The specimens agree almost precisely with de Man's account. The only discrepancy that I have noted is that the lower border of the rostrum, described as " scarcely emarginate at the base," is, as in most species of the genus, distinctly concave above the eye, being at its narrowest only about two-thirds as deep as in the vicinity of the hindmost inferior tooth.

The rostrum bears from 7 to 10 dorsal teeth, usually 8 or 9; the first is remote from the others and is situated on the carapace, the second being as a rule immediately above the hinder limit of the orbit. On the lower border are from 2 to 5 teeth, nearly always 3.

The branchiostegal tooth is not very much smaller than the antennal. The outer margin of the basal segment of the antennular peduncle ends in a spine that extends much beyond the produced, setose, antero-external portion of the segment. The two rami of the outer antennular flagellum are fused basally for a distance varying from two-fifths to one half the entire length of the shorter ramus. The antennal scale is about three times as long as wide, narrowed apically and with the distal end of the lamella not extending very far beyond the terminal spine of the outer margin.

The mandibular palp is composed of only two segments, the joint between the second and third being suppressed. In this respect the species is comparable to the European *L. squilla* in which precisely the same modification is found.

The chela of the second peraeopods is nearly always a trifle longer than the carpus, but is occasionally about equal to it, as noted by Ortmann. In reference to the last three pairs of peraeopods de Man remarks, "end of the terminal joint armed with three small and two longer spines." This is doubtless a clerical error, the segment referred to being the propodus. The description, thus amended, applies well enough to the third and fourth pairs; in the fifth the spinules are much more numerous towards the distal end. In the third pair the propodus is one and three quarter times the length of the carpus and two and a third times as long as the dactylus. In the fifth pair the propodus is longer both relatively and actually; it is about twice the length of the carpus and three and a quarter times as long as the dactylus. The sixth abdominal somite, measured dorsally, is rather more than half the length of the carapace.

The largest specimen in the collection is a female, 40 mm. in total length. The eggs are of medium size, about 0·73 × 0·58 mm. in longer and shorter diameter.

The rostrum is proportionately longer in small specimens than in adults.

L. semmelinki, as de Man has remarked, bears a rather close resemblance to Heller's *L. modestus*; but in the latter species (i) the basal crest of the rostrum is much more elevated, (ii) the interval between the 1st and 2nd dorsal teeth of the rostrum is not greater than that between the 2nd and 3rd, (iii) the two rami composing the outer antennular flagellum are fused for a shorter length, (iv) the antennal scale is parallel-sided, not narrowed distally, (v) the mandibular palp is composed of three segments, (vi) the fingers of the first peraeopod are nearly one and a half times as long as the palm, (vii) the fingers of the second peraeopod are conspicuously longer than the palm and (viii) the last three peraeopods are

more slender, with a proportionately longer dactylus, that of the third pair being three quarters the length of the propodus.

The specimens collected by Dr. Annandale were obtained in February, 1914, in brackish water at the mouth of the Prai River opposite Penang; the species was extremely abundant in very shallow water at the edge of mud flats and, when alive, was whitish in colour without definite markings.

Other examples in the Indian Museum are from Fisher Bay, Port Owen, Tavoy I., Burma, obtained in November, 1911, by the R.I.M.S. 'Investigator' and from Bandra, near Bombay, collected in February 1911 by Mr. J. W. Caunter, from Ennur backwater near Madras, collected by myself in May 1918 in water of specific gravity 1·02625. There are ovigerous specimens from all the localities.

Leander semmelinki has been recorded from the roads of Makassar in Celebes (de Man), from Luzon in the Philippines (Ortmann) and from Singapore (Nobili).

Leander potamiscus, Kemp.

1917. *Leander potamiscus*, Kemp, *Rec. Ind. Mus.*, XIII, p. 225, text-fig. 7.

This species, which has been described from material collected by Dr. Annandale, differs from all known members of the genus with the exception of *L. fluminicola*, Kemp, in the complete absence of the branchiostegal spine of the carapace.

The type specimens were collected by Dr. Annandale in the Patani River, below the town of Patani in the Siamese Malay States and the species was also found at Telok Tikus on Penang I. Other specimens in the collection of the Zoological Survey of India are from Middle I., in the Andaman group and from the Sarguem and Tuari Rivers in Portuguese India. All the specimens were found in fresh water, but in places subject to tidal influence.

Leander paucidens (de Haan).

1907. *Leander paucidens*, de Man, *Trans. Linn. Soc. Zool.* (2), IX, p. 409.

1914. *Leander paucidens*, Balss, *Abhandl. math.-phys. Klasse K. Bayer. Akad. Wiss.*, Suppl. Bd. II, Abh. 10, p. 58.

Of this species, which is by far the commonest freshwater prawn in Japan, large numbers of specimens were obtained by Dr. Annandale. There are long series from Lake Biwa and from Ogura pond near Kyoto and other less numerous examples from the Yodo R., 1 mile above Osaka, from Kasumi-ga-ura on the Pacific coast and from Sapporo in Hokkaido: the specimens from the last locality were presented by the Otsu laboratory. All were collected in fresh water and a number of the females bear eggs.

The species was found in all parts of Lake Biwa, but was most abundant near the shore. Individuals were obtained in nets hauled in deepest part of the lake, at a depth of 320 ft., and as the species appears to live exclusively on the bottom there is every probability that they actually came from the depth indicated. Specimens from over 200 ft. are all small, none exceeding 35 mm. in length; nearer the shore larger examples, up to 48 mm. in length, were obtained. The largest specimens in the collec-

tion are from Kyoto and Sapporo and reach a length of about 54 mm. Miss Rathbun[1] has remarked that examples from the sea are larger than those from fresh water, attaining a length of 66½ mm. Dr. Annandale's specimens from Lake Biwa are, however, considerably larger than any that she examined from that locality.

According to an excellent colour sketch, made by Dr. T. Kawamura of the Otsu laboratory, living specimens are closely mottled with dull olive green with a dark posterior border to each abdominal somite. On either side of the carapace are three characteristic dark lines; two of these are on the branchiostegal wall and are nearly vertical, converging a little as they approach the inferior margin; the third extends obliquely downwards and forwards from the cardiac region, running between the two other lines at its lower end. The articulations of all the leg segments are tinged with yellow; there are dark patches at the base of the pleopods and at the tip of each uropod there is a large pale spot bordered with purplish brown. Dr. Annandale notes that specimens from bare ground, either in deep or shallow water, were almost colourless, though still retaining traces of the characteristic markings on the carapace. Examples with the deepest colouration were found among dense weed at a depth of about 10 ft.

The species forms one of the most important commercial products of Lake Biwa, being caught near Otsu in very large numbers in small basket traps.

De Man has given a list of the localities from which *Leander paucidens* has been recorded. It is evidently abundant in all parts of Japan and is known from Hokkaido and the Kurile Is. Miss Rathbun has recorded it from Fusan in Korea.

Genus **Palaemonetes**, Heller.

1911. *Allocaris*, Sollaud, *Bull. Mus. d'Hist. nat. Paris*, p. 50.
1913. *Allocaris*, synonymous with *Palaemonetes*, Pesta, *Ann. K.-K. Hofmuseums Wien*, XXVII, p. 9.
1914. *Coutierella*, Sollaud, *Bull. Soc. zool. France*, XXXIX, p. 318.

A small Palaemonid, obtained by Dr. Annandale in fresh water in the vicinity of Shanghai, is without doubt identical with that described by Sollaud under the name *Allocaris sinensis*. The new genus created for this species differs from *Palaemonetes* only in two points,—the wide separation of the coxal and basal segments of the first maxillipedes and the greater number of plumose setae at the apex of the telson.

Sollaud was apparently so impressed with the importance of these characters that he regarded *Allocaris sinensis* as the representative of an isolated branch which had evolved independently of all other Palaemonidae. His views, however, have been severely criticised by Pesta, who regards *Allocaris* as a synonym of *Palaemonetes* and has even expressed the opinion that *A. sinensis* is nothing more than a local race of the European *P. varians*. No two views could possibly be more divergent.

In reference to the characters noted above, Pesta has shown that the form of the first maxillipede is very variable in *Palaemonetes varians*, in some cases bearing an exceedingly close resemblance to that of *Allocaris*, while the number of setae at the

[1] Rathbun, *Proc. U.S. Nat. Mus.*, XXVI, p. 51 (1902).

apex of the telson is, in the same species, by no means constant. I have checked Pesta's observations by an examination of Irish specimens of *P. varians* and can in a large measure substantiate his statements.[1] Consideration of the text-figures which Pesta has given, affords convincing proof that *Allocaris* is nothing more than a synonym of *Palaemonetes* and that Sollaud formed a completely erroneous estimate of the value of the characters he discovered. On the other hand Pesta is undoubtedly wrong in suggesting that the Chinese species is merely a local race of *P. varians*.

More recently Sollaud has described another genus, *Coutierella*, based on a fresh-water Palaemonid from South China, and this also must be relegated to the synonymy of *Palaemonetes*. *Coutierella* is distinguished from *Palaemonetes* only by the form of the second maxilla and first maxillipede, the latter bearing a very close resemblance to the same appendage in *Palaemonetes sinensis*, while the former appears to differ from that of all Palaemonids in which it has been examined in the absence of the re-entrant angle in the margin below the two distal laciniae and in the presence of setae on this margin. It is clear from Pesta's work that the characters drawn from the first maxillipede do not form a valid generic distinction, and even in the Palaemonidae, in which genera are separated by such comparatively slight distinctions, the features of the second maxilla cannot by themselves be held to have the importance that Sollaud has ascribed to them.

In describing Caridea a study of the mouth-parts is far too often neglected; it is much to be regretted, therefore, that Sollaud in his discovery of certain most interesting points in the structure of these appendages in the Chinese species of *Palaemonetes* has adopted such extreme views regarding their evolution and classification.

Palaemonetes sinensis (Sollaud).

1911. *Allocaris sinensis*, Sollaud, *Bull. Mus. d'Hist. nat.*, p. 50, text-figs. 1, 2.

This species is certainly not a local race of *P. varians* as suggested by Pesta (*loc cit.*). It may be distinguished by the following characters:—

(i) The teeth on the upper border of the rostrum extend nearer to the apex. In *P. varians* the distal quarter of the rostrum is usually unarmed, whereas in *P. sinensis* it bears a tooth. In *P. sinensis* the foremost tooth of the dorsal series is situated above, or in advance of, the distal tooth on the lower border; in *P. varians* the foremost inferior tooth is in advance of all those on the upper edge.

(ii) The two ultimate segments of the antennular peduncle are proportionately shorter and the free portion of the accessory antennular ramus is nearly four times as long as the fused basal part. In *P. varians* the fused portion is very much longer, the free part of the accessory ramus being only about one third its length.

(iii) The antennal scale is a little broader (about two and two third times as long as wide) and is a trifle more broadly rounded distally.

(iv) The coxa and basis of the first maxillipede are more widely separated.

[1] In a number of Irish specimens the form of the first maxillipede is intermediate between those shown in Pesta's figs. 9 and 10 and in some it is almost as extreme as in fig. 10. There are as a rule only two setae at the apex of the talson, but in a few examples four were found.

(v) In the second peraeopods the chela is equal in length with the merus and is only about two-thirds as long as the carpus. In *P. varians* the chela is decidedly longer than the merus and only a little shorter than the carpus.

(vi) The dactylus of the last three peraeopods is a little longer; that of the third pair is about half as long as the propodus in *P. sinensis*, rather less in *P. varians*.

(vii) There are more setae (9 or 10) at the apex of the telson.

In other respects the two species appear to be in close agreement.

The teeth on the upper border of the rostrum vary in number from 4 to 6,[1] the hindmost being placed on the carapace behind the level of the orbit. On the lower margin there are from 1 to 3 teeth.[2]

On the ciliated margins of the antennules and buccal appendages there are numerous small cysts of a Protozoan apparently identical with that described by Sollaud.

Sixteen specimens of *Palaemonetes sinensis* were obtained by Dr. Annandale in the vicinity of Shanghai in small ponds and ditches of fresh water. They were found in the month of October in company with *Caridina* and young *Leander modestus*: none of the females carry eggs.[3]

Family ALPHEIDAE.

Genus **Alpheus**, Fabricius.

Alpheus paludicola, Kemp.

1915. *Alpheus paludicola*, Kemp, *Mem. Ind. Mus.*, V, p. 303, pl. xiii, figs. 11-13.

The only difference I am able to detect between specimens collected by Dr. Annandale in Lower Siam and those originally described from the Chilka Lake in Orissa is that the rostrum is very slender and rather longer, extending considerably beyond the end of the orbital hoods. In the form of the chelae and in all other particulars there is precise agreement. The eggs are 1·3 or 1·4 mm. in diameter.

According to Dr. Annandale's notes the specimens differed somewhat in colour from those observed in the Chilka Lake, the transverse bands of pigment on the abdomen being missing. They were translucent, without definite markings, but tinged, owing to the presence of scattered chromatophores, with reddish brown. The eyes were black and the palm and fingers of both chelae were deeply tinged with blue, especially on the dorsal surface. The eggs were pale green.

The specimens were obtained in the Tale Sap, in the channel connecting the upper and lower lakes at a depth of 3½ to 8 metres. They were found in a shallow layer of dense mud overlying a coarse sandy bottom and occurred in company with *Upogebia heterocheir*. The specific gravity of the water in the channel was variable according to the state of the tide, but probably does not rise much above 1·004.

Alpheus paludicola has hitherto been found only in the Chilka Lake on the Orissa coast of India.

[1] Of sixteen specimens five have 4 dorsal teeth, ten have 5 and one has 6.

[2] Of sixteen specimens seven have 1 inferior tooth, eight have 2 teeth and one has 3.

[3] See Addendum, p. 297.

Family ATYIDAE.

Genus **Caridina**, Milne-Edwards.

All the species recorded below possess epipods at the base of the first four peraeopods and a gill-formula which is apparently the same as that given for the genus by Calman and Bouvier.[1]

Caridina propinqua, de Man.

1908. *Caridina propinqua*, de Man, *Rec. Ind. Mus.*, II, p. 227, pl. xix, figs. 6, 6*a-f*.
1913. *Caridina propinqua*, Bouvier, *Trans. Linn. Soc. Zool.* (2), XV, p. 463.
1915. *Caridina propinqua*, Kemp, *Mem. Ind. Mus.*, V, p. 309.

The specimens agree closely with those from the neighbourhood of Calcutta. In young individuals the rostrum extends little, if at all, beyond the end of the basal segment of the antennular peduncle, whereas in adults it almost or quite reaches the end of the second segment. On the upper border there are from 11 to 20 teeth,[2] of which from 2 to 4 (usually 3 or 4) are situated on the carapace. On the lower border there are from 0 to 4 teeth (usually 2).

The carpus of the first peraeopods is from 2·8 to 3·2 times as long as broad. In the third pair the propodus is from 2·7 to 3·2 times the length of the dactylus; the latter segment is slender and is armed with 6 or 7 spines, the terminal claw included. The propodus of the fifth peraeopod is from 2·4 to 2·8 times the length of the dactylus, the latter segment bearing from 43 to 55 spinules. There are from 11 to 16 movable spines on the outer uropod.

The eggs are from 0·64 mm. in length by 0·39 mm. in breadth, when freshly extruded, to 0·70 mm. in length by 0·44 mm. in breadth, when on the point of hatching. Ovigerous females vary greatly in size, being from 12 to 20 mm. in total length.

Dr. Annandale found *Caridina propinqua* in abundance in the Tale Sap in January and February, 1916. It occurred among weeds in all parts of the lake, both in the inner portion where the water is in all probability fresh throughout the year and in the outer lake near the island of Koh Yaw in water of low salinity. There are also numerous specimens in the collection from the Patani River, below the town of Patani in the Siamese Malay States. The water in this locality, though fresh at the time the specimens were obtained, is subject to tidal influence.

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[1] Bouvier, *Ann. Sci. France Belgique*, XXXIX, p. 68 (1905).

[2] In fifty specimens the numbers of rostral teeth are as follows:—

Dorsal teeth.		Ventral teeth.	
2 specimens have	11 teeth.	1 specimen has	no tooth.
3 ,, ,,	12 ,,	6 specimens have	1 ,,
2 ,, ,,	13 ,,	30 ,, ,,	2 teeth.
7 ,, ,,	14 ,,	12 ,, ,,	3 ,,
8 ,, ,,	15 ,,	1 specimen has	4 ,,
8 ,, ,,	16 ,,		
9 ,, ,,	17 ,,		
6 ,, ,,	18 ,,		
3 ,, ,,	19 ,,		
2 ,, ,,	20 ,,		

Caridina propinqua has hitherto been recorded only from the vicinity of Calcutta and from the Chilka Lake and the neighbourhood of Puri in Orissa.

Caridina nilotica, Roux, subsp. **gracilipes**, de Man.

1892. *Caridina wyckii*, var. *gracilipes*, de Man, in Weber's *Zool. Ergebn. Reise Nied. Ost-Ind.*, II, p. 393, pl. xxiv, figs. 29, *a-e*.
1902. *Caridina wyckii gracilipes*, Schenkel, *Verh. naturf. Ges. Basel*, XIII, p. 498, pl. viii, fig. 5 (in part).
1904. *Caridina wyckii* var. *gracilipes*, Roux, *Rev. Suisse Zool.*, XII, p. 554.
1905. *Caridina nilotica* var. *gracilipes*, Bouvier, *Ann. sci. France Belgique*, XXXIX, p. 73.
1908. *Caridina nilotica* var. *bengalensis*, de Man, *Rec. Ind. Mus.*, II, p. 265, pl. xx, figs. 6, 6*a*, 6*b*.
1908. *Caridina nilotica* var. *gracilipes*, de Man, *ibid.*, p. 207, pl. xx, figs. 7, 7*a*, 7*b*.
1915. *Caridina nilotica* var. *bengalensis*, Kemp, *Mem. Ind. Mus.*, V, p. 307.

I have already drawn attention to the fact that Indian specimens of *C. nilotica* subsp. *bengalensis* show a greater range of variation than is indicated by de Man and that in consequence it becomes almost impossible to separate the Indian race from the subsp. *gracilipes*, described from Celebes.

A short series of specimens obtained by Dr. Annandale at Shanghai still further emphasizes the close relationship that exists between the two races, and I am therefore forced to the conclusion that *bengalensis* must be regarded merely as a synonym of *gracilipes*. In a few points differences may certainly be detected between the forms inhabiting India, Celebes and N. China, but these in my opinion are too trivial to justify nomenclatorial recognition; in most cases they can only be discerned by taking the average characters of a large number of specimens and they are clearly of far less weight than those employed in the case of other subspecies.

In the Shanghai specimens the rostrum reaches a little beyond the end of the antennal scale and is armed dorsally at its proximal end with from 10 to 20 teeth (usually 12 to 17).[1] Of these the first 1 or 2 are placed on the carapace behind the orbital notch. At the apex there are from 1 to 3 dorsal teeth (nearly always 1); in no case are there any isolated teeth between these and the foremost of those comprising the proximal series. The teeth on the lower border are from 6 to 14 in number, usually 7 to 12.[1]

[1] In thirty-three specimens the numbers of teeth are as follows:—

Dorsal teeth. (Proximal series only.)		Ventral teeth.	
1 specimen has	10 teeth.	1 specimen has	6 teeth.
1 ,, ,,	11 ,,	3 specimens have	7 ,,
3 specimens have	12 ,,	2 ,, ,,	8 ,,
4 ,, ,,	13 ,,	8 ,, ,,	9 ,,
6 ,, ,,	14 ,,	9 ,, ,,	10 ,,
3 ,, ,,	15 ,,	6 ,, ,,	11 ,,
7 ,, ,,	16 ,,	2 ,, ,,	12 ,,
4 ,, ,,	17 ,,	1 specimen has	13 ,,
1 specimen has	18 ,,	1 ,, ,,	14 ,,
1 ,, ,,	19 ,,		
2 specimens have	20 ,,		

The carpus of the first peraeopods is from 2·0 to 2·2 times as long as wide. The propodus of the third peraeopod is from 2·9 to 3·3 times as long as the dactylus. The dactylus bears from 9 to 11 spines; excluding which it is from 3·8 to 4·2 times as long as broad. In the fifth peraeopods the propodus is from 2·7 to 3·1 times as long as the dactylus; the latter segment is from 4·8 to 5·2 times as long as broad and bears from 42 to 50 spinules. There are 8 or 9 movable spines on the outer uropod.

The eggs are from 0·50 to 0·52 mm. in length and from 0·31 to 0·32 mm. in breadth.

Dr. Annandale was unable to recognise any difference in colouration between these specimens and those of *C. denticulata* subsp. *sinensis* taken with them, though he noted that two species were probably present in the Shanghai ditches.

As regards the number of rostral teeth it will be noticed that the average of the dorsal series is 15 in the case of the Shanghai specimens, about 15·8 in de Man's examples from Celebes and from 16·8 to 22·7 in various samples from the coasts of India and Ceylon (*v.* Kemp, *l.c.*, 1915, p. 308). In this respect, therefore, the Shanghai specimens are in close agreement with those from Celebes. The teeth on the lower margin are much less numerous than usual; the average number in the Shanghai examples is 9·8, whereas in those from Celebes it is 14·4 and from 12·0 to 15·6 in those from India and Ceylon. In the length of the eggs (0·50 to 0·52 mm.) the specimens correspond most nearly with Indian specimens, the length in the latter being from 0·41 to 0·49 mm. as compared with 0·33 to 0·40 mm. in the case of those from Celebes.

Miss Rathbun, writing in 1902,[1] refers Hickson's *Atya wycki* from Celebes to the synonymy of the Japanese *C. leucosticta*, Stimpson,[2] while de Man in 1908,[3] follows other authors in regarding the form described by Hickson as a subspecies of *C. nilotica*. Three specimens of *C. leucosticta*, obtained in Japan and determined by Balss,[4] are in the Indian Museum; they almost certainly belong to the same form as those examined by Miss Rathbun and agree well enough with Stimpson's brief description. The specimens are unfortunately in very poor condition, but it seems fairly certain that they represent merely a race of *C. nilotica*. The carpi of the first legs are, however, slender—about twice as long as broad—, a fact which precludes the suggestion that they belong to *C. nilotica* subsp. *wycki*, while the comparative measurements of the dactyli of the last three legs and the very small eggs indicate affinity with the subspecies *gracilipes*.

Though the material from Japan is quite insufficient to justify any definite statement, the probability that a race of *C. nilotica* inhabits that country should not be forgotten. The Japanese form appears to be closely related to the subspecies *gracilipes* and may indeed prove to be identical with it, Stimpson's name in the latter event having priority as a subspecific term.

From the comparatively small amount of knowledge that we at present possess it

[1] Rathbun, *Proc. U.S. Nat. Mus.*, XXVI, p. 50 (1902).

[2] Stimpson, *Proc. Acad. Sci. Philadelphia*, 1860, p. 28.

[3] De Man, *loc. cit.*, 1908, p. 269.

[4] Balss, *Abhandl. math.-phys. Klasse K. Bayer. Akad. Wiss.*, Suppl. Bd. II, Abh. 10, p. 25.

would appear that there is a discontinuity in the distribution of this form. It occurs in India and Ceylon on the one hand and in Celebes, N. China and possibly Japan on the other hand, but is apparently absent from Java, Sumatra and the Malay Peninsula. Max Weber's extensive collections of Atyidae from Java and Sumatra seem to indicate that no form of the wide-spread *C. nilotica* occurs in those islands, while, judging from Dr. Annandale's collection, the species is represented in the Malay Peninsula only by the distinct variety described below.

Caridina nilotica (Roux),
subsp. **macrophora,** nov.

A subspecies of *Caridina nilotica*, readily distinguished by the very large size of its eggs from all the Asiatic races hitherto known, was found by Dr. Annandale in the

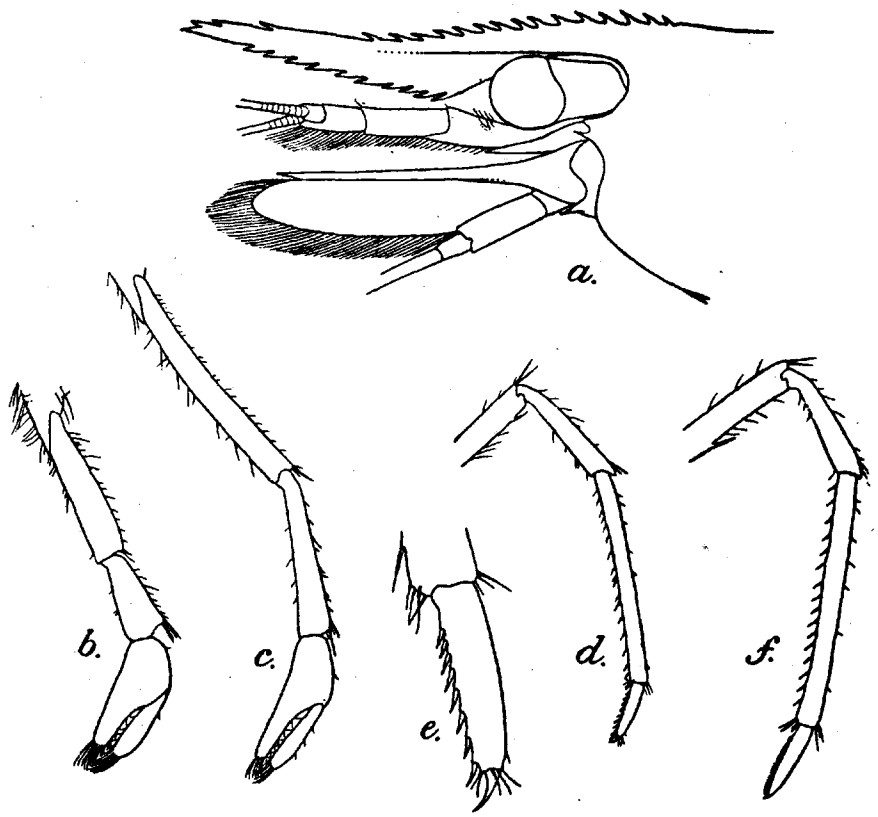

FIG. 9.—*Caridina nilotica*, subsp. *macrophora*, nov.

a. Carapace, rostrum, etc., in lateral view.
b. First peraeopod.
c. Second peraeopod.
d. Third peraeopod.
e. Dactylus of same further enlarged.
f. Fifth peraeopod.

Tale sap in Peninsular Siam. It occurred only in the inner part of the lake in water that in all probability is permanently fresh.

The rostrum (text-fig. 9*a*) usually extends a little beyond the apex of the antennal scale. In lateral view it is directed somewhat downwards in its proximal half, while distally it is a little ascendant. The proximal part of the upper margin bears a series

of 13 to 20 close set teeth,[1] of which from 1 to 3 (usually 2) are situated on the carapace behind the orbital notch. The foremost of the series is, as a rule, not situated in front of the middle point of the second segment of the antennular peduncle. There are from 1 to 3 (most commonly 2) subterminal dorsal teeth and between these and the foremost of the proximal series there is, in a few cases, a single isolated tooth. The lower margin bears from 6 to 12 teeth (usually 6 to 10)[1] which decrease regularly in size from behind forwards.

The lateral process of the antennular peduncle does not reach the end of the segment to which it is attached. The antennal scale is about $3\frac{1}{2}$ times as long as broad.

In the first peraeopods (text-fig. 9*b*) the carpus is about $2\frac{1}{2}$ times as long as broad; the chela is one third longer than the carpus with the dactylus about $1\frac{1}{2}$ times the length of the palm.

The carpus of the second peraeopods (text-fig. 9*c*) is very slender, from $5\frac{1}{2}$ to 7 times as long as broad and about one fifth longer than the chela. The dactylus is $1\frac{1}{2}$ times the length of the palm.

The last three pairs of peraeopods possess the usual large spines on the lower margins of the ischium, merus and carpus. In the third pair (text-figs. 9*d*, *e*) the propodus is from $3\frac{1}{5}$ to $3\frac{1}{3}$ times the length of the dactylus (terminal spine included). Excluding the spines the latter segment is from $4\frac{1}{3}$ to nearly 5 times as long as broad: the spines vary in number from 6 to 10.

In the fifth peraeopods (text-fig. 9*f*) the propodus is from $3\frac{1}{5}$ to $3\frac{1}{2}$ times the total length of the dactylus. Excluding the spinules, which vary in number from 35 to 45, the latter segment is from $4\frac{1}{2}$ to $4\frac{3}{4}$ times as long as broad.

The outer uropod bears 8 or 9 movable spines.

The eggs are very large, from 0·90 to 0·96 mm. in length and from 0·52 to 0·58 mm. in breadth.

Large specimens do not exceed 23 mm. in total length.

Classified on the lines adopted by de Man in his excellent paper on the races of *Caridina nilotica*,[2] the form from the Tale Sap would find a place near the subspecies *gracilipes* and *bengalensis* from both of which it is immediately distinguished by the very large size of the eggs. Eggs of more than 0·75 mm. have hitherto been known

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[1] In fifty specimens the numbers of rostral teeth are as follows:—

Dorsal teeth. (Not including those at apex.)	Ventral teeth.
7 specimens have 13 teeth.	5 specimens have 6 teeth.
9 ,, ,, 14 ,,	6 ,, ,, 7 ,,
11 ,, ,, 15 ,,	13 ,, ,, 8 ,,
9 ,, ,, 16 ,,	11 ,, ,, 9 ,,
5 ,, ,, 17 ,,	11 ,, ,, 10 ,,
4 ,, ,, 18 ,,	3 ,, ,, 11 ,,
4 ,, ,, 19 ,,	1 specimen has 12 ,,
1 specimen has 20 ,,	

Twenty specimens have one subtermiaal dorsal tooth, twenty-eight heve two and two have three.

[2] De Man, *Rec. Ind. Mus.*, II, p. 257 (1908).

only in two races of the species,[1] viz. the typical form, which is found in Egypt, and the subspecies *paucipara* from Natal. From both these forms the subspecies *macrophora* is distinguished by the greater proportionate length of the dactylus of the third legs, while from *paucipara* it also differs in the smaller number of spinules on the dactylus of the last leg.

C. n. macrophora may also be distinguished from all the other known races by the reduced number of teeth on the rostrum, a feature which is especially marked in the case of those on the lower border.

I have little doubt that the two mutilated specimens recorded by Lanchester[2] from the River Petwi, Tale Sap, as *Caridina wycki* are to be referred to this subspecies.

The specimens were all obtained in January, 1916, at the northern end of the Tale Sap in and near the mouth of the Patalung River. The water where they were found was quite fresh, though subject to slight alterations of level according to the state of the tide, and probably remains fresh throughout the year. The types bear the number 9664/10 in the register of the Zoological Survey of India.

Caridina brachydactyla, de Man.

1892. *Caridina wyckii*, de Man (*nec* Hickson), in Weber's *Zool. Ergebn. Reise Nied. Ost-Ind.*, II, p. 386, pl. xxiv, figs. 29 *f*, *g*, *i*, *ii*, *k*, *cc*, *dd*.
1908. *Caridina nilotica* var. *brachydactyla*, de Man, Rec. Ind. Mus., II, p. 269.
1913. *Caridina brachydactyla*, Bouvier, *Trans. Linn. Soc., Zool.* (2), XV, pp. 463, 466.

subsp. **peninsularis**, nov.

A number of specimens collected by Dr. Annandale near Patani, in the Siamese Malay States and on Penang I. appear to represent a local race of de Man's *C. nilotica* var. *brachydactyla*. This form, hitherto known only from Celebes, Flores and Saleyer, differs notably from all other varieties of *C. nilotica* in the very short dactyli of the last three pairs of legs and Bouvier, whom I follow, has recently given it full specific rank.

Minor points of distinction are to be found between individuals from Patani and those from Penang, while the specimens from both these localities in my opinion differ sufficiently from those described by de Man to justify their separation as a distinct subspecies.

The rostrum (text-fig. 10*a*) always exceeds the length of the antennular peduncle and in some cases extends a trifle beyond the end of the antennal scale. It is a little upturned distally, more rarely straight, and is armed above with a series of 21 to 37 (usually 25 to 32) teeth of which 3 or 4 (usually 3) are situated on the carapace behind the orbital notch. In most of the specimens examined by de Man a considerable length of the rostrum towards its distal end is unarmed, except for the presence of from 1 to 3 subterminal teeth, in this respect resembling *C. nilotica*. In the specimens before me the condition is quite different. The teeth, in the great majority of cases, stretch un-

[1] The size of the eggs in *C. nilotica* subsp. *wycki*, Hickson, a race found in Lake Tondano in Celebes, is at present unknown. No ovigerous females occur among cotypes of the subspecies preserved in the Indian Museum.

[2] Lanchester, *Proc. Zool. Soc. London*, 1901, p. 560.

interruptedly from the base to the apex, with the result that it is quite impossible to draw any line of separation between the subterminal teeth and those that form the proximal series. The teeth are crowded at the base and the interspaces between them sometimes increase in size as they approach the tip. In a very few cases there is a distinct break in the series and such specimens seem to differ only in a small degree from some from Mbawa in Flores examined by de Man. He notes that in these

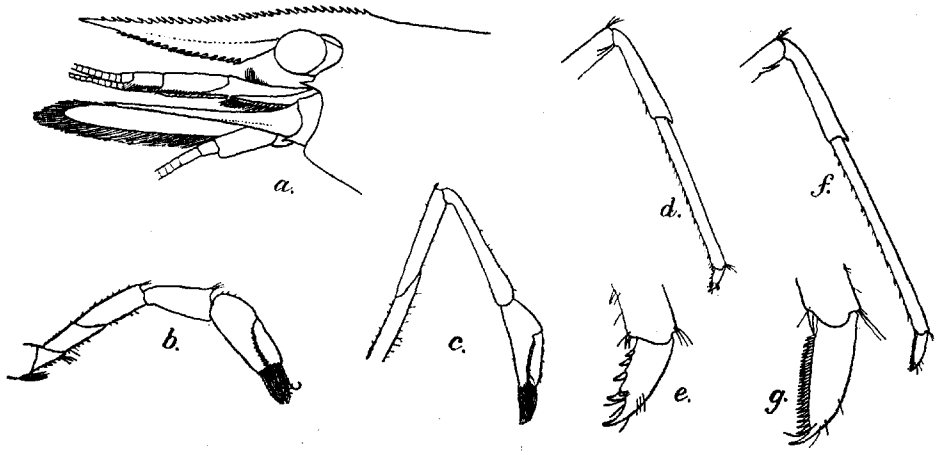

FIG. 10.—*Caridina brachydactyla*, subsp. *peninsularis*, nov.

a. Anterior part of carapace, rostrum, etc.
b. First peraeopod.
c. Second peraeopod.
d. Third peraeopod.
e. Dactylus of same further enlarged.
f. Fifth peraeopod.
g. Dactylus of same further enlarged.

examples " der distale ungezähnte Theil des oberen Randes ist kurz, nicht selten sehr kurz, zumeist ein wenig aufgebogen; vor der Spitze stehen 1-3 Zänchen, aber nicht selten rücken zwei oder drei Zänchen der proximalen Reihe mehr nach vorn und stehendann auf dem sonst gewöhnlich zahnlosen Theile" (de Man, *l.c.*, 1892, p. 393, pl. xxiv, figs. 29*i*, *ii*). The lower margin of the rostrum bears from 6 to 10 teeth in the few specimens from Patani, from 8 to 17 in those from Penang.[1] The teeth may

[1] The numbers of rostral teeth in the few specimens from Patani and in fifty examples from Penang are as follows :—

Number of dorsal teeth.	Number of Specimens	
	Penang.	Patani R.
21	1	..
22	..	..
23	2	1
24	..	..
25	6	..
26	2	2
27	4	2
28	7	4
29	8	2
30	7	..
31	2	..
32	4	1
33	2	..
34	2	..
35	1	..
36	1	..
37	1	..

Number of ventral teeth.	Number of Specimens	
	Penang.	Patani R.
6	..	1
7	..	..
8	3	2
9	5	5
10	10	4
11	5	..
12	5	..
13	8	..
14	7	..
15	3	..
16	3	..
17	1	..

extend throughout the anterior two-thirds of the lower border, or may cease some little distance behind the apex.

The cornea is proportionately larger than in any *C. nilotica* that I have seen, while the stalk is shorter and broader. In dorsal view the length of the cornea is greater than that of the stalk, whereas in *C. nilotica* subsp. *gracilipes* the reverse is the case.

The preocular length of the antennular peduncle is at least 0·82 times the post-ocular length of the carapace. The lateral process is short, not reaching the end of the basal segment. The antennal scale is from 3·6 to 3·8 times as long as broad; the second segment of the antennal peduncle is produced distally as a spine immediately below the insertion of the scale.

The carpus of the first peraeopods (text-fig. 10*b*) is about 2·2 times as long as broad in the Patani R. specimens, from 2·4 to 2·6 times in those from Penang. The fingers are about 1·5 times the length of the palm.[1]

In the second peraeopods (text-fig. 10*c*) the carpus is one quarter longer than the chela and is from 4·9 to 5·8 times as long as broad. The fingers are about 1·5 times the length of the palm.[1]

The last three pairs of peraeopods usually bear from 2 to 4 spines on the lower edge of the merus and, occasionally, one near the distal end of the carpus. The propodus of the third pair (text-fig. 10*d*) is from 5·6 to 6·6 times as long as the total length of the dactylus in the Patani R. specimens, from 5·5 to 5·8 (exceptionally 5·1) times in the case of those from Penang. Excluding the spines, which vary in number from 5 to 7, the dactylus (text-fig. 10*e*) is from 2·0 to 2·6 times as long as broad. In the fifth peraeopods (text-figs. 10*f*, *g*) the propodus is from 4·8 to 6·8 times the length of the dactylus; the dactylus is from 2·5 to 2·8 times as long as broad and bears from 29 to 43 (usually 36 to 43) spinules.

There are from 3 to 5 pairs of dorsal spines on the telson and from 8 to 10 at the apex. On the outer uropod there are from 12 to 14 movable spines.

The eggs vary from 0·35 to 0·42 mm. in length and from 0·22 to 0·25 mm. in breadth; they do not differ in size in specimens from the two localities.

Large specimens reach a length of about 28 mm. In examples of 18 to 20 mm. in length the rostrum is not longer than in adults whereas in varieties of *C. nilotica* it is proportionately longest in adolescent individuals.

The subspecies *peninsularis* is based solely on the character of the upper border of the rostrum; in the subspecies the teeth extend along the whole length of this border, whereas in the typical form there is an untoothed portion close behind the apex.

The few Patani specimens were obtained in the river in muddy water which was fresh though subject to tidal influence, while those from Penang came from a stream of clear water in the Botanic Gardens. In the latter locality they occurred in places where the flow of water was not very rapid and where the banks were not overgrown

[1] The length of the palm is measured from the hindmost limit of the chela to the dorsal point of junction between palm and dactylus, the dactylus from its tip to the same point. De Man appears to have measured these segments differently.

with dense jungle. They were most abundant among the roots of grasses, etc., at the edge.

The types of the subspecies, which are from Penang, bear the number 9667/10 in the register of the Zoological Survey of India.

Caridina gracilirostris, de Man.

1892. *Caridina gracilirostris*, de Man, in Weber's *Zool. Ergebn. Reise Nied. Ost-Ind.* II, p. 399, pl. xxv, fig. 31.
1904. *Caridina gracilirostris*, Roux, *Rev. Suisse Zool.*, XII, p. 555.
1905. *Caridina gracilirostris*, Bouvier, *Ann. sci. France Belgique*, XXXIX, p. 72.
1908. *Caridina* sp., de Man, *Rec. Ind. Mus.*, II, p. 227.

This species, hitherto recorded only from Celebes, Flores and Sumatra, is represented in Dr. Annandale's collection by a number of specimens from Peninsular Siam. There are also in the Indian Museum numerous examples from four widely separated parts of India. The following is a list of the localities from which specimens have been examined :—

Dhappa, near Calcutta. N. Annandale. Brackish water. Three specimens (much damaged ; recorded by de Man in 1908 as *Caridina* sp.).

Garia, near Calcutta : Dec., 1910, and Jan., 1911. S. Kemp. Brackish water. Seventeen specimens.

Sanguem R., Sanvordem, Portuguese India : Sept., 1916. S. Kemp. In water fresh at the time of capture, but subject to tidal influence. Six specimens.

Udaiyarpettai Kulam, Tinnevelly, S. India : Sept., 1911. J. R. Hill. Fresh water. Twenty-three specimens.

Tambrapani R., Tinnevelly, S. India : Sept., 1911. J. R. Hill. Fresh water. About sixty specimens.

Vellaney, Travancore : March and Sept., 1911. S. N. Pillay. Fresh water. About fifty specimens.

Patani R., below town of Patani, Siamese Malay States. N. Annandale. In water fresh at the time of capture, but subject to tidal influence.

In addition there are three specimens from Celebes, determined by de Man and received in exchange from Prof. Max Weber.

Ovigerous females were found in the months of September, December, January, February and March and occur in samples from all the localities listed above with the exception of Dhappa.

I have made a close comparison of the available material with a view to determining the possible existence of distinct races of the species. Specimens from different localities, however, agree very closely in structure and the few small differences that were observed in the case of one or two samples are of far too trivial a character to justify subspecific recognition.

The rostrum varies very considerably in length and is apparently longest in adolescent individuals between 25 and 30 mm. in length. In these it not infrequently exceeds twice the length of the carapace. In adults, especially in large

females, it is usually shorter and in rare cases is less than one and a half times the length of the carapace. The dorsal teeth, excluding that at the apex, vary in number from 4 to 10 (usually 5 to 9). In the specimens from Tinnevelly the number appears to be decidedly lower than in those from other localities, while de Man has recorded examples with an exceptionally high number from the Bari R. in Flores. There is, almost without exception, a single subapical dorsal tooth: I have seen single specimens with 2 and 3 teeth in this position.

The ventral teeth of the rostrum vary still more, from 17 to 42, the majority having from 23 to 32. Here again the specimens from Tinnevelly seem to have, on the average, a lower number than the others, but the material is not sufficiently abundant for accurate determination of the point.

The numbers of teeth in specimens from the five principal localities are as follows:—

Number of dorsal teeth.	Number of specimens.				
	Garia.	Sanvordem.	Tinnevelly.	Vellaney.	Patani.
4	..	..	5	..	..
5	..	..	23	6	..
6	1	..	19	11	1
7	2	2	3	18	2
8	6	2	..	15	7
9	3	..	..	3	2
10	..	2	..	1	1

Number of ventral teeth.	Number of specimens.				
	Garia.	Sanvordem.	Tinnevelly.	Vellaney.	Patani.
17	..	..	1	..	..
19	..	..	1	..	..
20	..	..	2	..	1
21	..	..	1	..	1
22	..	..	3	1	1
23	1	..	7	3	1
24	..	..	8	1	..
25	..	1	6	5	1
26	1	..	5	3	2
27	3	1	6	4	3
28	..	..	3	11	2
29	..	..	2	6	..
30	2	2	1	1	..
31	1	..	2	3	1
32	3	..	..	4	..
33	..	..	2	..	..
34	..	..	..	3	..
35	..	1	..	1	..
36	..	..	..	1	..
37	1	..	..	..	..
38	..	..	..	1	..
41	..	1	..	1	..
42	..	..	..	..	..

The antennal scale is from $3\frac{2}{3}$ to 4 times as long as wide. The lateral process of the antennular peduncle is short, not reaching the end of the basal segment. The second segment is about twice as long as broad.

In the third maxillipedes the epipod is long and straight; the terminal segment bears from 8 to 10 spines.

The carpus of the first peraeopods is from $1\frac{2}{3}$ to 2 times as long as wide and is

moderately excavate anteriorly; I have not seen any individual with this segment as slender as in de Man's examples from the Nargi River in Flores (de Man, *l.c.*, 1892, p. 403, pl. xxv, fig. 31*d*). The fingers are usually a little longer than the palm.

In the second peraeopods the carpus is from $1\frac{1}{8}$ to $1\frac{1}{3}$ times as long as the chela and is from 4 to $4\frac{1}{2}$ times as long as its greatest breadth.

The usual spines are present on the ischium, merus and carpus of the last three peraeopods. The dactylus of the third pair generally bears from 8 to 10 spines, but in specimens from the Patani River the number is higher, from 12 to 15. In the fifth peraeopods the propodus is from $3\frac{3}{4}$ (Tinnevelly) to $4\frac{1}{2}$ times (Patani R.) the length of the dactylus. The latter segment usually bears from 32 to 39 spinules; but, as in the case of the third pair, the number is higher in specimens from the Patani River, varying from 45 to 55.

The outer uropod is provided with from 8 to 11 movable spines.

Large specimens reach a total length of about 38 mm.

The size of the eggs is somewhat variable. In specimens from Calcutta, Portuguese India and the Patani River they are from 0·35 to 0·43 mm. in length and from 0·23 to 0·28 mm. in breadth. In those from Travancore and Tinnevelly they are slightly, but noticeably larger, from 0·50 to 0·52 mm. in length and from 0·32 to 0·33 mm. in breadth. The lowest of these determinations agrees with de Man's description, in which the length is stated to be $\frac{1}{3}$ mm. Even between the extremes the variation is small, but it is noteworthy that the specimens from Travancore and Tinnevelly that possess the largest eggs were found in fresh water, whereas all the rest, including those from which de Man drew up his description, were obtained in places within the reach of tidal influence.

Summarizing the foregoing observations it may be stated that material from five distinct regions (four situated in the Indian Peninsula and one in Siam) shows little signs of local variation. Three points only call for emphasis,—(i) in specimens from the Tinnevelly district in S. India the average number of upper rostral teeth is below normal, (ii) in specimens from Lower Siam the number of spines on the dactyli of the last three legs is above normal, and (iii) specimens from water that is brackish or subject to tidal influence have smaller eggs than those obtained in fresh water.

The colouration of living specimens is distinctive. The animal as a whole is translucent with the rostrum, the lower surface of the last abdominal somite, the distal two-thirds of the telson and frequently the tips of the uropods deeply pigmented. The carapace is without markings, but there is a short transverse row of chromatophores on the third abdominal somite and a longitudinal line of similar chromatophores near the inferior margin of the first five somites. The depth of pigmentation is variable. In extreme cases the whole of the rostrum, the antennules, the inner edge of the antennal scale and the tail-fan are deeply pigmented and there is a broad lateral longitudinal band on either side of the abdomen.

In my experience *C. gracilirostris* is a scarce form, much less abundant than other species of the same genus with which it is found associated.

The localities from which specimens have been examined have already been enumerated. The range of the species so far as known is Peninsular India, Lower Siam, Sumatra, Flores and Celebes.

Caridina gracillima, Lanchester.

1901. *Caridina gracillima*, Lanchester, *Proc. Zool. Soc. London*, p. 560, pl. XXXIV, fig. 1.
1905. *Caridina gracillima*, Bouvier, *Bull. sci. France Belgique*, XXXIX, p. 72.
1913. *Caridina gracillima*, Bouvier, *Trans. Linn. Soc., Zool.* (2), XV, p. 463.

As Lanchester has pointed out this form is very closely related to *C. gracilirostris*; it may indeed be no more than a well marked local race of that species. The principal distinctions between the two are as follows :—

C. gracillima, Lanchester.	*C. gracilirostris*, de Man.
Rostrum shorter, usually not more than 1½ times length of carapace.	Rostrum longer, usually more than 1½ times length of carapace.
Ventral teeth of rostrum less numerous, usually not more than 20.	Ventral teeth of rostrum more numerous, usually more than 20.
Outer uropod with 6 to 8 movable spinules.	Outer uropod with 8 to 11 movable spinules.
Eggs larger, from 0·65 to 0·70 mm. in length.	Eggs smaller, from 0·33 to 0·52 mm. in length.
Size smaller; total length not exceeding 25 mm.	Size larger; total length up to 38 mm.

The differences noted by Lanchester in regard to the proportionate lengths of the first two peraeopods and the spinulation of the telson break down on actual comparison of specimens.

In fifty specimens the number of dorsal teeth [1] on the proximal part of the rostrum varies from 5 to 10. In forty-nine specimens there is a single subapical dorsal tooth and in one specimen two such teeth. The ventral teeth vary from 13 to 22 (usually 14 to 20).

The antennal scale is from 3½ to nearly 4 times as long as broad. The peraeopods agree almost precisely with those of the allied species. The dactylus of the third bears from 6 to 9 teeth and that of the fifth from 30 to 47 (52 according to Bouvier).

According to Dr. Annandale's notes living specimens were transparent, with the

[1] The teeth in these specimens are arranged thus :—

Dorsal teeth.		Ventral teeth.	
7 specimens have	5 teeth.	1 specimen has	13 teeth.
6 ,, ,,	6 ,,	4 specimens have	14 ,,
20 ,, ,,	7 ,,	2 ,, ,,	15 ,,
12 ,, ,,	8 ,,	15 ,, ,,	16 ,,
3 ,, ,,	9 ,,	10 ,, ,,	17 ,,
2 ,, ,,	10 ,,	9 ,, ,,	18 ,,
		4 ,, ,,	19 ,,
		2 ,, ,,	20 ,,
		2 ,, ,,	21 ,,
		1 specimen has	22 ,,

rostrum, posterior and lower margins of each abdominal somite, the margins of the telson and a longitudinal streak on each branchial region dark olive green. Suffusions of the same colour were sometimes present on other parts of the body. The eggs were greenish.

The numerous specimens in the collection were all obtained in the lower reaches of the Patalung River and in the Tale Sap in Lower Siam. In the inner lake they were common in fresh water, among weeds at the mouth of the Patalung River and at the edges of the lake in the same neighbourhood. In the outer lake they were equally abundant, living among weeds round the island of Koh Yaw in water of specific gravity 1·006.

Ovigerous females were obtained in both parts of the lake, but the size of the eggs—0·65 to 0·70 mm. in length and 0·40 to 0·45 mm. in breadth—does not differ in correlation with the different specific gravity of the water. It will be noticed that the eggs of specimens obtained in slightly brackish water are nearly twice the size of those of *C. gracilirostris* living in similar situations. This fact, more than any other, has induced me to retain *C. gracillima* as a distinct species.

Lanchester was in some little doubt as to the precise locality at which his specimens were obtained. They were found by Dr. Annandale and Dr. R. Evans in 1899, when attached to the "Skeat" Expedition, and were caught in the inner lake of the Tale Sap, just inside the mouth of the Patalung River. The species has not been recorded from any other locality.

Caridina denticulata (de Haan).

1849. *Caridina denticulata*, de Haan, in Siebold's *Fauna Japonica, Crust.*, p. 186, pl. xlv, fig. 8 (as *Hippolyte*).
1894. *Caridina denticulata*, Ortmann, *Proc. Acad. Sci. Philadelphia*, p. 406.
1902. *Caridina denticulata*, Rathbun, *Proc. U.S. Nat. Mus.*, XXVI, p. 49.
1902. *Caridina denticulata*, Doflein, *Abandl. math.-phys. Klasse Bayer. Akad. Wiss. München*, XXI, p. 632, text-figs.
1905. *Caridina denticulata*, Bouvier, *Bull. sci. France Belgique*, XXXIX, p. 74.
1914. *Caridina denticulata*, Balss, *Abhandl. math.-phys. Klasse Bayer. Akad. Wiss. München*, Suppl. Bd. II, Abh. 10, p. 24.

This species has been recorded both from China and Japan and good series from each of these countries are in Dr. Annandale's collection. On comparison certain small but apparently constant differences are to be found between the two sets of specimens and I have, in consequence, given the Chinese form subspecific rank.

An important character of *C. denticulata* is the presence of an acute forwardly directed tooth on either side of the carapace at the antero-inferior angle. Though clearly shown in Doflein's figures, and less distinctly in that of de Haan, its existence is not mentioned in any of the published descriptions. The antero-inferior angle of the carapace[1] is rounded off in most known species of Atyidae, but

[1] Bouvier in his key to certain species of *Caridina* (1913) separates some forms by the presence or absence of spines at the points he calls "l'angle orbitaire" and "l'angle sous-antennaire." By the former term he apparently refers to the angle on the anterior border of the carapace which is frequently called the antennal angle or antennal spine and by

is produced to form a tooth in *C. pasadenae*, Kingsley,[1] from California and *C. davidi*, Bouvier[2] from China. A similar tooth is frequently to be found in Indian specimens of a form closely allied to *C. weberi*, subsp. *sumatrensis*; but it is here variable in its development and in some localities at least does not even possess racial significance.[3]

Classified according to the scheme outlined by Bouvier[4] in 1913, *C. denticulata* would find a place alongside the Chinese *C. davidi*, Bouvier. Balss regards the latter species as synonymous with the former, but in this he is certainly in error. *C. davidi*, co-types of which are in the Indian Museum, differs in many respects from *C. denticulata* and may be distinguished at a glance by the depressed rostrum and by the strong curvature of the propodi of the last three pairs of legs.

The Japanese and Chinese races of *C. denticulata* may be distinguished in the following manner :—

Typical form. Japan.	subsp. *sinensis*. nov. China.
Rostrum usually with 10 to 15 teeth above and with 2 to 5 below[5] (text-fig. 11*a*).	Rostrum usually with 14 to 22 teeth above and with 3 to 8 below.[6] (text-fig. 11*c*).
Anterior margin of carpus of first peraeopod slightly excavate (text-fig. 11*b*).	Anterior margin of carpus of first peraeopod deeply excavate (text-fig. 11*d*).

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the latter to a projection on the infero-external aspect of the second segment of the antennal peduncle (*cf.* description of *C. brevirostris*, p. 452). He makes no mention of a tooth or spine at the antero-inferior angle of the carapace.

[1] Kingsley, *Bull. Essex Inst.*, XXVII, p. 98, pl. iii, figs. 1-7 (1897).

[2] Bouvier, *Bull. Sci. France Belgique*, XXXIX, p. 83, fig. 7.

[3] *Vide* Kemp, *Rec. Ind. Mus.*, XIV, p. 100 (1918).

[4] Bouvier, *Trans. Linn. Soc. Zool.* (2), XV, p. 462 (1913).

[5] In fifty specimens from the neighbourhood of Lake Biwa in Japan the numbers of rostral teeth are as follows :—

Dorsal teeth.		Ventral teeth.	
6 specimens have	10 teeth.	1 specimen has	no tooth.
4 ,, ,,	11 ,,	1 ,, ,,	1 ,,
12 ,, ,,	12 ,,	7 specimens have	2 teeth.
11 ,, ,,	13 ,,	17 ,, ,,	3 ,,
8 ,, ,,	14 ,,	16 ,, ,,	4 ,,
7 ,, ,,	15 ,,	8 ,, ,,	5 ,,
1 specimen has	16 ,,		
1 ,, ,,	17 ,,		

[6] In fifty specimens from the Tai Hu in China the numbers of teeth are as follows :—

Dorsal teeth.		Ventral teeth.	
1 specimen has	12 teeth.	2 specimens have	2 teeth.
3 specimens have	13 ,,	5 ,, ,,	3 ,,
2 ,, ,,	14 ,,	13 ,, ,,	4 ,,
7 ,, ,,	15 ,,	12 ,, ,,	5 ,,
6 ,, ,,	16 ,,	9 ,, ,,	6 ,,
8 ,, ,,	17 ,,	5 ,, ,,	7 ,,
7 ,, ,,	18 ,,	3 ,, ,,	8 ,,
6 ,, ,,	19 ,,	1 specimen has	9 ,,
3 ,, ,,	20 ,,		
1 specimen has	21 ,,		
4 specimens have	22 ,,		
1 specimen has	23 ,,		
1 ,, ,,	26 ,,		

The specimens recorded by Miss Rathbun from Fusan in Korea, with 14 to 18 teeth on the upper margin of the rostrum and 4 to 6 on the lower margin, most probably belong to the subspecies *sinensis*, and this is almost certainly true of Doflein's specimens from Pekin with 14 to 16 dorsal teeth and 3 to 5 ventral. In the figure given by the latter author the deeply excavate anterior margin of the carpus of the first legs is clearly shown.

In both races the rostrum reaches almost to, or a little beyond, the apex of the antennular peduncle. Its upper border is dorsally concave with the distal quarter or third of its length unarmed. Two or three of the posterior dorsal teeth are situated on the carapace behind the level of the orbit. The preorbital length of the antennular peduncle is about seven-tenths the post-orbital length of the carapace.

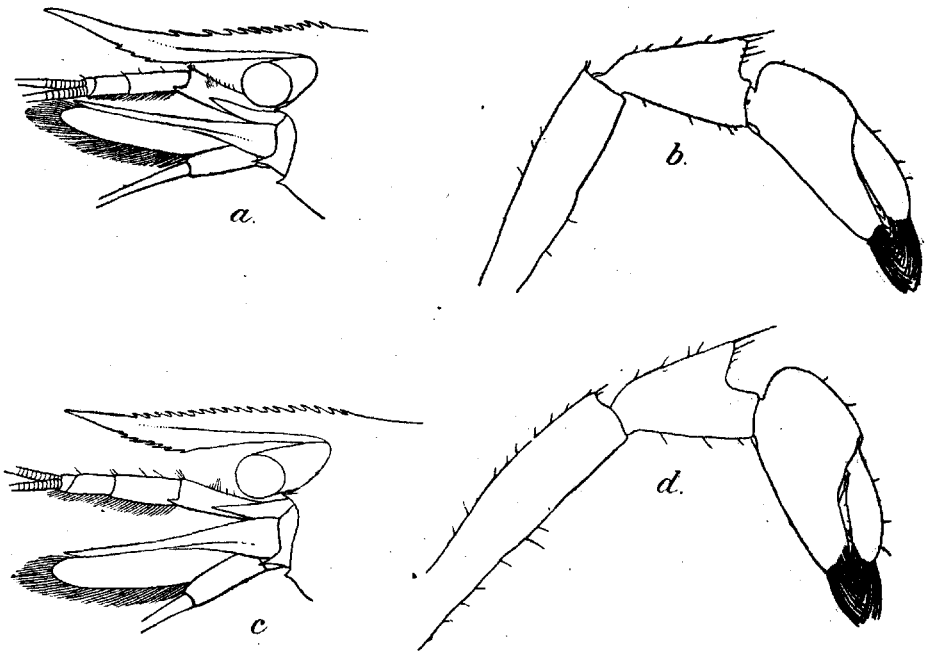

FIG. 11.—*Caridina denticulata* (de Haan).
a, *b*. Typical form. *c*, *d*. Subsp. *sinensis*, nov.
a, *c*. Anterior part of animal in lateral view.
b, *d*. First peraeopod.

The merus of the third peraeopods bears 3, very rarely 4 teeth on its lower border; the dactylus bears 7 to 10 spines in Japanese specimens, 8 to 13 in those from China. The merus of the last pair of peraeopods also has 3 teeth on its lower edge; the propodus is from $2\frac{1}{2}$ to $2\frac{3}{4}$ times the length of the dactylus. The latter segment is about 4 times as long as broad; it bears about 40 to 60 teeth in Japanese specimens and about 50 to 70 in those from China. The number of movable spines on the outer uropod varies from 10 to 16.

Large specimens reach a length of about 28 mm.; none are ovigerous.

According to notes made by Dr. Annandale on Japanese specimens the species in life varies considerably in colour, as a rule it was brownish with mottled and marbled

sides, with a broad pale bar running from the rostrum to the tip of the telson, and with the edges of the uropods irregularly pale. Occasionally the whole animal was dead black, except for the longitudinal mid-dorsal bar, which was then yellowish, and for the pale edging to the uropods. Chinese individuals were similarly coloured, but were as a rule rather paler.

The parasitic Temnocephalid, *Caridinicola*, was very abundant on the Chinese specimens.

The Japanese specimens were obtained at Hikone on the eastern shores of Lake Biwa and in ditches at the edge of the Seta River at its exit from the lake. The Chinese specimens were found in creeks and irrigation channels at the edge of the Tai Hu lake in Kiangsu province.

Caridina laevis, Heller.

1862. *Caridina laevis*, Heller, *Sitzber. K. Akad. Wiss. Wien*, XLV, p. 411.
1892. *Caridina laevis*, de Man, in *Weber's Zool. Ergebn. Reise Nied. Ost-Ind.*, II, p. 376, pl. xxiii, fig. 27.
1905. *Caridina laevis*, Bouvier, *Bull. sci. France Belgique*, XXXIX, p. 74.
1913. *Caridina laevis*, Bouvier, *Trans. Linn. Soc., Zool.* (2), XV, p. 464.

A large number of specimens of this species have been presented to the Indian Museum by the late Dr. W. C. Hossack, who obtained them in September 1916, in Lake Situ Bagendit, Garut, Java, at an altitude of about 3000 ft. The series includes a number of ovigerous females and agrees very closely with de Man's description of specimens from the same locality. *Caridina laevis* is known only from Java.

Caridina serrata, Stimpson.

1860. *Caridina serrata*, Stimpson (not of Richters),[1] *Proc. Acad. Sci. Philadelphia*, p. 29 (98 of reprint).
1905. *Caridina serrata*, Bouvier, *Bull. sci. France Belgique*, XXXIX, p. 76.

The species does not seem to have been found since it was briefly described by Stimpson from Hong Kong more than fifty years ago. The specimens collected by Dr. Annandale are also from Hong Kong and agree fairly well with the original description.

The rostrum (text-fig. 12*a*) is very short but varies somewhat in length. In lateral view it is horizontal or inflected downwards and its apex may fall a little short of, or reach a little beyond the end of the first segment of the antennular peduncle. In dorsal view it is comparatively very broad at the base and bears above from 5 to 18 (nearly always 9 to 14)[2] small forwardly directed teeth, of which from 1 to 3 are usually situated on the carapace behind the orbit. The teeth are largest proximally and the series extends along almost the whole length of the upper border. Stimpson does not make any reference to teeth on the lower border of the rostrum, from which it might well be

[1] *Caridina serrata*, imperfectly described by Richters as a new species in Möbius' *Meeresfauna Mauritius*, p. 163, pl. xvii, figs. 24-27 (1880), is different. Thallwitz in 1892 suggested for it the name *C. richtersii* (*Abh. Ber. K. Zool. Mus. Dresden*, 1890-91, no. 3, p. 27).

[2] In seventeen specimens, in which the rostrum is complete, the numbers of teeth are as follows:—

inferred, as has been done by Bouvier, that they were altogether absent. In the comparatively short series of specimens before me the lower margin bears from 1 to 4 very small teeth in its distal third; it is therefore not improbable that it is occasionally toothless.

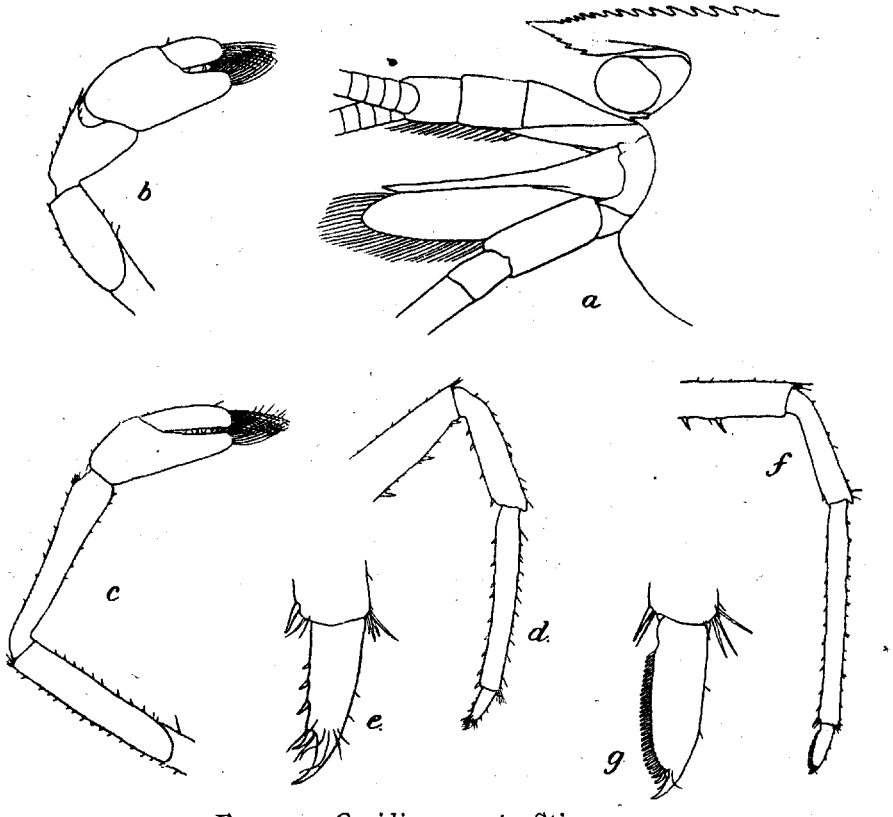

FIG. 12.—*Caridina serrata*, Stimpson.

a. Carapace, rostrum, etc., in lateral view.
b. First peraeopod.
c. Second peraeopod.
d. Third peraeopod.
e. Dactylus of same further enlarged.
f. Fifth peraeopod.
g. Dactylus of same further enlarged.

The preorbital length of the antennular peduncle is only about half the postorbital length of the carapace. The lateral process of the basal peduncular segment is long, much as in *C. serratirostris*, de Man, reaching a little beyond the end of the segment to which it is attached.

In lateral view the distal end of the second segment of the antennular peduncle is

Dorsal teeth.	Ventral teeth.
1 specimen has 5 teeth.	2 specimens have 1 tooth.
1 ,, ,, 8 ,,	4 ,, ,, 2 teeth.
3 specimens have 9 ,,	8 ,, ,, 3 ,,
2 ,, ,, 10 ,,	3 ,, ,, 4 ,,
5 ,, ,, 11 ,,	
1 specimen has 12 ,,	
2 specimens have 13 ,,	
1 specimen has 14 ,,	
1 ,, ,, 18 ,,	

produced to a tooth at its infero-external angle. The antennal scale is nearly three times as long as wide and its outer margin is very slightly concave.

The second maxillipedes are remarkable for the possession of a large protruding lobe, quadrate in outline, at the proximal end of the propodite. The third maxillipedes reach to the end of the antennal scale, the exopod extending beyond the end of the antepenultimate segment.

In the first peraeopods (text-fig. 12*b*) the carpus is equal in length with the palm and its greatest breadth is about two-thirds its extreme length; anteriorly it is very deeply hollowed to receive the rounded proximal end of the chela. The second peraeopods (text-fig. 12*c*) are long and slender, reaching a little beyond the end of the scale. The carpus is about one and a third times the length of the chela and is between $5\frac{1}{2}$ and 6 times as long as its greatest breadth. The palm is two-thirds the length of the dactylus. In the third peraeopods (text-figs. 12*d*, *e*) the merus bears four spines on its lower margin and the carpus one near its distal end. The propodus is provided with a series of spinules on the same margin; it is about 8 times as long as broad and rather more than $3\frac{1}{2}$ times as long as the dactylus (terminal spine included). The dactylus bears in all 5 or 6 spines, the outermost large and strongly curved. The fifth peraeopods (text-figs. 12*f*, *g*) bear spines on the merus, carpus and propodus, much as in the case of the third pair. The propodus is from 11 to $13\frac{1}{2}$ times as long as broad and from 4 to $4\frac{1}{2}$ times the total length of the dactylus. The latter segment bears from 29 to 34 slender spines; excluding these its length is a trifle more than three times its breadth.

The outer uropod is provided with a series of from 18 to 21 movable spinules.

Well-grown specimens reach a length of about 17 mm. The eggs are large and few in number: about 0·96 mm. by 0·70 mm. in longer and shorter diameter.

Caridina serrata is allied to *C. parvirostris*, de Man, and *C. pareparensis*, de Man, but differs from both in the much greater proportionate length of the lateral process of the antennular peduncle. In addition it differs from *C. parvirostris* in the large size of the eggs and from *C. pareparensis* in the more deeply excavate carpus of the first pair of legs. In Bouvier's latest scheme of classification (1913) it would come nearest to *C. serratirostris*, de Man, which it resembles in the length of the lateral process of the antennule. From this species, however, it differs in many respects, notably in the length and dentition of the rostrum and the form of the carpus in the first pair of legs.

Dr. Annandale informs me that, in life, the specimens were mottled with brownish pigment and were consequently very difficult to detect on the rocks on which they commonly sat. They were found in pools in very small streamlets of clear water, devoid of weeds, on the Peak at Hong Kong, at altitudes of 1200-1500 ft. The specimens were collected in September, three of the females being ovigerous. Two additional specimens from the same locality, collected by Capt. F. H. Stewart, I.M.S., have recently been presented to the Museum.

Stimpson gives the habitat of his specimens as "ad insulam Hong Kong; in rivulis."

Caridina weberi, de Man.

subsp. **sumatrensis**, de Man.

1892. *Caridina weberi* var. *sumatrensis*, de Man, in Weber's *Zool. Ergebn. Reise Nied. Ost-Ind.*, II, p. 375, pl. xxii, fig. 23 *g*.

1905. *Caridina weberi* var. *sumatrensis*, Bouvier, *Bull. sci. France Belgique*, XXXIX, pp. 75, 83.

The principal characters of the specimens that I refer to this subspecies are as follows :—

The rostrum reaches nearly to, or a little beyond the end of the second segment of the antennular peduncle and is armed above with from 12 to 21 (usually 15 to 19)[1] teeth of which from 4 to 6 (usually 4 or 5) are situated on the carapace behind the orbital notch. The lower margin bears from 2 to 9 teeth (usually 3 to 6).

The lateral process of the antennular peduncle does not nearly reach the end of the basal segment. The longitudinal carina on the dorsal surface of the antennulary somite is high. The antero-inferior angle of the carapace is rounded.

The carpus of the first peraeopods is deeply excavate anteriorly and is from 1·8 to as 2·0 times as long as its greatest breadth. In the second pair the carpus is very slender, 6·7 or 6·8 times as long as broad. The propodus of the third peraeopods is from 4·3 to 4·7 times the length of the dactylus, the latter segment bearing 7 spines. In the fifth legs the propodus is 5·2 times as long as the dactylus (4·5 times in a very large individual) ; the spinules on the dactylus vary in number from 36 to 57. The outer uropods bear 18 or 19 movable spines.

Fully developed eggs are from 0·46 to 0·47 mm. in length and from 0·28 to 0·29 mm. in breadth. An exceptionally large specimen is about 24 mm. in total length.

The specimens are from Penang I. and the lower reaches of the Patani River ; in both localities they were found together with the examples of *C. brachydactyla* subsp. *peninsularis*. There are thirty-one specimens from Penang and two from the Patani River.

The subspecies *sumatrensis* was described from Sumatra and has also been recorded from Bombay.

Genus **Paratya**, Miers.

1882. *Paratya*, Miers, *Ann. Mag. Nat. Hist.* (5), IX, p. 194.

1909. *Xiphocaridina*, Bouvier, *Comptes Rendus Acad. Sci. Paris*, p. 1729.

1917. *Paratya*, Kemp, *Rec. Ind. Mus.*, XIII, p. 293.

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[1] In thirty specimens (from Penang) the numbers of teeth as are follows :—

Dorsal teeth.		Ventral teeth.	
1 specimen has	13 teeth.	3 specimens have	2 teeth.
4 specimens have	15 ,,	7 ,, ,,	3 ,,
8 ,, ,,	16 ,,	6 ,, ,,	4 ,,
6 ,, ,,	17 ,,	7 ,, ,,	5 ,,
5 ,, ,,	18 ,,	4 ,, ,,	6 ,,
3 ,, ,,	19 ,,	2 ,, ,,	7 ,,
2 ,, ,,	20 ,,	1 specimen has	9 ,,
1 specimen has	21 ,,		

I have recently given some notes on the species and races of this genus and have pointed out that the form inhabiting Australia is not, as was hitherto supposed, conspecific with that found in Japan. The information I have been able to give regarding the two races found in the latter country is, in the main, derived from material obtained by Dr. Annandale.

Paratya compressa (de Haan).

1917. *Paratya compressa*, Kemp, *Rec. Ind. Mus.*, XIII, p. 296, text-figs. 1 *a-f*.

The typical form of this species was found in abundance by Dr. Annandale among weeds and dense vegetation at Komatsu and in pools and backwaters round Lake Biwa; in the lake itself it was much scarcer. Other specimens are from Ogura and Yodo ponds near Kyoto. The Temnocephaloid worm *Caridinicola* was present in the gill-chambers of a large proportion of the individuals examined at Komatsu.

subsp. **improvisa**, Kemp.

1917. *Paratya compressa*, subsp. *improvisa*, Kemp, *Rec. Ind. Mus.*, XIII, p. 299, text-figs. 2 *a-f*, 3.

The race differs from the typical form in certain well-defined rostral characters. Judging from the material examined it is restricted to the north-eastern parts of the main island, while the typical form inhabits the south-western regions. The boundary between the two races appears to be just to the north-east of Lake Biwa.

The specimens I have examined are from the lagoon Kasumi-ga-ura in Hikachi province, collected by Dr. Annandale; from Tokio, collected by Hilgendorf (Berlin Mus.); from Lake Haruna, near Ikao, about 3000 ft., collected by Dr. K. Nakazawa and from Lake Suwa, in the Shinano province, 2660 ft., collected by Dr. T. Kawamura.

Tribe **PENAEIDEA.**

Family PENAEIDAE.

Subfamily *PENAEINAE.*

Penaeus indicus, Milne-Edwards.

var. **merguiensis**, de Man.

1906. *Peneus indicus* var. *merguiensis*, Alcock, *Cat. Indian Decap. Crust.*, III, i, p. 13, pl. ii, fig. 4.

1911. *Penaeus merguiensis*, de Man, *Decap. 'Siboga' Exped., Penaeidae*, p. 104, and (1913), pl. ix, figs. 33 *a–c*.

Two specimens obtained by Dr. Annandale in Lower Siam are referred with some doubt to this form. The principal distinction between typical *indicus* and the variety *merguiensis* rests in the comparative length of the terminal segment of the third maxillipede of the male, and both the specimens in the collection are female.

In the larger individual, which is about 120 mm. in length, the rostrum is much elevated at the base, as in Alcock's figure, and the foremost tooth on the upper

border is situated above the middle of the terminal segment of the antennular peduncle. In the smaller example, which is 85 mm. in length, the rostrum agrees precisely with de Man's fig. 33*a*.

The large specimen was taken from fishermen's nets opposite Singgora in the outer lake of the Tale Sap; the smaller individual is from Patani Bay, at the mouth of the Patani river in the Siamese Malay States.

Penaeus carinatus, Dana.

1906. *Peneus semisulcatus*, Alcock (not of de Haan), *Cat. Indian Decap. Crust.*, III, i, p. 10, pl. i, fig. 2.
1911. *Penaeus carinatus*, de Man, *Decap. 'Siboga' Exped., Penaeidae*, p. 101.
1915. *Penaeus carinatus*, Kemp, *Mem. Ind. Mus.*, V, p. 317.

Two males and one female, varying in length from 176 to 186 mm., are in Dr. Annandale's collection. They were obtained from nets and stakes set by fishermen opposite Singgora in the outer part of the Tale Sap in Lower Siam.

Genus **Penaeopsis,** Bate.

Penaeopsis monoceros (Fabricius).

1906. *Metapeneus monoceros*, Alcock, *Cat. Indian Decap. Crust.*, III, i, p. 18, pl. iii, figs. 7, 7*a–c*.
1911. *Penaeopsis monoceros*, de Man, *Decap. 'Siboga' Exped., Penaeidae*, p. 55 and (1913), pl. vi, figs. 14*a–c*.

Numerous examples of both sexes, the largest 107 mm. in length, were found by Dr. Annandale in the Tale Sap, along with the preceding species. The petasma does not appear to be fully developed in any of the specimens.

Penaeopsis affinis (Milne-Edwards).

1906. *Metapeneus affinis*, Alcock, *Cat. Indian Decap. Crust.*, III, i, p. 20, pl. iii, figs. 8, 8*a–d*.
1911. *Penaeopsis affinis*, de Man, *Decap. 'Siboga' Exped., Penaeidae*, p. 57 and (1913), pl. vi, figs. 15 *a*, *b*.

Nine males were found in company with *P. monoceros*. All are young, the largest being only 78 mm. in length. The fifth legs are not appreciably longer than in *P. monoceros* of similar size, and in no case reach beyond the end of the second segment of the antennular peduncle. The petasma precisely resembles that figured by de Man and differs conspicuously from that of the larger specimens recorded from the Chilka Lake[1] and from Alcock's figure. The differences, as de Man has noted, are probably due to age.

Penaeopsis brevicornis (Milne-Edwards).

1906. *Metapeneus brevicornis*, Alcock, *Cat. Indian Decap. Crust.*, III, i, p. 22, pl. iv, figs. 10, 10 *a*, *b*.

The collection contains two large females from the Tale Sap, found with *P. monoceros*, and one male and four females from Patani Bay, at the mouth of the Patani

[1] Kemp, *Mem. Ind. Mus.*, V, p. 321 (1915).

river in the Siamese Malay States. The females are from 76 to 117 mm. in length and the male 73 mm.

In both sexes the rostrum is more elevated at the base than in Alcock's figure; in the male it reaches only a little beyond the eyes, whereas in the female it is much longer, extending to or a trifle beyond the end of the antennular peduncle. Alcock has not noted any difference between the sexes in the proportionate length of the rostrum, but some of the females determined by him are in close agreement with those in the present collection. The petasma agrees almost exactly with Alcock's figure. The thelycum varies considerably, more especially as regards the size of the central plate between the bases of the fourth legs.

Family SERGESTIDAE.

Genus **Acetes**, Milne-Edwards.

The characters of the different species of *Acetes* have hitherto been very imperfectly known, and the determination of the three forms in the collection proved in consequence to be a matter of some difficulty. It was only after an examination of the long series of undetermined specimens in the Indian Museum that definite conclusions were reached. The results of my examination of this material (with which that collected by Dr. Annandale is included) have been published in the *Records of the Indian Museum*. In this paper Milne-Edwards' *A. indicus* is redescribed and figured along with *A. erythraeus*, Nobili, *A. japonicus*, Kishinouye, and a hitherto unknown form from Borneo. In three of the species well marked sexual differences are to be found in the length of the last segment of the antennular peduncle. In the fourth species, *A. erythraeus*, Nobili, the males appear to be dimorphic in respect of the proportionate length of this segment, the specimens on which this interesting observation is based forming part of Dr. Annandale's collection.

Acetes indicus, Milne-Edwards.

1917. *Acetes indicus*, Kemp, *Rec. Ind. Mus.*, XIII, p. 47, text-figs.

The specimens in Dr. Annandale's collection are from the Tale Sap. Eleven examples were obtained in the channel between the inner and outer lakes in the vicinity of Pak Raw and Pak Payun, the specific gravity of the water varying from 1·0015 to 1·00225 (corrected). Four individuals were also found at the mouth of the outer lake near Singgora in company with *Acetes japonicus*, the specific gravity of the water here varying from 1·004 to 1·0085.

Acetes erythraeus, Nobili.

1917. *Acetes erythraeus*, Kemp, *Rec. Ind. Mus.*, XIII, p. 51, text-figs.

This species is represented in the collection by four males from the mouth of the Prai river, opposite Penang and by a few of each sex from the Patani river, below the town of Patani in the Siamese Malay States. In the latter locality the species was found with *Acetes japonicus*, occurring in water that was quite fresh, though in a situation subject to tidal influence.

In the paper cited above I have drawn particular attention to the four individuals from the Prai river, for it is on their characters that I have based my statement that the male in this species is dimorphic. In all the four specimens (precisely as in males of *A. indicus* and *A. erythraeus*) the ultimate segment of the antennular peduncle is slender and longer than the basal segment. In examples of the same sex from the Patan river, as well as in numerous males from three separate localities on the west coast of the Bay of Bengal, the ultimate peduncular segment is invariably short, closely resembling that of the female[1]: the specific identity of the Prai river specimens is proved beyond doubt by the distinctive form of the petasma.

Acetes japonicus, Kishinouye.

1917. *Acetes japonicus*, Kemp. *Rec. Ind. Mus.*, XIII, p. 56, text-figs.

The collection contains numerous specimens obtained in the market at Osaka in Japan, a considerable number from the Tale Sap and a few from the Patani river in the Siamese Malay States. The examples from the Tale Sap were found along with a few *A. indicus* at the mouth of the outer lake near Singgora in water of specific gravity varying from 1·004 to 1·0085 (corrected). Those from the Patani river were taken in company with *A. erythraeus* in water that was fresh at the time of their capture but subject to tidal influence.

Genus **Lucifer**, Thompson.

Lucifer hanseni, Nobili.

1906. *Lucifer hanseni*, Nobili, *Ann. Sci. nat., Zool.* (9), IV, p. 25, pl. ii, fig. 1 and text-fig. 3*b*, p. 27.

1915. *Lucifer hanseni*, Kemp, *Mem. Ind. Mus.*, V, p. 324, text-figs. 37*a–d*.

1916. *Leucifer hanseni*, Borradaile, *Brit. Antarct. Exped.*, '*Terra Nova*,' *Zool.*, III, p. 83.

A number of specimens were obtained in the outer lake of the Tale Sap, between Koh Yaw and the mainland and at the mouth of the lake near Singgora. The specific gravity of the water in which they were found varied from 1·00625 to 1·0085 (corrected).

Lucifer hanseni was described by Nobili from the Red Sea and has recently been recorded by Borradaile from Melbourne.

STOMATOPODA.

Family SQUILLIDAE.

Genus **Squilla**, Fabricius.

Four species and one variety of Stomatopoda, all belonging to the genus *Squilla*, were found by Dr. Annandale at the mouth of the Tale Sap in Peninsular Siam. They were obtained in fishermen's nets and all were caught in water of specific gravity 1·0085 (corrected).

[1] I have recently examined a large male of *A. erythraeus* from Silavathurai Lagoon, near Tuticorin, S. India, which agrees exactly with the specimens from the Prai River. This is the first record of the "high" dimorphic male from the coasts of British India. We are indebted to Mr. J. Hornell for the specimen.

Squilla scorpio, Latreille.

1913. *Squilla scorpio*, Kemp, *Mem. Ind. Mus.*, IV, p. 42, pl. ii, fig. 30.

Five specimens are in the collection, the largest a male 75 mm. in length. Apart from the fact that the lateral carinae of the fourth abdominal somite occasionally terminate in spines, the specimens agree exactly with the description in the paper quoted above.

var. **immaculata**, Kemp.

1913. *Squilla scorpio* var. *immaculata*, Kemp, *loc. cit.*, p. 45, pl. ii, fig. 31.

Six specimens, the largest a male 73 mm. in length, were obtained in company with typical *scorpio*. As in the case of the collection from the Chilka Lake,[1] where both forms also occur, no specimen with intermediate characters is to be found. The variety *immaculata* has hitherto not been recorded east of the Bay of Bengal.

Squilla nepa, Latreille (Bigelow).

1913. *Squilla nepa*, Kemp, *loc. cit.*, p. 60, pl. iv, fig. 49.

Two specimens were obtained, the largest a male 70 mm. in length. *S. nepa* has not hitherto been reported from brackish water.

Squilla interrupta, Kemp.

1913. *Squilla interrupta*, Kemp, *loc. cit.*, p. 72, pl. v, figs. 60–62.

A number of young specimens were obtained, the largest only 46 mm. in length. In very small individuals the tubercles on the upper edge of the carpus are represented only by two obscure lobes. This species also was not previously known to inhabit brackish water.

Squilla raphidea, Fabricius.

1913. *Squilla raphidea*, Kemp, *loc. cit.*, p. 88, pl. vii, fig. 77.

Two specimens were obtained, a female 255 mm. in length and a male 200 mm. in length. The latter individual differs from the majority of large examples of the same sex, preserved in the Indian Museum, in the complete absence of the angular projection on the external border of the dactylus of the raptorial claw. In the paper cited above attention is drawn to the existence of the same phenomenon in a male 190 mm. in length. *S. raphidea* has not hitherto been recorded from brackish water.

ADDENDUM.

While this paper was in the press I received from Soochow, through the kindness of Prof. N. Gist Gee, some further specimens of *Palaemonetes sinensis* (see p. 272). The largest of these individuals is 40 mm. in length, whereas none of those collected by Dr. Annandale exceed 25 mm. Some of the Soochow specimens are ovigerous, bearing eggs about 1·2 × 0·94 mm. in longer and shorter diameter.

[1] Kemp, *Mem. Ind. Mus.*, V, p. 193 (1915).