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XXI. NOTES ON CRUSTACEA DECAPODA
IN THE INDIAN MUSEUM.

VII. FURTHER NOTES ON HIPPOLYTIDAE.

By STANLEY KEMP, B.A., *Superintendent, Zoological Survey
of India.*

(Plate XXXVI).

Although only two years have elapsed since my previous paper on the Indian Hippolytidae was published, a number of interesting forms have come to light, obtained partly during the recent cruises of the 'Investigator' by Capt. R. B. Seymour Sewell, I.M.S., partly by Dr. Annandale in Japan, and partly by myself during a short visit to Port Blair in the Andamans.

The Hippolytid fauna of Port Blair is one of great richness. During three weeks' collecting, fully half the known Indian species of the family were met with, enabling me to obtain notes on the natural colouration of several forms hitherto unknown in this respect. In addition, three forms were found that had not previously been recognised, one representing a new generic type. Of these, *Thor discosomatis* is of particular interest owing to the fact that it lives commensally with a large anemone of the genus *Discosoma*, and is most peculiar in its colouration; the species of *Phycocaris*, gen. nov., is extremely grotesque in appearance and closely mimics the weed among which it lives.

Borradaile, in a recent paper,¹ has briefly described a genus and three new species of Hippolytidae from the Maldives, the Seychelles and other localities. If my identification is correct, two of these, *Thor maldivensis* and *Lysmatella prima* (the latter the type of the new genus), occur in the Andamans; but I am inclined to think that *Lysmatella* should at most be distinguished only subgenerically from the closely allied *Hippolysmata*. *Exhippolysmata*, recently proposed by Stebbing² to include *Hippolysmata ensirostris* and a nearly related form from S. Africa, does not appear to differ sufficiently to warrant either generic or subgeneric separation.

Genus *Saron*, Thallwitz.

Saron marmoratus (Olivier).

1914. *Saron marmoratus*, Kemp, *Rec. Ind. Mus.*, X, p. 84.

A number of specimens of this well-known species were obtained at Port Blair; the majority were found under stones left

¹ Borradaile, *Ann. Mag. Nat. Hist.*, (8), XV, pp. 206, 208 (1915).

² Stebbing, *Ann. S. African Mus.*, XV, p. 94 (1915).

bare at low water, but one individual was dredged at a depth of two fathoms.

There are tufts of setae on the carapace and abdomen of all the specimens; the males are small and do not possess the enlarged third maxillipedes and first peraeopods characteristic of well-grown examples of their sex.

On close inspection the colouration of living specimens is very wonderful, resembling that of a rich Turkey carpet. At a casual glance, however, the animal is dull in tone and it is clear that the vivid tints blend and cause it to harmonise with its surroundings, just in the same way that the splashes of bright colour on gun-mountings are effective in rendering them inconspicuous.

On the carapace and abdomen are numerous large ocellar spots of an irregular shape; in the centre these spots are buff, dotted with red and circumscribed with white and reddish orange. Between the spots are patches, irregularly lobulate in form, but symmetrical on either side of the animal. They are of a deep reddish brown colour with numerous large bright blue spots. Each patch is sharply defined, its sinuous margin being outlined with black and pale grey. At the antero-lateral angle of the carapace there is a dull red spot. The rostrum, antennules and antennal scales are pale buff, barred with dark brown, the brown bearing numerous white flecks. The anterior two pairs of legs are reddish at the base; their distal segments and all segments of the last three pairs are pale yellowish green broadly barred with black. The tail-fan is obscurely mottled with brown and buff.

The largest specimen, an ovigerous female, is only 36 mm. in total length.

$\frac{95.00}{10}$ Port Blair, Andamans.

S. Kemp.

Eleven.

Genus *Spirontocaris*, Bate.

Spirontocaris pandaloides (Stimpson).

1907. *Spirontocaris pandaloides*, de Man, *Trans. Linn. Soc., Zool.*, (2), IX, p. 418, pl. xxxii, figs. 47, 48.

A number of examples of this species were obtained by Dr Annandale during his recent visit to Japan from Mr. Kuma Aoki. The teeth on the rostrum vary from 8 to 10 on the upper border and from 10 to 13 on the lower.

$\frac{95.61}{10}$ Misaki, Japan.

Kuma Aoki.

Fourteen,
46-49 mm.

Spirontocaris rectirostris (Stimpson).

1907. *Spirontocaris rectirostris*, de Man, *Trans. Linn. Soc., Zool.*, (2), IX, p. 411, pl. xxxii, figs. 31-34.

Two fine specimens in Dr. Annandale's Japanese collection (presented by Dr. S. Yoshida) agree very closely with de Man's description of the male of this species. Both individuals have only 5 teeth on the upper border of the rostrum; on the lower

border there are 2 in one specimen and 3 in the other. The telson in one case bears four pairs of dorsal spinules, in the other five.

De Man has drawn attention to the great development of the third maxillipedes and first peraeopods in the male. In the two specimens obtained by Dr. Annaudale this character is well shown, the proportions of the limbs agreeing precisely with de Man's description. The enlargement of these appendages in the adult male is a feature of considerable interest, for though apparently rare in the genus *Spirontocaris*, an almost precisely similar phenomenon is met with in the genera *Alope* and *Saron*.

♂♂² Tanabe, Kii prov., Japan. S. Yoshida. Two, 34, 36 mm.

The third maxillipedes in the larger specimen are 30 mm. in length; in the smaller they are 26 mm.

Genus *Thor*, Kingsley.

The definition of this genus requires modification in order to include *T. maldivensis*, Borradaile, in which supraorbital spines are found on the carapace. In addition to the greater number of segments in the carpus of the second peraeopods and the presence of a movable plate at the distal end of the antennular peduncle—characters by which the genus is readily distinguished from *Hippolyte*—the outer antennular flagellum, in *Thor*, is greatly swollen in both sexes.

An interesting species, hitherto undescribed, was obtained at Port Blair; it lives commensally with giant sea-anemones of the genus *Discosoma* and is very peculiar in its pigmentation.

The three known species of *Thor*, all of which have been found in the Andamans, may be distinguished as follows:—

- | | |
|--|--|
| I. Rostrum with two or more dorsal teeth;
supraorbital spines absent. | |
| A. Apex of rostrum bifid; lateral process
of antennule without a tooth at its
proximal end | <i>T. paschalis</i> (Heller). |
| B. Apex of rostrum simply pointed;
lateral process of antennule with a
small upstanding tooth at its prox-
imal end | <i>T. discosomatis</i> , sp. nov. |
| II. Rostrum with only a single dorsal tooth;
supraorbital spines present | <i>T. maldivensis</i> , Borra-
daile. |

Thor paschalis (Heller).

1914. *Thor paschalis*, Kemp, *Rec. Ind. Mus.*, X, p. 94, pl. i, figs. 6-10.

Additional specimens are from Singapore and from Port Blair in the Andamans. The species was found on several occasions in the latter locality, living among weeds at depths of from 2 to 5 fathoms in the neighbourhood of Ross I. The specimens are smaller than the majority of those obtained in the Gulf of Manaar; the largest is only 8 mm. in length and ovigerous females sometimes do not exceed 6.5 mm. The single individual from Singapore, a male, was obtained at low water under a block of coral.

$\frac{9.5.6.3}{10}$ Port Blair, Andamans.
 $\frac{9.5.6.1}{10}$ Tanah Merah Besar,
 Singapore I.

S. Kemp.
 N. Annandale.

Ten.
 One.

Thor discosomatis, sp. nov.

(Plate xxxvi, fig. 1).

Thor discosomatis is a very close ally of *T. paschalis* and agrees with that species in the great majority of its structural features. It differs, however, in the following points:—

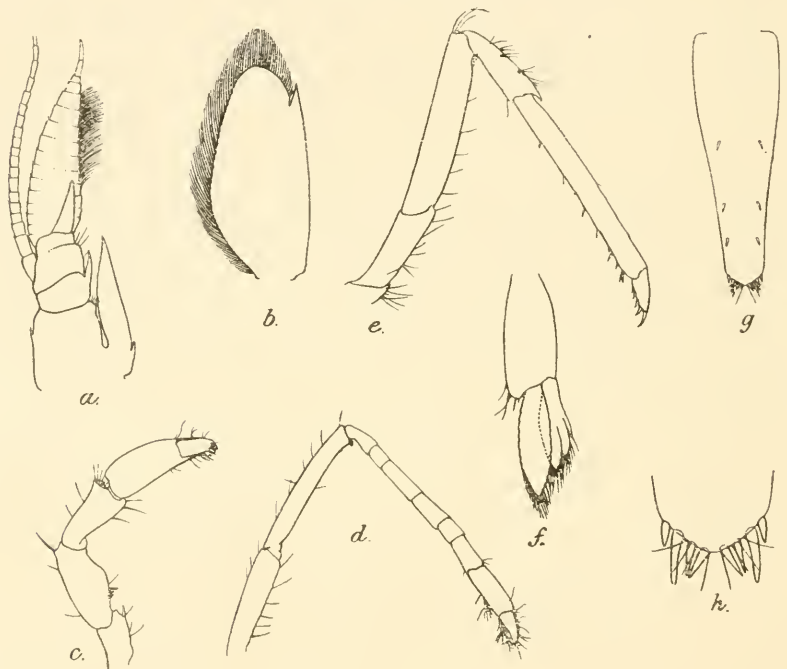


FIG. 1.—*Thor discosomatis*, sp. nov.

- | | |
|----------------------|----------------------------|
| a. Antennule. | e. Third peraeopod. |
| b. Antennal scale. | f. Second pleopod of male. |
| c. First peraeopod. | g. Telson. |
| d. Second peraeopod. | h. Apex of telson. |

The rostrum is a little shorter; at its apex it is sharply pointed, not bifid, and on its upper margin it bears only two or three teeth. These teeth are larger and all of them are situated on the rostrum in front of the hinder limit of the orbit. The basal segment of the antennular peduncle (text-fig. 1a) bears a spine on its infero-internal aspect, as in *T. paschalis*; but the lateral process, though variable in length, is usually longer than in that species, often reaching the end of the third segment. The process bears, near the proximal end of its outer margin, a sharp upstanding tooth of which no trace exists in the allied species.

The peraeopods closely resemble those of *T. paschalis*. The carpus of the second pair (text-fig. 1*d*) is composed of six sub-segments the proportional lengths of which are much the same as in *T. paschalis*, except that the third is comparatively a little shorter. There is practically no difference between males and females in the length of the third pair of legs (text-fig. 1*e*). On the lower border of the merus of the third and fourth pairs there is a small subterminal spine. This spine is present on all the last three pairs in *T. paschalis*,¹ whereas in *T. discosomatis* it is absent from the last pair.

On the telson (text-fig. 1*g*) as in *T. paschalis* there are three or four pairs of dorso-lateral spinules. At the apex, however, there are four pairs of spines, the outermost the shortest, the second the longest and the two inner pairs sub-equal (text-fig. 1*h*). In *T. paschalis* there are only three pairs of terminal spines.

In the shape of the antennal scale (text-fig. 1*b*) and in all other features, *T. discosomatis* seems to bear the closest resemblance to *T. paschalis*.

The largest specimen obtained, an ovigerous female, is 13 mm. in length.

The colouration of living specimens was very remarkable, the animal being of a deep reddish brown tint, semitransparent, with very large spots and patches of pale greenish yellow. On the carapace are two such spots, round and confluent in the mid-dorsal line; there is one on either side of the second abdominal somite, a broad transverse band on the fourth somite with a small spot on each side below it, a ventral transverse bar on the fifth somite and a patch, forming a complete ring, on the sixth somite. Each of these spots or patches is very pale green in the centre, with a broad margin of bright yellow, the whole being narrowly circumscribed by blue. The central portions are traversed by streaks of yellow extending inwards from the margin. The apex of the telson is greenish yellow and there is a circumscribed spot in the middle of each uropod. On the upper side of the eyestalk there is a greenish yellow patch; all the other appendages are reddish brown.

The specimens of *Thor discosomatis* were found along with a Palaemonid in the immediate vicinity of large anemones of the genus *Discosoma*. Two very small individuals were obtained in the dredge, but it is probable that on this occasion the net was drawn over an anemone in the course of its passage along the bottom.

The Palaemonid has been described by Nobili under the name *Ancyllocaris aberrans*,² and of this species Miss Rathbun's *Pericliomenes hermitensis*³ is apparently a synonym. Coutière,⁴ who

¹ These spines are omitted in the figure given in pl. i, fig. 6, *op. cit.*, 1914.

² Nobili, *Bull. sci. France Belgique*, XL, p. 52, pl. iv, figs. 9-9*b* (1906).

³ Rathbun, *Proc. Zool. Soc. London*, 1914, p. 655, pl. i, figs. 1-3.

⁴ Coutière, *Bull. Mus. d'Hist. nat., Paris*, IV, p. 198 (1898).

refers to the same form as a species of *Bithynis*, has given the following account of its habits.—“ Un Palémonidé du genre *Bithynis* Dana mérite une mention spéciale par son habitat et sa coloration. Il est absolument transparent, mais se signale par quelques anneaux d'un violet pâle sur les appendices et l'abdomen, et surtout par des taches d'un blanc nacré éclatant, occupant la région stomacale tout entière, le coude de l'abdomen, l'extrémité des rames caudales et les épimères du deuxième segment. Ce magnifique Crustacé se tient obstinément dans la zone de protection que circonscrit une grande Actinie assez commune dans les flaques profondes qui séparent les Madrépores. Étalé sur le sable, le disque oral de l'Actinie de couleur blanchâtre, armé d'un très grand nombre de courts tentacules urticants, atteint souvent 0 m. 30 de diamètre. *Bithynis* se tient dans ce cercle, nageant à peu de distance au-dessus, souvent par couples, et se laisse assez aisément capturer à l'aide d'une éprouvette pleine d'eau que l'on descend doucement sur l'animal.”

The anemone at Port Blair was one with greenish tentacles, not whitish as in Coutière's description. It was not uncommon at low water on the foreshore at “Aberdeen” and was sometimes left high and dry by the tide. On anemones from which the water had completely retreated we failed to find any shrimps, even though the whole specimen was dug up and most carefully examined. On the other hand the shrimps were seldom absent from anemones living in a few inches of water, and were easily caught in a tube full of water as described by Coutière. The *Ancyllocaris*¹ was found swimming and crawling on the column of the anemone beneath the fringe of tentacles and wandering occasionally on to the disc. *Thor discosomatis* had similar habits, but seemed to wander further afield and rarely ventured among the tentacles.

The curious feature of the shrimps is that in both species the pigmentation takes the form of very large spots almost pure white in colour. This, too, is a characteristic of certain fish, *Amphiprion percula* (Lacép.) and *Tetradrachmum trimaculatum* (Rüpp.),² which also appear to live commensally with the *Discosoma*; the latter was found beneath the fringe of tentacles and was black with a broad transverse band of white at the back of the head, extending downwards to the eye, and a large white spot below the dorsal fin; the former, which was commonly found swimming among the tentacles, was bright orange with three broad bands of white tinged with green and narrowly margined with black. The presence of white patches in all four commensal species is a most curious

¹ Coutière, in this brief description, has scarcely done justice to the marvellous colouration of *Ancyllocaris aberrans*; the large white patches are frequently circumscribed by red or orange pigment and on the tail-fan are eye-spots with reddish centres. A complete account of the colouration of this Palaemonid would be out of place in the present paper, but it may be mentioned that the pigmentation varies somewhat in the two sexes and alters considerably with age. The colouration of *Thor discosomatis*, on the other hand, is apparently constant throughout life.

² I am indebted to Dr. B. L. Chaudhuri for these determinations.

feature and one of which it is impossible to offer an explanation.

$\frac{9261-1}{10}$ Port Blair, Andamans. S. Kemp. Fourteen.

The types bear the number 9261/10.

Thor maldivensis, Borradaile.

1915. *Thor maldivensis*. Borradaile, *Ann. Mag. Nat. Hist.*, (8), XV, p. 208.

A single ovigerous female, about 9 mm. in length, doubtless belongs to this species. It differs, however, from Borradaile's brief description in possessing six distinct segments in the carpus of the second pereopods. The presence of strong supraorbital spines and the very short rostrum, armed with only a single dorsal tooth are characters which readily distinguish it from the two preceding species. According to Borradaile the first leg is enlarged in adult males.

$\frac{9251}{10}$ Port Blair, Andamans. S. Kemp. One.

The specimen was found at low water on the coral reef in North Bay and was, when living, rather conspicuously mottled.

Thor maldivensis was described from Minikoi, the Maldives and Salomon Atoll.

Genus **Hippolyte**, Leach.

Hippolyte ventricosus, Milne-Edwards.

1914. *Hippolyte ventricosus*, Kemp, *Rec. Ind. Mus.*, X, p. 96, pl. ii, figs. 1-3.

This species is not very abundant in Port Blair harbour. The majority of the specimens obtained were taken at Corbyn's Cove North, not far from the entrance to the harbour, living in a fucoid weed washed by the waves. All the individuals taken in this situation were of a dull olive-brown colour closely resembling that of the sea-weed.

The collection includes many ovigerous females, an unusually large specimen being 21 mm. in length.

$\frac{9277}{10}$ Port Blair, Andamans. S. Kemp. Many.

Genus **Phycocaris**, nov.

Carapace with supraorbital and antennal spines; anterolateral (pterygostomial) spine absent. Lateral process of antennular peduncle spiniform; upper flagellum uniramous. Mandible with incisor-process, but without palp. Third maxillipede with exopod. Neither epipods nor arthrobranchs at base of first four pereopods. Carpus of second pereopods composed of two segments. Endopods of second to fifth pleopods very large in female, small and slender in male.

Type and only species, *Phycocaris simulans*, sp. nov.

This genus is formed for the reception of a small and peculiar Hippolytid of the most grotesque appearance, that lives on weeds in the vicinity of Port Blair. On its appendages, including the eyestalks, are long straggling hairs and these, in conjunction with its colour and the unusual attitude it adopts, combine to give it a most extraordinarily close resemblance to small tufts of algae.

In most of the characters mentioned above the genus agrees with Calman's *Trachycaris*,¹ though in outward appearance there is the widest possible difference between them. The type and only known species of *Trachycaris*² is that described by Spence Bate from the West Indies under the name *Platybema rugosum*. It agrees with *Phycocaris* in having only two segments in the carpus of the second peraeopods and in the great size of the endopods of the second to fifth pairs of pleopods. The latter character, though given without qualification in Calman's diagnosis, is probably found only in females.

Phycocaris differs from *Trachycaris* in the absence of the antero-lateral spine of the carapace and in the presence of an incisor-process on the mandible.³ The latter feature is of considerable importance and indicates that the genus is in reality allied to *Thor* and *Hippolyte* rather than to *Trachycaris* and other genera of the Latreutid section of the family. From *Thor*, *Hippolyte* and the peculiar N. Atlantic genus *Cryptocheles*, it is easily distinguished by the number of segments in the second legs.

Phycocaris simulans, sp. nov.

(Plate xxxvi, fig. 2).

The carapace is arched above and is produced anteriorly to a short and simple rostrum that reaches only a little beyond the end of the basal antennular segment. On the frontal margin above the eye there is, on either side, a short and stout supraorbital spine. The antero-lateral (pterygostomial) spine is absent, but there is a small spine at the base of the antenna; the antero-inferior angle is rounded. The carapace is not carinate in the middle line and bears a few long scattered hairs.

The eyes are comparatively long and slender. In dorsal view the cornea is not broader than the stalk and is about half its length. There is no ocellus; but at the junction of the cornea and stalk there is a circle of long hairs, a remarkable feature not known in any other Hippolytid.

The basal segment of the antennular peduncle (text-fig. 2*a*) is fully as long as the two following combined; its lateral process is

¹ Calman, *Ann. Mag. Nat. Hist.*, (7), XVII, p. 33 (1900).

² *Platybema pristis*, Nobili, [*Ann. Mus. civ. Genova*, (2), XX, p. 233 (1899)] should doubtless be referred to the genus *Latreutes*.

³ The statement that the mandible in *Trachycaris* is without incisor-process is given by Calman on the authority of Spence Bate. I have examined a specimen *T. rugosum* and am able to confirm the accuracy of the observation.

slender, incurved and spine-like, extending a little beyond the end of the segment and bearing a few hairs externally. The second and third segments are nearly equal in length, each bearing near its distal end one or two very long plumose setae. The outer flagellum is longer and stouter in the male than in the female. In the former sex the thickened portion is composed of some seven segments and is longer than the peduncle; in the latter it is shorter than the peduncle and consists only of five more slender segments.



FIG. 2.—*Phycocaris simulans*, gen. et sp. nov.

- | | |
|--|--------------------------------|
| a. Antennule. | g. Chela of first pereopod. |
| b. Antennal scale. | h. Second pereopod. |
| c. Mandible. | i. Third pereopod. |
| d. Third maxillipede, the distal segment seen obliquely. | j. Dactylus of third pereopod. |
| e. Distal segment of third maxillipede. | k. Second pleopod of female. |
| f. First pereopod. | l. Telson. |
| | m. Apex of telson. |

The inner flagellum is short and is usually carried reflected backwards.

The antennal scale (text-fig. 2*b*), which reaches a little beyond the antennular peduncle, is broadest near the base and is less than twice as long as wide; the outer margin is convex, terminating in a spine that reaches as far forwards as the apex of the lamella. The peduncular segments bear long setae similar to those on the antennule.

The mandible resembles that found in the genus *Thor*; the incisor-process is well developed and is furnished with about seven teeth at the apex. The palp is entirely absent and the molar process is cleft and furnished with slender spines, many of which are serrate.

The second maxilla is normally developed; the distal endite of the endopod is divided into two parts of equal breadth. The first and second maxillipedes possess epipods, that of the former being emarginate distally, while that of the latter is deeply bilobed. The ultimate segment of the endopod of the second maxillipede is placed terminally at the end of that which precedes it and is not applied as a strip along the outer margin of the latter as in the great majority of the Caridea. The third maxillipede (text-fig. 2*d*) does not possess an epipod; the exopod is small but foliaceous, reaching about to the middle of the antepenultimate segment. The ultimate segment (text-fig. 2*e*) is less than twice the length of the penultimate and is not three times as long as broad; in addition to numerous hairs it bears a series of nine or ten sharp spinules in its distal half.

The first peraeopods (text-fig. 2*f*) are stout, but very short; the ischium and merus and carpus are sub-equal, a little shorter than the chela. The segments bear long setae but are otherwise unarmed. The chela (text-fig. 2*g*) is rather more than twice as long as broad and the fingers are distinctly longer than the palm. On the internal surface of the chela the fingers are deeply hollowed or spooned near the cutting margin, while externally each forms a thin blade with a saw-like edge, the two meeting throughout their length when the claw is closed. At the extreme tip each finger is provided with three large teeth.

The second peraeopods (text-fig. 2*h*) are much longer, reaching nearly to the tip of the antennal scale. The carpus is almost as long as the ischium and merus combined and consists of two segments, the second a little shorter than the first and about twice as long as broad. The chela is almost two-thirds the length of the carpus and nearly two and a half times as long as wide, the fingers being about one-third shorter than the palm. When the claw is closed the fingers meet only at the tips where they cross each other.

The last three pairs of peraeopods (text-fig. 2*i*) are similar and show no sexual differences. The carpus is scarcely shorter than the merus and is a trifle longer than the propodus. The propodus is armed beneath with five or six spines, two pairs towards the distal end and one or two others, which are smaller, near the middle. When the dactylus is folded inwards it lies between the two spines constituting the distal pair and thus forms a poorly developed grasping organ. The dactylus (text-fig. 2*j*) is short, spines included about two-fifths the length of the propodus; on its inferior edge it bears a series of seven or eight spinules which increase in size distally, the two terminal ones being large spines. All the legs bear very long plumose setae, especially conspicuous on the ischium, merus and carpus.

The abdominal somites are not carinate dorsally. The third is very strongly humped and the sixth, which is but little longer than the fifth, is produced to a rounded prominence in the middle of its posterior margin. The endopod of the last four pairs of pleopods bears an appendix interna and is enormously expanded in the female (text-fig. 2*k*); in the male it is not broader than the exopod. The margins of both rami bear long setae.

The telson (text-fig. 2*l*) is nearly twice the length of the sixth somite and is feebly sulcate above. It bears two or three pairs of small dorso-lateral spines and terminates in a broad, almost truncate apex (text-fig. 2*m*) armed with three pairs of spines, the innermost the longest, about equal to the breadth of the apex, and the outermost much the shortest. Between the innermost pair of spines are two minute spinules, while a similar spinule occurs on either side between the bases of these spines and those of the intermediate pair. The outer uropods do not reach the apex of the telson; they are shorter than those of the inner pairs and are rather more than two and a half times as long as wide.

The long setae that have been described above as plumose differ considerably from those to which this term is generally applied, for the plumes have not the form of very fine microscopic hairs, but are comparatively short and blunt processes from the main axis of the seta.

The largest specimen obtained, an egg-bearing female, is barely 9 mm. in total length; other ovigerous individuals do not exceed 7 mm.

This curious little species was found at Port Blair near Ross I., living among weeds in water from 2 to 4 fathoms in depth. We found it impossible to obtain specimens at all freely by the usual methods, but if the contents of the net were immediately transferred to a bucket of sea-water, individuals were sometimes found swimming at the surface and alighting on floating fragments of weed.

The illustration on Plate xxxvi, which is based on sketches made from living specimens, will give an idea of the peculiar attitude that the species adopts. The abdomen is strongly flexed near its junction with the cephalothorax, so much so that the third segment as a rule almost touches the carapace, and the antennules are bent upwards and backwards. In this attitude, and with the help of the long plumose setae that the species possesses,¹ *Phycocaris* bears the most extraordinarily close resemblance to small tufts of algae that are plentiful on the weeds: it was only after considerable experience that we were able to distinguish the one from the other. The resemblance, which is undoubtedly protective, is further enhanced by the colour. The tufts of algae vary in shade and are sometimes dull olive-yellow and sometimes almost black. Two colour varieties of the prawn, corresponding

¹ These setae are very easily broken off in preserved specimens and are in life more numerous and longer than is shown in the figure.

exactly with these tints, were obtained and a few specimens of a bright red tone were also caught on occasions in which much red alga was brought up in the net.

$\frac{9255-60}{10}$ Port Blair, Andamans. S. Kemp. Twenty-four.

The type specimens bear the numbers 9255-6/10 in the Indian Museum register.

Genus *Latreutes*, Stimpson.

Latreutes pygmaeus, Nobili.

1914. *Latreutes pygmaeus*, Kemp, *Rec. Ind. Mus.*, X, p. 99, pl. ii, figs. 7, 8; pl. iii, figs. 1-7.

The species was very common in the vicinity of Ross I., living among weeds. Most of the females were ovigerous.

$\frac{9276}{10}$ Port Blair, Andamans. S. Kemp. Many.

Latreutes planirostris (de Haan).

1907. *Latreutes planirostris*, de Man, *Trans. Linn. Soc., Zool.*, (2), IX, p. 421.

1914. *Latreutes planirostris*, Balss, *Abhandl. math.-phys. Klasse K. Bayer. Akad. Wiss.*, Suppl. Bd. II, abh. 10, p. 46.

This species is represented in the Museum collection by two female specimens, in both of which, as in those examined by Miss Rathbun,¹ the median spine in the posterior third of the carapace, figured by de Haan, is obsolete.

Miss Rathbun cites *L. mucronatus* as a synonym of *L. planirostris*, but this view is not held by Balss. *L. planirostris* is a larger species, with even more perfectly orbicular rostrum than in any examples of *L. mucronatus* that I have seen; the carapace, moreover, is carinate in the mid-dorsal line almost up to the posterior margin.

$\frac{8880}{10}$ Sagami Bay, Japan. Munich Mus. One, 25 mm.
 $\frac{9267}{10}$ Misaki, Japan. Kuma Aoki. One, 28 mm.

Latreutes mucronatus (Stimpson).

1914. *Latreutes mucronatus*, Kemp, *Rec. Ind. Mus.*, X, p. 101, pl. iii, figs. 8-15; pl. iv, figs. 1, 2.

1914. *Latreutes mucronatus*, Balss, *Abhandl. math.-phys. Klasse K. Bayer. Akad. Wiss.*, Suppl. Bd. II, abh. 10, p. 47, fig. 27.

The additional specimens agree with those recorded from Kilarai and Pamban in S. India, but are rather smaller; the largest is only 10.5 mm. long and one of the five ovigerous females is less than 8 mm. in length. The remarkable sexual differences noted in the case of the S. Indian specimens are clearly shown in the Andaman series, the females have the carapace more strongly arched and the rostrum more orbicular than in the males. Out of a total of thirty individuals only five, all males, possess more than a single tooth on the carapace behind the orbit; in three specimens

¹ Rathbun, *Proc. U.S. Nat. Mus.*, XXVI, p. 46 (1922).

there are 2 teeth and in two specimens 3 teeth in this position. In no case is there a tooth in the posterior third of the carapace as in de Haan's figure of *L. planirostris*. The teeth on the upper edge of the rostrum in the male may be as many as 10.

Living specimens were as a rule inconspicuously mottled; two examples were, however, found in which the carapace and the greater part of the abdomen were of a uniform rich red-brown, the tail-fan and the posterior half of the last abdominal somite being pure white.

Balss, who has recently recorded this species (*l.c. supra*) from Sagami Bay in Japan, from the Gulf of Siam and from Chemulpo in Korea, notes that the specimens recorded by Doflein in 1902 as *L. mucronatus* are in reality examples of *L. planirostris*, de Haan.

$\frac{5.5-6.5}{10}$ Port Blair, Andamans, 2-6 fms.

S. Kemp.

Thirty.

Most of the specimens were obtained among weeds in the channel off Ross I.; a few were found in Brigade Creek.

Latreutes porcinus, sp. nov.

(Plate xxxvi, fig. 3).

In general form there is very little difference between the sexes; in both the carapace is sharply carinate dorsally, the carina being very high and abruptly declivous in its anterior third. The carina is armed with rather irregular procurved teeth, 6 to 12 in number (usually 9 to 11 in large specimens). The series begins behind the middle point of the carapace and the foremost 3 or 4 are usually in advance of the orbit, though separated, in the majority of the specimens, by an unarmed interval from the teeth on the rostrum proper. The antennal spine is present and there are 7 or 8 spinules on the antero-lateral margin.

The rostrum resembles that found in female *L. mucronatus*, being semiorbicular and rounded anteriorly or broadly lanceolate and more or less pointed at the apex. The teeth are on the whole less numerous than in the allied species; the dorsal series consists of from 4 to 8 and the ventral of from 3 to 8; in most specimens there are from 5 to 7 on each margin. In two out of the fifteen specimens examined there are three minute teeth in the interval between the upper rostral teeth and the series on the carapace.

The antennule (text-fig. 3*a*) is more slender than in *L. mucronatus*; the antennal scale (text-fig. 3*b*) is closely similar in form. The second pereopods (text-fig. 3*e*) are a trifle more slender and of the three segments of which the carpus is composed the second is proportionately longer, exceeding the length of the first and third combined. The last three pereopods are similar to those of *L. mucronatus*, but the terminal spine of the dactylus is usually more slender than the next of the series. In a few individuals two spines are to be found at the distal end of the lower margin of the merus of the third pair (text-fig. 3*f*); in most cases, however, as in *L. mucronatus*, single spines occur in this position.

The third abdominal somite is distinctly carinate in its posterior half. The telson and uropods (text-figs. 3g, h) are not greatly dissimilar from those of *L. mucronatus*.

The largest specimen, an ovigerous female, is about 15.5 mm. in length.

In general appearance this species bears some resemblance to *Trachycaris rugosus*, a West Indian form with which it has, of course, no real affinity. From all species of *Latreutes* hitherto

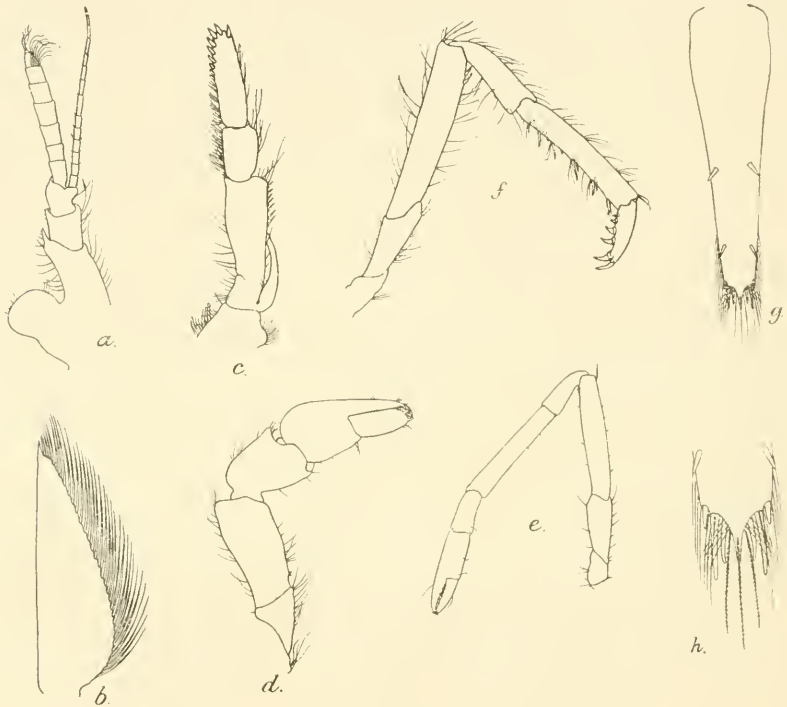


FIG. 3.—*Patreutes porcinus*, sp. nov.

- | | |
|-----------------------|----------------------|
| a. Antennule. | e. Second peraeopod. |
| b. Antennal scale. | f. Third peraeopod. |
| c. Third maxillipede. | g. Telson. |
| d. First peraeopod. | h. Apex of telson. |

known it is at once distinguished by the great number of teeth on the carapace.

Living specimens were variously banded and mottled, sometimes with pure white on a ground colour of reddish brown; one individual was pale pink throughout.

$\frac{9269-71}{10}$ Port Blair, Andamans.

S. Kemp.

Fifteen.

The specimens were all obtained off the jetty on Ross I., living among weed in company with *Latreutes pygmaeus*, *L. mucronatus* and *Tozeuma armatum*. The types bear the number 9269/10.

Latreutes anoplonyx, Kemp.

1914. *Latreutes anoplonyx*, Kemp, *Rec. Ind. Mus.*, X, p. 104, pl. iv, figs. 3-5.

Numerous additional specimens of this species have recently been obtained by the 'Investigator' off the Burma coast; they agree closely with the type. The rostrum is rather unusually constant in form, being always narrowly triangular in shape and extending, in all except extremely young specimens, well beyond the apex of the antennal scale. The dorsal margin is, however, straight in some examples, markedly concave in others. The number of teeth is variable; there are from 7 to 15 on the upper margin and from 6 to 11 on the lower. As was pointed out in the original description, *L. anoplonyx* differs from all other Indian species of the genus in that the dactyli of the last three legs are unarmed except for a few microscopic spinules.

The largest individual, an ovigerous female, is only 28 mm. in length, and is thus considerably smaller than the type.

335	Bombay.	H. P. le Mesurier.	One.
$\frac{527.2-5}{10}$	Burma coast, 7-8 $\frac{1}{2}$ fms.	'Investigator.'	Many.

The only other known example was found at Bombay.

When describing this species I remarked that its nearest ally appeared to be Ortmann's *L. laminirostris*. It is perhaps at least as nearly related to *L. unidentatus*, Bate,¹ imperfectly described from a single specimen only 5.5 mm. in length obtained off Samboangan in the Philippine Is. Very young examples of *L. anoplonyx* do not differ greatly from Bate's figure; but in the description it is stated that the last three legs agree with those of *L. planus* in which, according to the figure, the dactylus is biunguiculate. Neither *L. planus* nor *L. unidentatus* have been recognised since they were first described and it seems likely that their identification will remain uncertain until the Hippolytid fauna of the Philippine Is. is investigated in detail; it is not even certain that they are correctly referred to the genus *Latreutes*.

Genus **Tozeuma**, Stimpson.**Tozeuma armatum**, Paulson.

1914. *Tozeuma armatum*, Kemp, *Rec. Ind. Mus.*, X, p. 106.
 1914. *Angosia armata*, Balss, *Abhandl. math.-phys. Klasse K. Bayer. Akad. Wiss.*, Suppl. Bd. II, abh. 10, p. 48.

The additional specimens of this species, though a number of them are ovigerous females, are much smaller than those previously recorded from the Indian coast, a feature correlated perhaps with the shallower water in which they were obtained. The largest individual is only 43 mm. in length.

The number of teeth on the lower margin of the rostrum is variable and in one example is as high as 39. This specimen, obtained by Mr. Hornell in S. India, also possesses the additional

¹ Bate, *Rep. Challenger Macrura*, p. 584, pl. lxxix, fig. 5.

spine near the postero-inferior angle of the fifth abdominal somite, noticed in one of the examples previously recorded. In the latter, however, the number of rostral teeth is not abnormal.

A remarkable larval Carid found by the 'Investigator' in the Mergui Archipelago almost certainly belongs to this species (text-fig. 4). Although the rostral apex is broken the specimen is no less than 31 mm. in length. On the carapace are two large supra-orbital spines (which are absent in the adult) and the spines on the lower edge of the rostrum are represented merely by fine spinules. The legs are imperfectly formed, the first being chelate and the second simple with unsegmented carpus; attached to the first three pairs are long exopods. The hook-like projection on the dorsum of the third abdominal somite, a characteristic feature of adults of this species of *Tozeuma*, is represented by an enormously long, flattened, outstanding process, the tip of which is sickle-shaped and curved forwards. The sixth abdominal somite is proportionately much longer than in adults, while the telson

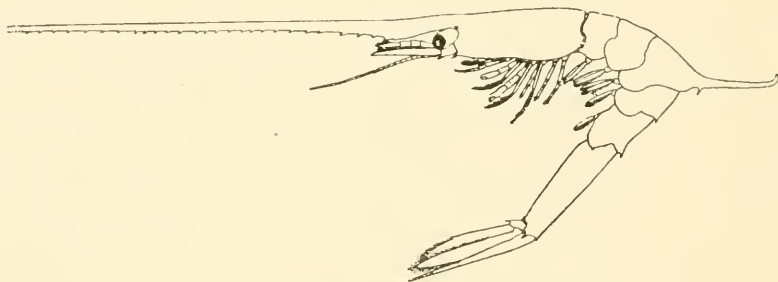


Fig. 4.—*Tozeuma armatum*, Paulson.

Late larval stage.

exceeds the tips of the uropods and is deeply bifurcate at its apex. Apart from its structure this post-larval specimen is remarkable for its great size. It is probable that (as is known to be the case with some other Caridea) there is an actual shrinkage in length at the final moult of the larval metamorphosis; other specimens in the collection, possessing all the adult characters, are 1 or 2 mm. shorter than the post-larval individual.

The colouration of living individuals, as observed in the Andamans, is peculiar. The specimens were deeply mottled with closely aggregated dark red chromatophores, slightly paler dorsally and especially dark on the lower portion of the rostrum which was fringed with bright red hairs. On the second and fifth abdominal pleura there were large eye-spots, each being deep blue in the centre, surrounded with concentric rings of black, pale yellow and red, in the order named. Just beyond its middle each of the inner uropods bore half a similar eye-spot, the two uropods, when juxtaposed, presenting a single perfect spot when seen from below. In dorsal view the spot is partially covered by the telson which is

not marked correspondingly. The inferior portions of the sixth somite were tinged with blue and there were pale pink chromatophores on the hook-like process on the third somite. The outer maxillipede was dark red, the first legs tinged with red and the remainder transparent.

Not infrequently specimens of a uniform bright green colour were met with. In these the rostral setae were also bright red, but the eye-spots were merely of a darker green surrounded by narrow bands of black and white. In the weed among which it is found *T. armatum* is very inconspicuous, extending its body almost perfectly straight and holding tightly to the stem.

$\frac{0267}{10}$	Mandapam, Ramnad Dist., S. India, 3 fms.	J. Hornell.	One.
$\frac{0265}{10}$	Port Blair, Andamans, 2-5 fms.	S. Kemp.	Nineteen.
$\frac{0268}{10}$	Burma coast, 8 fms.	'Investigator.'	One, larval.

Balss (*loc. cit. supra*) has recently recorded this species from Japan, thereby making a considerable increase in its known geographical range.

Genus *Gelastocaris*, Kemp.

Gelastocaris paronae (Nobili).

1914. *Gelastocaris paronae*, Kemp, *Rec. Ind. Mus.*, X, p. 107, pl. v, figs. 1-11.

An additional specimen of this curious species was obtained at Port Blair. It was dredged in 5 fathoms of water along with the sponge *Petrosia testudinaria*, Lamarck.¹ When alive the individual was remarkable for its strangely depressed form, the carapace and abdomen being so much flattened that it resembled an Isopod of the genus *Idotea*. In colour the specimen was pale pink throughout with a speckling of darker pink chromatophores on the antennal scale and tail-fan and at the sides of the carapace and abdomen. The *Petrosia* was of a similar pink shade and the colouration is doubtless protective.

The specimen is a male, about 10 mm. in length, and, except for the thickened outer antennular flagellum, differs little from the two females previously recorded; in lateral view, however, the carapace is less strongly arched anteriorly.

$\frac{0568}{10}$	Port Blair, Andamans, 5 fms.	S. Kemp.	One.
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Genus *Hippolysmata*, Stimpson.

1914. *Hippolysmata*, Kemp, *Rec. Ind. Mus.*, X, p. 112.

1915. *Exhippolysmata*, Stebbing, *Ann. S. African Mus.*, XV, p. 94.

Stebbing has recently proposed to separate *Hippolysmata ensirostris*, along with a closely allied S. African form, as a distinct genus under the name *Exhippolysmata*. The characters employed

¹ I am indebted to Dr. Annandale for this determination. Mr. Southwell informs me that the specimen from the Ceylon Pearl banks, recorded in the paper cited above, was also found on this sponge.

are those made use of in my key to the Indian species (*loc. cit.*, p. 113): the rostrum is longer than in other species of the genus and is provided with an elevated dentate basal crest; the telson is lanceolate, with the apex acute and unarmed.

These characters appear to me to be altogether unsuitable for generic definition and are clearly of far less morphological value than those hitherto employed in the generic subdivision of the family. In young specimens of *H. ensirostris* there is a pair of long spines at the tip of the telson, reaching far beyond the produced median point and these may still be seen in a reduced condition, even in individuals 40 mm. in length. Stebbing also, when describing *Exhippolysmata tugelae*, notes the presence of a very small spine on either side of the telson tip. The claims of *Exhippolysmata* to generic rank rest therefore on the rostral characters and in the fact that the telson has a median point instead of being rounded. If it be retained, its recognition requires to be balanced by the institution of a considerable number of other "new genera," a procedure which seems unlikely to serve any useful purpose, while tending to confuse the natural affinities of the component species of the family.

Lysmatella, recently instituted by Borradaile for a species from the Maldives, is based on surer structural differences, but is none the less very closely allied to *Hippolysmata*. In the very brief preliminary diagnosis that Borradaile has given,¹ it is merely described as "related to *Lysmata*, but without mastigobranchs on the legs." The type species of the genus, *Lysmatella prima*, is described in the same paper.

Three specimens, recently obtained in the Andamans, agree in every particular with the generic and specific descriptions that Borradaile has given; but, unfortunately, the information is so meagre that it is impossible to be certain of their identity. The Andaman specimens are, however, clearly related in a very close manner with the species of *Hippolysmata* belonging to the *vittata* group, the affinity being shown not only by the almost exact correspondence in all structural details (except for the absence of epipods), but also in colour, the specimens when alive exhibiting the brilliant longitudinal red streaks that characterise *H. vittata* and *H. dentata*.

If my identification of the Andaman specimens is correct it appears to me unwise, in the present state of our knowledge, to recognise *Lysmatella* in full generic significance. The presence or absence of epipods is in many cases a valuable aid to generic diagnosis in the Hippolytidae, but the number of these structures is variable in the genera *Spirontocaris* and *Latreutes* and in *Hippolysmata ensirostris* the entire series is rudimentary. In many species referred to *Hippolysmata* the epipods have not been examined and, on analogy with other genera, it would occasion no surprise if some were found to possess a reduced number.

¹ Borradaile, *Ann. Mag. Nat. Hist.*, (8), XV, p. 206 (1915).

Hippolysmata ensirostris, Kemp.

1914. *Hippolysmata ensirostris*, Kemp, *Rec. Ind. Mus.*, X, p. 118, pl. vii, figs. 1-4.

A number of very interesting larval and post-larval specimens belonging to this species have recently been found off the Orissa coast. The post-larval specimens are about 14 to 16 mm. in length and in most of their characters agree closely with adults. The rostrum, however, is much shorter, usually not reaching the end of the antennal scale and the pereopods, though well-formed, with perfect chelae, and with apparently the full number of sub-segments in the carpus of the second, possess rudimentary exopods on all pairs except the last. The apex of the telson is compara-

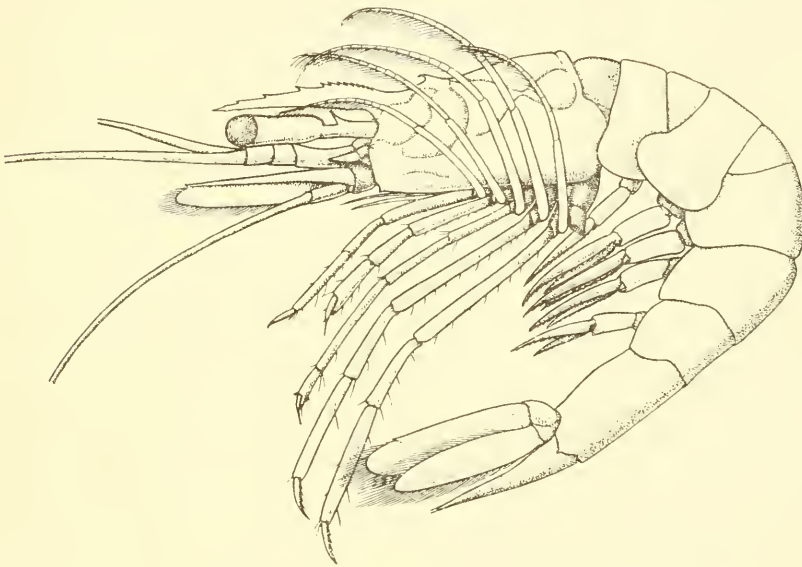


FIG. 5.—*Hippolysmata ensirostris*, Kemp.
Late larval stage.

tively broad, with a pair of long spines that extend beyond the small median point by more than half their length. These spines appear to dwindle slowly in the course of further development and, though not mentioned in my original description, traces of them may still be found in specimens 40 mm. in length.

Judging by the number of teeth on the basal crest of the rostrum, these post-larval specimens belong to *H. ensirostris* rather than to its variety *punctata*.

Other specimens, found with the above, almost certainly represent the same species in its last larval stage, but show remarkable differences in structure (text-fig. 5). The rostrum is short, dorsally convex and bears teeth only on its dorsal margin and that on the carapace, which is deeply grooved on either side

of the mid-dorsal line, is large and procurved. The eye is exceedingly long, reaching beyond the end of the antennular peduncle; it is composed of two distinct segments, the proximal and more slender of the two bearing a conspicuous dorsal spine. The antennules and antennae are normally developed, except that the lateral process on the basal segment of the former is rudimentary. The third maxillipedes and all the peraeopods except the last bear very long exopods. The chelae of the first and second pairs are more rudimentary. The full series of gills appears to be present but there is no trace of epipods. The pleopods and uropods are well formed and the apex of the telson resembles that of the post-larval specimens, but possesses a pair of setae near the middle.

So far as I am able to discover the larva differs from that of all other Carids hitherto described in the possession of a large spine on the eyestalk.

$\frac{9.5 \times 8.3-1}{1.0}$ Off Puri, Orissa coast, S. Kemp. Fourteen, post-larval
4-4½ fms. five, larval.

Hippolysmata (Lysmatella) prima (Borradaile).

1915. *Lysmatella prima*, Borradaile, *Ann. Mag. Nat. Hist.*, (8), XV, p. 209.

Borradaile's description of this species runs as follows:—
“Rostrum $\frac{8.1-1}{5.9}$, straight but upcurved at end, outreaching antennular stalk. Third maxilliped as stout as first leg, in which hand and arm are subequal, wrist a little shorter. Second wrist has 20-22 joints, the last the longest. Maldive Is.”

The Andaman specimens agree well with this description as far as it goes. The rostrum reaches beyond the end of the antennular peduncle and is almost or quite as long as the carapace; it is furnished with 9 or 10 teeth above and with 5, 6 or 7 below. The posterior tooth of the dorsal series is situated a little in front of the middle of the carapace and is separated by a marked interval from the rest; the latter are rather crowded posteriorly but more distantly spaced on the rostral blade; two of them (that is to say three teeth in all) are situated on the carapace behind the orbital notch. The teeth on the lower margin are as large as those on the upper. There is a large antennal spine on the carapace and another, which is smaller, at the pterygostomial angle.

The lateral process of the basal segment of the antennular peduncle is short, not reaching to half the length of the segment; its outer margin is strongly convex. The outer antennular flagellum is thickened at the base, but is devoid of the accessory ramus found in species of *Lysmata*. The antennal scale is narrow, scarcely broader behind than in front, and four times as long as wide. The outer margin is conspicuously concave and terminates in a sharp spine that reaches beyond the distal end of the lamella. The mouth-parts closely resemble those of *H. vittata*. All three maxillipedes bear epipods; the exopod of the last pair reaches beyond the middle of the antepenultimate segment

The first peraeopods are as described by Borradaile ; the chela resembles that of *H. vittata*, the fingers being shorter than the palm and meeting only at the tips when the claw is closed. The second legs are very slender, reaching beyond the antennal scale by nearly two-thirds the length of the carpus ; the merus is indistinctly divided into 13 or more segments, while the carpus is composed of from 21 to 24 segments. The last carpal segment is the longest, about equal in length with the palm and one and a half times as long as the fingers.

Of the remaining pairs of the peraeopods the third is the longest reaching beyond the antennal scale by almost the entire length of the propodus. In each pair the merus bears conspicuous teeth externally near the lower border : 5 in the third pair, 5 or 6 in the fourth and 3 or 4 in the fifth. The posterior edge of the propodus is set with fine setae and some seven or eight very slender spinules. The toothing of the dactylus is characteristic. As in *H. vittata* it bears 3 or 4 teeth on its posterior margin which increase in size distally ; the actual apex of the dactylus does not, however, take the form of a tooth, comparable to the others, but is extremely slender and, at the base, less than half the breadth of the adjacent tooth of the marginal series.

The abdomen, telson and uropods do not appear to differ in any marked degree from those of *H. vittata*.

The three specimens obtained are all ovigerous females ; the largest is about 21 mm. in length.

The colouration of living specimens is striking, the entire carapace and abdomen being marked with longitudinal stripes composed of small bright red chromatophores. On the carapace at the base of the rostrum the first three pairs of lateral stripes meet in the middle line. The three succeeding pairs are strictly longitudinal, but beneath them the striping on the carapace is oblique. In the middle of the abdomen there are about twenty longitudinal stripes. The eyestalks are heavily blotched with red ; the antennules and antennae are transparent with a faint yellowish tinge ; the third maxillipedes and all the legs, except the second pair, are conspicuously banded with red. The tail-fan is dotted with red and the eggs are sage green. In colour, therefore, the species bears a striking resemblance to *Hippolysmata vittata* and *H. dentata*, but lacks the transverse bands on the abdomen that are found in the former of these species.

$\frac{9252-4}{10}$

Port Blair, Andamans, 8 fms.

S. Kemp.

Three.

The three specimens were all obtained in a single haul of the net on rough ground in the southern entrance to the channel off Ross I.

EXPLANATION OF PLATE XXXVI.

- FIG. 1.—*Thor discosomatís*, sp. nov., $\times 8\frac{1}{3}$.
,, 2.—*Phycocaris simulans*, gen. et sp. nov., $\times 11$.
,, 3.—*Latreutes porcínus*, sp. nov., $\times 8\frac{1}{3}$.

