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40. ZOOLOGICAL RESULTS OF THE PERCY SLADEN  
TRUST EXPEDITION TO YUNNAN UNDER THE  
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F.R.S. (1922).

DECAPOD CRUSTACEA.

By STANLEY KEMP, Sc.D., *Zoological Survey of India.*

(Plate 18.)

Four species of Decapod Crustacea are represented in the collection made by Professor Gregory's expedition. The only Macruran is a species of *Caridina* from Tali-fu, which, apart from the fact that it had not hitherto been described, is interesting in showing peculiar sexual modifications in the third and fourth legs of the male. Similar modifications are known to occur in two of the more primitive genera of the family Atyidae, but had not previously been discovered in *Caridina*. Of the three river-crabs one species, belonging to the genus *Potamon* and subgenus *Potamiscus*, is regarded as new. One species, *Parathelphusa* (*Phricotelphusa*) *elegans*, was found on the Burmese side of the frontier.

Tribe CARIDEA.

Family ATYIDAE.

*Caridina gregoriana*, sp. nov.

The rostrum (text-fig. 1) usually reaches to the middle of the terminal segment of the antennular peduncle; occasionally it is longer, sometimes considerably exceeding the length of the peduncle, and not infrequently it is shorter, extending only to the middle or end of the second segment. In lateral view it is slender and is straight or slightly depressed with the dorsal border sometimes a little concave. Dorsally it bears from 8 to 17 teeth,<sup>1</sup> nearly always 9 to 14. The majority of these teeth form a close-set series over the base of the rostrum and from 4 to 7 of them (most commonly 5 or 6) are placed on the carapace behind the posterior limit of the orbit. The teeth at the proximal end of the series are generally a little more widely spaced than those in front of them and all are

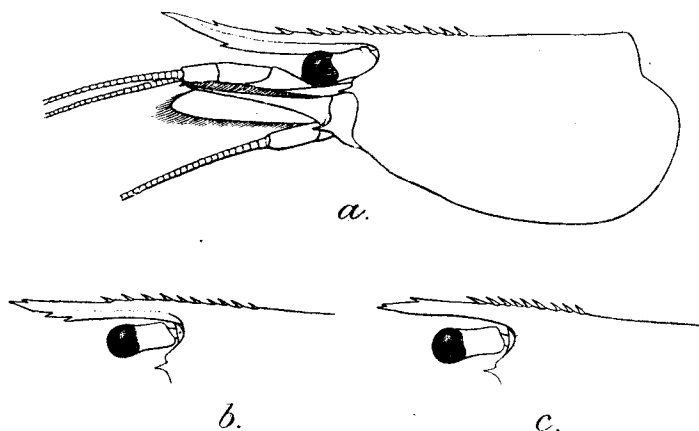
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<sup>1</sup> Of fifty specimens, one has 8 dorsal teeth, six have 9, eight have 10, eleven have 11, fourteen have 12, three have 13, five have 14, one has 15 and one has 17.

articulated. In advance of the series, on the anterior half of the rostrum one or two isolated teeth, which are not articulated, are usually to be found; the foremost tooth is never placed so close to the apex as to give it a bifid appearance. The lower portion of the rostral blade is well developed and bears from 0 to 3 teeth,<sup>1</sup> usually 1, in the anterior half.

The preorbital length of the antennular peduncle is slightly more than 0·8 times the post-orbital length of the carapace (from 0·81 to 0·85 according to my measurements). The orbit is rather deeply excavated, but with its lower angle little prominent. The antennal spine is strong and the antero-lateral angles rather broadly rounded.

The antennular somite does not appear to be dorsally



TEXT-FIG. 1.—*Caridina gregoriana*, sp. nov.

a. Carapace, rostrum, etc., of an ovigerous female.

b., c. Rostra of two other specimens.

carinate. The antennular peduncle does not quite reach the end of the antennal scale. Its lateral process does not reach the end of the basal segment and the distal spine of this segment falls short of the middle of the second segment. The second segment itself is slender, in dorsal view about twice as long as its greatest breadth. The antennal scale is nearly three times as long as wide, with straight or feebly concave outer border.

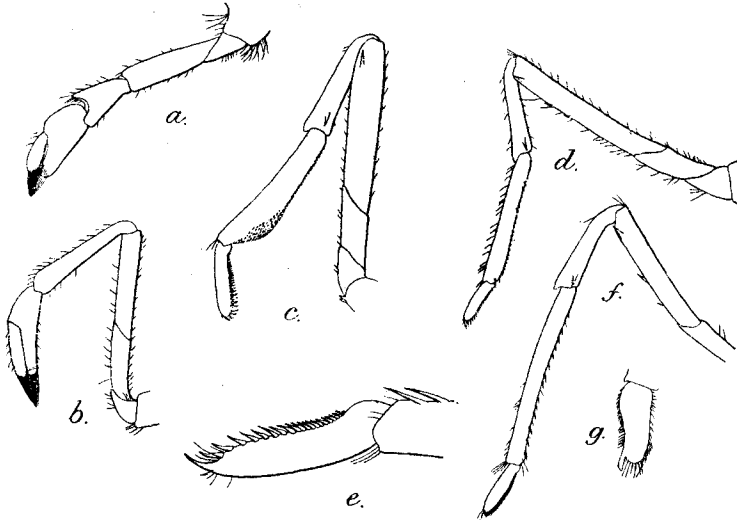
The epipod of the third maxilliped is short and pointed.

The first legs (text-fig. 2a) are very short and reach only to the end of the eye. The carpus is rather deeply excavated

<sup>1</sup> Of fifty specimens, nine have no ventral teeth, twenty-six have 1 tooth, eleven have 2 teeth, and four have 3 teeth.

anteriorly and its length is from 1.65 to 1.75 times its distal breadth. The palm does not extend far backwards behind the carpo-propodal articulation; the fingers are a little longer than the palm and a little shorter than the carpus.

The second legs (text-fig. 2*b*) reach about to the middle of the second antennular segment in females; in males they are slightly shorter. The carpus is from 5 to 5.5 times as long as its distal breadth. The chela is one fifth shorter than the carpus and is from 3.25 to 3.5 times as long as wide in females, about 3 times in males; in both sexes the fingers are 1.5 times as long as the palm.



TEXT-FIG. 2.—*Caridina gregoriana*, sp. nov.

- |                         |                                     |
|-------------------------|-------------------------------------|
| a. First leg.           | e. Dactylus of third leg of female, |
| b. Second leg.          | further enlarged.                   |
| c. Third leg of male.   | f. Fifth leg.                       |
| d. Third leg of female. | g. Endopod of first pleopod of      |
|                         | male.                               |

In females the third legs (text-fig. 2*d*) reach about to the tip of the antennal scale. At the distal end of the merus on the outer side there is a sharp forwardly directed spine and there is a similar spine in the same position on the carpus. The propodus is from 2.3 to 2.6 times the length of the dactylus and from 8 to 9 times as long as wide; it bears a series of numerous spinules on its posterior border. The dactylus (text-fig. 2*e*) is rather slender and slightly curved and bears (in all) 19 to 21 spinules. The fourth legs of the female are similar to the third but somewhat shorter.

In males the third and fourth legs (text-fig. 2*c*) are

remarkably modified. They are longer than in females, the third pair reaching beyond the scale by one or two times the length of the dactylus. The merus and carpus resemble those of females and have the same external spines, but the propodus is very conspicuously dilated towards its distal end and the posterior border is still more thickly set with spinules. The propodus is only from 1·8 to 2·1 times the length of the dactylus and is only from 4·6 to 4·7 times as long as its greatest breadth. The spinules of the dactylus vary in number from 20 to 29 and are conspicuously recurved near the apex.

The fifth legs (text-fig. 2f) in both sexes reach a little beyond the end of the first antennular segment. The merus has one or two spines on its posterior border and one situated externally near the distal end; there is one external spine at the distal end of the carpus and sometimes a smaller spine in addition in the anterior part of the posterior border. The propodus is from 2·5 to 3·2 times the length of the dactylus and tends to be proportionately longest in females. The dactylus bears a series of 42 to 56 spinules.

The branchial formula is normal and there are well developed epipods at the base of the first four legs.

The form of the endopod of the first pleopod of the male is shown in text-fig. 2g. The appendix masculina of the second pleopod is very large and nearly as long as the endopod which bears it.

The telson bears from 4 to 9 pairs of dorsal spinules and the apex, which is broadly rounded, is furnished with five pairs of rather stout setae between the spinules at the posterolateral corners. The spinules on the outer uropod vary in number from 9 to 11.

Full grown females reach a length of about 30 mm. The eggs are very large, from 1·0 to 1·17 mm. in length and from 0·65 to 0·85 mm. in breadth.

The species is described from a large number of specimens collected for Dr. J. W. Gregory by Mr. W. N. Ferguson at Tali-fu in Yunnan at an altitude of about 7,000 feet. A number of the best specimens have been selected as types and are registered in the collections of the Zoological Survey of India under number C 688/1.

Some years ago Mr. J. Coggin Brown of the Geological Survey of India brought back a large number of *Caridina* from Yunnan. He obtained them from a fisherman at Tali-fu who was taking them to market in a basket and it is probable that they came from Lake Tali. The condition of these specimens is exceedingly bad, for they were completely dry when purchased and appear to have been cooked. So far as can be seen they agree closely in general character with *C. gregoriana*, but the upper rostral teeth appear on the whole to be less numerous and no males with modified legs can be recognised.

*Caridina gregoriana* appears to be distinguished from all other species of the genus by the large number of spinules on the dactyli of the third and fourth legs and by the peculiar modifications which these legs undergo in males. In general appearance the species is not unlike *C. davidi* Bouvier<sup>1</sup> from Southern Shensi and the environs of Pekin. Apart, however, from the two characters mentioned above *C. davidi*, which I have myself examined, is at once distinguished by the more depressed rostrum with fewer teeth on the carapace behind the orbit, the much shorter preorbital length of the antennular peduncle and the proportionately longer dactylus of the fifth leg. In Bouvier's key to certain species, published in 1913,<sup>2</sup> it comes nearest to *C. propinqua* de Man, from which it is readily separated by a large number of well-defined characters.

The remarkable modifications of the third and fourth legs of the male do not appear to have been noticed hitherto in any species of *Caridina*; they are, however, precisely similar to those seen in *Paratya* (= *Xiphocaridina*) *compressa* (de Haan) and *P. curvirostris* (Heller).<sup>3</sup> A similar sexual difference also occurs in *Atyaephyra desmaresti* (Millet),<sup>4</sup> but in this genus the segment affected is not the propodus but the merus. *Paratya* and *Atyaephyra* are primitive genera of Atyidae and in this connection it is noteworthy that *Caridina gregoriana*, as shown by the comparatively great preorbital length of the antennular peduncle, is among the more primitive species of the genus to which it belongs.

Both in the modified legs of the male and in the large number of dactylar spinules on the third and fourth legs *Caridina gregoriana* resembles the two species of *Paratya* referred to above. These are striking features, but it would hardly be legitimate to assume without further evidence that the species forms a link between the two genera and was derived directly from *Paratya* by the suppression of the exopods of the legs and of the supra-orbital spines.

### Tribe BRACHYRHYNCHA.

#### Family POTAMONIDAE.

##### **Potamon (Potamon) atkinsonianum** (Wood-Mason).

1910. *Potamon (Potamon) atkinsonianum*, Alcock, *Cat. Ind. Decap. Crust.* I, fasc. ii, *Potamonidae*, p. 26, Plate X, fig. 39.

This species, which is common in the Himalayas from Darjiling to Simla and has once been recorded from the Shan

<sup>1</sup> Bouvier, *Bull. sci. France Belgique*, xxxix, p. 83, fig. 7 (1905).

<sup>2</sup> Bouvier, *Trans. Linn. Soc. (2), Zool.*, xv, p. 462 (1913).

<sup>3</sup> See Kemp, *Rec. Ind. Mus.*, xiii, p. 295 and fig. 3, p. 300 (1917).

<sup>4</sup> See Barrois, *Rev. Biol. Nord. France*, v, p. 126, figs. 1-3 (1893).



Hills in Burma, is represented in the collection by a single small female.

Compared with typical specimens from Nepal, this individual differs slightly (i) in the more deeply incised grooves of the upper surface of the carapace, the cervical in particular being very deeply impressed, (ii) in the stronger rugae on the anterior and antero-lateral parts of this surface, and (iii) in the less conspicuous epibranchial tooth. The merus of the third maxilliped is proportionately a little longer than in typical specimens, though still evidently broader than long.

The specimen agrees more nearly with the typical form than with any of the varieties described by Alcock. In the example from the Shan Hills (the only individual known from Burma) the grooves of the carapace are more superficial than in normal specimens, whereas in that in the present collection they are much deeper.

The carapace is 21·8 mm. in greatest breadth, 16·8 mm. in length and 9·3 mm. in depth.

The specimen was obtained at Tengyueh, the Treaty Port on the road from Bhamo to Tali-fu, east of the Chinese frontier; altitude, 5,300 feet, "on the floor of a basin with rice-fields, amid hills of basalts and other volcanic rocks; collected during the rainy season in August."

**Potamon (Potamiscus) yunnanense, sp. nov.**

(Plate XVIII.)

The length of the carapace is about four-fifths its greatest breadth and its depth is nearly half the greatest breadth. In a transverse direction the carapace is slightly convex, longitudinally it is convex anteriorly and almost flat in its posterior two-thirds. The H-groove is sharply defined, but the anterior parts of the cervical groove are for the most part superficial and obscure, though quite distinct where they cut the post-orbital crests. The mesogastric areola is narrow, little more than a quarter the greatest breadth of the carapace; its antero-lateral boundaries are defined posteriorly, but anteriorly are altogether deficient. At the extreme posterior end of the mesogastric areola there is a pair of large oval pits disposed longitudinally. The cardiac region is obscurely defined laterally by a pair of shallow furrows which posteriorly turn outwards and run towards the base of the penultimate pair of legs.

The surface of the carapace is for the most part smooth and, when dry, presents a polished appearance; it is, however, coarsely pitted throughout. The anterior portion of the epibranchial region bears a small number of coarse tubercles, separated by a smooth interval from the upturned antero-

lateral border. The sub-orbital lobes, which are defined inferiorly by a finely crenulate rim, are quite smooth and the side-walls bear numerous fine striae.

The epigastric and post-orbital crests together form a common curve, but the former are greatly advanced in the middle, extending much beyond a line joining the posterior border of the orbit. The strongly oblique edges of the epigastric crests bear transverse tuberculate rugae, but the surface immediately behind the crests is smooth except for the pits, which are here unusually coarse. The post-orbital crests are rather blunt and are separated from the epigastric by a distinct groove. Their edges are broken up into rugae which, towards the lateral margin, merge indistinguishably with the tubercles on the anterior part of the epibranchial region. The crests curve obliquely backwards towards the antero-lateral margin, but do not meet it. They terminate far behind the epibranchial tooth, the latter being midway between them and the outer orbital angle.

The front is moderately declivous; its edge is faintly crenulate, concave in the middle and with the outer angles rather sharply rounded. Behind the strongly raised edge the surface on either side is a little tumid (much less so than in *P. pealianum*) and is smooth save for a few low scattered tubercles. The lateral edges are smooth but both upper and lower orbital borders are conspicuously crenulate. The upper orbital border trends obliquely forwards and outwards from the inner corner and is not transverse as in many species of the genus. The gap below the outer orbital angle is small and obscure on the right side, completely absent on the left.

The antero-lateral borders are about as long as the postero-lateral. They are strongly raised, sharply serrulate, moderately curved and posteriorly turn a little inwards on to the dorsum of the carapace. About 22 serrations can be counted behind the epibranchial tooth and 4 or 5 in front of it. The epibranchial tooth is a little larger than any of the serrations but does not differ from them in character.

The abdomen of the male is coarsely pitted. The proximal breadth of the 6th segment is about 2·3 times its median length. The 7th segment is bluntly rounded and about three-quarters as long as broad.

The ischium of the third maxilliped is coarsely pitted, with a shallow longitudinal groove; the merus is considerably broader than long. In both exopodites the flagellum is completely absent.

The chelipeds are a little unequal. All three edges of the merus are sharply serrulate; the upper surface of the carpus is finely rugose and the inner spine is very sharp with two serrations at the base. The palm is slightly swollen and is rugose dorsally; externally it is rather coarsely pitted with three

ill-defined longitudinal rows of tubercles. The movable finger has 3 or 4 dorsal tubercles at the proximal end. Both fingers bear longitudinal rows of pits and have small teeth on their inner edges. The fingers do not gape appreciably when the claw is closed.

The second pair of walking legs is the longest and is rather less than twice the length of the carapace. In all four pairs the upper edge of the merus is rugose and both borders of the propodite spinulose. The dactylus throughout is longer than the propodus and the latter segment in the last pair is 1.8 times as long as broad.

The species is described from a single adult male having the following measurements (in mm.):—

Length	..	..	..	..	22.5
Breadth	..	..	..	..	27.5
Depth	..	..	..	..	13.0
Fronto-orbital breadth	..	..	..	..	19.3
Distance between epibranchial teeth	..	..	..	..	23.3
Breadth of mesogastric areola	..	..	..	..	7.7

The specimen was obtained from the river at Yung-chang, in the Mekong watershed, at an altitude of about 5,500 feet. It was collected on 23rd May, 1912, from a pool in a stream outside the city wall. Yung-chang is a large city, about six days march south of Tali-fu, situated approximately in Lat. 24° 27' N., Long. 100° 10' E. It is preserved in the Indian Museum under the number C 792/1.

The nearest ally of this species appears to be *Potamon* (*Potamiscus*) *tumidulum* Alcock<sup>1</sup> from Sikkim. On comparison this species differs in the following points: (i) the areolation of the carapace is better defined, the cervical groove in particular being well marked throughout its course; (ii) there is a conspicuous curved groove behind each epigastric crest, defining an epigastric areola (these are well shown in Alcock's figure); (iii) the mesogastric areola is proportionately broader; (iv) the upper orbital margins are transverse; (v) the antero-lateral margins are less strongly arched and less crisply serrulate, and (vi) the chelipeds are smoother.

*Potamon* (*Potamiscus*) *alcockianum* Kemp<sup>2</sup> from Northern Siam is in some respects similar, but the carapace is much flatter and shallower and is very strongly rugulose anteriorly. The mesogastric areola also is broader and the front is densely tuberculate.

### Paratelphusa (Phricotelphusa) elegans (de Man).

1910. *Paratelphusa* (*Phricotelphusa*) *elegans*, Alcock, *Cat. Ind. Decap. Crust.* I, fasc. ii, *Potamonidae*, p. 104, Plate XIII, fig. 63.

<sup>1</sup> Alcock, *loc. cit.*, pp. 43, 58, Plate II, fig. 6.

<sup>2</sup> Kemp, *Journ. Nat. Hist. Soc. Siam*, VI, p. 24, Plate III, fig. 7 (1923).

A single small male, with carapace 9·3 mm. in length, 11·8 mm. in breadth and 5·6 mm. in thickness, agrees precisely with specimens from the Kakhien Hills determined by Alcock. The specimen was obtained at Hkalonghka, 28 miles from Bhamo, at an altitude of 1,000 feet. It was found beside a small stream in thick forest on 6th September, 1922.

The species is known only from the Kakhien Hills.

EXPLANATION OF PLATE 18.

*Potamon (Potamiscus) yunnanense*, sp. nov.

Dorsal view of the type specimen, enlarged about twice.



R.C.Mondul, Photo.

POTAMON (POTAMISCUS) YUNNANENSE, sp.nov.