xi, p. 298.

1903. *Id.*, *F. Geogr. Mald. Laccad. Archip.*, ii, p. 576.

1913. Ihle, *l. c.*, pp. 25, 86, 90.

Carapace convex, usually longer than broad, regions very feebly defined; front tridentate. Sternal grooves ♀ ending together on a median tubercle between bases of chelipeds or 2nd legs. Legs not ridged or knobbed; 5th leg longer than 4th but usually shorter than 3rd, often with a spine on outer side of its 6th joint. Epipods on chelipeds only.

Dromidiopsis cornuta Brnrd.

Fig. 59, *a-d.*

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 367.

Covered with short close pile, the hairs rather thick and shaggy, especially on margins of carapace, chelipeds, and legs. Carapace as long as broad, pentagonal, regions obsolete, but branchial groove distinct, the lateral grooves of cardiac region reduced to elongate pits. Frontal teeth acute and divergent in ♀, spiniform and subparallel in ♂, the median tooth slightly shorter, deflexed, acute. A very blunt and feeble supra-orbital projection, an acute infra-orbital tooth, outer orbital angle distinct but not dentiform, antero-lateral angle rounded, lateral margins nearly straight, with a feeble indent at branchial groove; subhepatic region convex, without tubercles. Terminal abdominal segment ♂ ending in a sharp point. Cheliped with 2 tubercles on outer apex of wrist. Legs not knobbed; 4th leg with 6th joint subglobose, with spine on inner apex (one on outer apex doubtfully present); 5th leg shorter than 3rd, but longer than 4th, 6th joint with a spine on both inner and outer apex. Epipods on

cheliped only. Sternal grooves ♀ ending on a prominent knob on suture between sternites of chelipeds and 2nd legs. Eggs large, 1.5 mm. in diam., about 20 in number.

Length ♂ 9.5, ♀ 7 mm., breadth ♂ 8.5, ♀ 7 mm.

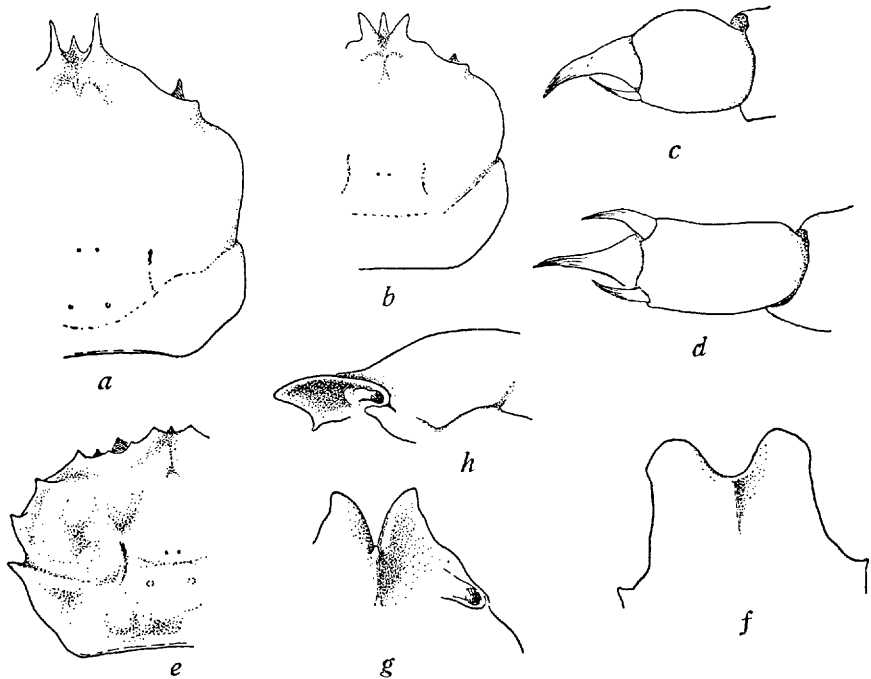


FIG. 59.—*Dromidiopsis cornuta* Brnrd. *a*, *b*, carapace, ♂ and ♀ respectively, denuded. *c*, inner view of 6th and 7th joints of 4th leg. *d*, outer view of 6th joint of 5th leg with dactyl (7th joint) foreshortened.

Petalomera wilsoni (F. & G.). *e*, carapace, denuded.

Eudromidia frontalis (Hend.). *f*, ventral view of frontal lobes (after Henderson).

Eudromidia hendersoni (Stebb.). *g*, ventral view of frontal lobes. *h*, lateral view of anterior part of carapace.

Localities.—False Bay, 23 fathoms (♀), and off Cape St. Blaize, 39 fathoms (♂) (S. Afr. Mus.).

Gen. PETALOMERA Stimpson

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 226.

1903. Borradaile, Ann. Mag. Nat. Hist. (7), xi, p. 300.

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 179.

1913. Ihle, *l. c.*, pp. 48, 87, 91.

1923. Rathbun, Biol. Res. "Endeavour," v, p. 153.

1927. Hale, S. Austral. Crust., pt. 1, p. 111.

Carapace convex, regions clearly or indistinctly defined; front tridentate, upper lobes rather large. Sternal grooves ♀ ending apart behind bases of chelipeds; 4th joint of chelipeds and 2nd and 3rd legs, or chelipeds and 2nd legs only, more or less dilated and ridged (petaloid). Legs with or without knobs; 4th and 5th legs subequal, or 5th distinctly the longer. Epipods on chelipeds only.

Petalomera wilsoni (F. & G.)

Fig. 59, e.

1902. Fulton and Grant, Proc. Roy. Soc. Vict., xv, p. 61, pl. 9 (*Cryptodromia w.*).

1923. Rathbun, *l. c.*, p. 154, pl. 42, fig. 1.

1927. Hale, *l. c.*, p. 113, fig. 111 (after Rathbun).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 368.

Covered with very soft and dense, spongy pile, which on the carapace accentuates instead of obliterating the underlying regions. Frontal lobes very shortly pointed, median rostral point acute. A supra- and an infra-orbital tooth; outer orbital angle with short fissure but not toothed. Antero-lateral margin with 4 short sharp teeth, including the one behind branchial groove, the foremost one at a lower level than the others; all the teeth blunter in juv. No buccal tubercle; 2 supra-sutural tubercles, the one immediately below the infra-orbital tooth inconspicuous and smaller than the other more ventral one. Sternal grooves ♀ ending apart on small knobs on sternal suture between 2nd and 3rd legs. Terminal abdominal segment ♂ broader than long, triangular, apically blunt. Chelipeds more massive in ♂ than in ♀, with 2 prominent knobs on wrist. 2nd and 3rd legs each with a knob on outer apex of 5th and 6th joints; 5th leg distinctly more slender than 4th, in both a spine on apex of 6th joint opposing the dactyl. No spine on coxal joint of 2nd leg ♂. Epipod on cheliped only.

Length up to ♂ 42, ♀ 28 mm., breadth ♂ 60, ♀ 37 mm.

Localities.—Algoa Bay to Natal (off Umhlangakulu River), 30–85 fathoms (S. Afr. Mus.).

Distribution.—Southern Australia.

Remarks.—Comparison of an Australian ♀ specimen, kindly forwarded by Mr. M. Ward, shows no character on which to separate the South African specimens, except that in the latter the outer orbital angle

can scarcely be called prominent; the smaller of the 2 subhepatic (supra-sutural) tubercles is very inconspicuous, in fact practically obsolete; but, on the other hand, the supra-orbital margin is perhaps a little more prominent in the Australian specimen.

The spongy, almost gelatinous, appearance of the pile, when the animal is in liquid or semi-dry, is like the representations given by Fulton and Grant, and Rathbun.

So far as material has been available for verification, this crab and *Conchoecetes artificiosus* and *Dromia dormia* are the only South African Sponge-crabs in which the terminal abdominal segment ♂ is apically rounded or triangularly pointed, instead of ending in a prominent *spiniform* point.

Gen. EUDROMIDIA Brnd.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 13 (*Eudromia*, preocc. Geoffroy, 1832, Aves).

1910. Stebbing, *l. c.*, p. 346 (*Eudromia*).

1920. *Id.*, Ann. S. Afr. Mus., xvii, p. 253 (not the species there-under described) (*Eudromia*).

1921. *Id.*, *ibid.*, xviii, p. 462 (*Eudromia*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 368.

Carapace convex, longer than broad, regions not, or scarcely, defined; front prominently bilobed, with a small median rostral point at a much lower level. Sternal grooves ♀ ending together on a median tubercle between bases of 2nd legs. Legs not knobbed or ridged; 4th and 5th legs unusually small; a spine on inner apex of 6th joint (opposing the dactyl) in 4th leg, but none on outer apex; spines on 6th joint of 5th leg ?. No epipods on chelipeds or legs. Peduncle of antenna 1 large.

Remarks.—An endemic genus with two species, both of which appear to be rare. It must be admitted that the difference between the frontal margin in this genus and that in other genera is one of degree only.

Key to the Species.

1. Indent between frontal lobes wide and shallow, U-shaped.
Lateral margin of carapace toothed *frontalis*.
2. Indent between frontal lobes narrow and deep, V-shaped.
Lateral margin entire, except for notch at branchial
groove *hendersoni*.

Eudromidia frontalis (Hend.)

Fig. 59, *f*.

1910. Stebbing, *l. c.*, p. 346 (*Eudromia f.*).

Covered with short thick pile. Frontal lobes up-turned and separated by a wide and shallow indent. Lateral margin of carapace with a "prominent blunt spine," behind which one or two smaller processes, and a prominent tooth behind branchial groove. Terminal abdominal segment ♂ ending in a sharp point. Each abdominal segment ♀ (except 1st) with a median elevation, on each side of which a small projection on the anterior margin overlapping the preceding segment.

Length (♀) 15 mm., breadth 11.7 mm., cheliped 20 mm. (Henderson).

Locality.—Agulhas Bank, 150 fathoms (Henderson).

Remarks.—Known only from the one ♂ and one ♀ collected by H.M.S. *Challenger*.

Eudromidia hendersoni (Stebb.)

Fig. 59, *g, h*.

1921. Stebbing, *l. c.*, p. 462, pl. 19 (Crust., pl. 114) (*Eudromia h.*).

Covered with short thick pile. Frontal lobes horizontal, separated by a deep and narrow V-shaped indent. Lateral margin entire except for a shallow indent at the branchial groove. Abdominal segments 2-6 in ♀, each with 2 low median tubercles, one near the anterior, one near the posterior margin; no projections overlapping the preceding segments.

Length (to tips of frontal lobes) 13 mm., breadth 12 mm., cheliped *ca.* 15 mm.

Locality.—False Bay, 19 fathoms (Stebbing).

Remarks.—Stebbing did not clean the pile off the frontal lobes, and consequently his figure is far from accurate. Also his figure of the 5th leg shows no spine on inner apex of 6th joint opposing the dactyl; both 5th legs are missing from the now dismembered type specimen, but such a spine was presumably present, as it is present on the 4th leg. Both pairs of antennae are missing.

Known only from the single ♀ specimen collected by the s.s. *Pieter Faure*.

Gen. PSEUDODROMIA Stimpson

1893. Henderson, *Trans. Linn. Soc. Lond.*, v, p. 406.

1910. Stebbing, *l. c.*, p. 345.

Carapace very convex, longer than broad, regions not defined, only the branchial groove and the longitudinal grooves bordering the cardiac region moderately distinct, the latter ending in front in pits. Front forming either a tridentate rostrum with the median point at a lower level, or a single conical rostral point. An incision between the ventral margin of the rostral point and the median crest of the epistome. Sternal grooves ♀ ending together on a median tubercle between bases of 2nd legs. Legs not knobbed or ridged; 4th shorter than 3rd, 5th longer than 2nd. No epipods on chelipeds or legs.

Remarks.—The genus comprises two South African species, and one from Ceylon and Obock; both are easily distinguished from other Sponge-crabs by the unusual length of the 5th leg.

Key to the Species.

1. Front tridentate.
 - a. Frontal teeth subparallel, concealing the median tooth *latens*.
 - b. Frontal teeth divergent, median tooth visible from above *rotunda*.
2. Front forming a conical entire rostral process [*integrifrons*].

Pseudodromia latens Stimpson

Fig. 60, *e, f*.

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, pp. 226, 240.

1900. Stebbing, Mar. Invest. S. Afr., i, p. 24.

1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 178, pl. 21, fig. 3.

1910. Stebbing, *l. c.*, p. 345 (part: nos. 15 and 16).

? 1914. *Id.*, Trans. Roy. Soc. Edin., 50, p. 273.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 368.

Covered with short close, yellowish or brownish pile, longer towards edges of carapace and on chelipeds and legs. Carapace convex, regions indistinct, hollowed laterally in front of branchial groove for reception of the "knee-joint" (junction of 4th and 5th joints) of 5th leg. Front tridentate, the 2 upper teeth subparallel and close together, concealing in dorsal view the much smaller lower median tooth. A very blunt supra-orbital projection, and a blunt infra-orbital tooth. Antero-lateral and lateral margin evenly convex, indented at the branchial groove, but without a tooth behind this indent. Terminal abdominal segment ♂ ending in a sharp point. No spine on coxal joint of 2nd leg ♂. Sixth joint of 4th leg without apical spines (some-

times a minute one amongst the fur on outer apex); in 5th leg a small spine on both inner and outer apex. In ♀ outer rami of 2nd–5th pleopods enlarged and closing round the eggs laterally. Eggs large, 2 mm. in diam., not numerous.

Length up to ♂ 29, ♀ 36 mm., breadth ♂ 22·5, ♀ 32 mm. Crimson or rose-red, carapace and abdomen more or less mottled or speckled,

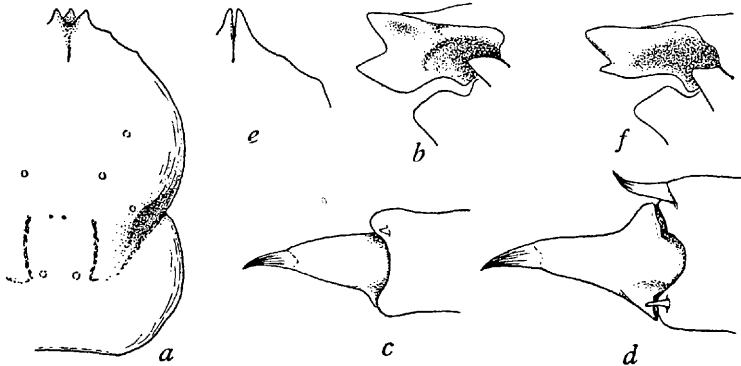


FIG. 60.—*Pseudodromia rotunda* (McLeay). *a*, carapace, denuded. *b*, lateral view of frontal lobe and rostral tooth. *c*, apex of 6th joint with dactyl of 4th leg. *d*, the same of 5th leg (in both the dactyl is shown foreshortened; setae omitted).

Pseudodromia latens Stimpson. *e*, dorsal view of frontal lobes. *f*, lateral view of frontal lobe and rostral tooth.

6–8 small circular areas, which are bare of pile, deeper in colour, as are likewise the lateral cardiac grooves, legs rose-red, eye-stalks crimson, cornea maroon.

Localities.—Simon's Bay, 12 fathoms (Stimpson); False Bay, 10–30 fathoms (Stebbing); Saldanha Bay, Table Bay, west coast of Cape Peninsula, False Bay to East London, 0–55 fathoms (S. Afr. Mus.).

Remarks.—See under *rotunda*.

Pseudodromia rotunda (McLeay)

Fig. 60, *a*–*d*.

1838. McLeay, *Annulosa S. Afr.*, p. 71 (*Dromia r.*).

1849. *Id.*, in Smith, *Illustr. Zool. S. Afr. Invert.*, p. 71 (*Dromia r.*).

? 1884. Miers, *Crust. H.M.S. Alert*, pp. 552, 553.

1888. Henderson, *Rep. H.M.S. Challenger*, xxvii, p. 16, pl. 1, fig. 8, (*latens*, non Stimpson).

? 1894. Ortmann, *Semon's Austral. Reise*, v, p. 35 (*latens*).

1904. Doflein, D. Tiefsee Exp., vi, p. 12, pl. 8, figs. 1-6 (*latens*, non Stimpson).

1910. Stebbing, *l. c.*, p. 343 (*Dromidia* ? *r.*).

1910. *Id.*, *ibid.*, p. 345 (*latens*, part: no. 29).

? 1913. Balss, Schultze Reise, v, p. 109 (*latens*).

? 1923. Odhner, Medd. Göteb. Mus., xxxi, p. 26 (*latens*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 369.

Resembles *latens* in all respects except the front, in which the 2 upper teeth are a little distance apart and slightly divergent, allowing the equally large lower median tooth to be seen in dorsal view. Size and colour as in *latens*.

Localities.—Simon's Bay, 10-12 fathoms (Henderson); False Bay (Stebbing); St. Francis Bay, 100 metres (Doflein); False Bay to East London, 8-35 fathoms (S. Afr. Mus.).

Distribution.—? Amirante Is. (Miers). Off Dar-es-Salaam, 400 metres (Doflein).

Remarks.—As McLeay's brief description fitted Stimpson's species so well, and as this is the most abundant Sponge-crab in False Bay, where it is often washed up on the beach, and therefore most likely to be obtained by collectors like Sir Andrew Smith and Verreaux (see McLeay, *l. c.*, p. 1), I had already come to the conclusion that Stimpson's and McLeay's species were identical. Then in 1937 Mr. Ward informed me that McLeay's type was in the Australian Museum, and sent me a photograph of it. In this photograph the 2 dorsal frontal teeth are separate and the lower median tooth is visible. Henderson's and Doflein's figures agree in this respect, but Stimpson's does not. The whole series in the South African Museum was then examined, and it was found that this difference in the frontal lobes was the only difference, and that it was not a sexual difference. Although there were slight variations in both forms, there was never any doubt as to whether a specimen was *latens* or *rotunda*.* Two distinct species may therefore be accepted.

The geographical distribution of both in South African waters is the same, except that in the South African Museum there are no specimens of *rotunda* from Table Bay or the west coast of South Africa.

The record of Miers, and that of Doflein (off Dar-es-Salaam), are rather surprising, and the specimens should be re-examined; Miers said he was not certain of his identification. The s.s. *Pieter Faure*

* There is one specimen (S. Afr. Mus., No. A808) in which all three frontal lobes are fused into a broadly triangular rostral process, slightly concave dorsally; somewhat similar to that of *integrifrons* Hend. 1893, but not so acutely prominent.

obtained no specimens of either species off the Natal coast, the most north-easterly locality being East London.

In the above references, queries are put against those which merely record localities under the name "*latens*" without giving a figure; they may refer either to *rotunda* or to *latens*. Kossmann (1880, p. 67) regarded *rotunda* as synonymous with *unidentata* (*v. infra*, p. 323), but that opinion is now clearly untenable. McLeay's name refers not so much to the circular profile of the carapace as to its globosity.

Both species cover themselves with the compound Ascidians *Gynandrocarpa placenta* (incl. *G. domuncula*: see Michaelsen, 1934, Trans. Roy. Soc. S. Afr., xxii, p. 132) and *Distaplia skoogi*. The Ascidian is usually more or less globular in shape, and the opening triangular; the apex of the triangular opening dorsal, over the rostrum of the crab. The long 5th legs of the crab are hooked into the Ascidian just inside the sloping sides of the opening.

Gen. DROMIDIA Stimpson

1910. Stebbing, *l. c.*, p. 342.

1913. Ihle, *l. c.*, pp. 31, 86, 90.

1923. Rathbun, *l. c.*, p. 147.

1937. *Id.*, *l. c.*, p. 32.

Carapace convex, as long as broad, or broader than long, regions more or less distinct. Front tridentate, median tooth at lower level. Sternal grooves ♀ ending together, usually between the chelipeds. Legs not knobbed or ridged; 4th and 5th legs subequal, 6th joint with spine on inner apex opposing dactyl, and sometimes also one on outer apex. No epipods on chelipeds or legs.

Key to the South African Species.

1. Antero-lateral margin (between outer orbital angle and branchial groove) with 1 sharp tooth. Covered with dense soft and shaggy hair *hirsutissima*.
2. Antero-lateral margin with 2 sharp teeth. Sparsely covered with longer and shorter spiniform bristles *dissothrix*.
3. Antero-lateral margin with 3 sharp teeth. Densely covered with short stiff bristles *aegibotus*.
4. Antero-lateral margin without teeth. Covered with short close pile. End of 5th leg conspicuously 3-spinate *unidentata*.

Dromidia hirsutissima (Lam.)*Shaggy Sponge-crab.*

Fig. 61, a-c.

? 1793. Fabricius, Entom. Syst., ii, p. 456 (*aegagropila*).1818. Lamarck, Hist. Nat. Anim. sans Vert., v, p. 264 (*Dromia h.*).1838. McLeay, Annulosa S. Afr., p. 71 (*hirtissima*: typ. err.).1910. Stebbing, *l. c.*, p. 342.

Covered with short stiff pile, and long dense fibrous and shaggy brown or yellow hairs. Carapace broader than long, convex with low gibbositities, the most conspicuous being one on inner anterior portion of branchial region, and separated by a rather well-marked groove from cardiac region. Front declivous, the 3 teeth subequal, acute. A sharp supra-orbital tooth, and a sharp infra-orbital tooth, outer orbital angle acutely toothed; 2 buccal teeth, the hinder one blunt; supra-sutural gibbosity distinct, but subhepatic region smooth and concave. Antero-lateral margin with one sharp tooth; a blunt prominence (scarcely a tooth) immediately behind cervical groove and a blunt tooth behind branchial groove. Terminal abdominal segment ♂ triangular, broader than long, ending in a sharp point. Sternal grooves ♀ ending together on a slight prominence between bases of chelipeds. Fifth leg subequal in length to, but more slender than 4th; in 5th leg a horny spine on inner apex of 6th joint opposing dactyl, and also one on outer apex; only the inner spine on 4th leg. A sharp backwardly directed spine on coxal joint of 2nd leg ♂. No epipods on chelipeds or legs. Eggs numerous, 1.5-2 mm. in diam.

Length up to 37 mm., breadth 45 mm. In juveniles (14 mm.) the length and breadth are equal. Maroon or brick-red, with yellowish fur.

Localities.—Lambert's Bay, Saldanha Bay, Table Bay, west coast of Cape Peninsula, Simonstown (S. Afr. Mus.).

Remarks.—There are two old dried specimens in the South African Museum, the larger measuring 42 × 53 mm., alleged to be from a collection made at Mauritius by Monsieur Robillard; as this species has not been found on any part of the South African coast east of False Bay, the source of these specimens must be regarded as doubtful.

The Shaggy Sponge-crab appears to be fairly common in Table Bay. One of the Saldanha Bay specimens is holding a compound Ascidian over its back.

Specimens sent to the British Museum were stated by Dr. Gordon

to agree with specimens there labelled *hirsutissima*. If it could be proved that this was Fabricius' species, his name (*aegagropila* = wild-goat pile) would be most appropriate.

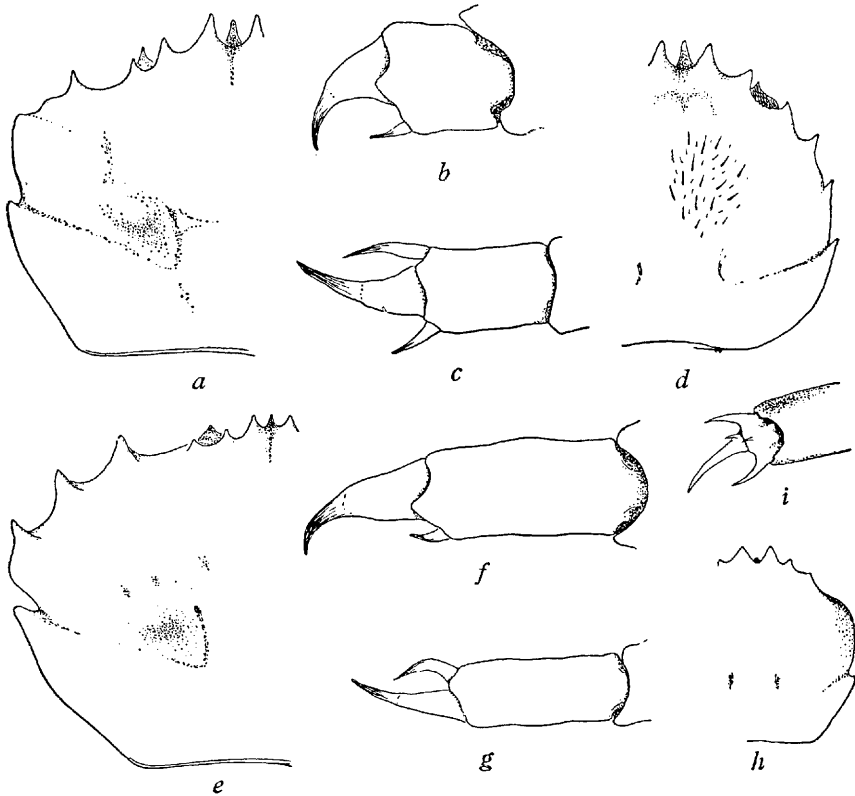


FIG. 61.—*Dromidia hirsutissima* (Lam.). *a*, carapace, denuded. *b*, *c*, 6th joint and dactyl of 4th and 5th legs respectively.
Dromidia dissothrix Brnrd. *d*, carapace, partly denuded.
Dromidia aegibotus Brnrd. *e*, carapace, denuded. *f*, *g*, 6th joint and dactyl of 4th and 5th legs respectively.
Dromidia unidentata (Rüpp.). *h*, carapace, denuded. *i*, apex of 6th joint and dactyl of 5th leg.

Dromidia dissothrix Brnrd.

Fig. 61, *d*.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 367.

Sparsely covered with longer and shorter spiniform bristles and setae. Carapace as broad as long, subcircular, convex, regions obsolete, even the branchial and lateral cardiac grooves very feebly

indicated. Frontal teeth triangular, acute, subequal. A prominent sharp supra-orbital tooth, outer orbital angle dentiform; an acute infra-orbital tooth. Antero-lateral margin with 2 sharp teeth, and a smaller one behind branchial groove. Subhepatic region convex, without tubercles. Sternal grooves ♀ ending on a median tubercle between bases of chelipeds. Two sharp tubercles on wrist of chelipeds. Legs not knobbed. Fifth leg slightly longer than 4th; 6th joint in both legs with spine on inner apex opposing the dactyl, in 5th leg a spine also on outer apex. No epipods on chelipeds or legs.

Length and breadth 9 mm.

Locality.—Off Hoets [*sic*] Bay, 24/xii/97, 1 non-ovig. ♀ (S. Afr. Mus., ex coll. s.s. *Pieter Faure*).

Remarks.—The locality appears to be Hout Bay, west coast of Cape Peninsula, because on the date given the *Pieter Faure* was not near Hoetjes Bay inside Saldanha Bay.

The specimen is sexually mature, and for this reason can scarcely be a not fully-grown example of either *hirsutissima* or *aegibotus*. The 6th joints of 4th and 5th legs are like those of *hirsutissima*, but I have seen young examples of the latter which present all the characters of the adult except that the breadth does not exceed the length. Moreover, the sparse covering is different from that of any other South African Dromiid.

The outline of carapace is similar to that of *Cryptodromia coronata* Stimpson (see de Man, Arch. Naturg., liii, p. 398, pl. 18, fig. 2, ♂), but this, being a *Cryptodromia*, has knobbed legs.

Dromidia aegibotus Brnrd.

Scrubbing-brush Crab.

Fig. 61, e-g.

1910. Stebbing, *l. c.*, p. 342 (*dormia*, non Linn., part: the False Bay specimen).

? 1913. Balss, Schultze Reise, v, p. 109 (*Dromia dornica* (typ. err.), non *dormia* Linn.).

? 1914. Stebbing, Trans. Roy. Soc. Edin., 50, p. 273 (small unidentified specimens from Saldanha Bay).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 366.

Covered with short stiff bristles, like a scrubbing-brush or curry-comb. Carapace broader than long, convex with low gibbosities, the most conspicuous being one on inner anterior portion of branchia

region and separated by a rather well-marked groove from the cardiac region. Front declivous, the 3 teeth subequal and acute. A sharp supra-orbital tooth, a sharp infra-orbital tooth, outer orbital angle blunt, with a very short fissure below it. Two blunt buccal teeth, subhepatic region convex, supra-sutural gibbosity obscure. Antero-lateral margin with 3 sharp teeth, and a prominent tooth behind branchial groove. Terminal abdominal segment ♂ triangular, broader than long, ending in a sharp point. Sternal grooves ♀ ending together on a slight prominence between bases of chelipeds. Fifth leg distinctly shorter and more slender than 4th; in both a horny spine on inner apex of 6th joint opposing the dactyl; that on 4th leg being small in comparison with the dactyl. A sharp backwardly directed spine on coxal joint of 2nd leg ♂. No epipods on chelipeds or legs. Eggs large, 1.5–2 mm. in diam., not very numerous.

Length up to ♂ 70, ♀ 55 mm., breadth ♂ 95, ♀ 70 mm. Reddish, the bristles brownish or yellowish.

Localities.—False Bay (Stebbing, Balss); ? Saldanha Bay (Stebbing); Table Bay, off Cape Point, False Bay, Algoa Bay, 17–32 fathoms (S. Afr. Mus.).

Remarks.—The Buffels Bay (False Bay) specimen sent to Stebbing (no. 39) was a ♂; Stebbing was therefore unaware that in the ♀ the sternal grooves converge to a median tubercle. The specimen, however, is quite unlike *Dromia dormia*, but bears Stebbing's autograph label. Whether Balss also fell into the same error is impossible to say, without re-examination of his material. It seems unlikely that the true *D. dormia* should be found as far west as False Bay; if it were, surely the s.s. *Pieter Faure* would have secured at least one specimen.

In contradistinction to the Shaggy Sponge-crab, the bristly covering of the Scrubbing-brush crab has the appearance of close-cropped turf (*ἀγγιβοτος*).

There is a general resemblance to *D. erythropus* (see Rathbun, 1937, *l. c.*, p. 31, pl. 6.)

Dromidia unidentata (Rüppell)

Fig. 61, *h, i.*

1830. Rüppell, Beschreib. 24 Krabben, p. 16, pl. 4, fig. 2, pl. 6, fig. 9.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 813.

1888. de Man, J. Linn. Soc. Lond., xxii, p. 207, pl. 14, figs. 4, 5.

1894. Ortmann, Semon's Austral. Reise, v. p. 34.
 1901. Alcock, Cat. Decap. Crust. Ind., i, p. 47, pl. 2, fig. 6.
 1905. Nobili, Boll. Mus. Zool. Univ. Torino, xx, no. 506, p. 4.
 1913. Ihle, *l. c.*, p. 31.
 1915. Laurie, J. Linn. Soc. Lond., xxxi, p. 426.

Covered with short close pile. Carapace convex, regions not defined, but lateral grooves of cardiac region usually distinct. Frontal lobes triangular, rostral tooth inconspicuous. A supra-orbital tooth; outer orbital angle prominent, but scarcely dentiform, behind it the antero-lateral margin runs in a sigmoid curve without teeth. A blunt tooth behind branchial groove. Sternal grooves ♀ ending together between bases of 2nd legs. Sixth joint of 4th and 5th legs with a strong spine on both inner and outer apices, these two legs, especially the 5th, thus appear to end in 3 claw-like spines, the middle one being the dactyl (fig. 61, *i*).

Length and breadth ♀ 30 mm. Whitish, with dark brown or blackish pile.

Localities.—Mozambique (Bianconi); Delagoa Bay (coll. van der Horst).

Distribution.—East coast of Africa, Red Sea, Indian Seas and East Indies.

Remarks.—The Delagoa Bay specimen collected by Dr. C. J. van der Horst was concealed under a colony of the Actinian *Palythoa nelliae*.

Dromidia sp.

There is one ♂ specimen (S. Afr. Mus., No. A8301, 32° 45' S., 28° 26' E., 36 fathoms), 6 mm. in length and breadth, which can scarcely be separated from *Dromidiopsis cornuta*, except that the frontal teeth are short and triangular, the rostral tooth is inconspicuous, the infra-orbital tooth is obsolete, and there is no trace of any epipods.

Gen. EXODROMIDIA Stebb.

1905. Stebbing, Mar. Invest. S. Afr., iv, p. 64.
 1910. *Id.*, *l. c.*, p. 344.

Like *Dromidia*, but chelipeds much larger in ♂ than in ♀.

Remarks.—The reasons for instituting this genus do not seem very strong; but if *spinosa* is to be separated from *Dromidia* on account of the marked sexual dimorphism in the chelipeds, clearly *bicornis* should be included with it. Both species are endemic in South Africa.

Key to the Species.

1. Frontal lobes broadly triangular. Coxal joint of 2nd leg ♂
without a spine *spinosa*.
2. Frontal lobes slender, spiniform. Coxal joint of 2nd leg ♂
with backwardly directed spine *bicornis*.

Exodromidia spinosa (Studer)

Fig. 62, a, b.

1905. Stebbing, *l. c.*, p. 65, pl. 18.

1910. *Id.*, *l. c.*, p. 344.

Covered with short fine pile intermixed with solitary short hairs. Carapace about as broad as long, with 2 transverse series each of 3 conical tubercles, in front of and behind the more or less transversely conical tubercle in middle of gastric region; a transverse ridge on anterior border of intestinal region. Frontal lobes large, triangular, the lower median rostral tooth small and conical. An infra-orbital tooth, and outer orbital angle dentiform (when seen in dorsal view). Lateral margin with 3 teeth, the 3rd behind the branchial groove; often some small denticles behind the 3rd tooth. Terminal abdominal segment ♂ triangular, broader than long, ending in a sharp point. Sternal grooves ♀ ending together on a tubercle between bases of 2nd legs. Third joint of peduncle of ant. 2 with a blunt projection on outer apex. Chelipeds ♂ (when fully developed) more than twice as long as carapace, in ♀ very little longer than carapace. Fourth and 5th legs subequal, short, 6th joint in both with a horny spine on inner apex opposing dactyl, but none on outer apex. No spine on coxal joint of 2nd leg ♂. No epipods on chelipeds or legs. Eggs large, *ca.* 1.5 mm. in diam., not numerous.

Length up to ♂ 34, ♀ 22 mm., cheliped ♂ 95, ♀ 31 mm. Mottled with brick-red or orange on a cream ground-colour, legs banded or mottled with reddish, tubercles on carapace and chelipeds white (K. H. B.).

Localities.—South of the Cape, 117 fathoms (Studer); Table Bay, 178 metres, and St. Francis Bay (Doflein); off Cape Point, 91 fathoms (Stebbing); west coast from off Saldanha Bay to south of Cape Point, 80–195 fathoms (S. Afr. Mus.); False Bay and off Cape Hangklip (S. Afr. Mus.).

Remarks.—Juveniles of less than about 10 mm. in length are feebly

sculptured on the carapace, though the grooves bounding the cardiac region are usually distinct.

This Sponge-crab does not apparently cover itself with sponges or Ascidians. Most of the specimens are much obscured by fine greenish

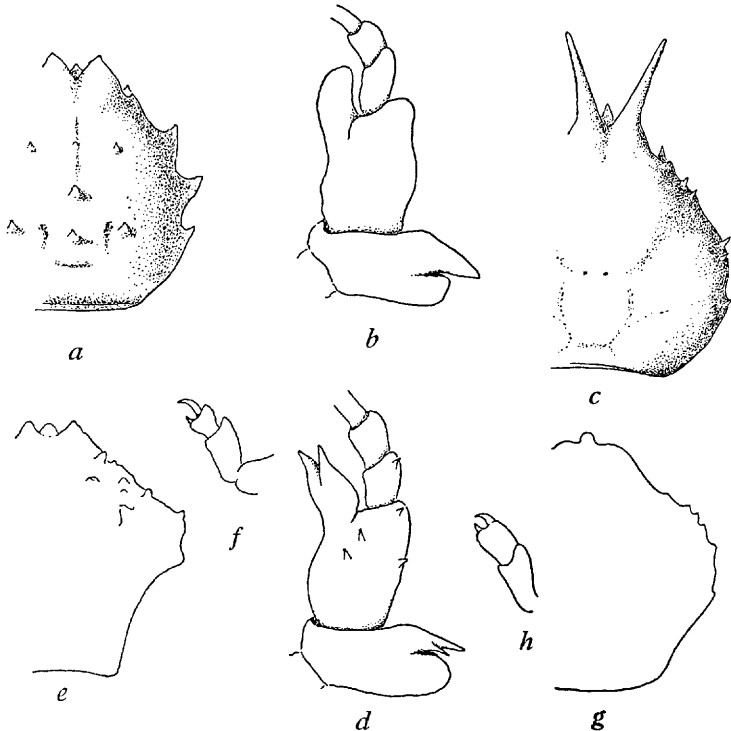


FIG. 62.—*Exodromidia spinosa* (Studer). *a*, carapace, denuded. *b*, ventral view of right peduncle of antenna 2. *Exodromidia bicornis* (Studer). *c*, carapace, denuded. *d*, ventral view of right peduncle of antenna 2 (the apical process of 3rd joint may be single or bifid). *Cryptodromia oktahedros* Stebb. *e*, carapace. *f*, 5th leg. *Cryptodromia monodous* Stebb. *g*, carapace. *h*, 5th leg. (*e, f, g, h* after Stebbing.)

mud and sand entangled in the fur, and probably the crabs lie buried in the soft ooze. Sometimes the tubes of Serpulid worms are attached to the large chelipeds of the ♂, showing that the chelipeds at least are held above the surface of the mud.

Common off the west coast on the Stock-fish grounds, but rare east of Cape Point. Associated with *E. bicornis*, and the Oxyrhynch crabs *Scyramathia hertwigi* and *Achaeopsis thomsoni*.

Exodromidia bicornis (Studer)

Fig. 62, c, d.

1910. Stebbing, *l. c.*, p. 343 (*Dromidia* (?) *b.*).

Covered with rather short stiff pile, with longer bristles towards edges of carapace and on chelipeds and legs. Carapace about as broad as long, regions not defined. Front with 2 divergent, more or less upwardly directed slender spiniform processes, bearing spinules and setae, median tooth acute, much smaller, at a lower level. Supra-orbital and antero-lateral margins with small white spinules, varying in number; similar spinules scattered over carapace, chiefly towards the margins. Terminal abdominal segment ♂ nearly as long as broad, triangular, ending in a sharp point. Sternal grooves ♀ ending together on a tubercle on suture between chelipeds and 2nd legs. Third joint of peduncle of ant. 2 with a spinous process, which may be simple or bifid. Chelipeds larger in ♂ than in ♀, 2 strong tubercles on upper apex of wrist. 4th–6th joints of chelipeds and 2nd and 3rd legs with scattered conical tubercles and spinules. Fifth leg subequal to 4th, in both 6th joint with a horny spine on inner apex opposing dactyl, but none on outer apex. A strong white spine on coxal joint of 2nd leg ♂. No epipods on chelipeds or legs. Eggs large, 1.5–2 mm. in diam., not numerous.

Length (to tip of median frontal point) up to ♂ 20, ♀ 16 mm., breadth ♂ 18, ♀ 15 mm., cheliped ♂ 57, ♀ 25 mm. Reddish (Studer).

Localities.—South of the Cape, 117 fathoms (Studer); Agulhas Bank, 150 fathoms (Henderson); off Table Bay and Cape Point, 106 and 318 metres, St. Francis Bay (Doflein); off Cape Point, 166 fathoms (Stebbing); from off Saldanha Bay to Cape Point and southern slope of Agulhas Bank, 120–200 fathoms (S. Afr. Mus.).

Remarks.—On the same grounds and associated with *E. spinosa*, but much less abundant. Like *spinosa* this species seems to lie buried in the sand and mud.

Gen. CRYPTODROMIA Stimpson

1910. Stebbing, *l. c.*, p. 344 (references, but not the one species thereunder included).

1913. Ihle, *l. c.*, pp. 32 (key to some of the species), 86, 90.

1918. Stebbing, *Ann. Durban Mus.*, ii, p. 56.

1920. *Id.*, *Ann. S. Afr. Mus.*, xvii, p. 251 (not the *n. sp.* there described).

1923. *Id.*, Fish. Mar. Biol. Surv., Rep. iii (for 1922), Spec. Rep. 3, p. 4.

Carapace convex, usually broader than long, regions usually well defined. Front bilobed, with median rostral point at a lower level. Sternal grooves ♀ ending apart, behind the cheliped segment. Legs knobbed or ridged. Fifth leg shorter than 3rd. No epipods on chelipeds or legs.

Key to the South African Species.

1. Carapace approximately octagonal in outline *oktahedros*.
2. Carapace approximately circular *monodous*.
3. Carapace pentagonal [*pentagonalis*].

C. pentagonalis Hilg. (1878, MB. Ak. Wiss. Berlin, p. 814, pl. 2, figs. 1, 2) from Ibo, Portuguese East Africa (also Mauritius and India: Henderson, 1893: Dar-es-Salaam: Ortmann, 1894), is a species which probably occurs also south of 15° S. lat. within our region.

Cryptodromia oktahedros Stebb.

Fig. 62, *e, f*.

1923. Stebbing, *l. c.*, p. 4, pl. 12.

Front with the median tubercle smaller than the frontal lobes and somewhat depressed. Greatest breadth of carapace in the anterior half, the postero-lateral margins nearly straight and converging. Anterior portion of carapace tuberculate, tubercles also on sub-hepatic region (see Stebbing's figures). Chelipeds and legs knobbed. 6th joint of 4th and 5th legs very short, with a spine on inner, but not on outer, apex. Sternal grooves ♀ ? (the description and figure are not clear on this point). Epipods ?.

Length 11.5 mm., breadth 11 mm. (non-ovig. ♀).

Locality.—Durban (Stebbing).

Remarks.—There is a certain likeness in the figure to *C. nodulifera* Hend. (*Challenger* Rep., xxvii, pl. 1, fig. 3) from the Australian coast. Possibly the same as *tomentosa* (see Hilgendorf, 1878, *l. c.*, pl. 2, figs. 3-5), of which *hirsuta* Borradaile, 1903 may be a synonym.

Cryptodromia monodous Stebb.

Fig. 62, *g, h*.

1918. Stebbing, *l. c.*, p. 56, pl. 8.

Covered with short pubescence. Carapace strongly convex, smooth. Frontal lobes rounded, not so prominent as the depressed but slightly

up-turned rostral point. Antero-lateral margin with 6-8 (the type was asymmetrical) small teeth; no supra-orbital tooth. Sternal grooves ♀ ending apart between bases of 2nd legs. Chelipeds and legs knobbed. 5th leg longer than 4th, in both 6th joint short, with spine on inner, but not on outer, apex. Epipods ?.

Length 21 mm., breadth 20 mm. (♀ with ova in oviducts). Reddish.

Locality.—Durban (Stebbing).

Remarks.—Cf. *octodentata* (Rathbun, 1923, Biol. Res. "Endeavour," v, p. 151, pl. 41; and Hale, 1927, S. Austral. Crust., pt. 1, p. 107, fig. 103; also de Man's figure of *caput-mortuum*, 1887, Arch. Naturg., liii, pl. 17, fig. 5).

Gen. CRYPTODROMIOPSIS Borradaile.

1903. Borradaile, Ann. Mag. Nat. Hist. (7), xi, p. 299.

1903. *Id.*, F. Geogr. Mald. Laccad. Archip., ii, p. 578.

Carapace convex, usually broader than long, regions usually ill-defined. Front bilobed, with median rostral point at a lower level. Sternal grooves ♀ ending together between chelipeds. Legs knobbed or ridged. Fifth leg shorter than 3rd. No epipods on chelipeds or legs.

Remarks.—Separated from *Cryptodromia* on account of the converging sternal grooves in ♀. It is doubtful whether a spine on outer apex of 6th joint of 5th leg can be regarded as a generic character.

Key to the South African Species.

1. Frontal teeth not prominent. 6th joint of 5th leg more than twice as long as wide. Carapace smooth *spongiosa*.
2. Frontal teeth prominent, overhanging the rostral point.
6th joint of 5th leg not twice as long as wide. Carapace areolate, granulate or tuberculate.
 - a. Carapace tuberculate and granulate, covered with setiform hairs *bituberculata*.
 - b. Carapace areolate only, covered with imbricate scales . . . *lepidota*.

Cryptodromiopsis spongiosa (Stimpson)

Fig. 63, a-c.

? 1865. Heller, Novara Crust., p. 72 (*Dromidea s.*).

? 1884. Miers, Zool. H.M.S. *Alert*, Crust., p. 552, pl. 50, fig. A (? var. *stimpsonii*).

1910. Stebbing, *l. c.*, p. 343 (*Dromidia s.*).

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

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 251, pl. 22 (Crust., pl. 102)
(*Cryptodromia micronyx*).

1921. Balss, Beitr. Kennt. Meeresf. Westaf., iii, p. 47 (*Dromidia s.*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 369.

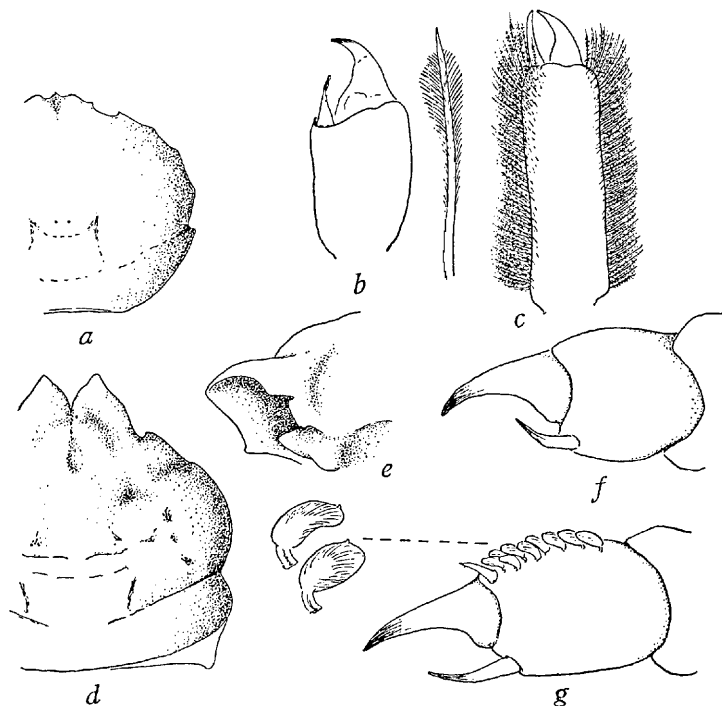


FIG. 63.—*Cryptodromiopsis spongiosa* (Stimpson). *a*, carapace, denuded. *b*, *c*, 6th joint and dactyl of 4th and 5th legs respectively, with seta from leg. *Cryptodromiopsis lepidota* Brnrd. *d*, carapace, denuded, the unshaded triangular area is membranous. *e*, lateral view of front. *f*, *g*, 6th joint and dactyl of 4th and 5th legs respectively, the scaly covering only partly represented, and two scales further enlarged.

Covered with a very short close and thick pile ("sponge-like," Stimpson). Carapace globose, smooth. Frontal lobes short, rounded; median rostral point subequal but strongly deflexed. A blunt supra-orbital tooth. Antero-lateral margin with 4 rounded undulations, the hindermost one forming a blunt knob behind branchial groove. Regions ill-defined, but grooves defining cardiac region distinct. Terminal abdominal segment ♂ broader than long, triangular, ending in a sharp point. Chelipeds and legs knobbed. Fifth leg longer and

more slender than 4th, its 6th joint (when denuded) almost 3 times as long as wide; dactyl in both legs very small, a horny spine on inner but not on outer apex of 6th joint. No spine on coxal joint of 2nd leg ♂. Sternal grooves ♀ ending together between chelipeds. No epipods on chelipeds or legs. Eggs large, 1.5–2 mm. in diam., not numerous.

Length up to ♂ 13, ♀ 13.5 mm., breadth ♂ 16, ♀ 15 mm. Reddish orange, finger and thumb of chelipeds crimson with white tips.

Localities.—False Bay, 10–20 fathoms (Stimpson, Henderson); Luderitzbucht (Balss); off Cove Rock, East London, 22 fathoms (Stebbing); Saldanha Bay, False Bay, Hermanus, Mossel Bay, and off East London, 9–85 fathoms (S. Afr. Mus.).

Distribution.—St. Paul Is., Indian Ocean (Heller; see Henderson's comment).

Remarks.—Two ♂♂ from False Bay agree in all respects with the 2 ♀♀ returned by Stebbing as *micronyx*. It is probable that if Stebbing had seen examples from False Bay he would have recognized Stimpson's species. Stimpson described the 4th leg as "truncate at the tip," which exactly expresses the appearance of this leg when seen with the naked eye and not denuded of its furry covering; his representation of the 6th joint of the 5th leg is certainly not correct. The explanation seems to be that the right-hand side of the figure is drawn with the setose covering, and with the 6th joint of 5th leg somewhat fore-shortened; the left-hand side is drawn as denuded of the covering, but the legs are drawn as of the *same thickness* as those on the right side (except the 4th joint of 5th leg), thus giving a false impression. The ventral view of the front corresponds with Henderson's figure.

Miers' var. *stimpsonii* from Mozambique requires further investigation.

According to Ihle (*l. c.*, p. 31) this species was studied by Bouvier (1896, Bull. Soc. Philom. Paris (8), viii, p. 55). I have not seen the paper.

Cryptodromiopsis bituberculata (Stebb.)

1920. Stebbing, *l. c.*, p. 254, pl. 23 (Crust., pl. 103) (*Eudromia b.*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 369.

Whole surface (including ventral surface of 3rd and 4th joints of mxp. 3) granulate. Carapace, chelipeds and legs with a thin, feeble covering of short stiffish hairs, sometimes nearly obsolete. Carapace pentagonal, areolate; frontal lobes prominent, the median rostral tooth strongly deflexed, small, acute. A pair of prominent rounded tubercles on gastric region (not always as strongly developed as in the

type), and a less conspicuous pair behind them. Lateral margin with a large conical tubercle behind cervical groove, and a smaller one behind branchial groove. Inner portion of anterior branchial region often surmounted by a small tubercle. Chelipeds and legs nodulose as well as granulate. Terminal abdominal segment ♂ ending in a sharp point (bifid in one case). Sternal grooves ♀ ending together between bases of chelipeds. No spine on coxal joint of 2nd leg ♂. 5th leg shorter than 4th, both with a small dactyl impinging against a spine on inner apex of 6th joint. Anterior margin of 4th joint of mxp. 3 *gibbous, white and polished*. No epipods on chelipeds or legs.

Length (incl. frontal lobes) up to ♂ 14, ♀ 15 mm., breadth ♂♀ 17 mm. (incl. lateral processes).

Localities.—False Bay, 18 fathoms (Stebbing); Algoa Bay, off Gt. Fish Point, and off East London, 16–22 fathoms (S. Afr. Mus.).

Remarks.—This species conflicts with the diagnosis of *Eudromia*, as Stebbing himself said (p. 253); it is obviously closely allied to the Indian *C. gilesii* Alck. (1901, Cat. Ind. Decap. Crust., i, p. 54, pl. 3, fig. 13), but is even more strongly sculptured.

Cryptodromiopsis lepidota Brnrd.

Fig. 63, *d–g*.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 369.

Covered with a soft close tomentum consisting of imbricate, scale-like battledore-shaped "hairs." Carapace areolate, smooth, not granulate, subpentagonal, about as long as wide. Frontal teeth prominent, triangular, overhanging the small rostral point. No supra-orbital tooth, infra-orbital tooth weak; supra-sutural hump distinct, but region between it and orbital notch concave. Antero-lateral angle rounded; lateral margin distinctly notched at branchial groove, but without tooth. Sternal grooves ♀ apparently ending together (specimen immature). Chelipeds and 2nd and 3rd legs knobbed. Fourth and 5th legs stout, 5th slightly the longer; 6th joint of 4th leg globose, with spine opposing dactyl; 6th joint of 5th leg oblong, with spine on both inner and outer apices. No epipods on chelipeds or legs.

Length (incl. frontal teeth) 6 mm., breadth 6.5 mm.

Locality.—Off Hood Point Lighthouse, near East London, 49 fathoms, 1 immature ♀ (S. Afr. Mus.).

Remarks.—The imbricate scale-like covering seems to be peculiar to this species and *Speodromia platyarthrodes*.

Gen. SPEODROMIA Brnrd.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 370.

In general like *Cryptodromiopsis*. Carapace with the gastric and branchial regions gibbous, the branchial region especially inflated owing to a deep cavity in the subbranchial region. This cavity is closed anteriorly by a lobate enlargement of the 4th joint of the cheliped (when flexed) and posteriorly by the 4th joints of the 2nd-4th legs (1st-3rd walking legs). Upper surface of carapace with sessile scale-like setae arranged more or less in a network or vermiculate pattern; margins of carapace, under surface, 3rd maxillipeds, chelipeds and legs with longer clavate and spiniform setae. Front obscurely tridentate. Sternal grooves ♀ ending together between bases of chelipeds. Tips of finger and thumb of cheliped hollowed, with interlocking teeth. The gills are phyllobranchiae, arranged as follows:—

	Podobranchs.	Arthrobranchs.	Pleurobranchs.
Mxp. 1	epipod	..	..
2	1 + epipod	..	..
3	1 + epipod	..	..
Prp. 1	..	2	..
2	..	1	1
3	..	1	1
4	..	1	1
5	..	..	1
	2 + 3 epipods	5	4 = 11 + 3 epipods

Remarks.—Stebbing made no comment on the remarkable cavities on the ventral surface of the branchial regions, which, together with the reduced branchial formula, are the reasons for instituting a separate genus.

Balss (1938, *l. c.*, *infra*) has excluded Stebbing's species *platyarthrodes* from the genus *Dynomene*, giving reasons why he considered it a Dromiid. The statement, based on Stebbing's figures, that the tips of the finger and thumb of cheliped are pointed is not correct; they are typically Dromiid, with small interlocking teeth.

Speodromia platyarthrodes (Stebb.)

Fig. 64.

1905. Stebbing, Mar. Invest. S. Afr., iv, p. 59, pl. 17 (*Dynomene p.*).1910. *Id.*, l. c., p. 347 (*Dynomene p.*).

1938. Balss, Medd. Göteb. Mus., lxxv, p. 6.

Upper surface of carapace reticulate and vermiculate with low corrugations which are studded with minute sessile, scale-like setae (fig. 64, *b*); margins of carapace, under surface, chelipeds and legs with pedunculate, clavate setae (fig. 64, *c*) and setiform hairs, those on wrist and hand of cheliped arranged more or less reticulately or in groups. A thick fringe of clavate setae around the anterior margin of the subbranchial cavity (fig. 64, *a*, right side). Hind margin of 4th joint of cheliped laminately expanded, forming a prominent lobe distally. Uropods visible on external surface of abdomen in ♀ (*vide* Stebbing), but only on internal surface in ♂ and juv. ♀. In addition to the phyllobranchiae as given above, there are on the membranous inner wall of the branchial chamber, just above its junction with the calcified epimera, a group of 5 lobes bearing long setae, and a single lobe farther posteriorly. These lobes appear to be hollow, and connected through two apertures with the body cavity, but the condition of the specimens is too poor to determine with certainty whether they are connected with the circulatory system.

Length up to 26 mm., breadth 38 mm.

Localities.—"Off Cape Point, 650-700 fathoms" [*sic*] (Stebbing); Mossel Bay and Algoa Bay, 20-28 fathoms (S. Afr. Mus.).

Remarks.—The type ♀ was not returned to the South African Museum. There are, however, one ♂ from Mossel Bay, and 1 adult ♂, 1 juv. ♂, 1 juv. ♀ from Algoa Bay, which have been utilized in the above description.

The locality given by Stebbing is so remarkable that it is suggestive of other bottles having been broken in transit besides the one mentioned by Stebbing (1905, p. 60), with consequent mixing of labels. The Cape Point locality should, in my opinion, be deleted.

FAMILY DYNOMENIDAE.

1910. Stebbing, *l. c.*, p. 346.

1937. Rathbun, Bull. U.S. Nat. Mus., no. 166, pp. 30, 51.

Carapace convex or flattish, subcircular. Sternal grooves ♀ very short. Only the last pair of legs reduced in size and subdorsal in

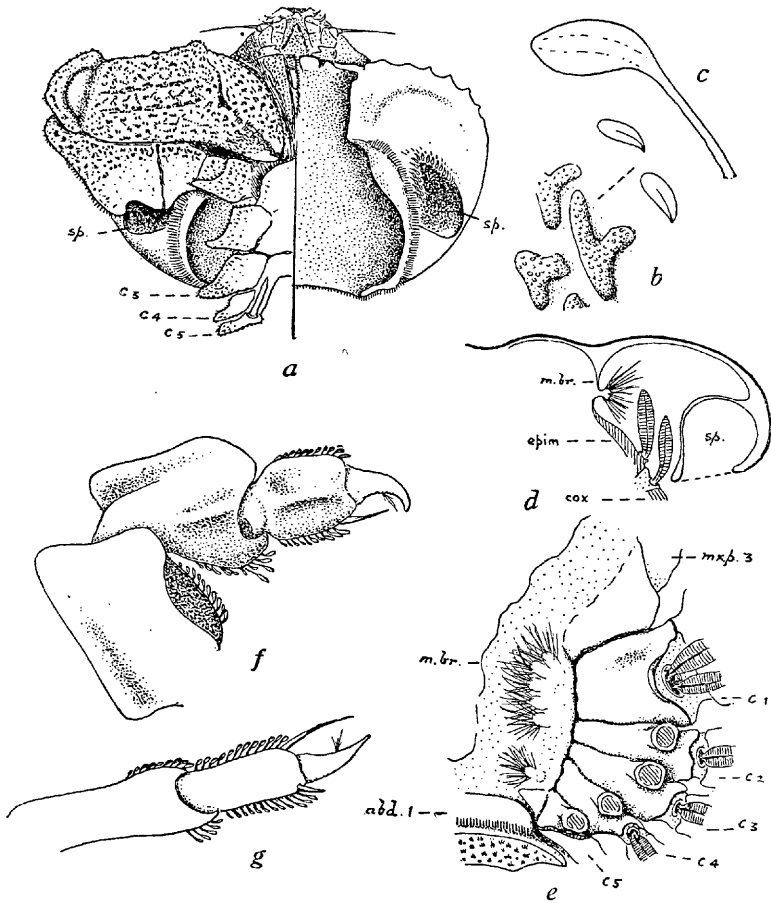


FIG. 64.—*Speodromia* Brnd., *Speodromia platyarthrodes* (Stebb.). *a*, ventral view, left side showing mxp. 3, cheliped, and coxae 2-5 *in situ*, right side after removal of sternites and appendages. *b*, portion of carapace, with sessile scale-setae. *c*, stalked clavate seta from ventral surface. *d*, diagrammatic cross-section through branchial chamber and subbranchial cavity. *e*, view of inner wall of branchial chamber, arthrobranchs cut off short, pleurobranchs removed, setiferous lobes on membranous part of inner wall. *f*, 4th leg. *g*, 5th leg, marginal clavate setae only partly represented.

(*c* 1-5, 1st-5th coxae. *m.br.*, cut edge of membranous inner wall of branchial chamber. *sp.*, cavity in subbranchial region.)

position; 6th joint of 4th leg not subchelate, *i.e.* without a spine opposing the dactyl. Epipods typically present on chelipeds and next two legs. Vestiges of uropods present.

Gen. DYNOMENE Desm.

1905. Stebbing, Mar. Invest. S. Afr., iv, p. 58 (but not the *n. sp.* thereunder described).

1911. Rathbun, Trans. Linn. Soc. Lond., xiv, p. 195.

1921. Stebbing, Ann. S. Afr. Mus., xviii, p. 456 (*Maxillothrix*).

1925. Odhner, Medd. Göteb. Mus., xxix, p. 85 (*Maxillothrix* = *Dynomene*).

1937. Rathbun, *l. c.*, p. 54.

1938. Balss, Medd. Göteb. Mus., lxxv, p. 6.

1942. Ward, Mauritius Inst. Bull., ii, p. 70.

Carapace flattish, subcircular, covered with soft pile. Front broadly and bluntly triangular, with medio-dorsal groove. Tips of finger and thumb of chelipeds spooned.

Remarks.—The branchial formula (1899, M. Edwards and Bouvier, Res. Sci. Camp. Monaco, xiii, p. 10) is said to be the same as that of *Homarus vulgaris* (*i.e.* 20 + 7 epipods). Alcock (1899, J. Asiat. Soc. Bengal, lxxviii, p. 133, footnote) had insufficient material for complete dissection, but found that the gills were more numerous than in *Dromia*, etc. One of the South African specimens of *D. pilumnoides* shows the following formula:—

	Podobranchs.	Arthrobranchs.	Pleurobranchs.
Mxp. 1	epipod	..	..
2	1 + epipod	..	..
3	1 + epipod	..	..
Prp. 1	1	2	..
2	1	2	1
3	1	2	1
4	1	2	1
5	..	..	1
	6 + 3 epipods	8	4 = 18 + 3 epipods

I failed to find any epipods on the chelipeds or legs.

Dynomene pilumnoides Alck.

Fig. 65, a-c.

1899. Alcock, J. Asiat. Soc. Bengal, lxxviii, p. 133.

1901. *Id.*, Cat. Decap. Crust. India, i, p. 35, pl. 1, fig. 2.

1921. Stebbing, *l. c.*, p. 457, pl. 14 (Crust., pl. 109) (*Maxillothrix actaeiformis*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 371.

Covered with a thick tomentum of short club-shaped setae, with groups of longer spiniiform setae on various parts of carapace, and on chelipeds and legs. Carapace slightly broader than long, regions fairly well marked. Upper orbital margin with a feeble notch, lower border with a stronger notch near inner angle, and forming a short infra-orbital tooth on its outer side; outer orbital margin rounded. Antero-lateral margin with 5 sharp teeth, the hindmost the smallest and situate just behind the very feeble branchial groove. Chelipeds subequal, with small scattered tubercles on upper surfaces of 4th-6th joints, 2 larger tubercles on outer upper apex of wrist (5th), and a tuberculiform process, sometimes tridentate, on its inner margin (fig. 65, b). Upper and lower margins of 4th joint, and both upper margins of 5th joint of 2nd-4th legs with a few small denticles; upper apex of 4th joint rather prominent. Terminal abdominal segment ♂ and ♀ broadly rounded.

Length up to 11.5 mm., breadth 13.5 mm.

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

Distribution.—Laccadive Archipelago.

Remarks.—Stebbing's description and figure of five "lobules" instead of sharp teeth on the carapace border were due to his not cleaning off the tomentum.

It is probable that *pilumnoides* is really synonymous with *hispidia* Desm., but Alcock (1901) distinguished his species from *hispidia* and *pugnatrix* de Man by its non-serrate lower orbital border. As the present specimens also have only one small tooth on the lower orbital border, they are referred to Alcock's species.

Both *hispidia* and *pugnatrix* have been recorded from Mauritius (*cf.* Ward, *l. c.*).

In the only ♂ of the four specimens in the South African Museum the abdomen does not agree with Stebbing's description and figure: the 1st segment is wider than 2nd, which is the shortest (as is also the case in ♀). Neither the figure of the ♂ abdomen nor that of the ♀ show the very distinct intercalated pieces representing the uropods.

The largest specimen is a ♀ but with no apparent sternal grooves.

FAMILY THELXIOPEIDAE.

1910. Stebbing, *l. c.*, p. 347 (*Homolidae*).

1913. Ihle, Siboga Exp. monogr., xxxix, *b*, pp. 52 *sqq.* (*Homolidae* part; morphology and key to genera), 88, 92.

1937. Rathbun, Bull. U.S. Nat. Mus., no. 166, p. 62.

Carapace more or less quadrangular. Basal joint of eye-stalk about the same length as distal joint (including cornea). Epipods on chelipeds and 2nd legs, or chelipeds and 2nd and 3rd legs. Flagellum of ant. 2 much longer than carapace. Mxp. 3 pediform. Gills 13-14.

Gen. THELXIOPE Raf.

1814. Rafinesque, Précis des Découv., p. 21.

1815. Leach, Trans. Linn. Soc. Lond., xi, p. 324 (*Homola*).

1910. Stebbing, *l. c.*, p. 347 (*Homola*).

1937. Rathbun, *l. c.*, p. 62.

Carapace not depressed, hepatic spine some distance behind level of the unbranched supra-orbital spine. Mxp. 3 subpediform, outer margin of 4th joint dilated. Distal joint of eye-stalk (excl. cornea) shorter than the slender basal joint. Flagellum of ant. 2 long. Dactyl of 5th leg about half length of 6th and closing against a more or less distinct process at base of latter. Epipods on chelipeds and 2nd and 3rd legs. Gills 14 + 6 epipods.

Remarks.—The *línea homolica* (fig. 65, *d*, *l.h.*) is a dark, feebly calcified groove running dorsal to, and near the lateral margin of carapace, but is not always very distinct.

Key to the South African Species.

1. Rostrum bifid. Carapace with tubercles on anterior half.
 - a.* Hind margin of 4th joint of 2nd-4th legs without spines *barbata*.
 - b.* Hind margin (as well as front) of 4th joint of 2nd-4th legs with spines *orientalis*.
2. Rostrum entire, spiniform. Carapace strongly spinose
(*Moloha*) *alcocki*.

Thelxiope barbata (Fabr.)

Fig. 65, *d*, *e*.

1910. Stebbing, *l. c.*, p. 347 (*Homola b.*).

1921. Balss, Beitr. Kennt. Meeresf. Westaf., iii, p. 48 (*Homola b.*).

1937. Rathbun, *l. c.*, p. 63, fig. 16, and pl. 15

Carapace pubescent, quadrate, slightly broader in front than behind. Rostrum bifid, with a tubercle at its base on each side. Two teeth, a larger and a smaller, on the lateral border between cervical

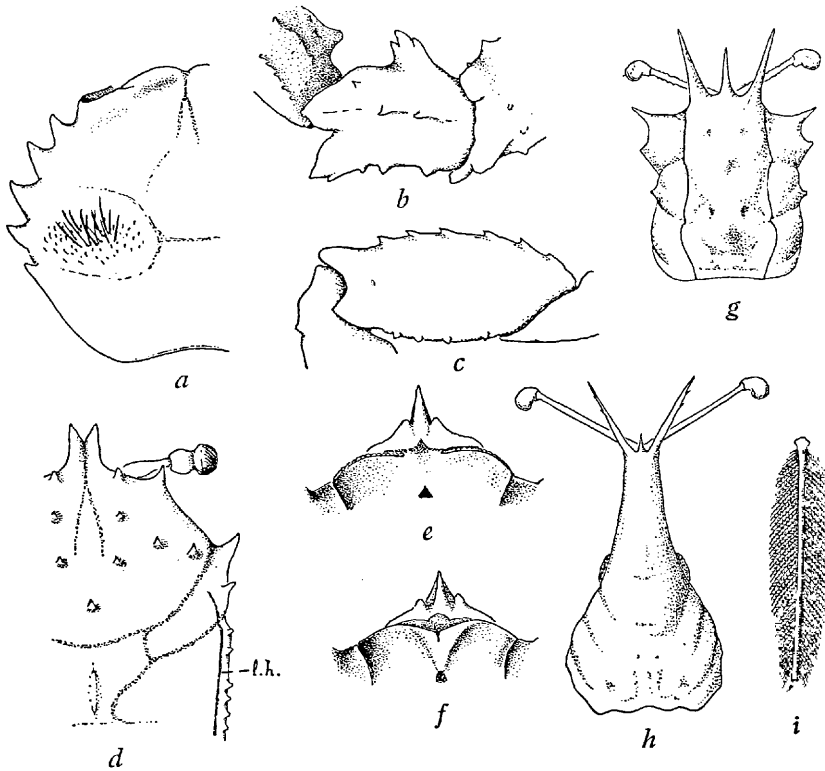


FIG. 65.—*Dynomene pilumnoides* Alck. *a*, carapace, most of setose covering removed. *b*, 5th joint (with apex of 4th and base of 6th) of cheliped. *c*, 4th joint of 2nd leg.

Thelziope barbata (Fabr.). *d*, carapace. *l.h.*=linea homolica. *e*, epistomal spine and anterior part of buccal cavity.

Thelziope orientalis (Hend.). *f*, epistomal spine and buccal cavity.

Latreillopsis bispinosa Hend. *g*, carapace.

Latreillia pennifera Alck. *h*, carapace. *i*, 6th joint and dactyl of 5th leg.

and branchial grooves. No spines on lower (hind) margin of 4th joint of 2nd–4th legs. 6th joint of 5th leg scarcely enlarged basally, but with a double row of stout spines between which the dactyl closes. The raised anterior rim of buccal cavity is interrupted medianly by a rather wide but shallow depression (fig. 65, *e*). Pleopods 1 and 2 ♂

stout; pleopod 2 apically truncate, with slightly expanded rim, like a piston.

Length up to 36 mm. (incl. rostrum), breadth 25 mm.

Localities.—False Bay, 32 fathoms (Stebbing); False Bay and off Cape Infanta, 46 fathoms (S. Afr. Mus.).

Distribution.—Mediterranean, Azores, West Indies.

Thelxiope orientalis (Hend.)

Fig. 65, f.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 19, pl. 2, fig. 1 (*Homola o.*).

1901. Alcock, Cat. Ind. Decap. Crust., i, p. 61, pl. 4, fig. 20 (*H. andamanica*).

1904. Doflein, D. Tiefsee Exp., vi, p. 14, pl. 5, figs. 4, 5 (*H. barbata orientalis*).

1923. Rathbun, Biol. Res. "Endeavour," v, p. 143, pl. 37 (*Homola o.*).

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

Differs from *barbata* as follows: tubercles at base of rostrum, supra-orbital spines, and denticles on hinder half of lateral margin of carapace smaller; only one tooth on lateral margin between cervical and branchial grooves, the first of the series of denticles on lateral margin being immediately behind the branchial groove. Lower (hind) margin as well as the front margin of 4th joint of 2nd-4th legs with spines. The raised anterior rim of buccal cavity medianly expanded into a slightly raised triangular area extending backwards to the median pit, with a small slit anteriorly. Pleopods 1 and 2 ♂ as in *barbata*.

Length 19 mm. (S. Afr. Mus.), 27 mm. (Alcock). Reddish (*Pieter Faure* log-book).

Localities.—Zululand coast, 75-90 fathoms (S. Afr. Mus.); Portuguese East Africa (26° 3' S., 33° 4' E.), 290 metres (Barnard).

Distribution.—Japan, Philippine Is., Kei Is., Andaman Is., S.E. Australia.

Remarks.—Although Henderson refers to the branchial groove as the cervical groove, his figure shows quite clearly that there is only one spine between the (true) cervical and the branchial grooves on the lateral border.

Doflein noticed the difference in the anterior rim of the buccal cavity in *barbata* and *orientalis*, but did not regard it as of specific value.

The two forms, which are here given specific rank, appear to inhabit separate regions in South African waters: the Atlantic form in False Bay and extending on the Agulhas Bank to Cape Infanta; the Indo-Pacific form not extending farther south than the coast of Zululand in the Mozambique current.

Subgen. *Moloha* Brnrd.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 371.

Carapace urn-shaped, widest across branchial regions, not depressed, *lineae homolicae* conspicuous and well within the lateral borders. Rostrum a simple spine. Chelipeds slender. 5th leg reaching to about end of 5th joint of 4th leg. No epipod (or a rudimentary one) on 3rd leg, and no arthrobranch on 4th leg; branchial formula thus 13 + 5 epipods.

Thelxiope (Moloha) alcocki (Stebb.)

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 255, pl. 24 (Crust., pl. 104) (*Latreillopsis a.*).

1924. *Id., ibid.*, xix, p. 4 (*Latreillopsis a.*).

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

1947. *Id., l. c.*, p. 372.

Each of the two spines immediately above the rostrum, but not the rostrum itself, with a subsidiary spine. The epistome has anteriorly 2 low ridges, and a more prominent median ridge, which abuts against the rostrum, and seen in lateral view is hatchet-shaped. The anterior rim of the buccal cavity has a slight median notch. The 2nd joint of eye-stalk nearly as long as 1st joint. Third (2nd free) joint of ant. 2 without apical processes or spines; 5th joint slightly shorter than 3rd and about half length of 4th (not one-quarter as in Stebbing's figure or one-fifth as in his text). Other features as in Stebbing.

	Podobranchs.	Arthrobranchs.	Pleurobranchs.
Mxp. 1	epipod	..	..
2	1 + epipod	1	..
3	epipod	2	..
Prp. 1	epipod	2	..
2	epipod	2	1
3	0 or rud. epip.	2	1
4	..	..	1
5	..	..	..
	1 + 5 epipods	9	3 = 13 + 5 epipods

There is a rudimentary epipod on 3rd leg on the left side only, no trace of such on the right side.

Length (incl. rostrum) 45 mm., breadth (across branchial region, excl. spines) 33 mm.

Localities.—Algoa Bay, 40 fathoms (Stebbing); Portuguese East Africa (25° 59' S., 33° 6' E.), 312 metres (Barnard).

Remarks.—The relative lengths of the joints of the eye-stalk, and the presence of epipods on the chelipeds and 2nd legs, show at once that this species has been wrongly assigned to *Latreillopsis*. There is a general resemblance to *L. multispinosa*, but the two species are not closely related as Stebbing (1924) thought.

This species might be included in *Paromola*, but the 5th legs are much shorter in the latter (sub)genus.

Besides the type ♀ in the South African Museum, only one other specimen is known (but see under *L. multispinosa*). At the time (1926) I contented myself with merely identifying the Portuguese East African specimen with Stebbing's type, and unfortunately the specimen is no longer accessible to me.

"*Latreillopsis*" *major* Kubo (1936, J. Imp. Fish. Inst., xxxi, p. 63, pl. 17) from Japan may be synonymous, but Kubo gives a different gill formula. In view of Stebbing's error in regard to the length of 4th joint of ant. 2, noted above, the supposed specific difference mentioned by Kubo falls away. No comparison is made with "*Latreillopsis*" *hawaiiensis* Edmondson (1932, Occasion. Pap. Bernice P. Bishop Mus., ix, no. 24, p. 5, fig. 1 and pl. 1). Edmondson does not mention the gill formula of his species.

FAMILY LATREILLIIDAE

1910. Stebbing, *l. c.*, p. 347.

1913. Ihle, Siboga Exp. monogr., xxxix, *b*, pp. 52 (*Homolidae* part), 69 (in key), 88, 93.

1937. Rathbun, Bull. U.S. Nat. Mus., no. 166, p. 73.

Carapace quadrangular or piriform. Basal joint of eye-stalk much longer than distal joint. No epipods on chelipeds or legs. Flagellum of ant. 2 not as long as carapace. Mxp. 3 suboperculiform. Gills 8.

Key to the Genera.

1. Carapace quadrilateral *Latreillopsis*.
2. Carapace piriform, anterior portion forming a long "neck" . . . *Latreillia*.

Gen. LATREILLOPSIS Hend.

1913. Ihle, *l. c.*, p. 77.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 255 (not the *n. sp.* there described).

Carapace more or less quadrangular, not depressed. Rostrum spiniform, flanked on either side by a long supra-orbital spine. Mxp. 3 with 4th joint dilated on outer margin, the antero-external angle sharply quadrate. First joint of eye-stalk slender, elongate. Flagellum of ant. 2 long. Chelipeds and legs very slender; 6th and 7th (dactyl) joints of 5th leg as in *Thelxiope*.

Remarks.—Although accepted as a species of this genus by Ihle, I think *L. petterdi* Grant 1905 (see also McCulloch, 1907, and Rathbun, 1923) should be re-examined as regards its branchial formula.

Key to the South African Species.

- | | |
|--|-----------------------|
| 1. Carapace with few spines | <i>bispinosa</i> . |
| 2. Carapace with numerous spines | <i>multispinosa</i> . |

Latreillopsis bispinosa Hend.

Fig. 65, *g*.

1901. Alcock, Cat. Ind. Decap. Crust., i, p. 73, pl. 7, fig. 26.

1913. Ihle, *l. c.*, p. 77.

1924. Stebbing, Ann. S. Afr. Mus., xix, p. 4.

In addition to the supra-orbital spines, there are laterally 2 on the hepatic region, and one between the cervical and branchial grooves; dorsal surface with tumid regions, and sometimes minute tubercles. A median tubercle on each of abdominal segments 2-5 (the last very small) and on posterior margin of 6. Third (2nd free) joint of peduncle of ant. 2 with a spine on both inner and outer apices.

Length (incl. rostrum) 12 mm. (Doflein: 16 mm.).

Localities.—Natal coast, 85 [not 35] fathoms (Stebbing); off Cape Morgan, 77 fathoms (S. Afr. Mus.).

Distribution.—Japan, Philippine Is., Kei Is., Andaman Sea.

Latreillopsis multispinosa Ihle

1912. Ihle, Tijdschr. Ned. Dierk. Ver. (2), xii, p. 211.

1913. *Id.*, *l. c.*, p. 78, pl. 4, figs. 19-21.

? 1923. Stebbing, Fish. Mar. Biol. Surv., Rep. iii (for 1922), Spec. Rep. 3, p. 5.

The supra-orbital spines are as long as the carapace and bear one or two small subsidiary branches. Strong spines on the dorsal and lateral parts of carapace. A median tubercle on each of abdominal segments 2-5 and apex of 6. Mxp. 3 with 3rd and 4th joints each with a spine.

Length (excl. rostrum) 23 mm. (Ihle); Stebbing's specimen 45 mm.

Locality.—Natal coast, 130 fathoms (Stebbing).

Distribution.—Kei Is., 204 metres.

Remarks.—I have a strong suspicion that the specimen on which the South African record of this species is based was really another specimen of Stebbing's own "*Latreillopsis*" *alcocki*; but until the specimen can be found and re-examined, the record of Ihle's species must remain on the fauna-list.

Gen. LATREILLIA ROUX.

1910. Stebbing, *l. c.*, p. 347.

1913. Ihle, *l. c.*, p. 81.

1937. Rathbun, *l. c.*, p. 73.

Carapace piriform, the anterior portion narrowed to form an elongate "neck," the hinder portion not covering the bases of the legs. Rostrum spiniform, deflexed between the two long divergent supra-orbital spines. Basal joint of eye-stalk very slender, and much longer than 2nd joint. Mxp. 3 with 4th joint not strongly dilated. Flagellum of ant. 2 short. Chelipeds and legs very long and slender; 5th leg not subchelate, the dactyl being very short, and the 6th joint fringed with plumose setae on both margins like a feather (fig. 65, *i*). 4th-6th abdominal segments in ♀ fused (but showing faint sutures).

Latreillia pennifera Alcock

Fig. 65, *h, i*.

1901. Alcock, *Cat. Ind. Decap. Crust.*, i, p. 71, pl. 7, figs. 27, 27, *a, b*.

1910. Stebbing, *l. c.*, p. 347 (*elegans*, non Roux).

1911. Rathbun, *Trans. Linn. Soc. Lond.*, xiv, p. 196.

1913. Ihle, *l. c.*, p. 82.

1926. Barnard, *Trans. Roy. Soc. S. Afr.*, xiii, p. 120 (*elegans*, non Roux).

1947. *Id.*, *Ann. Mag. Nat. Hist.* (xi), 13, p. 372.

No median spine on the "neck." Three small, more or less distinct tubercles in a triangle on cardiac region (the median one posterior). A median spine on 2nd and 3rd abdominal segments in ♀, and a lateral one on each side on anterior margin of 4th segment. Fifth leg reaching well beyond the end of 4th joint of 4th leg.

Length (incl. rostrum) up to 15 mm. Narrow reddish longitudinal stripes on carapace, legs banded alternately red and white.

Localities.—Natal coast, 25 fathoms (Stebbing); Durban and Zululand coast, 36 fathoms (S. Afr. Mus.); Portuguese East Africa (25° 55' S., 33° 4' E.), 37 metres (Barnard).

Distribution.—Bay of Bengal, Gulf of Martaban, Mergui Archipelago, Kei Is., Seychelles.

Remarks.—Stebbing (1902, Mar. Invest. S. Afr., ii, p. 25) discussed the synonymy of *valida*, *elegans*, and *pennifera*, and recorded a South African specimen under the name *elegans*. Ihle, without specifying the differences between *elegans* and *pennifera*, records specimens of the latter from the Kei Islands, and states that the former is restricted to the Atlantic and Mediterranean.

OXYSTOMATA.

1903. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 434 (key to families).

1907. *Id.*, Ann. Mag. Nat. Hist. (7), xix, p. 478 (key to families).

1910. Stebbing, *l. c.*, p. 333.

1922. Bourne, J. Linn. Soc. Lond., xxxv, pp. 25–73 (*passim*: morphology).

1937. Rathbun, Bull. U.S. Nat. Mus., no. 166, pp. 75–258.

Buccal cavity produced forwards, more or less triangular in shape, epistome usually said to be reduced or absent (see Remarks). Exhalant branchial canals closed in by the elongate endopods of mxp. 1 (see Remarks). Female genital openings usually sternal. Gills 6–9 on each side. First pair of pleopods absent in female.

Remarks.—Bourne gives reasons for removing the *Raninidae* to a separate group (*infra*, p. 396). He also shows (*l. c.*, pp. 43 *sqq.*) that, so far from the "epistome" being reduced or absent, the triangular buccal cavity is in fact chiefly made up of the antennary sternite, *i.e.* it is the epistome.

Rathbun, apparently following Alcock, says that it is the exopod, instead of the endopod, of the 1st maxilliped which closes the exhalant branchial canals.

Key to the Families.

1. Carapace of usual crab-like shape.
 - a. Inhalant branchial openings in front of chelipeds (fig. 67, *i*). Gills 9. Male genital openings coxal. Pleopod 2 ♂ elongate *Calappidae*.
 - b. Inhalant branchial openings at bases of external (3rd) maxillipeds (fig. 68, *a*). Gills less than 9. Male genital openings sternal. Pleopod 2 ♂ short *Leucosiidae*.
2. Carapace subquadrilateral or subcircular, short, leaving the first 2 or 3 abdominal segments exposed. Last 2 pairs of legs dorsal in position, ending in hook-like dactyls *Dorippidae*.

FAMILY CALAPPIDAE.

1907. Borradaile, *Ann. Mag. Nat. Hist.* (7), xix, p. 478.

1910. Stebbing, *l. c.*, p. 333, and p. 335 (*Matutidae*).

1918. Ihle, *Siboga Exp. monogr.*, xxxix, *b* 2, pp. 161–186, and pp. 297–301, 307, 308 (morphology, systematics).

1922. Bourne, *J. Linn. Soc. Lond.*, xxxv., pp. 52–55 (morphology).

1937. Rathbun, *Bull. U.S. Nat. Mus.*, no. 166, p. 196.

Carapace of usual crab-like shape. Inhalant branchial openings in front of the chelipeds. Antenna 2 small. Gills 9. Male genital openings coxal. Pleopod 2 ♂ more or less elongate.

Key to the South African Genera.

1. Mxp. 3 not completely closing the buccal cavity, distal joints (palp) not concealed (*Calappinae*).
 - a. Walking legs concealed under postero-lateral expansions of carapace (fig. 66, *a*) *Calappa*.
 - b. Walking legs not concealed, no postero-lateral expansions of carapace (fig. 67, *a*) *Mursia*.
2. Mxp. 3 completely covering the buccal cavity, palp concealed (fig. 67, *i*). Legs natatory, distal joints flattened and expanded (*Matutinae*) (fig. 67, *h*) *Matuta*.

Gen. CALAPPA Fabr.

Box Crabs; Shame-face Crabs.

1910. Stebbing, *l. c.*, p. 333.

1918. Ihle, *l. c.*, p. 181.

1928. Monod, *Bull. Soc. Sci. Nat. Maroc.*, viii, p. 109.

1937. Rathbun, *l. c.*, p. 197 (credited to Weber; unacceptable).

Carapace strongly convex, rounded in front, posteriorly with a

wing-like expansion on each side, under which the walking legs can be withdrawn and concealed. Orbits small, subcircular, lower margin complete (not notched), inner angle open but filled by the stout and often expanded basal joint of ant. 2. Mxp. 3 leaving exposed the anterior (calcified) prolongations of the endopods of mxp. 1, which form the floor of the exhalant branchial channels. Chelipeds very large, subequal, fitting closely over the mouth-parts, 4th joint strongly keeled on its lower outer margin; finger of the slightly larger (right *) cheliped with a strong knob-like process on outer basal surface, opposed to large molariform tubercle on base of thumb. Abdomen in adult ♂ with 3rd-5th segments fused. Pleopod 2 ♂ not as long as pleopod 1.

Remarks.—Miers' record of the American and Bermudan species *flammea* from Simon's Bay seems to be due to an error in labelling, and is omitted from the South African fauna-list (see also p. 3).

C. moniziana (see Stebbing, *l. c.*, p. 334) is also not admissible on account of doubts as to locality and specific identity.

Odhner (1923, Medd. Göteborg. Mus., xxxi, pp. 16, 17, pl. 2, figs. 1, 2) records *pelii* Herklots, and *rubroguttata* Herklots, from Port Alexander. Balss (1921) regarded both as synonyms or varieties of the Mediterranean *granulata*. Not having seen actual specimens of these forms, I do not include them in the key, but refer to Odhner's figures.

It is possible that the fingers of the chelipeds rubbing against one another may be used for stridulating, but there is no special granulate ridge opposing the fingers as there is in *Mursia* (and *Acanthocarpus*, see Rathbun, 1937).

No specific difference in 1st pleopods ♂ of *hepatica* and *lophos*, the only two species of which I have seen males (*cf.* Stephensen, 1945, *l. c.*, *infra*, p. 66).

Key to the South African Species.

1. A distinct re-entrant angle or sinus between antero-lateral margin and lateral wing-like expansion of carapace (fig. 66, a). Eye-stalks slender, non-granulate.
 - a. Serrations on antero-lateral margin, lateral expansion, and outer margin of wrist of cheliped blunt . . . *hepatica*.
 - b. These serrations sharp, spiniform var. *spinosissima*.
2. Antero-lateral margin passing gradually into the lateral expansion or with only a slight emargination (fig. 66, e, j, n). Eye-stalks stout, granulate (fig. 66, g, o).

* Miers' figures (1886, Rep. H.M.S. *Challenger*, xvii, pls. 23, 24) may be mirror-pictures due to reversal in the lithographing process. In *C. hepatica spinosissima* I have seen two "sinistral" specimens in 20 specimens.

- a. A deep cavity on either side of gastric region. Front projecting prominently beyond orbits . . . *gallus*.
- b. Carapace evenly convex. Front not extending much beyond orbits.
- i. Hand of cheliped with ridge and smooth groove running from base to molariform tubercle on thumb, lower border basally smooth (fig. 66, *m*) *lophos*.
- ii. Hand of cheliped without ridge and groove, granulate all over, including whole of lower border *japonica*.

Calappa hepatica (Linn.)Fig. 66, *a-d*.

1878. Hilgendorf, MB. Ak. Wiss Berlin, p. 809.
1884. Miers, Zool. H.M.S. *Alert*, Crust., p. 550.
1903. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 436, pl. 22, fig. 6.
1910. Stebbing, *l. c.*, p. 333.
1917. *Id.*, Ann. Durban Mus., ii, p. 19 (*spinosissimus*).
1918. Ihle, *l. c.*, p. 183, fig. 80 (buccal area).
1930. McNeill and Ward, Rec. Austral. Mus., xvii, p. 373.
1938. Balss, Medd. Göteb. Mus., lxxv, p. 8.

Length of carapace a little over $\frac{1}{2}$, sometimes nearly $\frac{2}{3}$, extreme width. Front not prominent, bluntly triangular, with dorsal groove forming an apical notch, smooth ventrally. Carapace evenly convex, anteriorly with low blunt tubercles, posteriorly with short transverse rows of granules; antero-lateral margins dentate; 4 teeth on lateral expansion, which is separated from antero-lateral margin by a distinct sinus, 2-3 small notches on postero-lateral margin, from which run beaded ridges; posterior margin beaded, without projections. Eye-stalks long, slender, smooth. Suborbital margin semicircular, fringed with setae, the area behind it forming a smooth and slightly concave surface. Epistome (small plate between basal joints of 1st antennae) broader than long. Lateral ridge bordering exhalant canal not prominent, evenly convex; median septum evenly, but anteriorly rather strongly, convex (fig. 66, *c*). Basal joint of ant. 2 strongly produced into orbit, especially its upper distal corner. Pterygostomial region, and ridge below antero-lateral margin, thickly setose. Lower outer border of wrist of cheliped with 4 bluntly rounded lobes, of which the penultimate may bear a small tooth.

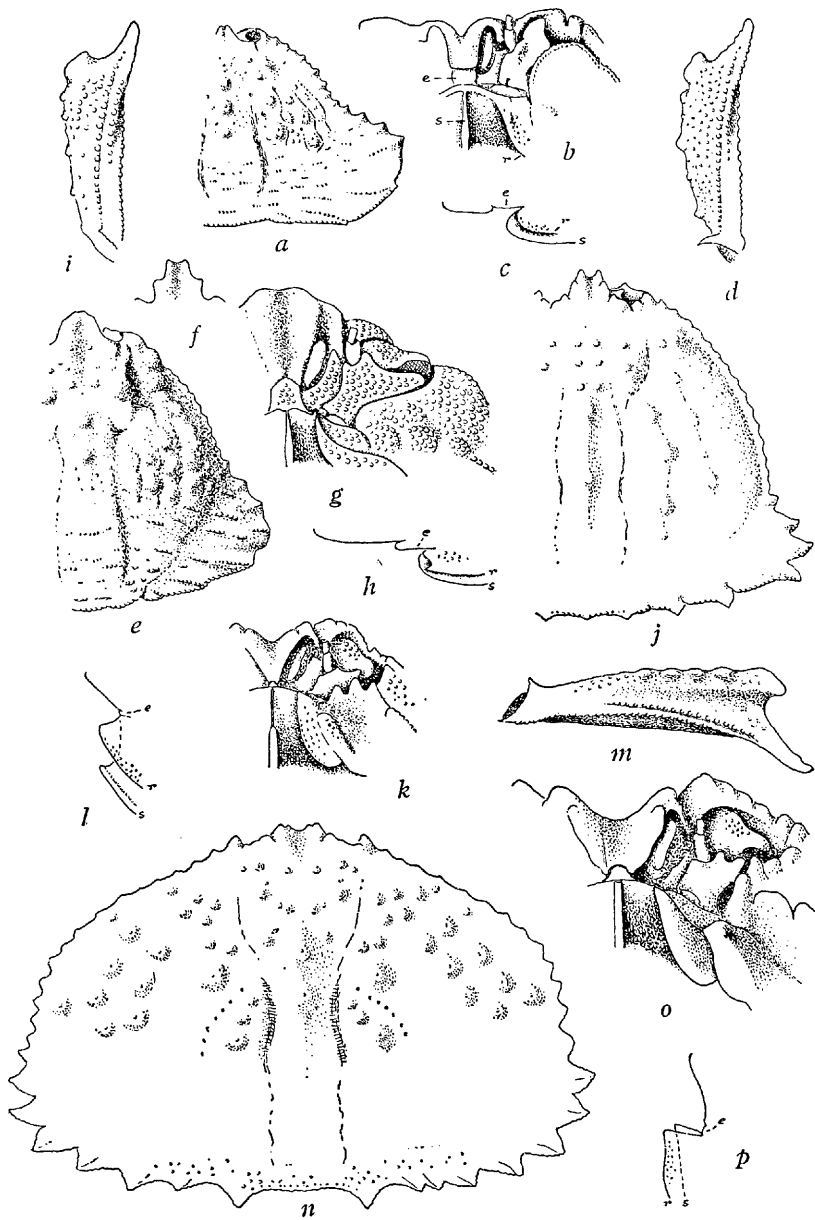


FIG. 66.—*Calappa hepatica* (Linn.). *a*, carapace. *b*, ventral view of front. *c*, profile of epistome (*e*), endostomial septum (*s*) and ridge bordering exhalant canal (*r*). *d*, ventral view of right chela of var. *spinosissima*.
Calappa gallus (Herbst). *e*, carapace (length slightly exaggerated to show both front and hind margin in same plane). *f*, front of juv. *g*, ventral view of front. *h*, profile as in *c*. *i*, ventral view of right chela.
Calappa lophos (Herbst). *j*, carapace ♂ (length slightly exaggerated as in *e*). *k*, ventral view of front. *l*, profile as in *c*. *m*, ventral view of right chela.
Calappa japonica Ortm. *n*, carapace ♀. *o*, ventral view of front. *p*, profile as in *c*.

Lower border of hand of larger cheliped as in *gallus*, but with a denticiform tubercle at base on outer surface.

Length up to 45 mm., breadth 80 mm. Mottled grey.

Localities.—Durban Bay (Krauss, Stebbing, and S. Afr. Mus.); Mozambique (Hilgendorf, Miers, and coll. K. H. B.); Delagoa Bay (coll. van der Horst).

Distribution.—East coast of Africa, Red Sea, Mauritius, Madagascar, Indo-Pacific, Australia.

Remarks.—The teeth on the antero-lateral margin and around the lateral expansion tend to become sharp up-turned spines in the form *spinosissima* M. Edw.; the distal 2 lobes on the lower outer margin of wrist both bear a spiniform denticle, and the tubercle at base of hand is larger and spiniform (fig. 66, *d*). Amongst the Mozambique specimens are typical *hepatica* and transitional forms to *spinosissima*. The latter clearly can be regarded only as a variety.

Calappa gallus (Herbst)

Fig. 66, *e-i*.

1896. Alcock, J. Asiat. Soc. Bengal, l xv, p. 146.

1918. Ihle, *l. c.*, p. 181, figs. 81, 85 (buccal cavity, orbit, antennae).

1921. Balss, Beitr. Kennt. Meeresf. Westafr., iii, p. 50.

1937. Rathbun, *l. c.*, p. 214, pl. 65, figs. 2, 3.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 372.

Length of carapace $\frac{3}{4}$ to nearly $\frac{5}{8}$ extreme width. Front projecting prominently beyond orbits, with 4 teeth, distinct in juv., but very blunt and obscure in adult; ventrally with shallow median groove (more distinct in juv. than in ad.). Carapace very convex, with a deep cavity on either side of gastric region, and deep grooves between branchial and cardiac regions; anterior portion of carapace with blunt tubercles, of which a medio-gastric and one on either side in advance of it are usually the largest and most prominent, posterior portion with short transverse beaded ridges; antero-lateral margin crenulate in adult, more sharply dentate in juv.; lateral expansions with (3-)4 teeth; 2-3 short teeth, from which run beaded ridges, on postero-lateral margin; posterior margin beaded but without teeth or projections. Eye-stalk granulate. Suborbital region with 4 teeth, one bordering orbit and 3 below it, distinct and more or less sharp in juv., very blunt or obsolete in adult. Epistome longer than broad. Lateral ridge bordering exhalant branchial canal prominent, ending in a point, sharper in juv. than in adult; median septum evenly convex

to anterior border of the canals. Basal joint of ant. 2 widely expanded distally, especially at hinder outer angle. Pterygostomial region not very thickly setose, but with thick fringe below antero-lateral margin. Lower outer margin of wrist with 4 rounded lobes, only feebly dentate in juv. Lower border of hand of larger cheliped smooth between 2 beaded ridges, with distally an intermediate row of granules, no marked groove or concavity between lower margin and the molariform process at base of thumb; no tooth or spine at base of outer surface of hand.

Length up to 54 mm., breadth 70 mm. Smallest specimen examined 11 mm. in length.

Localities.—Off Port Shepstone and Tongaati River mouth, 24–36 fathoms (S. Afr. Mus.).

Distribution.—Red Sea, Indo-Pacific. Also West Africa, and east coast of America from Florida to Brazil (see Balss and Rathbun).

Calappa lophos (Herbst)

Fig. 66, *j–m*.

1896. Alcock, *l. c.*, p. 144.

1918. Ihle, *l. c.*, p. 182.

1923. Rathbun, *Biol. Res.* "Endeavour," v, p. 137.

1933. Chopra, *Rec. Ind. Mus.*, xxxv, p. 28.

1945. Stephensen, *Dan. Sci. Invest. Iran*, pt. 4, p. 65, fig. 5, A, B (plp. 1, 2 ♂).

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 372.

Length about $\frac{2}{3}$ extreme width. Front not projecting far beyond orbits, bifid, with a tubercle on each side behind the apical one, dorsally grooved, ventrally embracing the very small and (in adult) indistinct epistome (fig. 66, *k*). Carapace evenly convex, gastric and cardiac regions bounded by grooves, some low rounded tubercles anteriorly, 3–4 indistinct median ones on gastro-cardiac region, and in 2 rows on branchial regions (the outer row very indistinct in adult); antero-lateral margin crenulate, 4 teeth (anteriorly) on lateral expansion, and 3 on postero-lateral margin, the latter beaded, hind margin beaded, bounded by a tooth on each side, and with a feeble median one (not developed in juv.). Eye-stalk granulate. Sub-orbital border with 3 teeth (only 2 distinct in juv.), the area behind it smooth and concave. Lateral ridge bordering exhalant branchial canal slightly angular in front; median septum excavate in front, as if cut away, only the posterior thickened margin showing when the

1st maxillipeds are closed. Basal joint of ant. 2 produced as a scalloped process adjacent to suborbital ridge. Pterygostomial region densely setose. Lower outer border of wrist with 4 rounded lobes, in adult the penultimate lobe with a sharp denticle in middle, in both juv. and adult the ultimate lobe with a sharp subapical point. Lower border of hand of larger cheliped with 2 rows of granules, a strong but rounded granulate ridge between base of hand and molariform tubercle at base of thumb, between this ridge and the lower border the surface smooth and distinctly concave; a sharp tooth at base on lower outer surface. Upper part of outer surface of hands much more feebly tuberculate than in other species.

Length ♂ 40 mm., breadth 58 mm. Juvenile specimen examined 13 mm. in length.

Localities.—Natal coast, 20–36 fathoms (S. Afr. Mus.).

Distribution.—Indo-Pacific to Japan, Queensland, and New South Wales.

Remarks.—The above description is taken solely from the two South African specimens. The shape of the endostomial septum corresponds with Alcock's description, and the young specimens mentioned by Ihle. From his comparison with adults referred to this species, Ihle thinks the shape of the septum may alter with age; but the agreement between the young and the adult South African specimens does not confirm this suggestion.

The marked groove on the lower outer surface of the hands of both chelipeds is not mentioned by Alcock.

Calappa japonica Ortm.

Fig. 66, *n-p*.

1892. Ortmann, Zool. Jahrb. Abt. Syst., vi, p. 566, pl. 26, fig. 8.

1894. Alcock and Anderson, J. Asiat. Soc. Bengal, lxiii, p. 177 (*exanthematosa*).

1895. *Id.*, Illustr. Zool. R.I.M.S. "Investigator," Crust., pl. 15, figs. 1, 1, *a* (*exanthematosa*).

1896. Alcock, *l. c.*, p. 146 (*exanthematosa*).

1899. *Id.*, Deep-Sea Brachyura, "Investigator," p. 21 (*exanthematosa*).

1914. Parisi, Atti Soc. ital. Milano, liii, p. 287, fig. 1 (mxp. 1) and pl. xi.

1918. Ihle, *l. c.*, pp. 301, 308 (in list of species).

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120 (*flammea*, non Herbst).

1947. *Id.*, Ann. Mag. Nat. Hist. (xi), 13, p. 372.

Resembling *lophos* in general, but slightly broader, the anterior part of carapace with more numerous pustules and blunt tubercles, postero-lateral margin with larger teeth, no median tooth on hind margin, all 4 lobes on lower outer margin of wrist dentiform, lower border of hand of cheliped granulate all over, no ridge running to the molariform tubercle on thumb causing a groove between it and the lower border; the endostomial septum is not visible when 1st mxp. are closed, both the septum and ridges bordering exhalant canals square-cut and end at same level anteriorly; basal joint of ant. 2 not so strongly produced; teeth on suborbital area arranged slightly differently (*cf.* fig. 66, *k* and *o*).

Length ♀ 87 mm., breadth 125 mm. (Parisi: ♂ 97 × 147 mm., ♀ 76 × 107 mm.). As preserved, pale with salmon-pink mottling around the pustules and on hinder half of carapace.

Localities.—Trawling ground between Bushman River and Bird Island, Algoa Bay (trawler *Linnet*, 1905, 1 ♀) (S. Afr. Mus.); Portuguese East Africa (25° 45' S., 33° 3' E.), 58 metres (Barnard).

Distribution.—Japan, Bay of Bengal, 166–205 metres.

Remarks.—The single very fine ♀ specimen, compared above with *lophos*, is certainly referable to *japonica*. It is the only record from South African waters, except the Portuguese East African specimen, which I erroneously identified as *flammea*.

Gen. MURSIA Desm.

1910. Stebbing, *l. c.*, p. 334.

1918. Ihle, Siboga Exp. monogr., xxxix, b 2, pp. 179, 300, 307 (list of species.)

1937. Rathbun, *l. c.*, p. 215 (credited to Leach. Leach's *Murcia* = *Cycloës*).

Carapace transversely oval or subcircular, without lateral wing-like expansions, but with a strong spine in middle of lateral margin. Orbits rather large, oval, lower margin with a deep notch; inner angle open, but filled by the slender, unexpanded basal joint of ant. 2. Mxp. 3 as in *Calappa*. Chelipeds subequal, wrist with 1–3 spines on lower outer margin, finger and thumb of the slightly larger cheliped with knob at base (but not enormously enlarged as in *Calappa*). Abdomen ♂ with 3rd–5th segments fused. Pleopod 2 ♂ longer than pleopod 1.

Stridulating mechanism present (in South African species) on inner surface of finger of cheliped and 3rd joint of mxp. 3.

Key to the South African Species.

1. Inner suborbital tooth oblong, apically truncate (slightly obliquely) (fig. 67, f). Hind margin of carapace even, slightly convex or nearly straight *cristimanus*.
2. Inner suborbital tooth triangular, apically acute (fig. 67, g). Hind margin of carapace bluntly trilobed *armata*.

Mursia cristimanus de Haan.

Fig. 67, *a-f*.

1894. Ortmann, Semon's Austral. Reise, v, p. 35 (*cristata*).

1910. Stebbing, *l. c.*, p. 334.

1914. *Id.*, Trans. Roy. Soc. Edin., 50, pp. 272, 307.

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 26.

Carapace slightly broader than long, granulate and tuberculate. Front triangular, apex acute, a more or less distinct denticle on each lateral margin. Antero-lateral margin crenulate. Hind margin even, slightly convex or nearly straight. Inner suborbital tooth oblong, slightly obliquely truncate (fig. 67, *f*). Wrist of cheliped with 3 spines on outer margin, the distal one the largest; outer surface of hand with a few conical or spiniform tubercles, and 3 spines near lower margin; lower margin dentate, upper margin with 7-8 sharp, cristate teeth. Stridulating mechanism ($\delta\varphi$) formed by a series of short, transverse ridges on inner surface of finger (both chelipeds), and a transverse row of granules along distal margin of 3rd joint of mxp. 3. Basal segment of abdomen ($\delta\varphi$) trilobed.

Length up to 30 mm., breadth 32 mm. (38 if lateral spines included). One extra large δ from Algoa Bay: 36 × 41 mm. (46 incl. spines). Smallest specimen examined 5 × 5.5 mm. Reddish brown with purple-red warts (Studer); pinkish or salmon with the branchial and cardiac tubercles deeper in colour or bright red, patches of the same colour on wrist, and on crest of the hand (K. H. B.).

Localities.—Table Bay (Studer, Miers, Doflein); south of Saldanha Bay and Dassen Island (Stebbing); False Bay (Miers, Stebbing, Doflein); Agulhas Bank (Miers, Doflein, Odhner); Port Elizabeth (Ortmann); East London (Stebbing); off Saldanha Bay, around Cape Peninsula, False Bay and Agulhas Bank to Cape Natal (Durban), 9-180 fathoms (S. Afr. Mus.).

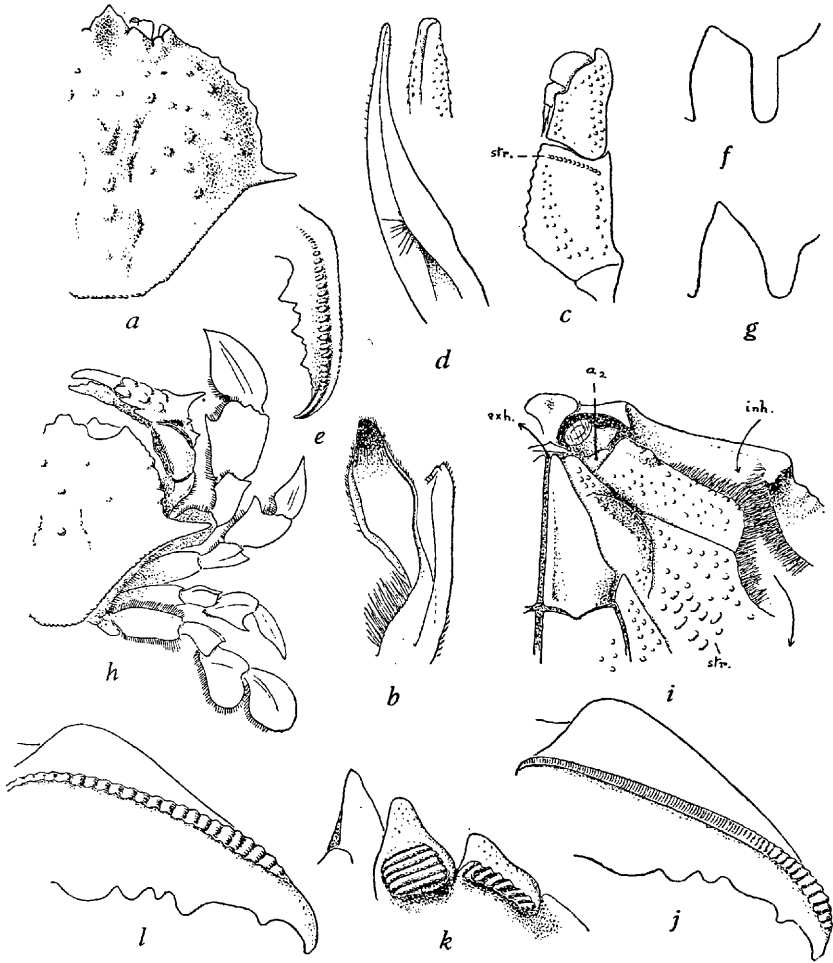


FIG. 67.—*Mursia cristimanus* de Haan. *a*, carapace. *b*, endopod and exopod (flagellum of latter cut short) of mxp. 1, calcified apex darkened. *c*, mxp. 3, exopod omitted. *d*, pleopod 1 ♂, with apex further enlarged. *e*, inner view of finger of cheliped with stridulating ridge. *f*, suborbital notch and inner suborbital tooth.

Mursia armata de Haan. *g*, suborbital notch and inner suborbital tooth.

Matuta banksii Leach. *h*, carapace with chelipeds and legs. *i*, ventral view of front and pterygostomial region, fur surrounding the stridulating tubercles omitted (*str.*), eye and ant. 1 removed, arrows indicating inhalant and exhalant (*inh.*, *exh.*) currents. *j*, outer view of finger of cheliped ♂. *k*, inner upper margin of hand of cheliped (♂♀) showing stridulating areas.

Matuta lunaris (Forsk.). *l*, outer view of finger of cheliped ♂.

Remarks.—One of the commonest crabs on the Agulhas Bank, but becoming rare, according to the numbers of specimens collected by the s.s. *Pieter Faure* in different localities, towards East London and Natal. Off the coast of Portuguese East Africa its place is taken by the following species.

Females are smaller, and apparently much less common than males.

Mursia armata de Haan

Fig. 67, *g*.

1894. Alcock and Anderson, J. Asiat. Soc. Bengal, lxiii, p. 179 (*bicristimana*).

1896. Alcock, *ibid.*, lxv, p. 150 (*bicristimana*).

1896. *Id.*, Illustr. Zool. R.I.M.S. "Investigator," Crust., pl. 24, fig. 5 (*bicristimana*).

1899. Alcock, Deep-sea Brachyura, p. 23, pl. 3, figs. 3, 3, *a*, *b* (*bicristimana*).

1904. Doflein, D. Tiefsee Exp., vi, pp. 39 *sqq.*, pl. 17, and pl. 18, figs. 2-4 (discussion of subspecies).

1906. Rathbun, Bull. U.S. Fish. Comm. for 1903, pt. 3, p. 888, fig. 41, and pl. 16, fig. 1 (*spinimanus*).

1911. *Id.*, Trans. Linn. Soc. Lond., xiv, p. 198, pl. 15, fig. 3 [not "5"] (*spinimanus*).

1914. Parisi, Atti Soc. ital. Milano, liii, p. 290, and var. *trispinosa*, pl. 12.

1918. Ihle, *l. c.*, pp. 179, 300, 307.

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

Carapace proportionately broader, granulation stronger, more even and conspicuous, front less prominent, than in *cristimanus*; lateral spine longer and straighter; hind margin bluntly trilobed. Inner suborbital tooth triangular, apically acute (fig. 67, *g*). Lower margin of hand of cheliped with the teeth (scarcely spiniform) more widely spaced than in *cristimanus*, and knobs at base of finger and thumb (larger cheliped) better developed. Ornamentation on legs (described by Alcock, 1896) the same as in *cristimanus*. Stridulating mechanism as in *cristimanus*.

Length 20 mm., breadth 25 mm. (37 if lateral spines included). Alcock: 47 × 67, excl. spines. As preserved, pinkish, a bright red spot on inner surface of hand of both chelipeds at insertion of finger.

Locality.—Portuguese East Africa (26° 3' S., 33° 4' E.), 290 metres (Barnard).

Distribution.—Seychelles, Ceylon, Indo-Pacific to Japan.

Remarks.—Both ♂ and ♀ correspond with Rathbun's 1911 illustration of the Seychelles specimen as regards the more conspicuous tubercles. Doflein, Parisi, and Ihle agree that one widely distributed species, with several subspecies or varieties, should be recognized.

Gen. MATUTA Fabr.

1906. Klunzinger, Verh. D. Zool. Ges., xvi, p. 230 (structural peculiarities).

1910. Stebbing, *l. c.*, p. 335.

1918. Ihle, *l. c.*, p. 308 (list of species).

1921. Balss, Beitr. Kennt. Meeresf. Westaf., iii, p. 50.

1933. Chopra, Rec. Ind. Mus., xxxv, p. 31.

Carapace flattish, subcircular, with a large spine on middle of lateral margin. Front trilobed, median lobe more prominent than the others. Orbits oval, with a deep notch in lower border near outer orbital angle leading to a channel on subhepatic region, and covered over by a thick mat of setae; a narrow gap at inner angle (fig. 67, *i*). Ant. 2 very small and inconspicuous (fig. 67, *i*). Mxp. 3 elongate, extending to anterior margin of, and completely closing, the buccal cavity (fig. 67, *i*); no endostomial septum separating the exhalant canals. Chelipeds equal. Legs natatorial and fossorial, 6th and 7th (dactyl) joints laminately flattened and expanded. Abdomen ♂ with 3rd–5th segments fused. Pleopod 2 ♂ longer than pleopod 1. Stridulating mechanism consisting of 2 obliquely striate areas, one linear (proximal) and one oval or subcircular (distal), on inner surface of upper margin of hand of cheliped (fig. 67, *k*), and a double series of transversely elongate tubercles (concealed in a thick mat of setae) on the pterygostomial region (fig. 67, *i*). The proximal linear striate area on the hand may be feebly developed or even obsolete.

Remarks.—Owing to considerable variation many synonyms have arisen; but the number of recognized species has now been commendably reduced. Balss has described one species from West Africa, the only exception to an otherwise exclusive Indo-Pacific distribution.

As the striate areas on the inside of the hand will engage also with the milled or ribbed ridge on the outside of the finger of the opposite cheliped in the ♂, it seems likely that this may be a subsidiary or additional stridulating mechanism.

Chopra (1935, *l. c.*, p. 32), and Chopra and Das (1937, *l. c.*, *infra*), quoting Balss, 1922, say that *M. planipes* Fabr. ranges as far west

as the "Cape of Good Hope." But *M. planipes* does not appear to occur in South Africa, and in any case "Cape of Good Hope" must be understood as "South Africa," or more strictly speaking, "Natal."

Key to the South African Species.

1. Upper margin of 5th joint of 4th (penultimate) leg with a single keel. Ridge on finger of cheliped of ♂ coarsely ribbed (fig. 67, l) *lunaris*.
2. Upper margin of 5th joint of 4th leg bicarinate. Ridge on finger of cheliped of ♂ very finely milled proximally, ribbed only towards apex (fig. 67, j) *banksii*.

Matuta lunaris (Forsk.)

Fig. 67, l.

1775. Forskål, Descr. Anim., p. 91, no. 44.
 1781. Fabricius, Spec. Insect. Append., p. 502 (*victor*).
 1830. Rüppell, Beschreib, 24 Krabben, p. 7, pl. 1, fig. 3, pl. 6, fig. 3 (*lessueri*).
 1838. McLeay, Annulosa S. Afr., p. 70 (*victor*).
 1843. Krauss, Südafrik. Crust., pp. 16, 52 (*victor*).
 1877. Miers, Trans. Linn. Soc. Lond. (2), i, p. 243, pl. 39, figs. 1-3 (*victrix*), and p. 244, pl. 39, fig. 4 (var. *crebripunctata*).
 1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 810 (*victor*).
 1896. Alcock, J. Asiat. Soc. Bengal, lxxv, p. 160 (*victor*).
 1910. Stebbing, l. c., p. 335.
 1918. Ihle, l. c., p. 185 (references).
 1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 383, fig. 1, a (abd. ♂).

The 6 tubercles on the carapace are rather indistinct, especially the anterior 2. Antero-lateral margin crenulate, the hinder crenulations larger but blunt (not dentiform). Tubercle in middle of postero-lateral margin sometimes fairly distinct, usually obsolete. Ridge in middle of outer surface of hand of cheliped running *downwards* to the *middle* of the thumb, with one large spine, followed sometimes by a smaller one, thereafter becoming often indistinct. A distinct spini-form tooth at base of lower outer margin of hand where it touches the wrist. Outer surface of finger in adult ♂ with a longitudinal ridge which is transversely ribbed from base nearly to apex; in ♀ and juv. ♂ smooth, though in adult ♀ there may be a few indistinct beads or

granules. Upper margin of 5th joint of 4th leg (penultimate) with a single keel.

Length up to 50 mm., breadth (excl. spines) 55 mm. Greyish or biscuit-colour, with numerous tiny red dots.

Localities.—Durban Bay and Umlaas River mouth (Krauss, and S. Afr. Mus.); Ibo and Mozambique (Hilgendorf); Chinde and Mozambique (coll. K. H. B.); Delagoa Bay (coll. van der Horst, and Lourenzo Marques Mus.).

Distribution.—Red Sea, Zanzibar, Madagascar, Indo-Pacific.

Matuta banksii Leach

Fig. 67, *h-k*.

1817. Leach, Zool. Miscell., iii, p. 14.

1865. Hess, Arch. Naturg., xxxi, pp. 158, 172, pl. 6, fig. 13 (*picta*)

1877. Miers, *l. c.*, p. 245, pl. 40, figs. 1, 2, and p. 246, pl. 40, figs. 5-7 (*picta*).

1896. Alcock, *l. c.*, p. 158 (references).

1918. Ihle, *l. c.*, p. 185 (references).

All 6 tubercles on carapace nearly always distinct. Antero-lateral margin crenulate anteriorly, with 2 or 3 larger, dentiform projections behind. Postero-lateral margin with a sharply defined (usually) denticle in middle. Ridge in middle of outer surface of hand of cheliped subparallel with lower margin and running to the gap between finger and thumb, with 5 teeth, the 1st small (or obsolete), the 2nd (and sometimes the 4th) large and sharp; near the lower border a less distinct and more or less knobbly ridge running on to thumb. Only a small but sharp tubercle at base of lower margin of hand. Finger in adult ♂ with a ridge which is minutely (not visible to naked eye) transversely striate or milled, striae gradually increasing in size until in the distal third they form distinct ribs; in ♀ and juv. ♂ smooth. Upper margin of 5th joint of 4th leg bicarinate.

Length up to 43 mm., breadth (excl. spines) 44 mm. Biscuit-coloured, with red dots forming rings, loops and vermiculations.

Localities.—Durban (S. Afr. Mus.); Delagoa Bay (coll. van der Horst); Mozambique (K. H. B.).

Distribution.—Mauritius (de Man, and S. Afr. Mus.); Red Sea, east coast of Africa, Indo-Pacific.

Remarks.—There is no difficulty in distinguishing adult ♂♂ of this species from *lunaris*, apart from the character of the 4th leg which is found in both sexes.

FAMILY LEUCOSIIDAE.

1907. Borradaile, Ann. Mag. Nat. Hist. (7), xix, p. 478.

1910. Stebbing, *l. c.*, p. 335.

1918. Ihle, Siboga Exp. monogr., xxxix, b, 2, pp. 186–293, 297–305, 308–317.

1937. Rathbun, Bull. U.S. Nat. Mus., no. 166, p. 121.

Carapace of usual crab-like shape, usually subcircular, oval, or polygonal, compact-looking. Orbits and eyes very small. Inhalant

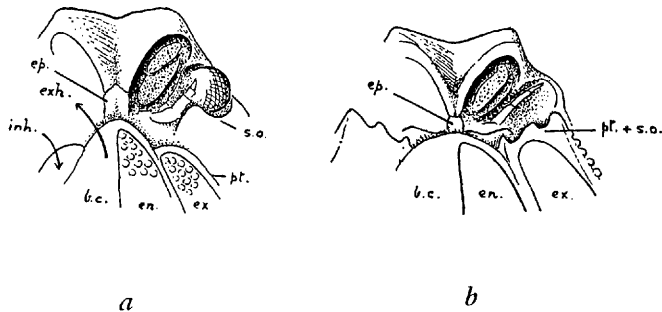


FIG. 68.—Ventral view of front and buccal cavity of *a*, *Ebalia*, and *b*, *Myra* (eye removed).

b.c., buccal cavity. *en.*, *ex.*, endopod and exopod of mxp. 3. *ep.*, epistome (so-called). *exh.*, *inh.*, exhalant and inhalant branchial channels. *pt.*, pterygostomial ridge. *s.o.*, suborbital border.

branchial channels opening at bases of external maxillipeds (mxp. 3), which are elongate and completely cover the buccal cavity. Gills less than 9. Male openings sternal. Pleopod 2 ♂ short (in South African genera examined).

Remarks.—As comparatively few of the known genera occur in South Africa, and as the proposed subfamilies are not sharply or satisfactorily defined, the following key takes no account of subfamilies.

Key to the South African Genera.

- I. Anterior edge of pterygostomial groove (inhalant channel) well separated from suborbital border (fig. 68, *a*).
 Exopod of mxp. 3 distinctly shorter than endopod, anterior margin of buccal cavity (exhalant channels) in advance of inhalant channels (fig. 68, *a*).
 A. Abdominal segments in both sexes distinct and movable *Actaeomorpha*.

- B. Some of the abdominal segments in both sexes fused.
1. Carapace subcircular or polygonal, convex, nodose, tuberculose, granulose. Eyes visible dorsally.
 - a. Front broad *Heteronucia*.
 - b. Front narrow *Ebalia*, incl. *Lithadia*.
 2. Carapace flattened, with raised beaded margin. Eyes not visible dorsally *Leucisca*.
- II. Anterior edge of pterygostomial groove close to or coalescent with, and forming the suborbital border (fig. 68, b). Exopod of mxp. 3 not, or not much, shorter than endopod, anterior margins of buccal cavity (exhalant channels) and pterygostomial grooves (inhalant channels) more or less in a transverse line (fig. 68, b).
- A. No lateral cavity.
1. Exopod of mxp. 3 narrower than 4th joint of endopod (fig. 68, b).
 - a. 4th joint of endopod of mxp. 3 a little less than half length of 3rd joint (measured along inner margin). No lateral projection *Myra*.
 - b. 4th joint of endopod of mxp. 3 distinctly less than half length of 3rd joint. A strong lateral spiniform projection *Arcania*.
 2. Exopod of mxp. 3 broader than 4th joint of endopod (fig. 72, d, l) *Philyra*.
- B. A cavity or sinus under the cave of lateral epibranchial angle, above base of cheliped (fig. 71, j) *Leucosia*.

Gen. ACTAEO MORPHA Miers

1918. Ihle, *l. c.*, pp. 208, 301, 308.

1920. Stebbing, Ann. Durban Mus., ii, p. 272.

Carapace convex, pitted and granulate. Front rather broad. Eyes not prominent. Chelipeds stout, finger and thumb shorter, or at most not longer, than hand, apically acute, the thumb very broad at base, finger opening in a nearly vertical plane. Abdominal segments in both sexes all distinct and movable.

Actaeomorpha erosa Miers

Fig. 69, a, b.

1877. Miers, J. Linn. Soc. Lond., xiii, p. 184, pl. 14.

1911. Chilton, Trans. New Zealand Inst., xliii [1910], p. 555.

1915. Bouvier, Bull. Sci. Fr. Belg. (7), xlvi, p. 47, pl. 6, figs. 2, 3.

1918. Ihle, *l. c.* p. 308 (references and distribution).

1920. Stebbing, *l. c.*, p. 273, pl. 32.

1938. Balss, *Medd. Göteb. Mus.*, lxxv, p. 8.

Carapace octagonal, lumpy, with deep pits in the hollows and around the postero-lateral and hind margins. Lower surface of 4th joint, and outer surfaces of wrist and hand of cheliped pitted and granulate, the granules on the latter two joints mostly in longitudinal rows. Upper margin of 4th joint of legs with one keel, of 5th joint with three, and of 6th joint with 2 keels. Abdominal segments corrugated and pitted.

Length 7 mm., breadth 9 mm.

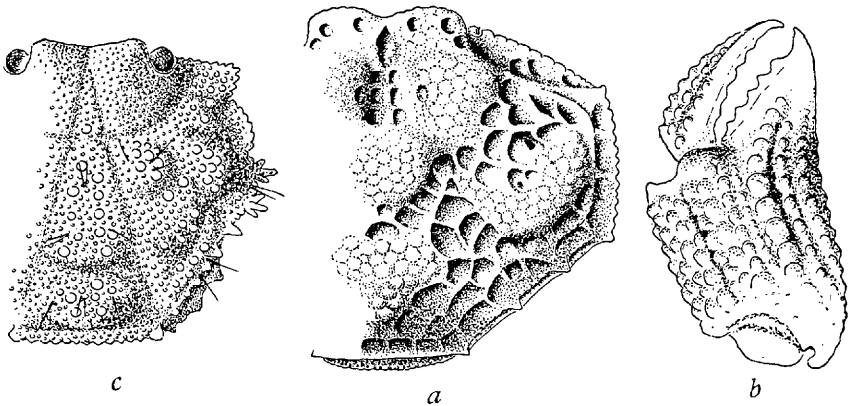


FIG. 69.—*Actaeomorpha erosa* Miers. *a*, carapace ♀. *b*, outer view of chela.
Heteronucia angulata Brnd. *c*, carapace ♀.

Locality.—Port Shepstone, Natal, 24 fathoms, 1 ♀ (Stebbing).

Distribution.—Mauritius; Kermadec Islands; Port Curtis, Australia; West Australia; Gilbert Is., Hawaiian Is.

Remarks.—The specimen described by Stebbing is in the South African Museum, but I have seen no other specimens.

Gen. HETERONUCCIA Alck.

1896. Alcock, *J. Asiat. Soc. Bengal*, lxxv, p. 177.

1918. Ihle, *l. c.*, pp. 219, 301, 309.

1937. Chopra and Das, *Rec. Ind. Mus.*, xxxix, p. 385.

1941. Ward, *Amer. Mus. Novit.*, no. 1104, p. 3.

Carapace convex, broader than long, granulate and tuberculate, or spinose. Front rather broad, shallowly bilobed. Eyes prominent. Chelipeds stout, finger as long as or a little longer than hand, opening

nearly vertically, thumb stouter than finger. Abdominal segments 3-5 in both sexes fused.

Remarks.—The following species, from its general likeness to the Ceylonese *H. vesiculosa*, is placed in this genus.

Heteronucia angulata Brnrd.

Fig. 69, c.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 372.

Carapace with Λ -shaped groove from front to hind margin, branchial region somewhat lumpy, the whole closely covered with vesicular granules of more or less uniform size, a few larger ones on the branchial humps, cardiac and intestinal areas, and a few scattered bristles. Front broad, shallowly bilobed, notched at its junction with the epistome ventrally. Hepatic region forming an angular projection, with its anterior border horizontal in line with orbit, followed by a rounded lobe. Lateral angle formed by a trifid spinous projection, followed by a similar one and several bluntly spiniform or digitiform tubercles on postero-lateral margin. A dentiform projection on either side of buccal cavity, at tip of external maxilliped. Pterygostomial ridge not prominent. Chelipeds and legs granulate; finger of cheliped subequal to upper margin of hand.

Length 4 mm., breadth 4.75 mm.

Locality.—Delagoa Bay (coll. van der Horst, 1 juv. ♀).

Remarks.—This specimen appears similar to *oeschi* Ward 1941 from the Philippine Islands, but the small size and poor quality of the photographic illustration of the latter permits no proper comparison.

Gen. EBALIA Leach

1817. Leach, Malac. Podophth. Brit., text of pl. 25, and Zool. Miscell., iii, p. 18.

1855. Bell, Trans. Linn. Soc. Lond., xxi, p. 303 (*Ebalia* and *Phlyxia*) and p. 305 (*Lithadia*).

1910. Stebbing, *l. c.*, p. 337.

1918. Ihle, *l. c.*, pp. 225, 302, 310.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 247 (*Lithadia*).

1921. *Id.*, *ibid.*, xviii, p. 459.

1928. Lebour, J. Mar. Biol. Assoc. Plym., n.s., xv, p. 110, figs. (larval stages).

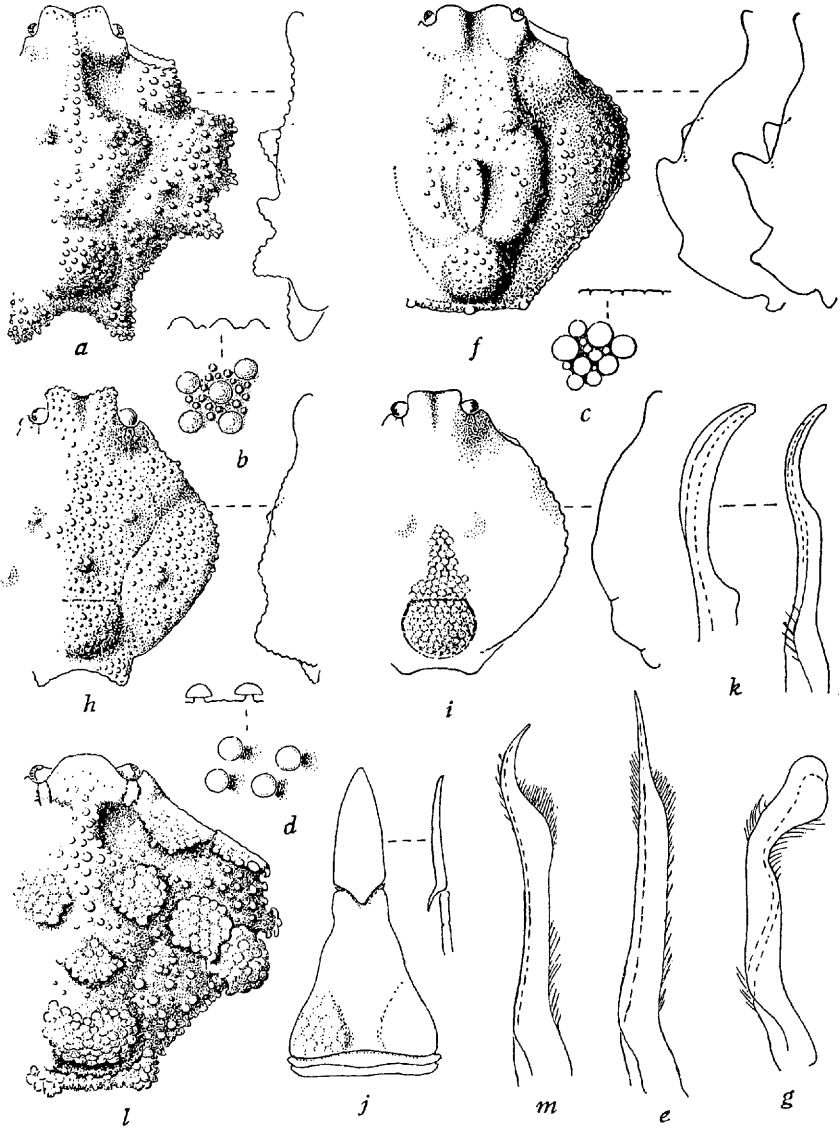


FIG. 70.—*Ebalia tuberculata* Miers. *a*, carapace ♂♀, with sagittal profile of dorsum. *b*, *c*, *d*, varieties of granulation (plan and elevation). *e*, 1st pleopod ♂.

Ebalia glomus Stebb. *f*, carapace ♀, with sagittal profile of ♀ (left) and ♂ (right).

g, 1st pleopod ♂.

Ebalia tuberculosa f. *postulans* Stebb. *h*, carapace ♂, with sagittal profile.

Ebalia tuberculosa f. *scandens* Stebb. *i*, carapace ♀ (granular mosaic only partly indicated), with sagittal profile. *j*, abdomen ♂, with profile. *k*, 1st pleopod ♂, with apex further enlarged.

Ebalia (*Lithadia*) *barnardi* Stebb. *l*, carapace ♀. *m*, 1st pleopod ♂.

1932. Monod, Bull. Soc. Sci. Nat. Maroc., xii, pp. 206–210 (figs. of 5 Eur-afric. species).

1937. Rathbun, *l. c.*, p. 123, and p. 136 (*Lithadia*).

Carapace convex, tumid, nodose, granulate. Front rather narrow, subtruncate (*Ebalia*, *Lithadia*) or quadridentate (*Phlyxia*). Chelipeds moderate, sometimes elongate, finger and thumb subequal in length to hand, subequal to one another in width (thumb not greatly wider than finger). Abdomen with 3rd–5th (or 6th) segments in ♂, 3rd–6th in ♀, fused; usually a denticle at base of terminal segment in ♂.

Remarks.—*Phlyxia*, with quadridentate (incl. inner orbital angles) front, is included in *Ebalia* by Miers and Ihle. *Lithadia* differs from *Ebalia* only in the deeper or more extensive excavations on the dorsal surface of the carapace.

Key to the South African Species.

1. Tubercles on carapace more or less conical and evenly distributed. Upper margin of hand of cheliped rounded.
 - a. Carapace dorsally trilobed, a deep smooth furrow between the gastro-cardiac-intestinal and the branchial regions (fig. 70, *f*) *glomus*.
 - b. No deep smooth furrows.
 - i. Carapace suboctagonal, a laterally projecting tubercle on branchial region, pterygostomial ridge prominent, with one tubercle especially prominent *tuberculata*.
 - ii. Carapace subhexagonal or subcircular, no laterally projecting tubercle on branchial region, pterygostomial ridge not prominent *tuberculosa*.
 - α. Carapace with mosaic of closely packed flat-topped granules (fig. 70, *i*) forma *scandens*.
 - β. Carapace with conical granules of various sizes and not closely packed forma *postulans*.
2. Tubercles to a large extent aggregated to form up-standing flat-topped bosses (fig. 70, *l*). Upper margin of hand of cheliped keeled } (*Lithadia*
} *barnardi*.

Ebalia glomus Stebb.

Fig. 70, *f*, *g*.

? 1896. Alcock, J. Asiat. Soc. Bengal, lxxv, p. 187, pl. 7, fig. 4 (*diadumena*).

? 1897. *Id.*, Illustr. Zool. R.I.M.S. "Investigator," Crust., pl. 29, fig. 4 (*diadumena*).

? 1906. Laurie in Herdman, Ceylon. Pearl Fish. Rep. 5, p. 360 (*diadumena*).

1921. Stebbing, *l. c.*, p. 460, pl. 17 (Crust., pl. 112) (*glomus*).

Carapace rhomboidal, length and breadth subequal, dorsally divided into a broad median (gastro-cardiac-intestinal) gibbosity and a branchial gibbosity on either side by a deep smooth furrow; the median gibbosity bears a pair of gastric tubercles, 3 longitudinal cardiac ridges, of which the median one is the more prominent and frequently overhangs anteriorly, and, separated by a shallow smooth groove, an intestinal hump. All the gibbosities are granulate, the rest of the surface, except the grooves, minutely granulate. Postero-lateral and hind margins beaded, the latter bounded by a larger granule or tubercle, with a median one; antero-lateral margin beaded as far as hepatic region; margin of latter, and of pterygostomial ridge minutely granulate. Front truncate, not beaded, extending as far as margin of buccal cavity, with deep dorsal groove. Hepatic and branchial regions separated by a shallow smooth (or with a few granules) groove. Cheliped $1\frac{1}{2}$ times the length of carapace, arm (4th joint) shorter than length of carapace; arm, wrist, and hand granulate, the granules on outside of arm the largest; hand not much longer than wide, finger and thumb subequal to hand, with minutely beaded ridges. Legs smooth, with a few minute granules on 4th joint, dactyls long, slender, glabrous. Abdomen with 3rd-6th segments in ♂ fused, lateral margin indented at the suture (visible) between 5th and 6th segments (but these segments not movable), a rather large but low and blunt tubercle at end of 6th segment; 3rd-6th segments ♀ fused. Pleopod 1 ♂ apically enlarged, cowl-like, the groove beginning on inner side passes round on dorsal surface to the outer side.

Length and breadth up to 9 mm. ♀, ♂ smaller.

Localities.—Off Umhloti River and off Umvoti River (between Durban and Tugela River), 25-27 fathoms (Stebbing, and S. Afr. Mus.).

Distribution of E. diadumena.—Ceylon.

Remarks.—These specimens are so extraordinarily like *diadumena* that one can scarcely hesitate to refer them to the Ceylonese species. But until a direct comparison has been made, particularly as regards the 1st pleopod ♂, Stebbing's name may stand for the South African specimens. I have not seen Laurie's paper.

Ebalia tuberculata Miers

Fig. 70, *a-e*.

1881. Miers, Ann. Mag. Nat. Hist. (5), viii, p. 266, pl. 14, fig. 3.

1910. Stebbing, *l. c.*, p. 337 (? *tuberosa* var., non *tuberosa* Pennant).

1921. Balss, Beitr. Kenntn. Meeresf. Westaf., iii, p. 52.

1932. Monod, *l. c.*, p. 207, fig. 2.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 373.

Carapace octagonal, a trifle wider than long, nodose, covered with miliary granules, numerous but seldom in contact, sometimes prominent and even shortly stalked (mushroom-like), sometimes flattened (fig. 70, *b-d*), the intervening surface minutely granulate. Front subtruncate, with slight median notch, projecting beyond margin of buccal cavity. A marked hollow between the hepatic region and the rounded ridge on gastric region; a pair of cardiac tubercles, with a median one behind them; the latter separated by a shallow depression from the intestinal hump, which is more or less sharply conical; a pair of large conical tubercles on hind margin; a strong tubercle on the branchial region projecting postero-laterally. Pterygostomial ridge prominent, granulate, one granule or a granulate tubercle larger than the rest. Cheliped less than $1\frac{1}{2}$ times length of carapace, arm less than length of carapace; arm, wrist, and hand closely granulate, some of the granules on outer margin of arm being conical, hand somewhat gibbous, not much longer than its width, upper margin rounded, finger and thumb subequal to length of hand, with minutely granulate ridges. Legs granulate, dactyls setose. Abdomen ♂ with 3rd-6th segments fused, a sharp point at base of terminal segment. Pleopod 1 ♂ slender, apically acute.

Length and breadth up to ♀ 11 mm., ♂ slightly smaller. Pinkish or reddish mottled with white, usually mostly red with the front, the median gastric ridge and the branchial and posterior tubercles white.

Localities.—Gt. Fish Point to Cape Natal (Durban), 47-85 fathoms (S. Afr. Mus.).

Distribution (tuberculata).—Senegal, Canaries, Azores, Morocco.

Remarks.—Stebbing had been given a wrong locality for "P.F. 10763," which is a s.s. *Pieter Faure* station off Cape Natal (not False Bay). He recorded this species with a query, as being in "near agreement" with Pennant's species. Bell's figure (1853, Brit. Stalk-eyed Crust., p. 141) of *tuberosa*, however, shows that the South African form is very different.

Monod's recent figure (*l. c.*, p. 206, fig. 1, *tuberosa*) confirms this, and on the other hand his fig. 2 shows that the South African specimens may well be the same as *tuberculata* Miers. Pending direct comparison of actual specimens, the South African form is recorded as *tuberculata*.

Odhner (1923, Medd. Göteb. Mus., xxxi, p. 16) records *tuberosa* (western Europe, Mediterranean, Canary Is., and West Africa (to 26° N.)) from Port Alexander, Angola.

Ebalia tuberculosa (M. Edw.)

Fig. 70, *h-k*.

1873. Milne Edwards, J. Mus. Godeffroy, iv, p. 86 (*Persephona t.*).

1879. Haswell, Proc. Linn. Soc. N.S.W., iv, p. 54, pl. 6, fig. 3 (*Phlyxia granulosa*).

1886. Miers, Rep. H.M.S. *Challenger*, xvii, p. 306, pl. 25, fig. 1 (♂).

? 1904. Doflein, D. Tiefsee Exp., vi, p. 47, pl. 16, figs. 1-3 (*salamensis*).

1906. Rathbun, Bull. U.S. Fish. Comm. for 1930, p. 889.

1910. Stebbing, *l. c.*, p. 337.

1918. Ihle, *l. c.*, p. 311 (references only).

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 247, pl. 26, fig. A (Crust., pl. 106, fig. A) (*Nursia scandens*).

1921. *Id.*, *ibid.*, xviii, p. 461, pl. 18, fig. A (Crust., pl. 113, fig. A) (*Nursia postulans*).

1921. *Id.*, *ibid.*, p. 462, pl. 18, fig. B (Crust., pl. 113, fig. B) (*N. scandens*).

1923. Rathbun, Biol. Res. "Endeavour," v, p. 134, pl. 35, figs. 1, 2.

1927. Hale, S. Austral. Crust., pt. 1, p. 197, fig. 198.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 373.

Forma *postulans*. Carapace subhexagonal or subcircular, with 2 prominent posterior tubercles; 2 gastric tubercles, one cardiac and one on each branchial region; an elevated intestinal hump, the intestinal region fairly well defined by grooves; branchio-cardiac grooves moderately distinct; whole surface with numerous conical granules, interspersed with minute granules; some of the granules on the lateral branchial and hepatic margin and pterygostomial ridge almost pedunculate. Chelipeds and legs with a mosaic of flattened closely packed granules (as in *scandens*). Abdomen ♂ (*vide* Stebbing) without tubercle or projection. Pleopod 1 ♂ (according to Stebbing's figure) as in *scandens*.

Forma *scandens*. Carapace subhexagonal or subcircular, the 2 posterior tubercles more prominent in smaller (4.5 mm.) than larger specimens (7 mm.); 2 very slight convexities on gastric region, intestinal region clearly marked by impressed lines; pterygostomial ridge not prominent; surface covered with a reticulation or mosaic of flat-topped closely packed granules. Chelipeds and legs similarly sculptured. Abdomen ♂ with a pointed projection at base of terminal segment projecting backwards over the suture between 6th and 7th segments. Pleopod 1 ♂ distal third narrowly spoon-shaped and curved outwards.

Length and breadth up to 7 mm.

Localities.—*postulans*: off Cape Natal, Durban, 184 fathoms (Stebbing).

scandens: off Cove Rock, East London, 80–130 fathoms (Stebbing); off Gt. Fish Point, 100 fathoms (S. Afr. Mus.).

Distribution (tuberculosa).—Australia, New Zealand, Hawaiian Is.

Remarks.—Whitelegge (1900) and Rathbun (*l. c.*) have mentioned the variability in the granular covering of *tuberculosa*, ranging from flat-topped granules forming a pavement-like surface, to the separate conical granules forming a rough surface. At first sight *scandens* and *postulans* are two distinct species, and though there are no transitions in the small amount of material from South Africa, an exactly similar variation in granulation occurs in the *tuberculata* material, the extreme forms of which look totally different.

The specimen figured by Miers appears to have the flattened granular mosaic sculpture. Except for the length of the chelipeds, his figure fits the South African specimens of *scandens* very well.

E. tuberculosa differs from *tuberculata* in never having *laterally projecting* tubercles or bosses.

E. salamensis, from off Dar-es-Salaam, 400 metres, is closely allied and may prove identical. Although Doflein did not mention it, the photograph of the underside appears to indicate that there is a sharp projection at the base of the terminal segment abdominal. Pleopod 1 ♂ is not described.

Stebbing, while quoting Leach to the effect that the tubercle on the ♂ abdomen is on the last segment in *Ebalia* but on the 6th in *Nursia*, put his species in *Nursia* though in this respect it clearly agrees with *Ebalia*. Further, his description and figure of the mxp. 3 (4th joint less than half length of 3rd) is erroneous.

Ebalia (Lithadia) barnardi Stebb.

Fig. 70, l, m.

1920. Stebbing, *l. c.*, p. 248, pl. 21 (Crust., pl. 101).

Carapace octagonal, with sunken areas bearing isolated, more or less numerous, mushroom-like granules, and more or less strongly raised areas or bosses formed by the coalescence of such granules. Front truncate or bluntly rounded, without notch, more or less granulate, projecting beyond margin of buccal cavity. A raised area on hepatic region and anterior "shoulder" of branchial region; a deep hollow on either side of the anterior gastric region, which bears a pair of raised bosses; a raised boss on cardiac and on intestinal region, and an elongate (more or less divided into two) boss on branchial region; lateral corners of hind margin more or less prominent and boss-like. Pterygostomial ridge not prominent. The 2 supra-orbital fissures distinct. Chelipeds and legs as in *tuberculata*, but hand of cheliped with upper margin distinctly carinate and sinuous. Abdomen with 3rd-6th segments fused in both sexes, in ♂ a sharp tubercle at base of terminal segment. Pleopod 1 ♂ slender, apically rather abruptly narrowed to an acute apex, and curved outwards.

Length up to ♀ 9 mm., breadth 11 mm.; ♂ smaller.

Localities.—Off Umhloti River, Natal, and East London, 25-45 fathoms (Stebbing); off Port Shepstone, Natal, 24 fathoms, and Algoa Bay (S. Afr. Mus.).

Remarks.—No two specimens are exactly alike as regards the quantity of isolated granules on the sunken areas, or the prominence of the boss-like areas; in the largest ♀ the latter pass gradually into the sunken areas, without the sharp undercut boundaries seen in other specimens (*cf.* Bell, 1855, Trans. Linn. Soc. Lond., xxi, p. 305, variation in *Lithadia cummingi*).

In spite of Stebbing's statement (p. 249) all the specimens were obtained by the s.s. *Pieter Faure*.

Gen. LEUCISCA McLeay

1838. McLeay, *Annulosa S. Afr.*, p. 70.

1858. Stimpson, *Proc. Ac. Nat. Sci. Philad.*, x, p. 161 (*Carcinaspis*).

1907. *Id.* (ed. Rathbun), *Smiths. Misc. Coll.*, xlix, p. 161 (*Carcinaspis*).

1910. Stebbing, *l. c.*, p. 338 (*Leucisca* and *Carcinaspis*).

1918. Ihle, *l. c.*, pp. 207, 208 (statement of systematic position, no discussion, both genera accepted).

1920. Stebbing, *Ann. Durban Mus.*, ii, p. 271.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 373.

Carapace subcircular, but narrowing abruptly to the truncate, laminately projecting front, depressed, almost flat, with more or less raised costate margin; regions not marked. Orbits below margin of carapace, a very faint groove (suture α or β of Ihle) showing on dorsal surface; completely separated from sockets of 1st antennae. Antenna 2 minute, basal joint indistinguishable. Pterygostomial ridge anteriorly well separated from suborbital border, notched. Apex of buccal cavity (exhalant canals) projecting well beyond the pterygostomial ridges (inhalant canals) to between the sockets of 1st antennae; no epistome (fig. 71). Chelipeds rather stout, subequal in the two sexes, hand and finger moving in a horizontal plane. Legs strong, 4th joint not completely concealed under lateral margin of carapace. Abdomen with 3rd-6th segments fused in both sexes, segments 1 and 2 extremely short and sunken in ♂, segment 1 in ♀ invisible.

Remarks.—Both being based on specimens from the same country, the identity of Stimpson's genus with McLeay's is so obvious that Stebbing's hesitancy (1920, p. 271) to unite them seems strange. Incidentally Stebbing (*l. c.*) credited McLeay with a figure of the pleon, but the figure in question really belongs to *Dehaanius*. McLeay has given an accurate figure of the anterior ventral surface.

Ihle (*l. c.*) placed both genera in the subfamily *Leucosiinae* (Miers, Alcock, Ihle). It seems, however, to be more allied to *Nursia* and the Ebaliids.

Endemic genus, with one species.

Leucisca squalina McLeay

Fig. 71, a-c.

1838. McLeay, *l. c.*, p. 70, pl. 3, figs. a, b.

1858. Stimpson, *l. c.*, p. 161 (*Carcinaspis marginatus*).

1907. *Id.*, *l. c.*, p. 162, pl. 14, fig. 7 (*C. marginatus*).

1910. Stebbing, *l. c.*, p. 338 (*L. squalina* and *C. marginatus*).

1920. *Id.*, *l. c.*, p. 272, pl. 31 (*phaenomma*).

1947. Barnard, *l. c.*, p. 373.

Carapace with central (gastric) portion slightly convex, two frontal

convexities and a cardiac-intestinal convexity may be indicated, margin more or less raised, with 2-3 series of minute granules; indication of (flattened) granules on the central portion. Anterior portion of pterygostomial region with relatively large flat-topped granules, closely packed but separated by deep crevices, sometimes these crevices enlarged or eroded (cf. *Ebalia* (*Lithadia*) *barnardi*). External maxillipeds (mxp. 3) more or less distinctly granulate. Cheliped, arm triquetral, the edges with (flattened) granules, wrist more or less granulate, hand inflated, outer (upper) and inner (lower) edges, and a ridge on middle of upper (outer) surface more or less granulate; finger and thumb shorter than hand, grooved, opposing margins denticulate. Legs with 4th joint dorsally unicarinate, 5th and more distinctly the 6th bicarinate. Abdomen in (adult) ♂ with a sharp tubercle near distal margin of 6th segment. Pleopod 1 ♂ rather stout, but abruptly narrowing to a long slender spiniform apex.

Length up to 9 mm., breadth 10.5 mm.; ♀ smaller. White or creamy, uniform or with reddish dots, or 2 red longitudinal stripes, or a broad median red band from hind margin to gastric or to frontal region; or uniform pinkish or salmon.

Localities.—Cape of Good Hope (McLeay, Stimpson); False Bay coast (Stebbing); littoral, under stones, in False Bay, Sebastian Bay, Port Shepstone (Natal) and Durban (S. Afr. Mus.); Jeffreys Bay (coll. T. A. Stephenson).

Remarks.—Natal specimens are smaller (both sexes) than Cape specimens, but otherwise indistinguishable.

Gen. MYRA Leach

1896. Alcock, J. Asiat. Soc. Bengal, l xv, p. 200.

1918. Ihle, l. c., pp. 255, 303, 313.

Carapace ovoid or subglobular, with 3 spines on hind margin (the median one on a higher level than the lateral ones), smooth and granular (not nodose or eroded), regions scarcely if at all demarcated; hepatic region separated by a semicircular emargination from the branchial region. Front narrow, bidentate. Epistome very small. Anterior margin of pterygostomial groove tridentate, scarcely separated from suborbital margin (fig. 68, *b*). Chelipeds usually elongate and slender, finger and thumb slender, as long as or shorter than hand. Abdomen with segments 3-6 fused in both sexes. Juveniles often with 5 spines on hind margin.

Remarks.—Indo-Pacific. The closely allied genus *Persephona*

(Atlantic and West American coast) is distinguished by the anterior margin of the pterygostomial groove being bidentate.

The record of *Persephona punctata* (Linn.) (Miers, 1886, p. 312, footnote, and Stebbing, 1910, *l. c.*, p. 336) is not accepted, because Miers himself was not too sure of his identification. It is also possible that the specimen did not come from South Africa; Sir Andrew Smith also obtained specimens from other parts of the world.

Myra fugax (Fabr.)

Fig. 71, *d, e.*

1849. M. Edwards in Cuvier, Règne Anim. Crust., pl. 25, figs. 3
3, *a.*

1855. Bell, Trans. Linn. Soc. Lond., xxi, p. 297, pl. 32, fig. 3
(*carinata*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 811 (*fugax* and *punctata*),
p. 812, pl. 1, figs. 6, 7 (*coalita* juv. ♂).

1896. Alcock, *l. c.*, p. 202 (references).

? 1910. Stebbing, *l. c.*, p. 336 (*Persephona cuphaeus* Linn.).

1918. Ihle, *l. c.*, p. 256 (references), figs. 104, 112 (orbital and pterygostomial regions).

1930. Monod, Zool. Anz., xcii, p. 140, fig. 8.

1931. Shen, Hong Kong Natural., ii, p. 108, pl. 10, fig. 2.

1933. Chopra, Rec. Ind. Mus., xxxv, p. 39, fig. 3 (mxp. 3).

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 72, fig. 7, B, C
(plp. 1, 2 ♂).

Carapace subcircular (excl. posterior projection), margins finely beaded, surface convex, smooth except for tracts of minute granules (scarcely visible to naked eye), hepatic region forming a distinct facet bounded by a line of granules. A slight medio-longitudinal keel posteriorly, more or less distinct. Posterior projections granulate. Chelipeds elongate, especially in adult ♂, arm granulate, finger about $\frac{2}{3}$ length of hand. A conical tubercle at distal end of the fused abdominal segments in ♂.

Length (excl. spine) up to 40 mm.; breadth 36 mm. Pinkish, darker (maroon) on anterior portion of carapace.

Locality.—Delagoa Bay (coll. van der Horst).

Distribution.—Ibo, Portuguese East Africa; Zanzibar; Red Sea; Indo-Pacific. By migration through Suez Canal to Palestine coast and Gulf of Alexandrette, Syria.

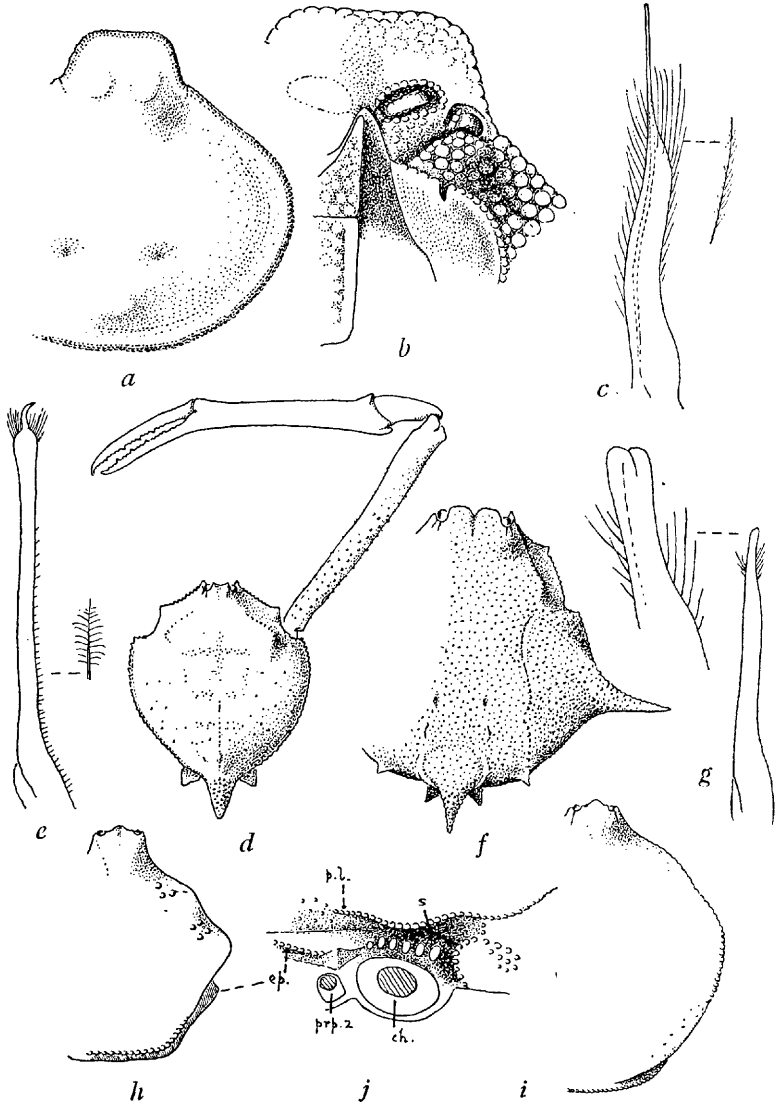


FIG. 71.—*Leucisca squalina* McLeay. *a*, carapace. *b*, ventral view of front, buccal cavity, pterygostomial region. *c*, pleopod 1 ♂.

Myra fugax (Fabr.). *d*, carapace, with cheliped. *e*, pleopod 1 ♂.

Arcania septemspinosa (Fabr.). *f*, carapace. *g*, pleopod 1 ♂, with apex further enlarged.

Leucosia whitei Bell. *h*, carapace, redrawn after Bell, semi-diagrammatic.

Leucosia marmorea Bell. *i*, carapace. *j*, lateral view of carapace, right side, showing sinus (*s*), true postero-lateral margin (*p.l.*), epimeral margin (*ep.*), cheliped and 2nd leg (*ch.*, *prp. 2*) cut off.

Remarks.—Ward (1942, Mauritius Inst. Bull., ii, p. 67, pl. 5, fig. 1) described *cyrenae* from Mauritius, distinguished by minor differences from *fugax*.

Gen. ARCANIA Leach

1910. Stebbing, *l. c.*, p. 337.

1918. Ihle, *l. c.*, pp. 262, 303, 313.

Carapace subcircular, oval, or rhomboidal, lateral and posterior margins with (usually) large spines, smooth, granulate, regions scarcely demarcated. Front bilobed. Epistome very small. Anterior margin of pterygostomial groove fused with and forming the sub-orbital border. Chelipeds slender, elongate, finger and thumb slender. Abdomen with segments 3-5 in ♂, 3-6 or 4-6 in ♀, fused. Mxp. 3 with 4th joint distinctly less than half length of 3rd.

Arcania septemspinosa (Fabr.)

Fig. 71, *f, g.*

1849. M. Edwards in Cuvier, Règne Anim. Crust., pl. 25, fig. 4 (after Herbst).

1910. Stebbing, *l. c.*, p. 337.

1918. Ihle, *l. c.*, p. 265.

1933. Chopra, Rec. Ind. Mus., xxxv, p. 43, fig. 5 (mxp. 3).

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 73, fig. 7, F (plp. 1 ♂).

[Not *septemspinosa* Bell 1855.]

Carapace subcircular (or subrhomboidal), finely granulate, with 7 spines: a large straight lateral epibranchial spine, a shorter median posterior one on the intestinal region and projecting backwards, one small spine on postero-lateral margin, hind margin with a spine at each end (the latter 3 projections may be spiniform or sharply tubercular). Finger of cheliped longer than hand. Abdomen with segments 3-6 in ♂, 4-6 in ♀, fused.

Length and breadth (excl. spines) up to 14 mm. (Alcock: 20 mm.).

Localities.—Off Tugela River mouth, 12-14 fathoms (Stebbing); off Zululand coast, 26 fathoms (S. Afr. Mus.).

Distribution.—Red Sea, Indian Seas, East Indies to Hong Kong.

Remarks.—It is unfortunate that Stebbing was supplied with "the Cape" as the locality for the s.s. *Pieter Faure* specimens no. 11426; it has been quoted in the literature (Ihle, *l. c.*, pp. 266, 313; Chopra, *l. c.*; Stephensen, *l. c.*) and gives a wrong impression of the distribution of this warm-water species in South Africa.

Gen. PHILYRA Leach

1906. Laurie in Herdman, Ceylon Pearl Fish. Rep. v, pp. 363 *sqq.*
 1910. Stebbing, *l. c.*, p. 336.
 1918. Ihle, *l. c.*, pp. 273, 304, 314.
 1932. Shen, Zool. Sinica, ix, p. 18.
 1937. Rathbun, *l. c.*, p. 167.

Carapace circular, convex, but not strongly so, regions scarcely if at all defined; usually surrounded by a beaded margin, more prominent in juv. than adult, the antero-lateral portion continued uninterruptedly on to the pterygostomial ridge. Edges of pterygostomial ridges and apex of buccal cavity projecting beyond the rather broad front. Epistome very small. Margin of pterygostomial groove scarcely separated from suborbital border. Chelipeds usually elongate and slender, longer in ♂ than in ♀, hand more or less inflated and broader than arm, finger and thumb slender, hand lying horizontally and finger moving horizontally. Exopod of mxp. 3 broader than 4th joint of endopod, usually laminately expanded (to a variable extent). Abdomen with some of the segments in both sexes fused.

Remarks.—Indo-Pacific, with numerous closely allied species. The South African forms are easily separable into species, but, with the exception of *punctata*, the true identity of the species remains provisional pending comparison with authentically named specimens. Descriptions frequently leave out of consideration characters which appear to be essential to a correct identification, *e.g.* 1st pleopod ♂. Considerable variation in sculpturing may occur.

Near the inner margin of 3rd and 4th joints of mxp. 3 there is a submarginal fringe of setae, which is well marked in the ♀, but almost or quite obsolete in the ♂; only in *globulosa* does the groove (from which the setae arise) remain in the ♂, causing the margin to be distinctly costate. This seems to be rather a curious sexual difference.

Shen (*l. c.*) has given figures of the 1st pleopod ♂ in some species. The five South African species exhibit four types of structure. The more or less blunt chitinized tip, with a brush of setae, is found in *globulosa* *plactychira*, *tuberculosa* (*vide* Shen), and Shen's two species; and may possibly be correlated with an oval, non-expanded exopod on mxp. 3.

Among the South African species there are three different types of ♂ abdomen. In *punctata* the 1st segment is well defined, though sunken, the 2nd very prominent; in *globosa* and *scabriuscula* both 1st and 2nd are sunken, but visible throughout their width; in *plactychira*

and *globulosa* the 1st is distinct, but only the lateral extremities and a median oval piece of the 2nd are visible externally.

Key to the South African Species.

- I. Mxp. 3 glabrous, exopod more or less widely expanded distally (fig. 72, *d, g*). Eye-stalk short, stout.
 - A. Arm of cheliped definitely triquetral (fig. 72, *b*). 2nd abdominal segment ♂ very prominent, transversely keeled (fig. 72, *c*) *punctata*.
 - B. Arm of cheliped nearly cylindrical. 1st and 2nd abdominal segments ♂ inconspicuous, sunken.
 - 1. Opposing margins of finger and thumb of cheliped denticulate (*cf.* fig. 72, *b*).
 - a. Pterygostomial ridge and apex of buccal cavity not very prominent. Carapace without granules visible to the naked eye *globosa*.
 - b. Pterygostomial ridge and apex of buccal cavity projecting prominently beyond the front. Carapace with branchio-cardiac-intestinal grooves, and visible granules *scabriuscula*.
 - 2. Inner margin of thumb with fringe of short, stiff setae; inner margin of finger sharply trenchant, quite smooth (fig. 72, *j*). Hepatic facet completely circumscribed by beaded margins *platychira*.
- II. Mxp. 3 furry, exopod oval, not distally expanded (fig. 72, *l*). Eye-stalk longer and more slender. Thumb of ♂ cheliped with large tooth fitting into a basal excision on finger (fig. 72, *k*) *globulosa*.

Philyra punctata Bell

Fig. 72, *a-e*.

1910. Stebbing, *l. c.*, p. 336.

[Not Barnard, 1926. = *scabriuscula*.]

Carapace smooth to the naked eye, but with numerous pits; the intervening surface in ♀ is shagreened or minutely and closely granulate but in ♂ nearly always more distinctly closely and regularly granulate, so much so that the pits are obscured, some of the granules near the middle line often slightly larger; juveniles often very distinctly granulate. The beaded margin usually more distinctly beaded in ♂ than in ♀, but always more distinct and serrulate in juv. (fig. 72, *a*,

left). Hepatic facet incomplete, *i.e.* dorsal margin marked by a few granules (serrulations in juv.) which, however, do not meet the anterolateral margin. Front straight, with median depression down to epistome. Pterygostomial ridge with 5 or 6 (extremes 4–7) prominent, squarish lobules or teeth, the innermost one the most distinct (often with subsidiary denticles on inner margin), the outermost with a distinct gap between it and the continuation of the beaded (or serrulate) margin; the innermost teeth of the two sides project well beyond the apex of the buccal cavity, forming in dorsal view a subquadrangular excision in the profile. Anterior margin of pterygostomial ridge not setose, though the concave channel below is setose; most of the straining of the inhalant current is done by the fringe of short setae on the margin of the widely expanded exopod of mxp. 3; inner margin of 3rd joint of latter not costate in ♂, but with submarginal fringe in ♀. Cheliped with arm triquetral in cross-section, upper margin ridged, anterior (inner) surface flattened, opposing margins of finger and thumb trenchant, evenly denticulate, but feebly so and often only distally in ♀; whole cheliped granulate, especially the upper outer and lower inner margins of arm (serrulate in juv.), lower surface of hand shagreened only, in ♀ almost smooth. Abdomen in ♂ with segments 1 and 2 distinct for whole width, the 2nd transversely carinate and strongly granulate, segments 3–5 fused, more or less strongly granulate basally, segment 6 slightly wider proximally than distal width of 5th, and distinctly narrower distally, without tubercle; in ♀ segment 1 invisible, 3–6 fused, but suture between 3 and 4 distinct. Pleopod 1 ♂ slender, tapering to an acute, in-turned apex. A few minute short setules scattered over anterior part of carapace (best seen when specimen is removed from liquid and drained, not wiped, as each setule retains a drop of moisture).

Length and breadth up to ♂ 21 mm., ♀ 16 mm.; pterygostomial projection not included in length, which is usually a trifle greater than breadth; cheliped ♂ 42 mm. Smallest ovigerous ♀ 10 mm., smallest specimen examined 5 mm. Pinkish or salmon, usually (especially in juv.) a paler or white lozenge-shaped or cuneiform patch on gastric region, sometimes extending back on to cardiac and intestinal regions.

Localities.—Simon's Bay, 4–7 fathoms (Bell); Mossel Bay (Stebbing); Plettenberg Bay, St. Francis Bay, and Algoa Bay, shallow water (Doflein); False Bay and Agulhas Bank to Algoa Bay and off Gt. Fish Point, 5–30 fathoms (S. Afr. Mus.); Table Bay and Saldanha Bay, 22–24 fathoms (S. Afr. Mus.).

Remarks.—Doflein gives photographs because Bell's figure was "not

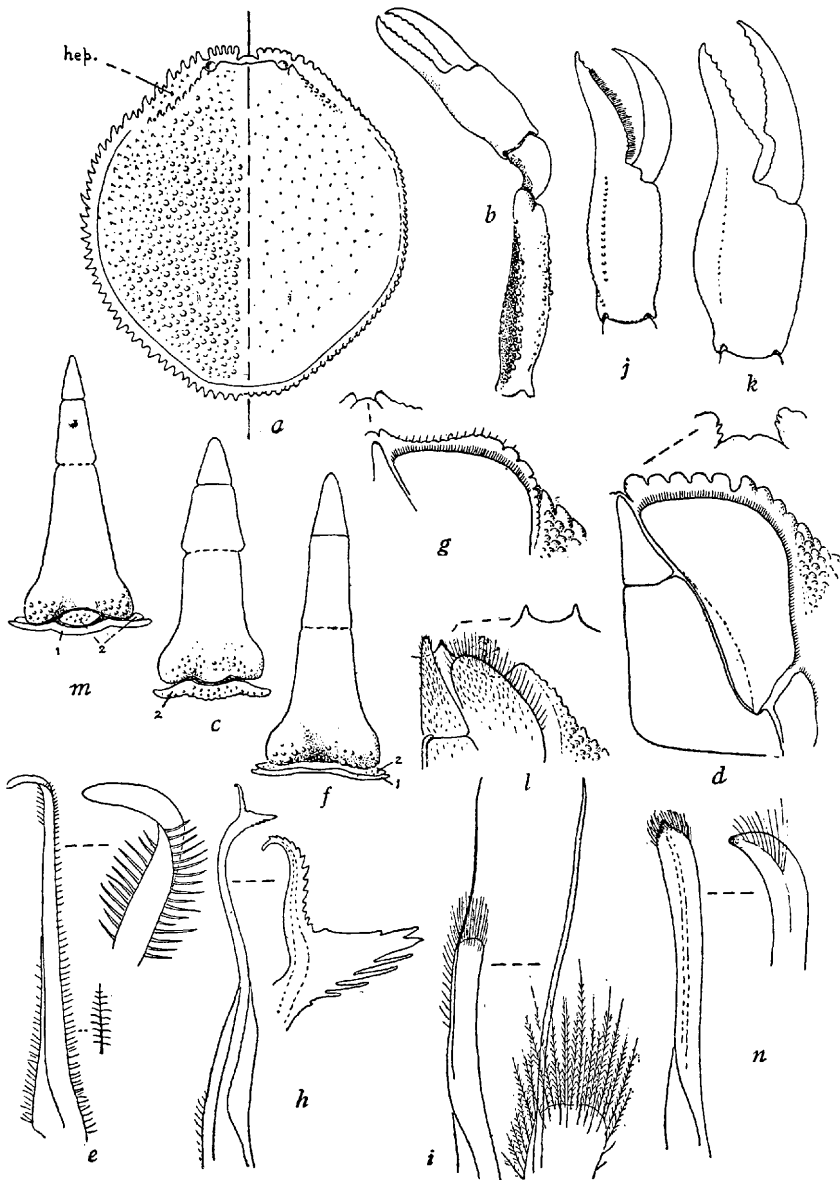


FIG. 72.—*Phillyra punctata* Bell. *a*, carapace, juv. (left) and adult (right), hep., hepatic facet. *b*, cheliped. *c*, abdomen ♂, 1st segment not shown. *d*, pterygostomial ridge and mxp. 3 (ventral view), with apex of buccal cavity further enlarged (dorsal view). *e*, pleopod 1 ♂, with apex further enlarged.

Phillyra globosa (Fabr.). *f*, abdomen ♂. *g*, pterygostomial ridge and mxp. 3, with apex of buccal cavity further enlarged. *h*, pleopod 1 ♂, with apex further enlarged.

Phillyra scabriuscula (Fabr.). *i*, pleopod 1 ♂, with apex further enlarged.

Phillyra platychira de Haan. *j*, chela.

Phillyra globulosa M. Edw. *k*, chela. *l*, pterygostomial ridge and mxp. 3, with apex of buccal cavity further enlarged. *m*, abdomen ♂. *n*, pleopod 1 ♂, with apex (in lateral view) further enlarged.

very good"; the ♂ abdomen is well shown, but otherwise Bell's figures are infinitely more useful in practice than the photographs!

This species is common on sandy areas on the Agulhas Bank. Its place is taken farther east (Natal) by *globulosa* and the other Indo-Pacific species. It is easily distinguished at a glance by the triquetral arm of the cheliped. A strongly granulate juvenile, with its serrulate margin, looks a very different species from the adult, especially an adult ♀.

Other species with triquetral arms are *sexangula* Alek. 1896, *alcocki* Kemp 1915, and *olivacea* Rathbun 1910.

Philyra globosa (Fabr.)

Fig. 72, *f-h*.

1798. Fabricius, Sp. Insect., i, p. 497, and Ent. Syst., ii, p. 441 (♀, apud de Man).

1888. de Man, J. Linn. Soc. Lond., xxii, p. 202.

1893. Henderson, Trans. Linn. Soc. Lond., v, p. 401, pl. 38, figs. 1-3 (*polita*).

1896. Alcock, J. Asiat. Soc. Bengal, lxxv, p. 243.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 83, fig. 12 (pl. 1 ♂, etc.).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 373.

Carapace to the naked eye smooth, but pitted and finely shagreened, minutely granulate more or less extensively on the branchial and cardiac-intestinal regions. Circumference with a very slight indent in the hepatic region, with a beaded border of nearly equal-sized granules. Branchio-cardiac grooves scarcely visible; no hepatic facet. Pterygostomial ridge laterally beaded, but from below the eye medianly finely crenulate, sparsely fringed with short setae, its inner angle moderately prominent; apex of buccal cavity forming a rather narrow excision in dorsal view, semicircular or U-shaped in front view. Mxp. 3 glabrous except for inner submarginal line of setae in ♀ on 3rd and 4th joints, exopod widely expanded. Cheliped with arm sub-cylindrical, its upper margin rounded, visibly granulate proximally, the granules petering out distally except along upper, outer, and lower borders; rest of cheliped minutely granulate, opposing margins of finger and thumb evenly denticulate. Abdomen ♂ with segments 1 and 2 very short, more or less sunken, segments 3-6 fused (but suture between 5 and 6 distinct), proximally granulate and laterally gibbous with median hollow, segment 6 nearly parallel-sided, about twice as

long as wide, without tubercle; in ♀ segment 1 invisible, 3-6 fused (suture between 3 and 4 distinct). Pleopod 1 ♂ elongate, distally slender, apically widely bifurcate, the inner branch serrate and curling inwards at tip, outer branch triangular, laminate, with deep narrow incisions on outer margin. Short scattered setules on carapace anteriorly.

Length up to ♂ 22, ♀ 18 mm., breadth ♂ 21, ♀ 17 mm.

Locality.—Off Tugela River mouth, 12 fathoms (S. Afr. Mus.).

Distribution.—Coasts of India, and Mergui Archipelago.

Remarks.—Four ♂♂, 1 ovig. ♀ and 1 juv. ♀ were taken together with a large number of *globulosa*. Strict identity with the Indian form can only be proved by examination of the 1st pleopod ♂.

Philyra scabriuscula (Fabr.)

Fig. 72, *i*.

1798. Fabricius, Ent. Syst. Suppl., p. 349.

1837. Milne Edwards, Hist. Nat. Crust., ii, p. 132, pl. 20, figs. 9, 10 (not good).

1877. Targione-Tozzetti, Zool. Magenta. Crost., p. 196, pl. 12, fig. 1.

1896. Alcock, *l. c.*, p. 239 (references).

1918. Ihle, *l. c.*, p. 275 (references), figs. 97, 102, 115 (frontal regions, sternum).

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120 (*punctata*, non Bell).

1937. Chopra and Das, Rec. Ind. Mus., xxxix, p. 388.

1937. Menon, Bull. Madras Mus., III, 5, p. 43, figs. (development).

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 88, fig. 15, C-E (chela, plp. 1 ♂).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 374.

Carapace pitted, and with granules, visible to naked eye, extending more or less over the branchial, cardiac-intestinal, and gastric regions; branchio-cardiac grooves distinct; a slight ridge with 2-3 granules bordering the hepatic facet dorsally, but not connecting with antero-lateral margin. Circumference closely beaded, anteriorly the beading passes on to the pterygostomial ridges without notch or interruption below the eye; innermost points of pterygostomial ridge blunt, forming with the apex of buccal cavity a narrow U-shaped incision; in dorsal view these ridges and the buccal cavity project well beyond the front (Alcock: "like lower jaw of a bull-dog"). Mxp. 3 glabrous

except for submarginal line of setae in ♀ on 3rd and 4th joints, exopod widely expanded. Cheliped with arm subcylindrical, visibly granulate, but granules mostly petering out distally, inner margin of wrist with a row of granules (feeble in ♀), opposing margins of finger and thumb denticulate. Abdomen ♂ with segments 1 and 2 very short, more or less sunken, 3–6 fused (suture between 5 and 6 distinct), segment 6 without tubercle; in ♀ segment 1 invisible, 3–6 fused, suture between 3 and 4 distinct. Pleopod 1 ♂ rather short and stout, with apical brush of plumose setae, and a long exceedingly slender filamentous (but stiff) process. Short scattered setules on carapace anteriorly.

Length 9 mm. (10, incl. "lower jaw of bull-dog"), breadth 10 mm. Greyish, paler below.

Locality.—Chinde, mouth of Zambesi River, Portuguese East Africa in sand between tide-marks, 1 ♂, 1 ♀ (Barnard).

Distribution.—Red Sea, Zanzibar, Indian coasts, Mergui, Nicobars, East Indies.

Remarks.—The 1926 record (as *punctata*) was due to my accepting, without criticism, Stebbing's identification of the specimens.

Philyra platychira de Haan

Fig. 72, *j*.

1841. de Haan, Fauna Jap. Crust., p. 132, pl. 33, fig. 6.

1874. Milne Edwards, Nouv. Arch. Mus. Paris, x, p. 43, pl. 2, fig. 4 (*longimana*).

1894. Ortmann, Semon's Austral. Reise, v, p. 36 (*platycheira*).

1896. Alcock, *l. c.*, p. 242.

1906. Laurie, *l. c.*, p. 363.

1915. Balss, Denkschr. K. Ak. Wiss. Wien, xcii, p. 15.

1918. Ihle, *l. c.*, p. 315 (in list of species).

1930. McNeill and Ward, Rec. Austral. Mus., xvii, p. 368, fig. 1, and pl. 60, figs. 5, 6 (*platycheira*).

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 89, figs. 15, F–K, 16 (chart) (*variegata*, discussion of synonymy).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 374.

Carapace to the naked eye smooth or even polished, but pitted and shagreened, and posteriorly minutely granulate. Branchio-cardiac grooves distinct. Hepatic facet distinct and complete, its upper beaded margin joining the beaded circumference. Pterygostomial ridge with notch below eye, medianly to which it is much less distinctly beaded or crenulate; the blunt inner angles forming with the

apex of buccal cavity a narrow U-shaped excision. Mxp. 3 glabrous except for the submarginal fringe in ♀, exopod distally expanded, but not so strongly as in preceding species. Cheliped with arm subcylindrical, but somewhat triquetral distally, granulate, a line of granules on inner margins of wrist and hand, more distinct in ♂ than ♀, inner margin of thumb entire, except for 2 subapical denticles, densely fringed with setae, finger curved, ensiform, inner margin thin, trenchant, entire. Abdomen ♂ with segment 1 short, sunken, 2 invisible externally except at lateral extremities and medianly as an oval piece interpolated between segments 1 and 3 (and usually fused to the latter), 3-6 fused but suture between 5 and 6 distinct, 6 without subapical tubercle but with distal margin raised medianly as a flat transverse tubercle; in ♀ segment 1 invisible, 3-6 fused, but suture between 3 and 4 distinct. Pleopod 1 ♂ fairly stout, with apical chitinized tip, and brush of setae (similar to that of *globulosa*). A few scattered setules on carapace anteriorly.

Length and breadth up to ♂ 15 mm., ♀ 12 mm.

Localities.—Off Amatikulu River mouth, Zululand, 13 fathoms, fine sand, 2 ♂♂, 4 ♀♀ (S. Afr. Mus.); Delagoa Bay (coll. van der Horst).

Distribution.—Red Sea, east coast of Africa, Indo-Pacific to Japan and Australia.

Remarks.—Easily distinguished by the peculiar finger and thumb of cheliped.

Philyra globulosa M. Edw.

Fig. 72, *k-n*.

1782. Herbst, Krabben, I, ii, p. 90, pl. 2, fig. 19 (*anatum*).

1798. Fabricius, Ent. Syst. Suppl., p. 349 (*Leucosia globulosa*, *fide* M. Edw.) (♂, apud Alcock).

1837. Milne Edwards, Hist. Nat. Crust., ii, p. 132.

1849. *Id.* in Cuvier, Règne Anim. Crust., pl. 24, figs. 4, 4, *a, b*.

1896. Alcock, *l. c.*, p. 245.

1918. Ihle, *l. c.*, p. 273.

1933. Chopra, Rec. Ind. Mus., xxxv, p. 38.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 77, figs. 10, 11, A-L.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 374.

Carapace to the naked eye smooth, but pitted and shagreened, minutely granular in ♀ and juv. (chiefly on branchial regions), some-

times in juv. some larger granules in medio-dorsal line. Branchio-cardiac grooves broad and shallow. Hepatic facet not indicated, except by a few granules in juv. Circumference minutely beaded, some of the beads at more or less regular intervals larger, and in the juv. forming denticles. Pterygostomial ridge as far as below eye minutely beaded, thence concave and entire to the sharp projecting inner tooth, which with the apex of the buccal cavity forms a broad shallow excision. Mxp. 3 furry, inner margin of 3rd joint distinctly costate in ♂ as well as in ♀, exopod oval, not expanded, its outer margin thickly setose. Cheliped with arm subcylindrical, with visible granules (usually), a line of fine granules on inner margin of wrist and hand, less distinct in ♀ than in ♂, inner margins of finger and thumb denticulate, in *adult* ♂ thumb with a large tooth basally fitting into an excavation on base of finger. Abdomen ♂ with segment 1 distinct but very short and sunken, segment 2 visible only at lateral extremities and as a median oval piece, 3-6 fused (suture between 5 and 6 distinct), 6 with tubercle in its distal half in *adult* ♂; in ♀ segment 1 invisible, segments 3-6 fused, suture between 3 and 4 distinct. Pleopod 1 ♂ fairly stout, with apical chitinized tip and brush of setae. Eye-stalks distinctly longer and more slender than in the other South African species. Anterior part of carapace and the front furry.

Length and breadth up to ♂ 16, ♀ 13 mm. (Alcock: ♂ 30, ♀ 24 mm.).

Localities.—Off East London (4 specimens), and coast of Natal and Zululand (a large number of ♂♂, ♀♀, and juv.), 12-54 fathoms (S. Afr. Mus.).

Distribution.—Persian Gulf, Indian Seas to East Indies and Siam.

Remarks.—According to the s.s. *Pieter Faure* log-book, this species seems to prefer muddy ground, to which, no doubt, its furry "front" and longer eye-stalks are adaptations. These features and the oval exopod of mxp. 3 (both sexes) render this species easily identifiable.

Specific name: de Man (1888, p. 203) says that "in its other characters the male [*i.e.* Fabricius' type ♂] perfectly agrees with the female" [Fabricius' type ♀]. It (the ♂) should therefore have an *expanded* exopod of mxp. 3, because de Man says his Mergui specimens have an expanded exopod, and "they perfectly agree with Fabricius' female type." On the other hand, on p. 204 he says the 6th abdominal segment of Fabricius' type ♂ has a tubercle, which the Mergui specimens have not got. This certainly points to Fabricius' ♂ being the species which Alcock has called *globulosa* M. Edw.; but was de Man quite accurate regarding the exopod of Fabricius' ♂?

de Man has in effect designated Fabricius' ♀ as the type of *globosa*

(Fabr.), the Mergui specimens being plesiotypes. Alcock (p. 245) has designated Fabricius' ♂ as the type of *globulosa* M. Edw.

M. Edwards (1837) in his synonymy of *globulosa* quotes Fabricius' (Ent. Syst. Suppl., p. 349) "*Leucosia globulosa*." Did Fabricius actually write "*globulosa*"? If so, and if his ♂ type ("*globosa*") has an unexpanded exopod of mxp. 3, should not *globulosa* be credited to Fabricius and not to Milne Edwards?

If "*globulosa* Fabr." cannot be maintained, can Herbst's *anatum* be proved to be the same species, thus taking priority and avoiding the use of two confusingly similar names? Stephensen (*l. c.*, pp. 78, 82) says that *anatum* cannot be recognized with certainty.

Gen. LEUCOSIA Fabr.

- 1896. Alcock, J. *Asiat. Soc. Bengal*, lxv, p. 209.
- 1918. Ihle, *l. c.*, pp. 276, 305, 315.
- 1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 249.
- 1927. Gurney, *Trans. Zool. Soc. Lond.*, pt. 2, p. 284 (larva).
- 1933. Chopra, *Rec. Ind. Mus.*, xxxv, pp. 32-38.
- [Not *Leucosia* Rathbun, 1937, p. 194.]

Carapace very convex, almost hemispherical, subcircular to hexagonal in outline, smooth (hepatic region sometimes defined), glazed or polished, frontal region narrowed and up-turned (snout-like); lateral epibranchial angle bent downwards towards base of cheliped forming the eave of a sinuous Y-shaped cavity: the thoracic sinus (Ihle, *l. c.*, p. 192, fig. 107) (fig. 71, *j*). The true postero-lateral margin ill-defined behind the lateral angle, its place taken by the epibranchial margin which is thickened and milled, and continuous with a beaded crest forming the hind margin. Pterygostomial ridge fused with and forming the suborbital margin. Epistome very small. Chelipeds rather stout, hand and finger moving in a horizontal plane. Legs small. Abdomen in both sexes with some of the segments fused.

Remarks.—The hemispherical shape and the "snout" are a ready means of distinguishing this genus.

Key to the South African Species.

In both species outer margin of hand not carinate.

- 1. Postero-lateral border thickly furry. Epimeral edge visible in dorsal view (fig. 71, *h*). 4th joint of legs (walking) compressed *whitei*.
- 2. Postero-lateral border not furry. Epimeral edge not visible in dorsal view except a small portion posteriorly (fig. 71, *i*). 4th joint of legs subcylindrical . . . *marmorea*.

Leucosia whitei Bell.Fig. 71, *h*.1918. Ihle, *l. c.*, p. 283, fig. 101 (orbit).1920. Stebbing, *l. c.*, p. 249.

Carapace about as long as broad, hexagonal, a narrow strip of short thick fur on postero-lateral border, 3-4 granules on an angular hump on hepatic region, and a group of granules just in front of lateral epibranchial angle, antero-lateral margin smooth as far as front end of thoracic sinus, true postero-lateral margin beaded as far as level of 3rd (*i.e.* 2nd walking) leg; epimeral edge visible throughout in dorsal view, inflexed surface below hind margin punctate and granulate. Arm of cheliped closely nodular except on middle of ventral surface, hand inflated, its inner edge sharply granulate. 4th joint of legs compressed, granulate on edges, 5th and 6th joints sharply carinate dorsally.

Length 10 mm., breadth 9 mm. (Stebbing) (Alcock: 14 × 13.5 mm.).

Locality.—Natal coast, 27 fathoms (Stebbing).

Distribution.—Andaman Is., East Indies to Eastern Australia.

Remarks.—The specimen was not returned by Stebbing; the above description is taken from Alcock.

Leucosia marmorea BellFig. 71, *i, j*.

1855. Bell, Trans. Linn. Soc. Lond., xxi, p. 286, pl. 30, fig. 4.

1896. Alcock, *l. c.*, p. 221.

1903. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 439, pl. 22, fig. 3.

1918. Ihle, *l. c.*, p. 316 (in list of species).

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

Carapace longer than broad by the length of the "snout," sub-circular, smooth and polished, sparsely pitted laterally, antero-lateral margin crenulate, becoming beaded at lateral epibranchial angle, true postero-lateral margin beaded as far as level of 2nd (1st walking) leg, epimeral edge not visible in dorsal view except a small portion posteriorly, beaded posterior margin nearly straight, surface below it quite smooth. Thoracic sinus defined below by the granulate hind margin of pterygostomial region and 5-6 large granules at base of cheliped (fig. 71, *j*). Arm of cheliped nodose, except the dorsal and

ventral surfaces distally, wrist and hand with a row of granules on inner margin. 4th joint of legs subcylindrical, finely granulate on upper and lower margins, 6th joint carinate on upper margin. Abdomen ♂ with strong tubercle on 6th segment (adult). Pleopod 1 ♂ straight, tapering to a plain subacute apex, but specimen not fully adult (no tubercle on 6th abdominal segment).

Length 29 mm., breadth 25 mm. (Bell: 35 × 30 mm.).

Locality.—Portuguese East Africa (26° 17' S., 33° 10' E.), 415 metres (Barnard). (See Addenda.)

Distribution.—Maldives, Andamans, Philippine Is., Singapore.

Remarks.—Hilgendorf (1878, MB. Ak. Wiss. Berlin, p. 811) quotes Bianconi's record (1869, Spec. Zool. Mossambic, fasc. xix/xx, p. 341) of *L. urania* Herbst from Mozambique. *L. longifrons* de Haan, *neocaledonica* M. Edw., *pulcherrima* Miers, and *ornata* Miers are all very closely allied to *urania*, and may prove to be merely varieties of it, as Alcock and Ihle considered *neocaledonica* and *pulcherrima* to be. Alcock separates *marmorea* on account of the carapace being *longer than broad by the length of the snout*; *longifrons* having the length and breadth approximately equal. But the figures of *urania* (Milne Edwards in Cuvier, 1849), and *pulcherrima* and *ornata* (Miers, 1877) all agree with Alcock's diagnosis of *marmorea*.

FAMILY DORIPPIDAE.

1910. Stebbing, *l. c.*, p. 339.

1916. Ihle, Siboga Exp. monogr., xxxix, b, 1, pp. 97–158.

1937. Rathbun, Bull. U.S. Nat. Mus., no. 166, p. 75.

Carapace usually flat, subquadrangular or subcircular, short, leaving the first two or three abdominal segments uncovered dorsally. First two pairs of (walking) legs long and strong; last two pairs short and slender, dorsal in position and ending in hook-like dactyls. Gills less than 9. Male genital openings coxal, female openings sternal or coxal; when the latter are coxal a pair of sternal grooves is present (Ihle, *l. c.*, fig. 49; cf. *Dromiidae*). Openings of inhalant branchial channels variable.

Key to the South African Genera.

- I. Mxp. 3 not covering anterior part of buccal cavity, floor of exhalant canals formed by the calcified endopods of mxp. 1. Openings of inhalant canals in front of chelipeds. Female genital openings sternal (sternal groove absent). Eggs small and numerous (*Dorippinae* or *Sternitrema*).

- A. A narrow bridge of the carapace between cheliped and inhalant branchial opening *Dorippe*.
- B. Inhalant openings immediately in front of cheliped [*Ethusa*].
- II. Mxp. 3 almost completely closing in the buccal cavity and forming floor of exhalant canals. Openings of inhalant canals reduced or absent. Female genital openings coxal, sternal grooves present. Eggs large and few (*Cyclodorippinae* or *Peditrema*).
- A. Carapace subquadrangular. Inhalant openings reduced. Exopod of mxp. 3 with flagellum, epipod reduced (*Cymonomae*) *Cymonomus*.
- B. Carapace oval or subcircular. Inhalant openings absent. Exopod of mxp. 3 without flagellum, epipod absent (*Cyclodorippae*)*.
1. Carapace broader than long. Interocular distance much less than half width of carapace *Corycodus*.
2. Carapace about as broad as long, Interocular distance at least half width of carapace *Xeinostoma*.

Gen. DORIPPE Fabr.

1899. Milne Edwards and Bouvier, Res. Sci. Camp. Monaco, fasc. xiii, p. 16.

1910. Stebbing, *l. c.*, p. 339.

1916. Ihle, *l. c.*, pp. 148, 153, 156.

Carapace subquadrangular, broader behind than across frontal margin, which is formed by the bilobed front, the recedent supra-orbital margin, and a strong tooth at outer orbital angle, being the continuation of the lateral margin; regions well defined. Apex of buccal cavity (exhalant openings) produced upwards between the 1st antennae to meet the front. Exopod of mxp. 3 without flagellum. An inner subocular tooth, usually well developed. Openings of inhalant canals a little distance in front of bases of chelipeds, protected by a fringe of long setae around margin. Chelipeds in ♂ usually unequal. Abdomen of 7 distinct segments in both sexes. Pleopod 2 ♂ short.

Key to the South African Species.

1. Carapace broader than long. Inner subocular tooth smooth *lanata*.
2. Carapace longer than broad, slightly. Inner subocular tooth stout, serrate *dorsipes*.

* In the South African genera a wide gap between bases of chelipeds and next pair of legs.

Dorippe lanata (Linn.) .

Fig. 73, *d*.

1900. Milne Edwards and Bouvier, Exp. Travailleux, Talisman, Crust., p. 33.

1904. Doflein, D. Tiefsee Exp. vi, p. 32.

1910. Stebbing, *l. c.*, p. 339.

1921. Balss, Beitr. Kennt. Meeresf. Westafr., iii, p. 49.

1933. Monod, Bull. Com. Sci. Afr. occid. Fr., xv, pp. 35-39, figs. 3, C-G, 4, C, D, 5, A, B, D (comparison with *armata*) (pagination of separate copy).

Body and legs, except finger and thumb of cheliped and dactyls of legs, pilose-setose. Apex of exhalant canals meeting front and visible in dorsal view. Supra-ocular lobe distinct from frontal lobe.

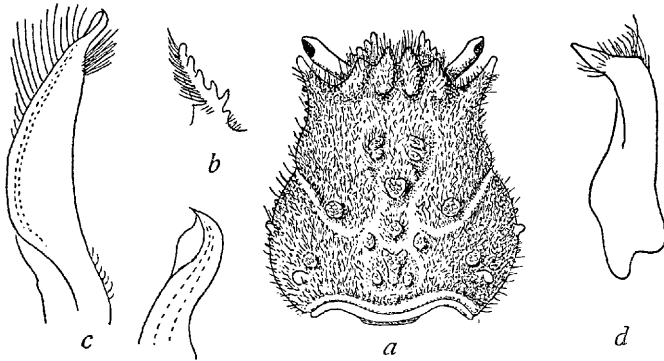


FIG. 73.—*Dorippe dorsipes* (Linn.). *a*, carapace. *b*, ventral view of left subocular tooth. *c*, pleopod 1 ♂, with apex further enlarged.
Dorippe lanata (Linn.). *d*, pleopod 1 ♂.

Carapace broader than long, with bands and patches of granules or small tubercles, variable in extent, the most constant being 2 oval (submedian) gastric patches, and an intestinal Y- or V-shaped band. Inner subocular tooth spiniform and smooth. Coxa of 4th leg adjoining the 1st abdominal segment, narrow, at least anteriorly (as in Monod's fig. 5, B, D). Right cheliped ♂ not noticeably larger than left. 4th joint of 2nd and 3rd legs spinulose on upper margin, 5th joint also but more feebly so.

Length up to 18 mm., breadth 23 mm. (Pesta, 1918: 30 × 40 mm.).

Localities.—Off Umhloti River mouth (Natal), 46 metres (Stebbing); off Gt. Fish Point and off Tugela River mouth, 30-46 fathoms (S. Afr. Mus.).

Distribution.—Mediterranean, Ivory Coast, Congo River mouth.

Remarks.—Monod has compared this and the closely allied species *armata* Miers. One point, not mentioned, but which shows clearly in Monod's figs. 4, C, and 5, A, is the distinctness of the supra-ocular lobe in *lanata* (in *armata*, fig. 4, A, it forms an even margin with the lateral margin of the frontal lobe).

Dorippe dorsipes (Linn.)

Fig. 73, *a-c*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 812 (*quadridentata*).

1896. Alcock, J. Asiat. Soc. Bengal, lxxv, p. 277 (references).

1903. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 439, pl. 22, fig. 1.

1916. Ihle, *l. c.*, pp. 148, 153, 156, figs. 41, 45, 51, 54, 58, 59, 61, 63, C.

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 120 (*lanata* laps. cal.).

1931. Shen, Hong Kong Natural., ii, p. 98, text-figs. 5-7, pl. 5, figs. 1, 2.

1945. Stephensen, Dan. Sci. Invest. Iran, pt. 4, p. 63, fig. 4, A, B (plp. 1, 2 ♂).

Pilose-setose. Carapace longer than broad, with raised nodules, mostly granular; the hinder outer nodule on branchial region, the lateral branchial spine and apex of antero-lateral spine non-granulate and bare. Inner subocular tooth very large and prominent, serrate on upper border. Supra-ocular lobe distinct from frontal lobe. Lateral margin serrate behind antero-lateral tooth. Cheliped with smooth white conical granules on outer surface of arm, wrist, and hand; in ♂ one of the hands usually enlarged. Outer margin of 5th joint of 2nd and 3rd legs granulate. Abdomen ♂ with low median boss on 1st segment, 3 knobs on both 2nd and 3rd, one subgranular median one on 4th, and a small rather sharp tubercle on 5th segment; in ♀ 3rd-5th segments each with a transverse denticulate ridge, the median tooth on 3rd and 4th segments enlarged.

Length up to ♀ 32 mm., breadth 31 mm. (Alcock: ♂ 36 × 34 mm., ♀ 25 × 24 mm.).

Localities.—Portuguese East Africa (27° 17' S., 33° 10' E.), 415 metres (Barnard); Delagoa Bay (coll. van der Horst).

Distribution.—Ibo and east coast of Africa, Indo-Pacific to China, Japan, Queensland, and West Australia.

Remarks.—The record of this species from Portuguese East Africa as “*lanata*” was due to a *laps. cal.*, as the original MS. notes contain the correct name.

Gen. CYMONOMUS M. Edw.

1905. Alcock, *Ann. Mag. Nat. Hist.* (7), xv, p. 566.

1916. Ihle, *l. c.*, pp. 118, 152, 153.

1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 244.

1937. Rathbun, *l. c.*, 96.

Carapace subquadrangular, post-gastric, cardiac and branchial regions fairly well defined. Front rostriform, more or less prominent. Supra-orbital border either distinct with the eye-stalks inserted below level of rostrum, and either separate or fused basally; or rostrum and eye-stalks forming a trifid front, without any supra-orbital margin, or groove or suture separating the eye-stalks from carapace. Cornea much reduced and unpigmented, or obsolete. Antenna 1 large, unconcealed. Antenna 2 not concealed, peduncle with prominent renal tubercle. Mxp. 3 almost completely covering buccal cavity, palp exposed, exopod with flagellum. No apparent inhalant openings. Chelipeds equal. 2nd and 3rd legs very long, especially the dactyl of 3rd; 4th and 5th legs with claw-like dactyls. Abdomen with segments distinct. Female genital openings on 3rd coxae. Pleopod 2 ♂ as long as or slightly longer than pleopod 1. Eggs large, few. Development abbreviated, without free-swimming stage.

Remarks.—Deep water, Atlantic and Indian Oceans. There seems to be an unusual disinclination on the part of most authors who have dealt with this genus to regard the forms from various parts of the world as full species. There would seem to be, however, quite a lot of difference between a form with separate, more or less movable eye-stalks, and one where the eye-stalks are fused together or with the rostrum. A comparison of the 1st pleopods ♂ has apparently not been made. On the basis of the following division, there seems no reason why Stebbing's species should not be maintained with full specific rank.

Key to the Species and Subspecies.

I. A distinct supra-orbital margin.

A. Distance between outer bases of eye-stalks about half anterior width of carapace.	} <i>granulatus</i> <i>typicus.</i>
movable	

B. Distance between outer bases of eye-stalks about one-quarter anterior width of carapace.

- | | | |
|---|---|--|
| 1. Eye-stalks separate, immovable | { | <i>andamanicus.</i>
<i>granulatus</i>
<i>indicus.</i> |
| 2. Eye-stalks fused together basally below the
rostrum | { | <i>normani.</i>
<i>granulatus</i>
<i>valdiviae.</i>
<i>granulatus</i>
n. subsp.
Hansen. |

II. No supra-orbital margin. Eye-stalks fused on either side of rostrum, distance between their outer bases one-half width of carapace *trifurcus.*

Cymonomus trifurcus Stebb.Fig. 74, *a-f*.1920. Stebbing, *l. c.*, p. 245, pl. 20 (Crust., pl. 100).

The trifurcate front, composed of the fused eye-stalks and rostrum, passes into the carapace without any suture or supra-orbital margin; width of front at base of eye-stalks half width of carapace. Carapace glabrous except for a short fringe along hind margin, densely granulate, the granules sessile posteriorly, pedunculate anteriorly, with a few especially elongate ones on antero-lateral angle; in juv. sparsely granulate posteriorly, more thickly anteriorly where the granules, especially those on antero-lateral angles, are conical or spiniform. Rostrum triangular, in adult with stalked granules, in juv. with spiniform denticles; medio-ventrally carinate. Eye-stalks with stalked granules in adult, spiniform denticles or conical granules in juv. Area between base of rostrum and eye-stalks, bases of antennae, and buccal cavity smooth and polished. Chelipeds granulate, less strongly so on inner surfaces, inner upper margin of wrist and hand with some longer spiniform denticles. Legs granulate, dactyls of 4th and 5th legs short, strongly arcuate with 3 spines on inner margin. Pleopod 1 ♂ forming a simply folded sheath for the slightly longer 2nd pleopod, which has apically a groove leading to the acute apex (cf. *Corycodus*).

Length 7 mm., breadth 6 mm.; total length of "body" (carapace plus the projecting doubled-up abdomen) of ovig. ♀ 9.5 mm.

Localities.—Off East London, 300 fathoms, and off Cape St. Blaize, 125 fathoms (Stebbing); off Umhlangakulu River mouth (Natal, near Port Shepstone), 50 fathoms, 2 juv. ♂♂ (S. Afr. Mus.); off Cove Rock, East London, 43 fathoms (S. Afr. Mus.).

Gen. CORYCODUS M. Edw.

1880. Milne Edwards, Bull. Mus. Comp. Zool. Harv., viii, p. 23.
1910. Stebbing, *l. c.*, p. 340 (*Nasinatalis*).
1916. Ihle, *l. c.*, pp. 124, 152, 154.
1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 242.
1937. Rathbun, *l. c.*, p. 101.

Carapace broader than long, semicircularly arched anteriorly, postero-lateral margins converging, hind margin concave. Front bilobed, with decurrent groove, meeting apex of buccal cavity. Mxp. 3 completely covering buccal cavity, palp small and concealed under 4th joint, exopod without flagellum. Chelipeds equal, finger and thumb slender, elongate. 2nd leg inserted considerably behind base of cheliped. Abdomen in ♂ with segments 4-7 fused, in ♀ segments 5 and 6 fused. Pleopod 1 ♂ a simple sheath for the slightly longer pleopod 2. Eggs large, few; development presumably abbreviated, without free-swimming stage.

Remarks.—Besides the Indian Ocean species, one other species in the West Indies. No male of either species has, apparently, hitherto been described.

Corycodus disjunctipes (Stebb.)

Fig. 74, *g-i*.

1910. Stebbing, *l. c.*, p. 340, pl. 16 (Crust., pl. 42) (*Nasinatalis d.*).
1916. Ihle, *l. c.*, Zool. Anz., xlvi, p. 362 (*bowwieri*).
1916. *Id.*, *l. c.*, p. 124, figs. 44, 68.
1920. Stebbing, *l. c.*, p. 242.

Carapace sparsely setose; dorsally and on pterygostomial regions, sternum and abdomen closely granulate, the granules on carapace anteriorly more prominent, more or less stalked, the antero-lateral margin with spiniform denticles, which are continued in a curved line from lateral epibranchial angle inwards across the branchial region (to a variable distance). A small tubercle (granulate or spinulose) on the epibranchial region. Hind margin beaded or granulate (not smooth as in Stebbing's and Ihle's figures). A deep groove from supra-orbital margin. Chelipeds granulate, outstanding spines on thumb and inner margin of hand, one or two also on finger. Dactyls of 4th and 5th legs about $\frac{3}{4}$ length of 6th joint, falcate, inner margin minutely denticulate. Pleopod 1 ♂ a simple sheath; pleopod 2 distally bent outwards, with a groove running to the acute apex.

Length 6 mm., breadth 9 mm.; length including doubled-up abdomen ♀ 11 mm.

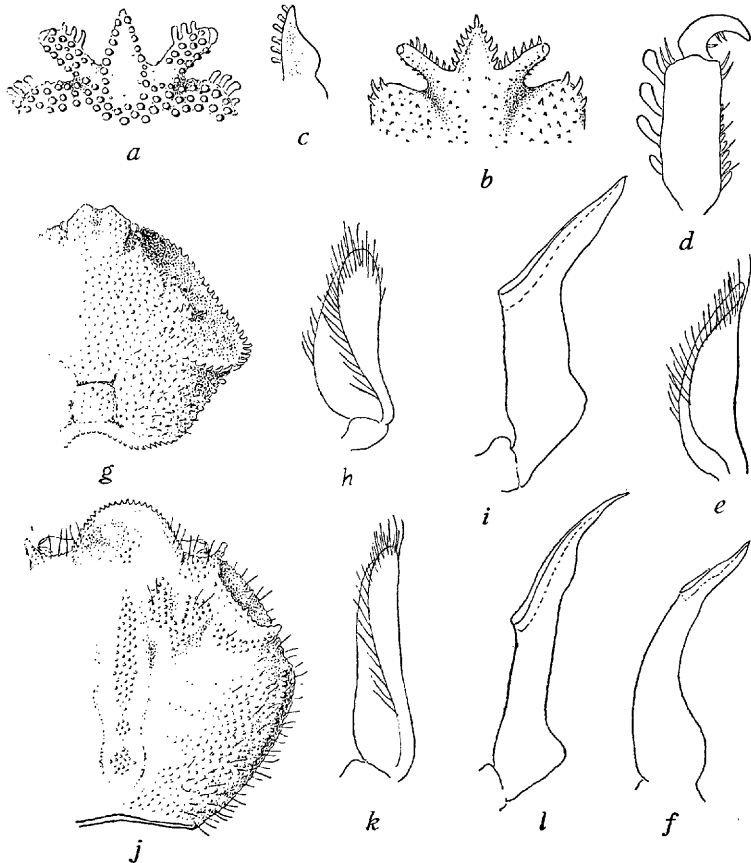


FIG. 74.—*Cymonomus trifurcus* Stebb. *a*, front of carapace with eye-stalks, adult. *b*, the same, juv. *c*, lateral view of rostrum. *d*, 6th joint and dactyl of 4th (or 5th) leg. *e*, pleopod 1 ♂. *f*, pleopod 2 ♂.

Corycodus disjunctipes (Stebb.). *g*, carapace ♂. *h*, pleopod 1 ♂. *i*, pleopod 2 ♂. *Xeinostoma euchair* Stebb. *j*, carapace ♂. *k*, pleopod 1 ♂. *l*, pleopod 2 ♂.

Localities.—Off Cape Natal (Durban), 62 fathoms (Stebbing); off Umhloti River mouth (Natal) and off Cape Vidal (Zululand), 80–100 fathoms (S. Afr. Mus.).

Distribution.—East Indies (5° 43' N., 119° 40' E.), 522 metres (Ihle).

Remarks.—Of the ♀♀ in the South African Museum collection, three contain respectively 7, 9, and 10 eggs, and three contain 5, 11, and 12 advanced embryos.

Gen. XEINOSTOMA Stebb.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 243.

Carapace about as broad as long, subcircular. Front broad, semi-circular, concave, but not decurrent, not quite meeting apex of buccal cavity (a deep crevice between them). Mxp. 3 completely covering buccal cavity, palp not concealed, exopod without flagellum. Chelipeds robust, equal. 2nd leg inserted considerably behind base of cheliped. 6th and 7th joints of 2nd and 3rd legs closely fringed with long setae on hind margins. Abdomen in ♂ with segments 5-7, in ♀ segments 6 and 7, fused; in ♀ pleural portions of segments 2-5 narrowed, bearing the pleopods near their apices. Pleopod 1 ♂ a simple sheath for the slightly longer 2nd pleopod.

Remarks.—The structure of the ♀ pleon is remarkable and in strong contrast with the broad bowl-shaped pleon in *Cymonomus* and *Corycodus*. Possibly the specimen was not fully mature.

Xeinostoma eucheir Stebb.

Fig. 74, j-l.

1920. Stebbing, *l. c.*, p. 243, pl. 19 (Crust., pl. 99).

Carapace sparsely setose, chiefly around the lateral margins; branchio-cardiac grooves well marked; these, and other slight depressions, and the concave dorsal surface of front smooth, the raised areas finely granulate, especially near the margins where the granules become conical; front denticulate on margin, granulate submarginally. A prominent conical tubercle at outer angle of orbit, and another farther back nearer lateral rounded angle. Hind margin costate, smooth. Chelipeds granulate and setose, a prominent tubercle on outer surface of wrist, granules on hand mostly in rows and bands, with 3 intervening smooth grooves. Dactyls of 4th and 5th legs nearly as long as 6th joint, falcate, inner margin with a few setae. Pleopods 1 and 2 ♂ similar to those of *Cymonomus* and *Corycodus*.

Length (♂) 7 mm., breadth 8 mm. Length including abdomen as measured by Stebbing 9 mm.

Locality.—Off Cape Vidal, Zululand, 80-100 fathoms (Stebbing).

Remarks.—Only five specimens were obtained in the course of the survey by the s.s. *Pieter Faure*. Two ♂♂, including the one figured by Stebbing with 4th and 5th legs still attached, and a ♀ abdomen (on a slide) were returned to the South African Museum. I have figured the ♂, as Stebbing's representation of the surface sculpturing was not too detailed.

The remarkable fringes on the hind margins of the last two joints of the 2nd and 3rd legs would suggest natatory habits; or a habitat in mud, but the nature of the ground is recorded as "rock." Associated with this species were specimens of *Corycodus disjunctipes* and *Eurynome elegans*.

There is considerable resemblance to *Cyclodorippe agassizii* M. Edw., from the West Indies (*cf.* Rathbun, *l. c.*, p. 105, fig. 25, and pl. 32, fig. 5).

GYMNOPLEURA.

1922. Bourne, J. Linn. Soc. Lond., xxxv, pp. 55 *sqq.*

1937. Rathbun, Bull. U.S. Nat. Mus., no. 166, pp. 6-27.

Anterior thoracic sterna broad, posterior sterna narrow and keel-like. Posterior thoracic epimera largely exposed by reduction of the branchiostegite. Last pair of legs dorsal in position, normal or reduced in size. Male and female genital openings coxal, sternal grooves present in ♀. Gills 8. Exhalant branchial canals closed by the enlarged and modified exopod *and* endopod of mxp. 1.

Remarks.—Bourne's thesis sustains the views of Boas, and of M. Edwards and Bouvier, that the *Raninidae* should not be included in the *Oxystomata*.

FAMILY RANINIDAE.

1910. Stebbing, *l. c.*, p. 339.

1918. Ihle, Siboga Exp. monogr., xxxix, b, 2, pp. 294-296, 298, 300, 306, 317-318.

1922. Bourne, *l. c.*, pp. 56 *sqq.*

1937. Rathbun, *l. c.*, p. 6.

Carapace longer than broad, greatest width in the anterior third. Abdominal terga narrow, most of them visible in dorsal view. Buccal cavity elongate, completely closed by mxp. 3. Chelipeds robust, hand usually broad and flat, the finger and thumb nearly at right angles to the long axis of hand. Legs with the 6th and 7th (dactyl) joints more or less flattened and foliaceous. Inhalant branchial canals between the 1st abdominal tergum and the coxae of 5th pair of legs.

Remarks.—There is a remarkable resemblance between these crabs and the sand-burrowing *Albuneidae*. The *Raninidae*, however, are distinguished by the narrowness of the first abdominal segment in contact with the carapace, and the shortness of the 1st antennae.

Key to the South African Genera.

1. Carapace evenly convex, with rostral point (fig. 75, a, e).
 - a. Carapace scabrous. 5th leg subequal to 4th *Ranina*.
 - b. Carapace smooth. 5th leg shorter and more slender than 4th *Raninoides*.
2. Carapace roof-like, with median longitudinal ridge, and V-shaped excision instead of rostrum (fig. 75, h) *Cosmonotus*.

Gen. RANINA Lam.

1910. Stebbing, *l. c.*, p. 339.

Carapace evenly convex, scabrous, with rostral point. Sternum very broad between bases of chelipeds, becoming rapidly very narrow between bases of 2nd legs; 3rd pair close behind 2nd pair; 5th pair inserted above and slightly in advance of, but subequal in size to, 4th pair. Dactyls of all legs foliaceous.

Ranina ranina (Linn.).

Fig. 75, a-d.

1851. Bianconi, Spec. Zool. Mosambic, fasc. 5, p. 86 (*dentata*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 814 (*dentata*, after Bianconi).

1910. Stebbing, *l. c.*, p. 339 (*scabra*).

1918. Ihle, *l. c.*, p. 295 (called *scabra*, though admitting the just priority of Linnaeus' name).

1931. Shen, Hong Kong Natural., ii, p. 103, fig. 9 and pl. 7.

Anterior profile in adult straight or slightly concave. Carapace closely covered with adpressed spiniform tubercles pointing forwards. Three teeth, separated by notches on either side of the triangular rostrum, the outermost bifid; 2 trifold processes on antero-lateral corner of carapace, the anterior one in adult ♂ very prominent and projecting beyond level of rostral point. In juv. (a specimen 20 mm. in length) anterior profile convex, the rostrum being the most forward point; the 2 trifold antero-lateral processes not nearly so prominent; carapace much more sharply spinate, the spines acute and not adpressed, anterior margin strongly spinulose, and a distinct medio-dorsal line of conical granules on rostrum. Cheliped with 2 spines on upper apex of wrist, 2 on upper outer margin of hand, 1 on base of finger followed by several smaller ones, 5 teeth on lower (inner) margin of hand.

Length up to 130 mm., breadth (excl. antero-lateral processes)
115 mm.

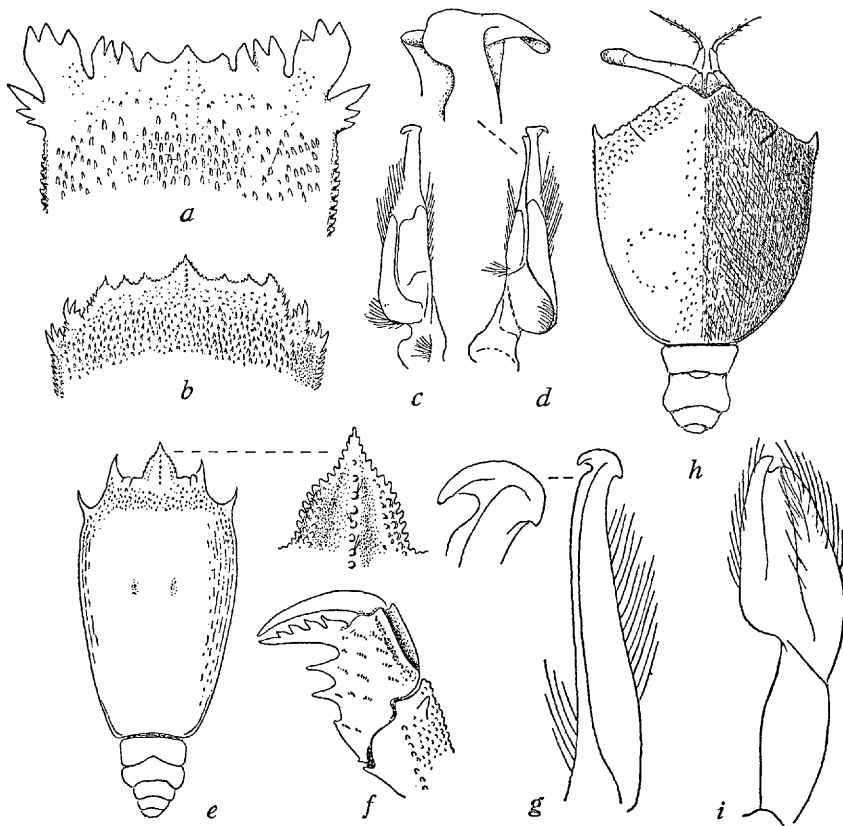


FIG. 75.—*Ranina ranina* (Linn.). *a*, anterior part of carapace, adult (length 130 mm.). *b*, the same, juv. (length 20 mm.). *c*, 1st pleopod ♂, outer view. *d*, the same, inner (median) view, with apex further enlarged.

Raninoides serratifrons Hend. *e*, carapace and abdomen (latter not fully extended) ♂, with rostrum further enlarged. *f*, chela. *g*, 1st pleopod ♂ from inner (median) side, with apex further enlarged.

Cosmonotus grayii Ad. & White. *h*, carapace and abdomen (latter not fully extended) ♂, right eye folded in. *i*, 1st pleopod ♂, inner view.

Localities.—Durban (Stebbing, and S. Afr. Mus.); Zululand coast, 24 fathoms (S. Afr. Mus.); Delagoa Bay (Lourenzo Marques Mus.); Mozambique (Bianconi).

Distribution.—Mauritius, Réunion, East Indies to China, Japan, and Sandwich Is. Apparently not found in India.

Gen. RANINOIDES M. Edw.

1918. Ihle, *l. c.*, p. 317 (list of species).
1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 249.
1922. Bourne, *l. c.*, pp. 73-75.
1933. Chopra, *Rec. Ind. Mus.*, xxxv, pp. 81-86 (doubts whether *Notosceles* Bourne is distinct).
1937. Rathbun, *l. c.*, p. 7.
1942. Ward, *Mauritius Inst. Bull.*, ii, p. 47 (*Notosceles*).

Carapace evenly and strongly convex, mostly smooth (to the naked eye), with rostral point. Sternum moderately broad between bases of chelipeds and 2nd legs, but very narrow between bases of 3rd legs; distance between 2nd and 3rd pairs as great as that between 2nd and chelipeds; 5th legs inserted above and in advance of 4th legs, and markedly shorter and more slender than the latter. Pleopod 1 ♂ large, not concealed by abdomen, calcified; pleopod 2 shorter than pleopod 1.

Raninoides serratifrons Hend.

Fig. 75, *e-g*.

1906. Laurie in Herdman, *Ceylon Pearl Fish. Rep.* v, p. 367.
1920. Stebbing, *l. c.*, p. 250.
1933. Chopra, *l. c.*, p. 86, pl. 3, figs. 3, 3, *a*, and text-fig. 1, *c*.

Carapace sparsely pitted and minutely shagreened, becoming in anterior quarter squamulose-granulose and sparsely setose; rostrum with a slightly raised median line of granules; margins of rostrum and supra-orbital border serrulate or denticulate. Tooth on supra-orbital border between the 2 fissures not acute, outer orbital tooth spiniform. One spine on antero-lateral margin. Cheliped without spine on 3rd joint, wrist squamose-granulose, outer upper margin of hand bicarinate.

Length up to 22 mm., breadth 11.7 mm. (Henderson).

Locality.—Off Port Shepstone, Natal, 34 fathoms (Stebbing).

Distribution.—Ceylon, India, N.W. Australia.

Remarks.—Ward (*l. c.*, p. 47, pl. 4, figs. 5, 6) describes *viaderi* from Mauritius, closely allied to *serratifrons*.

Gen. COSMONOTUS Ad. & White

1896. Alcock, *J. Asiat. Soc. Bengal*, lxxv, p. 291.
1918. Ihle, *l. c.*, pp. 294, 306, 317.
1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 250.

Carapace strongly raised in medio-dorsal line, roof-like, nearly flat on either side; a V-shaped excision instead of a rostrum, in which the basal joints of the eye-stalks are visible. Second joint of eye-stalk elongate, flattened, lying in a groove extending nearly to the antero-lateral spinous tooth. Sternum broad between bases of chelipeds, very narrow between bases of 2nd legs. 5th pair of legs subequal to 4th. Pleopod 1 ♂ long, not completely concealed by abdomen.

Cosmonotus grayii Ad. & White

Fig. 75, h, i.

1918. Ihle, *l. c.*, p. 294.

1920. Stebbing, *l. c.*, p. 250.

Carapace smooth and polished, but rather closely pitted along medio-dorsal line, and minutely scabrous at antero-lateral corners. Supra-orbital margin minutely denticulate, with indications of 2 fissures. Cheliped, wrist with 1 apical denticle, outer and inner (upper and lower) margins of hand carinate, entire, finger (in adult) with a denticle in middle of inner margin. Pleopod 1 ♂ with distal portion forming a rather loosely folded sheath.

Length up to "about an inch" (Adams and White).

Locality.—Off Umvoti River mouth, Natal, 56 fathoms (Stebbing).

Distribution.—Dar-es-Salaam, Persian Gulf, East Indies, Formosa.

ANOMURA.

1907. Borradaile, *Ann. Mag. Nat. Hist.* (7), xix, pp. 474, 475.

1909. Calman in Lankester, *Treatise Zool. Crust.*, vii, p. 313.

1910. Stebbing, *Gen. Cat. S. Afr. Crust.*, pp. 349, 367 (*Macrura Anomala* + *Thalassinidea*).

Body either crab-like or Macruran in general shape. Abdomen either bent more or less beneath carapace, or extended and not strongly calcified. Carapace not fused with epistome. Third pair of legs unlike the 1st, never chelate; 5th pair always reduced in size, sometimes also the 4th pair. Tail-fan often reduced. Uropods present or absent.

Remarks.—Stebbing (*l. c.*, p. 367) remarks that "Anomura" is not a fitting name for a group in which three tribes out of four have symmetrical "tails." The name may be ill-chosen, but morphology shows that the *Thalassinidea* are not to be included in the *Macrura Genuina*.

Key to the Divisions (Tribes).

1. 2nd-4th pairs of legs with last joint (dactyl) flattened for shovelling and burrowing. Abdomen bent under carapace, telson and uropods not forming a tail-fan . . . *Hippidea*.
2. 2nd-4th pairs of legs with dactyl not flattened.
 - a. Tail-fan developed, but uropods modified for holding the body into hollow objects (mollusc shells, etc.) (fig. 82). Abdomen soft, extended, usually twisted *Paguridea*.
 - b. Tail-fan well developed, uropods adapted for swimming (fig. 95, *h*). Abdomen symmetrical.
 - i. Carapace depressed. Rostrum well developed. Abdomen calcified, more or less bent under carapace (figs. 87, 91, 92) *Galatheaidea*.
 - ii. Carapace compressed (figs. 93, 96). Abdomen soft, extended straight *Thalassinidea*.

HIPPIDEA

Mole-crabs.

1904. Borradaile, F. Geogr. Mald. Laccad. Archip., ii, p. 750.

1910. Stebbing, *l. c.*, p. 365.

1924. Gurney, "Terra Nova" Rep. zool., viii, p. 187 (larvae).

Carapace ovoid or subquadrate, regions ill-defined. Cornea of eye small. First 4 pairs of legs with flattened terminal joint (dactyl), though that of 1st leg may be ovate, or linear, or elongate and multi-articulate. 5th pair very slender and feeble, inflexed. Abdomen partially extended, but the large telson bent under, the preceding segment with a pair of biramous uropods not adapted for swimming (not forming a tail-fan). No pleopods in ♂.

Remarks.—All the Mole-crabs dwell on sandy beaches and burrow with great rapidity. They burrow backwards. The very furry flagella of the 1st antennae and/or the 2nd antennae are adapted to the habitat in shifting sand, forming a filter to keep the stream of water to the gills clear of sand (Garstang, Quart. J. Microsc. Sci., xl, 1897, p. 224). Benedict (Proc. U.S. Nat. Mus., xxvii, 1904, p. 624) suggests that the furry flagella trap small particles of food washed along by the current. As the mandibles are feeble (Stebbing, Hist. Crust., 1893, p. 151), the food probably consists of small soft-bodied animals and plankton. Moore in studying the faecal pellets (Proc. Roy. Soc. Edin., liii, 1933, p. 252) found that they contained comparatively large particles of shell and sand; and regarded *Hippa* as a

typical "detritus-eater" like the majority of the *Anomura* (Moore, *l. c.*, lii, 1932, p. 296).

Key to the Families.

1. Carapace oval. Telson elongate, lanceolate. 1st pair of legs not subchelate. Mxp. 3 without exopod . . . *Hippidae*.
2. Carapace quadrangular. Telson ovoid. 1st pair of legs subchelate. Mxp. 3 with exopod . . . *Albuneidae*.

FAMILY HIPPIDAE.

1910. Stebbing, *l. c.*, p. 365.

Outline of carapace in dorsal view oval. Mxp. 3 sub-operculiform, 4th joint very large; exopod absent. First pair of legs subcylindrical, not subchelate. Telson elongate, lanceolate.

Key to the South African Genera.

1. Carapace narrowly ovoid, very convex. Flagellum of ant. 2 large and long (fig. 76, *a*). Dactyl of 1st leg lamellate, ovate (fig. 76, *b*). Eye-stalks elongate . . . *Emerita*.
2. Carapace broadly ovoid, moderately convex. Flagellum of ant. 2 small. Dactyl of 1st leg cylindrical, styliform (fig. 76, *d*). Eye-stalks very short . . . *Hippa*.

Gen. EMERITA Meuschen.

1910. Stebbing, *l. c.*, p. 366.

1933. Menon, Bull. Madras Mus., n.s., III, 3, p. 34, figs. (development) (*Hippa*).

1934. *Id.*, J. Bombay Nat. Hist. Soc., xxxvii, p. 499, figs. ♂ ♀.

1935. Schmitt, New York Ac. Sci., xv, p. 210.

1937. *Id.*, Ann. S. Afr. Mus., xxxii, p. 25.

Carapace narrowly ovoid, strongly convex (barrel-shaped); frontal margin tridentate. Flagellum of ant. 2 large and long. Last joint of 3rd mxp. narrow, laminate. Dactyl of 1st leg ovate, lamellate. Eye-stalks elongate, very slender, the cornea forming a distinct knob.

Remarks.—According to Menon the ♂♂ of the Indian and American species are considerably smaller than the ♀♀: *asiatica*, ♂ 3.5–7.5 mm., ♀ 22–30 mm. He also found (in July) soft-shelled, *i.e.* recently moulted, ♀♀ with two or three ♂♂ attached between the thorax and abdomen. Alikunhi (J. Bomb. Nat. Hist. Soc., xlv, 1944, p. 94) says that the Indian species breeds throughout most of the year, with

maximum intensity in January to April; and that the young post-larval individuals are found in the finer sand near high-water mark, whereas the larger ones are in the coarser sand nearer low-water mark.

Emerita austroafricana Schmitt.

Fig. 76, *a, b.*

1910. Stebbing, *l. c.*, p. 366 (*emeritus*, non Linn.).
1912. Lenz, *Ark. Zool.*, vii, no. 29, p. 5 (*asiatica*, non M. Edw.).
1917. Stebbing, *Ann. Durban Mus.*, ii, p. 25 (*asiaticus*, non M. Edw.).
1926. Barnard, *Trans. Roy. Soc. S. Afr.*, xiii, p. 120 (*emeritus*, non Linn.).
1937. Schmitt, *l. c.*, pp. 25–29, pl. 3.

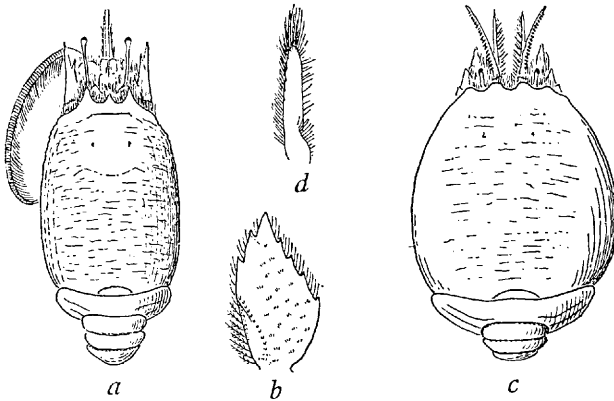


FIG. 76.—*Emerita austroafricana* Schmitt. *a*, carapace, flagellum of ant. 2 pulled out on one side. *b*, dactyl of 1st leg. *Hippa adactyla* Fabr. *c*, carapace. *d*, dactyl of 1st leg.

Greater part of the downwardly projecting lateral portion of the carapace smooth, without transverse striae. Dactyl of 1st leg ovate, apically acute, the inner margin with 3–5, usually 4, dentations, outer margin with 1 or usually 2. Second joint of peduncle of ant. 2 smooth, the longest of its 3 spines extending beyond the subglobular 4th joint.

Length ♂ up to 35 mm., ovig. ♀♀ 23–37 mm. Pale pinkish grey, eggs orange.

Localities.—Amanzemtoti, S. of Durban (Lenz); Umkomaas, S. of Durban (S. Afr. Mus.); Durban Bay (Stebbing, Schmitt); Delagoa

Bay and Inhambane (Barnard); Masiene, Portuguese East Africa (S. Afr. Mus.); Impengazi, N. of St. Lucia Bay. (coll. T. A. Stephenson).

Distribution.—Zanzibar, India (see *infra*).

Remarks.—Distinguished from *emeritus* (Linn.) by the dentate margins of dactyl of 1st leg (*cf.* figs. on pl. 3, Schmitt, *l. c.*, 1937). Schmitt (1935) showed that the *emerita* of Milne Edwards (1837) was wrongly identified, and that M. Edwards' *asiatica* was really the *emerita* of Linnaeus. Schmitt, however, appears to have overlooked Stebbing's 1917 paper in which he refers to the description of the dactyl of 1st leg given by Nobili (1903). If Nobili is accepted, it appears that the form with dentate dactyl extends to Zanzibar and India.

Gen. HIPPA Fabr.

1910. Stebbing, *l. c.*, p. 365.

1920. *Id.*, Ann. Durban Mus., ii, p. 274.

Carapace broadly ovoid, moderately convex; frontal margin undulate. Flagellum of ant. 2 small. Last joint of mxp. 3 unguiform. 1st leg cylindrical, dactyl narrow linear, but not elongate or multiarticulate. Eye-stalks slender, but very short, expanding slightly and gradually to the cornea.

Hippa adactyla Fabr.

Fig. 76, *c, d.*

1837. Milne Edwards, Hist. Nat. Crust., ii, p. 206, pl. 21, figs. 14–20.

1912. Lenz, Ark. Zool., vii, no. 29, p. 5 (*Remipes ovalis* M. Edw.).

1920. Stebbing, *l. c.*, p. 274 (references).

1923. *Id.*, Fish. Mar. Biol. Surv. Rep., iii, Spec. Rep. 3, p. 5 (*pacificus*).

1939. Estampador, Philipp. J. Sci., lxi, pp. 348 *sqq.*, pls. 1–4 (anatomy) (*Remipes testudinarius*).

Frontal margin with 2 submedian lobes, flanked by a lateral lobe which (typically) is rounded and projects very little beyond the median lobes. Lateral margin with a submarginal series of short transverse setiferous pits.

Length up to 35 mm., breadth 32 mm. Pale greyish or pinkish brown, eggs orange-red.

Localities.—Amanzemtoti, S. of Durban (Lenz); Umgeni Lagoon and Durban beach (Stebbing); Durban Bay, Port St. Johns (S. Afr. Mus.).

Distribution.—Zanzibar, Red Sea, Mauritius, Réunion, to East Indies, Pacific islands and California.

FAMILY ALBUNEIDAE.

1904. Benedict, Proc. U.S. Nat. Mus., xxvii, p. 621.

1914. Stebbing, Trans. Roy. Soc. Edin., 50, p. 280 (references).

Outline of carapace in dorsal view subquadrangular. Flagellum of ant. 1 elongate. Mxp. 3 subpediform, 4th joint not enlarged, exopod present. First pair of legs subchelate. Telson not greatly elongate, ovate.

Gen. ALBUNEA Fabr.

1904. Benedict, *l. c.*, p. 623.

1914. Stebbing, *l. c.*, p. 280.

1938. Gordon, Bull. Raffles Mus. Singapore, no. 14, p. 190 (comparison with *Lepidopa*).

A deeply concave median sinus on anterior margin of carapace, with (usually) a minute rostral point. Spine on antero-lateral corner situate on the lateral wall (not the dorsal shield) of carapace (*i.e.* ventral to the *linea anomurica*). Scaphocerite (scale or accessory joint) of ant. 2 elongate and slender. Eye-stalks lamellate, compressed, tapering to the very small cornea. Mxp. 3 with 4th joint (in Gordon's paper = antepenultimate joint or carpus) only shortly produced at outer apex.

Remarks.—There is a strong superficial resemblance to *Ranina*, which is also a sand-burrower, but *Albunea* is easily distinguished by its elongate 1st antennae, the lamellate eye-stalks, and the slender and feeble 5th pair of legs.

Albunea symnista (Linn.)

1878. Miers, J. Linn. Soc. Lond., Zool., xiv, p. 326.

1893. Henderson, Trans. Linn. Soc. Lond., v, p. 409.

1917. Stebbing, Ann. Durban Mus., ii, p. 26 (*guerinii*, non Lucas).

1937. Menon, Bull. Madras Mus., n.s., III, 5, p. 10, figs. (development).

1938. Gordon, *l. c.*, p. 187 (localities), figs. 1, e, 3, f, 4, c.

Anterior margin of carapace with (11) 12–14 spiniform teeth on either side of the median emargination, in which there is a small rostral denticle. Dactylus of 3rd leg slender, arcuate, with a prominent narrow lobe proximally (Gordon, *l. c.*, fig. 4, c).

Length up to 25 mm.

Locality.—Durban Bay (Stebbing).

Distribution.—Aden, Ceylon, India, Mascarenes, Nicobars, East Indies.

Remarks.—Although I have seen no specimens, I feel sure that the Durban specimen should have been identified with the Indian species rather than with one which has been recorded from the Mediterranean, west coast of Africa, and St. Helena. Stebbing says there were 10 (left side) + 13 (right) teeth on frontal margin in his Durban specimen, which conforms better with *symnista* than with *guerinii*, in which latter there are 8–9 on each side. He makes no reference to the character of the dactyl of 3rd leg, which appears to be an important diagnostic feature (*cf.* Gordon, *l. c.*).

PAGURIDEA.

1910. Stebbing, *l. c.*, p. 349.

1924. Gurney, "Terra Nova" Rep. zool., viii, p. 181 (larval stages).

Carapace ovate with well-defined regions; or elongate and feebly calcified behind the cervical groove. First pair of legs (chelipeds) chelate; 2nd–4th pairs well developed, 5th slender; or 2nd and 3rd well developed and 4th and 5th small. Abdomen nearly always asymmetrical, soft, twisted, or folded under carapace. Uropods (when present) adapted for holding the body in empty mollusc shells and other hollow objects.

Key to the Families.

1. Uropods absent. Carapace crab-like. 4th legs at least as well developed as the preceding legs *Lithodidae.*
2. Uropods present. 4th legs much shorter than the preceding legs.
 - a. Abdomen straight and symmetrical, with all the terga developed and in contact, with 5 pairs of symmetrical appendages in addition to the uropods *Pomatochelidae.*
 - b. Paired appendages never present on all the abdominal segments (except in larval stages).
 - i. Flagella of ant. 1 ending in a filament (fig. 79, c); peduncle usually considerably shorter than length of carapace *Paguridae.*
 - ii. Flagella of ant. 1 ending abruptly and bluntly (fig. 86); peduncle nearly as long as, or longer than, carapace. Terrestrial *Coenobitidae.*

FAMILY LITHODIDAE.

Stone Crabs.

1910. Stebbing, *l. c.*, p. 349.

Carapace crab-like, with abdomen folded underneath. Chelipeds well developed; 2nd-4th legs cylindrical, 5th slender, chelate, folded into the branchial chamber. Pleopods absent in ♂, more or less reduced in ♀. No uropods.

Remarks.—In *Lithodes* the development is abbreviated (Gurney, 1924, *l. c.*, p. 181).

Gen. NEOLITHODES M. Edw. & Bouv.

1905. Stebbing, *Mar. Invest. S. Afr.*, iv, p. 69.

1910. *Id.*, *l. c.*, p. 349.

1922. Bouvier, *Res. Sci. Camp. Monaco*, lxii, p. 37 (Megalopa stage).

Rostrum simple, with a pair of spines at its base dorsally. Eye-stalks short, cornea ventral. Acicle of antenna 2 rudimentary (normally). Right cheliped stouter, but not longer than left cheliped. 2nd abdominal segment composed of 5 pieces separated by sutures, the outermost sutures indistinct (less so in ♂ than in ♀), thus apparently only 3 pieces. Segments 3-5 covered with calcified nodules or conical tubercles, without intersegmental sutures, and in ♂ without distinctly separated lateral pieces, but in ♀ the lateral pieces of left side of each of the 3 segments enlarged and causing the abdomen to be much more asymmetrical than in the ♂. A pair of rudimentary appendages on 1st abdominal segment (close to bases of 5th legs), and unpaired appendages on left side on segments 2-5 in ♀; in ♂ no abdominal appendages.

Remarks.—The discovery of a Giant Stone-crab in South African waters was one of the noteworthy results of the survey made by the Cape Government trawler s.s. *Pieter Faure* under the directorship of Dr. Gilchrist. The ship's log-book shows that specimens (including juveniles) of this genus were trawled at the following stations:—

P.F. no. 16847. Cape Point N.E. × E. 36 miles, 660-700 fathoms, green mud, 2 juv. 9.vii.03 (in S. Afr. Mus.).

P.F. no. 17053. Cape Point N.E. × E. $\frac{1}{2}$ E., 46 miles, 900 fathoms, green mud. 21.vii.03. 1 specimen.

P.F. no. 17118. Cape Point N. 70° E., 40 miles, 800 fathoms, green mud, 10 specimens. 22.vii.03 (1 preserved in formalin, now in S. Afr. Mus.; 9 preserved dry, of which 2 sent to Stebbing; whereabouts of the others unknown).

P.F. no. 17175. Cape Point E. $\frac{3}{4}$ N., 38 miles, 630 fathoms, green mud, 1 juv. 29.vii.03 (sent to Stebbing, now in S. Afr. Mus.).

P.F. no. 17871. Cape Point N. 49° E., 38 miles, 475–550 fathoms, green mud, 1 specimen. 11.ix.03 (in S. Afr. Mus.).

P.F. no. 18043. Cape Point N.E., 40 miles, 560–700 fathoms, green mud, 1 juv. 17.ix.03 (in S. Afr. Mus.).

I do not know the present whereabouts of the two (type) specimens sent to Stebbing. The South African Museum possesses an ovigerous ♀ from the type locality, presumably the one specimen originally preserved in formalin.

The South African Museum also has one ♂ in formalin without serial number (possibly P.F. no. 17053), and P.F. no. 17871, which is a ♀ belonging to the *n. sp.* described below. This seems to have been the only specimen of this latter species collected by the *Pieter Faure*, and seems not to have been recognized at the time as different from those submitted to Stebbing.

At a much later date the South African Museum received a fine pair of this latter species from an area to the north of the Cape Point area. From this very limited evidence it might seem that the two species do not occur together, and that *capensis* occurs at greater depths. Against this, however, is the fact that all the juveniles appear to belong to the second species.

Benedict (1895, Proc. U.S. Nat. Mus., xvii, p. 479) has recorded the similar occurrence of two species on the east coast of North America: one, *agassizii* (S. I. Smith), with flattened and prickly legs at an average depth of 500 fathoms south of Cape Hatteras, and another, *goodei* (Benedict), with subcylindrical non-prickly legs at an average depth of 900 fathoms north of Cape Hatteras. The correlation of a decreased prickliness with increased depth and increase of latitude in the two regions is rather striking.

Key to the South African Species.

1. Only a few small scattered spines amongst the large ones on legs and chelipeds. Finger of right cheliped equal to upper margin of hand. Dactyls of 2nd–4th legs terete, evenly tapering (fig. 77, b) *capensis*.
2. Very numerous and close-set small spines and prickles amongst the larger spines on chelipeds and legs. Finger of right cheliped $1\frac{1}{2}$ times the length of upper margin of hand. Dactyls of 2nd–4th legs distally flattened, denticulate (fig. 77, e) *aserrimus*.

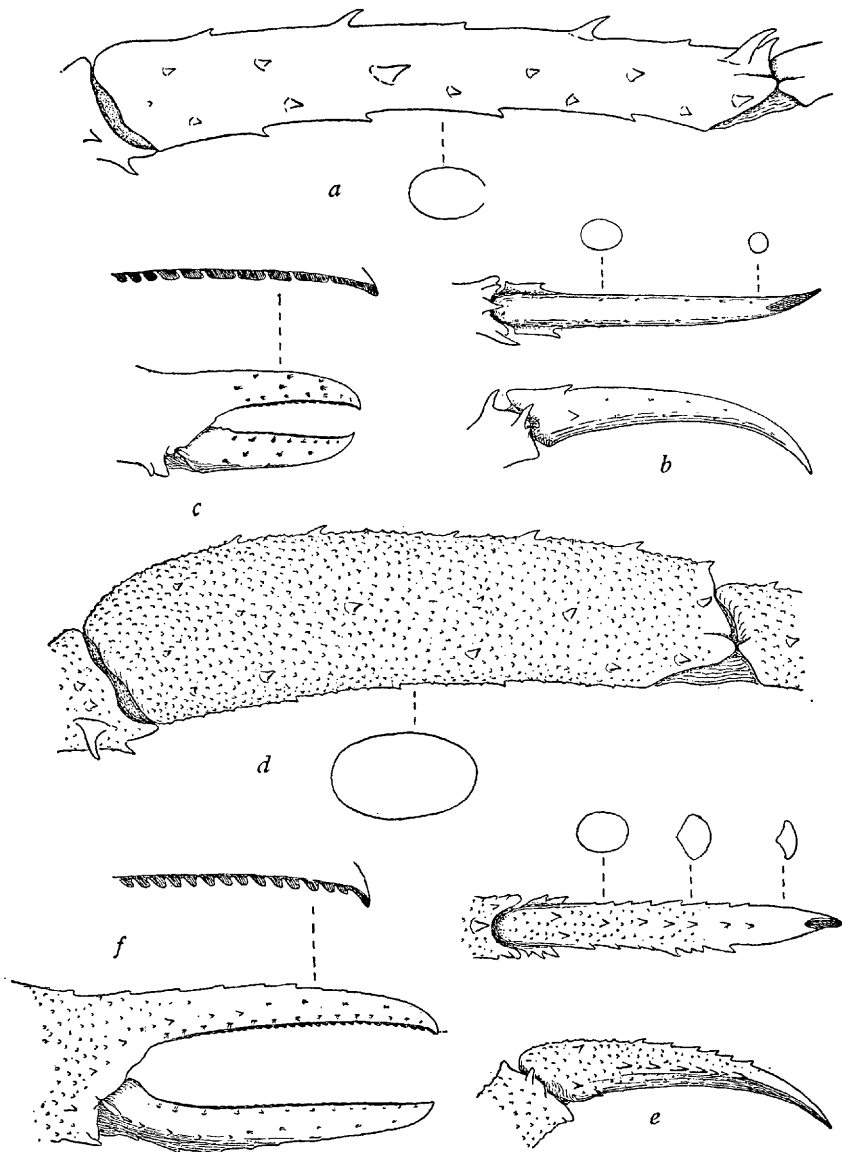


FIG. 77.—*Neolithodes capensis* Stebb. ♂. *a*, 4th joint of 4th leg, with cross-section. *b*, dorsal and lateral views of dactyl of 4th leg, with cross-sections. *c*, left chela, with cutting-edge of thumb further enlarged.
Neolithodes asperrimus Brnrd. ♂. *d*, *e*, *f*, as in *a*, *b*, *c* respectively.

Neolithodes capensis Stebb.*Cape Stone-crab.*

Fig. 77, a-c.

1905. Stebbing, *l. c.*, p. 70, pls. 19, 20.

1910. *Id.*, *l. c.*, p. 349.

Small scattered spines amongst the larger ones on carapace, chelipeds, and legs. On carapace 6 prominent spines (hexagonally) on gastric region, 2 successive pairs followed by a single median one on cardiac region. Right cheliped: length of finger subequal to upper margin of hand (thumb corresponding); the sharp corneous edge in both finger and thumb less than the length occupied by the large white nodular teeth. Left cheliped: finger $1\frac{1}{2}$ times as long as upper margin of hand (thumb corresponding); the sharp corneous edge of finger continuous but obscurely serrulate proximally and with 2 minute nodular denticles at base, that of thumb divided into a number of quadrangular lobes, short proximally, but lengthening distally. 2nd-4th legs slender; greatest depth (*i.e.* between upper and lower surfaces) of 4th joint at base 5 times ($\varnothing 4\frac{1}{2}$), least depth $7\frac{1}{2}$ times ($\varnothing 5\frac{1}{2}$), in length of joint in 2nd leg; in the 3rd and 4th legs these ratios are respectively 6 and 8 ($\varnothing 5\frac{1}{2}$ and 6); width (*i.e.* between inner or anterior and outer or posterior surfaces) of the joint 9 times ($\varnothing 7$) in the length of the joint in 2nd leg, $10\frac{3}{4}$ times ($\varnothing 7\frac{1}{2}$) in 3rd leg, and 12 times ($\varnothing 7\frac{1}{2}$) in 4th leg. The depth of the 6th joint in its shallowest part is contained 9, 11, and 12 times ($\varnothing 7\frac{1}{2}$, $7\frac{1}{2}$, and $8\frac{1}{2}$) in its length in the 2nd, 3rd, and 4th legs respectively. Dactyls of 2nd-4th legs twice in length of the 6th joints, terete, tapering quite evenly to the apex, the cross-section near the apex being circular; dorsally and ventrally a corneous area at the apex representing the unguis. 2nd (coxal) joints of the legs only feebly dentate.

Length of carapace from apex of rostrum to hind margin: largest σ (S. Afr. Mus.) 150 mm., largest \varnothing (Stebbing's type) 148 mm.; breadth 140 mm. and 116 mm. respectively. Length of 4th leg: 465 mm. and 350 mm. respectively. Deep red (*Pieter Faure* log-book).

Locality.—Cape Point N. 70° E., 40 miles, 800 fathoms, green mud (Stebbing, and topotype \varnothing in S. Afr. Mus.); one σ (from which above measurements taken) without data (S. Afr. Mus.).

Remarks.—In the ovigerous \varnothing , eggs are attached to both the pleopods on 1st abdominal segments as well as to the other 4 pleopods.

Neolithodes asperrimus Brnrd.

Rough Stone-crab.

Fig. 77, *d-f*.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 374.

Carapace with larger and smaller spines as in *capensis*, and similarly arranged, but all of them smaller; in addition whole upper surface thickly sprinkled with tiny sharp granules or prickles. The pterygostomial region, however, not more granulate than in *capensis*. Chelipeds and legs also thickly covered with prickles, more so in ♀ than in ♂. Right cheliped: length of finger $1\frac{1}{2}$ times length of upper margin of hand, the sharp corneous edge in both finger and thumb equal to the length occupied by the nodular teeth. Left cheliped: length of finger twice length of upper margin of hand, the sharp corneous edge of finger continuous, but slightly serrulate proximally, no white nodular denticles at base, that of thumb divided into numerous, regular, bluntly-triangular serrations. 2nd–4th legs stout; greatest depth proximally $3\frac{1}{2}$ times, least depth 4 times, in length of joint in 2nd leg (♂♀); in 3rd and 4th legs these ratios respectively $3\frac{1}{2}$ and $4-4\frac{1}{2}$ (♂♀); width of the joint $6\frac{1}{2}$, 7, and 7 times in its length in the 2nd, 3rd, and 4th legs respectively (6 times in all 3 legs in ♀). Depth of 6th joint $7\frac{1}{3}$, 8, and 8 times (♀ 6, $6\frac{1}{2}$, 7) in its length in 2nd, 3rd, and 4th legs respectively. Dactyls of 2nd–4th legs $1\frac{2}{3}$ in length of 6th joints, flattened distally, the lower surface distally with a rounded median ridge, with the surface on either side of it flat or slightly concave; dorsally and laterally denticulate; corneous area representing the unguis shorter than in *capensis*; the flattening and slight lateral expansion is more noticeable in the ♂ than in the ♀. 2nd (coxal) joints strongly dentate on lower distal margins. One of the spines on lower outer surface of 3rd joint of the legs, especially the 3rd and 4th, prominent, more so in ♀ than in ♂, and in both sexes more so than in *capensis*. Abdomen as in *capensis*.

Length of carapace: ♂ 180 mm., ♀♀ 152 and 128 mm.; breadth, ♂ 150 mm., ♀♀ 125 and 118 mm. Length of 4th leg: ♂ 490 mm., ♀♀ 380 and 340 mm.

Localities.—Off Saldanha Bay, 500 fathoms (Capt. Benson of the trawler *Ben Holden*, Cape Town, 1924) (♂ and the larger ♀, types); Cape Point N. 49° E., 38 miles, 475–550 fathoms (s.s. *Pieter Faure*, 1903) (the smaller ♀, P.F. no. 17871).

Remarks.—This species is at once distinguished from *capensis* by the

stout and prickly legs, the shape of the dactyls, and the more elongate fingers and thumbs of the chelipeds.

It is very close to *agassizii*, but seems to be distinguished by the noticeably greater stoutness of the 2nd-4th legs, especially the 4th joints, and slightly more elongate fingers and thumbs of the chelipeds; S. I. Smith (1882, Bull. Mus. Comp. Zool. Harvard, x, p. 11) gives measurements of right cheliped and its dactyl in 2 specimens as 55:35 and 66:44; but his figure shows the right finger only a little longer than upper margin of hand. According to the figure the greatest depth of the 4th joint of 4th leg in *agassizii* is 6 times in its length (as against $4-4\frac{1}{2}$), and the depth of the 6th joint 10 times in its length (as against 7).

Juveniles.

The specimen, P.F. no. 17175, referred to by Stebbing (1905, p. 73, and 1910, p. 349, no. 174), is in the South African Museum, together with three other smaller specimens. Stebbing's hope of obtaining material intermediate in size between his specimen and the adults was never realized.

S. I. Smith (*l. c.*, p. 11, and pl. 1) in his description of *agassizii* concentrates largely on the spines in the adults and young, but as his figure of the adult conforms approximately to the measurements, it may be assumed that fig. 2 of the juvenile is also fairly correct. It shows the finger of the right chela subequal to, and that of the left chela $1\frac{1}{2}$ times as long as, the upper margin of hand. Benedict (*l. c.*), who also relies largely on the spines for specific differentiation, claims the juveniles described by Smith as belonging not to *agassizii* but to *goodei*, but does not mention whether the latter is a "short-fingered" species as contrasted with the "long-fingered" *agassizii*. Milne-Edwards and Bouvier (1894, Res. Sci. Camp. Monaco, vii, pp. 62, 63) in describing *L. grimaldii* (transferred to *Neolithodes* on p. 91) also regarded Smith's juveniles as belonging to a species different from *agassizii*; their figure of the right chela shows the finger $1\frac{1}{3}$ times as long as upper margin of hand, and thus differing from Smith's figure.

It is thus evident that far more material is necessary before the essential specific characters can be separated from the non-essential ones. Nevertheless, on the basis of the proportional length of the fingers and thumbs of the chelipeds, which appears to remain constant throughout life, whereas the length of the dactyls (*e.g.*) changes, I am provisionally assigning Stebbing's and the other three juvenile specimens to the new species *asperrimus*.

P.F. 18043. 1 ♀, carapace length 16 mm., of which median rostral point is 5 mm. 4th leg 26 mm. Dactyls of 2nd-4th legs almost as long as 6th joints, with a few minute granules proximally.

P.F. 16847. 1 ♂, 1 ♀, carapace length 22 mm., of which rostral point is 7 mm. 4th leg 36 mm. Dactyls of legs $1\frac{3}{4}$ times in length of 6th joints, with a few conical granules proximally in both sexes.

P.F. 17175. 1 ♀, carapace length 37 mm., of which rostral point is 10 mm. 4th leg 75 mm. Dactyls $\frac{3}{2}$ length of 6th joints, with denticles proximally.

In all the specimens the carapace is covered with long spines, but none of them as long as those of Smith's juveniles or of *grimaldii*, the chelipeds and 2nd-4th legs with long and short spines, denticles and prickles. The finger of left chela is twice, that of the right chela $1\frac{1}{2}$ times, the length of upper margin of hand, and the cutting-edge of the left thumb has the characteristic serrations of the adult.

The 2nd-4th legs are subcylindrical. The dactyls in the ♀♀ are terete, with a slight ridge on lower surface in the largest specimen, but in the ♂ showing the start of the flattening and lateral expansion distally which gives the characteristic shape to the dactyl in the adult. One of the spines on 3rd joint of 4th leg is especially prominent.

The genital orifices and the 4 pleopods on the left side are distinct in all three ♀ specimens, and even in the youngest specimen the abdomen is slightly asymmetrical. In the ♂ there are no pleopods. The pleopods are 2-jointed (peduncle and ramus), the 2nd joint being non-setose but tipped with a setule. Even in the largest specimen there is no trace of the pair of pleopods on 1st segment.

FAMILY POMATOCHELIDAE.

1914. Stebbing, Ann. S. Afr. Mus., xv, p. 2 (*Pomatochelidae* pro *Pylochelidae*).

Body Macruran in shape, abdomen symmetrical, segmented, with well-developed tergal plates. First pair of legs chelate (chelipeds); 2nd and 3rd legs cylindrical, 4th and 5th legs small, minutely subchelate. Five pairs of pleopods in both sexes. Uropods present.

Gen. POMATOCHELES Miers

1914. Stebbing, *l. c.*, p. 3.

Mxp. 3 approximate at base, not cheliform (*i.e.* 6th joint not produced in a thumb-like process). Eyes well developed. Gills 14 (on each side).

Pomatocheles balssi Stebb.

1914. Stebbing, *l. c.*, p. 3, pl. 1 (Crust., pl. 75).

Rostrum minute, acute. Eye-stalks about half total length of carapace. Palp of mx. 1 one-jointed. Chelipeds unequal, the left larger than the right. Telson symmetrical, apically incised.

Length of carapace 6 mm.

Locality.—Off East London, 80–130 fathoms, in the coral *Trochocyathus* (Stebbing).

FAMILY PAGURIDAE.

Hermit-crabs.

1910. Stebbing, *l. c.*, p. 350, and p. 360 (*Glaucothoë*).

1912. Balss, D. Tiefsee Exp., xx, pp. 89 *sqq.* (biological notes, p. 116).

1939. Melin, K. Sv. Vet. Ak. Handl., xviii, no. 2, p. 12 (discussion of taxonomic characters, and key to genera).

Body Macruran in shape; carapace narrow, the hinder part membranous and soft; abdomen soft, imperfectly segmented, usually twisted and without definite calcified tergal plates. First pair of legs chelate (chelipeds); 2nd and 3rd cylindrical, 4th and 5th small, one or both of the latter subchelate or chelate. Pleopods reduced. Uropods present, asymmetrical and modified as hold-fasts. Flagella of ant. 1 ending in a filament.

Remarks.—The typical Hermit-crabs are all marine, and are found from the shore down to deep water. They inhabit hollow objects, usually the empty shell of a Gastropod mollusc, but sometimes a *Dentalium* shell or short lengths of water-logged bamboo stems or holes in rocks. Sometimes the shell is covered by Sea-anemones, Sponges, Alcyonarians, or Hydractinians, thus affording additional concealment to the crab.

Melin reduces some of the genera to subgenera, e.g. *Pagurus* sensu lato includes *Pagurus* s.s., *Aniculus* and *Petrochirus*; *Clibanarius* sensu lato includes *Clibanarius* s.s., *Calcinus*, etc.; *Eupagurus* s.l. includes *Eupagurus* s.s., *Catapaguroides*, *Anapagurus*, etc. Without expressing any opinion on the merits of Melin's arrangement, all are here given generic rank.

Two subfamilies are accepted: the *Pagurinae* and the *Eupagurinae*.

Key to the Subfamilies and South African Genera.

- Subfam. 1. Mxp. 3 approximate at base.* Chelipeds equal or subequal or the left vastly larger than the right (very rarely is the right *slightly* larger than the left, but not in any South African species) *Pagurinae*.
- I. Paired pleopods on 1st and 2nd abdominal segments ♂, on 1st segment ♀; 3 unpaired pleopods in ♂, 4 in ♀. 4th leg simple, not chelate (fig. 78, *d*). Gills 13 *Paguristes*.
- II. No paired pleopods in either sex. 4th leg chelate or subchelate (fig. 79, *a*).
- A. Four unpaired (on left side) pleopods in ♂ and ♀.
1. Endopod of mx. 2 without flagellum. Finger and thumb of cheliped moving obliquely or nearly vertically. Gills 14.
- a. Left cheliped usually the larger. Tips of finger and thumb slightly spooned, corneous *Pagurus*.
- b. Chelipeds subequal. Tips of finger and thumb hoof-shaped, corneous. Chelipeds and next 2 legs transversely ringed or scutellate *Aniculus*.*
2. Endopod of mx. 2 with flagellum (in the S. African genera).
- a. A small (immovable) rostral point. Tips of finger and thumb spooned.
- i. Finger and thumb moving horizontally, tips corneous. Chelipeds subequal *Clibanarius*.
- ii. Finger and thumb moving obliquely or nearly vertically, tips calcareous. Left cheliped the larger *Calcinus*.
- b. Rostrum replaced by a movable scale or spine between the ophthalmic scales (fig. 81, *a*). Left cheliped vastly the larger. Tips of finger and thumb pointed, calcareous *Diogenes*.
- B. No pleopods in ♂; 4 unpaired (left side) in ♀. Chelipeds equal, angularly bent at wrist, and together with 2nd (or 2nd and 3rd) legs forming an operculum (fig. 82). Tail-fan symmetrical (or nearly so). Gills 14 (1 rudimentary, 1 unbranched) *Cancellus*.

* *Aniculus strigatus* has a very broad flat body and the 3rd maxillipeds are considerably separated at base.

- Subfam. 2. Mxp. 3 widely separated at base. Right cheliped usually vastly larger than the left, the latter never larger than right, though sometimes subequal (but not in any South African genus) *Eupagurinae*.
- I. None, one or two pairs of pleopods in ♂; none or one pair in ♀. Gills 11.
- A. ♂ with 2 pairs and 3 unpaired pleopods, ♀ with only 4 unpaired pleopods. Finger and thumb moving obliquely-vertically. Vas deferens not protruding *Parapagurus*.
- B. ♂ with only 3 unpaired pleopods, ♀ with 1 pair and 4 unpaired pleopods. Finger and thumb moving horizontally.
1. Vas deferens not protruding *Pylopagurus*.
2. Vas deferens protruding *Nematopagurus*.
- II. Paired pleopods absent in both sexes; 3-4 unpaired pleopods in ♂. Finger and thumb moving horizontally. Tail-fan asymmetrical. Gills 11 (in S. African species).
- A. 4 unpaired pleopods in ♂ and ♀. 5th coxae symmetrical, vas deferens not protruding *Eupagurus*.
- B. 3 unpaired pleopods in ♂, 4 in ♀.
1. Vas deferens protruding on right side, sabre-shaped (a short tube on left side) *Catapaguroides*.
2. Vas deferens protruding on left side only, sabre-shaped *Anapagurus*.

The following synopsis may be useful as a first aid to identification:—

Mxp. 3 close together.

Left cheliped the larger: . . . *Pagurus, Diogenes, Calcinus*.

Chelipeds subequal *Paguristes, Clibanarius, Cancellus, Aniculus*.

Mxp. 3 separate.

Right cheliped the larger: All the South African genera in this subfamily.

Petrochirus bahamensis (Herbst) has once been recorded from South Africa, but probably by some error in labelling (see p. 3).

Development.—The first larval stage is a *Zoea*, with long pointed rostral process, and acute postero-lateral angles of carapace.

The post-larval stage is known as the *Glaucothoë*, of which two stages are recognized: one free-swimming (pelagic) with paired pleopods, the other benthic with the pleopods of the right side atrophied.

Glaucothoë was formerly regarded as a distinct genus of adult forms, but these have since been recognized as larval stages of various Pagurids.

An abbreviated development is known in a species of *Paguristes*, and a further case is described below for *Cancellus*.

Glaucothoë M. Edw.

1891. Bouvier, Ann. Sci. Nat. (7), xii, p. 65.

1910. Stebbing, *l. c.*, p. 360.

1910. Issel, Archiv. zool. Naples, iv, p. 335.

1924. Gurney, "Terra Nova" Rep. Zool., viii, pp. 181-187.

1926-27. Balss in Kükenthal, Handb. Zool., iii, p. 924, fig. 1025.

Rostrum present or absent. Ocular scales absent. Mxp. 3 close together or separated. Chelipeds equal, or one much larger than the other, fingers opening obliquely. Abdomen symmetrical, straight, the tergal plates more strongly chitinized than the sternites. Five pairs of pleopods on segments 2-5. Uropods and telson symmetrical.

Glaucothoë peronii M. Edw.

1837. Milne Edwards, Hist. Nat. Crust., ii, p. 307.

1924. Gurney, *l. c.*, p. 183, fig. 72.

Locality.—35° 55' S., 17° 6' E., 1014 fathoms (Gurney).

Distribution.—N. and S. Atlantic, Pacific.

Remarks.—The adult of this form is not known.

Gen. PAGURISTES Dana

1910. Stebbing, Gen. Cat. S. Afr. Crust., p. 351.

1920. *Id.*, Ann. S. Afr. Mus., xvii, p. 257.

1923. Odhner, K.V.V. Samh. Handl. Göteborg., xxvii, 5 (=Medd. Göteborg Mus. Zool. Avd. 31), p. 6.

1939. Melin, *l. c.*, p. 18 (in key).

Rostrum usually well developed. Eye-stalks long, ophthalmic scales well developed. Chelipeds equal, or one (usually the left) larger than the other, fingers opening in a horizontal plane, tips of fingers and thumbs usually corneous. Telson lop-sided to the left. The first pair of abdominal appendages in ♂ lie close up against or between the bases of the 5th thoracic legs.

Remarks.—Distinguished from all other South African genera by the 4th pair of legs being simple (not subchelate), with terminal dactyl.

Tropical and subtropical, mostly Indo-Pacific; littoral, but many species also from a depth of 100 or more fathoms (Alcock).

Odhner (*l. c.*) has recorded two species from Port Alexander, Angola:

oculatus var. *brunneo-pictus* M. Edw. & Bouv., and *skeogi* Odhner. The former is a Mediterranean and N.W. African species, but owing to lack of literature I am unable to include it in the key, or to give a description of it.

Key to the South African Species.

- I. Flagellum of antenna 2 shorter than carapace.
 - A. Ocular scales far apart. Eye-stalks cylindrical.
 - 1. Eye-stalks and peduncle of antenna 1 subequal, and longer than peduncle of antenna 2.
 - a. Rostrum blunt. Outer surface of chelae with sparsely set small tubercles . . . *gamianus*.
 - b. Rostrum sharp. Outer surface of chelae closely set with large tubercles . . . *rosaceus*.
 - 2. Eye-stalks and peduncle of antenna 2 subequal, shorter than peduncle of antenna 1 . . . *skeogi*.
 - B. Ocular scales close together. Eye-stalks narrowing distally *engyops*.
- II. Flagellum of antenna 2 longer than carapace sp. cf. *ciliatus*.

Paguristes gamianus (M. Edw.)

Fig. 78, a-d.

1910. Stebbing, *l. c.*, p. 351.

1912. Balss, *Wiss. Erg. D. Tiefsee Exp.*, xx, p. 91, fig. 2.

1920. Stebbing, *l. c.*, p. 257.

Rostral projection bluntly triangular, not prominent and not extending beyond level of lateral points. Eye-stalks shorter than width of carapace, subequal in length to peduncle of antenna 1 (if latter is extended), but longer than peduncle of antenna 2, cylindrical cornea about equal to width of stalk at base; scales far apart, ovoid, apex acute, outer margin crenulate. Antenna 2, outer apex of 2nd joint with 2 contiguous spines, scale projecting forwards or outwards with 2 spines on outer margin, 3 on inner, apex bifurcate, ultimate joint of peduncle elongate.

Chelipeds densely hirsute (with plumose setae), upper and lower margins of 4th joint serrate, wrist with conical tubercles, outer surface of hand with rather sparsely arranged small tubercles or denticles, finger and thumb in contact throughout. 2nd and 3rd legs densely hirsute. Upper margin of 5th and 6th joints of 2nd and 3rd legs spinose, dactyls longer than 6th joint.

Carapace length 7-8 mm.

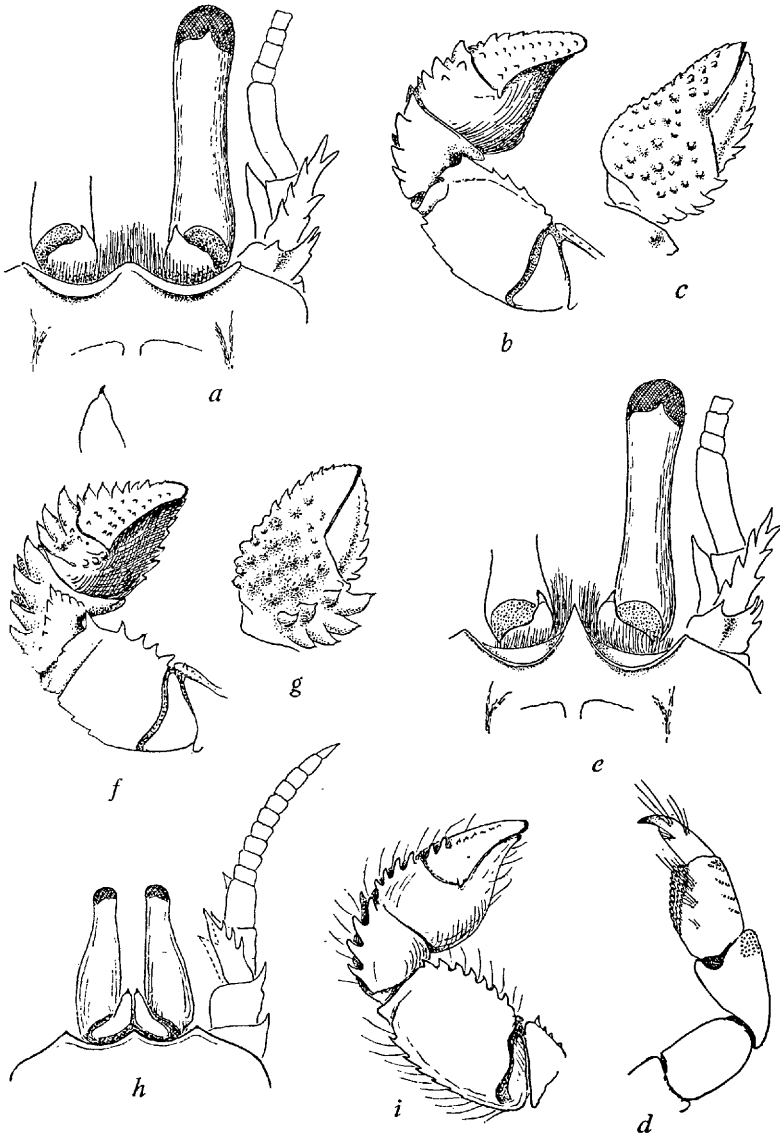


FIG. 78.—*Paguristes gamianus* (M. Edw.). *a*, front of carapace, with ocular scales, right eye, and ant. 2 (setae on latter omitted). *b*, inner view of left cheliped (denuded). *c*, outer view of left chela. *d*, outer view of left 4th leg, marginal plumose setae omitted.

Paguristes rosaceus Brnrd. *e*, front of carapace, with ocular scales, right eye, and ant. 2 (setae on latter omitted). *f*, inner view of left cheliped. *g*, outer view of left chela.

Paguristes engyops Brnrd. *h*, front of carapace, with ocular scales, eyes, and right ant. 2 (setae on latter omitted). *i*, inner view of left cheliped.

Localities.—Cape of Good Hope (M. Edwards); Natal coast, 50 fathoms (Stebbing); Agulhas Bank, 155 metres (Balss).

Remarks.—I have examined the specimen seen by Stebbing. It appears to agree with the specimens described and figured by Balss. I rather doubt whether this is the species described by M. Edwards, which is far more likely to have been based on a specimen of the next species (*rosaceus*), which is a common *littoral* species.

The matter, however, can only be settled by examination of the type (if extant).

Paguristes rosaceus Brnrd.

Fig. 78, e-g.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 375.

Differs from the species described above (as *gamianus*) as follows: rostral projection sharply triangular, projecting well beyond the lateral points; peduncle of antenna 2 slightly longer (but not reaching to base of cornea); ophthalmic scales crescent or L-shaped, with concave outer margin and conspicuous apical point; outer surface of wrists and hand of chelipeds with large conical tubercles, each with a blackish corneous apical point, their bases contiguous or nearly so.

Carapace length up to 9 mm. Anterior part of carapace, and the eye-stalks, antennae, chelipeds, and 2nd and 3rd legs rose-red or carmine or speckled with crimson, distal half of dactyls of 2nd and 3rd legs white, ungues and tips of finger and thumb of chelipeds brown, cornea black.

Localities.—Keurbooms River (Plettenberg Bay) (S. Afr. Mus.); False Bay, Danger Point, Knysna, Plettenberg Bay, Jeffreys Bay, Port Elizabeth, and Port Alfred (Professor T. A. Stephenson coll.). Littoral.

Remarks.—The ♀♀ carry 12–15 eggs, measuring 1.3 mm. major diameter.

Paguristes skoogi Odhner

1923. Odhner, *l. c.*, p. 6, pl. 1.

Very like the species described above as *gamianus*, but the eye-stalks are subequal to the peduncle of the *second* antenna, and *both are shorter than the peduncle of the first antenna.*

Carapace length 6.75 mm.

Locality.—Port Alexander, Angola, 72 metres (Odhner).

Paguristes engyops Brnrd.

Fig. 78, *h, i.*

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 375.

Rostral point broadly triangular, not extending beyond level of lateral points. Eye-stalks shorter than width of carapace, about equal to distance between lateral points on front margin, shorter than peduncle of antennae 1, but subequal to that of antenna 2, somewhat flask-shaped, narrowing distally, the cornea small; scales L-shaped, with acute apices, approximate. Antenna 2, 2nd joint with single spine on outer apex, scale projecting inwards, with 2-3 teeth on outer margin, none on inner margin, a strong tooth on lower margin of both 3rd and 4th joints, 5th joint not much longer than penultimate joint, with small tooth on lower apex, flagellum subequal to peduncle, shorter than half length of carapace, stout.

Chelipeds subequal, robust, sparsely setose, upper and lower margins of 4th joint, and upper inner margins of wrist and hand with strong denticles, finger with 2 moderate and several minute denticles on its free edge, a few conical granules on outer surface of hand, a very slight gap at base between finger and thumb. 2nd and 3rd legs densely setose (plumose) on upper and lower margins, 5th and 6th joints with upper margin spinose, dactyls subequal to 6th joint.

Carapace length 2.5 mm., total length 5.5 mm. Creamy or buff, the anterior part of the carapace, and the chelipeds and legs faintly pinkish, cornea brown.

Localities.—Buffels Bay, False Bay, littoral, in various shells of the family *Trochidae* (K. H. B., March 1915, ♂♂ and ovig. ♀♀); Paternoster, N. of Saldanha Bay, and Hermanus (Professor T. A. Stephenson coll.).

Remarks.—The ♀♀ carry 3 or 4 very large eggs, measuring in major diameter 1 mm.

Paguristes sp.

1920. Stebbing, *l. c.*, p. 257.

Stebbing compares a single specimen in poor condition with *ciliatus* Heller, originally described from the Nicobar Islands.

Locality.—Off Gt. Fish Point, 49 fathoms (Stebbing).

Gen. PAGURUS Fabr. (sensu restricto).

1775. Fabricius, Syst. Entomol., p. 410 (*Pagurus* part).
 1875. Paulson, Red Sea Crust., p. 90 (*Dardanus*).
 1910. Stebbing, Gen. Cat. S. Afr. Crust., p. 350.
 1917. *Id.*, Ann. Durban Mus., ii, p. 20.
 1921. Balss, Beitr. Meeresf. Westafr., iii, p. 43.
 1926. Schmitt, Bull. Amer. Mus., liii, p. 45 (*Dardanus*).
 1938. Yap-Chiongco, Philipp. J. Sci., lxvi, p. 194.

Rostrum absent. Eye-stalks stout; ophthalmic scales large, widely separated. Chelipeds (with few exceptions, none S. African) unequal, the left greatly the larger; finger opening in an obliquely-vertical plane, tips of finger and thumb corneous. Telson lop-sided to left. In ♂ a small, uniramous appendage on each of abdominal segments 2-5; in ♀ the appendages on segments 2-4 are triramous, that of segment 5 is small and uniramous.

Remarks.—Tropical and subtropical; mostly littoral and shallow water, *P. arrosor* being the only species descending below 100 fathoms.

Adequate reasons for the substitution, mostly by American writers, of *Dardanus* for *Pagurus* (in its restricted sense) have yet to be given.

Key to the South African Species.

- I. Upper and outer surfaces of chelae and legs with more or less regular transverse, scutelated striae, edges of the scutes with short close-set setae (fig. 79, a) . . . *arrosor*.
- II. Chelae and legs not thus sculptured (legs sometimes, but never the chelae).
 - A. Eye-stalk reaching nearly to, or beyond, end of peduncle of antenna 1, cornea less than $\frac{1}{3}$ length of eye-stalk.
 1. Greatest breadth of carapace across branchial region less than median length of carapace.
 - a. Left cheliped vastly larger and longer than right.
 - i. Whole outer surface of hand of left chela spinose.
 - a. Outer surface of propod of 3rd left leg spinose. Carapace and legs ocellated (fig. 79, c) *megistos*.
 - β. Propod and dactyl of 3rd left leg broadened, outer surface flattened and regularly tessellated (fig. 79, d) . . . *setifer*.

- ii. Outer surface of hand smooth, except a few spinules along upper margin *fabimanus*.
- b. Left cheliped decidedly larger but not much longer than right. Chelipeds and legs hairy and spinose, with a bald patch on upper surface of wrists (5th joints). Joints of distal half of flagellum of antenna 2 strongly gibbous . . . *euopsis*.
- 2. Greatest breadth of carapace equal to median length. Left cheliped moderately larger than right. Chelipeds and legs hairy. Outer surface of last two joints of 3rd left leg transversely striated *guttatus*.
- B. Eye-stalk very short and stout, not nearly reaching end of peduncle of antenna 1. Cornea $\frac{1}{3}$ or more length of eye-stalk.
 - 1. Inner border of upper surface of dactyl of left cheliped sharply cristiform. Outer surface of dactyl of 3rd left leg without a keel . . . *deformis*.
 - 2. Upper surface of dactyl of left cheliped with longitudinal rows of polished granules only. Outer surface of dactyl of 3rd left leg with a longitudinal keel (fig. 79, e).
 - a. Upper edge of outer surface of propod of 3rd left leg well defined, suberistiform . . . *pedunculatus*.
 - b. Upper edge of outer surface of propod of 3rd left leg hardly defined *asper*.

Pagurus arrosor (Herbst)

Fig. 79, a.

- 1910. Stebbing, *l. c.*, p. 350.
- 1912. Balss, D. Tiefsee Exp., xx, p. 95.
- 1913. *Id.*, Schultze Reise, v, p. 109.
- 1914. Stebbing, Trans. Roy. Soc. Edin., 50, p. 276.
- 1921. Balss, *l. c.*, p. 43.
- 1922. Bouvier, Res. Sci. Camp. Monaco, fasc. lxii, p. 15.
- 1923. Odhner, Medd. Göteb. Mus., xxxi, pp. 8, 25.
- 1926. Schmitt, *l. c.*, p. 45, fig. 69, B, E, H (chela and leg).
- 1927. Hale, Crust. S. Austral., pt. 1, p. 93, fig. 89 (*Dardanus a.*).
- 1933. Monod, Bull. Et. Sci. Afr. occid. Fr., xv, p. 25 (pagination of separate copy).

The sculpturing of the chelipeds and legs is characteristic. (A somewhat similar sculpturing is found in *Aniculus*.)

Median length of carapace up to ♂ 50 mm., length from front margin of carapace to end of telson about 130 mm. Salmon-pink or reddish.

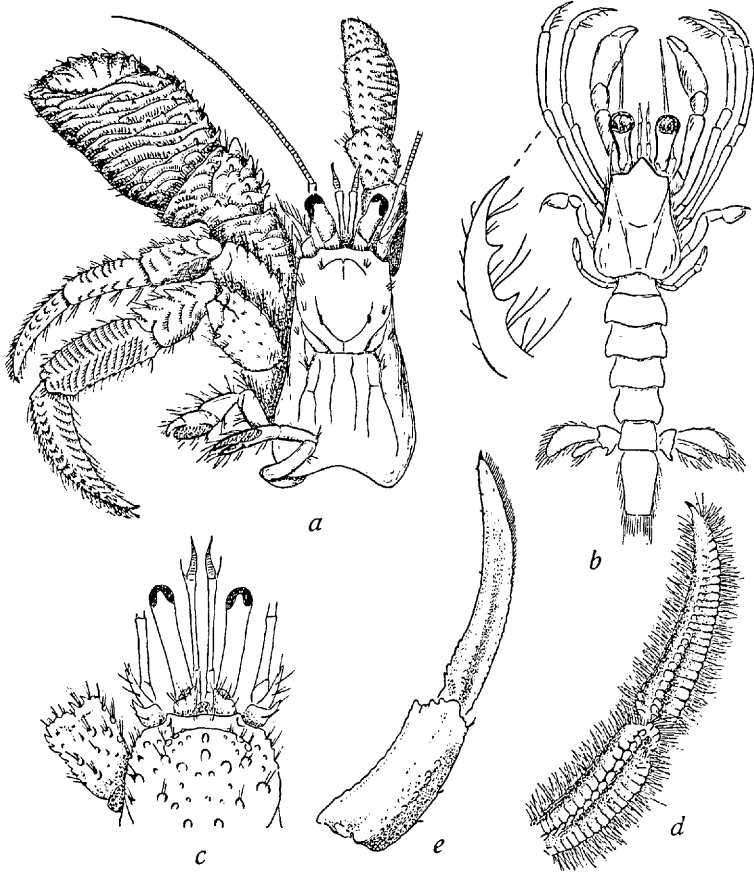


FIG. 79.—*Pagurus arrosor* (Herbst). *a*, carapace, chelipeds (the right one foreshortened in perspective), and 2nd–5th legs of left side. *b*, *Glaucothoë* stage, with dactyl of 2nd leg further enlarged.

Pagurus megistos (Herbst). *c*, anterior part of carapace, with 4th joint of left cheliped.

Pagurus setifer M. Edw. *d*, outer view of 6th and 7th (dactyl) joints of 3rd leg of left side.

Pagurus pedunculatus (Herbst). *e*, outer view of 6th and 7th joints of 3rd leg of left side.

Localities.—Table Bay (Stebbing); False Bay and Agulhas Bank to Natal, 20–92 fathoms (Stebbing, Odhner and S. Afr. Mus.); St. Lucia Bay (S. Afr. Mus.); Delagoa Bay (Lourenço Marques Mus.).

Distribution.—West Indies, Brazil; Mediterranean, Cape Verde Is.,

Madeira, west coast of Africa to Port Alexander, Angola; Philippine Is., Japan, Australia.

Remarks.—The largest specimen in the South African Museum is a ♂ whose dimensions are given above.

Inhabits various shells, to which Sea-anemones (*Calliactis polypus*) are attached; sometimes also in the more or less spherical ball-like sponge *Suberites domuncula*.

The form *pectinatus* Ortm. is given specific rank by Schmitt (*l. c.*, p. 45, figs.). The extreme form is easily distinguished from typical *arrosor*, but certain specimens in the South African Museum series seem to indicate that transitions may occur.

Glaucothoë stage

Fig. 79, *b*.

Frontal margin triangularly produced. Eye-stalks equal to anterior width of carapace, cornea dilated. Left cheliped larger than right, smooth and unsculptured, glabrous except for a few setules on finger and thumb, the tips of which are corneous. 2nd and 3rd legs elongate and slender, glabrous except for some setae on the dactyls, the lower margin of which bears two spiniform processes. Posterior margin of peduncle of uropod produced in an acute process. Telson twice as long as wide, slightly tapering to the truncate apex.

Localities.—Off Cove Rock (East London), 25 fathoms, 1 specimen, carapace length 4 mm.; False Bay, 1 specimen, carapace length 4.5 mm., together with several *arrosor* in sponges.

Remarks.—Apart from one specimen having been found in actual association with adults of *arrosor*, the size would exclude *Diogenes*; and *Calcinus* (the only other genus with mxp. 3 close together and the left cheliped larger than the right) is not found so far west as False Bay. It seems highly probable, therefore, that these two *Glaucothoë* belong to *arrosor*.

The smallest *arrosor* of adult form which I have seen has a carapace length of 7 mm.

Pagurus megistos (Herbst)

Fig. 79, *c*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 814 (*punctulatus*).

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 376 (*punctulatus*).

1910. Stebbing, *l. c.*, p. 350.

1917. *Id.*, Ann. Durban Mus., ii, p. 21.

1927. Hale, S. Austral. Crust., pt. 1, p. 92, fig. 88 (*Dardanus m.*).

1938. Yap-Chiongco, *l. c.*, p. 197, pl. 1, fig. 3 (*punctulatus*).

Eye-stalks not quite as long as width of carapace. Outer surfaces of wrist, hand, and fingers of chelipeds, and of the last 3 joints of 2nd and 3rd legs densely covered with long coarse, reddish or brownish, bristles; upper surfaces of wrist and hand of chelipeds also with strong black-tipped spinous tubercles, more or less hidden under the bristles. Dactyl of 3rd leg convex on outer surface.

Length of carapace up to 70 mm. Carapace, chelipeds, and legs red or reddish, with numerous white or bluish-white, black-edged ocelli; eye-stalks maroon, cornea black.

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

Distribution.—Mauritius, Red Sea, east coast of Africa, Indo-Pacific to Australia and Hawaiian Is.

Pagurus setifer M. Edw.

Fig. 79, *d.*

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 816, pl. 3, figs. 1-5 (*pavimentatus*).

1894. Ortmann, Semon's Austral. Reise, v, p. 30.

1905. Alcock, Cat. Crust. Ind. Mus., ii, p. 83, pl. 8, fig. 3.

1921. Balss, K. Sv. Vet. Ak. Handl., lxi, no. 10, p. 19.

[not *setifer* Hilg. = *guttatus*.]

Eye-stalks as long as width of carapace. Upper surfaces of wrist, hand, and fingers of chelipeds, and of distal joints of 2nd and 3rd legs densely covered with longish bristles; upper surface of wrist and hand of cheliped also with (black-tipped) spinous tubercles. On hand of larger cheliped the bristles form wreaths around the bases of the tubercles, and along the lower margin the spines are grouped in palisade fashion (best seen from inside). Last 2 joints of 3rd left leg broadened, with crenulate upper and lower margins; outer surface flattened and concave, with a longitudinal ridge or keel, the surface with pavement-like sculpture of regular transverse grooves or tessellations.

Length of carapace up to 47 mm. Yellowish or reddish, chelipeds and legs yellowish with reddish patches tending to form cross bands, chiefly visible on the 4th and 5th joints; bristles shining green.

Localities.—Off Port Shepstone, Natal, 24 fathoms, and Durban (S. Afr. Mus.).

Distribution.—Ibo, Portuguese East Africa; Mauritius; East Indies, Hong Kong, Japan, Australia.

Remarks.—The 3rd left leg is characteristic. The Natal specimens agree better with Hilgendorf's description and figure than with Alcock's.

Pagurus fabimanus Dana

1852. Dana, Proc. Ac. Nat. Sci. Philad., p. 270, and U.S. Expl. Exp., Crust., i, p. 454, pl. 28, figs. 7, *a-e*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 819.

1905. Alcock, *l. c.*, p. 84, pl. 8, fig. 2.

1938. Yap-Chiongco, *l. c.*, p. 199, pl. 1, fig. 2 (not good).

Eye-stalk equal, or almost, to anterior width of carapace. Upper surface of wrist, hand and finger of larger cheliped spinose and setose, elsewhere smooth. Legs finely scabrous. Outer surface of dactyl of 3rd left leg flattened, longitudinally grooved, its upper and lower margins sharply defined.

Length of carapace up to 25 mm. Colour as in *setifer*, but the rusty-red patches fainter (Alcock).

Distribution.—Ibo, Portuguese East Africa (Hilgendorf); east coast of Africa, Laccadives and Maldives, Philippine Is., Fiji.

Remarks.—Not yet found within our limits, but almost certainly occurs south of Ibo.

Pagurus euopsis Dana

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 814 (*depressus*).

1905. Alcock, *l. c.*, p. 86, pl. 9, fig. 2.

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 376.

1917. Stebbing, Ann. Durban Mus., i, p. 439 (*enopsis* typ. err.).

1917. *Id.*, *ibid.*, ii, p. 20.

1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 157.

1938. Yap-Chiongco, *l. c.*, p. 200, pl. 1, fig. 7.

Eye-stalks much longer than anterior width of carapace. Carapace depressed (especially in var. *depressus*). Joints of the distal half of flagellum of ant. 2 with their antero-internal angles produced. Chelipeds and legs with long stiff brownish or red-and-white bristles as in *megistos*, but the spinose tubercles much less numerous.

Length of carapace up to 35 mm. Reddish, somewhat mottled, chelipeds and legs slaty, spotted with red and white; a broad maroon

cross band on 4th and 5th joints of 2nd and 3rd legs; bristles apically greenish. (No ocellate spots.)

Locality.—Durban Bay (Stebbing).

Distribution.—Ibo, Portuguese East Africa; east coast of Africa, Red Sea, Aldabra, Andamans, to Samoa.

Pagurus guttatus Olivier

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 815, pl. 3, fig. 8 (*setifer*, non M. Edw.).

1905. Alcock, *l. c.*, p. 87, pl. 9, fig. 1 (references).

1912. Balss, D. Tiefsee Exp., xx, p. 95.

1938. Yap-Chiongeo, *l. c.*, p. 200, pl. 1, fig. 13.

Carapace greatly depressed, breadth equal to length. Eye-stalk about $\frac{2}{3}$ anterior width of carapace, cornea very short. Chelipeds and legs, especially the last two joints, with long yellow bristles, forming a particularly long and thick fringe on upper and lower margins of 3rd left leg. Wrist of cheliped and 5th joints of 2nd and 3rd legs with a characteristic bald patch on upper surface. Last 2 joints of 3rd left leg with outer surface flattened, longitudinally grooved near upper margin, with regular transverse striae or grooves.

Length of carapace up to 50 mm. Brownish, reddish or crimson, with white markings and dots (not ocelli), the bare patches on the chelipeds and legs nearly white.

Locality.—Natal (Fishery Survey, 1948).

Distribution.—Ibo, Portuguese East Africa; east coast of Africa, Indian Seas, to Hawaiian Is.

Pagurus deformis M. Edw.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 818, pl. 3, figs. 6, 7.

1905. Alcock, *l. c.*, p. 88, pl. 9, fig. 4 (references).

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 376.

1917. Stebbing, Ann Durban Mus., ii, p. 20.

1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 157.

1935. Boone, Bull. Vanderbilt Mar. Mus., vi, p. 28, pl. 5.

1938. Yap-Chiongeo, *l. c.*, p. 195, pl. 1, fig. 10 (not good).

Carapace not much depressed, longer than broad. Eye-stalks depressed, broadened distally, about $\frac{3}{4}$ anterior width of carapace, cornea large, $\frac{1}{2}$ – $\frac{2}{3}$ length of eye-stalk. Chelipeds and legs sparingly setose. Left cheliped vastly the larger, 4th joint with lower border alate and strongly serrate, wrist and hand with strong tubercles,

inner upper edge of finger forming an upstanding crenulated crest. Last 2 joints of 3rd left leg with upper outer margin sharply cristate, forming a crenulated crest overhanging the concave outer surface of the joints.

Length of carapace up to 38 mm. Yellowish, often with reddish cross bands on eye-stalks and legs.

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

Distribution.—Ibo, Portuguese East Africa; Mauritius; east coast of Africa, Indian Seas to Tahiti.

Remarks.—Characteristic of this species is the fact that males possess genital openings on the bases of the 3rd pair of legs, corresponding with those of the female, in addition to the true male openings on the bases of the 5th pair.

Pagurus pedunculatus (Herbst)

Fig. 79, e.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 815.

1881. de Man, Notes Leyden Mus., iii, p. 129 (*varipes*).

1894. Ortmann, Semon's Austral. Reise, v, p. 31, and footnote.

1905. Alcock, *l. c.*, p. 90, pl. 9, fig. 7 (*varipes*).

1917. Stebbing, Ann. Durban Mus., ii, p. 21 (*varipes*).

Differs from *deformis* as follows: upper surface of dactyl of left cheliped with several rows of polished granules and no upstanding crest on inner upper margin; outer surface of dactyl of 3rd left leg longitudinally carinate near lower margin; no male openings corresponding with those of female on 3rd legs.

Length of carapace up to 45 mm. Flesh-red, upper parts of chelae violaceous, fingers rosy, legs orange and white.

Localities.—Mozambique (Hilgendorf); Durban Bay (Stebbing, and S. Afr. Mus.); Delagoa Bay (coll. van der Horst).

Distribution.—Red Sea, east coast of Africa, Indian Seas, Malay Archipelago.

Remarks.—Hilgendorf regards *varipes* Heller as a variety of *pedunculatus*, the former being without the longitudinal groove on outer surface of hand of chela which is present in Herbst's type specimens. Ortmann adopts Herbst's specific name, but neither Alcock nor Stebbing follow him.

In two specimens from Durban Bay (S. Afr. Mus.) there is a faint keel on 6th joint of 3rd left leg; in the absence of further specimens

for comparison these are assigned to *pedunculatus*, which has already been recorded from Durban. The larger specimen was occupying a land shell, *Metachatina (Livinhacia) kraussi*, covered with 6 large and 3 small violet anemones (*Calliactis polyopus*). The Delagoa Bay specimens were in *Dolium* shells, also with *Calliactis*.

Pagurus asper de Haan

1881. de Man, Notes Leyden Mus., iii, p. 130.
 1894. Ortmann, Semon's Austral. Reise, v, p. 31.
 1905. Alcock, *l. c.*, p. 90, pl. 9, fig. 5.
 1938. Yap-Chiongco, *l. c.*, p. 197, pl. 1, fig. 14.
 1943. Thompson, John Murray Exp., vii, p. 416.

Agrees with *pedunculatus* and differs from *deformis* in the same characters as given under *pedunculatus*; differs from the latter in having the limits of the upper and outer surfaces of 6th joint of 3rd left leg undefined by a sharp keel. In other words, the upper surface of this latter joint has 2 keels (inner and outer) in *pedunculatus*, but only the inner one in *asper*.

Locality.—Delagoa Bay (coll. van der Horst).

Distribution.—Maldives, Gulf of Aden, Indian Seas, East Indies to Japan, Australia and Hawaiian Islands.

Remarks.—This species is so very closely allied to *pedunculatus* that it might be regarded merely as a variety.

Gen. ANICULUS Dana

1852. Dana, U.S. Expl. Exp., i, p. 460.
 1905. Alcock, Cat. Crust. Ind. Mus., ii, pp. 94, 171.

Differs from *Pagurus* as follows: chelipeds equal or nearly so, and similar, fingers and thumbs short, blunt, deeply spooned or hoof-shaped; chelipeds and 2nd and 3rd legs regularly ringed or transversely scutellated, the edges of the scutes finely and closely setose; abdominal appendages in ♀ biramous.

Key to the South African Species.

1. Carapace not depressed, much longer than broad. Eye-stalks shorter than anterior width of carapace. Frontal region, chelipeds and legs remarkably hirsute *aniculus*.
2. Carapace extraordinarily flat, its breadth greater than its length. Eye-stalks equal to anterior width of carapace. Not hirsute *strigatus*.

Aniculus aniculus (Fabr.)

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 824.

1905. Alcock, *l. c.*, p. 94, pl. 7, fig. 6 (references).

1935. Boone, Bull. Vanderbilt Mar. Mus., vi, p. 36, pl. 8.

1938. Yap-Chiongeo, Philipp. J. Sci., lxvi, p. 201, pl. 2, fig. 2.

As in key. Length of carapace up to 40 mm. Red, chelipeds and legs red and yellow, with broad darker red band on wrist; tips of chelae and dactyls of 2nd and 3rd legs black.

Locality.—Mozambique (Hilgendorf).

Distribution.—East coast of Africa, Mauritius, Indo-Pacific to Japan, Paumotu Archipelago, and New Zealand.

Aniculus strigatus (Herbst)

Fig. 80, *a*.

1878. Hilgendorf, *l. c.*, p. 820, pl. 2, fig. 8 (*Pagurus s.*).

1905. Alcock, *l. c.*, p. 97, pl. 7, fig. 4 (references).

1943. Thompson, John Murray Exp., vii, p. 417.

As in key. Length of carapace up to 14 mm. Carapace whitish; chelipeds and legs deep orange to red, ringed, each ring consisting of the cobalt-blue setae between two dark red lines; eye-stalks deep orange, cornea black; tips of chelae, and dactyls of 2nd and 3rd legs black.

Localities.—Mozambique (Hilgendorf); Delagoa Bay (S. Afr. Mus., coll. van der Horst).

Distribution.—East coast of Africa, Gulf of Aden, South Arabian coast, India to Tahiti.

Remarks.—The strong flattening of the carapace seems to be correlated with the animal's preference for the shells of *Conus* and other shells which have very narrow slit-like openings. The Delagoa Bay specimen is in the shell of *Melongena*, with fairly wide aperture.

Gen. CLIBANARIUS Dana

1910. Stebbing, *l. c.*, p. 352.

1915. Kemp, Mem. Ind. Mus., v, p. 249.

1926. Schmitt, Bull. Amer. Mus. Nat. Hist., liii, p. 49.

1938. Yap-Chiongeo, Philipp. J. Sci., lxvi, p. 185.

1939. Melin, *l. c.*, p. 21 (sensu lato).

1940. Chopra and Das, Rec. Ind. Mus., xlii, pp. 145-153.

Rostrum distinct, short. Eye-stalks long and slender, ocular

scales well developed, almost always closely approximate. Chelipeds equal or subequal; fingers opening horizontally; tips of finger and thumb corneous and spooned. Telson lop-sided to the left. A

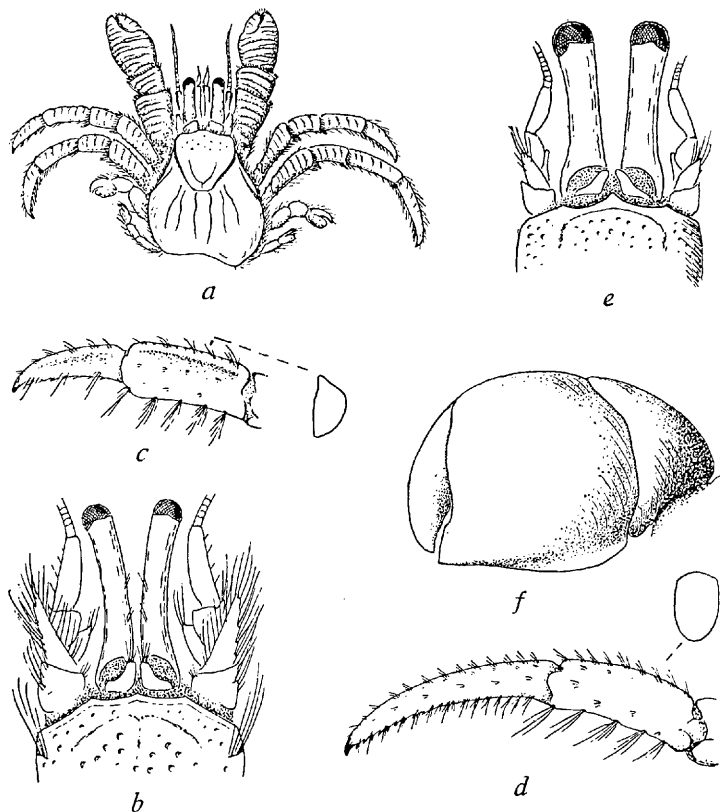


FIG. 80.—*Aniculus strigatus* (Herbst). *a*, carapace, chelipeds, legs.
Clibanarius virescens (Krauss). *b*, front of carapace with eye-stalks and 2nd antennae. *c*, outer view of 6th and 7th joints of 3rd left leg, with cross-section of 6th joint.
Clibanarius padavensis de Man. *d*, outer view of 6th and 7th joints of 3rd left leg, with cross-section of 6th joint.
Calcinus laevimanus (Randall). *e*, front of carapace with eye-stalks and 2nd antennae. *f*, outer view of left chela.

biramous appendage on left side of each of abdominal segments 2–5 in both sexes.

Remarks.—Essentially a shallow-water and littoral genus, often ascending into brackish-water estuaries. The species of the group with long dactyls on the walking legs are mostly found on muddy or soft ground; those with short dactyls in rocky habitats.

Key to the South African Species.

- I. Dactyl of 3rd (*i.e.* 2nd walking) leg longer than penultimate joint (fig. 80, *d*).
 - A. Eye-stalk much shorter than peduncle of ant. 1 . . . *clibanarius*.
 - B. Eye-stalk as long as peduncle of ant. 1.
 - 1. Red lines along legs.
 - a. Eye-stalk longer than width of carapace.
 - Length of hand of cheliped more than twice its width *padavensis*.
 - b. Eye-stalk equal to width of carapace.
 - Length of hand of cheliped less than twice its width *striolatus*.
 - 2. Blue stripes along legs *longitarsus*.
- II. Dactyl of 3rd leg equal to penultimate joint. Sternal plate between 4th legs very wide *eurysternus*.
- III. Dactyl of 3rd leg shorter than penultimate joint, which on the left side has the outer surface flattened and upper margin sharply defined (fig. 80, *c*) *virescens*.

Clibanarius clibanarius (Herbst)

1843. Krauss, Südafrik. Crust., p. 56.

1910. Stebbing, *l. c.*, p. 352 (*vulgaris*).

Stebbing mentions a small specimen, 50 mm. in length, from Natal. He accepts Krauss' record of this species, whereas Ortmann (1894) and Lenz (1905) consider that Krauss' *clibanarius* is a synonym of *longitarsus* (q.v.). Krauss said it was the largest of the S. African Hermit-crabs!

Distribution.—Indian Ocean, East Indies, Hong Kong. ? West coast of Africa (see Balss, Beitr. Meeresf. Westafr., iii, p. 40, 1921).

Clibanarius padavensis de Man

Fig. 80, *d*.

1888. de Man, J. Linn. Soc. Lond., xxii, p. 242, pl. 16, fig. 1.

1905. Alcock, Cat. Crust. Ind. Mus., ii, p. 44, pl. 4, fig. 2.

1913. McCulloch, Rec. Austral. Mus., ix, p. 349.

1915. Kemp, Mem. Ind. Mus., v, p. 250.

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

Eye-stalks longer than anterior width of carapace, and subequal to peduncle of ant. 1. Cornea smaller than in *striolatus* ($\frac{1}{3}$ – $\frac{1}{5}$ length of eye-stalk). Length of hand of cheliped more than twice its width; hand, finger, and thumb with black-tipped conical tubercles on outer surfaces.

Length of carapace up to 32 mm. Carapace uniform yellowish; eye-stalks, peduncles of both antennae, and the legs with narrow longitudinal red lines on a whitish or pale yellowish ground-colour.

Localities.—Delagoa Bay (Barnard).

Distribution.—Coasts of Bay of Bengal to Singapore, East Indies, Australia.

Clibanarius striolatus Dana

1852. Dana, U.S. Expl. Exp., Crust., p. 463, pl. 29, figs. 3, *a-e*.

1905. Alcock, *l. c.*, p. 46, pl. 4, fig. 7.

1913. McCulloch, Rec. Austral. Mus., ix, p. 348.

Eye-stalks equal to anterior width of carapace, cornea larger than in *padavensis*. Width of hand of cheliped more than half the length.

The anterior half of a small specimen (anterior width of carapace 6 mm.), collected together with several *padavensis*, has the eye-stalks equal to anterior width of carapace, and considerably stouter than in *padavensis* (*cf.* Alcock's figure). The hands are not broader than those of similar-sized specimens of *padavensis* with slender eye-stalks. Coloration as in *padavensis*.

Locality.—Delagoa Bay (coll. K. H. B. 1912).

Distribution.—Gulf of Aden, Persian Gulf, Seychelles, eastwards to Fiji and Tahiti, Australia.

Clibanarius longitarsus (de Haan)

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 821, and p. 822 (sternal plate).

1894. Ortmann, Semon's Austral. Reise, v, p. 31.

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 377.

1915. Kemp, Mem. Ind. Mus., v, p. 250 (*longitarsis*).

1917. Stebbing, Ann. Durban Mus., ii, p. 22.

1942. Chace, Bull. Mus. Comp. Zool. Harv., xci, p. 186.

Very closely allied to *padavensis* (Alcock, *l. c.*, p. 43). Distinguished by the coloration (Henderson, 1915, Rec. Ind. Mus., xi, p. 28).

Locality.—Durban Bay (Stebbing).

Distribution.—Ibo, Zanzibar, Mikindani, Indo-Pacific to Philippine Is. and Japan.

Clibanarius eurysternus Hilg.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 822, pl. 3, figs. 9, 10.

1903. Whitelegge, Rec. Austral. Mus., v, p. 11 (*taeniatus*, non M. Edw., see next reference).

1913. McCulloch, Rec. Austral. Mus., ix, p. 349.

1938. Yap-Chiongco, *l. c.*, p. 189, pl. 1, fig. (not good).

Carapace depressed. Eye-stalks equal to anterior width of carapace, moderately slender. Dactyl of 3rd leg equal to penultimate (6th) joint (Hilgendorf's figure); outer surface of latter joint transversely rugulose. Coxae of 5th legs widely separated; sternal plate between 4th legs greater than anterior width of carapace.

Length of carapace up to 30 mm. Coloration as in *padavensis*, but carapace as well as the legs with longitudinal red stripes.

Locality.—Mozambique (Hilgendorf).

Distribution.—Central Pacific and Torres Strait.

Remarks.—Inhabits shells with narrow apertures.

Clibanarius virescens (Krauss)

Fig. 80, *b, c*.

1843. Krauss, Südafrik. Crust., p. 56, pl. 4, figs. 3, *a-c* (*Pagurus v.*).

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 821, pl. 3, fig. 11 (apex of 5th leg).

1888. de Man, J. Linn. Soc. Lond., xxii, p. 247.

1894. Ortmann, Semon's Austral. Reise, v, p. 31.

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 377.

1910. Stebbing, *l. c.*, p. 352.

1913. McCulloch, Rec. Austral. Mus., ix, p. 346, pl. xi, fig. 2.

1917. Stebbing, Ann. Durban Mus., ii, p. 22.

1920. *Id.*, Ann. S. Afr. Mus., xvii, p. 258 (*aequabilis*, non Dana; also specimen with parasites included under *Calcinus laevimanus*).

1924. *Id.*, *ibid.*, xix, p. 5, pl. 2 (Crust., pl. 117) (*Calcinus astathes*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 376.

[? not Osorio, J. Sc. Nat. Lisbon, xi, p. 228. West Africa. See Schmitt, Bull. Amer. Mus. Nat. Hist., liii, 1926, p. 51.]

Front margin of carapace feebly costate; anterior portion of carapace feebly pitted or sometimes strongly rugulose-punctate. Eye-stalks subequal to anterior width of carapace, and to peduncle of ant. 1, but usually slightly (by length of cornea) longer than peduncle of ant. 2. Dactyl of 3rd leg shorter than 6th joint, which latter on the left side has the outer surface flattened, feebly or sometimes strongly rugulose, with sharp (subcarinate) upper edge. Hand of cheliped less than twice as long as wide; hand and fingers with conical tubercles, some of them black-tipped.

Length of carapace up to 20 mm. Carapace anteriorly whitish or greenish, with or without brown or reddish or greenish marks; eye-stalks olive-green with a white ring before the cornea; peduncles of both antennae olive-green; hands and fingers of chelipeds and basal joints of 2nd-4th legs olive-green, brownish or castaneous; 6th joints of 2nd and 3rd legs with white spot on outer surface near apex, and a dark band at apex; dactyls of 2nd and 3rd legs pale yellow or white in the basal and apical thirds; ungues dark; hands of chelipeds with white tubercles, fingers yellowish, tips black. Flagellum of ant. 2 blue. Abdomen blue, greenish, or violaceous. Dactyls of 2nd and 3rd legs sometimes wholly pale, without the dark band in middle.

Localities.—Natal (Krauss); Mozambique (Hilgendorf); East London and Durban (Stebbing); Port Alfred, East London, Durban, St. Lucia Bay, Delagoa Bay (S. Afr. Mus.).

Distribution.—East coast of Africa, Red Sea, East Indies, Hong Kong, Fiji, Australia.

Remarks.—Stebbing's East London specimen is, as he says, quite faded, but agrees in all respects with *virescens*, of which there are other fresher specimens from the same locality in the South African Museum.

I would not have ventured to dispute the identity of Stebbing's *Calcinus astathes* if there had not been four specimens returned to the Museum bearing Stebbing's autographic label (the largest and type specimen probably retained by him, or perhaps now transferred to the British Museum). These four specimens are obviously *virescens*. The dactyl of the 3rd leg is not longer than 6th joint, and has the characteristic shape.

A very common species along the eastern portion of the South African coast, and easily recognized by its olive-greenish colour, and the pale dactyls, usually with dark bands in the middle, of the walking legs.

Gen. CALCINUS Dana

1910. Stebbing, *l. c.*, p. 353.

1922. Bouvier, Res. Sci. Camp. Monaco, lxii, p. 16.

1924. Stebbing, Ann. S. Afr. Mus., xix, p. 5 (references, but not the species referred to this genus).

1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 155.

1938. Yap-Chiongeo, Philipp. J. Sci., lxvi, p. 204.

Anterior part of carapace very firmly calcified; rostrum small but distinct. Eye-stalks long and slender; ocular scales slender and close together. Chelipeds unequal, the left vastly the larger; finger

opening in an obliquely-vertical plane, tips of finger and thumb calcareous, strongly spooned. Telson lop-sided to the left. Abdominal appendages on left side on segments 2-5 biramous in both sexes.

Remarks.—Littoral, and mostly Indo-Pacific. The hard parts of the animal usually brightly coloured and variegated.

For the species described under the 1924 reference above, see under *Clibanarius virescens*.

Key to the South African Species.

1. Eye-stalk equal to anterior width of carapace. Upper edge of hand of right cheliped entire. Lower border of 6th and 7th joints of 3rd leg non-setose *laevimanus*.
2. Eye-stalk much longer than anterior width of carapace. Upper edge of hand of right chela serrate. Lower border of 7th joint and neighbouring part of 6th joint of 3rd leg hirsute (brush-like).
 - a. Eye-stalk $1\frac{1}{2}$ times width of carapace. 2nd and 3rd legs with alternate broad bands of blue (white) and dark red. Fingers of both chelae with pearl-like tubercles *elegans*.
 - b. Eye-stalk $1\frac{1}{2}$ times width of carapace. Legs not cross-banded.
 - i. Lower border of hand of left chela carinate and serrate *latens*.
 - ii. Lower border of hand of left chela not carinate *gaimardii*.

Calcinus laevimanus (Randall)

Fig. 80, e, f.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 823 (*tibicen* M. Edw., non Herbst).

1910. Stebbing, *l. c.*, p. 353.

1912. Balss, D. Tiefsee Exp., xx, p. 93 (*herbstii*).

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 258.

1926. Laurie, *l. c.*, p. 155.

1938. Yap-Chiongco, *l. c.*, p. 205, pl. 2, fig. 5 (not good) (*herbstii*).

1939. Melin, *l. c.*, p. 22, figs. 7, 8 (*herbsti*).

See key. Length of carapace up to 19 mm. Carapace dark brown, greyish, or slaty. Chelipeds dark purplish brown, apices of finger and thumb in right chela white; lower distal corner of hand of the smooth and glabrous left chela and outer distal portion of finger white. 2nd and 3rd legs orange-brown externally, with a median longitudinal dark stripe on 4th and 5th joints; 6th joint uniform

reddish brown, 7th (dactyl) white with a reddish-brown annular band in middle and a dark spot near base on inner and outer surfaces; ungues dark; inner surfaces of 4th and 5th joints greenish orange. Antenna 2 orange; peduncle of antenna 1 cobalt-blue, flagellum orange. External maxillipeds orange or greenish, with flagella of exopods pinkish. Eye-stalks cobalt in basal half, orange distally, cornea blue or black, ocular scales orange or light brown.

Localities.—Natal (Krauss); Ibo and Mozambique (Hilgendorf); Mozambique and Delagoa Bay (Stebbing; and S. Afr. Mus.); St. Lucia Bay, Zululand (S. Afr. Mus.).

Distribution.—East coast of Africa, Indo-Pacific to Hawaiian Islands.

Remarks.—Both de Man and Melin regard the identification with Randall's *laevimanus* 1839 as uncertain, and Melin follows Alcock (1905) in accepting *herbstii* de Man 1887.

Calcinus elegans (M. Edw.)

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 823.

1910. Stebbing, *l. c.*, p. 353.

1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 155.

1935. Boone, Bull. Vanderbilt Mar. Mus., vi, p. 23, pl. 3.

1938. Yap-Chiongco, *l. c.*, p. 206, pl. 2, fig. 10 (not good).

1939. Melin, *l. c.*, p. 21.

1943. Thompson, John Murray Exp., vii, p. 415.

See key. Length of carapace up to 20 mm. Carapace bluish purple, paler anteriorly. Chelipeds dull greenish or purplish, the pearly tubercles on fingers white. 2nd and 3rd legs with alternate broad bands of cobalt-blue and dark purplish maroon, dactyls bluish white with red spots. Ocular scales and bases of eye-stalks red, greater part of eye-stalks cobalt-blue. Antenna 1 blue, antenna 2 orange.

Locality.—Natal (Krauss).

Distribution.—East coast of Africa, Gulf of Aden, Mauritius, Laccadives, to Hawaiian Islands.

Calcinus latens (Randall)

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 823.

1905. Alcock, Cat. Crust. Ind. Mus., ii, p. 58, pl. 5, fig. 5.

1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 155.

See key. Dactyls of 2nd and 3rd legs dark purplish brown at bases.

Locality.—Mozambique (Hilgendorf).

Distribution.—Ibo, Red Sea, east coast of Africa to Hawaiian Islands, Australia.

Calcinus gaimardii (M. Edw.)

1848. Milne Edwards, *Ann. Sci. Nat. zool.* (3), x, p. 63.

1852. Dana, *U.S. Expl. Exp. Crust.*, i, p. 457, pl. 28, fig. 9.

1894. Ortmann, *Semon's Austral. Reise*, v, p. 32.

1905. Alcock, *Cat. Crust. Ind. Mus.*, ii, p. 56, pl. 5, fig. 3 (references).

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 376.

See key. (As preserved) carapace pinkish, red on antero-lateral corners and pterygostomial region. Chelipeds and legs maroon; 6th and 7th joints of 2nd and 3rd legs paler orange, 7th joint whitish apically, ungues black; tips of spines on legs and chelipeds white; tips of fingers and thumbs of chelipeds white (with tufts of black setules). Eye-stalks in basal two-thirds red, distal third puce (? blue in life). Antennae 1 deep orange basally, becoming paler distally, flagellum nearly white. Antenna 2 chrome-yellow.

Locality.—Impengazi, N. of St. Lucia Bay, Zululand (coll. T. A. Stephenson).

Distribution.—Dar-es-Salaam, Maldives, and Indo-Pacific.

Gen. *DIOGENES* Dana

1910. Stebbing, *l. c.*, p. 353.

1927. Gurney, *Trans. Zool. Soc. Lond.*, pt. 2, p. 278 (larval stages).

Rostrum absent, replaced by a movable spiniform process lying between the ocular scales. Eye-stalks moderately slender; ocular scales large, more or less serrate or pectinate on anterior margin. Chelipeds unequal, the left vastly the larger; finger opening in an obliquely-vertical plane, tips of finger and thumb pointed, calcareous. Telson lop-sided to the left. Abdominal appendages on left side on segments 2-5, uniramous in ♂, the first 3 biramous in ♀.

Remarks.—West coasts of Europe and Africa, Mediterranean, Indo-Pacific. Essentially shallow-water species, not descending below about 70 fathoms (Alcock).

The species are difficult to determine, mainly on account of considerable variability (see, *e.g.*, Balss, *Beitr. Meeresf. Westaf.*, iii, 1921, p. 41). The three commoner South African species, however, are easily distinguished from each other, when examined in detail.

Key to the South African Species.

1. Eye-stalks not as long as anterior width of carapace, equal to or shorter than peduncle of ant. 2. Only the right cheliped hirsute.
- a. Upper edge of vertical side-wall of carapace conspicuously serrate throughout nearly its whole length (fig. 81, e). 6th joint of 3rd leg slender (fig. 81, g) *costatus*.
- b. Upper edge of side-wall of carapace with only 2-3 serrations posteriorly, its anterior portion smooth or very minutely serrate (fig. 81, a). 6th joint of 3rd leg rather stout (fig. 81, b).
- i. Upper surface of wrist of left chela convex, with irregularly arranged conical tubercles. No red spot on left chela *brevirostris*.
- ii. Upper surface of wrist of left chela flat between two conspicuous rows of tubercles. A red spot on outer surface at base of hand of left chela *extricatus*.
2. Eye-stalks longer than peduncle of ant. 2. Left cheliped, as well as right, hirsute *senex*.

Diogenes pugilator (Roux)

1891. Bouvier, Mem. Soc. zool. Fr., iv, p. 396.

1892. Chevreux and Bouvier, *ibid.*, v, p. 120.

1905. Alcock, Cat. Crust. Ind. Mus., ii, p. 166 (references only).

1921. Balss, Beitr. Kenntn. Meeresf. Westafr., iii, p. 41.

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 8.

Locality.—Port Alexander, Angola, littoral to 72 metres (Odhner).

Distribution.—West coasts of Europe and Africa, Mediterranean, Red Sea, Persian Gulf, Singapore.

Diogenes brevisrostris Stimpsn.

Fig. 81, a-d.

1843. Krauss, Südafrik. Crust., p. 58 (*miles*, non Fabr.).

1910. Stebbing, *l. c.*, p. 354 (also *miles* Krss., non Fabr.).

1912. Balss, D. Tiefsee Exp., xx, p. 94.

1917. Stebbing, Ann. Durban Mus., ii, p. 21 (*costatus*, non Hend.).

1921. Balss, Beitr. Meeresf. Westafr., iii, p. 43 (as var. of *varians* = *pugilator*, p. 41).

1923. Odhner, Medd. Göteb. Mus., xxxi, pp. 25, 30.

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 376.

[Not Henderson, 1888. = *costatus*.]

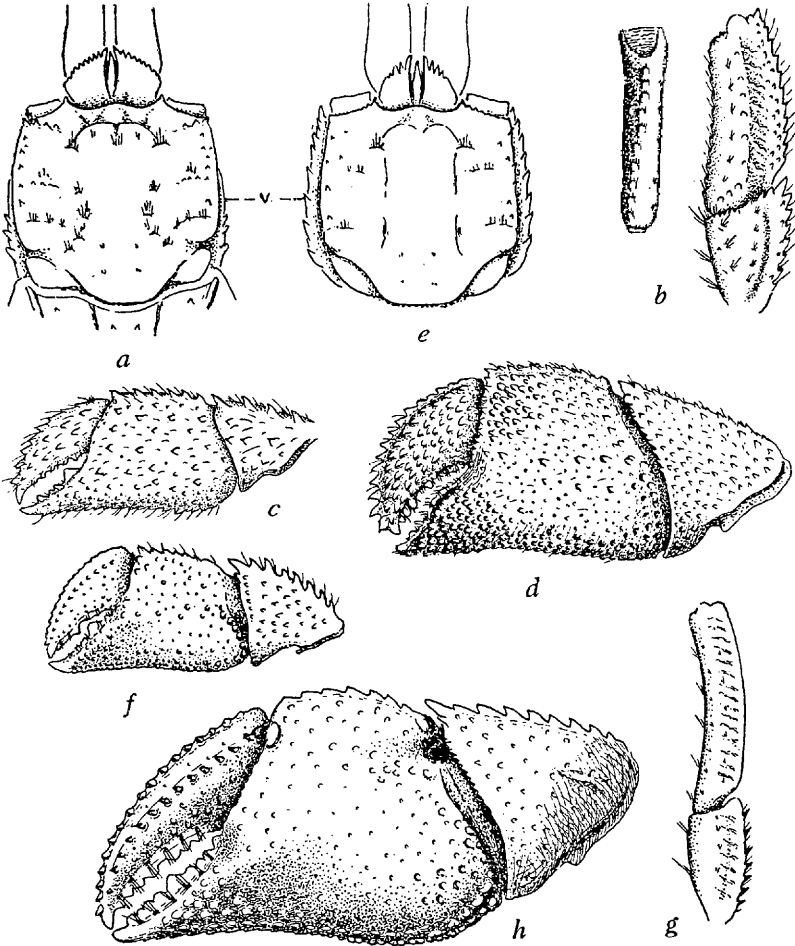


FIG. 81.—*Diogenes brevirostris* Stmps. *a*, carapace, with ocular scales and rostral process. *v.* = vertical wall of carapace. *b*, 5th and 6th joints of 3rd left leg, with lower surface of 6th joint. *c*, left chela of specimen of carapace length 3 mm. *d*, the same, length 15 mm.

Diogenes costatus Hend. *e*, carapace. *f*, left chela. *g*, 5th and 6th joints of 3rd left leg.

Diogenes extricatus Stebb. *h*, left chela, showing red spot at base of hand.

Carapace longer than its greatest width, frontal margin shallowly arcuate, the submedian points tipped with a spinule, usually more or less concealed in a tuft of setae, sometimes flanked on outside by

subsidiary denticles, usually a distinct transverse series of 2-4 sharp denticles at each antero-lateral corner; upper edge of vertical side-wall (separated by a deep groove anteriorly from the dorsal shield of carapace) with 2-3 not very conspicuous denticles on its hinder part, the anterior part opposite the antero-lateral corner of carapace and base of ant. 2 quite smooth. Rostral process slender, spiniform, scarcely as long as ocular scales, each of which is as wide as base of eye-stalk, and has from 4-6 (juv.) to 10-12 (ad.) serrations on margin. Eye-stalks shorter than anterior width of carapace, and subequal to peduncle of ant. 2. Acicle of ant. 2 not bifid, extending to end of penultimate joint of peduncle, with 4-5 (juv.) to 6-7 (ad.) teeth on its margin. Left cheliped nearly naked or with short scattered setae, right cheliped with longer and denser yellow hairs. Left cheliped, wrist with 2 rows of conical granules on upper surface, more distinct in young because in adult the upper surface becomes more rounded, and the granules more irregularly placed; outer surface of wrist, hand and finger thickly set (almost imbricate in places) with conical granules and tubercles, palm with fewer tubercles, inner surface of finger with a row of tubercles between two grooves, finger distally strongly convex and serrate in adult. 2nd and 3rd legs with upper margin of 5th joint denticulate (with spiniform granules), of 6th joint with fewer granules, in young almost smooth, dactyl $1\frac{1}{2}$ times the 6th joint, sulcate; in 2nd leg the 6th joint very slightly longer than 5th, in 3rd leg $1\frac{1}{5}$ - $1\frac{1}{4}$ times as long; lower margin of 6th joint of 3rd left leg with a series (10-12) of low rounded tubercles (fig. 81, *b*), of 3rd right leg smooth.

Length of carapace up to 15 mm. Flesh-coloured, with pinkish or reddish patches or speckles on carapace anteriorly and on upper surfaces of legs; hand and finger of left cheliped reddish, the larger tubercles (especially distally) often with a whitish or dull bluish tint in relief against the ground-colour when this is extra deep red; 6th and 7th joints of 2nd and 3rd legs often with reddish or brownish longitudinal stripes along the grooves, eyes black (K. H. B.).

Localities.—Natal (Durban) Bay (Krauss); Simon's Bay, 12 fathoms (Stimpson); Gt. Fish Bay, Angola (Balss); St. Francis Bay (Balss); Cape Barracouda and St. Sebastian Bay, 72 metres (Odhner); littoral and shallow water Table Bay, and from False Bay to Durban, also Saldanha Bay on west coast (S. Afr. Mus.).

Remarks.—This is without any doubt the form described by Stimpson, who compared it with *custos*. The smoothness of the upper surfaces of the 6th joints of 2nd and 3rd legs is to a large degree a

juvenile character (Stimpson's specimen had a carapace length of about 7–8 mm.).

Its great abundance and the brown stripes on the legs make it extremely likely that it is also the form which Krauss recorded as *miles*. The latter is a species with a denticulate rostral process, and carapace broader than long, and as yet no species with such characters has been recorded from the South African region.

Balss (1912, 1921) and Odhner (1923) were inclined to regard this as one of the many varietal forms of *pugilator* (Roux) (= *varians* Costa) (distribution, see *supra*). Henderson (1888) thought the same, but he appears to have mistaken the identity of his specimen. Stebbing's 1917 specimens from Durban Bay are almost certainly *brevirostris*, and not *costatus* to which he assigned them.

The species is extremely common, and inhabits all kinds of shells except those with very narrow apertures.

Diogenes costatus Hend.

Fig. 81, *e-g*.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 53, pl. 6, figs. 3, 3, *a* (*brevirostris*, non Stimpson).

1893. *Id.*, Trans. Linn. Soc. Lond., ser. 2, vol. v, p. 418, pl. 39, figs. 7, 8.

1905. Alcock, *l. c.*, p. 70, pl. 6, figs. 7, 7, *a*.

1910. Stebbing, *l. c.*, p. 355.

1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 156.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 376.

[Not Stebbing 1917. = *brevirostris*.]

Differs from *brevirostris* as follows: antero-lateral angles of carapace without any denticles, or one, or at most 2 denticles; the submedian points on frontal margin are tipped with a small spine, and often flanked on the outside by some very minute spinules; upper edge of side-wall of carapace with 7 (6–9) sharp denticles extending as far forwards as opposite the base of ant. 2 (fig. 81, *e*); ocular scales with fewer serrations, which are confined to the inner half of margin, each scale scarcely as wide as base of eye-stalk; eye-stalks distinctly shorter than peduncle of ant. 2, extending only half-way along last peduncular joint; acicle of ant. 2 with 3–5 teeth. Left cheliped, wrist with sharper upper margin, bearing larger and more regular denticles; outer surface of hand and finger with finer and consequently more numerous granules, without any tendency to imbrication, the

transverse ridge proximally on lower half of hand much more conspicuous, palm and inner surface of finger also with finer and more numerous granules, profile of finger less strongly convex and serrate. Upper margin of 5th joint of 2nd leg more prominently denticulate, of 6th joint almost smooth (with minute tufts of setules only); upper margin of 5th joint of 3rd leg inconspicuously denticulate, of 6th joint as in the 2nd leg; lower margin of 6th joint of 3rd leg (both left and right) smooth (with minute tufts of setules only). In 2nd and 3rd legs 6th joint more slender than in *brevirostris*, in 2nd leg $1\frac{1}{3}$ times, in 3rd leg $1\frac{1}{2}$ times the length of 5th joint, outer surface without any trace of a longitudinal groove. Dactyls of both legs relatively shorter, $1\frac{1}{4}$ – $1\frac{1}{3}$ times the 6th joint.

Length of carapace up to 11 mm. (ovig. ♀ 10 mm.). In Stebbing's dried specimen very faint traces of an annular band in middle of 6th joints of 2nd and 3rd legs.

Localities.—Simon's Bay, 10–12 fathoms (Henderson); off Gt. Fish Point, 30 fathoms (Stebbing); False Bay and Agulhas Bank to Algoa Bay, East London and Natal (S. Afr. Mus.); Delagoa Bay (coll. van der Horst).

Distribution.—East coast of India. ? Seychelles.

Remarks.—Henderson (1888) refers to the "tendency to spinulation" on the left cheliped. His figure, which represents a specimen of 9–10 mm. carapace length, shows a curved lower margin on the hand of left chela, very like the shape found in *extricatus* (*q.v.*), but which does sometimes occur in *costatus* (in the South African Museum series: 4 juv. out of 50 specimens) (and in *brevirostris*); the curvature might easily be exaggerated by an artist according to the angle of view. Henderson's enlarged figure 3, *a*, however, is decisive: he shows the narrow sparingly denticulate ocular scales (also referred to in the text), and the conspicuous serrate edge of the vertical side-wall of carapace.

Balss (1912, *l. c.*, p. 94) was inclined to regard the specimen, identified as *costatus* by Stebbing, as being really *brevirostris*. The differential characters, based on a direct comparison, of these two species have never been given, because Stebbing apparently never saw any *brevirostris*, and Balss no *costatus*.

The two species are undoubtedly distinct, but I am not quite satisfied that the South African form referred to *costatus* is really the same as the Indian form. Henderson's (1893) figure 7 shows faintly a series of denticles along the side of the carapace, but whether they are intended to be on the dorsal shield or on the side-wall is ambiguous; the figure does not correspond with the text as regards the relative

lengths of the eye-stalks and peduncles of ant. 2. Fig. 8 shows the thumb of the chela more strongly deflexed than in any South African specimen.

The Natal specimens (off Umhloti River mouth, 25 fathoms) are all in shells which are completely covered with *Hydractinia*.

Diogenes extricatus Stebb.

Fig. 81, *h*.

? 1893. Henderson, Trans. Linn. Soc. Lond., v, p. 413, footnote ("a large and distinct species from Natal" in Brit. Mus.).

1910. Stebbing, *l. c.*, p. 355.

1912. Balss, D. Tiefsee Exp., xx, p. 94, fig. 3.

Agrees with *brevirostris* as regards the ocular scales (these when fully grown are even wider than the eye-stalks), relative lengths of eye-stalks and peduncles of ant. 2. The proportions of 5th and 6th joints of 2nd and 3rd legs are also nearest to those of *brevirostris* (and more unlike those of *costatus*), being subequal, as measured along upper margin. The 6th joint of 3rd left leg has the upper surface nearly smooth between the inner and outer denticulate margins, a feeble groove along middle of outer surface, and on the lower surface some tufts of setules arising in the axils of very low and rounded, irregularly scattered tubercles (no regular row of tubercles as in *brevirostris*).

Resembles *costatus* in the strongly and regularly dentate upper margin of 5th joint of 2nd and 3rd legs; the 4th joint also is more conspicuously dentate than in either *costatus* or *brevirostris*.

The vertical side-wall of carapace has 2-3 denticles posteriorly (as in *brevirostris*), and some very minute and inconspicuous serrulations extending forwards to opposite antero-lateral corner of carapace.

Characteristic of the present species is the nearly flat upper surface of the wrist of left cheliped, bordered by an inner and an outer row of conical tubercles, the outer row being slightly the stronger; between the two rows there are 4-5 (6) small granules nearer the outer row than the inner row. This double row of tubercles is continued on the upper surface of the hand and the finger, but less conspicuously on the hand. The hand and finger are more like those of *costatus* than those of *brevirostris* in shape; there is no prominent ridge or row of granules proximally on lower half of hand, and both hand and finger are studded with fewer and smaller granules than in *brevirostris*.

Length of carapace up to 20 mm. Pale flesh-colour, brighter on

wrist and hand of larger cheliped, a characteristic red spot on outer surface at base of hand of larger cheliped (fig. 81, *h*), a reddish longitudinal stripe on outer surface of 6th joint of legs, cornea black, ova salmon-red (K. H. B.).

Localities.—Mossel Bay (Stebbing, and S. Afr. Mus.); Algoa Bay (Balss); False Bay (S. Afr. Mus.).

Remarks.—Besides Stebbing's specimen, there are in the South African Museum five other specimens from 10 to 13 mm. carapace length, including an ovigerous ♀ of 13 mm. In the three largest the lower margin of hand of left chela is almost straight from the proximal convexity; that is to say, the thumb is not at all deflexed as it is in Stebbing's specimen (here figured); when viewed from above and slightly obliquely the hand has the shape shown in Henderson's figure (1888) of his "*brevirostris*."

Diogenes senex Heller

1865. Heller, Reise "Novara," Crust., p. 85, pl. 7, figs. 3, 3, *a*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 824.

1882. Haswell, Cat. Austral. Crust., p. 158.

1905. Alcock, *l. c.*, p. 166 (references only).

Rostral process spiniform. Ocular scales broad, apex with 2-3 spinules. Eye-stalks longer than peduncle of ant. 2. Acicle not bifid, with 2-3 long teeth. Left cheliped as well as the right hirsute. Wrist of left cheliped with 6 teeth on upper margin; outer surface of hand with a rough longitudinal ridge. (After Hilgendorf and Haswell.)

Length of carapace 12 mm.

Localities.—Inhambane (Hilgendorf); Durban (Univ. Cape Town Ecol. Surv., 1946).

Distribution.—Red Sea, Singapore, New South Wales.

Gen. CANCELLUS M. Edw.

1924. Stebbing, Ann. S. Afr. Mus., xix, p. 6.

1927. Hale, Crust. S. Austral., pt. 1, p. 94.

1941. *Id.*, B.A.N.Z. Antaret. Res. Exp., B, iv, pt. 9, p. 277.

Body squat and broad, the abdomen symmetrical or nearly so, not coiled (typically). Rostrum not prominent. Eye-stalks long, ocular scales well separated. Flagellum of ant. 2 short. Chelipeds equal, more or less modified, and together with the 2nd pair (or 2nd and 3rd pairs) of legs forming an operculum closing the burrow (or shell) in which the animal lives; hand of chelipeds triquetral, bent

downwards at the wrist. In ♂ no abdominal appendages (except the uropods); in ♀ appendages on left side only on segments 2-5. Uropods and telson symmetrical or nearly so.

Remarks.—The above diagnosis covers the typical species of the genus. As pointed out below, the single South African species departs from it in several structural features, as well as in its choice of a home.

Normally these Hermit-crabs live in burrows, which they are said to excavate themselves, in corals, soft rocks, and sponges; the mouth of the burrow being completely closed by the chelae and apical joints of the anterior legs (see Hale, fig. 92).

Cancellus makrothrix Stebb.

Fig. 82.

1924. Stebbing, *l. c.*, p. 6, pl. 3 (Crust., pl. 118).

Most parts of the body and appendages strongly hirsute. Rostrum broad and very short, but acute and distinct. Frontal margin rather strongly costate, the costa interrupted at the shallow notch between rostrum and the very obtuse submedian points. Behind the costa a transverse crescentic groove, and a short medio-longitudinal groove. Eye-stalks equal to anterior width of carapace (*i.e.* between the very obtuse antero-lateral angles), and extending slightly beyond apex of extended peduncle of ant. 1 (by about length of cornea), slender, dilated at base, but swelling only very slightly distally, setose. Ocular scales L-shaped, apically acute, closely approximate or contiguous. Apex of peduncle of ant. 2 reaching half-way along eye-stalk, acicle reaching nearly to end of last joint of peduncle, acute, 2 spinous tubercles on outer margin, and one on inner margin, with numerous bristly hairs; flagellum about as long as length of anterior (calcified) part of carapace, its joints with whorls of short setules. Chelipeds and 2nd and 3rd legs thickly covered on their anterior surfaces with stiff bristly hairs arranged in tufts, and on the hands of the chelipeds more or less in longitudinal lines. Inner upper margin of hands and fingers with a few blunt (mostly dark-tipped) tubercles, and on the inner surface of the fingers below the upper margin two additional rows of tubercles (4-5 in each row). Inner upper margin of 5th joint of 2nd leg with 7-8 denticles, of 6th joint more or less scalloped owing to the insertion of bristle-tufts. 6th and 7th joints of 2nd and 3rd legs subequal. Biramous appendages in ♀ on left side of abdominal segments 2-5 (in the single ♂ specimen the abdomen is missing). Left uropod slightly longer than right; 6th abdominal segment calcified,

transversely divided by a deep groove, granulose and setose, its distal margin overhanging base of telson, margin denticulate, a broad quadrangular lobe projecting slightly beyond the postero-lateral corners. Telson about as broad as long, or slightly longer than broad,

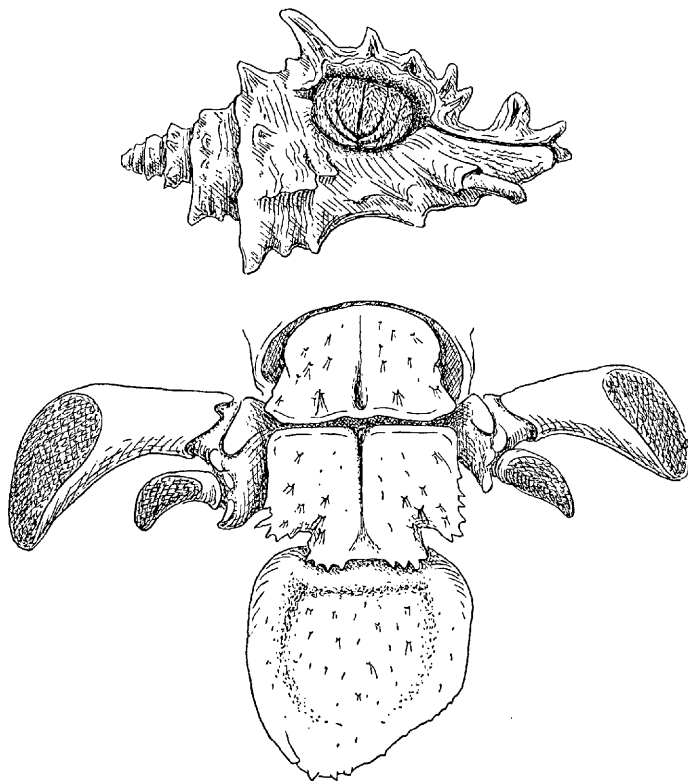


FIG. 82.—*Cancellus makrothrix* Stebb. Crab in *Murex* shell, showing chelipeds and anterior two pairs of walking legs closing the aperture, $\frac{2}{3}$ natural size. Fifth and sixth abdominal segments, uropods and telson, enlarged, setae on uropods and telson omitted.

asymmetrically subcircular, a semicircular shallow groove and a few granules and setules on upper surface, margin strongly setose, and (in one specimen) with a few calcified denticles.

Length of carapace up to 27 mm., greatest width 25 mm. (in all 3 specimens the width is slightly less than median length, not greater as given by Stebbing for his type).

Localities.—Algoa Bay, 10 fathoms (Stebbing); off East London and off Cape Morgan, 17 fathoms (S. Afr. Mus.).

Remarks.—Beyond the remarkable hirsuteness, it is difficult to extract any specific characters from Stebbing's description and figures. Fortunately there is another specimen from the same locality as the type, and also two other specimens in the South African Museum, from which the above description has been compiled.

This species is a very aberrant one, if it is to be regarded as a *Cancellus*. Both the 2nd and also the 3rd pairs of legs participate with the chelipeds in closing the aperture of the mollusc shell, and in conformity with this unusual habitat the abdomen is spirally coiled to an extent equal to that of any other shell-inhabiting Hermit-crab. The uropods, however, remain nearly symmetrical. The upper distal corner of the wrists of the chelipeds does not project so strongly (knuckle-like) as in more typical species, and the anterior surface of the hand, though flat, is scarcely concave. The carapace is widened posteriorly. The ocular scales are closely approximate, in fact contiguous.

The East London and Cape Morgan specimens are both housed in *Murex* shells, which would appear to be extraordinarily heavy for the crabs to drag about; the aperture of the shell, however, is exactly closed by the chelipeds and two pairs of walking legs.

Development.—Attached or adhering to various parts of the abdomen and sides of the carapace of the Cape Morgan specimen were 8 juveniles, 2 still enclosed in the egg membrane, the other 6 free.

Those curled up in the egg membrane form an oval mass measuring 3 mm. \times 2.5 mm. When removed from the membrane and straightened out the crab has a carapace length of about 2 mm., and a total length of about 5 mm. The eye-stalks are stout, not more than $2\frac{1}{2}$ times as long as wide. The carapace, abdomen, chelipeds, and legs appear to be glabrous, but the rasp-like pads on 4th and 5th legs are developed. The abdomen is symmetrical, with 4 pairs of simple appendages on segments 2-5; the uropods are equal, but the telson is slightly asymmetrically bilobed.

The 6 free specimens are miniatures of the adult, except that the abdomen is symmetrical, with 4 pairs of appendages. They can thus be said to be still in the *Glaucothoë* stage. The length of the carapace is 2.5 mm., total length 5.5-6 mm. The chelipeds and 2nd and 3rd legs are covered with bristly hairs, the rest of the body with plumose setae. Hands of chelipeds bent downwards at the wrists. Tips of fingers and thumbs, and ungues of 2nd and 3rd legs corneous, brown. 6th abdominal segment medio-longitudinally grooved, posterior

margin denticulate; uropods subequal, setose; telson slightly asymmetrically bilobed, margin setose.

It is thus certain that in this species the free-swimming *Zoeä* stage is suppressed, the larva developing up to the *Glaucothoë* stage within the house occupied by the mother.

Gen. PARAPAGURUS S. I. Smith

1910. Stebbing, *l. c.*, p. 356.

1912. Balss, D. Tiefsee Exp., xx, p. 96.

1939. Melin, *l. c.*, p. 20 (sensu lato).

Rostral point short or obsolescent. Eye-stalks moderate, ocular scales spiniform, moderately or widely separated. Chelipeds unequal, the right vastly larger than the left, finger moving in an obliquely vertical plane, tips of finger and thumb calcareous (or with minute corneous granular tip). 2nd and 3rd legs long, especially the dactyls. Telson lop-sided to the left. Abdominal appendages: in ♂ a pair of uniramous appendages on segments 1 and 2, and a biramous (one ramus almost rudimentary) one on the left side only on segments 3-5; in ♀ a biramous appendage on left side only on segments 2-5. Vas deferens not protruding. Genital opening of ♀ present on left side only.

Key to the South African Species.

1. Chelipeds densely pubescent, not sexually dimorphic. Last peduncular joint of ant. 1 elongate, more than half the anterior width of carapace *pilosimanus*.
2. Chelipeds sparsely setose, sexually dimorphic. Last peduncular joint of ant. 1 not more than half anterior width of carapace *dimorphus*.

Parapagurus pilosimanus S. I. Smith

Fig. 83, *a, b*.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 87, pl. 9, figs. 2, 2, *a* (*abyssorum*).

1894. Milne Edwards and Bouvier, Res. Sci. Camp. Monaco, fasc. vii, p. 64, pl. 9, figs. 1-17.

1905. Alcock, Cat. Crust. Ind. Mus., ii, p. 99, pl. 10, fig. 1 (references).

1910. Stebbing, *l. c.*, p. 357, pl. 17 (Crust., pl. 43) (*bouvieri*).

1912. Balss, *l. c.*, p. 96, pl. xi, figs. 1-6.

1926. Laurie, *Trans. Linn. Soc. Lond.*, xix, p. 160.

1943. Thompson, *John Murray Exp.*, vii, p. 417.

Anterior width of carapace slightly greater than median length from rostral point to cervical groove. Cornea slightly dilated, but not wider than base of eye-stalk; the latter $\frac{3}{5}$ – $\frac{2}{3}$ the anterior width of carapace. Last peduncular joint of ant. 1 $\frac{2}{3}$ – $\frac{3}{4}$ the anterior width of carapace, and as long as peduncle of ant. 2. Acicle of ant. 2 extending

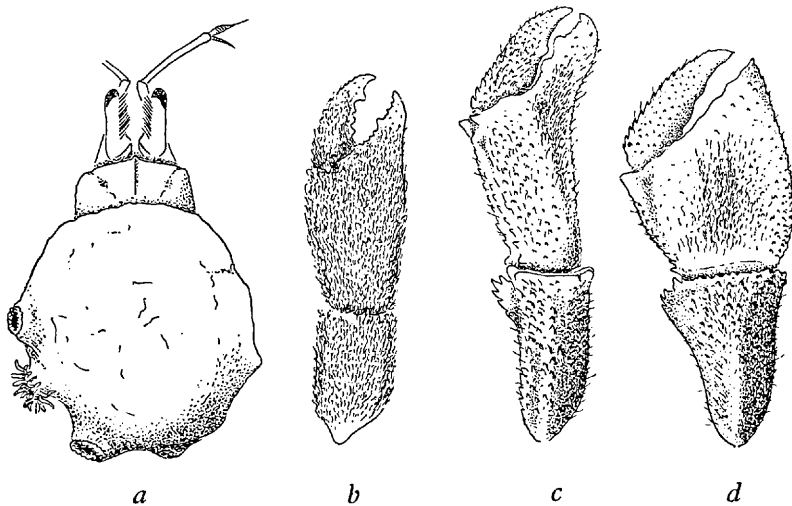


FIG. 83.—*Parapagurus pilosimanus* S. I. Smith. *a*, anterior part of carapace projecting from colony of *Epizoanthus*, with eye-stalks and antenna 1. *b*, right chela.

Parapagurus dimorphus (Studer). *c*, right chela ♂. *d*, right chela ♀ (more strongly magnified than that of ♂).

to or slightly beyond apex of last peduncular joint. Chelipeds, especially the right, densely pubescent, not sexually dimorphic.

Length of carapace up to 25 mm., right cheliped ♂ 70 mm., ♀ 55 mm. Body pinkish, basal joints of chelipeds with reddish patches, 2nd and 3rd legs red, with a conspicuous white band along the upper and lower margins, cornea dark crimson, antenna 1 pink with white band along upper margin of last peduncular joint, antenna 2 pink (K. H. B.).

Localities.—Off East London, 300 fathoms (Stebbing); Agulhas Bank, 500 metres (Balss); off Table Bay and Cape Point, southern edge of Agulhas Bank, and off East London, 130–400 fathoms (S. Afr. Mus.).

Distribution.—Atlantic from Nova Scotia to Tristan d'Acunha;

Indian Ocean; Pacific from Japan and California to southern Patagonia. 250–2260 fathoms.

Remarks.—Stebbing's species *bowieri* was based on small specimens. Apparently the only difference from the typical form (and the species is known to be very variable), as shown in Henderson's and Alcock's figures, is the slightly greater length of the eye-stalks. The dilatation of the cornea is an ambiguous character, as the cornea often appears slightly dilated unless viewed in a true dorsal view. *P. bowieri* can be regarded as at most a variety of *pilosimanus*.

The 1st abdominal appendage in adult ♂ is broader and more triangular than shown in Stebbing's figure; it resembles that of *dimorphus*.

Lives in shells covered with the coenosarc of *Epizoanthus* colonies. Most of the specimens would appear to have been unable to withdraw completely into their protective "houses"; this is especially noticeable in young specimens where the abdomen only is encased and protected.

A ♀ specimen in the S. African Museum (carapace length 15 mm.) has a cluster of flask-shaped bodies, 13–14 on each side, attached to the bases of the maxillipeds, chelipeds, and walking legs. These bodies are attached by a narrow base, are 6–7 mm. in length, and are parasitic Copepods.

Parapagurus dimorphus (Studer)

Fig. 83, *c, d.*

1910. Stebbing, *l. c.*, p. 356.

1912. Balss, *l. c.*, p. 97.

Anterior width of carapace equal to median length to cervical groove. Cornea dilated, wider than base of eye-stalk; the latter equal to half anterior width of carapace. Last peduncular joint of antenna 1 not exceeding half anterior width of carapace, and shorter than peduncle of antenna 2. Acicle of antenna 2 barely reaching apex of last peduncular joint. Chelipeds with short scattered setae not concealing the tubercles and granules; sexually dimorphic, the hand of right chela in ♂ adult being trapezoidal, with finger oblique, in ♀ obovate, with finger almost at right angles to long axis of hand; upper distal margin of wrist of right cheliped on inside (both sexes) strongly carinate and prominent (not so prominent in juv., with carapace length less than 7–8 mm.); a prominent knob at end of upper margin of hand of right chela (both sexes) overhanging articulation of finger.

Length of carapace up to 25 mm., of right cheliped ♂ 70 mm., ♀ 50 mm.

Coloration similar to that of *pilosimanus*.

Localities.—34° 13' S., 15° W., 117 fathoms (Studer); Agulhas Bank 150 fathoms (Henderson); off Cape Point (Stebbing); off Table Bay, Cape Point, Agulhas Bank, 178–500 metres (Balss); off Saldanha Bay, Table Bay and Cape Point, 80–250 fathoms (S. Afr. Mus.).

Distribution.—Tristan d'Acunha, Marion Island, and Patagonia.

Remarks.—In various shells, either without sea-anemones, or with single anemones, but most frequently in shells completely covered with the coenosarc of *Epizoanthus* colonies. This species seems to be able to withdraw itself into its house far better than *pilosimanus*.

Glaucothoë stage (probably *dimorphus*). Frontal margin convex, but not triangularly produced. Chelipeds unsculptured and nearly glabrous, the right much larger than left, with some feeble crenulations on inner distal margin of wrist. 2nd and 3rd legs with dactyls longer than 6th joints, setose, without spinous projections on lower margin. Peduncle of uropod without spinous projection. Telson as long as basal width, triangular, with the apex rather broadly rounded, and the lateral margins slightly indented.

Carapace length 3.5 mm., total length 10–11 mm.

Locality.—Off Cape Point, 120 fathoms, 4th May 1900, 3 specimens (S. Afr. Mus.).

Gen. PYLOPAGURUS M. Edw. & Bouv.

1891. Milne Edwards and Bouvier, Bull. Soc. Philom. Paris, ser. 8, iii, p. 108.

1893. *Id.*, Mem. Mus. Comp. Zool. Harv., xiv, p. 74.

1895. Faxon, *ibid.*, xviii, p. 61.

1910. Stebbing, *l. c.*, p. 359.

Rostral point not prominent. Eye-stalks moderate; ocular scales simple, separated. Chelipeds unequal, the right vastly larger than the left; in both the hand bent downwards and incapable of being straightened, hand of right cheliped flattened on outer surface and forming an operculum; finger moving in a horizontal plane (see remarks); tips of finger and thumb corneous (except that of thumb of left chela). Telson lop-sided to the left. Abdominal appendages: in ♂ unequally biramous appendages on left side only on segments 3–5; in ♀ a pair of uniramous appendages on segment 1, biramous appendages on left side only on segment 5. Vas deferens not protruding.

Remarks.—Differs from *Eupagurus* in having a pair of appendages on abdominal segment I in ♀. The vertical movement of the fingers of the chelae is also given as a differential character, but in the few specimens I have seen the fingers certainly move horizontally; the figures of other species also give the impression of a horizontal movement, and some of the species were at first described as species of *Eupagurus*.

Key to the South African Species.

1. Outer surface of hand of right chela granulate *ungulatus*.
2. Outer surface of hand of right chela pitted *liochele*.

Pylopagurus ungulatus (Studer)

1910. Stebbing, *l. c.*, p. 359.

1912. Balss, D. Tiefsee Exp., xx, p. 106, footnote.

1921. *Id.*, Beitr. Kenntn. Meeresf. Westaf., iii, p. 46 (“*Nylopagurus*”; typ. err.).

Peduncle of ant. 2 extending to cornea (Studer; but according to his figure he would seem to have reckoned the elongate 5th joint as part of the flagellum). Right cheliped: 4th joint (according to figures) with 5 rounded tubercles on upper margin; upper surface of wrist with inner and outer margins serrate, and with some conical tubercles on both upper and (according to figure) lateral surfaces; hand broadly oval, upper surface with smooth granules, outer and inner margins connected across the base of hand, costate and serrulate, finger with serrulate outer margin. Hand of left cheliped (according to figure) with smooth margins and a few granules on upper surface. Upper margins of 5th–7th joints of 2nd and 3rd legs carinate and serrulate, and (according to figure) glabrous. Text and figure in conflict as to relative lengths of 6th and 7th joints of 2nd and 3rd legs. Movable finger of 5th leg curved, much longer than thumb (text and figure, but probably the long setae on apex have been matted together and misinterpreted as the finger).

Length of carapace about 6 mm.

Locality.—Off Table Bay, 50 fathoms, in shell of *Fusus* overgrown with *Eschara* (Studer). The type has “the paired abdominal appendages which are characteristic of the genus” (Balss, 1912).

Distribution.—Lagos, W. Africa (Balss). Recorded (♂ ♀) from the Caribbean Sea, 20 fathoms, but differing in several features from Studer’s description; these differences, however, may be due to the conflict between Studer’s text and figures (M. Edwards and Bouvier).

Pylopagurus liochele Brnrd.

Fig. 84.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 376.

Carapace as broad as long (to cervical groove), rostral point not prominent, with a tuft of setules on apex. Eye-stalks about $\frac{2}{3}$ width of carapace, base and cornea slightly dilated, ocular scales acute. Peduncle of ant. 1 slightly longer than eye-stalk (by about half the length of its last joint). Peduncle of ant. 2 very slightly longer than

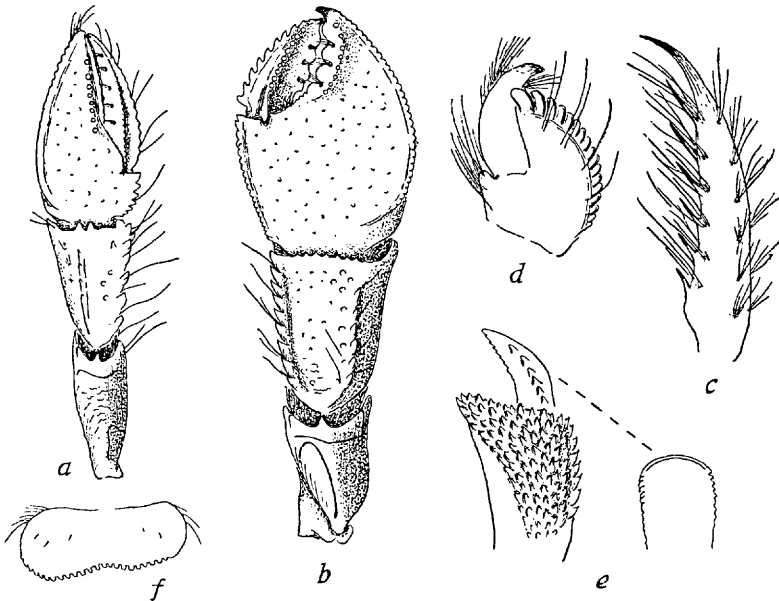


FIG. 84.—*Pylopagurus liochele* Brnrd. *a, b*, left and right chelipeds (drawn as if straightened out). *c*, dactyl of left 3rd leg. *d*, 6th and 7th joints of 4th leg, surface setae omitted. *e*, 6th and 7th joints of 5th leg, setae omitted, with inner view of 7th joint (dactyl). *f*, telson.

peduncle of ant. 1, eye-stalk reaching to about middle of last peduncular joint; acicle reaching to about basal third of last joint of peduncle of ant. 1, with strong bristles on inner margin and apex. Right cheliped: 4th joint quite smooth, a denticle at distal end of upper margin; wrist with inner and outer margins of upper surface serrate, the inner stronger than the outer, upper distal margin denticulate, a very few low granules on upper surface; hand ovate, upper surface quite smooth, with numerous shallow pits, inner and outer margins costate and crenulate (about 20 crenulations on inner margin)

but not connected across base of hand, lower surface with scattered tufts of setae, an inconspicuous row of low pearly granules bordering the cutting-edge of thumb, which bears 4 large blunt teeth distally and 3 small ones proximally; finger with serrulate margin, a strong ridge bearing a row of pearly granules on upper surface, tips of finger and thumb conspicuously corneous. Left cheliped similar to right but more slender, with more numerous bristles on wrist, the hand ovate-lanceolate, the finger without ridge or granules in middle of upper surface, cutting-edge of thumb and proximal half of finger crenulate, in distal half of finger forming a sharp ridge; tip of finger, but not of thumb, corneous. 2nd and 3rd legs strongly setose, dactyl (including the rather long unguis) equal in length to 6th joint, with 5-6 stiff corneous spines on lower margin in both 2nd legs and in left 3rd leg, and 8 in right 3rd leg. 6th joint of 4th leg with a single row of very stout, slightly imbricate, blunt spines, finger and unguis stout (fig. 84, *d*). 6th joint of 5th leg with patch of spiniform granules, the apical thumb-like process very short and broadly spooned, finger strongly spooned, with corneous margin (fig. 84, *e*). Abdomen in ♂ asymmetrical, dried and badly shrunken so that only one appendage in middle of left side can be traced; in ♀ missing. Telson much broader than long, distal margin slightly emarginate, minutely denticulate. Left uropod much larger than right.

Length of carapace ♂ 12 mm., ♀ 5 mm.; left cheliped (base of 4th joint to apex of thumb) ♂ 22 mm., ♀ 7 mm.; right cheliped ♂ 26 mm., ♀ 9 mm.

Localities.—Off Cape Seal, 37 fathoms, mud, 1 ♂ in a sponge (the original Gastropod shell having been completely covered up and absorbed); Algoa Bay, 10 fathoms, sand, shell, stones, 1 ♀ without abdomen, shell not preserved (S. Afr. Mus.).

Remarks.—This species is distinguished from all others by the pitted surface of the right chela; in other species the outer surface of the hand is granulate or tuberculate, each tubercle being mushroom-shaped. The right hand in *liochele* is further noticeable in that the costate inner and outer margins are not continuous across the base of the hand (cf. *affinis* Faxon, and *hirtimanus* Faxon). In having only a single row of spines ("rasp") on the 6th joint of the 4th leg this species resembles *discoidalis* (M. Edw.), *rosaceus* M. Edw. & Bouv., and *hirtimanus* Faxon.

Incertae sedis

The following species, represented by four specimens, is placed here between *Pylopagurus* and *Eupagurus* for the following reasons:—

The specimens might perhaps have been identified with *ungulatus* if Balss (1912) had not stated that Studer's type had the paired abdominal appendages characteristic of *Pylopagurus*. The present ♀ specimen has no paired appendages on segment 1.

Eupagurus is the only other possible genus, but here again is a conflict. The present specimens have 3 unequally biramous appendages on left side in ♂, 4 appendages on left side in ♀. They do not therefore fit into *Eupagurus* (♂ as well as ♀ with 4 appendages) or *Pagurillus* Melin, which has 3 *uniramous* appendages in ♂.

Rostral point not prominent. Eye-stalks $\frac{2}{3}$ width of carapace, base and cornea slightly enlarged, ocular scales acute. Peduncles of ant. 1 and ant. 2, and acicle of latter as in *P. liochele*. Right and left chelipeds as in *liochele* except right hand is considerably more narrowly ovate, $1\frac{1}{2}$ – $1\frac{3}{4}$ times as long as broad, with its upper surface granulate; as in *liochele* the costate and crenulate inner and outer margins not connected across base of hand. Legs as in *liochele*; rasp on 4th leg uniseriate. Abdominal appendages: 3 biramous in ♂ on 2nd, 3rd, and 5th segments on left side, one ramus about $\frac{1}{3}$ the length of the other on the foremost appendage, but scarcely $\frac{1}{4}$ on the hindmost appendage; in ♀ 4 appendages on left side, the hindmost one uniramous, the other 3 biramous. Telson apically notched and denticulate; left uropod much larger than the right.

Length of carapace ♂ 9 mm., ♀ 5 mm.; right cheliped (base of 2nd joint to apex) ♂ 15 mm., ♀ 8.5 mm. Colour (taken from the Port Elizabeth specimen in formalin, and the Simonstown one collected alive by myself): eye-stalks sienna at base, distal half cobalt, with narrow dark sienna ring immediately next the black cornea; 4th joint of right and left chelipeds with a cobalt band bordered with sienna, and distal margin dark sienna; granules on upper surface of hands white on a pale sienna ground, sienna longitudinal stripes on thumb and finger; basal half of 4th joint of 2nd and 3rd legs sienna, distal half pale, longitudinal sienna stripes on 5th and 7th joints and on upper basal half of 6th joint, distal half of 6th joint yellowish, passing into cobalt apically.

Localities.—False Bay, 1 ♂ in the sponge *Suberites*, and Simonstown, littoral, 1 ♂ (S. Afr. Mus.); Jeffreys Bay, littoral, 1 ♂, and Port Elizabeth, littoral, 1 ovig. ♀ (Professor T. A. Stephenson, 1936).

Remarks.—Until more collecting of the smaller littoral and shallow-water Hermit-crabs has been carried out along the South African coast, I think it best to leave this species without a name. When alive it ought to be easily identifiable by the cobalt bands on the

chelipeds, and by the sculpturing of the hands of the chelipeds in preserved material.

Gen. *EUPAGURUS* Brandt

1910. Stebbing, *l. c.*, p. 356.

1912. Balss, D. *Tiefsee Exp.*, xx, p. 106.

1924. Stebbing, *Ann. S. Afr. Mus.*, xix, p. 7.

1939. Melin, K. *Sv. Vet. Ak. Handl.*, xviii, no. 2, pp. 20, 29 (*sensu lato*).

Rostrum distinct or obsolescent. Eye-stalks stout or slender, ocular scales separate, simple, acute. Chelipeds unequal, the right vastly the larger (very rarely subequal, but not in any South African species), fingers opening in a more or less horizontal plane, tips of fingers and thumbs calcareous or minutely corneous. Telson lop-sided to the left. Abdominal appendages unequally biramous, on left side only on segments 2-5 in both sexes. Vas deferens not protruding.

Remarks.—The largest of all the genera of Hermit-crabs; shallow to moderately deep water; cosmopolitan. Formerly thought (Alcock, 1905) to be absent from the African coast except the Mediterranean and northwest coast as far as Senegal, but species have since been recorded from as far south as Gt. Fish Bay on the west coast, and from the Agulhas Bank, Natal, and Somaliland. Between Gt. Fish Bay and Cape Point, however, none have as yet been reported.

A few small specimens, collected at Simonstown, Hermanus, Jeffreys Bay and Algoa Bay, have been submitted to me by Professor T. A. Stephenson, but the material is not good enough for a thorough examination.

Three species recorded by Odhner (1923) from Port Alexander are omitted from the key owing to lack of material and literature.

Key to the South African Species.

- I. Eye-stalks equal to or greater than anterior width of carapace. Legs striped *zebra*.
- II. Eye-stalks less than anterior width of carapace.
 - A. Cornea not dilated. Hands of the two chelipeds fitting together to form an operculum. Hand and finger of right chela bluntly oval. Dactyls of 2nd and 3rd legs subequal to the 6th joints *alcocki*.
 - B. Cornea dilated. Hands of the two chelipeds not fitting together. Hand of right chela oblong, twice as long as wide. Dactyls of 2nd and 3rd legs longer than the 6th joints.

1. Eye-stalks stout, scarcely exceeding half anterior width of carapace, and not extending to end of peduncle of ant. 2. Cornea strongly dilated.
 - a. Rasp * of 4th leg multiseriate *spinulentus*.
 - b. Rasp of 4th leg uniseriate *deprofundis*.
2. Eye-stalks slender, about $\frac{3}{4}$ anterior width of carapace, extending to end of peduncle of ant. 2. Cornea moderately dilated. Finger of left chela curved, a gap between it and thumb *placens*.

Eupagurus zebra Hend.

1912. Balss, *l. c.*, p. 106.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 259.

Rostral point acute. Eye-stalks slender, as long as (or slightly longer than) anterior width of carapace, cornea very little dilated. Hand of right cheliped increasing in width distally, but greatest width less than its length, lower border subcarinate, beaded, outer surface more or less granulate, inner surface (according to Alcock) with a strong diagonal ridge, finger very broad at base, free edge carinate; cutting-edge of both finger and thumb without strong teeth. Left cheliped very slender.

In a variety (from the Andaman Is.) the whole outer surface of wrist and hand of right cheliped is finely granular; upper surface of wrist and hand of left cheliped with granules and spinules tending to form longitudinal series.

Length of carapace 8 mm. (Alcock); 21 mm. (Stebbing). Yellowish, with blood-red stripes on 2nd and 3rd legs and left cheliped, inner and upper surfaces of 4th joint and upper surface of wrist of right cheliped, upper surface of peduncle of antenna 2, and on sides of carapace anteriorly.

Localities.—Agulhas Bank, 102 metres (Balss); off East London, 32 fathoms (Stebbing).

Distribution.—N.W. Australia, Ceylon, Andaman Is., Persian Gulf.

Remarks.—Balss referred a single ♂ specimen (size not given) to the Andaman variety, remarking that no red stripes were visible.

Stebbing considered the South African specimens might prove specifically different from *zebra* (he suggested the name *parazebra*), but beyond pointing out that Alcock's description did not agree in one

* The tuberculate pad on 6th joint used as a hold-fast.

respect with Henderson's, and that there was a conflict between Alcock's text and figure, he did not say how the South African specimens differed from the typical form except in size. The specimens returned to the South African Museum with Stebbing's autographic label do not belong even to the genus *Eupagurus*, so that a re-examination is impossible. The real specimens may be in the British Museum.

Eupagurus alcocki Balss

1911. Balss, Zool. Anz., xxxviii, p. 6.

1912. *Id.*, l. c., p. 108, pl. 8, fig. 4, pl. 9, fig. 3, and text-figs. 17-21 (*pollicaris* var. *alcocki*).

1923. Odhner, Medd. Göteb. Mus., xxi, p. 12, fig. (right cheliped).

Rostral point obtuse. Eye-stalks shorter than anterior width of carapace, cornea not dilated. Outer surfaces of wrist and hand of both chelipeds granulate, but the inner surfaces smooth, flattened and fitting closely together; hand and finger of right chela bluntly oval in outline, forming an operculum, the free edge of the broadly subtriangular finger coarsely denticulate. 2nd and 3rd legs thinly setose, dactyls subequal to the 6th joints.

Length of carapace up to 10 mm.

Locality.—Gt. Fish Bay, Angola (Balss); Port Alexander, Angola, 72-108 metres (Odhner).

Distribution.—Congo River mouth, 44 metres (Balss).

Remarks.—Odhner supports Balss' original opinion that *alcocki* should be given specific rank, and details the points of difference between it and *pollicaris* (Say). The latter is found on the east coast of N. America.

Eupagurus spinulentus Hend.

Fig. 85, a-d.

1910. Stebbing, l. c., p. 356 (*tristanensis*, non Henderson).

1920. *Id.*, Ann. S. Afr. Mus., xvii, p. 260.

Frontal margin of carapace evenly curved, without median rostral point. Eye-stalks stout, scarcely exceeding half the anterior width of carapace, cornea strongly dilated. Chelipeds with granules and spiniform conical tubercles. Right cheliped: distal width of 4th joint $1\frac{1}{2}$ times its length, which is equal to length of hand to finger-hinge,

and also to distal width of wrist, the latter with a more or less double row of strong tubercles down the middle and a row of stronger ones on inner margin, hand oblong, twice as long as wide, outer and inner margins spinose-tuberculose, at base a short continuation of the middle ridge of wrist, finger and thumb with robust but unequal teeth. Left cheliped similar, distal width of 4th joint $1\frac{1}{2}$ times its length, which is about $\frac{2}{3}$ total length of hand, the middle and inner ridges on wrist more strongly spinose-tuberculose, and the middle ridge on hand more marked, cutting-edges of finger and thumb corneous, continuous on finger, but on thumb interrupted at nearly equal intervals by little upstanding conical denticles. 2nd and 3rd legs granulate and spinose-tuberculose, dactyls longer than the 6th joints (nearly equal to 5th plus 6th), slender, evenly tapering, outer margin finely serrulate, lower margin sparsely setose. Rasp of 4th leg multiseriate. Telson longer than broad, postero-lateral margin spinose on either side of a slight median emargination.

Length of carapace up to 14 mm.

Localities.—Natal coast, 27–92 fathoms (Stebbing); Mossel Bay and Natal coast, 27–36 fathoms (not north of Tugela River mouth) (S. Afr. Mus.).

Remarks.—At the time Stebbing identified a small specimen (carapace 4.3 mm., left chela 6.3 mm.) from the Natal coast with the Tristan d'Acunha species *tristanensis* he had not seen the larger specimens, also from the Natal coast. On comparing the specimens I find that the former is merely a juvenile of the latter.

For identifying the South African form with the Philippine *spinulenus* there seems to be considerable justification. The presence of the two spines on upper distal margin of 4th joint of left cheliped may be mentioned as an additional reason. But the granules on outer surface of hand are much smaller and much more numerous, without any tendency to alignment, except near the base, where some larger ones are aggregated on a low short ridge; nor is there a naked groove near the inner margin. A direct comparison with the type would probably show that the South African form is worthy of specific rank.

All the shells which have been preserved with the crabs (*Melapium*, *Natica*, *Tonna*) have a single sea-anemone surrounding the aperture; the crown of the sea-anemone is situated over the inner lip or columella of the shell, so that when the crab is walking about, the sea-anemone would be underneath, with the crab's maxillipeds immediately above it. Some of the shells are covered above with *Balanus amphitrite* Darwin.

Eupagurus placens Stebb.

Fig. 85, e.

? 1923. Odhner, Medd. Göteborg. Mus., xxxi, p. 25 (? *cuanensis*, non Thompson, the St. Sebastian Bay specimens).

1924. Stebbing, *l. c.*, p. 7, pl. 4 (Crust, pl. 119).

Rostral point minutely tridentate. Eye-stalks moderately slender, about $\frac{3}{4}$ width of carapace, and extending very nearly to end of peduncle of ant. 2, cornea moderately dilated. Chelipeds with thick shaggy filamentous setae on hand and wrist, especially the former, more or less concealing the spiniform conical tubercles, and the junction of finger and thumb. Right cheliped: 4th joint with a small denticle in middle of distal upper margin, wrist as long as hand as far as finger-hinge, its distal width $\frac{4}{5}$ its length, inner margin with 6 strong spine-tubercles, a more or less distinct row in middle of upper surface, and a few scattered ones, outer margin not defined, hand oblong, about twice as long as wide, strong spine-tubercles along inner and outer margins, especially strong on outer margin of thumb, a row in middle of upper surface, and a few smaller scattered ones; lower surface of hand and wrist smooth, sparsely setose, finger equal to inner margin of hand, free edge serrate, a submarginal row of conical tubercles. Left cheliped similar but more slender, hand slightly more than twice as long as wide, no denticle on 4th joint, finger twice as long as inner margin of hand, without serrations and tubercles, curved, cutting-edges of finger and thumb not meeting, that of finger as in *spinulentus*, that of thumb with a series of close-set conical denticles; tips of fingers and thumbs of both chelipeds minutely corneous. 2nd and 3rd legs rather thickly covered with shaggy setae, especially on distal joints, dactyls longer than 6th joints, upper margin of 5th joint of 2nd leg (right and left) with 5-6 slender spines, lower margin of dactyls smooth. Rasp of 4th leg multiseriate. Telson broader than long, postero-lateral margin spinose on either side of a slight median emargination.

Length of carapace up to 16 mm., left cheliped 20 mm., right 30 mm.

Localities.—Mossel Bay, 19 fathoms (Stebbing); False Bay, 32 fathoms, and off Cape St. Blaize, 55 fathoms (S. Afr. Mus.); Knysna channel (Univ. Cape Town Ecol. Surv., 1947).

Remarks.—Although the type of *placens* was not returned by Stebbing, two other specimens are available, one of them from off Cape St. Blaize, near the type locality. Both of these had previously

been compared by myself with the specimen sent to Stebbing, registered as conspecific, and retained in case of loss in transit of the specimen sent overseas.

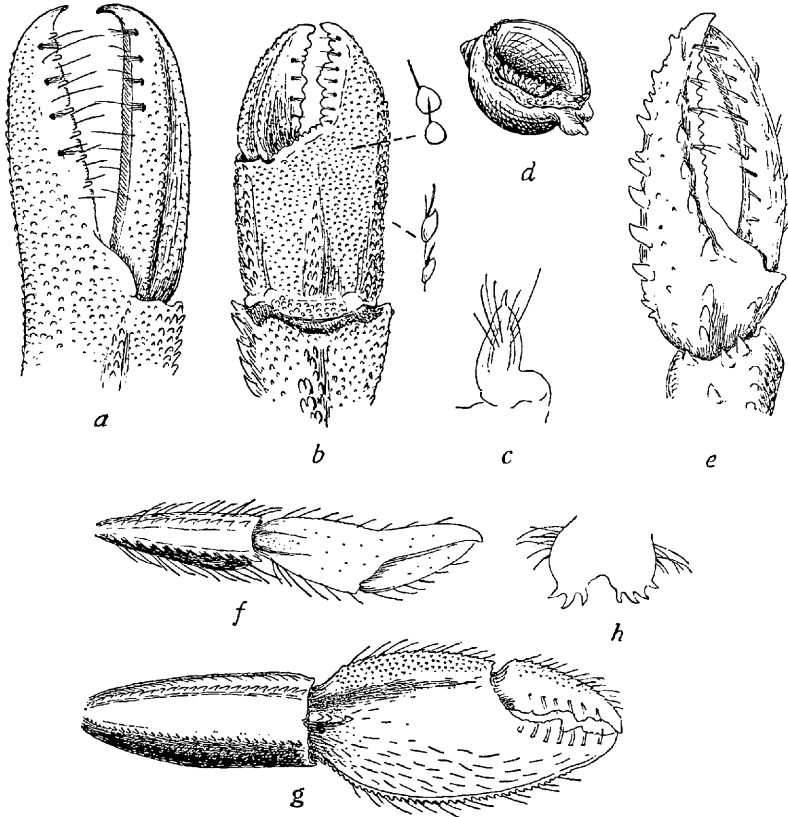


FIG. 85.—*Eupagurus spinulentus* Hend. *a, b*, apices of left and right chelae, with setiferous denticles on latter further enlarged, and in side view. *c*, right ocular scale. *d*, shell (*Melapium*) with sea-anemone encircling aperture, crab removed.

Eupagurus placens Stebb. *e*, hand of left chela, shaggy setae omitted.

Anapagurus hendersoni Brnrd. *f, g*, wrists and hands of left and right chelae. *h*, telson.

Stebbing's figure shows the eye-stalks as too robust, and in the 4th leg the rasp seems to have been omitted so that the leg appears simple (as in *Paguristes*) instead of subchelate. Whether the rasp was multiseriate was not stated, but in his description of the following species (*deprofundis*) Stebbing said that the 4th legs were alike in the

two species, and his figure of that of the latter seems to show a uniseriate rasp. The type, if extant (? in British Museum), should be re-examined. A figure of the left chela denuded of its shaggy covering is given here to show the characteristic gap between finger and thumb.

The "house" of the Cape St. Blaize specimen is a compound Ascidian, in shape like a conical cap. The wide, open aperture measures about 30 mm. in width, 20 mm. in height, and the depth of the cap is about 13-14 mm. The crab seems to have lived sideways in this cap, leaving the cheliped and legs of the left side more or less exposed.

I am inclined to suspect that Odhner's specimens from St. Sebastian Bay should be assigned to this species and not to *cuanensis*.

Eupagurus deprofundis Stebb.

1924. Stebbing, *l. c.*, p. 9, pl. 5 (Crust., pl. 120).

According to the figures: rostral point entire, subacute; eye-stalks rather short, robust, reaching not more than half-way along last peduncular joint of ant. 2, cornea strongly dilated; right cheliped similar to that of *placens*; rasp of 4th leg uniseriate.

Length of carapace 14 mm.

Locality.—Off Cape Morgan, 250-320 fathoms (Stebbing).

Remarks.—The type and only specimen of this species was not returned to the South African Museum, and I am unable to add anything to Stebbing's description and figures. The specimen may perhaps be in the British Museum.

Eupagurus variabilis M. Edw. & Bouv.

1892. Milne Edwards and Bouvier, *Ann. Sci. Nat.* (7), xiii, p. 217.

1899. *Id.*, *Res. Sci. Camp. Monaco*, fasc. xiii, p. 67.

1900. *Id.*, *Crust. Trav. and Talisman*, p. 230, pl. 26, figs. 4-12.

1922. Bouvier, *Res. Sci. Camp. Monaco*, fasc. lxii, p. 33.

1923. Odhner, *Medd. Göteb. Mus.*, xxxi, p. 10.

Locality.—Port Alexander, Angola, 72-108 metres (Odhner).

Distribution.—Norway to Senegal, Mediterranean.

Eupagurus triangularis Chevr. & Bouv.

1892. Chevreux and Bouvier, *Mem. Soc. zool. Fr.*, v, p. 93, pl. 2, figs. 9-15.

1900. Milne Edwards and Bouvier, *Crust. Trav. and Talisman*, p. 239.

1923. Odhner, *l. c.*, p. 12.

Locality.—Port Alexander, Angola, 12–15 metres (Odhner).

Distribution.—Senegal and Cape Verde Islands.

Eupagurus cuanensis (Thompson)

1843. Thompson, Rep. Brit. Assoc. Adv. Sci., p. 267 (sine descr.).

1853. Bell, Stalk-eyed Crust. Brit., p. 178, fig.

1886. Henderson, Proc. Roy. Phys. Soc. Edin., ix, p. 72.

1900. Milne Edwards and Bouvier, Crust. Trav. and Talisman, p. 227, pl. 28, figs. 19, 20.

1922. Bouvier, Res. Sci. Camp. Monaco, fasc. lxii, p. 32.

1923. Odhner, *l. c.*, p. 10, and ? p. 25.

Localities.—Port Alexander, Angola, 72 metres (Odhner); St. Sebastian Bay, 72 metres (Odhner).

Distribution.—Norway to Canaries, Mediterranean.

Remarks.—As mentioned above, I rather suspect that the St. Sebastian Bay specimens should be identified as *placens*.

Gen. ANAPAGURUS Hend.

1910. Stebbing, *l. c.*, p. 358.

Differs from *Eupagurus* in that the left vas deferens protrudes as a curved membranous organ from the base of 5th leg.

Remarks.—As pointed out below, the ♀ of the South African species is distinguishable at once from the species of *Eupagurus* by its specific characters.

Anapagurus hendersoni Brnrd.

Fig. 85, *f-h*.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 74 (Cape specimen referred with doubt to *pusillus*).

1910. Stebbing, *l. c.*, p. 358 (*pusillus*, non Henderson).

1912. Balss, D. Tiefsee Exp., xx, p. 110 (*pusillus*, non Henderson).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 377.

Frontal margin of carapace evenly curved, without median rostral point. Eye-stalks short, rather robust, about half anterior width of carapace, extending nearly to apex of peduncle of ant. 2, cornea strongly dilated. Chelipeds finely and evenly setose, the hand less so than the wrist; outer and inner lower margins of 4th joint, and outer and inner upper margins of wrist each with a row of numerous close-set

spiniform tubercles. Right cheliped: wrist twice as long as wide, its length extending to half-way along thumb, upper surface of hand smooth except for a band of fine granules along inner margin, a very short tubercular ridge in middle at base, and a costate-serrulate outer margin, nearly glabrous; finger minutely serrulate on free margin, upper surface convex but scarcely carinate; lower surface of wrist and hand finely granulate and setose laterally. Left cheliped very slender, wrist $2\frac{1}{2}$ times as long as wide, its length extending half-way along thumb, hand almost entirely smooth and glabrous, a very feeble and minutely serrulate outer margin proximally, and a few minute granules on the slight middle ridge basally, thumb slightly deflexed, cutting-edges of finger and thumb meeting, that of finger as in *E. spinulentus*, that of thumb very feebly crenulate. 2nd and 3rd legs moderately setose, upper margins of 4th and 5th joints with very feeble serrations, caused by the insertions of tufts of setules, dactyls very slender, longer than 6th joints, and slightly longer on right than on left side, upper margins setose, lower margins smooth. Rasp of 4th leg uniseriate, the spines apically acute. Telson about as broad as long, rather deeply incised, 3-4 large spinous projections on each lobe.

Length of carapace up to 7 mm., left cheliped 14 mm., right 16-17 mm. Carapace anteriorly pale pinkish, 4th joints of chelipeds and legs with pale brownish transverse markings, 6th joints of legs violaceous, eyes black, ova scarlet (K. H. B.).

Localities.—Simon's Bay, 18 fathoms (Henderson); St. Francis Bay (Balss); Table Bay, False Bay, Algoa Bay, 10 fathoms, off East London, 45 and 400 fathoms, off Umhloti River mouth, Natal, 100 fathoms, and off Cape Natal, 54 fathoms (S. Afr. Mus.).

Remarks.—Henderson referred a Cape specimen with some hesitation to his *pusillus* from the Azores and Canaries, pointing out certain differences. In addition to these differences, the present specimens show others which Henderson apparently overlooked. The 4th joint of the right cheliped has many more spines on its outer lower margin (*pusillus* 3, *hendersoni* 10-15), the wrist of right cheliped is longer relatively to the hand. The eye-stalk in *pusillus* is said to extend to the end of the penultimate peduncular joints of both antennae, but Henderson's figure is in conflict with this statement as regards antenna 2. (In his figure of the left cheliped, the finger and thumb are transposed; ? mirror-picture due to printing.)

In both sexes this species is at once distinguished from all the South African species of *Eupagurus* by the slender left cheliped, with its long

biseriably spinose wrist, and by the hand of the right cheliped. The projecting vas deferens on the left side extends to about the middle of the 4th joint of the 5th leg, and is almost as wide as this joint. Distally the convex margin is cultrate, and the apex is acute. In one specimen several oval spermatophores are visible through the integument, but the actual orifice cannot be traced. An external prolongation of the vas deferens is said* to transfer the spermatophores to the penis proper (modified 1st pair of pleopods), but where such is not present, as in the present genus, the vas deferens is probably applied direct, if not inserted into, the female orifice on the 3rd legs.

Ortmann (1891-92, Zool. Jahrb. Abt. Syst., vi, p. 296, pl. 12, fig. 11) has described *pusillus* var. *japonicus*. I have not seen the paper.

Gen. NEMATOPAGURUS M. Edw. & Bouv.

1905. Alcock, Cat. Crust. Ind. Mus., ii, pp. 108, 174.

Anterior margin of carapace without median rostral point. Eye-stalks stout, ocular scales small, separate. Chelipeds nearly alike in form, sculpture, and length, but the right more bulky than left; finger moving horizontally, tips of fingers and thumbs corneous. Telson lop-sided to the left. Abdominal appendages: on left side on segments 3-5 in ♂, in ♀ a pair of modified appendages on 1st segment, and appendages on left side on segments 2-5. Vas deferens protruding on left side as a short conical tube or papilla, on right side as a long tube ending in a long filament.

Nematopagurus longicornis M. Edw. & Bouv.

1892. Milne Edwards and Bouvier, Ann. Sci. Nat. (7), xiii, p. 210.

1899. *Id.*, Res. Sci. Camp. Monaco, fasc. xiii, p. 60.

1900. *Id.*, Crust. Trav. and Talisman, p. 201, pl. 24, figs. 10-16.

1922. Bouvier, Res. Sci. Camp. Monaco, lxii, p. 26.

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 9.

Locality.—Port Alexander, Angola, 72 metres (Odhner).

Distribution.—Spain to the Azores and Cape Verdes, Mediterranean, 75-800 metres.

Gen. CATAPAGUROIDES M. Edw. & Bouv.

1905. Alcock, *l. c.*, p. 185.

1922. Bouvier, Res. Sci. Camp. Monaco, lxii, p. 26.

* Balss in Kükenthal, Handb. Zool., iii, 1926-27, p. 903.

Similar to *Nematopagurus*, but the right vas deferens sabre-shaped and curving under the abdomen from right to left; and ♀ without appendages on 1st abdominal segment.

Catapaguroides timidus (Roux)

1900. Milne Edwards and Bouvier, *l. c.*

1905. Alcock, *l. c.*, p. 184 (*Eupagurus t.*) (references only).

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 9 (variety).

Odhner's variety lacks the tooth-like process on lower outer surface of wrist of right cheliped.

Locality.—Port Alexander, Angola, 72 metres (Odhner).

Distribution.—Eastern Atlantic, Mediterranean, Canaries.

FAMILY COENOBITIDAE.

1910. Stebbing, *l. c.*, p. 359.

Like *Paguridae*, but the peduncle of 1st antenna is very long, and both its flagella end bluntly.

Remarks.—This family contains the genera *Birgus* (the Robber-crab) and *Coenobita*. These Hermit-crabs are terrestrial, but resort to the sea for spawning. The eggs hatch as normal Zoeas (with rounded postero-lateral angles of carapace.)

Gen. COENOBITA Latr.

1901. Borradaile, F. Geogr. Mald. Laccad. Archip., i, p. 69 (structure and habits.)

1904. Seurat, Bull. Mus. Hist. Nat. Paris, no. 5, p. 238 (habits).

1910. Stebbing, *l. c.*, p. 359.

1938. Yap-Chiongco, Philipp. J. Sci., lxvi, p. 209.

Carapace well calcified, elongate, anteriorly compressed from side to side. Rostrum obsolete. Eye-stalks more or less compressed, ocular scales close together. Peduncle of antenna 1 very long, larger flagellum compressed, with blunt apex. Peduncle of antenna 2 compressed, acicle small, often fused with 2nd joint, flagellum elongate. Left cheliped much more robust than right, fingers moving vertically. 4th leg subchelate, the 6th joint very broad, finger minute. Basal joints of 5th leg (with genital openings in ♂) more or less produced, sometimes unequally, and more so in ♂ than in ♀. Abdominal appendages on left side on segments 2-4 in ♀, rudimentary in ♂.

Key to the South African Species.

Ocular scales narrow, acuminate. Antennal acicle fused with 2nd joint. A brush of hairs on inner upper surface of hand of both chelae.

1. A stridulating rasp on upper outer surface of hand of left chela *rugosus*.
2. No stridulating organ on hand *cavipes*.

Coenobita rugosus M. Edw.

Fig. 86.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 824.
 1910. Stebbing, *l. c.*, p. 360.
 1912. Balss, D. Tiefsee Exp., xx, p. 111.
 1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 162 (also p. 163, *perlatus*).
 1938. Yap-Chiongco, *l. c.*, p. 210, pl. 2, fig. 7 (not good), and p. 211, pl. 2, fig. 3 (not good) (*perlata*).

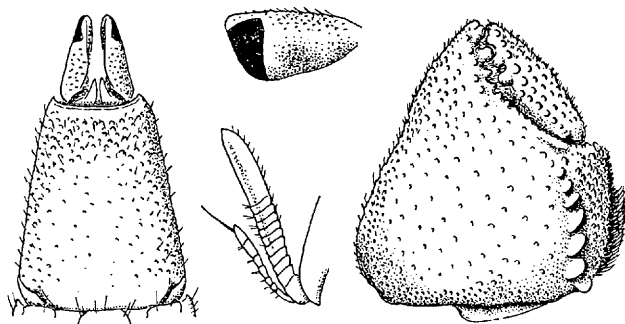


FIG. 86.—*Coenobita rugosus* M. Edw. Anterior part of carapace, with eyes; outer side view of eye; flagella of 1st antenna; left chela, showing stridulating tubercles.

Eye-stalks compressed, reaching beyond middle of last peduncular joint of ant. 2. On upper part of outer surface of hand of left chela a series of oblique laminar tubercles forming a stridulating organ. A strong longitudinal ridge on middle of inner surface of hand of left chela below the brush of hairs. Outer surface of 6th joint and dactyl of 3rd left leg flattened and separated from the upper surface by a distinct ridge or crest. On lower inner surface of dactyl of 2nd and 3rd left legs a longitudinal ridge of close-set and regular tubercles,

which can be rubbed against the rasp on hand of chela. Basal joints of 5th leg produced, more so in ♂ than in ♀, and in ♂ more so on right than on left side.

Length of carapace up to 30 mm. Pale creamy or pinkish, usually a dark brownish or reddish patch on outside of hand of left chela.

Localities.—Natal (Krauss); Ibo and Mozambique (Hilgendorf); Scottburgh, Natal (coll. K. H. B.); Delagoa Bay (coll. van der Horst).

Distribution.—East coast of Africa, Red Sea, Indo-Pacific to west coast of America.

Coenobita cavipes Stimpson

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 825 (*violascens* Heller).

1912. Balss, D. Tiefsee Exp., xx, p. 112.

1917. Stebbing, Ann. Durban Mus., ii, p. 24.

1938. Yap-Chiongeo, *l. c.*, p. 212, pl. 1, fig. 12 (not good).

Eye-stalks compressed, not reaching middle of last peduncular joint of ant. 2. No stridulating tubercles on hand of left chela; but lower inner surface of dactyl of 2nd and 3rd left legs with a fine ridge, whose edge is corneous. Outer surface of 6th joint of 3rd left leg nearly flat, but not separated from upper surface by a crest except quite at its distal end. Basal joints of 5th leg slightly more prominently produced in ♂ than in ♀, and in both sexes more so on the left than on the right side.

Length of carapace up to 39 mm. Coloration as in *rugosus*.

Localities.—Mozambique (Hilgendorf); Durban (Stebbing); Kosi Bay (Univ. Cape Town. Ecol. Surv., 1949); Delagoa Bay (Lourenzo Marques Mus.).

Distribution.—East coast of Africa to East Indies and Liu Kiu Islands.

GALATHEIDEA.

1910. Stebbing, *l. c.*, p. 360.

1924. Gurney, "Terra Nova" Rep. zool., viii, p. 174 (larval stages).

Carapace more or less depressed, regions well- or ill-defined. Eye-stalks short and stout. First 4 pairs of legs well developed; the 1st pair (chelipeds) stout and flattened or elongate and slender; the 5th pair slender, feeble, and bent up against carapace. Abdomen symmetrical, folded under thorax (crab-like) or folded on itself and not closely adpressed to thorax. Uropods and telson forming a tail-fan. Pleopod 2 in ♂ well developed, but pleopod 1 either well developed, or rudimentary, or absent.

Key to the Families.

1. Front without prominent acute rostrum (figs. 87-90).
Abdomen folded under thorax, crab-like. Ant. 1 concealed. Peduncle of ant. 2 directed backwards. 3rd joint of 3rd mxp. broad (fig. 90, c) *Porcellanidae.*
2. Front with a prominent acute rostrum (except *Hapaloptyx*) (figs. 91, i, 92). Abdomen folded upon itself, not adpressed to thorax. Ant. 1 exposed. Peduncle of ant. 2 directed forwards. 3rd joint of 3rd mxp. narrow (fig. 91, j).
 - a. Telson not folded beneath preceding abdominal segment. Cutting-edge of mandible entire *Galatheidæ.*
 - b. Telson transversely fissured, and folded beneath preceding abdominal segment. Cutting-edge of mandible serrate (except *Hapaloptyx*) *Uroptychidæ.*

FAMILY PORCELLANIDÆ.

Porcelain Crabs.

1910. Stebbing, *l. c.*, p. 360.
1924. Gurney, *l. c.*, p. 176 (larval stages).
1927. Hale, *Crust. S. Austral.*, pt. i, p. 81.

Carapace with ill-defined regions, frontal margin more or less triangularly produced but never with acute rostrum. Abdomen symmetrical, bent under and closely adpressed to thorax. Tail-fan large. 1st antennae concealed. Peduncle of ant. 2 directed backwards. Chelipeds usually large, especially in ♂, more or less flattened. Mxp. 3 large, 3rd joint broad, 4th with internal lobe, distal joints with conspicuous fringe of long plumose setae, used in sweeping food into the mouth.

Remarks.—Although crab-like in appearance, the small posterior (5th) pair of legs at once distinguishes the Porcelain Crabs from the true Crabs. The external (3rd) maxillipeds with their long fringe of setae are also characteristic.

The enlarged 1st peduncular joint of 1st antennae appears to provide useful specific characters. But the 1st pleopods exhibit little or no specific difference (*cf.* Miyake, *Annot. Zool. Jap.*, xvi, 1937).

Key to the South African Genera.

- I. A portion of hinder part of epimeral region (side-wall) of carapace separated from the rest by a membranous suture (fig. 87, b). Wrist of chelipeds short and broad. *Pachycheles.*

II. No portion of the epimeral region separated by a membranous suture.

A. Walking legs ending in a single claw (fig. 87, *e*).

1. 1st joint of ant. 2 produced (fig. 88, *c*, *g*).

Frontal margin dentate *Porcellana*.

2. 1st joint of ant. 2 very short, not produced (fig. 89, *c*, *g*). Frontal margin triangularly produced, undulate but not dentate

Petrolisthes.

B. Walking legs ending in two claws (fig. 90, *d*).

1. Carapace transversely ovoid *Polyonyx*.

2. Carapace longer than broad *Porcellanella*.

See Addenda.

Gen. PACHYCHELES Stimpson

1894. Ortmann, Semon's Austral. Reise, v, p. 28 (key to species).

1910. Stebbing, *l. c.*, p. 361.

1939. Melin, K. Sv. Vet. Ak. Handl., xviii, no. 2, p. 114.

Frontal margin not very prominent, broadly triangular, subacute, not dentate. 1st joint of ant. 2 enlarged, excluding the following (movable) joints from the orbit, but not produced forwards. Chelipeds thick and robust, wrist very short and broad. Legs ending in a single claw. A squarish portion of the hinder part of the epimeral region of carapace separated from the rest by a membranous suture.

Pachycheles natalensis (Krauss)

Fig. 87.

1843. Krauss, Südafrik. Crust., p. 58, pl. 4, fig. 1, *a-c* (*Porcellana n.*).

1910. Stebbing, *l. c.*, p. 362.

Carapace a little broader than long. Frontal margin obtusely triangular; lateral margins entire, with 4-5 costae in hinder part. 4th joint of cheliped with one short blunt tooth, wrist about as broad as long, inner margin with 3 blunt teeth; hand granulate, with 2 feeble, granulate, longitudinal ridges. 1st joint of ant. 1 triquetral in cross-section, ventral surface flat. Lower front margin of basal joint of ant. 2 entire.

Length of carapace 6 mm., breadth 7 mm. "Mottled greenish blue and reddish" (Krauss); mottled salmon-pink, chelipeds reddish, or creamy-white with crimson chelipeds.

Localities.—Natal (Krauss); Umhlali (N. of Durban) and Impengazi (N. of St. Lucia Bay) (coll. T. A. Stephenson); St. Lucia Bay, Zululand (S. Afr. Mus.).

Remarks.—Since Krauss' time no one had collected this species in Natal until Professor Stephenson's survey party in 1938. Paulson recorded it from the Red Sea. Ortmann (1894) collected a ♀ at Dar-es-Salaam which he said agreed with Krauss' description, and also with *sculptus* M. Edw. If identical with the latter, the distribution extends to the East Indies, Liu Kiu Islands, and Australia. Without material for comparison I am unable to express any opinion on the

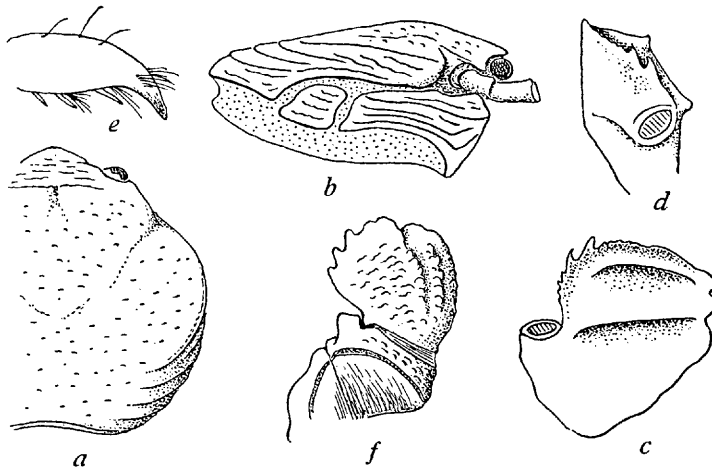


FIG. 87.—*Pachycheles natalensis* (Krauss). *a*, carapace. *b*, side view of carapace showing membranous areas (lightly dotted). *c*, ventral view of 1st joint of left 1st antenna. *d*, side view (from median line) of same. *e*, dactyl of walking leg. *f*, 3rd-5th joints of smaller cheliped.

identity or otherwise of this species with *sculptus*. Melin (1939) describes a closely allied species, *fronto*, from the Bonin Is.

Gen. PORCELLANA Lam.

1910. Stebbing, *l. c.*, p. 361.

Frontal margin prominent, dentate. 1st joint of ant. 1 enlarged, thick, triquetral in cross-section, its apex more or less truncate, and variously ornamented. 1st joint of ant. 2 enlarged and produced forwards, forming the lower border of orbit. Chelipeds moderately flattened, 4th joint rather short, often with a projecting lobe on inner margin at base; the two chelipeds usually unequal in size in ♂; finger and thumb often contorted. Legs ending in a single claw.

Key to the South African Species.

1. Median tooth of frontal margin broadly triangular, its length half its basal width. Basal joint of ant. 2 serrate. Lobe of 4th joint of cheliped squarely truncate . . . *streptocheles*.
2. Median tooth of frontal margin narrower, its length subequal to its basal width. Basal joint of ant. 2 entire. Lobe of 4th joint of cheliped rounded . . . *dehaanii*.

Porcellana streptocheles Stimpson*Cape Porcelain Crab.*Fig. 88, *a-d*.

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 243.
 1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 110.
 1902. Stebbing, Mar. Invest. S. Afr., ii, p. 28 (False Bay: *dehaanii*, non Krauss).
 1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 191, pl. 23, fig. 1.
 1910. Stebbing, *l. c.*, p. 361 (False Bay: *dehaanii*, non Krauss).
 1913. Doflein and Balss, D. Tiefsee Exp., xx, p. 162 (*dehaanii*, non Krauss).
 1913. Balss, Schultze Reise, v, p. 109 (*dehaanii*, non Krauss).
 1914. Strunck in Lenz and Strunck, D. Südpol. Exp., xv, p. 286 (*dehaanii*, non Krauss).
 1923. Odhner, Medd. Göteb. Mus., xxxi, p. 25 (*dehaanii*, non Krauss).
 1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 377.
- Median frontal tooth broadly triangular, half as long as its basal width, when viewed obliquely from behind appearing almost tridentate owing to the apex being somewhat abruptly depressed; margin of median tooth and outer margin of lateral teeth minutely crenulate or denticulate, more so in ♀ and juv. than in ♂; margin of carapace above peduncle of ant. 2 entire in ♂, but sometimes with indications of 2 feeble denticles, in ♀ with 2 denticles; lateral margin with 4 (or 5) small denticles, the hindmost but one slightly larger than the others. Surface of carapace with very shallow grooves, and very feebly rugulose-scabrous; 2 conspicuous tufts of setae on gastric region, and usually a tuft at apex of the groove on median frontal tooth; otherwise smooth in ♂, but in ♀ and juv. with a few tufts and scattered setae on the other regions. 1st peduncular joint of ant. 1

with a few not very prominent denticles. Basal peduncular joint of ant. 2 with about 4 rather strong denticles. Inner (front) margin of 3rd joint of chelipeds more or less crenulate; inner apex of 4th joint produced as a prominent lobe, apically squarely truncate; inner margin of 5th joint in ♂ with 2 very shallow emarginations and 2 very feeble points or almost straight; in ♀ and juv. with 2 more or less conspicuous denticles; outer margin of 5th joint with feeble indications of 1-3 denticles; upper surface of wrist and hand in ♂ smooth,

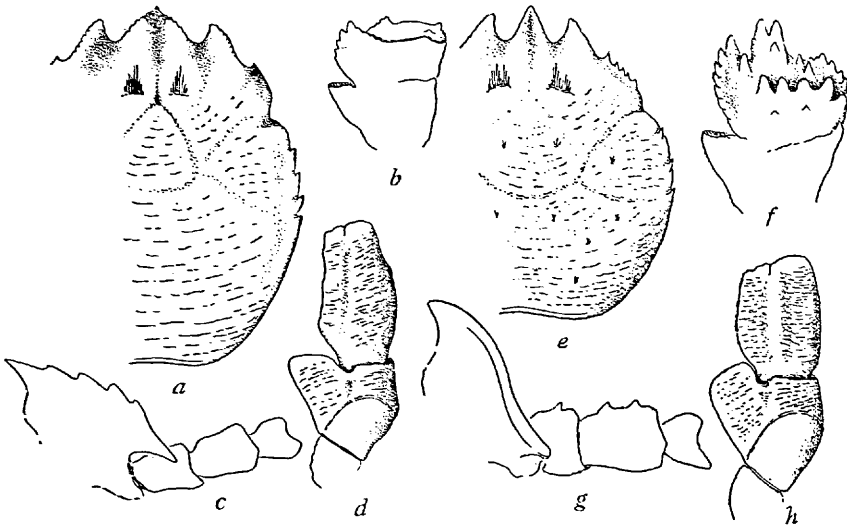


FIG. 88.—*Porcellana streptocheles* Stimpson. *a*, carapace. *b*, ventral view of left 1st antenna. *c*, ventral view of peduncle of left 2nd antenna. *d*, 3rd-5th joints of cheliped.

Porcellana dehaanii Krauss. *e-h*, as in *a-d* respectively.

very feebly transversely rugulose, in ♀ and juv. rather strongly rugulose-granulose, with the outer costate margin of hand and the median longitudinal ridge (when seen in profile) finely serrulate; finger and thumb of smaller chela contorted and furry on the inside in ♂. Both chelipeds relatively smaller and less unequal in ♀ than in ♂; either the right or the left cheliped may be the larger. Dactyls of legs with 3-4 conspicuous spines on lower margin.

Length of carapace up to ♂ 6.5 mm., breadth 6 mm., ♀ smaller. Various shades of red from pale flesh-coloured to indian red or bright crimson, chelipeds deeper in tint and more or less mottled, legs irregularly banded and mottled (K. H. B.).

Localities.—False Bay to Algoa Bay, littoral to 50 fathoms (Stimpson, Henderson, Stebbing, etc., and S. Afr. Mus.); off Umhlangakulu River (S. of Port Shepstone), Natal, 50 fathoms (1 ♀, S. Afr. Mus.).

Remarks.—If Stebbing in 1910 had had material from Natal he would undoubtedly have recognized the distinctness of this species, as Henderson did. Some of the differences commented on by previous writers are found to be sexual and not specific.

The "Valdivia" and Odhner's specimens from the Agulhas Bank are probably this species and not *dehaanii*. The "Gauss" specimens from Simon's Bay are certainly *streptocheles*, in spite of Strunck's remarks. Strunck made no mention of the peduncles of the antennae.

The single specimen from Natal seems to show that the distribution of the two species may overlap.

Porcellana dehaanii Krauss

Natal Porcelain Crab.

Fig. 88, *e-h*.

1843. Krauss, Südafrik. Crust., p. 59, pl. 4, fig. 2, *a-c*.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 110 (compared with *streptocheles*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 378.

[Not *dehaanii* Stebbing, Balss, etc., see *streptocheles*.]

Median frontal tooth rather narrowly triangular, length subequal to its basal width; margins of frontal teeth less noticeably crenulate than in *streptocheles*; margin of carapace above peduncle of ant. 2 with several denticles in both sexes; lateral margin with 3 (or 4) rather widely spaced denticles. Surface of carapace with the grooves slightly more marked than in *streptocheles*; setules as in the latter, the ♂ slightly more setose, but the ♀ always far more setose than the ♂. 1st peduncular joint of ant. 1 with numerous conspicuous denticles. Basal peduncular joint of ant. 2 with acute apex as in *streptocheles*, but margin entire, though sometimes very minutely and feebly denticulate distally; front margin of the following 2 joints with resp. 1, and 2-3 denticles. Inner margin of 3rd joint of chelipeds always entire; inner apex of 4th joint produced as a prominent lobe but apically rounded; 5th joint relatively shorter and broader, the median ridge feeble but slightly more marked, inner margin always entire in ♂, ♀, and juv.; upper surface of wrist and hand smoother in both sexes than in *streptocheles*, sometimes even punctate instead of rugulose, the outer margin and median ridge not serrulate in ♀. Relative sizes of

chelipeds, and contortion of finger and thumb of the smaller one in ♂, as in *streptocheles*. The pitting on the larger chela is particularly noticeable in the Delagoa Bay ♂.

Length of carapace ♂ up to 8 mm., breadth 7.5 mm., ♀ smaller.
* Delagoa Bay ♂ 9 × 9 mm. Yellowish to salmon or brick-red, ♂ deeper and brighter in colour than ♀, more or less mottled, chelipeds more uniform, legs banded and mottled.

Localities.—Natal (Krauss); Isipingo (S. of Durban) and Impengazi (N. of St. Lucia Bay) (coll. T. A. Stephenson); Durban and Delagoa Bay (S. Afr. Mus.).

Remarks.—The median frontal tooth, the wrist of the chelipeds, and the basal joints of 1st and 2nd antennae suffice to distinguish this species at once from *streptocheles*.

Gen. PETROLISTHES Stimpson

1892. Ortmann, Zool. Jahrb., vi, p. 258 (key to species).

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 261.

1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 140.

1939. Melin, K. Sv. Vet. Ak. Handl., xviii, no. 2, p. 97.

Frontal margin more or less produced subtriangularly, undulate but not dentate. 1st joint of ant. 1 enlarged, but (in the South African species) not so thick or so broadly triquetral as in *Porcellana*. 1st joint of ant. 2 very short, not produced, not forming lower border of orbit and not excluding the following movable joints from the orbit. Chelipeds flattened, wrist rather long, not very unequal in ♂. Legs ending in a single claw.

Key to the South African Species.

1. Carapace and chelipeds finely granular. Inner margin of wrist of chelipeds with 3 or more teeth, outer margin with a ridge bearing several graduated and imbricate teeth *lamarckii*.
2. Carapace and chelipeds coarsely granulate-tuberculate. Inner margin of wrist with one tooth near proximal end, outer margin without imbricate teeth. *ornatus*.

Petrolisthes lamarckii (Leach)

Lamarck's Porcelain Crab.

Fig. 89, *a-d*.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 825, pl. 2, fig. 7
(? *rufescens* Hell).

1894. Ortmann, Semon's Austral. Reise, v, p. 26 (references and discussion).

1913. Dofflein and Balss, D. Tiefsee Exp., xx, p. 162.

1918. Stebbing, Ann. Durban Mus., ii, p. 58 (*speciosus*).

1920. *Id.*, l. c., p. 261 (*politus*).

1926. Laurie, l. c., p. 140 (references).

Frontal margin broadly triangular, length (to transverse gastric ridges) half its basal width, margins undulate, apex narrowly rounded.

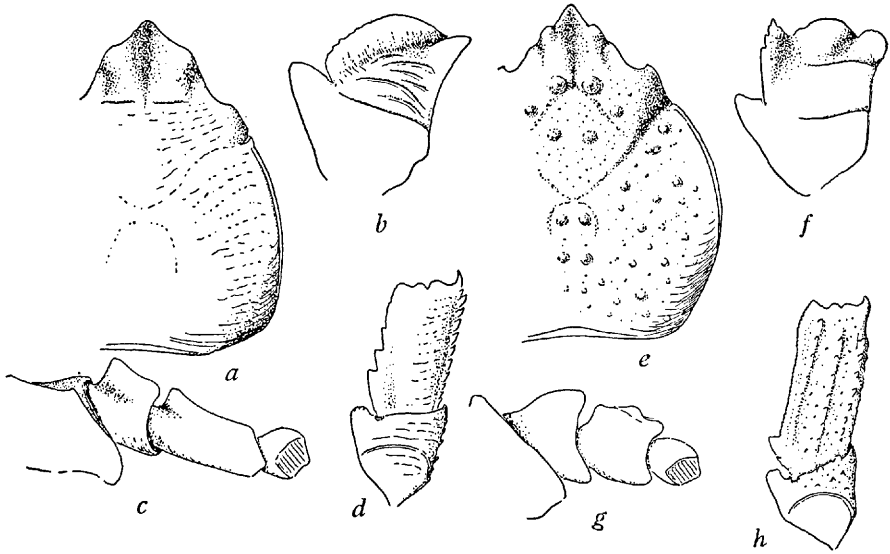


FIG. 89.—*Petrolisthes lamareckii* (Leach). *a*, carapace. *b*, ventral view of 1st joint of left 1st antenna. *c*, ventral view of left 2nd antenna. *d*, 4th and 5th joints of cheliped.

Petrolisthes ornatus Paulson. *e-h*, as in *a-d* respectively.

No supra-orbital spine. Epibranchial spine present. Lateral margin entire, costate. Surface feebly squamose-rugulose. 1st peduncular joint of ant. 1 with distal end abruptly narrowed to a transverse keel with a blunt point at outer distal angle. 2nd (1st free) peduncular joint of ant. 2 keeled on front margin along whole length, 3rd (2nd free) joint squarely prominent at its proximal front angle. 4th joint of cheliped with rounded lobe on inner (front) apex, 2 spines (sometimes only one) on lower distal margin, 5th joint about twice as long as wide, with 3 (or 4) low teeth on inner margin, the proximal one the most prominent, hind margin with a ridge bearing imbricate teeth increasing in size distally, surface of wrist and hand more or less squamose-

granulose, the sculpturing on the margins of the hand slightly stronger (as also on free edge of finger), finger and thumb not distorted, non-setose on inner (lower) surfaces. 4th joints of 2nd-4th legs without spines on front margin, outer surfaces feebly squamose-granulose, 4th joint of 4th leg $1\frac{3}{4}$ times as long as wide.

Length of carapace up to 13 mm., breadth 12 mm. Reddish, more or less mottled, or with symmetrical variegation, legs banded.

Localities.—Durban and Scottburgh, Natal (Stebbing); Durban and Delagoa Bay (S. Afr. Mus.).

Distribution.—Indo-Pacific.

Remarks.—The correct name for the South African specimens is difficult to fix. The South African Museum possesses a specimen caught at the same time and place as the one sent by Bell-Marley to Stebbing and recorded as *speciosus*. This specimen is identical with the Scottburgh one identified by Stebbing two years later as *politus*.

Ortmann regards *speciosus* as synonymous with *lamarckii*; in which case the species has a wide distribution in the Indo-Pacific. No extra-African material is available to me for comparison.

Petrolisthes ornatus Paulson

Ornate Porcelain Crab.

Fig. 89, e-h.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 825, pl. 2, fig. 6 (*mossambica*).

? 1893. de Man, Notes Leyden Mus., xv, p. 293, pl. 7, figs. 3, 3, a (*indicus*).

1905. Lenz, Abh. Senckenb. Ges., xxvii, p. 374 (*mossambicus*).

1920. Stebbing, *l. c.*, p. 262.

Frontal margin broadly triangular, its length about $1\frac{1}{2}$ its basal width, margins markedly undulate owing to the marginal tubercle, apex subacute. No supra-orbital or epibranchial spines. Lateral margin entire, costate. Surface with low rounded tubercles and granules as in fig. 89, e. 1st peduncular joint of ant. 1 distally narrowed to a tridentate edge, the inner tooth sharp and minutely serrate, the other two rounded. 2nd (1st free) peduncular joint of ant. 2 with rather blunt keel on front edge, 3rd joint with 2 obscure rounded knobs on front surface. 4th joint of cheliped with small lobe at inner apex, lower distal margin without spines, 5th joint about twice as long as wide, with a tooth proximally on inner margin, upper

surface with 3 rows of spinous tubercles and smaller intervening granules, hand and finger and thumb tuberculate-granulate on upper surface, a submarginal fringe of setae on lower surface of hand externally, finger and thumb furry on lower inner surfaces. 4th joints of 2nd-4th legs coarsely granulose on their outer surfaces, 4th joint of 4th leg $1\frac{1}{2}$ as long as wide.

Length of carapace 8 mm., breadth 7 mm.

Locality.—Mozambique (Hilgendorf, 1 ♀; and coll. K. H. B. 1912, 1 ♀).

Distribution.—Red Sea, Zanzibar. ? Flores.

Remarks.—A ♀ from Hilgendorf's locality agrees exactly with his description of *mossambica*. Stebbing accepted Nobili's identification of *mossambica* with the Red Sea *ornatus*, but gave no other synonymy. I have not seen Nobili's paper, but it seems to me that *indicus* de Man from Flores is undoubtedly synonymous.

Gen. POLYONYX Stimpson

1858. Stimpson, Proc. Ac. Nat. Sci. Philad., x, p. 229.

1907. *Id.* (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 194.

1926. Laurie, Trans. Linn. Soc. Lond., xix, pp. 146 *sqq.* (but *cf.* Gordon).

1930. McNeill and Ward, Rec. Austral. Mus., xvii, p. 363.

1935. Gordon, Res. Voy. Ind. orient. Néerl., iii, fasc. 17, p. 10.

1936. Shen, Bull. Fan Mem. Inst. Biol., vi, p. 275 (list of species).

Carapace transversely ovoid, frontal margin not prominent, deflexed. 1st joint of ant. 1 large, apically truncate, not denticulate. 1st joint of ant. 2 transversely elongate. Chelipeds usually unequal, wrist rather long. Legs ending in 2 claws.

Remarks.—Commensal in the tubes of Polychaet worms (*Chaetopterus*, etc.) (see Pearse, Biol. Bull., xxiv, 1931, p. 102, figs. *), and in the galleries of Sponges.

Polyonyx cf. biunguiculatus (Dana)

Fig. 90.

1935. Gordon, *l. c.*, p. 10, fig. 5, *b, d*.

1936. Shen, *l. c.*, p. 276 (listed).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 378.

Main regions of carapace fairly well marked; carapace smooth and polished, lateral and hinder margins fringed with setae, front feebly produced. Basal joint of ant. 1 as in fig. 90, *b*. Mxp. 3 as in fig. 90, *c*.

* Quoted from Shen, *l. c.*, 1936. Apparently omitted from Zoological Record.

Chelipeds unequal, non-granulate, thickly furry on inner margin of wrist, lower outer border of hand and around base of finger; 4th joint without teeth, wrist about $1\frac{3}{4}$ as long as wide, finger of smaller chela with a row of denticles on upper outer edge, cutting surface with 2 rows of denticles, thumb (of smaller chela) with 2 rows of denticles on cutting surface, but the inner one only on the distal third. Legs furry on their margins, 6th joint with 2 spines on lower margin near base, sometimes preceded by an additional pair set transversely, and

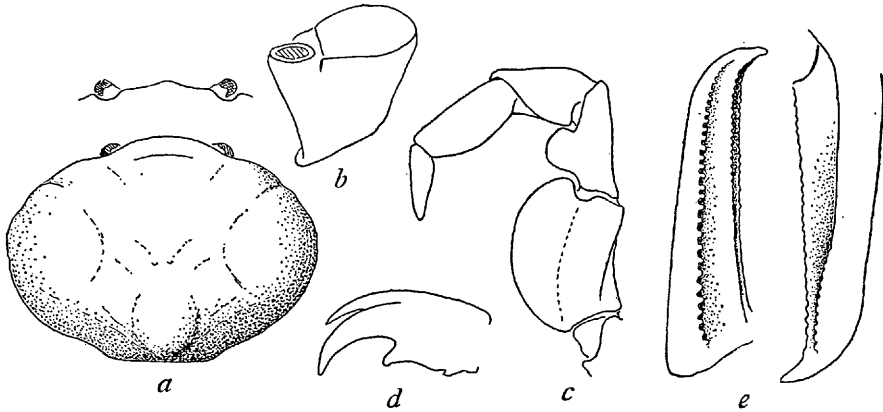


FIG. 90.—*Polyonyx* cf. *biunguiculatus* (Dana). *a*, carapace, with true vertical view of front. *b*, ventral view of 1st joint of left 1st antenna. *c*, 3rd maxilliped (setae omitted). *d*, dactyl of walking leg (setae omitted). *e*, outer side of finger and inner side of thumb of smaller chela, the two rows of denticles on the cutting surface shown although not actually visible from this point of view.

2 subapically, followed by a transverse pair; dactyl with 2 ungues close together, and one or two denticles on lower margin.

Length of carapace (ovig. ♀) 7.5 mm., breadth 10 mm. Orange- or salmon-coloured.

Locality.—Delagoa Bay (coll. van der Horst, in Polychaet tubes, 1 ovig. ♀, 1 non-ovig. ♀).

Remarks.—Owing to a certain confusion in the synonymy of the rather numerous "species" and the inadequacy of the descriptions, the name given to these specimens must be regarded as only provisional.

FAMILY GALATHEIDAE.

1910. Stebbing, *l. c.*, p. 362.

1924. Gurney Rep. "Terra Nova," zool., viii, p. 176 (larval stages).

Carapace with well-defined regions, frontal margin produced in a prominent acute rostrum. Abdomen symmetrical, folded upon itself, not closely adpressed to underside of thorax. Tail-fan large. 1st antennae exposed. Peduncle of 2nd antennae directed forwards. 3rd and 4th joints of external (3rd) maxillipeds narrow. Cutting-edge of mandible entire. Chelipeds and walking legs usually elongate and slender.

Key to the South African Genera.

1. Eyes faceted and pigmented. Exopod of mxp. 1 with flagellum.
 - a. Rostral process triangular with serrated edges (fig. 91, *i*).
Abdominal segments unarmed *Galathea*.
 - b. Rostral process spiniform (fig. 92, *a*). One or more of the abdominal segments with spines (usually) *Munida*.
2. Eyes not faceted and not pigmented. Exopod of mxp. 1 without flagellum.
 - a. Rostrum horizontal. No large spine in middle of carapace (fig. 92, *d*) *Munidopsis*.
 - b. Rostrum bent sharply upwards. A very large spine in middle of carapace (fig. 92, *e, f*) *Galacantha*.

Gen. GALATHEA Fabr.

1910. Stebbing, *l. c.*, p. 362.

1913. Doflein and Balss, *D. Tiefsee Exp.*, xx, p. 139.

1926. Laurie, *Trans. Linn. Soc. Lond.*, xix, p. 123.

1939. Melin, *K. Sv. Vet. Ak. Handl.*, xviii, no. 2, pp. 56 *sqq.*

Rostral process triangular, with serrated edges. Carapace and (usually) abdomen with transverse setose ridges or squamae (*cf.* fig. 92, *a*). Eyes faceted and pigmented. Exopod of mxp. 1 with flagellum. Abdominal segments unarmed.

Remarks.—The South African forms assigned to *intermedia* and *dispersa* should both be compared with European examples of these species.

Key to the South African Species.

1. Rostrum with 4 prominent teeth on both margins.
 - a. Cervical groove indicated only laterally. Apices of finger and thumb of chelipeds acute. 4th joint of mxp. 3 longer than 3rd. Epipod on base of cheliped only *intermedia*.

- b. Cervical groove continuous across carapace. Apices of finger and thumb spooned. 4th joint of mxp. 3 subequal to 3rd. Epipods on bases of chelipeds and following two legs *dispersa*.
2. Rostrum with 7 minute teeth on both margins. Epipod on base of cheliped only. Apices of finger and thumb acute. 3rd and 4th joints of mxp. 3 subequal . . . *elegans*.

Galathea intermedia Liljeb.

Fig. 91, a-e.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 120 ("second species").

1894. Milne Edwards and Bouvier, Res. Sci. Camp. Monaco, vii, p. 79 (epipod), and p. 81, pl. 8, figs. 1-10.

1910. Stebbing, *l. c.*, p. 362 (*labidolepta*).

1913. Doflein and Balss, *l. c.*, p. 140, text-fig. 6, and pl. 12, fig. 2 (*labidolepta*).

1914. Lenz and Strunck, D. Südpol. Exp., xv, p. 286, and p. 287, fig. 1 (*labidolepta*).

1916. Balss, Beitr. Kennt. Meeresf. Westaf., ii, p. 40.

1917. Stebbing, Ann. S. Afr. Mus., xvii, p. 26.

1923. Odhner, Medd. Göteb. Mus., xxxi, p. 13 (*intermedia* var.), and p. 25 (*labidolepta*).

1933. Monod, Bull. Etud. Afr. occid. Fr., xv, p. 18 (pagination of separate copy).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 378.

Rostrum with 4 prominent spinous teeth on each margin, the basal one smaller than the others and forming the inner supra-occipital spine. Lateral margin of carapace with 7-8 denticles, only one in front of the cervical groove, which is indicated only laterally (in this respect all the figures quoted above, even that of Lenz and Strunck, are misleading); the accessory denticle medial to the 1st lateral denticle mentioned by Strunck is not present in my material. Two submedian denticles on gastric region, sometimes with an accessory denticle external to each. No denticle on hepatic region. Front upper margin of pterygostomial region distinctly dentate (fig. 91, *d*). The ventral margin of the spine (fig. 91, *d*, sp.) below the socket of ant. 2 disappears about opposite the insertion of peduncle of ant. 2. 1st peduncular joint of ant. 1 with 2 strong spinous processes on lower external side of apical margin, each with a long spine and a seta; on inner (dorsal) side of apical margin a short blunt tooth. Mxp. 3 with

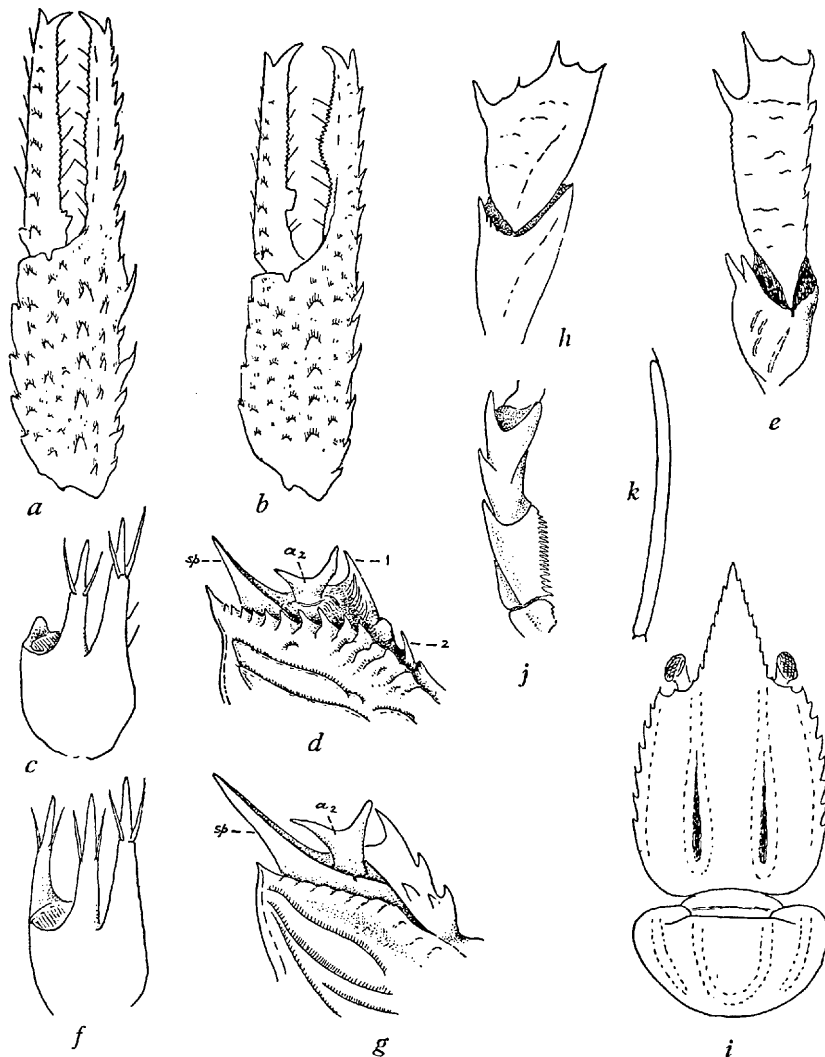


FIG. 91.—*Galathea intermedia* Liljeb. *a, b*, right chela ♀ and ♂, setae omitted. *c*, ventral view of 1st joint of left 1st antenna. *d*, ventral view of anterior corner of pterygostomial region of left side, with basal joint of antenna 2. (1, 2=1st and 2nd antero-lateral spines.). *e*, external view of 3rd and 4th joints of left mxp. 3.

Galathea dispersa Bate. *f, g, h*, as in *c, d, e* respectively.

Galathea elegans Ad. & White. *i*, carapace and base of abdomen, dotted lines indicating colour bands, transverse setose ridges not shown. *j*, inner view of 2nd-4th joints of right mxp. 3. *k*, seta from rostrum.

2 spine-teeth on inner ventral apex of 3rd joint, 4th joint longer than 3rd, narrow, inner ventral margin with 1 strong spine-tooth near apex, inner apex with a strong spine tooth, outer apex with a smaller curved one. Chelipeds, hand half as wide as long, finger and thumb slender, equal in length to hand, inner margins of both serrulate (Lenz and Strunck's figure is rather misleading), that of thumb sinuous, more so in ♂ than in ♀, forming a distinct gap, margin of finger with 1 tooth at base (in one ♂ with 2 teeth; cf. Doflein and Balss' figure); apices of finger and thumb in both chelipeds ending acutely in a spinous unguis, with a spine-tooth on outside, giving a bifid appearance; neither is spooned on inside. Epipod on base of cheliped, but not on any of the walking legs (stated by Doflein and Balss to be absent on the "thoracalfüssen" in *labidolepta*). Dactyls of all walking legs with 5 (sometimes 6) spines and tubercles, fewer in juv.

Length of carapace incl. rostrum up to 25 mm. Salmon or pinkish, with darker (brownish) transverse lines on carapace, and markings on abdomen, anterior segments of abdomen pale in median line, rostrum pale, cobalt-blue dots often on carapace and pterygostomial region (K. H. B.).

Localities: (*labidolepta*) Simon's Bay (Stimpson, Henderson, Lenz and Strunck); Agulhas Bank, St. Francis Bay, Cape Barracouta (Doflein and Balss, Odhner).

(*intermedia*) Mossel Bay (Stebbing); Port Alexander, Angola (Odhner); Simon's Bay, Agulhas Bank, Algoa Bay, East London, 20–42 fathoms (S. Afr. Mus.).

Distribution.—Europe, Mediterranean, Azores, Cape Verdes, Senegal; littoral to 318 metres.

Remarks.—It is strange that Stebbing (1917) in recording *intermedia* should have failed to comment on the remarkable likeness between this species and *labidolepta*. Neither Henderson nor Strunck also made any comment. The examination of several specimens (none larger than 10 mm. carapace length) confirms their agreement with Milne Edwards and Bouvier's account and figures, except that the dactyls of the legs are stouter than in the figure, with fewer spines (usually 5, sometimes 6, but fewer in juv.; M. Edwards and Bouvier: "about 7"), and no denticle on the hepatic region of carapace. (I have not seen Bonnier's 1888 paper.)

All the South African specimens recorded under the names of Liljeborg's and Stimpson's species are obviously one and the same species, and if they are really conspecific with *intermedia*, then Stimpson's *labidolepta* falls into synonymy.

This species resembles *australiensis* Stimpson, which also has an epipod only on the cheliped, in having the cervical groove present only at the sides.

Galathea dispersa Bate

Fig. 91, *f-h*.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 119, pl. 12, figs. 6, 6, *a* ("first species").

1910. Stebbing, *l. c.*, p. 364.

1913. Doflein and Balss, *l. c.*, p. 139 (*nexa* Embleton).

1914. Stebbing, Ann. S. Afr. Mus., xv, p. 5.

1916. Balss, *l. c.*, p. 39 (*nexa* Embleton).

1923. Odhner, *l. c.*, p. 25 (*nexa* Embleton).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 378.

Rostrum with 4 prominent spinous teeth on each margin, the basal one (inner supra-occipital) smaller than the others. Lateral margin with 9-10 denticles, 3 of which are in front of the well-marked and continuous cervical groove. An accessory denticle medial to the 1st lateral denticle and above the insertion of ant. 2. Six submedian denticles on the gastric region, and one very small one on the hepatic region. Front upper margin of pterygostomial region feebly crenulate (fig. 91, *g*). Ventral margin of the spine (fig. 91, *g*, sp.) below socket of ant. 2 continued past and behind the insertion of the antennal peduncle to meet the antero-lateral margin of (hepatic region of) carapace. 1st peduncular joint of ant. 1 with 3 strong spinous processes, 2 on ventral, 1 on inner dorsal apical margin, each with a long spine and a seta. Mxp. 3 with 1 spine-tooth (and 2 denticles externally) on ventral apex of 3rd joint, 4th joint subequal to 3rd, ovate, inner ventral margin with 1 strong spine-tooth in middle and 2 smaller ones near apex, outer apex with a small denticle. Chelipeds, all joints setose, hand $\frac{1}{2}$ to $\frac{2}{3}$ as wide as long, finger and thumb slightly shorter than hand, inner margins of both serrulate, and nearly straight or feebly sinuous, without any well-marked teeth, apices spooned and not appearing markedly bifid as in *intermedia*. Epipods on bases of cheliped and following 2 walking legs. Dactyls of all walking legs with 5 spines and tubercles.

Length of carapace incl. rostrum up to 16 mm. Dull salmon-red, with darker and brighter red spots and markings, apices of chelae deep crimson, eye-stalks reddish, cornea grey, a cobalt-blue wavy band along the pterygostomial and sub-branchial regions (K. H. B.).

Localities.—Simon's Bay (Henderson); St. Francis Bay (Doflein and Balss); off Gt. Fish Point * (Stebbing); Cape Barracouta and Walker Bay (Odhner); False Bay and Agulhas Bank to Natal and Zululand, 13–62 fathoms (S. Afr. Mus.).

Distribution.—Eastern North Atlantic, Mediterranean, Azores, Canaries.

Remarks.—This species appears to be commoner than *intermedia*, and is easily distinguished by several characters. But South African specimens of both this and the preceding species should be compared with European material before finally accepting their identity. Stebbing (1914) makes *nexa* Heller 1863 a synonym of *dispersa*, but distinct from the earlier *nexa* Embleton. Doflein and Balss (1913), Balss (1916), and Odhner (1923) all identify the South African form with *nexa* Embleton.

Both species occur together in the same localities in the western part of our area, but *intermedia* does not extend to Natal.

There appears to be considerable similarity between this species and *orientalis* Stimpson (see Stimpson, 1907, p. 231), but the latter has an epipod only on the cheliped (Ortmann, *l. c.*, 1894, p. 23).

The Bopyrid Isopod *Pseudione crenulata* Sars. occurs in the branchial cavity.

Galathea elegans Adams & White

Fig. 91, *i-k*.

1884. Miers, Zool. H.M.S. *Alert*, Crust., p. 278.
1888. Henderson, *l. c.*, p. 117, and p. 119, pl. 12, fig. 3 (*grandirostris*).
1894. Ortmann, Semon's Austral. Reise, v, p. 23.
1902. de Man, Abh. Senckenb. Ges., xxv, p. 709.
1907. Stimpson (ed. Rathbun), Smiths. Misc. Coll., xlix, p. 234 (*grandirostris*).
1909. Southwell, Okhamandal Mar. Zool. Rep., pt. 1, p. 120, pl. fig. xi.
1915. Potts, Carnegie Inst. Wash. Dept. Mar. Biol., viii, p. 83, pl. 1, fig. 5, and fig. 4, A.
1921. Balss, K. Sv. Vet. Ak. Handl., lxi, no. 10, p. 22.
1926. Laurie, Trans. Linn. Soc. Lond., xix, p. 133 (references).
1939. Melin, K. Sv. Vet. Ak. Handl., xviii, no. 2, p. 77, figs. 48–53.
1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 379.

* 27° 7' E. long. Not to be confused with Gt. Fish Bay, Angola.

Rostrum often somewhat depressed, at least half as long as rest of carapace, often nearly as long, each margin with about 7 very small denticles. All setae on rostrum simple, not plumose. Lateral margin of carapace with about 8 denticles (excl. external orbital angle). Cervical groove not continuous across carapace. Gastric region without denticles. Front upper margin of pterygostomial region very feebly crenulate. 1st peduncular joint of ant. 1 with 3 long spinous processes. Mxp. 3 with 1 tooth on ventral apex of 3rd joint, inner margin with comb-like serrations, 4th joint subequal to 3rd, inner ventral margin with 1 spine-tooth in middle and a larger one apically, outer apex shortly spinose. Chelipeds more or less setose, hand twice as long as broad, finger and thumb shorter than hand, their apices not spooned, inner margins serrulate, that of thumb sinuous, outer margins each with 2 denticles just behind the strong unguis. Epipod on base of cheliped, but not on any of the legs. Dactyls of walking legs with 4 spines, and a prominent tubercle at base of unguis.

Length of carapace incl. rostrum up to 9 mm. Brownish red or purplish, with 2 pale yellow stripes on carapace, and 4 stripes on abdomen, the 2 median ones confluent posteriorly, tail-fan with 3 pale stripes or bands.

Localities.—Durban and Delagoa Bay (S. Afr. Mus.).

Distribution.—India, East Indies, N. Australia, Philippine Is., S. Japan, Bonin Is., Seychelles.

Remarks.—The specimen from Durban harbour was found in a Feather-star (*Tropiometra carinata*) under a stone. Both the Crustacean and the Crinoid were coloured brown and pale yellow. Potts has referred to the fauna associated with Crinoids. Southwell describes a specimen with 3 dark purplish longitudinal bands on a yellow ground-colour on the carapace, and a dark band on either side of the chelipeds and legs. Miers and Laurie say the colour pattern is variable.

According to Melin the simple setae on the rostrum are characteristic of this species.

Gen. MUNIDA Leach

1894. Ortmann, Semon's Austral. Reise, v, p. 24.

1901. Alcock, Ind. Deepsea Crust. Anomura, p. 237.

1910. Stebbing, *l. c.*, p. 364.

1913. Doflein and Balss, D. Tiefsee Exp., xx, p. 141.

1935. Rayner, "Discovery" Rep., x, pp. 211-245 (Falkland Is. species, development, growth, *Grimothea* stage).

Rostral process spiniform, with a well-developed supra-orbital spine on either side at its base. Carapace and abdomen with transverse setose ridges and squamae. Eyes faceted and pigmented. Exopod of mxp. 1 with flagellum. One or more of the abdominal segments spiniferous (normally).

Key to the South African Species.

1. Several spines in a transverse row behind base of rostrum.
 - a. If present at all, spines on 2nd abdominal segment only.
 - i. Spines present on abdominal segment 2. 4th joint of mxp. 3 with 2 spine-teeth . . . *sancti-pauli*.
 - ii. Spines present or absent on segment 2. 4th joint of mxp. 3 with 3 spine-teeth . . . *semoni*.
 - b. Spines present on 2nd and 3rd abdominal segments . . . *speciosa*.
2. Only 2 spines behind base of rostrum (fig. 92, a). Spines on 2nd-4th abdominal segments *incerta*.

Remarks.—*Bathymunida* Balss 1914 is distinguished by the lamella uniting the three rostral (rostral and supra-orbital) spines forming a large rostral process; by the presence of 1 medio-gastric and 1 medio-cardiac spine; and by the transverse ridges on the carapace being shortened and divided up into squamae (*cf.* Melin, 1939).

Munida sancti-pauli Hend.

Fig. 92, b.

1910. Stebbing, *l. c.*, p. 364.

1922. Bouvier, *Res. Sci. Camp. Monaco*, lxii, p. 44, pl. 4, figs. 12, 13.

A transverse series of 8 spines behind base of rostrum, the second from the middle line on each side larger than the others. Cervical groove continuous. No spines between the cardiac and branchial regions. Upper edge of pterygostomial region entire, or very feebly granulate. A transverse series of 8-10 spines on anterior margin of 2nd abdominal segment; the other segments non-spinose; posterior median portion of segments 2-4 smooth, without any setose grooves. 1st joint of ant. 1 with 2 apical spines (one on either side of insertion of 2nd joint), a long spine arising at or slightly beyond midway on outer upper surface and curving dorsally, and 1 spine arising at middle of outer surface. 4th joint of mxp. 3 with 1 strong spine-tooth slightly proximal to middle of lower inner margin, and a slightly smaller apical one. Apices of finger and thumb of chelipeds not spooned, outer

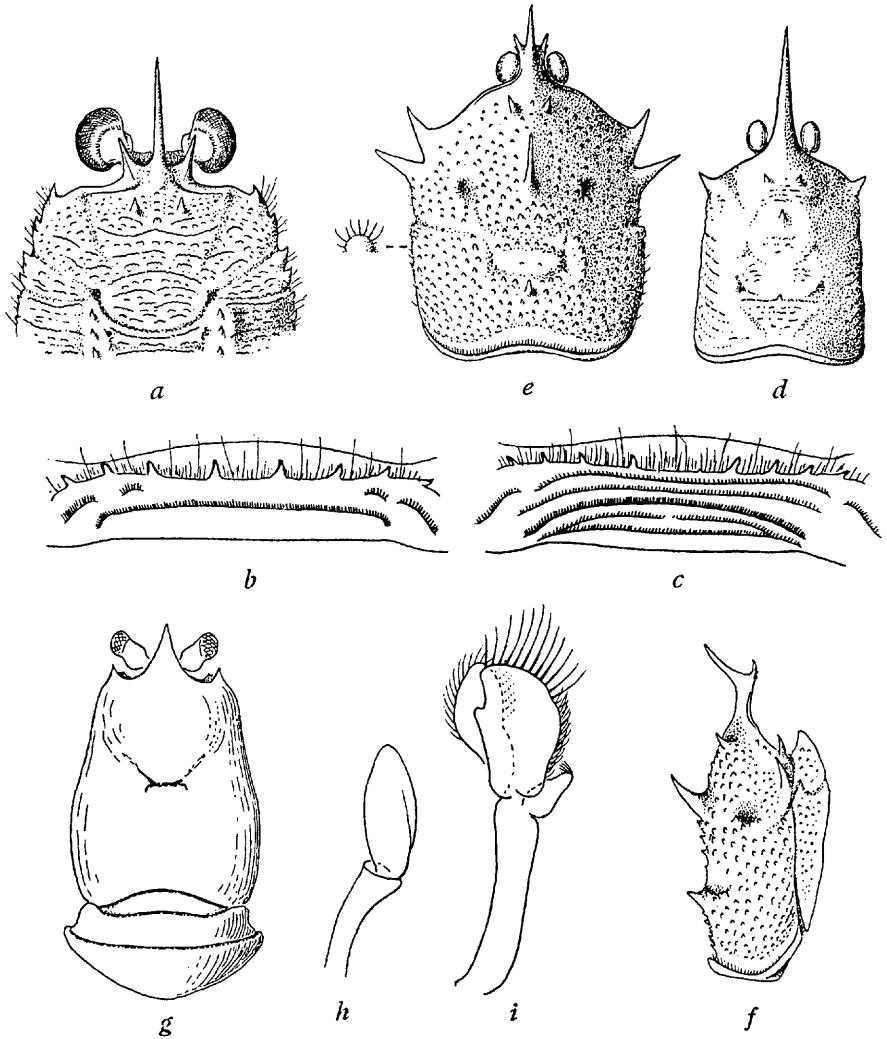


FIG. 92.—*Munda incerta* Hend. *a*, anterior portion of carapace.
Munda sancti-pauli Hend. *b*, median portion of 2nd abdominal segment.
Munda semoni Ortm. *c*, median portion of 2nd abdominal segment.
Munidopsis simplex (M. Edw.). *d*, carapace.
Galacantha rostrata M. Edw. *e*, carapace, with setiferous granule further enlarged.
f, lateral view of carapace.
Uroptychus nitidus (M. Edw.). *g*, carapace and basal segments of abdomen.
h, pleopod 1 ♂. *i*, pleopod 2 ♂, left side, posterior view.

margin of thumb (*excluding* outer margin of hand) with 3 spines and 2 near the apex, finger with 1 spine near apex.

Length of carapace incl. rostrum up to 30 mm.

Localities.—Off East London and Cape Morgan, 250–400 fathoms (Stebbing, and S. Afr. Mus.); off Cape Point, 250 fathoms (S. Afr. Mus.).

Distribution.—St. Paul's Rocks, Atlantic Ocean, 10–60 fathoms; Azores and Cape Verdes, 219–1229 metres.

Remarks.—Milne Edwards and Bouvier figure one of the ♂ chelipeds with a prominent tooth at base on inner margin of finger; but no such tooth is present in any of the South African specimens.

Bouvier (1922, p. 45) is inclined to consider *sancti-pauli* (1885) as a variety of *microphthalma* (1880) (by an oversight he makes the *earlier* species a variety of the *later* one).

Parasites.—The Bopyrid Isopods *Pseudione munidae* Brnrd. and *Paragigantione papillosa* Brnrd. are found in the branchial cavity.

Munida semoni Ortm.

Fig. 92, c.

1894. Ortmann, Semon's Austral. Reise, v, p. 24, pl. 1, fig. 4.

A transverse row of 12 spines behind base of rostrum. No spines on anterior margin of 2nd abdominal segment, or (in one specimen, figured) 9 spines (one asymmetrical and smaller); posterior median portion of segments 2 and 3 with 2 transverse setose grooves, that of segment 4 with one groove; setose grooves on pleura of segments 2–4 more numerous than in *sancti-pauli*. Ridges of the pterygostomial region fewer and less broken up into short discontinuous ridges. 4th joint of mxp. 3 with 3 strong spine-teeth. An additional subapical spine on inner margin of basal joint of ant. 2 (in the specimen with the spines on 2nd abdominal segment). Otherwise closely resembling *sancti-pauli*.

Length of carapace incl. rostrum up to 15 mm. (the same as in Ortmann's specimens).

Localities.—Off Scottburgh and Umhlangakulu River, Natal, 50–92 fathoms (S. Afr. Mus.).

Distribution.—Amboina, East Indies.

Remarks.—Although Ortmann says nothing about the *grooves* on the abdominal segments and his figure is inconclusive, in other respects these specimens agree fairly well with his description; the most distinctive resemblance being the 3 spine-teeth on 4th joint of mxp. 3. Ortmann's specimens had 6 spines on 2nd abdominal segment, but it

would seem that not only the actual number but also their presence or absence is a variable feature; the Natal specimens (4 without spines, 1 with spines) obviously all belong to the same species.

Munida speciosa von Martens

1883. Studer, Abh. K. Ak. Wiss. Berlin for 1882, p. 28, pl. 2, fig. 14, *a*, *b*.

1916. Balss, Beitr. Kennt. Meeresf. Westaf., ii, p. 41 (quoted).

1923. Odhner, Medd. Göteborg. Mus., xxxi, p. 14 (with a query).

A transverse row of 6 spines behind base of rostrum. Anterior margin of 2nd abdominal segment with 8 spines, of 3rd segment with 6 spines (2-4: Odhner's small specimens); posterior portions of these segments with setose grooves across dorsum. Chelipeds slender, sparsely setose and with spines only on the 4th joint (Studer's figure). Mxp. 3 as in *banffica* (Odhner). 1st joint of ant. 1 not projecting beyond ocular peduncle.

Length of carapace incl. rostrum 31 mm. (Studer's figure).

Locality.—Port Alexander, Angola (Odhner).

Distribution.—10° N., 17° W., 115 (150) fathoms (Studer).

Munida incerta Hend.

Fig. 92, *a*.

1888. Henderson, Rep. H.M.S. *Challenger*, xxvii, p. 130, pl. 13, figs. 4, 4, *a*.

1926. Barnard, Trans. Roy. Soc. S. Afr., xiii, p. 122.

A single spine behind base of each supra-orbital spine. Antero-lateral margin of carapace with 5-6 spines. Three spines, one behind the other, separating each branchial area from the cardiac region. All the transverse ridges on carapace finely beaded. Anterior margin of abdominal segments 2-4 each with 4 spines (some not very prominent); posterior portion of segment 4 with prominent median spine. 1st peduncular joint of ant. 1 somewhat flattened dorso-ventrally, with a curved groove on dorsal surface from the insertion of 2nd joint; inner apex with 1 spine, followed by the insertion of 2nd joint, then 2 long spines and a smaller one on outer convex margin. Mxp. 3 with 1 spine at inner ventral apex of 3rd joint, 4th joint with 1 spine in middle of inner ventral margin, and a small one at apex. Chelipeds slender, elongate; finger and thumb slender, apically acute, inner margins of both with 2 teeth (♂).

Length of carapace incl. rostrum 38 mm.

Locality.—Portuguese East Africa (25° 56' S., 32° 52' E.) 17 metres (Barnard).

Distribution.—Philippine Islands, 250 fathoms.

Remarks.—There seems no reason to doubt the identity of the Delagoa Bay specimens (I have re-examined the ♂ which is in the South African Museum), unless the structure of the 1st peduncular joint of 1st antenna (not described by Henderson) should prove to be different.

Gen. MUNIDOPSIS Whiteaves

1913. Doffein and Balss, D. Tiefsee Exp., xx, p. 148.

1914. Stebbing, Ann. S. Afr. Mus., xv, p. 6.

Rostral process spiniform, horizontal; no long spiniform supra-orbital spines, and no large spine in middle of carapace. Carapace strongly indurated, without transverse setose ridges. Eyes not faceted and not pigmented. Exopod of mxp. 1 without flagellum.

Munidopsis simplex (M. Edw.)

Fig. 92, d.

1914. Stebbing, *l. c.*, p. 7.

Rostrum slender, curving very slightly upwards. Antero-lateral angles shortly spiniform, behind which a small denticle on lateral margin, more or less distinct, often absent. Two denticles on gastric region, with a median one behind them (often obsolete), one median one on cardiac region; all of them more or less distinct. Lateral margin of carapace not indented by the cervical groove. Abdominal segments 2 and 3 each with a median denticle on anterior margin, sometimes also one on the posterior portion of the 2nd segment. 1st peduncular joint of ant. 1 with inner ventral apex acute, sometimes bifid or with subsidiary denticles, and 2 spines flanking externally the insertion of 2nd joint. 4th joint of mxp. 3 with a strong spine-tooth at base of inner ventral margin, followed by a smaller one. Chelipeds long and slender, finger and thumb slender, apices not spooned, inner margins in contact, serrulate, the serrulations increasing in size distally. No epipods on chelipeds or legs.

Length of carapace incl. rostrum up to 22 mm. Pale pinkish.

Localities.—Off Cape Point, 650–1000 fathoms (Stebbing, and S. Afr. Mus.); off west coast of Cape Peninsula, 250–300 fathoms (S. Afr. Mus.).

Distribution.—West Indies. ? N. Atlantic.

Gen. GALACANTHA M. Edw.

1908. Stebbing, Ann. S. Afr. Mus., vi, p. 19.

1910. *Id.*, l. c., p. 364.

1913. Doflein and Balss, D. Tiefsee Exp., xx, p. 147.

Rostrum bent sharply upwards. No supra-orbital spines. Carapace strongly indurated; without transverse setose ridges; a very large spine in middle. Eyes not faceted and not pigmented. Exopod of mxp. 1 without flagellum.

Galacantha rostrata M. Edw.

Fig. 92, e, f.

1882. S. I. Smith, Bull. Mus. Comp. Zool. Harv., x, p. 21, pl. 9, figs. 2, 2, a.

1895. Faxon, Mem. Mus. Comp. Zool. Harv., xviii, p. 78, pl. B, figs. 1 (coloured), 1, a.

1910. Stebbing, l. c., p. 364.

Carapace covered with blunt or subacute setiferous granules and tubercles, its posterior margin smooth (or feebly granulose). Rostrum with a pair of forwardly directed spines arising from its lower surface. Lateral margin of carapace with a large spine-tooth behind the one forming the antero-lateral corner, but none behind the cervical groove. Two small spines behind base of rostrum, a very large antrorse spine-tooth on gastric region, and a smaller one on cardiac region. A median antrorse spine on each of abdominal segments 2-4. Apex of 1st joint of ant. 1 with 3 teeth surrounding insertion of 2nd joint, the inner one small and subacute, the ventral one larger and apically rounded, the external one spiniform, longer than the others. 4th joint of mxp. 3 with 2 teeth (as in *M. simplex*). Chelipeds short (not much longer than carapace incl. rostrum) and moderately stout, finger and thumb hollowed on ventral surfaces, and apices somewhat spooned. Epipods on chelipeds and following 2 legs.

Length of carapace incl. rostrum 44 mm. Orange-red (Faxon).

Locality.—Off Cape Point, 900 fathoms (Stebbing):

Distribution.—Atlantic, off Pacific coast of America, East Indies, Bay of Bengal, Arabian Sea.

FAMILY UROPTYCHIDAE.

1910. Stebbing, *l. c.*, p. 365.

1913. Doflein and Balss, *D. Tiefsee Exp.*, xx, p. 134 (*Chirostylidae*, *Uroptychinae*).

1933. van Dam, *Siboga Exp. monogr.*, xxxixa, 7, pp. vii, viii, 1-46 (*Chirostylidae*).

Carapace with regions not very well defined, frontal margin produced in an acute rostrum. Last thoracic sternum atrophied. Abdomen symmetrical, folded on itself, telson transversely fissured and folded against preceding segments. 1st antenna exposed. Peduncle of antenna 2 directed forwards. 3rd and 4th joints of mxp. 3 narrow. Cutting-edge of mandible serrate (normally).

Key to the South African Genera.

1. Rostrum well developed, acutely triangular. 5th joint of cheliped elongate (as long as hand). Exopod of mxp. 1 with flagellum. Mandible serrate *Uroptychus*.
2. Rostrum represented by a small spine. 5th joint of cheliped very short. Exopod of mxp. 1 without flagellum. Mandible not serrate *Hapaloptyx*.

Gen. UROPTYCHUS Hend.

1910. Stebbing, *l. c.*, p. 365.

1933. van Dam, *l. c.*, p. 18.

Carapace with lateral margins well defined. Rostrum well developed. Chelipeds elongate, slender, 5th joint as long as hand. Exopod of mxp. 1 with flagellum. 6th joint of mxp. 3 longer than the other joints. Mandible serrate. Acicle of ant. 2 well developed. Cornea pigmented.

Uroptychus nitidus (M. Edw.)

Fig. 92, *g-i*.

1910. Stebbing, *l. c.*, p. 365.

1922. Bouvier, *Res. Sci. Camp. Monaco*, lxii, p. 49 (and var. *concolor*).

Rostrum acutely triangular. Carapace smooth, the regions not well defined; a small spine at antero-lateral angle, lateral margin not spinose. Chelipeds larger in ♂ than in ♀, hand cylindrical, widening slightly in ♂, but scarcely so in ♀; finger and thumb apically subacute,

hairy, inner margin of finger in both sexes with a squarish tooth, often notched or bifid, near base, inner margin of thumb with a triangular tooth or expansion in middle in ♂, near base in ♀, a gap between finger and thumb in ♂, especially in large ♂♂, in ♀ finger and thumb contiguous. Apical joint of 1st pleopod ♂ spoon-shaped, hollowed on anterior surface; 2nd pleopod, see fig. 92, *i*.

Length of carapace incl. rostrum up to 15 mm. Pinkish red.

Localities.—Off Cape Natal (Durban), 440 fathoms (Stebbing); off Cove Rock (East London), 80 fathoms (S. Afr. Mus.).

Distribution.—West Indies, eastern North Atlantic (Brittany to Cape Verdes), west coast of America.

Remarks.—Collected at only two localities off the South African coast by the s.s. *Pieter Faure*. In both cases the crustaceans were living amongst the branches of Alcyonarians (*Ceratoisis ramosa* Hickson).

Gen. HAPALOPTYX Stebb.

1920. Stebbing, *Ann. S. Afr. Mus.*, xvii, p. 262.

1933. van Dam, *l. c.*, p. 44.

Carapace with lateral margin well defined. Rostrum represented by a small spine. Chelipeds (♀) rather short, 5th joint very short. Exopod of mxp. 1 without flagellum. 6th joint of mxp. 3 longer than the other joints. Mandible not serrate. Acicle of ant. 2 obsolete. Cornea pigmented.

Remarks.—A single known species. van Dam does not admit the genus as belonging to the *Uroptychidae* on account of the absence of the flagellum on exopod of mxp. 1, and the presence of an epipod on mxp. 2.

Hapaloptyx difficilis Stebb.

1920. Stebbing, *l. c.*, p. 263, pl. 25 (Crust., pl. 105).

A supra-orbital spine and a smaller spine between it and the antero-lateral spine. Lateral margin of carapace non-spinose. Hand of cheliped widening distally, finger and thumb with acute and overlapping apices.

Length of carapace 7 mm.

Locality.—Off Scottburgh, Natal, 92 fathoms (Stebbing).

Remarks.—Neither the type nor any of its parts mounted on a slide are in the South African Museum, and no further specimens have come to light.

THALASSINIDEA.

1903. Borradaile, Ann. Mag. Nat. Hist. (7), xii, pp. 534, 638 (classification).

1907. *Id.*, *ibid.* (7), xix, p. 476 (key).

1910. Stebbing, *l. c.*, p. 367.

1938. Gurney, "Discovery" Rep., xvii, pp. 293 and 299 *sqq.* (larval stages and classification).

1941. Lebour, Ann. Mag. Nat. Hist. (xi), 7, p. 411 (larval stages).

Carapace compressed, more or less well calcified. Rostrum more or less well developed. Last segment of the narrow thoracic sternum movable and independent. Abdomen symmetrical, extended, feebly calcified. Tail-fan well developed. Eyes small. 1st pair of legs chelate (or subchelate). Appendix interna on pleopods present or absent.

Remarks.—Loosely-built Crustacea, resembling the *Macrura* in shape, but with soft or feebly calcified abdomen. They dwell mostly in burrows in sand or mud, or in cavities in rocks, corals, or sponges.

Gurney has discussed (*l. c.*, p. 339) their classification in the light of the evidence derived from both larvae and adults. He suggests the separation into two groups: a Homarine group including the *Axiidae* and *Callianassidae*, and an Anomuran group including the *Upogebiidae* and *Laomediidae*. The superficial resemblance between the adult Upogebiids and Callianassids may well be due to the adoption of burrowing habits; but the larvae show certain important differences.

In the same paper attention is drawn to the close relationship between the *Nephropsidae* (*Astacidae*) and *Axiidae*, and the possibility that *Enoplometopus* should be transferred from the former to the latter (*l. c.*, p. 299).

Key to the South African Families (based on Gurney).

1. 1st and 2nd pairs of legs chelate. Appendix interna present on pleopods 3-5.
 - a. Epipods on legs. No *lineae thalassinicae*. 1st pair of legs equal or unequal *Axiidae*.
 - b. No epipods on legs. *Lineae thalassinicae* present (*cf.* fig. 96, a, b). 1st pair of legs unequal *Callianassidae*.
2. 1st pair of legs equal, chelate, subchelate or simple; 2nd pair simple. No appendix interna on pleopods. Epipods on legs. *Lineae thalassinicae* present (fig. 96, a, b) *Upogebiidae*.

Both Borradaile and Gurney regard the *linea thalassinica* as of minor systematic importance, a view which receives considerable support from Pearse's observations (1911, Philipp, J. Sci. D., vi, p. 213), which seem to show that it is a modification for breathing in burrows, the sides of the carapace moving on the hinge of this line as if panting for breath (Gurney, *l. c.*, p. 342).

FAMILY AXIIDAE.

1903. Borradaile, *l. c.*, p. 536.
 1910. Stebbing, *l. c.*, p. 367.
 1914. *Id.*, Ann. S. Afr. Mus., xv, p. 9.
 1924. Gurney, "Terra Nova" Rep., zool., viii, p. 142 (larval stages).
 1925. de Man, Siboga Exp. monogr., xxxixa, 5, pp. 1 *sqq.* (key to genera and list of species).
 1938. Gurney, "Discovery" Rep., xvii, p. 299 (larval stages).

Rostrum moderate. Carapace without *lineae thalassinicae*. Acicle on ant. 2 present as a movable spinous process between 2nd and 3rd joints; a fixed spine outside the acicle on 2nd joint (fig. 93, *d*). 1st pair of legs chelate, large, equal or unequal; 2nd pair equal, ending in small chelae; 3rd-5th pairs simple, 5th sometimes tending to become subchelate. Epipods on legs. Abdominal pleurae well or moderately well developed. Pleopod 1 often reduced or absent; pleopods 2-5 with appendix interna, pleopod 2 in ♂ in addition with appendix masculina. No branchial filaments on pleopods. Uropod with endopod unjointed, exopod with or without transverse suture.

Key to the South African Genera and Subgenera.

- I. Exopod of uropod without transverse suture.
 A. 6th joint of 3rd and 4th legs normal, *i.e.* longer than 5th joint.
 1. Profile of carapace not descending steeply to the rostrum.
 a. Rostrum triangularly pointed. Pleuro-branches on 2nd-4th legs [Axius].
 b. Rostrum apically notched. No pleuro-branches [subgen. *Neaxius*, Mauritius].
 2. Profile descending steeply to rostrum. Acicle and spine on ant. 2 absent *Scytoleptus*.
 B. 6th joint of 3rd and 4th legs laminate, wider than 5th, fringed with setae (fig. 93, *b*) *Meticonaxius*.
 II. Exopod of uropod with transverse suture. Carapace medio-dorsally keeled.
 A. Antennal acicle and spine small (fig. 93, *i*) *Calocaris*.
 B. Antennal acicle and spine large (fig. 93, *d*) subgen. *Calastacus*.

Stebbing's species *Axius longispina* is transferred by de Man to *Meticonaxius*. *Axius* (*Neaxius*) *acanthus* var. *mauritiana* Bouvier 1915 is found at Mauritius.

Gen. SCYTOLEPTUS Gerst.

1856. Gerstaecker, Arch. Naturg., xxii, p. 155.

1882. Kingsley, Bull. Essex Inst., xiv, p. 26 (*Evaxius*). (Neave' Nomencl. gives date 1883, vol. xiv, for 1882, p. 130.)

1925. de Man, *l. c.*, pp. 5, 49.

Carapace arched in front, marked off by a ridge on each side of the medio-dorsal ridge, each of the 3 ridges ending anteriorly in a strong tooth; profile descending steeply to the rostrum. Eyes pigmented. No acicle or spine on ant. 2. Exopod of uropod without suture.

Scytoleptus serripes Gerst.

1856. Gerstaecker, *l. c.*, p. 158, pl. 6, figs.

1878. Hilgendorf, MB. Ak. Wiss. Berlin, p. 827.

1882. Kingsley, *l. c.*, p. 26, pl. 1, fig. 1 (*Evaxius tricarinatus*).

1915. Bouvier, Bull. Sci. Fr. Belg. (7), xlvi, p. 21, figs. 8, 9.

1925. de Man, *l. c.*, p. 49, pl. 4, figs. 9, 9, *h* (details).

Rostrum narrow-triangular, acute. Median keel ending in an up-turned spine.

Length up to 46 mm. (de Man).

Localities.—South Africa, probably Port Natal (Gerstaecker); Mozambique (Hilgendorf).

Distribution.—Mauritius, Aldabra, Madagascar, East Indies, Philippine Is.

Gen. METICONAXIUS de Man

1905. de Man, Tijdschr. Ned. Dierk. Ver. (2), ix, p. 592 (August).

1905. Bouvier, C.R. Ac. Sc. Paris, cxli, p. 804 (*Metaxius*) (November).

1925. de Man, *l. c.*, pp. 5, 53.

1925. Bouvier, Mem. Mus. Comp. Zool. Harv., xlvii, p. 469 (*Metaxius*).

1928. de Man, Siboga Exp. monogr., xxxix, 6, pp. 18, 20, 21.

Carapace arched, cervical groove indistinct, no *lineae thalassinicae*; rostrum triangular, apically pointed or blunt, carinate, margins unarmed. Abdominal pleurae small. Eyes not faceted, faintly pigmented. Acicle of ant. 2 well developed. Mxp. 3 with or without

exopod. 1st pair of legs equal, larger than 2nd pair; 6th joint of 3rd and 4th pairs laminate, shorter than 5th joint, fringed with setae; 5th pair subchelate. Exopod of uropod without suture.

Remarks.—de Man seems to be convinced that the West Indian genus *Metaxius* is synonymous. In 1925 he placed the genus among the *Axiidae*, but in 1928 he transferred it to the Callianideine group of the *Callianassidae* (no *linea thalassinica* and general appearance like that of the *Axiidae*). According to de Man *Meticonaxius* and *Callianidea* have an appendix interna on the 2nd (and following) pleopods; as also has *longispina* according to Stebbing.

Meticonaxius longispina (Stebb.)

Fig. 93, *a-c*.

1920. Stebbing, Ann. S. Afr. Mus., xvii, p. 265, pls. 26, B, 27 (Crust., pls. 106, B, 107).

Rostrum with low median keel, apex bluntly rounded, with a few (irregular) setiferous crenulations. Eye-stalks large, cornea scarcely pigmented (as preserved). Mxp. 3 with exopod on both right and left sides in the type (mounted on a slide), and in another specimen; 4th joint with a spine-tooth (easily overlooked) on inner margin in type, and on right side only in the second specimen. Long spine on the scaphognathite (vibratory plate) of 2nd maxilla present in the second specimen as in type. Chelipeds equal. Apex of 6th joint of 5th leg shortly produced, with 2-3 strong spines amidst a thick brush of long setae, dactyl slightly more than half length of 6th joint, spoon-shaped, setose, pectinate on one margin, unguis minute, up-turned. Pleopod 1 slender, uniramous; pleopods 2-5 with appendix interna. 6th abdominal segment keeled in the type, but not in the smaller specimen. Telson with hind margin broadly rounded.

Length 33 mm. (Stebbing); second specimen 12 mm.

Localities.—Off Cape Morgan, 52 fathoms (Stebbing); off East London, 50 fathoms (S. Afr. Mus.).

Remarks.—Two slides with some of the appendages of the type are in the South African Museum. The above description of the rostrum, and the figure, are taken from the smaller specimen, probably a young ♀.

From *monodon* de Man (East Indies) this species differs in the shape of the rostrum, and the relative lengths of the 6th and 7th (dactyl) joints of 5th leg (the *shape* of the dactyl is probably not different from that of *longispina*).

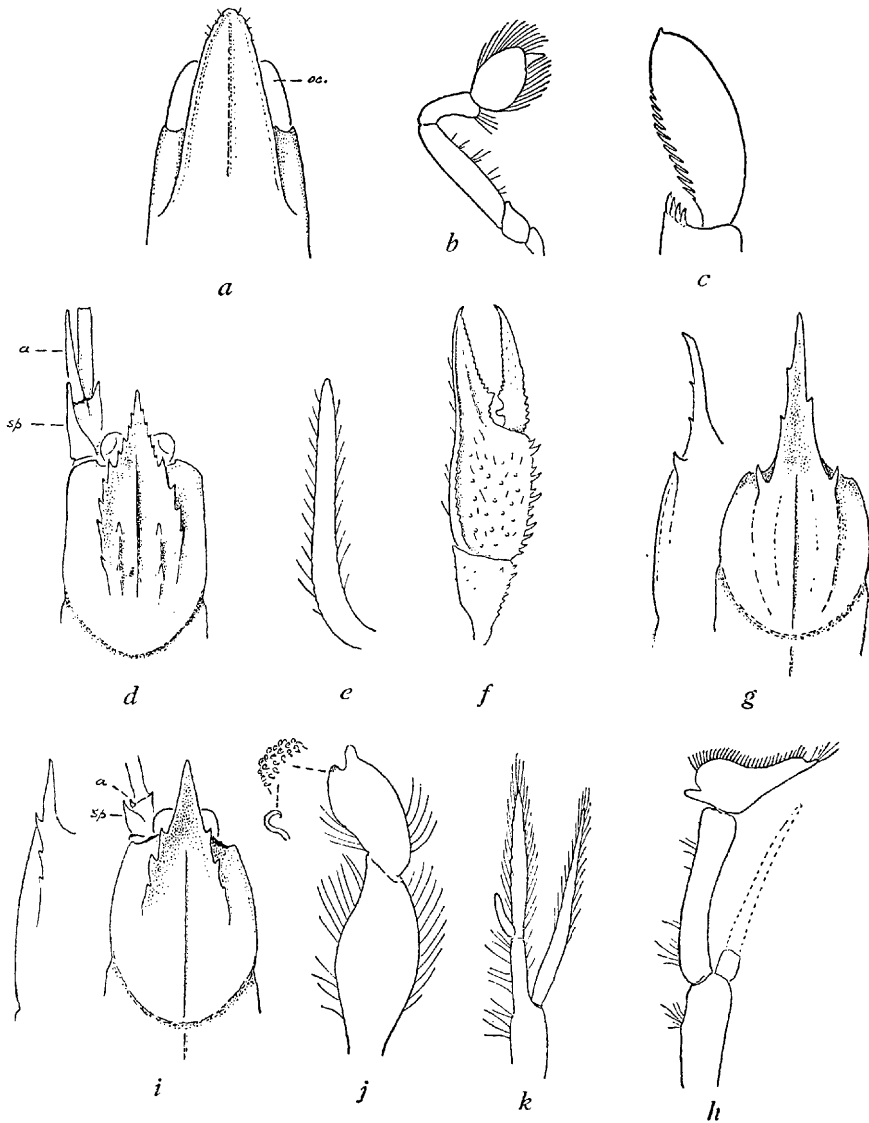


FIG. 93.—*Meticonaxius longispina* (Stebb.). *a*, front of carapace, with eyes (*oc*).
b, 3rd leg. *c*, dactyl of 5th leg, setae omitted.
Calocaris (Calastacus) longispinis McArd. *d*, front of carapace, with antennal spine (*sp*) and acicle (*a*). *e*, 1st pleopod ♀. *f*, left chela, outer surface.
Calocaris alcocki McArd. *g*, front of carapace, with profile. *h*, left 2nd pleopod, posterior view, terminal joint drawn as if flattened, actually at right angles to plane of paper.
Calocaris barnardi Stebb. *i*, front of carapace, with profile, and base of antenna 2. *j*, pleopod 1, with coupling-hooks further enlarged. *k*, pleopod 2 (drawn to a smaller scale than pleopod 1).

Gen. CALOCARIS Bell

1910. Stebbing, *l. c.*, p. 367 (*Calastacus*, as full genus).

1914. *Id.*, Ann. S. Afr. Mus., xv, p. 9.

1915. *Id.*, *ibid.*, xv, p. 58.

1925. de Man, *l. c.*, pp. 7 (list) and 114 (key to species).

Carapace arched, cervical groove distinct, a medio-dorsal keel throughout (except in one species), and a serrated keel from each lateral margin of rostrum nearly to cervical groove. Abdominal pleurae (behind the 1st) well developed. Eyes non-faceted, scarcely or not at all pigmented. Antennal acicle and spine large or minute. Mxp. 3 with exopod. 1st pair of legs much larger than 2nd; 3rd-5th pairs slender, elongate, simple. Pleopod 1 slender, uniramous, pleopods 2-5 with appendix interna (normally). Exopod of uropod with transverse suture.

Remarks.—The eggs are large and comparatively few in number. The earliest larval stage is a *Zoea*, having mxp. 3 biramous and natatory (Calman).

Key to the South African Species.

1. Antennal acicle and spine minute (fig. 93, *i*) (*Calocaris* s.s.).
 - a. Rostrum up-curved. Chelipeds slender, hand as long as finger *alcocki*.
 - b. Rostrum straight, horizontal. Chelipeds stout, hand only two-thirds length of finger *barnardi*.
2. Antennal acicle and spine large (fig. 93, *d*) (*Calastacus*). *longispinis*.

Calocaris (Calocaris) alcocki McArdle

Fig. 93, *g, h*.

1915. Stebbing, *l. c.*, p. 59.

1925. de Man, *l. c.*, p. 116 (in key).

Rostrum apically up-turned, dorsally grooved, with 1-2 teeth on lateral margin, and one larger tooth on each epigastric region. Chelipeds slender, a spine on apex of upper margin of 4th and 6th joints, lower border of 4th joint smooth, finger and thumb subequal to hand. 2nd pleopod with apical joint boot-shaped, set at right angles to plane of preceding joints (*i.e.* parallel with long axis of abdomen), the toe pointing backwards.

Length up to 54 mm. (McArdle).

Locality —Off Cape Natal (Durban), 440 fathoms (Stebbing).

Distribution.—Bay of Bengal, 542 fathoms.

Remarks.—From an examination of the remains of Stebbing's specimen, I am able to confirm his statement that none of the pleopods carry an appendix interna. The 1st pleopods apparently were removed by Stebbing.

Calocaris (Calocaris) barnardi Stebb.

Fig. 93, *i-k*.

1914. Stebbing, *l. c.*, p. 9, pl. 2 (Crust., pl. 66).

1925. de Man, *l. c.*, p. 116 (in key).

Rostrum straight, horizontal (even slightly down-turned), dorsally grooved, lateral margin entire, but 2-3 teeth on the continuation on the epigastric region. Chelipeds stout, a spine on apex of upper margin of 4th and 6th joints, lower border of 4th joint spinose, near lower margin on outside of hand a ridge with a spine. Pleopod 1, basal joint fusiform, 2nd joint ovate, with subapical lobe on inner margin bearing numerous coupling-hooks; pleopods 2-5 similar to one another, with appendix interna. Telson longer than broad, apex broadly rounded, with slight median notch.

Length up to 38 mm. Pale buff, chelipeds salmon.

Locality.—Off Saldanha Bay, 89 fathoms (Stebbing); 29° S., 16° 45' E., 84 m. (Fisheries Survey).

Remarks.—Three cotypes all agree as regards the pleopods; they show the ♀ genital openings on the 3rd coxae, but are non-ovigerous.

Calocaris (Calastacus) longispinis McArdle

Fig. 93, *d-f*.

1910. Stebbing, *l. c.*, p. 367.

1925. de Man, *l. c.*, p. 118 (in key).

♀. Rostrum with 4 (left) and 5 (right) denticles on lateral margins, 5 (left) and 4 (right) teeth on their continuations on the epigastric region. Median keel on carapace without any tooth or denticle. Between it and the outer keels 2 teeth on either side, the hindmost of the left side feebly developed. Eye-stalks movable. Antennal spine not reaching to $\frac{1}{4}$ length of 4th joint, acicle reaching to end of 4th joint. 4th joint of maxp. 3 with 4 spines, increasing in size distally, on inner (lower) margin. Chelipeds unequal, left the larger, lower margin of 3rd joint with a few denticles and a larger apical tooth, lower margin of 4th joint with a few minute denticles proximally and

a tooth about in the middle, lower *outer* margin distally serrulate and ending in a small tooth, upper margin with 4 spines distally, 5th joint spinulose distally on upper margin, 6th joint with upper margin spinulose, spines mostly in pairs (6), long and short ones alternating, a salient serrulate ridge along outer lower border, continued on to thumb, outer surface of 5th and 6th joints with scattered miliary granules and setae, inner margins of finger and thumb serrulate, finger of larger chela with a tooth in the proximal excavation (feeble in the smaller right chela). Pleopod 1 simple, curved, sparsely setose; pleopods 2-5 with appendix interna. Telson longer than 6th abdominal segment, longer than broad, oblong, apically rounded-truncate, with a minute median spinule. Endopod of uropod with 5-6 minute spinules and tufts of setules on median ridge; some spinules along the suture on exopod.

Length 62 mm.

Locality.—Off Cape Point (Table Mountain, N. 79° E., distant 40 miles), 700 fathoms (Stebbing).

Distribution.—Arabian Sea and Gulf of Oman, 300-700 fathoms.

Remarks.—The above description is from the same ovigerous ♀ which Stebbing had already compared with McArdle's and MacGilchrist's descriptions. He considered the South African specimen identical with *longispinis* in spite of certain differences.

Two other species have been described from the Arabian Sea: *felix* and *investigatoris*. Alcock's (1901) description of the cheliped of the latter applies very well to the South African specimen.

FAMILY CALLIANASSIDAE.

1903. Borradaile, Ann. Mag. Nat. Hist. (7), xii, p. 544 (part: *Callianassinae*).

1907. *Id.*, *ibid.* (7), xix, p. 476 (*Callianassinae*).

1910. Stebbing, *l. c.*, p. 369 (part).

1924. Gurney, "Terra Nova" Rep., zool., viii, p. 157 (larval stages).

1928. de Man, Siboga Exp. monogr., xxxixa, 6, pp. 18 *sqq.* (part).

1938. Gurney, "Discovery" Rep., xvii, pp. 299 *sqq.* (larval stages).

Rostrum small or minute, inconspicuous. *Lineae thalassinicae* present (*cf.* fig. 96). Antennal acicle minute or obsolete. 1st pair of legs (chelipeds) unequal, chelate; 2nd pair chelate; 3rd and 4th pairs simple (4th sometimes feebly subchelate); 5th pair chelate, the finger closing *laterally* against the thumb. No epipods on legs. Pleopod 1 uniramous, reduced in ♂; pleopod 2 biramous; pleopods 3-5 foliaceous,

with appendix interna. No branchial filaments on pleopods. Uropod without suture on either endopod or exopod.

Gen. CALLIANASSA Leach

1814. Leach, Edin. Encycl., vii, p. 400.
1866. Stimpson, Proc. Chicago Ac. Sci., i, p. 46 (*Glypturus*).
1903. Borradaile, *l. c.*, p. 544.
1910. Stebbing, *l. c.*, p. 369 (*Callichirus* and *Calliactites*).
1928 (May). de Man, Capita Zool., II, 6, pp. 1-56, pls. 1-12.
1928 (Dec.). *Id.*, *l. c.* (Siboga Exp.), pp. 25 (list) and 91 *sqq.* (key to species).
1935. Schmitt, Smiths. Misc. Coll., xciii, no. 2, p. 1 (Atlantic American species).
1937. Gurney, Proc. Zool. Soc. Lond., ser. B, pp. 326-330, figs. (larval stages).
1944. *Id.*, Proc. Zool. Soc. Lond., cxiv, p. 82.

Length of carapace medio-dorsally in front of cervical groove much greater than (more than twice) length behind the groove. Eye-stalks flattened against one another (except in *Scallasis*). 1st pair of legs (chelipeds) unequal (except in one South Australian species), chelate, finger and thumb stout, not longer than hand; 2nd pair chelate; 4th pair often feebly subchelate; 5th pair with the dactyl closing laterally against a thumb-like projection of the 6th joint to form a small chela. Pleopod 1 in ♂ short, rod-like, in ♀ longer, sigmoid, pleopod 2 biramous (foliaceous in *C. caecigena*); pleopods 3-5 foliaceous, appendix interna present, but often inconspicuous.

Remarks.—Five subgenera have been recognized by Borradaile and de Man; but I agree with Gurney (1937 and 1944) that these divisions are very unsatisfactory. There appear to be transitional forms between these somewhat loosely defined subgenera, and therefore all the South African species are included under *Callianassa*. More intensive study may lead to a subdivision based on more precise criteria (Gurney, 1944).

Bopyrid parasites of the genera *Ione*, *Ionella*, and *Pseudione* are found in the branchial chamber.

Key to the South African Species.

- I. 6th joint of 3rd leg with a lobe on hind margin, with characteristic T or hammer-head appearance (fig. 94, *d*).
Appendix interna on pleopods 3-5 triangular, inconspicuous, not projecting beyond inner margin of ramus (fig. 94, *i*).

- A. Endopod of uropod oval, extending well beyond apex of telson, which is distinctly broader than long.
1. Frontal margin unispinose (with rostral point but no tooth on antero-lateral margin).
 - a. Mxp. 3 operculiform, 3rd, 4th, and 6th joints expanded (fig. 94, a) . . . *kraussi*.
 - b. Mxp. 3 pediform, 3rd-5th joints narrow, 6th expanded (fig. 95, a) . . . *gilchristi*.
 2. Frontal margin trispinose, a tooth on antero-lateral margin in addition to rostrum.

Mxp. 3? [*martensi*, Mauritius].
- B. Endopod of uropod square-ended, not extending beyond apex of telson. Mxp. 3 operculiform, 3rd-6th joints expanded (fig. 95, f) . . . *natalensis*.
- II. 6th joint of 3rd leg oval, more or less obliquely articulated to 5th, but without definite lobe on hind margin (fig. 95, l). Appendix interna on pleopods 3-5 rod-like, projecting. Mxp. 3 operculiform, 3rd and 4th joints expanded *rotundicaudata*.

Two Mauritian species, *C. mauritiana* Miers (1882, Proc. Zool. Soc. Lond., p. 341, and 1884, *ibid.*, pl. 1, figs. 2, 2, a; de Man, 1928 (May), p. 10, pl. 2, fig. 4) and *C. martensi* Miers (1884, Proc. Zool. Soc. Lond., p. 13, pl. 1, figs. 1, 1, a-c), are both inadequately known.

Callianassa (Callichirus) kraussi Stebb.

Fig. 94.

1900. Stebbing, Mar. Invest. S. Afr., i, p. 39, pls. 2, 3.

1910. Stebbing, *l. c.*, p. 369.

1928 (Dec.). de Man, *l. c.*, p. 113 (in key).

Frontal margin slightly concave on either side of the small rostral point. 3rd peduncular joint of ant. 1 longer than 1st and 2nd together; peduncle of ant. 2 much shorter than that of ant. 1. Mxp. 3 operculiform, 3rd and 4th joints broadly expanded, 4th broader than long, 5th oval, 6th lobately expanded, broader than long, 7th slender. The larger cheliped on either right or left side, usually the left; 3rd joint denticulate on lower margin, inner surface and lower outer surface granulate; 4th joint with lower margin expanded proximally into a rounded lobe, curving evenly to the narrow apex, denticulate, inner surface and lower outer surface granulate; 5th joint longer than wide, lower margin denticulate, especially at rounded proximal corner, inner surface granulate only near lower margin and upper margin proximally and distally, proximally an ovoid sunken area defined by

a thin membranous line, outer surface smooth, nitidulous, a few granules on distal margin below junction with 6th joint; 6th joint (hand) longer than broad, measured along dorsal margin subequal to

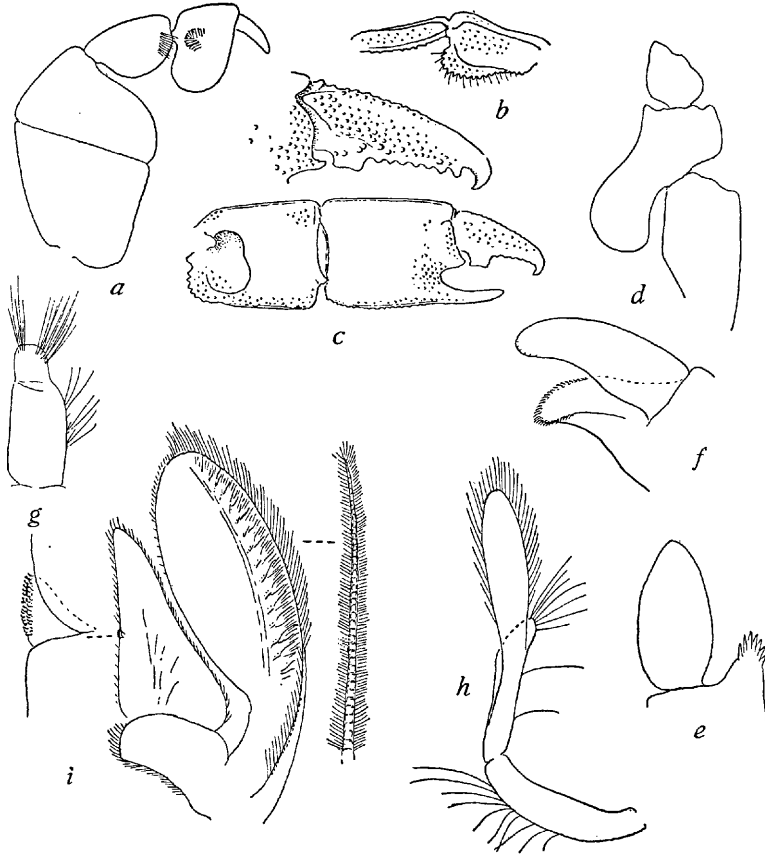


FIG. 94.—*Callianassa kraussi* Stebb. *a*, mxp. 3, inner view, setae omitted except special ones on 5th and 6th joints. *b*, inner view of 3rd and 4th joints of cheliped. *c*, inner view of wrist and hand chela, with outer view of finger further enlarged. *d*, 3rd leg, setae omitted. *e*, apex of 6th joint and dactyl of 4th leg, setae omitted. *f*, apex of 6th joint and dactyl of 5th leg, setae omitted. *g*, 1st pleopod ♂, left side, posterior view. *h*, 1st pleopod ♀, left side, posterior view. *i*, 3rd pleopod, with marginal seta and appendix interna further enlarged.

5th joint, upper and lower margins in both 5th and 6th joints thinly costate, inner surface granulate along lower margin and around distal excision and inner edge of thumb, feebly also along dorsal margin, outer surface granulate only around distal excision; finger overlapping thumb, apically hooked, inner margin with square tooth proximally

(in specimens from about 45 mm. upwards), inner and outer surfaces granulate except outer margin distally. Smaller cheliped, lower margin of 4th joint feebly denticulate, 5th twice (or almost) as long as wide, 6th joint measured along dorsal margin half as long as 5th, inner and outer surfaces of 5th and 6th joints smooth, finger and thumb subequal, apically acute, their opposing margins serrulate. In juv. the larger cheliped is less strongly granulate, thumb with its inner cutting-edge denticulate, finger with apex not hooked, and proximal tooth undeveloped, 5th joint slightly longer than 6th measured along upper margin. 3rd leg hammer-shaped, 6th joint strongly lobed, dactyl broadly subtriangular. 6th joint of 4th leg with lower apex shortly produced and tipped with several spines, dactyl ovate, unguis obsolete. 5th leg chelate in a lateral (not vertical) direction, 6th joint apically produced as a spoon-shaped process edged with a series of spines, dactyl attached on inside at base of this process and closing against it laterally (not closing "down" on it as Stebbing says), spoon-shaped, apically rounded, with smooth margin. Both 4th and 5th legs apically densely setose. A tuft of shaggy setae on postero-inferior corner of 3rd abdominal segment and in middle of lower margin of 4th and 5th segments. Pleopod 1 in ♂ short, stout, apically blunt, with 2 bunches of long setae, outer margin sinuous, with a few long setae; in ♀ slender, rather elongate, sigmoid, the distal joint with a short lobe about in middle on anterior surface (possibly the remnant of the exopod). Pleopod 2 biramous, the outer ramus elongate-oval, slightly longer than the inner (not *vice versa* as Stebbing says), inner ramus apically blunt. Pleopods 3-5 large, foliaceous, outer ramus oval, its outer margin fringed with plumose setae which appear submoniliform or articulated, inner ramus shorter, triangular, appendix interna a small triangular plate attached on anterior surface of ramus and scarcely projecting beyond the straight inner margin, with a double or treble row of coupling-hooks. Telson broader than long, broadest across middle, hind margin truncate, setose near lateral corners. Uropod extending well beyond telson, outer ramus subtriangular, densely fringed with setae, with another, submarginal, curved band of setae from outer corner, inner ramus oval, inner margin and apex setose.

Length up to 70 mm., larger cheliped 60 mm. Smallest specimen examined 15 mm. Pale yellowish or buff, deeper on abdomen, uropods gamboge, a pink or crimson line or suffusion medianly on 1st-3rd abdominal segments, chelipeds white or pale pink, deeper pink along upper borders, especially externally.

Localities.—Gordon's Bay, False Bay (Stebbing); Saldanha Bay, and Klaasjagers Lagoon (west coast of Cape Peninsula) (S. Afr. Mus.); Kalk Bay, St. James, Muizenberg Vlei, Strand, Gordon's Bay (all in False Bay), Kleinmond (mouths of Bot and Palmiet Rivers), Still Bay, Zwartkops estuary (Port Elizabeth), Kasouga Lagoon (south of Port Alfred), Nahoon River (East London) (S. Afr. Mus.); Port Edward, Natal (coll. T. A. Stephenson); Kosi Bay (Univ. Cape Town Ecol. Surv., 1946, 1948).

Remarks.—Stebbing described the ♀, with sigmoid 1st pleopod. Less reduction has taken place in the ♀ evidently because the pleopods are needed to help in retaining the eggs. Females are apparently much rarer than males, and I have not seen an ovigerous one.

But for its presence on the west coast of the Cape Peninsula one might be suspicious of the record from Saldanha Bay; two specimens from this latter locality were collected by the late Dr. Gilchrist together with *Upogebia capensis*.

Callianassa gilchristi Brnrd.

Fig. 95, *a-e*.

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 379.

Rostral point rather well developed, spiniform, extending half-way (or nearly) along eye-stalks, no teeth on antero-lateral margin. Eye-stalks apically acute, cornea rather large. 3rd peduncular joint of ant. 1 longer than 1st and 2nd together; peduncle of ant. 2 extending half-way (or a very little more) along 3rd peduncular joint of ant. 1. Mxp. 3 slender, pediform, 3rd and 4th joints together 4 times as long as wide, inner surface of 3rd joint smooth, 5th joint narrow, expanding slightly distally, 6th joint expanded, as long as wide. Larger cheliped ♂ (missing in the ♀ specimen), 3rd joint widening distally, lower margin serrulate, upper margin of 4th joint granulate or beaded (except distally), lower margin serrate, proximally widening to a sharp tooth, then indented, distally convex, inner surface and lower part of outer surface of 3rd and 4th joints granulate, 5th joint longer than wide, upper margin with a few indents on the in-turned costate edge, lower proximal corner rounded, serrate, the serrae somewhat in-turned and obscured by the intervening tufts of setae, 6th joint slightly narrower than 5th, width slightly less than length of upper margin, thumb with outer cutting-edge denticulate, inner edge granulate, lower margin of hand and thumb with the tufts of setae very closely set forming a thick fringe, finger with cutting-edge denticulate, upper margin near hinge

with several granules, outer and inner surfaces of 5th and 6th joints smooth and polished. Smaller cheliped (σ and φ), 5th joint $2\frac{1}{2}$ times

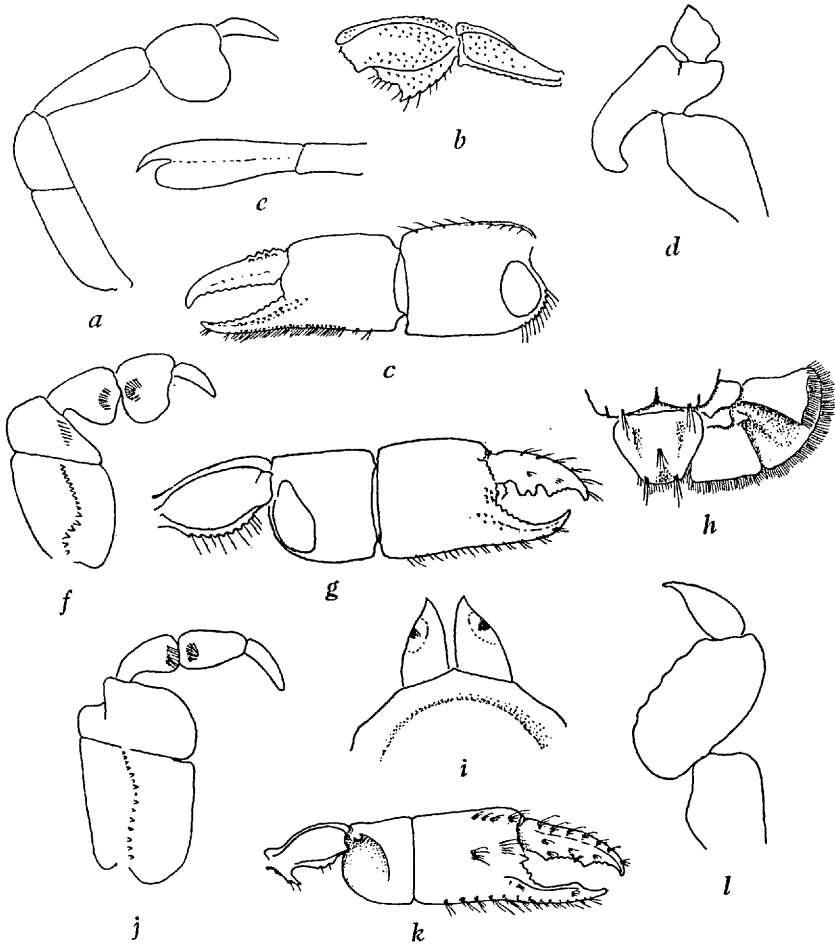


FIG. 95.—*Callianassa gilchristi* Brnd. *a*, mxp. 3, setae omitted. *b*, inner view of 3rd and 4th joints of cheliped σ . *c*, inner view of wrist and hand of larger cheliped σ . *d*, 3rd leg, setae omitted. *e*, 1st pleopod σ , setae omitted.

Callianassa natalensis Brnd. *f*, mxp. 3, setae, except special ones, omitted. *g*, inner view of cheliped φ . *h*, telson and uropod.

Callianassa rotundicaudata Stebb. *i*, front of carapace with eyes. *j*, inner view of mxp. 3, setae, except special ones, omitted. *k*, inner view of cheliped σ . *l*, 3rd leg, setae omitted.

as long as wide, not quite as long as 6th joint incl. thumb. 6th joint of 3rd leg with strongly developed posterior lobe, which is slightly

hooked. 4th and 5th legs as in *kraussi*. Pleopod 1 ♂ apically bilobed, outer lobe acute; a slight longitudinal groove seems to indicate the original biramous character of the appendage. Pleopod 1 ♀ sigmoid as in *kraussi*. Pleopods 3-5 as in *kraussi*. Telson broader than long, hind margin straight, postero-lateral angles rounded, each with a tuft of setae, a transverse setiferous groove across median portion nearer base than hind margin. Uropod extending well beyond telson, inner ramus ovate, apically rounded, outer ramus subtriangular, with marginal and submarginal fringe of setae, a spinule at base on the low median ridge.

Length up to 68 mm.

Localities.—False Bay, Durban Bay, and off Natal coast, 20 fathoms (S. Afr. Mus., A942 and A6807).

Remarks.—The non-ovigerous ♀ (larger cheliped missing) from False Bay agrees with the two Natal ♂♂.

Callianassa natalensis Brnrd.

Fig. 95, *f-h*.

Cf. 1905. de Man, Tijdschr. Ned. Dierk. Ver. (2), ix, p. 605 (*indica*).

1928 (Dec.). *Id.*, *l. c.*, p. 160, pl. 17, figs. 26, 26, *g* (*indica*).

1947. Barnard, Ann. Mag. Nat. Hist. (xi), 13, p. 379.

Rostral point very short, triangular, no tooth on antero-lateral margin. Eye-stalks apically subacute. 3rd peduncular joint of ant. 1 subequal to 2nd joint; peduncle of ant. 2 extending beyond peduncle of ant. 1 by half length of its 5th joint. Mxp. 3 operculiform, 3rd-6th joints broad, 3rd with curved row of denticles on inner surface, 4th broader than long, triangular, distal and inner margins oblique, 5th widening distally but a little longer than broad, 6th broader than long. Larger cheliped (♀), inner and outer surfaces smooth, polished, 3rd joint widening distally, lower margin with 2 feeble denticles distally, 4th joint with lower margin evenly convex (the joint widest in middle, not near base as in *kraussi*), serrate and setose, 5th joint as broad as long, lower hind corner rounded, entire (feebly crenulate owing to insertions of setae), 6th joint with upper margin equal to that of 5th (or a trifle longer), thumb shorter than rest of hand, broad basally, tapering to a sharp point, outer cutting-edge denticulate, a few granules on inside near base of thumb, and on distal margin near finger hinge, finger stout, cutting-edge with 2 strong teeth, the proximal one bifid, the second one triangular; smaller cheliped, 5th joint longer than broad, its upper margin almost twice

as long as that of 6th joint, thumb and finger longer than upper margin of 6th joint. 3rd-5th legs as in *kraussi*. Pleopod 1 (♀) sigmoid as in *kraussi*; pleopod 2 biramous; pleopods 3-5 as in *kraussi*. Telson a little broader than long, lateral margins gently converging to rounded-truncate hind margin. Uropod, inner ramus not extending beyond telson, trapezoidal, square-ended, outer ramus broadly triangular, with marginal and submarginal fringes of setae.

Length non-ovig. ♀ 100 mm., larger cheliped 50 mm.

Locality.—From stomach of Rock Cod, Natal coast (S. Afr. Mus., A8339).

Remarks.—Appears to bear considerable resemblance to *indica* de Man, a large Javanese species (90 mm.) described from a single ♂ without the larger cheliped. Both *indica* and the present specimen differ from *mauritiana* in the proportions of the 6th joint of mxp. 3.

Callianassa (Calliactites) rotundicaudata Stebb.

Fig. 95, *i-l*.

1902. Stebbing, Mar. Invest. S. Afr., ii, p. 41, pl. 8.

1910. Stebbing, *l. c.*, p. 369.

1928 (Dec.). de Man, *l. c.*, pp. 26, 94, and 97 (in key).

Frontal margin feebly scalloped, rostral point very feeble. 3rd peduncular joint of ant. 1 longer than 1st and 2nd together; peduncle of ant. 2 nearly as long as that of ant. 1. Mxp. 3 operculiform, inner surface of 3rd joint with gently curved longitudinal line of denticles, 3rd and 4th joints broadly expanded, 4th broader than long, 6th ovate, not expanded. Larger cheliped on right side in type, on left in 4 other specimens, larger in ♂ than in ♀; 3rd joint rather rapidly expanded distally, feebly serrulate on lower margin distally, 4th joint oval, smooth, lower margin with 2 or 3 feeble setiferous indents, a projecting tooth proximally, which usually has 1 or 2 setiferous indents, 5th joint wider than long, smooth, with a few isolated setae, inner surface proximally hollowed, more or less membranous, demarcated by a straight transverse line, 6th joint longer than 5th, width subequal to upper margin in ♀, but less in ♂, thumb in ♂ feebly grooved and denticulate along inner edge, in ♀ tapering more evenly, cutting-edge sharper, serrulate, cutting-edge of finger in ♂ more or less feebly denticulate, with 2 slight prominences, a larger tooth on either side of the distal prominence, cutting-edge in ♀ sharper; numerous tufts of setae along upper and lower margins of 6th joint, thumb, and finger, better developed in ♂ than in ♀; smaller cheliped in both sexes slender,

5th joint longer than upper margin of 6th. 6th joint of 3rd leg oval and set rather obliquely on 5th but without basal lobe and not truly hammer-head shaped, dactyl ovate-lanceolate. 6th joint of 4th leg not apically produced, dactyl more terete and digitiform than in *kraussi*, with stout unguis. 5th leg with the produced spoon-shaped apex of 6th joint and the spoon-shaped dactyl closing together in a lateral direction (as in *kraussi*), the margin of the former edged with close-set spines, that of latter smooth. Both 4th and 5th legs apically densely setose. Abdominal segments 1 and 2 not coalesced (contrary to Stebbing's statement), the terga and intervening membrane being quite distinct; a tuft of shaggy setae on postero-inferior corner of 3rd segment and on middle of lower margin of 4th and 5th segments. Pleopods 1 and 2 absent in ♂. Pleopod 1 in ♀ sigmoid as in *kraussi*; pleopod 2 biramous. Pleopods 3-5 foliaceous, outer ramus narrow (width less than greatest width of inner ramus), curved, fringed with plumose articulated setae as in *kraussi*, inner ramus triangular, appendix interna distinct, projecting, rod-like. Telson broader than long, lateral and hind margins evenly rounded. Uropod extending well beyond telson, outer ramus obovate, outer margin densely fringed with setae and a curved submarginal band (of setae, not spinules as Stebbing says) from outer corner, inner ramus broadly oval, inner margin and rounded apex fringed with setae.

Length up to ♂ 47 mm., ♀ 50 mm.; larger cheliped ♂ 35 mm., ♀ 30 mm. Eggs 1.3-1.75 mm. diam. Translucent white when alive, larger chela pinkish, eggs yellow.

Localities.—St. Francis Bay, 30-34 fathoms (Stebbing); Strand and Gordon's Bay (False Bay), low tide (S. Afr. Mus.); Algoa Bay, low tide (Port Elizabeth Mus.).

Distribution.—Ceylon (see de Man, 1928 (Dec.), pp. 26, 94).

Remarks.—A smaller ♂, 25 mm. in length, has the same characteristics of the larger chela, e.g. the terete thumb, but the cutting-edges of both finger and thumb are sharper, and the tooth on either side of the distal prominence on the former is not developed.

FAMILY UPOGEBIIDAE.

1903. Borradaile, *Ann. Mag. Nat. Hist.* (7), xii, p. 542 (*Callianassidae*, part: *Upogebiinae*).

1907. *Id.*, *ibid.* (7), xix, p. 476 (*Upogebiinae*).

1910. Stebbing, *l. c.*, p. 369 (*Callianassidae* part).

1924. Gurney, "Terra Nova" Rep., Zool., viii, pp. 164 *sqq.* (larval stages).

1928. de Man, Siboga Exp. monogr., xxxixa, 6, pp. 18 *sqq.* (*Callianassidae*, part).

1938. Gurney, "Discovery" Rep., xvii, pp. 330 and 340 *sqq.* (larval stages and systematic position).

Rostrum well developed. *Lineae thalassinicae* present (fig. 96, *a, b*). Antennal acicle more or less distinct. 1st pair of legs (chelipeds) equal, chelate or simple; 2nd pair simple; * 3rd and 4th pairs simple; 5th pair feebly subchelate. Epipods present on legs. Pleopod I absent in ♂, uniramous in ♀; pleopods 2-5 foliaceous, without appendix interna. No branchial filaments on pleopods. Uropod without sutures on either endopod or exopod.

Gen. UPOGEBIA Leach

1910. Stebbing, *l. c.*, p. 370, and *Calliadne*, p. 370.

1927. de Man, *Capita Zool.*, II, 5, pp. 1-58, pls. 1-6.

1928. *Id.*, *l. c.*, pp. 22 (list) and 35 *sqq.* (key to species).

1937. Gurney, *Proc. Zool. Soc. Lond.*, ser. B, p. 98 (larval stages).

1940. Poulsen, *Vidensk. Meddel. Dansk. Naturh. For.*, civ, p. 216.

1941. Hale, *B.A.N.Z. Antarct. Res. Exp.*, B, iv, pt. 9, p. 273 (subg. *Calliadne*).

The length of the carapace medio-dorsally in front of cervical groove approximately equal to, or not considerably greater than, length behind the groove. 1st pair of legs chelate, or subchelate (in one species simple in the ♀ only); uropods not longer than telson.

Remarks.—The fairly abundant material of "*capensis*" in the South African Museum can be divided into two lots: (*a*) those with a spine on the upper apex of 4th joint of 1st leg (cheliped), and coxal spines on 1st-3rd legs; (*b*) those without these spines. The first lot occur on the west coast from Luderitzbucht to Table Bay, and two isolated localities on the south coast; the second lot occur from False Bay (east side) to East London (and possibly Natal).

Krauss' original locality was Table Bay. de Man found that 2 ♀♀ from Luderitzbucht had the coxal spines (1928, *l. c.*, p. 51), and included *capensis* in his key (*ibid.*, p. 41) under "*g2*. Upper border of merus of chelipeds armed with a spine near the distal extremity." Stimpson's locality was Simon's Bay, where the same form occurs at the present day; and he included in his brief description the diagnostic feature of the coxal spines.

Ortmann in describing a damaged specimen from Algoa Bay

* Chelate in *Bigea*, known only from an old drawing (see Borradaile, 1903).

expressly mentioned the absence of spines on 4th joint of 1st leg (see also his figure) and the coxal spines.

Obviously, if two species are to be recognized, one is Krauss' *capensis* and the other Ortmann's *africana*. It is a great pity that Stimpson's *subspinosa* must be suppressed, as he drew attention to one of the two crucial diagnostic features.

Bopyrid parasites of the following genera are recorded as living in the branchial chamber, *Ione*, *Pseudione*, *Aporobopyroides*, and *Upogebiophilus*, and from between the pleopods, *Phylloclurus*.

Key to the South African Species.

1. Finger of cheliped much longer than thumb (fig. 97, b).
 - a. Antero-lateral border of carapace with a small spine above antenna 2. A gill on base of 5th leg.
 - i. Coxae of 1st-3rd (♂) or 1st and 2nd (♀) legs with a spine. 4th joint of cheliped with spine on upper margin near apex (fig. 96, c, d) . . . *capensis*.
 - ii. No coxal spines. 4th joint of cheliped without spine *africana*.
 - b. No spinule on antero-lateral border of carapace. No gill on 5th leg *assisi*.
2. Finger and thumb of cheliped subequal, crossed (fig. 97, f). Antero-lateral border of carapace without spinule (*Calliadne*).
 - a. No spines on upper margin of 4th joint of cheliped . . . *savignyi*.
 - b. 2-4 spines near apex on upper margin of 4th joint of cheliped *rhadames*.

Upogebia capensis (Krauss)

Fig. 96.

1843. Krauss, Südafrik. Crust., p. 54 (*Gebia major* var. *capensis*).
 1860. Stimpson, Proc. Ac. Nat. Sci. Philad., xii, p. 22 (*subspinosa*).
 1891. Ortmann, Zool. Jahrb., vi, p. 54.
 1910. Stebbing, *l. c.*, p. 370 (*subspinosa*).
 1913. Balss, Schultze Reise, v, p. 108, fig. 8 (cheliped) (fig. 7: cheliped of *major*, Japan, for comparison) (excl. Stebbing (1910) and Ortmann (1894) from synonymy).
 ? 1914. Lenz and Strunck, D. Südpol Exp., xv, p. 291 (probably *capensis*, but coxal spines not mentioned).
 1916. Balss, Beitr. Meeresf. Westaf., ii, p. 34 (excl. localities: Port Elizabeth and Algoa Bay).

1927. de Man, *l. c.*, p. 32, pl. 3, fig. 12 (telson) (excl. Ortmann (1894) from synonymy).

1928. *Id.*, *l. c.*, pp. 37, 41 (in key), 51 (*capensis* and *subspinosa*).

1947. Barnard, *Ann. Mag. Nat. Hist.* (xi), 13, p. 380.

[Not *capensis* Stebbing 1900 and 1910 = *africana*.]

Front tridentate, lateral teeth not extending half-way along rostrum, no tooth or spine on lower surface of rostrum; a smooth medio-dorsal groove anteriorly, and a smooth groove between lateral teeth of front and rostrum extending back to cervical groove. Rostrum, lateral keel, and anterior portion of carapace granulate-tuberculate, more or less concealed in short thick pile. Several distinct denticles on hind margin of cervical groove below the *linea thalassinica*, and 1 or 2 indistinct ones above it. Projecting lateral lobe of epistome (behind base of ant. 2) more or less quadrate, with (usually) a spinule on its anterior corner. 2nd joint of ant. 2 with (usually) a spinule on upper margin; acicle well developed, ending in a single spine. Eyes feebly pigmented. Chelipeds very slightly more robust in ♂ than in ♀, 4-5 spinules on lower outer margin of 3rd joint, 4th joint with upper margin rather strongly convex, descending rather steeply to junction with 5th joint, a spine on its inner upper margin near apex (often curved and adpressed), inner and outer lower margins denticulate, with 4-5 larger spines proximally where the two denticulate margins run together; 5th joint with 1 apical spine on upper margin, with several spinules or denticles external to it, 1 spine on middle of inner apical margin, a larger medio-ventral spine, lower outer margin formed by a smooth ridge ending in a spine; 6th joint upper margin with 2 serrulate or spinose and setiferous ridges, with a third ridge on inner side, and a series of squamiform setiferous granules on outer side, all 4 ridges with smooth intervening grooves, lower margin spinulose proximally, outer surface with squamiform setiferous granules, larger and more thickly set ventrally and distally, a more or less spiniform tooth near finger-hinge, inner surface with squamiform setiferous granules above and distally, and a spiniform tooth at base of thumb and a smaller one opposite middle of finger, proximal part smooth and glabrous, bounded below by a straight groove from which arises a thick fringe of long setae; thumb with 2-3 blunt denticles on inner edge in juv. and half grown, but usually quite smooth in adult; finger triquetral in cross-section, inner surface nearly flat, with a median longitudinal line of granules, with a few above and below it proximally, lower margin denticulate, one or two nearest the hinge being larger, and a row of granules external and close to the lower denticulate margin, upper