frontal lobes were rather more prominent but I am inclined to regard the two forms as cospecific. All the material in the British Museum collection has been referred to *Ph. sculptus*. The specimens from Christmas Island are immature and they alone have distinct tubercles on the palm of the chela. The specimens from Galle, Ceylon (82.19) have the lobules of the carapace more deeply separated than in the U. S. Museum specimens, but agree with the latter as to front (fig. 20*a*) and first pleopod of the male. The specimens from the Red Sea are exactly similar to *Ph. nitidus* as regards lobulation of the carapace, but the front is usually rather more convex with more deeply separated lobes (fig. 20*a'*) and the first pleopod bears fewer long spines near the apex (*cf.* fig. 21*a* and *a'*). The same type of pleopod is also found in the Red Sea specimen determined by Nobili (Turin Museum).

These differences do not seem to be of specific importance. The variation in the chela led Klunzinger (1913, pp. 221-224) to establish two varieties of *Ph. sculptus* namely var. *granosimana* and var. *spinosimana*.

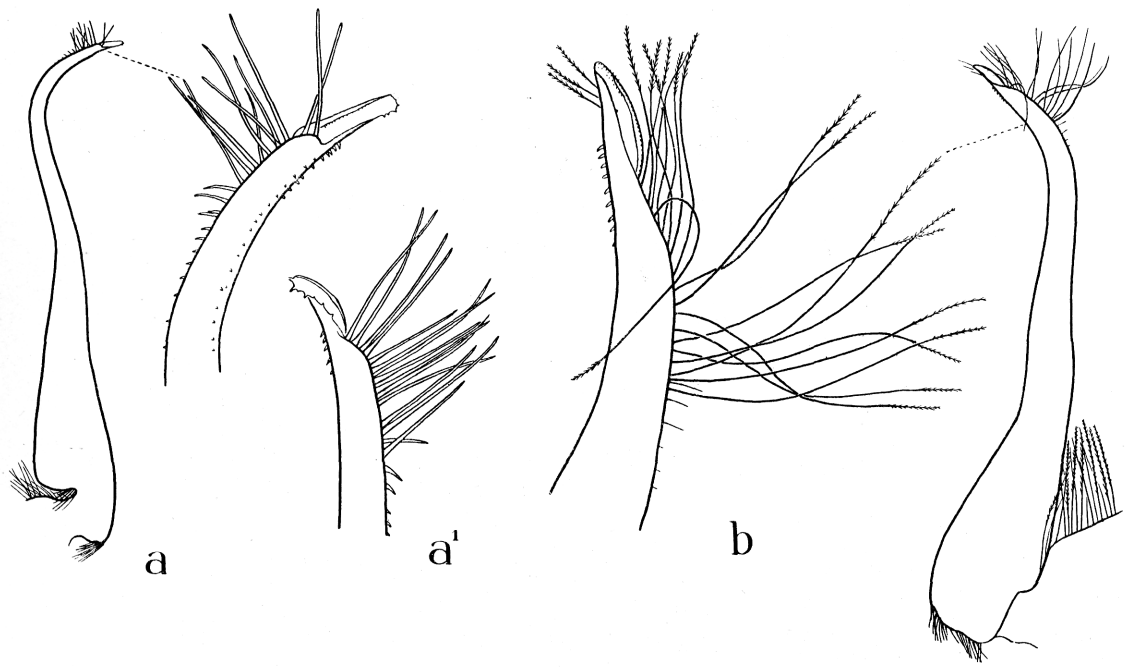

FIG. 21. — First pleopod of male of : *Phymodius nitidus* (DANA). *a*. specimen from Red Sea, Brit. Mus. 74.89. *a*¹. Specimen from U.S. Mus. (×15 and 45.)
b. *Phymodius granulatus* (TARG. TOZZ.). (×12 and 40.)

Phymodius granulatus (TARG. TOZZ.).

Phymodius granulatus KLUNZINGER, 1913, p. 227, pl. III, fig. 3.
Chlorodopsis arabica LAURIE, 1915, p. 450, fig. 1-1*b*, pl. XLII; fig. 2, 4*a*-4*d*, pl. XLIII.

MATERIAL EXAMINED :

Paris Museum :

Baie de Djibouti (M. Gravier), 1 ♂ (NOBILI, 1906, pp. 265-266).

British Museum :

(a) Gulf of Suez, 69.49, 1 ♂.

(b) Daedalus Shoal, Red Sea, 74.89, 1 ♂, 1 ♀.

(c) Egypt (no reg. number), 4 ♂, 3 ♀.

(d) Suez Canal, from coral 8-10-24; 1926.1.26.78, 1 ovig. ♀ (as *Chlorodopsis arabica* LAURIE in CALMAN, 1927, p. 213).

(e) Sudan, 1926.3.15, 1-2, 1 ♂ (203), 1 ♀ (211) (types of *Chlorodopsis arabica* LAURIE, 1915, p. 450, pl. XLII, fig. 1-1*b*; pl. XLIII, fig. 2, 4*a*-4*d*).

REMARKS. — This species differs from both *Ph. ungulatus* and *Ph. monticulosus* in having (1) more hairy walking-legs; (2) much larger and more irregular granules on the lobes of the carapace. The males differ also as regards

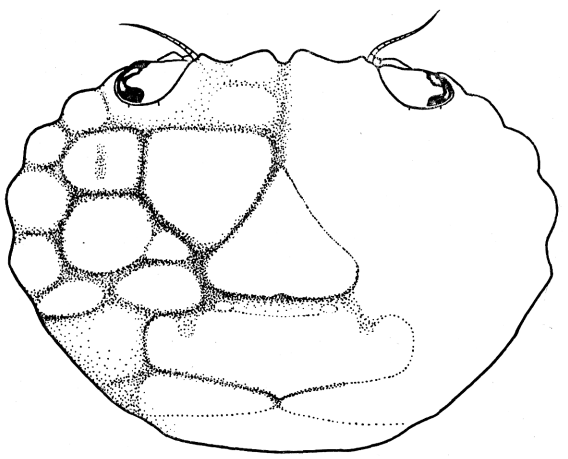

FIG. 22. — *Phymodius odhneri* n. sp. — Dorsal surface of carapace of holotype : ×7.5.

the terminal abdominal segments, the seventh being much broader than long, the sixth considerably narrowed posteriorly (fig. 19*b*); the first pleopod is also quite distinct, the long slightly plumose setae being visible under comparatively low magnification (fig. 21*b*, *cf.* fig. 18*a* and *b*).

In general outline the carapace is similar to that of *Ph. ungulatus*, the lobules being well marked and separated by deep grooves, and the frontal lobes well advanced and deeply separated from each other (*cf.* fig. 20*b* and 17*b*). The gastric region of the carapace however is rather more convex and the subdivision of lobe 2R is always pronounced. The chelipeds of the female resemble those of *Ph. monticulosus* in that they are scarcely visible beyond the anterolateral border (see table, p. 37). In the male the chelipeds are shorter (in specimens of approximately the same length of carapace) and in the largest

specimen examined ($l.$ = 15.4, $b.$ = 22.1 mm.) about 1/3 of the merus projects beyond S.

The walking legs are not biunguiculate, the conical spine at the base of the claw being very small.

MEASUREMENT OF MALE IN MM. :

	Ph. monticulosus.	*Ph. ungulatus.*	*Ph. granulatus.*	*Ph. sculptus.*	
Carapace	13.2 × 18.2	12.2 × 17.8	12.6 × 18.4	12.1 × 19.8	11.2 × 18.1
Larger chela	12.6 × 6.2	17 × 7.4	15.2 × 7.4	15.6 × 6	13.4 × 5.2
Smaller chela	11.7 × 4.7	15.2 × 5.6	13.5 × 5.4	13.6 × 5	13 × 4.5
Length of cheliped projecting beyond S.	17.7 and 15.5	23.8 and 21.5	20 and 18.8	20 and 17.5	—

Phymodius sp. ?

MATERIAL. — Banda Neira, 24-II-29, 1 ♂.

REMARKS. — This specimen is so similar to *P. ungulatus* — apart from the shape of the front — that I was at first inclined to regard it as a somewhat abnormal representative of that species.

The first pleopod, however, is similar to that of *P. nitidus* (fig. 21*a*) though perhaps somewhat less slender and sinuous. But the specimen differs from *P. nitidus* in having (1) only a few hairs on the walking-legs; (2) the lobules of the carapace finely granular instead of smooth and polished and (3) lobe 2M longitudinally divided.

It differs from *P. ungulatus* (of the same size) chiefly as regards the front, which is more advanced with the median lobes separated by a deep V-shaped notch (fig. 19*d*). The tubercles on wrist and palm of the cheliped are also lower and more obtuse. About 1/3 of the merus projects beyond the fourth antero-lateral tooth which terminates in a sharp spine.

The specimen is of small size and may not be quite mature (carapace $l.$ = 9, $b.$ = 12.3 mm.); it is just possible that it is a somewhat abnormal specimen of *P. nitidus*.

ATYPICAL SPECIES

Phymodius odhneri nov. spec.

MATERIAL. — Macclesfield Bank, collected by P. Bassett-Smith Esq., H. M. S. Penguin (Brit. Mus. Coll.). Holotype, ♂ (carapace, $l.$ = 7.1, $b.$ = 9.8, $d.$ = 4.4 mm.). Paratypes, 2 ♂, 2 ♀ (one slightly damaged).

DESCRIPTION OF HOLOTYPE. — Carapace very similar to that of *Ph. laysani* Rathbun (1906, p. 858, fig. 19*a*). Entire dorsal surface lobulated as represented

in fig. 22; 2M entire; 5L subdivided into a large outer and a small inner lobule the latter anterior to and separating 6L from 2M; 4M rather indistinct, 1P very large; 2P almost reaching to median line; 1L, 4L and 1R more or less confluent with the rounded antero-lateral lobes 1, 3 and 4 (*i.e.* E, T and S); 3L and

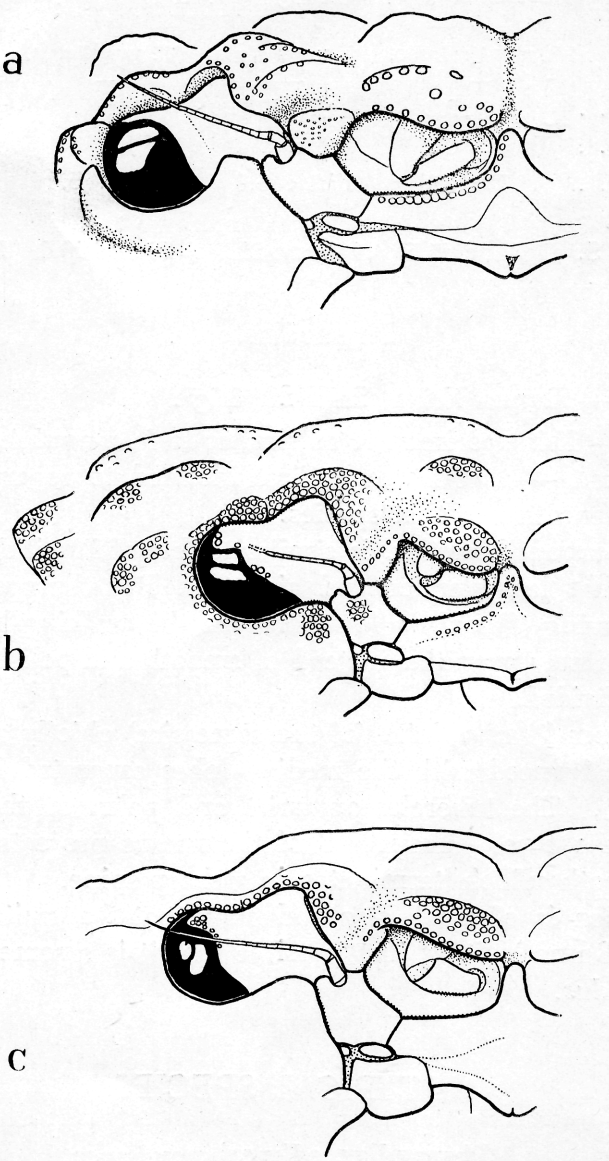

FIG. 23. — Right side of carapace, in frontal aspect, of : *a. Phymodius granulatus* (TARG. TOZZ.), cotype of « *Chlorodopsis arabica* » LAURIE. *b. Phymodius odhneri* n. sp. *c. Phymodius laysani* RATHBUN; many of the granules omitted : all × 14.

2L confluent but their apices distinct and granular. A few large flattened granules on most of the lobules, on front and round orbits (fig. 20*c*).

Front scarcely 1/3 of carapace width; median lobes convex and separated

by a deep U-shaped notch; each outer lobule small and merging into the inner orbital angle (fig. 20*c*).

Eyes wider (antero-posteriorly) than in typical species and only partially concealed by the shallow, backwardly-inclined orbits; orbital border entire, not lobulated as in typical forms, with two faint suture lines dorsally; infra-orbital angle prominent and visible in dorsal aspect (fig. 20*c*).

Basal segment of *antenna* in contact with down turned edge of front and extending into lower half of, flagellum in upper half of, orbital hiatus (fig. 23*b*). Antennular fossa at least 2/3 as deep as wide.

Anterior margin of *buccal cavern* rather straight (fig. 23*b*); palatal ridge rather distinct on anterior half of palate.

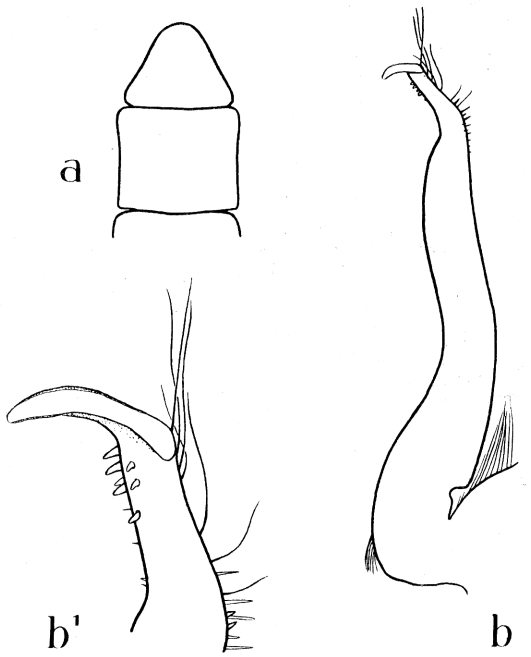

FIG. 24. — *Phymodius odhneri* n. sp. : *a*. Terminal segments of male abdomen. *b*. First pleopod of male. *b*¹. Apex of same farther enlarged. (*a*. ×15; *b*. ×22; *b*¹. ×75.)

Abdomen with segments 3-5 united; the two terminal segments as represented in fig. 24*a*.

Chelipeds subequal; ischium not much smaller than merus in ventral aspect; anterior margin of both crenulate. Upper inner border of merus (near *S*) bearing 4-6 large bluntly conical tubercles; two similar tubercles at inner angle of carpus (lower one more prominent); groups of small round low granules, similar to those on the carapace, on distal end of merus, on outer surface of carpus and upper half of palm.

Chela as represented in fig. 25*b*, finger short, with rather broad hollow tips but not hoof-shaped, each having an inner and an outer tuft of long fine

bristles; dactylus abruptly downturned distally so as to resemble a beak. The darker colouring on the immobile finger must have extended well on to the palm (indicated by the dotted line in fig. 25*b*) but, though this area is quite distinct, it now scarcely differs in colour from the rest of the palm.

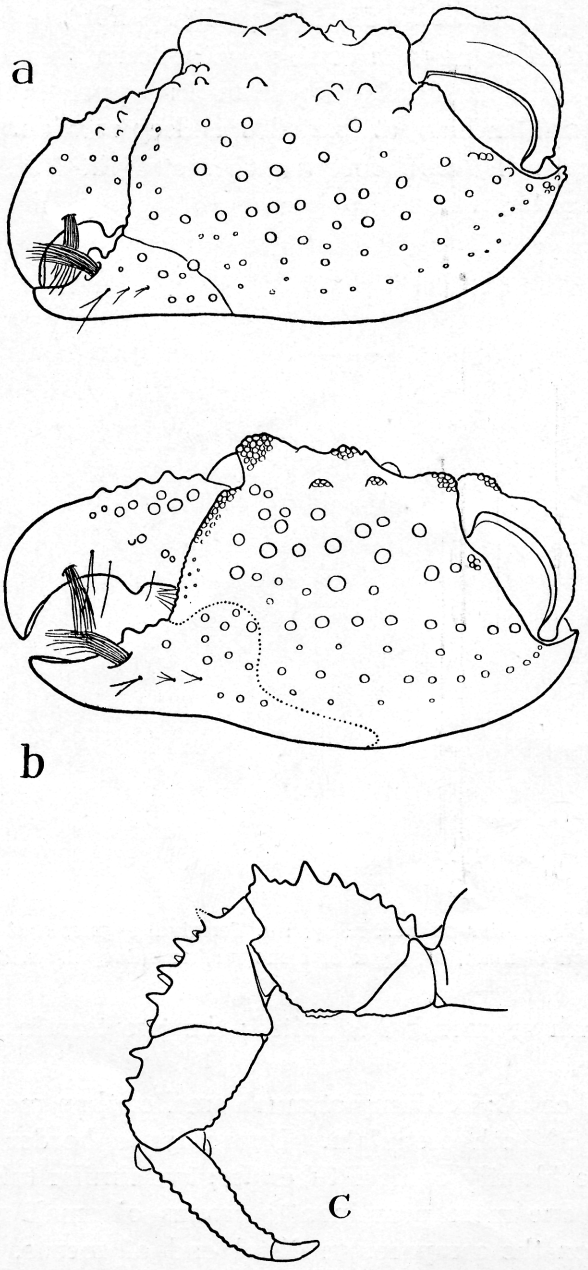

FIG. 25. — *Phymodius laysani* RATHBUN (RATHBUN det.). — *a*. Left chela of female. *Phymodius odhneri* n. sp. — *b*. Left chela of male. *c*. Third right leg of female, anterior aspect : all × 11.

Walking-legs clothed with long soft plumose yellow hairs; dorsal margin of merus, carpus, and propodus spinose (see fig. 25*c* — ♀); dactylus, propodus, dorsal part of carpus and ventral margin of merus granulose.

First *pleopod* as represented in fig. 24*b* and *b'*.

The *females* are smaller than but very similar to, the holotype; apparently the colouring did not extend very far beyond the base of the immobile finger of the chela (*cf.* that of ♀ of *Ph. laysani*, fig. 25*a*).

Remarks. — This species was determined by the late Dr. Odhner as « *Phymodius* n. sp. (*laysani* Rathbun aff.) ». I have compared the specimens with a female (1) of that form and the most important differences between the two are as follows : *Ph. laysani* has (1) a deeper carapace with a wider frontal notch (*cf.* fig. 20*c* and *d*); (2) the anterior border of the buccal cavern is much less regular, being deeply concave on either side of the median line (*cf.* fig. 23*c* and *b*) and the palatal ridges are much less pronounced; (3) the fingers of the chela are considerably shorter and less hollowed at the tips.

Dr. Balss has since sent me a male of *Ph. laysani* determined by Pesta; in this specimen the anterior border of the buccal cavern is not quite so concave on either side of the median line as in the female but the palatal ridges are very low compared with those of *Ph. odhneri*. The chela is very similar to that of *Ph. odhneri* but with a considerably shorter immovable finger. The first pleopod also is very similar to that of *Ph. odhneri* the terminal beak being rather longer and more curved at the apex.

Genus CHLORODOPSIS A. Milne-Edwards.

Chlorodopsis melanodactyla A. Milne-Edwards.

Lenz, 1905, p. 355.

Material. — Banda Neira, 24-II-29, 1 immature ♀ (Balss det.); 1 immature ♂.

Chlorodopsis pilumnoides (White).

Alcock, 1898, pp. 165 and 167.

Material. — Banda Neira, 24-II-29, 1 ♂ (without chelipeds — carapace *l.* = 11.3, *b.* = 15.8 mm.), 1 immature ♂ and 1 ovigerous ♀ (the ♀ identified by Dr. H. Balss).

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(1) Kindly lent by Dr. Mary Rathbun.

Remarks. — Both chelipeds and several of the walking-legs are missing from the larger male but the areolation of the carapace agrees with the much larger Samarang cotypes. A characteristic feature of the species is the presence of a long raised line of granules on area 1 P parallel to, and separated by a rather deep depression from, the posterior margin of the carapace.

The median frontal lobes are sharply denticulate and almost straight; each outer lobule is tridenticulate.

The first pleopod of the male is represented in fig. 26*a*.

The immature male probably also belongs to this species but the areolation of the carapace is scarcely apparent; the first pleopod has only a few (about 7) of the long spines near the apex (*cf.* fig. 26*a*).

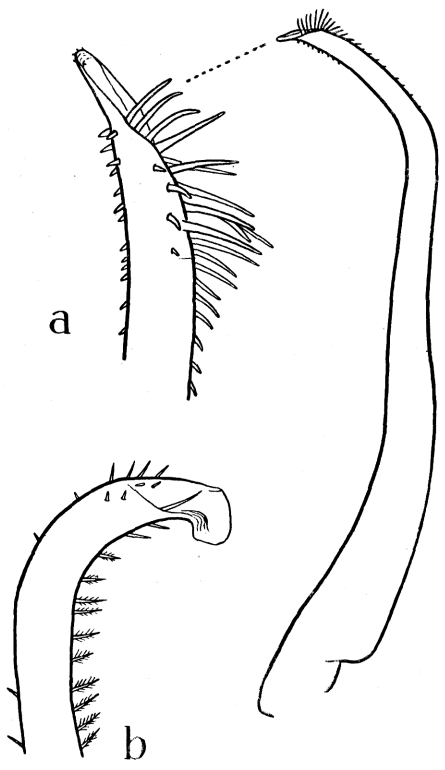

Fig. 26. — *a. Chlorodopsis pilumnoides* (White). — First pleopod of male and apex of same farther enlarged. (× 20 and 60.)
b. Chlorodiella bidentata (Nobili). — Apex of first pleopod of male : × 100.

Chlorodopsis pugil (Dana).

Pilodius pugil Dana, 1852, vol. I, p. 219; pl. XII, fig. 8*a-i*.
Chlorodopsis pugil, Klunzinger, 1913, p. 248; pl. VI, fig. 18*a-c*.

Material. — Banda Neira, 24-II-29, 1 immature ♂ (Dr. H. Balss det.).