ON TWO NEW SPECIES OF CRUSTACEA FROM CHRISTMAS ISLAND

ISABELLA GORDON

1935

From the ANNALS AND MAGAZINE OF NATURAL HISTORY,
Ser. 10, vol. xvi. p. 629, *December* 1935.

On Two new Species of Crustacea from Christmas Island.

By ISABELLA GORDON, D.Sc., Ph.D., Department of Zoology, British Museum (Natural History).

DURING the winter of 1932–33 Prof. J. W. Harms of Tübingen visited Christmas Island (Indian Ocean) and some localities in the Malay Archipelago. A list of part of the Crustacea collected by him is given below *, followed by descriptions of two species that appear to be new. The holotypes and some paratypes will be deposited in the British Museum Collection, the other paratypes will be kept in Prof. Harms's collection at Tübingen.

LIST OF SPECIES.

MACRURA.

Peneus indicus Edw.—Belawan (Sumatra).
Alpheus brevirostris (Olivier).—Lingula I.
—— aff. *collumianus* Stimpson.—Flying Fish Cove, Christmas I.
—— *phrygianus* Coutière. ,, ,, ,, ,,
Athanas djiboutensis Coutière. ,, ,, ,, ,,
Synalpheus biunguiculatus (Stimpson).—Flying Fish Cove, Christmas I.
? *Arete dorsalis* Stimpson. ,, ,, ,, ,,
Leander potamiscus Kemp.—Belawan (Sumatra).
Palæmon carcinus Fabr.—Flying Fish Cove, Christmas I.
—— *lar* Fabr. (juv.).—Sumatra.
—— ——, var.—1. Sidney's Dale, Christmas I.
2. Waterfall, Dolly Beach, Christmas I.
Panulirus penicillatus Olivier.—Flying Fish Cove, Christmas I.
Thenus orientalis Rumph. ,, ,, ,, ,,

ANOMURA.

Callianidea typa H. M.-Edw.—Flying Fish Cove, Christmas I.
Calcinus herbstii de Man. ,, ,, ,, ,,
Clibanarius corallinus Edw. (juv.).—Flying Fish Cove, Christmas I.
—— *infraspinatus* Hilgendorf.—Lingula I.
—— aff. *padavensis* de Man.—Lingula I.
Pagurus gemmatus Edw.—Flying Fish Cove, Christmas I.
? *Orthopagurus harmsi*, sp. n. ,, ,, ,, ,,
Cœnobita rugosus Edw. ,, ,, ,, ,,

* For the Brachyura, see Balss, 1934, Zool. Anz. Bd. 106, Heft 10, pp. 225–237, 12 figs.

BRACHYURA.

? *Varuna litterata* (Fabr.) (juv.).—Waterfall, Christmas I.

STOMATOPODA.

Squilla scorpio Latr.—Lingula I.
Gonodactylus chiragra (Fabr.) var. *affinis* de Man.—Flying Fish Cove, Christmas I.
—— —— var. *anancyrus* Borrad.—Flying Fish Cove, Christmas I.
—— *quinquelobatus*, sp. n.—Flying Fish Cove, Christmas I.

? *Orthopagurus harmsi*, sp. n.

Material.—Christmas Island, Flying Fish Cove, Piles of Pier, 7. iv. 33, 1 ♂, 6 ♀ (two ovigerous).

Description of the Holotype (♀).—The *carapace* is fairly well calcified in front of the cervical groove, its greatest width is approximately four-fifths of its length in the middle line. The rostrum is narrowly triangular and rather prominent (fig. 1 *a*).

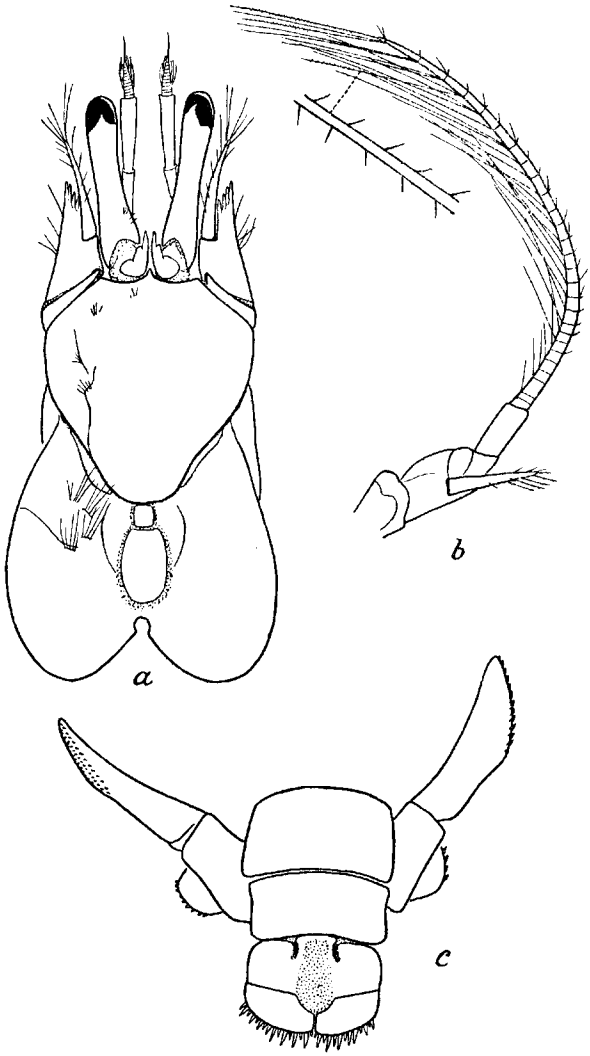
The *eye-stalk* is approximately five-sixths of the anterior border of the carapace, subequal to the antennular and antennal peduncles. The cornea is rather longer dorsally than ventrally; the ophthalmic scale terminates in an acute spine.

Antennule.—The ultimate segment of the antennular peduncle is somewhat enlarged distally and rather longer than the penultimate segment. The upper flagellum is about four-fifths the length of the ultimate segment.

Antenna (fig. 1 *b*).—The peduncle is robust, and about as long as the carapace in front of the cervical groove. The acicle is long, slightly curved, and furnished with long fine setæ; it does not reach to the distal end of the ultimate segment. The antero-external angle of the penultimate segment is produced, reaching just beyond the middle of the acicle, and bears four or five teeth (fig. 1 *a*). The flagellum is incomplete in the holotype. When complete it is at least half as long again as the carapace, and comprises some twenty-eight segments. It is beset with two rows of long slender setæ, each of which bears two series of minute setules as represented in the enlarged figure (fig. 1 *b*).

Mouth-parts.—The endopodite of the first maxilla is non-flagellate, but is bifurcated at the apex, the posterior branch being furnished with a strong seta. The exopodite of each maxilliped is flagellate; the external pair are widely separated at the base by a sternum.

Fig. 1.



? *Orthopagurus harmsi*, sp. n. ♀ paratype.

a. Carapace, in dorsal aspect. × 11.
b. Antenna (with portion of a single seta greatly magnified). × 11.
c. Telson, uropods, and last abdominal somite. × 15.

Chelipeds.—The chelipeds are very unequal. The right, or larger, is represented in fig. 2 *a*; the chela is bent so that its long axis is almost parallel to that of the merus. The outer surface of the propodus is flat and armed with curved white teeth or spines which are longest at the margins. Scattered over the surface, between the teeth, are rather short brownish setæ and numerous long, fine, silky hairs (fig. 2 *a*). The inner surface of the palm is strongly convex; the dactylus is narrower than the immovable finger and subequal to the palm. The carpus and merus are each short and very stout; a limited amount of movement is possible at the carpo-propodal articulation.

The left cheliped is represented in fig. 2 *b*; the outer surface of the palm is slightly convex and bears two irregular rows of short white teeth; a series of longer curved spines extends along the margin of the palm and the proximal half of the immovable finger. There are also many long silky hairs. At the distal end of the carpus are three teeth, the median of which is longest; the chela can be raised so as to lie in the same plane as the carpus.

Walking-legs.—The second and third legs probably over-reach the smaller cheliped * somewhat. They are compressed, setose—especially on the two terminal segments,—and unarmed save for a ventral spinule at the distal end of the propodus and five or six spinules, which increase in size distally, on the dactylus (in addition to the terminal claw).

The fourth pair are short and subcheliform, bearing a single row of nine corneous granules. The fifth pair are chelate and armed with numerous rows of corneous granules.

The genital openings are conspicuous on the bases of the third pair of legs.

Abdominal Appendages.—No paired appendages other than the uropods, which are of equal length, are present. There are three large biramose appendages on segments 2–4, but I have been unable to detect any trace of the small fourth appendage that is usually present on the left side. The posterior end of the body is almost, if not

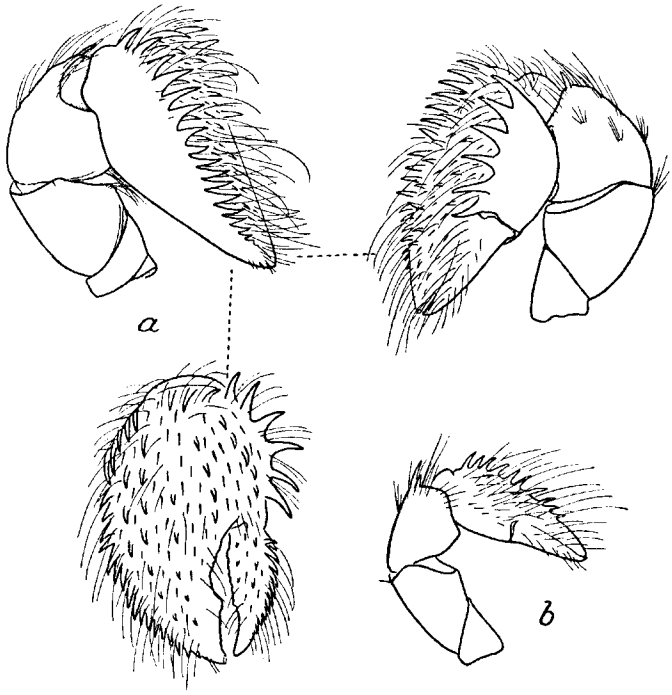
* The chelipeds break off very readily and are detached, in most cases, from the specimens.

quite, symmetrical and there are long curved teeth on the distal margin of the telson (fig. 1 *c*). The abdomen is 2–2·5 times the median length of the carapace, and almost straight.

Gills.—There are eleven phyllobranchiæ on each side.

Male.—The male is very similar to the females, but the abdomen is rather shorter; the genital pores are

Fig. 2.



? *Orthopagurus harmsi*, sp. n. Holotype. Chelipeds. × 11.

conspicuous, and, in spite of repeated examinations, I have been unable to detect the slightest trace of any appendages on the left side of the abdomen. The specimen measures approximately 10 mm. in length, eye-stalks included; the largest females are nearly twice this size. The vas deferens is not produced, on either side, into a tube.

Systematic Position.—This form belongs to the Eupagurinæ, and is apparently most closely related to the genus *Orthopagurus* Stevens (1927, p. 245). It also recalls certain species of the genus *Pylopagurus* Milne-Edwards and Bouvier, especially as regards the form of the larger cheliped. It differs from the latter genus, however, in the absence of paired appendages on the first abdominal somite of the female, in the number of unpaired abdominal appendages in both sexes *, and in the symmetrical tail-fan.

Through the courtesy of the authorities of the United States National Museum, Washington, I have been able to compare this species with a male and a female of *Orthopagurus minimus* (Holmes) determined by Dr. W. L. Schmidt. In *O. minimus* the posterior end of the body is almost or quite symmetrical, and differs from fig. 1 *c* only in that (1) the anterior plate is much larger relatively to the middle one with the anterior margin convex and bilobed, (2) the posterior margin of the telson is slightly concave and beset with fewer teeth, and (3) the uropods are much shorter, but also of equal size.

The only essential difference between the two species is in the number of pleopods on the left side of the body †. In *O. minimus* there are four in the female, three small and very unequally biramose pleopods in the male. The fourth pleopod, that corresponding to the fifth somite, is much reduced in size when present, and its suppression in the females of the present species is not of sufficient importance to exclude the species from the genus *Orthopagurus*. The complete suppression of the pleopods in the male presents some difficulty. When variation in the number of pleopods does occur within the limits of a genus it is usually slight, *e. g.*, the male of *Eupagurus variabilis* Milne-Edwards & Bouvier has three instead of the usual four pleopods.

Until more male specimens of this species are available, I do not feel justified in erecting a new genus for it. If the male proves normally to have no pleopods, it may be necessary to establish a new genus, which would be

* In *Pylopagurus* there are four unpaired pleopods in the female, three in the male.

† I unfortunately omitted to examine the maxilla of *O. minimus* (Holmes), and it is not referred to in the descriptions ; in all probability there is no flagellum to the endopodite.

analogous to the genus *Cancellus* in the Pagurinæ; the pleopods are absent in the male in all species of *Cancellus* (Alcock, 1905, p. 77), and the telson and uropods are symmetrical.

For the present I have deemed it advisable to refer the species, with much hesitation, to the genus *Orthopagurus*.

Habitat.—This species probably inhabits worm-tubes or " tooth " shells, but there are no details on the labels; a fragment of a Polychæte worm accompanies the specimens, but its presence may have no significance.

Gonodactylus quinquelobatus, sp. n.

Material.—Christmas Island, Flying Fish Cove, Piles of Pier, 7. iv. 33, 5 ♂♂, 5 ♀♀.

Description of Holotype (♀).—The *carapace* is rather broader posteriorly than anteriorly, where it is about two-thirds of its median length. The anterior margin, external to the gastric grooves, is slightly concave, and the antero-lateral angles are situated a short distance behind the rostral base.

The *rostrum* is sharply trispinous, the median spine reaching as far as the posterior border of the corneal portion of the eye, the lateral spines just over-reaching the base of the eye-stalk and the first segment of the antennal peduncle.

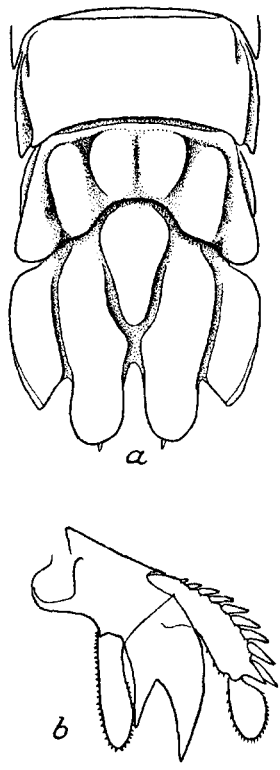
The dorsal process of the ophthalmic somite and the flattened eyes resemble those of *Gonodactylus excavatus* Miers (Kemp, 1913, pl. x. fig. 122).

The margins of the sixth and seventh thoracic segments are truncated with rounded anterior and posterior angles.

Abdomen.—The median portions of abdominal segments 1–5 are smooth; each has a lateral L-shaped ridge as in *G. excavatus*; the postero-lateral angles of the first three segments are rounded, of the fourth and fifth subacute. In the fifth there is a deepish furrow running to the extreme distal edge of the segment, external to a small rounded lobe on the posterior border. Internal to this, on the anterior half only, is another short shallow depression (fig. 3 *a*). The sixth abdominal somite bears three pairs of smooth elevations as represented in fig. 3 *a*; the intermediate pair are not constricted medially; the postero-lateral angles formed by the long external pair are very obtuse.

The *telson* is scarcely wider than long. It bears five smooth dorsal bosses deeply separated from each other by grooves. The median boss is pear-shaped, the rounded apex terminating a considerable distance from the posterior margin (fig. 3 *a*). The intermediate pair

Fig. 3.



Gonodactylus quinquelobatus, sp. n. Holotype.

a. Telson and two posterior abdominal somites.
b. Left uropod, in ventral aspect, setæ omitted. ×11.

of bosses are the longest, ending in blunt finger-like lobes separated by a long narrow gap, the edges of which are unarmed. The lateral bosses are shorter and more acutely pointed distally, with a carina on the posterior half of the external margin.

The uropod is represented, in ventral aspect, in fig. 3 *b*, the long plumose setæ being omitted.

Remarks.—This species belongs to Group III. and is nearly related to *G. ectypus* (Müller) and *G. excavatus* Miers (Kemp, 1913, p. 149, and pp. 185 & 187). It can at once be distinguished from both these species by the type of telson and sixth abdominal somite (*cf.* fig. 3 *a* with Müller, 1886, pl. iv. figs. 1 & 1 *a*, and Kemp, 1913, pl. x. fig. 123). The antero-lateral angle of the carapace is also less advanced than in either of these species.

References.

Alcock, A. 1905. 'Catalogue of the Indian Decapod Crustacea in the Collection of the Indian Museum,' pt. ii. Fasc. 1, Paguridæ. Calcutta, pp. xi+197, 16 pls.

Kemp, S. 1913. "An Account of the Crustacea Stomatopoda of the Indo-Pacific Region." Mem. Ind. Mus. Calcutta, iv. 1, pp. 1–217, 10 pls.

Müller, F. 1886. "Zur Crustaceenfauna von Trincomali." Verhandl. naturf. Ges. Basel, viii. pp. 470–484, pls. iv. & v.

Stevens, B. A. 1925. "Hermit Crabs of Friday Harbor, Washington." Publ. Puget Sound Biol. St., Seattle, iii. no. 68, pp. 273–309, 24 text-figs., pls. xxxiv.–xxxvi.

——. 1927. "*Orthopagurus*, a new Genus of Paguridæ from the Pacific Coast." Publ. Puget Sound Biol. St., Seattle, v. pp. 245–252, 4 text-figs.