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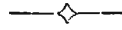
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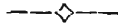
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- Part II.*—Revision of the Oriental Stratiomyidæ. Description of an Oligochaete Worm allied to *Chatogaster*. The Fauna of Brackish Ponds at Port Canning, Lower Bengal, IV. Further Note on a Polyzoon from the Himalayas. Reports on a collection of Batrachia, Reptiles and Fish from Nepal and the Western Himalayas. The Fauna of Brackish Ponds at Port Canning, Lower Bengal, V. Notes on Oriental Diptera, I and II. Miscellaneous.
- Part III.*—Report on the Marine Polyzoa in the collection of the Indian Museum. The Fauna of Brackish Ponds at Port Canning, Lower Bengal, VI. A third note on Earwigs (Dermaptera) in the Indian Museum, with the description of a new species. Notes on Oriental Diptera, III. Description of a new snake from Nepal. Notes on a collection of marketable fish from Akyab, with a description of a new species of *Lactarius*. Description of two freshwater Oligochaete Worms from the Punjab. Notes on Phosphorescence in Marine Animals. Notes on the rats of Dacca, Eastern Bengal. Notes on Freshwater Sponges, I—V. Miscellaneous.
- Part IV.*—*Nudiclava monocanthi*, the type of a new genus of Hydroids parasitic on Fish. Preliminary descriptions of three new Nycteribiidæ from India. Annotated Catalogue of Oriental Culicidæ. Notes on Oriental Diptera. Notes on Freshwater Sponges, VI, VII. Description of a new Cyprinid Fish of the genus *Danio* from Upper Burma. Miscellaneous.

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- Part III.*—The Fauna of Brackish Ponds at Port Canning, Lower Bengal, X, XI. On some Oriental Solifugæ with descriptions of new forms. The difference between the Takin (*Budorcas*) from the Mishmi Hills and that from Tibet, with notes on variation displayed by the former. On *Caridina nilotica* (Roux) and its varieties. Description of a new species of *Charaxes* from the Bhutan Frontier. First Report on the Collection of Culicidæ and Corethridæ in the Indian Museum, with descriptions of new genera and species. Miscellaneous.
- Part IV.*—Report on a collection of aquatic animals made in Tibet by Capt. F. H. Stewart in 1907, I. Notes on Aculeate Hymenoptera in the Indian Museum, I. Indian Psychodidæ. Description of a new species of mouse from the Madura District, Madras. Some Cleridæ of the Indian Museum. The Fauna of Brackish Ponds at Port Canning, Lower Bengal, XII. Description of a new species of Saw-Fish captured off the Burma Coast. A new Sting Ray of the genus *Trygon* from the Bay of Bengal. New Micro-lepidoptera from India and Burma. Notes on some Chrysomelid Beetles in the collection of the Indian Museum. Six new Cicindelinae from the Oriental Region. Description of a new slug from Tibet.

PREFATORY NOTE TO VOLUME VI.

A certain congestion has come about in the zoological publications of the Indian Museum owing to two causes, both eminently satisfactory in themselves, *viz.*, the recent increase in our scientific staff and the large number of papers received from zoologists in India and abroad not officially connected with the Museum. To remedy this congestion it is proposed, at any rate for 1911, to issue the "Records of the Indian Museum" at more frequent intervals and as a rule in smaller instalments than hitherto.

CALCUTTA:
March 13th, 1911.

N. ANNANDALE,
Superintendent, Indian Museum.

I. NOTE ON A RHIZOCEPHALOUS CRUSTACEAN FROM FRESH WATER AND ON SOME SPECIMENS OF THE ORDER FROM INDIAN SEAS

By N. ANNANDALE, D.Sc., F.A.S.B., Superintendent of the Indian Museum.

My reason for describing the parasite described below is its extraordinary habitat. It was found attached to one of the type specimens (a female) of the crab *Sesarma thelxinoe* in a jungle stream, at an altitude of 700 feet above sea-level, near Port Blair in the Andamans and is, so far as I am aware, the only representative of the Rhizocephala as yet found anywhere but in the sea. Dr. de Man refers to it in his original description of its host as a *Sacculina* (*Rec. Ind. Mus.*, ii, p. 181), but it differs considerably in structure not only from that genus but from any other hitherto described. My description, being based on a single specimen not in the best condition, must necessarily be superficial, but I hope that its publication may lead to the discovery of fresh specimens, to its amplification and to the correction of any errors it may contain. A word of warning is necessary as regards the habitat of the species. Grapsid crabs as a rule breed in brackish water if not in the sea, and it is possible that *Sesarma thelxinoe*, which is only known from a small oceanic island, may visit the sea periodically for that purpose, and may there become infected by the parasite. Nevertheless, the fact that the latter contains larvae in the brood-pouch while living at an altitude of 700 feet entitles it to be included in the freshwater fauna of the Indian Empire and suggests that it is able to flourish in jungle streams, even if it also occurs in the sea.

As the Rhizocephala of Oriental waters have received little attention I may put on record the fact that *Sacculina carcini*¹ (*sensu lato*) is not uncommon on the crabs *Doclea ovis* and *Menippe rumphii* in shallow water off the coasts of Madras and Orissa and off the mouth of the R. Hughli. The Indian Museum also possesses specimens on a species of *Goniosoma* from Madras. The only other Rhizocephala from Indian seas in the collection are two somewhat shrivelled and distorted specimens which I attribute with little doubt to Geoffrey Smith's *Triangulus munidae*, although the lip of the orifice is perhaps more prominent than his figure

¹ The late Dr. J. Anderson obtained a specimen on *Thalamita crenata* from the Andamans (*Proc. Zool. Soc. London*, 1871, p. 144).

would suggest and the ring of attachment less near the centre. These apparent differences are perhaps due to shrinkage effected *post mortem*. The two specimens were attached to the abdomen of a specimen of *Munida microps* Alcock from the Bay of Bengal (480 fathoms). This rare parasite appears to confine itself to Macrura of the genus *Munida* (Galatheidae) and has hitherto been found¹ only in the Atlantic and North Sea.

SESARMAXENOS, gen. nov.

Rhizocephala with a slug-like or sausage-shaped body the main axis of which lies across the longitudinal axis of the host, the body as a whole being compressed between the ventral surface of

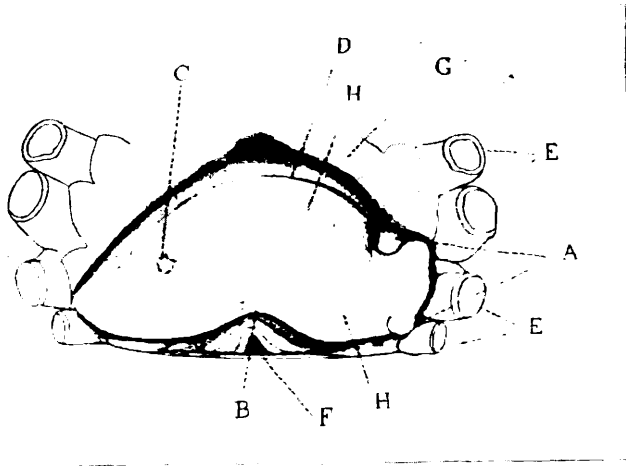


FIG. 1.—Type specimen of *Sesarmaxenos monticola*, $\times 4$. A = orifices; B = point of attachment; C = (?) sensory pit; D = line marking separation between ovaries; E = bases of ambulatory limbs of host; F = base of abdomen (which has been removed) of host; G = ventral surface of carapace of host; H = longitudinal muscles of parasite.

the carapace and the retroverted abdomen of the host, which in the case of the only known specimen is a Grapsid crab from fresh water. The parasite is attached to the ventral surface of the crab's carapace by means of a chitinous ring apparently without roots, the ring being situated in the middle of the margin of the parasite most remote from the anterior margin of the host's carapace. There are two slit-like orifices in the mantle; they are surrounded and separated by a stout muscle, strands from which run along both surfaces of the body. The visceral mass is apparently attached to the mantle by a mesentery that surrounds the ring of attachment, being surrounded at all other points by a capacious brood-pouch, which contains larvae of the cyprid type. The

¹ See G. Smith, "Rhizocephala," *Faun. u. Flor. Golfes v. Neapel*, p. 115 (1906); and Guérin-Ganivet, *Bull. Inst. Océanographique* (Monaco), No. 189 (1910).

mantle is thin and smooth but is well provided with slender circular muscle-fibres. The two ovaries are distinct, but a testis has not been detected.

Sesarma xenos monticola, sp. nov.

In the only known specimen of this species the body bears a close superficial resemblance to a slug with two tentacles partially withdrawn, their position being occupied by the papillae on which the orifices are situated. This end of the body is truncate, the orifices being separated by a distance a little greater than $\frac{1}{3}$ of the total length. The other end is pointed, the whole body being sinuous. The colour, after some years in spirit, has probably faded, but the surface has a purplish tinge which is most distinct at the two ends and round a small pit on the exposed surface (*i.e.*, exposed when the abdomen of the host is removed) not very far from the pointed end. This pit possibly indicates the position of the nerve-ganglion. The slit-like orifices are parallel to the

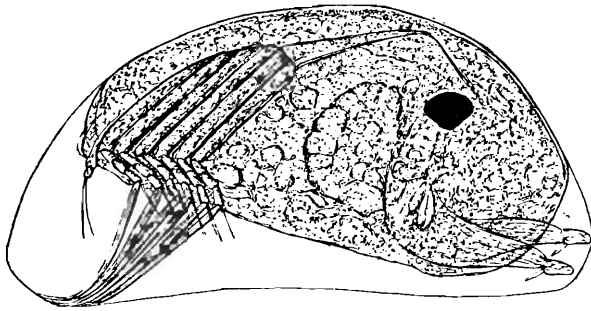


FIG. 2.—Advanced larva from brood-pouch of *S. monticola*, $\times 450$

longitudinal axis of the host. The muscle surrounding them is powerful, its fibres crossing one another obliquely in various directions and finally constituting two distinct strands which run along the exposed surface in a somewhat divergent course.

The larvae in the brood-pouch apparently represent two distinct instars, both of the cyprid type but one larger and better developed than the other. Those of the more advanced form measure about 0.3 mm. in length and 0.140 mm. in greatest depth, the whole animal being nearly semicircular in outline. Both ends of the shell are narrowly rounded or somewhat truncate, and the ventral margin is slightly sinuous. The abdomen is minute but distinctly segmented. At its tip it bears a pair of short bristles. The six cirri are well developed, each bearing a bunch of bristles directed forwards in a slanting direction. The whole animal is strongly compressed and the shell is very thin and transparent. The eye is situated at about $\frac{1}{3}$ of the distance between the anterior and posterior ends of the shell. The smaller instar only differs in size

(0.23 × 0.1 mm.) and in having the cirri and antennae shorter. Very large numbers of larvae are present. I can find no trace of degenerate males.

The type of *Sesarmaxenos monticola* was taken by Mr. B. B. Osmaston in January, 1907, and was attached to the ventral surface of the carapace of a female (one of the types) of *Sesarma thelxinoe* de Man, which was found about 700 feet above the sea in a stream running through thick jungle on Mt. Harriet near Port Blair in the Andamans. I have searched through the whole of the collection of Grapsidae in the Indian Museum without finding another specimen of this or of any other Rhizocephalon.

II. NOTES ON DECAPODA IN THE INDIAN MUSEUM.

II.—DESCRIPTIONS OF TWO NEW CRANGONIDAE WITH OBSERVATIONS ON THE MUTUAL AFFINITIES OF THE GENERA *Pontophilus* AND *Philocheras*.

By STANLEY KEMP, B.A., Assistant Superintendent, Indian Museum.

(Plate ii.)

In the present paper two new species of Crangonidae, one from New Zealand and the other from the Andaman Islands, are described from material in the Indian Museum.

An examination of these species and of others which occur on the coasts of Australia and New Zealand has induced me to reconsider the generic status of *Pontophilus* and *Philocheras*, with the result that the distinctions between the two genera are found to be so trivial that the only possible course is to revert to the view expressed by Ortmann in 1895,¹ and to classify all the various forms under *Pontophilus*, though it will not be necessary to follow him in placing *Acegon* in the same category.

So far as I am aware, the sole distinction which can be relied upon for the separation of the two genera rests in the presence or absence of the appendix interna on the endopod of the last four pairs of pleopods, and this, in the two species found on the New Zealand coasts (*P. australis*, Thomson, and *P. chiltoni*, sp. nov.), is greatly reduced in size, rudimentary on the fourth pair and entirely missing from the fifth. Consequently, in the case of Crangonidae, the importance of this character seems small in any natural scheme of classification, though in other families of Decapoda, such as the Callianassidae, it affords indications of great systematic value.

PONTOPHILUS, Leach.

Pontophilus chiltoni,² sp. nov.

(Plate ii, figs. 6—10.)

Among a small sample of *Pontophilus* labelled "New Zealand," and received here many years ago from the Canterbury Museum, two ovigerous females occur, which evidently represent a species

¹ Ortmann, *Proc. Ac. Nat. Sci. Philadelphia*, xlvii, 1895, p. 182.

² I take pleasure in associating with this species the name of Dr. Chas. Chilton, whose valuable work on the Crustacea of New Zealand is known to every carcinologist.

hitherto undescribed. The other specimens in the same bottle are to be referred to *Pontophilus australis*,¹ and as this species is extremely closely allied to the new form, it will be convenient to express the differences between the two in parallel columns—

P. australis (Thomson).*P. chiltoni*, sp. nov.

Rostrum narrow (fig. 1).

Two mid-dorsal spines of carapace situated close together in anterior third (fig. 1).

Antennal scale a trifle more than twice as long as wide (fig. 3).

Propodus of first peraeopod not narrowed anteriorly: *i.e.*, as broad behind subchelate termination as at base (fig. 2).

Sixth abdominal somite more than one and a half times length of fifth and bearing dorsally a pair of distinct but blunt longitudinal carinae (fig. 5).

Apex of telson narrow.³

Rostrum broad (fig. 6).²

Two mid-dorsal spines of carapace widely separate; posterior spine situated exactly in middle of carapace (fig. 6).

Antennal scale considerably less than twice as long as wide (fig. 8).

Propodus of first peraeopod evidently narrowed anteriorly: *i.e.*, distinctly broader at base than behind subchelate termination (fig. 7).

Sixth abdominal somite less than one and a half times length of fifth, with a median longitudinal depression, but without distinct carinae (fig. 10).

Apex of telson broader.³

In addition, *P. chiltoni* is a trifle stouter in build than *P. australis*, the terminal joint of the fourth pair of peraeopods is a little shorter and broader, and the spinous processes on the postero-inferior margin of the fifth abdominal somite are distinctly blunter.

Two specimens, ovigerous females, 30 and 32 mm. in total length, from New Zealand. (Regd. Nos. $\frac{7029-30}{10}$.)

Pontophilus sabsechota,⁴ sp. nov.

(Plate ii, figs. 11—14.)

The general form is short and stout. Measured dorsally, the carapace (including the rostrum) is longer than the first five abdominal somites, and its breadth is almost as great as its length.

¹ *Pontophilus australis* (Thomson), *Trans. Linn. Soc. London* (2), viii, 1903, p. 434, pl. 27, figs. 1—5.

² In the second specimen the rostrum is a trifle narrower than is shown in this figure, but is still very evidently broader than in *P. australis*.

³ The distinctions afforded by the comparative length of the telson and uropods, as seen in figs. 5 and 10, cannot be relied upon for differentiating the two species.

⁴ Hindustani, “*sab se chota*”: the smallest of all.

The rostrum is extremely broad and, in dorsal view (fig. 11), is constricted behind the squarely truncate apex; its distal breadth is about one-third the total length of the carapace. The lateral margins are greatly elevated and form a sort of hood covering the bases of the eye-stalks.

The carapace (figs. 11, 12) is sharply carinate in the median line, the carina terminating in a spine a little behind the rostral base. On either side there are three lateral carinae, all of which are well-defined and are continued as far as the posterior margin. The first of these commences a short distance behind the orbital notch and runs downwards and backwards; it bears no spines, but is abruptly notched near its middle point. The second lateral carina is more or less parallel with the first, and is continuous anteriorly with the acute orbital angle; it bears a sharp spine, a trifle in advance of that in the median line, and further back, near the middle of the carapace, a notch similar to, but well in front of, that on the first lateral carina. The third consists of two distinct carinae, of which the upper is sharp and runs from the apex of the branchiostegal spine to the middle of the carapace, while the lower, which is less prominent, starts beneath the posterior termination of the upper one and reaches to the hinder margin. The branchiostegal spine is very prominent, and extends a little beyond the apex of the rostrum.

In the female the sternal plates of the last three thoracic somites are very broad and form the roof of a chamber, continuous with that between the pleopods, which is used for the accommodation of eggs. From the anterior margin of the third thoracic sternum a sharp spine extends forwards as far as the base of the outer maxillipedes.

The eyes are well pigmented. The lateral process from the basal joint of the antennular peduncle is rounded anteriorly. The antennal scale (fig. 14) is broad, little more than one and a half times as long as wide, and its convex outer margin terminates in a minute spine, which does not exceed the apex of the lamella. The third maxillipedes extend beyond the distal end of the scale by the ultimate joint and about one-half of the antepenultimate.

The first pair of peraeopods reaches about as far forwards as the third maxillipedes. The merus is very broad, and does not possess the small spine at the distal end of its upper margin, which occurs in most of the allied species. The second pair is comparatively stout, and reaches beyond the carpus of the first pair; the ischium is unusually short, and the fingers of the chelae, which are not curved and meet throughout their length when the claw is closed, are twice the length of the palm.

There are six gills on either side, as in the Atlantic species.

The abdomen, as will be seen from figs. 11 and 12, is rather elaborately sculptured; the third, fourth and fifth somites are carinate, the sixth bicarinate.

The endopod of the last four pairs of pleopods (fig. 13) does not possess an appendix interna; it is, however, remarkable for its length, being only a trifle shorter than the exopod. The telson

is sulcate above and very long, extending beyond the distal end of the outer uropods. In addition to two pairs of dorso-lateral spinules, there is another pair defining the outer angles of the narrow apex. Between the two latter spinules there are four long setae.

The eggs measure about $.51 \times .33$ mm. in longer and shorter diameter.

The above description was drawn up from a single ovigerous female, only 9.3 mm. in length, which was obtained by the Marine Survey at S. Sentinel Island, Andamans (Regd. No. $\frac{2}{6}$ 2.)

Pontophilus sabsechota is one of the smallest *Macrura* known. It may easily be distinguished from all species hitherto described by the details of the carination and spinulation of the carapace.

THE MUTUAL AFFINITIES OF *Pontophilus* AND *Philocheras*.

The separation of the genera *Pontophilus* and *Philocheras* is almost an impossibility in the case of the species inhabiting Asiatic waters, and, as I have had an opportunity of examining a number of the species which occur in this region, the following notes bearing on the generic status of the forms concerned may be found useful.

In addition to those preserved in Calcutta, I have been able, thanks to the good offices of Mr. R. Etheridge, Curator of the Australian Museum, to examine the types of three very interesting species described in 1902 by Messrs. Fulton and Grant, and I have also added a few notes, which were kindly supplied me by Dr. W. T. Calman, concerning Spence Bate's *Crangon intermedius*, the only known example of which is preserved in the British Museum.

In the N. E. Atlantic the two genera may, with one important exception, be distinguished from one another by the use of the following characters:—

Pontophilus.

Basal process of antennular peduncle sharply pointed distally.

First peraeopods with small exopod.

Second peraeopods very short, not reaching to distal end of merus of first pair; chela well-formed with palm of good length; fingers concave internally, meeting only at tips.

Endopod of last four pairs of pleopods only a little shorter than exopod and with appendix interna at base.

Philocheras.

Basal process of antennular peduncle distally truncate or rounded.

First peraeopods without exopod.

Second peraeopods reaching at least as far as distal end of carpus of first pair; chela weak with palm very short; fingers parallel internally, meeting throughout their length.

Endopod of last four pairs of pleopods little, if at all, more than half length of exopod and without appendix interna at base.

According to my own observations, *P. spinosus* (Leach), *norvegicus* (M. Sars), *brevirostris*, Smith, *gracilis*, Smith and *abyssi*, Alcock,¹ agree in possessing the characters of *Pontophilus* as here defined, while *P. echinulatus* (M. Sars), *trispinosus* (Hailstone), *bispinosus* (Hailstone and Westwood) and *obliquus*, Fulton and Grant, are equally typical representatives² of *Philocheras*.

P. sabsechota, sp. nov., resembles *Philocheras*, except that the endopod of the pleopods is long, only a trifle shorter than the exopod (fig. 13).

Dr. Calman has kindly supplied me with the following information concerning the type of Spence Bate's *Crangon intermedius*,³ which was found on the coast of S. Australia. The lateral process of the basal joint of the antennular peduncle terminates in a small point at its antero-external angle. There is no exopod at the base of the first pair of peraeopods; the second pair reaches to the end of the carpus of the first, and the dactylus is more than half the length of the propodus. The endopod of the last four pairs of pleopods does not exceed half the length of the exopod. and does not possess an appendix interna.

From this it will be seen that the species is closely allied to typical examples of *Philocheras*; it differs from them only in the shape of the basal process of the antennule, and also, if Spence Bate's figure is correct, in the form of the chela of the second peraeopods,

In the two New Zealand species, *P. australis* (Thomson) and *P. chiltoni*, sp. nov., the basal process of the antennular peduncle is sharply pointed anteriorly. There is no exopod on the first pair of peraeopods. The second pair is slender (fig. 9), and reaches to the end of the carpus of the first pair; the palm is of moderate length, but shorter than the fingers, and the latter are only very slightly curved internally. The endopod of the last pair of pleopods is scarcely half the length of the exopod, and bears a very small appendix interna (fig. 4), which is quite rudimentary on the fourth pair and entirely absent from the fifth.

These two species appear to be exactly intermediate in character between the typical examples of *Pontophilus* and *Philocheras* occurring in European waters.

P. victoriensis, Fulton and Grant,⁴ resembles the New Zealand species in most of the characters just mentioned, but the palm of

¹ Alcock's statement (*Desc. Cat. Indian Deep-sea Macrura*, 1901, p. 114) that no exopod exists at the base of the first peraeopods in *P. gracilis* and *abyssi* is, I think, due to an oversight.

² I have not at hand any examples of *P. fasciatus* (Bell); the characters of this species are, I believe, quite typical of *Philocheras*.

³ *Crangon intermedius*, Spence Bate (*nec* Stimpson), *Proc. Zool. Soc. London*, 1863, p. 503, pl. xli, fig. 6 = *Crangon batei*, Kingsley, *nom. nov.*, *Bull. Essex Inst.*, xiv, 1882, p. 129.

⁴ Fulton and Grant, *Proc. Roy. Soc. Victoria* (n.s.), xv, p. 65, pl. x, fig. 2.

the second peraeopods is a trifle shorter, and the appendix interna is well-developed on all the last four pairs of pleopods.

P. flindersi, Fulton and Grant,¹ is closely similar to *P. victoricensis*, but the palm of the second peraeopods is still shorter; the basal process of the antennule is, moreover, rounded anteriorly, and not pointed as in that species.

Allied to the above is the Atlantic and Mediterranean species *P. sculptus* (Bell), the characters of which are wrongly indicated in my account of the Decapoda Natantia of the coasts of Ireland.² Though included under *Philocheras*, this species differs from the definition of the genus, as there given, in the possession of a well-developed appendix interna on the last four pairs of pleopods. In all other respects the species bears the closest resemblance to typical *Philocheras*; it is the only form occurring in the N. E. Atlantic which shows any character of an intermediate nature.

In the table on p. 11 an attempt has been made to summarize the foregoing observations. From this it seems sufficiently clear that, failing the discovery of new characters, no basis remains for the retention of two separate genera. It is true that the species may be separated into two groups, divided by the presence or absence of the exopod on the first pair of peraeopods and by the comparative length of the second pair, but the evidence afforded by these characters cannot be reconciled with that offered by the appendix interna. The latter character appears to hold such high importance in other groups that it is impossible to ignore it in the present instance.

The genus *Aegcon*, Guérin-Méneville (= *Pontocaris*, Spence Bate), which possesses seven C-shaped branchiae is, I believe, quite distinct from the group of species dealt with in this paper. All the forms here considered appear to have only six gills,³ the inferior apices of which are directed backwards.

Sixteen species belonging to the genus *Pontophilus* have been recorded from Asiatic waters. Nine of these have already been mentioned, and are included in the table on p. 11; the remaining seven are—

P. bidentatus (de Haan), in Siebold's *Fauna Japonica*, Crust., 1849, p. 183, pl. xlv, fig. 14. Japan.

¹ *Ibid.*, p. 67, pl. x, fig. 3.

² Fisheries, Ireland, Sci. Invest., 1908, i [1910], pp. 144, 148. A feature of this species, to which I have drawn special attention, is the presence of a stout spine in the middle of the outer margin of the antennal scale. This is, I believe, found in all British specimens, but, curiously enough, is quite absent in an example from the Mediterranean preserved in the Indian Museum. I leave it to those better situated than myself as regards material to determine whether distinct species exist in these two localities. Both forms possess the appendix interna.

³ The gill-formula of *P. intermedius* is unknown and that of the three species described by Fulton and Grant could not be determined satisfactorily owing to the poor condition of the type specimens.

SPECIES.	CHARACTERS TYPICAL OF <i>Pontophilus</i> .					CHARACTERS TYPICAL OF <i>Philochevas</i> .					DISTRIBUTION.
	Antennular process pointed.	Exopod on first peraeopods.	Second peraeopods short.	Endopod of pleopods long.	Appendix interna present.	Antennular process rounded or truncate.	No exopod on first peraeopods.	Second peraeopods long.	Endopod of pleopods short.	Appendix interna absent.	
1. <i>spinosus</i> ..	X	X	X	X	X	..	..	..	..	..	N.E. Atlantic and Mediterranean.
2. <i>norvegicus</i> ..	X	X	X	X	X	..	..	..	..	..	N.E. and N.W. Atlantic.
3. <i>brevirostris</i> ..	X	X	X	X	X	..	..	..	..	..	N.W. Atlantic.
4. <i>gracilis</i> ..	X	X	X	X	X	..	..	..	..	..	N.W. Atlantic and B. of Bengal.
5. <i>abyssi</i> ..	X	X	X	X	X	..	..	..	..	..	N.W. Atlantic and B. of Bengal.
6. <i>victoriensis</i> ..	X	..	..	X	X	..	..	..	..	..	Victoria.
7. <i>sculptus</i> ..	..	..	..	..	X	X	X	X	..	..	N.E. Atlantic and Mediterranean.
8. <i>flindersi</i> ..	..	..	..	..	X	X	X	X	..	..	Victoria.
9. <i>australis</i> ..	X	..	..	..	rud.	X	X	X	..	..	New Zealand.
10. <i>chiltoni</i> ..	X	..	..	..	rud.	..	X	X	..	..	New Zealand.
11. <i>intermedius</i> ..	X	..	..	..	..	..	X	X	X	X	South Australia.
12. <i>sabsechota</i> ..	..	..	..	X	..	X	X	X	..	X	Andaman Islands.
13. <i>obliquus</i> ..	..	..	..	..	..	X	X	X	X	X	Victoria.
14. <i>bispinosus</i> ..	..	..	..	..	..	X	X	X	X	X	N.E. Atlantic and Azores.
15. <i>irispinosus</i> ..	..	..	..	..	..	X	X	X	X	X	N.E. Atlantic and Mediterranean.
16. <i>echinulatus</i> ..	..	..	..	..	..	X	X	X	X	X	N.E. Atlantic.

- P. japonicus*, Doflein, *Abhandl. d. kön. bayer. Akad. Wiss.*, xxi, 1902, p. 621, pl. iii, fig. 6, and text-fig., p. 622. Japan.
- P. carinicauda* (Stimpson), *Proc. Acad. Nat. Sci. Philadelphia*, xii, 1860, p. 25. Hongkong.
- P. challengeri*, Ortmann, *Decap. u. Schizop.-Plankton Exped.*, 1893, p. 49 = *P. gracilis*, Spence Bate (*nec* Smith), *Rep. Voy. H.M.S. "Challenger"*, xxiv, Crust. Macr., 1888, p. 487, pl. lxxxvii. Atlantic: Tristan da Cunha, Cape Verde Islands; Pacific: New Zealand, near Torres Str., near Philippine Islands.
- P. profundus*, Spence Bate, *Rep. Voy. H.M.S. "Challenger"*, xxiv, Crust. Macr., 1888, p. 490, pl. lxxxviii, fig. 1. Off Sydney.
- P. junceus*, Spence Bate, *Rep. Voy. H.M.S. "Challenger"*, xxiv, Crust. Macr., 1888, p. 491, pl. lxxxviii, figs. 2—4. Between Philippine Islands and Borneo.
- P. modumaniensis*, Rathbun, *Bull. U. S. Fish. Comm. for 1903*, xxiii, pt. iii, 1906, p. 910, text-fig. 63. Hawaiian Islands.

There is reason to believe that the last four of these species resemble *P. spinosus* and the other typical representatives of the genus in their more important structural features.



EXPLANATION OF PLATE II.

Pontophilus australis (Thomson).

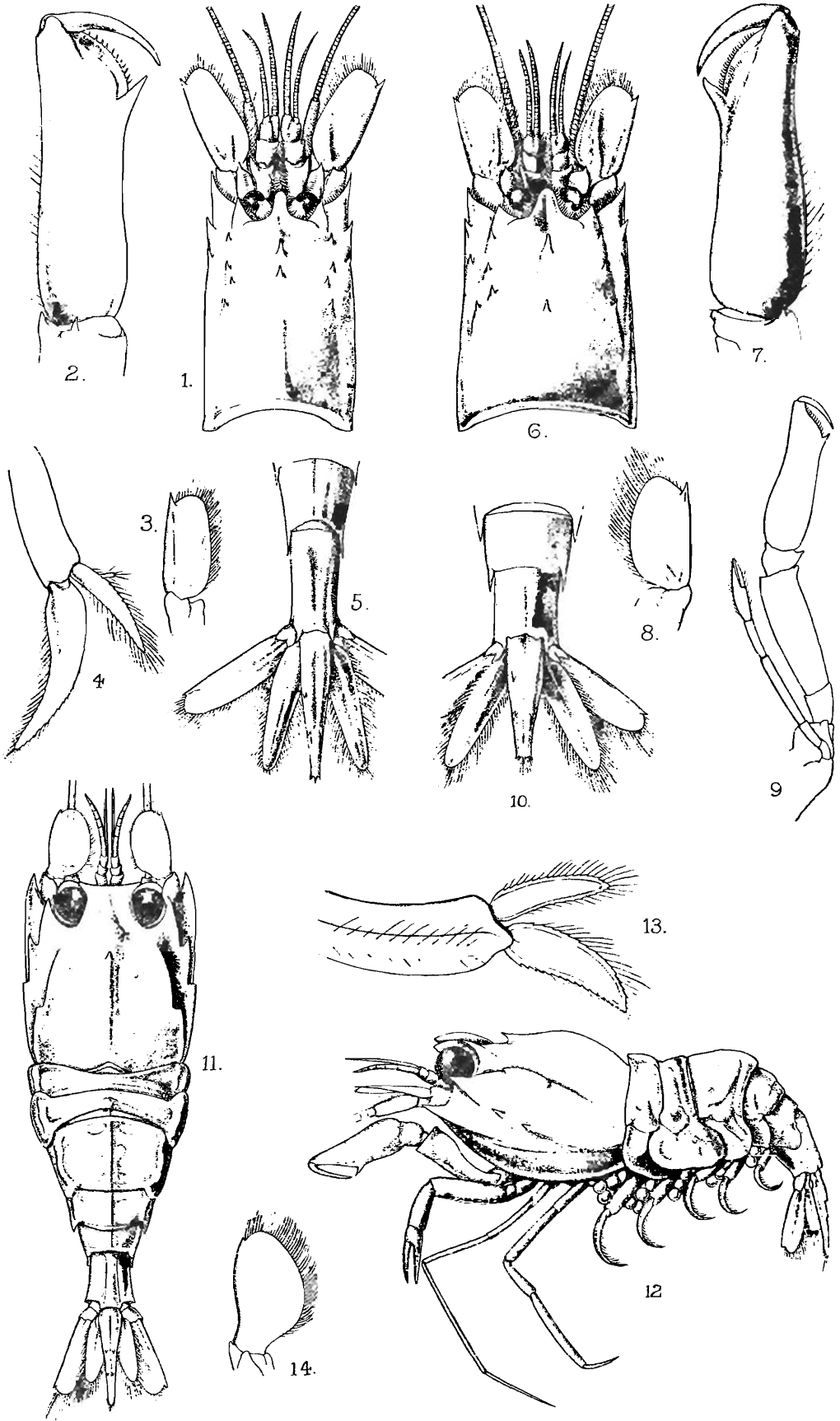
- FIG. 1.—Carapace of an ovigerous female in dorsal view, $\times 4$.
,, 2.—Propodus and dactylus of first peraeopods, $\times 8$.
,, 3.—Antennal scale, $\times 4$.
,, 4.—Third pleopod, $\times 8$.
,, 5.—Last two abdominal somites and caudal appendages,
 $\times 4\frac{1}{2}$.

Pontophilus chiltoni, sp. nov.

- FIG 6.—Carapace of an ovigerous female in dorsal view, $\times 4$.
,, 7.—Propodus and dactylus of first peraeopods, $\times 8$.
,, 8.—Antennal scale, $\times 4\frac{1}{2}$.
,, 9.—First and second peraeopods, $\times 4$.
,, 10.—Last two abdominal somites and caudal appendages, $\times 4\frac{1}{2}$

Pontophilus sabsechota, sp. nov.

- FIG. 11.—Dorsal view of the type specimen, $\times 9$.
,, 12.—Lateral view of the same, $\times 9$.
,, 13.—Third pleopod, $\times 30$.
,, 14.—Antennal scale, $\times 12$.



A.C. Chowdhary, del et lith:
1-5. *Pontophilus australis*.

6-10 *Pontophilus australis*.
11-14. *Pontophilus calsechota*.

III. CONTRIBUTIONS TO THE FAUNA OF
YUNNAN BASED ON COLLECTIONS
MADE BY J. COGGIN BROWN B.Sc.

1909 — 1910.

PART II.—FISHES.

By B. L. CHAUDHURI, B.A., B.Sc., Assistant Superintendent,
Indian Museum.

The fishes collected by Mr. J. Coggin Brown in Yunnan and its neighbourhood belong to the sub-orders Ostariophysi and Percosoces. Some of them are reported for the first time from the Province and four are believed to be new to science. For want of sufficient preserving fluid and bottles Mr. Coggin Brown had to put a large portion of his collection in local Chinese spirit in ill-fitting Chinese vases and pots, with the result that, notwithstanding all his care and trouble, a considerable number of the specimens arrived here in a condition unfit for identification. Nineteen different species have, however, been identified and are enumerated below. the report being supplemented with the descriptions of the four new species.

Fam. CYPRINIDAE.

Sub-fam. CYPRININAE.

1. *Cyprinus hybisoides*, Richards.

Günther, *Catal.*, vii, p. 27.

Hab.—Lake Tali Fu, 7,000 ft., Yunnan.

Reported from China, Amoy, Formosa, Japan and Java.

2. *Cyprinus fossicola* (Gray).

Günther, *Catal.*, vii, p. 28.

Hab.—Yungpê Lake, Yunnan.

Some female specimens with matured ova; month of collection June.

Reported from China.

3. *Carassius auratus* (L.).

Günther, *Catal.*, vii, p. 32.

Hab.—Lake Tali Fu, 7,000 ft., and Yung-chang Fu, Yunnan.

A very large number, mostly damaged.

China is the home of the gold carp.

4. *Schizothorax progastus* (McClell.).

McClell., *Ind. Cypr.*, pp. 274, 343, pl. 40, fig. 4.

Hab.—Lake Tali Fu, Yunnan.

One female specimen (damaged).

Reported from the Himalayas, from the headwaters of the Ganges to Sadiya in Upper Assam. This species has not been before reported from Yunnan; but Yunnan is separated only by the district of Kachin (Upper Burma) from the mountainous districts of Upper Assam whence the species was first reported.

5. *Labeo yunnanensis*, sp. nov.

(Plate i, figs. 1, 1a, 1b.)

Br. iii; D. III 11; P. 17; V. 9; A. II 5; C. 19; L.l. 43.

Length of head $4\frac{1}{2}$, height of body $3\frac{1}{2}$, length of middle (shortest) rays of the caudal fin $12\frac{1}{2}$ and outer (longest) rays nearly 4, and the length of caudal peduncle (the distance between the posterior root of anal fin and the middle of the root of caudal) is contained 4 times in the total length.

Shape.—Dorsal profile almost a straight line from the end of snout to the nape except for two slight concavities, one just above the snout and the other a little behind the orbit. From the neck to the anterior root of dorsal fin the profile is highly convex, from the anterior root of the dorsal fin to the root of the caudal the profile is concave the concavity being very deep over a black blotch on the middle of the caudal peduncle. The ventral profile is almost a straight line from snout to cloaca, but from cloaca to caudal it is somewhat convex though the curvature has no correspondence to the concavity of the upper side.

Snout.—Short, compressed and rather pointed but not projecting beyond the jaws, the terminal portion mostly covered with tubercles.

Barbels.—None, but flat thin processes or flaps like stumps of barbels are found hanging inside at the angles of the mouth.

Eyes.—Adipose circular eyelids, $3\frac{1}{2}$ diameters in the length of the head, $1\frac{1}{2}$ diameters from the end of snout and little less than 2 apart. Interorbital space slightly convex.

Lips.—Loose in the mouth which is inferior, semioval and less than one-third in the length of the head; the inner double fold of the lip is cartilaginous. The upper lip is cut in edges.

Tecth.—Pharyngeal 5, 4, 2; 2, 4, 5. The size of an individual of the outermost row is $1\frac{1}{2}$ of each of those in the middle row and double of each of the innermost row.

Air-bladder.—Thick and large, divided into two unequal chambers by a constriction, the anterior being the shorter and much the broader of the two.

Fins.—The dorsal arises three scales anterior to the vertical from the ventral, and twenty-two scales behind the nape and much

nearer to the snout than to the root of the caudal. The middle rays of the dorsal being abruptly short, the upper free portion of the fin is deeply concave. The pectoral is thin and tapering and is shorter than the distance between the roots of pectoral and ventral by two scales. The ventral fin has an appendant, the anterior rays of the anal fin are very long, hence the free margin is deeply concave behind. Caudal deeply lobed.

Lateral line.—Five rows of scales between the lateral line and the dorsal fin and seven rows between the lateral line and the ventral fin. The lateral line runs straight from the superior corner of the gill-cleft to the middle point of the beginning of the caudal peduncle where it bends upward and, following the curvature of the ventral side from this point, ends in the middle point of the root of the caudal fin.

Colour.—The upper portion, *i.e.*, from one scale above the lateral line, is steel-grey, below immaculate silver. A large black blotch on the caudal peduncle extending over seven scales of which three scales are on the lateral line (from the fourth to sixth scales counting from the caudal end), two scales above and two scales below it. The membranes between fin-rays are finely dotted with black points, hence the fins appear grey with the edges of a deeper shade.

Hab.—Lake Tali Fu, Yunnan.

One adult specimen measuring 158 mm. in length (including length of caudal fin).

This is the first time that a *Labeo* is reported from Yunnan. The new species resembles in some particulars *L. dyochilus* (reported from the Himalayas, Sikhim and Assam), *L. pangusia* (reported from the Himalayan ranges, Sind, Deccan, U. Provinces, Bengal and Assam), *L. rohita* (Sind, Punjab to Assam, and Burma), *L. diplostomus* (Sind Hills, Himalayas and Assam) and *L. potail* (Poonah to Tungabhadra and Deccan) from all of which it differs in having no barbels, in the shape of body, in proportions, shape of fins, lateral line, number of scales, etc., and from most of which it differs in the number of pharyngeal teeth, size and position of the eye, shape of snout and lip, number of fin-rays, etc.

6. *Barbus stigma* (Cuv. and Val.).

Cuv. and Val., *Hist. Nat. Poiss.*, xvii, p. 93, pl. 489.

Hab.—Bhamo, Upper Burma.

Reported from Sind, throughout India, and Burma as high as Mandalay.

7. *Barbus chola* (Ham. Buch.).

Günther, *Catal.*, vii, pp. 143-144.

Hab.—Bhamo, Upper Burma.

Reported from Madras, Orissa, the Punjab, Bengal, U. P. and Central Provinces, Assam and Akyab (Burma) to Mergui.

8. *Barbus cogginii*, sp. nov.

(Plate i, fig. 2.)

Br. iv; D. III 6-8; P. 15; V. 9; A. II 5; C. 17; L.l. 39-40;
L.tr. $6\frac{1}{2}/4\frac{1}{2}$.

Length of head $3\frac{3}{5}$ to $3\frac{1}{5}$, height of body $3\frac{2}{3}$ to $3\frac{1}{3}$, length of middle (shortest) rays of caudal fin 9 and outer (longest) rays $4\frac{3}{5}$ times in the total length. Length of caudal peduncle little less than 4 times in the total length. Height of head $1\frac{1}{2}$ times and width of head $1\frac{2}{3}$ times in the length of head.

Shape.—From snout to some distance behind the nape the dorsal profile is almost a straight line from which point it is convex up to second dorsal spine which occupies the highest point, from this point it slopes down in a gentle concave curve to be continuous with the upper outermost ray of the caudal fin. The ventral profile is almost a straight line with a slight convexity at the root of the ventral fin, whence it curves up suddenly and continues again as a straight line to the base of the caudal peduncle.

Snout.—Depressed, with a pointed ridge in front. It is entirely free from pores and tubercles.

Barbels.—4; 2 rostral, slightly shorter than the diameter of eye and contained $1\frac{2}{3}$ times in the length of the maxillary and $4\frac{1}{3}$ in the length of head, and 2 maxillary, contained 3 times in the length of head. The rostrals reach the anterior one-third of the eye, whereas the maxillaries reach the hind edge of the orbit.

Eyes.—Comparatively large, $3\frac{1}{3}$ diameters in the length of head, 1 diameter from end of snout and 1 apart. Interorbital space flat.

Mouth.—Anterior, terminal, protractile and curved. Upper jaw slightly projecting, the angle of the lower jaw is pointed, with a tubercle which fits into the angle of the upper jaw. The opening of the mouth ends considerably anterior to the vertical from the anterior orbit, the distance being greater than half the diameter of the eye.

Teeth.—Pharyngeal 4, 3, 2; 2, 3, 4. The outer are larger.

Fins.—The dorsal arises two scales behind the vertical from the anterior root of the ventral, has about 21 scales in front and is nearer to the root of the caudal than the end of the snout. The third spinous ray is serrated posteriorly with 28 serrations, the terminal one being slightly hooked; this spine is shorter than the length of head; the rest of the rays are shorter the further they are from the spine; the free edge of the fin is thus concave outward. The pectoral reaches above the ventral by one or two scales and the lower free margin is slightly concave. There are twelve rows of scales between the anterior roots of ventral and anal; the length of ventral is less than the intervening space. There are $3\frac{1}{2}$ scales between the root of the ventral and the lateral line

and 10 rows of scales from the posterior root of anal fin to the inferior terminal ray of the caudal. The second ray of the anal is ossified and the outer free margin of the fin is concave, that of the ventral being slightly convex.

Lateral line.—Commencing on the superior corner of the gill-cleft it drops down gradually through eight rows of scales to above the end of pectoral fin from which point it almost runs as a straight line to end at the middle point of the root of the caudal fin. There are three and a half rows of scales between the lateral line and the ventral fin and six and a half rows between the lateral line and the anterior root of the dorsal. In the caudal peduncle there are generally eight rows of scales, four rows above and three rows below the row in which the lateral organs are situated.

Colour.—Upper one-third including head brownish, the rest silvery. Fins pale yellow, the ventral being of a slightly deeper colour. The ends of rays of dorsal and caudal slightly touched with grey. In some there is a circular deep brownish or golden ring in the middle of the eyelid. The barbels are brown.

Hab.—Lake Tali Fu, 7,000 ft., Yunnan. Four full-grown specimens: F. $\frac{468.0}{1}$ is a mature female, 102 mm. in length with caudal; F. $\frac{468.2}{1}$, female big in roe, 154 mm., total length with caudal; F. $\frac{468.5}{1}$, total length 133 mm (damaged); and F. $\frac{468.6}{1}$ is a female big in roe, 148 mm., with caudal (figured).

The new species differs considerably from the two others of the same genus described from Yunnan, *i.e.*, *B. grahami*, Regan, and *B. yunnanensis*, Regan, and also from *B. oatesii*, Blgr., and *B. compressus*, Blgr., of the Shan States. It has some resemblance, however, to *Barbus clavatus* (McClelland) from Sikhim, which is very imperfectly described from a single specimen known, and also to *Barbus margarianus*, Day, from the Nampoung river in the Kakhyen Hills (Bhamo), but from each of these it differs in a good many important particulars some of which are detailed below:—Length of head in the total length is $6\frac{1}{4}$ in *B. margarianus*, $4\frac{2}{3}$ in *B. yunnanensis*, $3\frac{3}{4}$ in *B. grahami* and $3\frac{2}{5}$ in *B. clavatus*, while it is $3\frac{3}{5}$ to $3\frac{1}{5}$ in the new species. Length of snout in the diameter of eye is 2 in *B. grahami*, $1\frac{2}{3}$ in *B. yunnanensis*, $1\frac{1}{4}$ in *B. margarianus*, while it is only 1 in the new species. Two pairs of barbels are equal in length in *Barbus clavatus* but in all other species mentioned above, including the new species, they are unequal, the anterior pair being $\frac{3}{8}$ of head in *B. grahami*, $\frac{1}{5}$ in *B. yunnanensis* and nearly $\frac{1}{4}$ of head in the new species. In *B. clavatus* the snout is covered with thorny tubercles, and in *B. margarianus* there are large open pores on the front and sides of the snout, while that of the new species is exceptionally smooth. In *B. clavatus* none of the anal rays are prolonged but in the new species the anterior rays are longer than the posterior rays. In *B. margarianus* the abdominal profile is more convex than that of the back, in the new species the abdominal profile is almost a straight line. The mouth is anterior and terminal in the new species, whereas it is subterminal both in *B. grahami* and *B. yunnanensis*.

9. *Rasbora daniconius* (Ham. Buch.).

Günther, *Catal.*, vii, p. 194.

Two young specimens.

Hab.—Bhamo, Upper Burma.

10. *Rohtee cotio* (Ham. Buch.).

Day, *Fish. India*, p. 587, pl. cli, fig. 1.

Hab.—Bhamo, Upper Burma.

11. *Barilius polylepis*, Regan.

Ann. Mag. Nat. Hist. (7), vol. xiii, p. 191.

Hab.—Panhaitzu Lake, Lake Tali Fu and Yungpêting Lake, Yunnan.

Sub-fam. COBITIDINAE.

12. *Misgurnus anguillicaudatus* (Cantor).

Günther, *Catal.*, vii, p. 345.

Hab.—Lake Tali Fu, 7,000 ft., Yunnan.

Full-grown specimens. In some numerous raised black spots like "pearl-organs" were observed. They were caught about spawning time.

13. *Nemachilus pleurotaenia*, Regan.

Ann. Mag. Nat. Hist. (7), vol. xiii, p. 192.

Some very young specimens.

Hab.—Lake Tali Fu, Yunnan.

14. *Nemachilus salmonides*, sp. nov.

(Plate i, figs. 3, 3a.)

Br. iii; D. III 8; P. 13; V. 10; A. I 5; C. 16.

Length of head 4, height of body $3\frac{1}{2}$, length of middle caudal rays $5\frac{3}{4}$, length of terminal caudal rays $4\frac{3}{4}$, and the distance of cloacal opening from the root of caudal $3\frac{5}{8}$ in the total length.

Shape.—Dorsal profile in anterior two-thirds gently convex with the anterior root of the dorsal as the highest point. In the posterior third the dorsal profile is almost a straight line. The ventral profile of the head and chest is highly convex down to the root of pectoral fin from which it is gently convex to the root of the caudal.

Eyes.— $4\frac{3}{8}$ diameters in the length of head, $1\frac{3}{8}$ in the length of the snout and $1\frac{1}{2}$ apart. The interorbital space is slightly convex which is further altered by two narrow ridges that run from behind the nares to the posterior margin of the head. The length of the snout is contained $1\frac{2}{5}$ times in the postorbital length of the head.

Barbels.—6 in all, 4 rostral and 2 maxillary. The maxillary barbels are the longest, being half as long as the head and twice as long as the inner rostral. The outer rostrals are just intermediate in length between the maxillary and inner rostral.

Lips.—Upper fleshy and thick. The lower lobulated, being broken up into several fleshy protuberances in two series. The opening of the mouth, which is inferior, is deeply crescentic; the corners are fleshy and thick.

Fins.—The anterior root of the dorsal is slightly in advance of the vertical from the anterior root of the ventral. It is also equidistant from the posterior edge of the orbit and the root of the caudal. A few of the last rays being slightly longer than those immediately in front the outer contour of the fin, which is otherwise deeply convex, looks pointed at the end preceded by a notch. The pectoral extending $\frac{2}{3}$ of the distance from its base to origin of ventral. The free end of the ventral is triangular and the fin is two-thirds of the distance between the origin of ventral and the anterior root of anal. The free end of the anal is rather truncated and the depth of the caudal peduncle is contained $1\frac{1}{5}$ times in the distance between the posterior root of the anal and the root of the caudal fin. The outer margin of the caudal is concave, the middle rays being $\frac{2}{3}$ of the outermost rays.

Scales.—Minute and not imbricate. Thorax and abdomen covered with scales.

Lateral line.—Incomplete, the perforated scales with lateral organs are noticed only in 25 scales in the anterior part of the body and the lateral line stops 12 or 13 rows of scales in front of the vertical from the anterior root of the dorsal fin.

Colour.—Head, body and fins dirty brown with marbled markings in black all over the body. These marbled markings appear to be irregular transverse bands arranged in a vertical series from behind the operculum and running to the root of caudal. Most of the bands are broken up in the middle except a few over and behind the pectoral fin. The anterior bands are generally shorter and thinner than those behind. The margin of the caudal fin is slightly darker.

In colour as well as in shape this species has some superficial resemblance to a young trout.

Hab.—Mongpan, Southern Yunnan.

A single specimen 56 mm. in length (including caudal fin).

The new species resembles in some characters two other *Nemachili* reported from Yunnan but from each of these it differs in a good many important particulars some of which are stated below:—Depth of body of *N. pleurotaenia*, Regan, is 5 and of *N. nigromaculatus*, Regan, $4-4\frac{1}{4}$, whereas in the new species it is only $3\frac{1}{2}$; in *N. pleurotaenia* the snout is as long as the postorbital part of the head, in the new species the length of the snout is contained $1\frac{2}{3}$ times in the postorbital part of the head. In *N. pleurotaenia* the interorbital distance is 1 diameter of the eye, in the new species it is $1\frac{1}{2}$ diameters. The length of the maxillary

barbel is contained twice in the length of the head in *N. pleurotaenia*, three times in *N. nigromaculatus*, but in the new species only $1\frac{1}{3}$ times. Scales in *N. pleurotaenia* are minute and thorax naked, in *N. nigromaculatus* scales are very small, not imbricate, and both thorax and abdomen naked. In the new species the scales are minute and not imbricate but both the thorax and abdomen are covered with scales. In *N. nigromaculatus* the lateral line is altogether absent, in the new species it is present but incomplete. In *N. pleurotaenia* the anterior root of the dorsal fin is equidistant from the anterior nares and the root of caudal, in *N. nigromaculatus*, from middle of eye and base of caudal, whereas in the new species it is equidistant from the posterior edge of the orbit and the root of caudal.

Fam. SILURIDAE.

Sub-fam. BAGRINAE.

15. *Macrones scenghala* (Sykes).

Day, *Fish. India*, p. 444, pl. xcix, fig. 1.

Hab.—Lake Tali Fu, Yunnan.

This species has not been before this reported from Yunnan, nor from Burma. It is found all over India including Upper Assam.

16. *Macrones cavasius* (Ham. Buch.).

Günther, *Catal.*, v, p. 76.

Hab.—Bhamo, Upper Burma.

17. *Macrones pulcher*, sp. nov.

(Plate i, fig. 4.)

Br. vi; D. I 7; P. 9; V. 6; A. II 10; C. 17.

Length of head $3-3\frac{3}{5}$, height of body $3\frac{1}{5}$, length of middle caudal rays 9, length of terminal caudal rays $3\frac{1}{5}$, the distance of cloacal opening from the root of caudal fin $2\frac{2}{3}$ and the length of the base of adipose dorsal fin 3 times in the total length (without caudal).

Shape.—The limiting line of the snout meets the line from the root of the dorsal spine in front over the eyes in an obtuse angle. From the point of attachment of the dorsal spine, which is the highest point in the profile, it slopes down to the anterior root of the adipose dorsal from which point it continues almost in a straight line to the root of the caudal. The ventral profile is a convex curve from the lower jaw to the anterior root of the anal fin from which point it is concave.

Eyes.— $3\frac{1}{5}-4\frac{1}{5}$ diameters in the length of head, $1\frac{1}{5}$ to $1\frac{2}{5}$ diameters in the length of snout and $1\frac{1}{4}$ to $1\frac{1}{5}$ in the interorbital distance; length of snout 3 times and the interorbital distance $2\frac{1}{2}$ times in the length of head.

Barbels.—8 in number, nasal about $\frac{4}{5}$ of the length of head; maxillary pair reach beyond the posterior root of the anal fin; outer mandibular pair reach the end of pectoral spine and the inner mandibular barbels reach half the length of pectoral spine.

Mouth.—Anterior, terminal and transverse; the upper jaw being slightly longer. The width of the mouth is contained $2\frac{1}{2}$ times in the length of head. Teeth villiform in both jaws, arranged in series.

Osseous plates.—Upper surface of the head entirely covered with a granulated bony plate having three processes; the occipital process is twice as long as broad and meets the blunt process of the bony plate which forms the base of the dorsal spine; the other two broad lateral processes terminate half-way in front of the anterior black blotch. There is a bony ridge on each side bounding the posterior margin of the gill-openings; these bony ridges appear to terminate in a pointed bony plate on each side wedged between the pectoral spine and the anterior black blotch, which conceals the thin membrane stretched in front of the end of the air-bladder. All the osseous plates are granulated. The median longitudinal groove on the upper side of the head is soft, shallow and broad.

Fins.—The anterior dorsal fin commences just at the vertical from the posterior margin of the anterior black blotch behind the operculum. The dorsal spine is weak and is slightly larger than half the length of head and is minutely serrated on both sides—there being eight serrations on the posterior side, and those on the anterior side are still more minute. The middle rays of the dorsal fin being comparatively very long, the free margin of the fin is highly convex. The adipose dorsal is rather long, beginning from the point at which the last ray of the rayed dorsal would reach and ending beyond the end of the base of the anal; the distance between adipose dorsal and caudal is contained $1\frac{1}{2}$ times in the distance between the posterior edge of the base of anal and the caudal; the length of the base of the adipose dorsal is $1\frac{1}{3}$ in the length of head. Its height gradually increases backwards and the free end is pointed on the upper posterior edge. The greatest width of adipose dorsal is contained 7 times in the length of the base. The pectoral spine is stronger and longer than the dorsal spine in which the denticulations on the inner side are very strong and are about ten in number, the serrations on the outer margin being very weak. The length of the rays is smaller as they proceed inwards causing the outline of free margin to appear convex. The free margin of the anal fin is slightly concave. The middle rays of the ventral fin are long enough to reach the anterior root of the anal. The two limbs of the bilobed caudal fin are of equal length.

Lateral line.—There is a series of minute openings of lateral organs from above the opening of the gill-cleft, which bends round the anterior black blotch to the middle of the fish and then continues in a straight line to disappear in the posterior black blotch placed about the middle of the caudal peduncle.

Air-bladder.—An oval-shaped free sac not enclosed in a bony capsule, but lying superior to the heart and extending posteriorly: it is lodged under a flat osseous roof and is in direct contact on the two lateral sides with the stretched thin membranes, concealed as it were by the anterior black blotches behind the gill-clefts—suggesting some connection with the production and transmission of sound.

Colour.—Dorsal and upper part of the body dark brown, with lighter or paler whitish brown stripes: one median, from the tip of the snout to the base of the dorsal spine, and two lateral longitudinal on each side, one above and the other below the middle line, which is distinguished by being dotted black for the openings of the lateral organs. The upper of the two lateral longitudinal stripes is the darker of the two. There are on each side two large, conspicuous and intensely black circular blotches considerably larger than the eyes, one behind the gill-cleft covering and thereby concealing the thin membranous skin of the body where the air-bladder is in direct contact with the membranous leathery covering and thus with the outside water, and the other about the middle of the caudal peduncle, being separated from the root of the caudal fin by a thin white band that runs along the root. The ventral side of the body is coloured dirty silver; the lips, mandibular barbels, and the thin band at the root of the caudal are all white, the nasal and the maxillary barbels blackish brown, adipose dorsal dark brown and the dorsal, anal and caudal fins are brownish with black spots on the membranes between the rays.

There are altogether four specimens measuring from 60 to 67 mm. (including caudal fin), all collected in the district of Bhamo close to the Yunnan border. This new species differs in proportions, coloration, etc., from *Macrones medianalis*, Regan, reported from Yunnan, and also from *Macrones bleekeri* and *M. blythii*, reported among other places from Burma also. To these the new species has some superficial resemblance. The principal differences are summarised in the following table:—

	<i>M. medianalis.</i>	<i>M. bleekeri.</i>	<i>M. blythii.</i>	<i>M. pulcher.</i>
Length of head in total length	$3\frac{1}{2}$ — $4\frac{1}{6}$	$5\frac{1}{4}$ — $5\frac{1}{2}$	5	$3\frac{1}{2}$ — $3\frac{2}{3}$
Height of body in the total length	$5\frac{1}{4}$ — $5\frac{1}{2}$	5	5	$3\frac{1}{3}$
Length of head in diameter of eye	5 — $6\frac{2}{3}$	$4\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{3}$ — $4\frac{1}{3}$
Length of dorsal spine in the length of head ..	$1\frac{1}{3}$ — $1\frac{1}{2}$	2	Little less than 2	$1\frac{2}{3}$

Besides the above differences, among others the new species differs from *M. bleekeri* in having the length of the base of the adipose dorsal $1\frac{1}{3}$ in the length of head, whereas in *M. bleekeri* it is 2, and in having both the lobes of the caudal fin equal, whereas in *M. bleekeri* the superior lobe of the caudal fin is much longer than the inferior lobe.

Fam. OPHIOCEPHALIDÆ.

18. *Ophiocephalus gachua*, Ham Buch.

Günther, *Catal.*, iii, pp. 471-72.

Hab.—Tashuichai and Tali Fu Lakes, Yunnan; Bhamo, Upper Burma.

In some Bhamo specimens the ventral fins are not banded but immaculate and white. Reported for the first time from Yunnan.

19. *Ophiocephalus punctatus*, Bloch.

Günther, *Catal.*, iii, pp. 469-70.

Hab.—Tali Fu Lake, Yunnan.

The ventral fins are irregularly banded.

Reported for the first time from Yunnan.

LIST OF MEMOIRS ON FISHES FROM YUNNAN AND ITS
NEIGHBOURHOOD.

- I. Anatomical and Zoological Researches: Yunnan Expeditions, 1868 and 1875. By J. Anderson, M.D., Superintendent, Indian Museum. 2 vols. Published in 1878.
- II. "On a collection of Fishes made by Mr. John Graham at Yunnan Fu." By C. Tate Regan, B.A. (*Ann. Mag. Nat. Hist.* (7), vol. xiii, pp. 190-194). 1904.
- III. "Descriptions of two new Cyprinid Fishes from Yunnan Fu." By C. Tate Regan, B.A. (*Ann. Mag. Nat. Hist.* (7), vol. xiv, pp. 416-17). 1904.
- IV. "Descriptions of two new Cyprinid Fishes from Yunnan Fu, collected by Mr. John Graham." By C. Tate Regan, B.A. (*Ann. Mag. Nat. Hist.* (7), vol. xvii, pp. 332-33). 1906.
- V. "Descriptions of three new Fishes from Yunnan, collected by Mr. J. Graham." By C. Tate Regan, B.A. (*Ann. Mag. Nat. Hist.* (7), vol. xix, pp. 63-64). 1907.

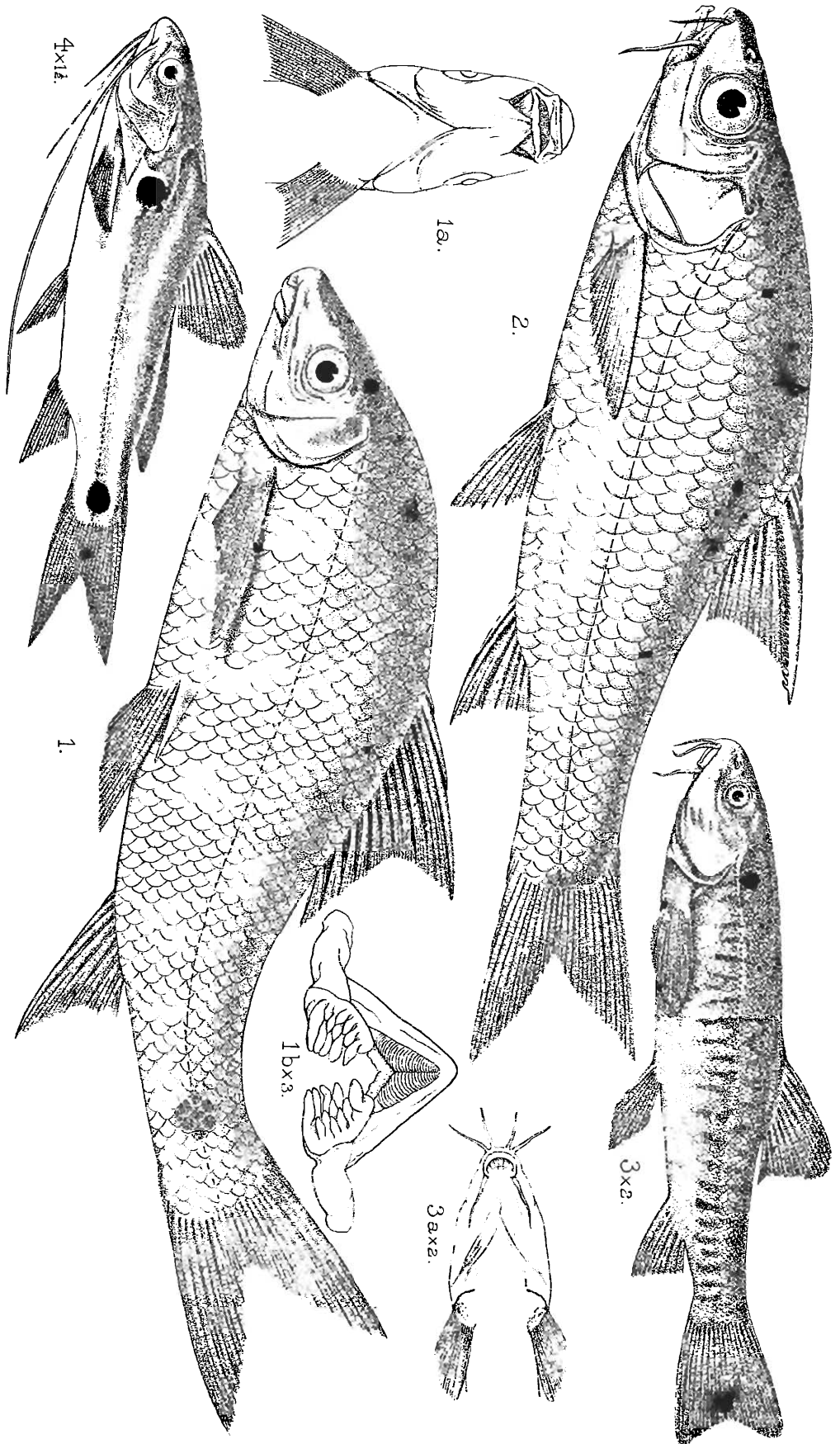
LIST OF FISHES ALREADY REPORTED FROM THE PROVINCE OF
YUNNAN AND ITS IMMEDIATE NEIGHBOURHOOD.

1. *Notopterus kapingat*, Lacep.
2. *Cyprinus micristius*, Regan.
3. „ *carpio*, L.
4. *Carassius auratus* (L.).
5. *Orcinus richardsonii*, Gray and Hardw.
6. „ *grahami*, Regan.
7. *Schizothorax talicnsis*, Regan.
8. *Discognathus yunnanensis*, Regan.
9. *Labeo calbasu* (Ham. Buch.).
10. „ *gonius* (Ham. Buch.).

11. *Cirrhina mrigala* (Ham. Buch.).
 12. *Catla buehanani*, Cuv. and Val.
 13. *Barbus sarana* (Ham. Buch.).
 14. „ *apogon*, Cuv. and Val.
 15. „ *margarianus*, Day.
 16. „ *tor* (Ham. Buch.).
 17. „ *grahami*, Regan.
 18. „ *yunnanensis*, Regan.
 19. *Achilognathus barbatus*, Günther.
 20. *Barilius intcrrupta*, Day.
 21. „ *polylepis*, Regan.
 22. „ *andersoni*, Regan.
 23. *Rohitec cotio* (Ham. Buch.).
 24. „ *belangeri*, Cuv. and Val.
 25. *Danio kakhicnsis*, Day.
 26. *Misgurnus anguillicaudatus*, Cantor.
 27. *Nemachilus pleurotaenia*, Regan.
 28. „ *nigromaculatus*, Regan.
 29. „ *grahami*, Regan.
 30. *Wallago attu* (Bloch).
 31. *Silurus mcnto*, Regan.
 32. „ *grahami*, Regan.
 33. *Callichrous bimaculatus* (Bloch).
 34. *Macrones cavasius* (Ham. Buch.).
 35. „ *corsula* (Ham. Buch.).
 36. „ *medianalis*, Regan.
 37. *Liobagrus nigricauda*, Regan.
 38. *Rita sacerdotum*, Day.
 39. *Exostoma andersoni*, Day.
 40. *Monopterus javancnsis*, Lacep.
 41. *Ophioccephalus argus*, Cantor.
-

EXPLANATION OF PLATE I.

- FIG. 1.—*Labeo yunnanensis*, sp. nov., nat. size.
,, 1a.—Head of same specimen, viewed from below, nat. size.
,, 1b.—Pharyngeal teeth of same specimen, $\times 3$.
,, 2.—*Barbus cogginii*, sp. nov., nat. size.
,, 3.—*Nemachilus salmonides*, sp. nov., $\times 2$.
,, 3a.—Head of same specimen, viewed from below, $\times 2$.
,, 4.—*Macroncs pulcher*, sp. nov., $\times 1\frac{1}{2}$.



PART III.—BUTTERFLIES.

By G. W. V. DERHÉ-PHILIPPE, F.E.S.

The few butterflies were all of species more or less common in the outer Himalayan ranges. The Pieridae are proportionately strongly represented; but it is curious that the Nymphalidae, which bulk so largely everywhere among the Indian and Burmese Rhopalocera, are not more prominent.

The only Satyrid is a male *Ypthima sakra*, Moore, a species fairly common throughout the Himalayas and Assam Hills. As might be expected, it is the darker eastern form, true *Y. sakra*, and not the paler variety *Y. nikaea*, Moore, prevailing in the Western Himalayas.

A couple of *Vanessa cashmircensis*, Kollas, represent the Nymphalidae. Both are somewhat brighter and lighter in tone than typical Himalayan specimens.

The Pieridae include—

Picris canidia, Sparrman, ♂ = *P. gliciria*, Cramer.

Picris melctc, Menetries, ♂ and ♀

Terias venata, Moore.

All three of these species were taken by the Yunnan Expeditions of 1868 and 1875, and recorded in the "Zoological Researches" subsequently published. They differ in no way from typical Indian specimens. *T. venata* would appear to be the species of the genus most commonly found in the locality. This is noteworthy, as this species is usually, in comparison with the others of the genus, somewhat scarce everywhere. One of the specimens is very heavily dusted with black scales, a seasonal variation often found in the group, but unusually marked in this case.

Of the *Lycaena* group of the Lycaenidae there are—

a ♂ *Zizera maha*, Kollas,

a ♂ *Zizera otis*, Fabricius.

The former was recorded by the Yunnan Expeditions as *Z. chandala*, Moore; the latter was apparently not taken.

The only other Lycaenid belongs to the *Thecla* group, and is a female of probably *Ilerda androcles*, Doubleday and Hewitson. The females of the species of *Ilerda* (with the single exception of *I. sena*) are all exceedingly alike; and, unless taken *in cop.* or in a locality known to be inhabited by only one form, it is often impossible to satisfactorily decide to which species a female belongs. The Yunnan insect compares best with typical females of *I. androcles* in the de Nicéville collection; and as this species occurs in N. E. India (I have seen the ♂ at Kohima in the Naga Hills), it is quite probable it is also found, possibly rarely, in the hills of Upper Burma. No species of *Ilerda* was recorded by the Yunnan Expeditions.

PART IV.—LES CHIRONOMIDES (TENDIPEDIDAE).

Par J. J. KIEFFER, *Doct. phil. nat., professeur à Bitsch.*

On ne connaît, jusqu'à présent, qu'un seul Chironomide de Chine, à savoir *Chironomus venustus*, Wiedemann, publié en 1828 (Ausser. Zweifl. Insect., vol. i, p. 547).

Les cinq espèces que nous allons décrire proviennent de la Chine occidentale, de la Province du Yunnan; elles ont été recueillies par J. Coggin Brown et sont conservées à l'Indian Museum de Calcutta.

Genus TENDIPES, Meig. (CHIRONOMUS, Meig.).

- | | |
|---|-----------------------------------|
| 1. Bifurcation et partie basale des deux rameaux de la posticale noires | 1. <i>T. atrifurca</i> , sp. nov. |
| — Nervure posticale entièrement pâle | .. 2. |
| 2. Bifurcation de la posticale distale de la transversale | 2. <i>T. sinensis</i> , sp. nov. |
| — Bifurcation de la posticale située sous la transversale | 3. <i>T. browni</i> , sp. nov. |

1. *T. atrifurca*, sp. nov.

♀ Bouche et palpes brun noir, vertex, antennes sauf le 6^e article qui est brun, hanches, pattes, balanciers et deux premiers segments abdominaux blanchâtres, thorax brunâtre ou jaunâtre, mesonotum blanchâtre, avec trois bandes longitudinales, dont la médiane est jaune et raccourcie en arrière, les latérales brunes et raccourcies en avant, aux pattes antérieures l'extrémité du fémur et du tibia et le tiers basal du tibia sont noirs (tarse brisé), les genoux des quatre autres pattes sont assombris, les cinq derniers segments abdominaux bruns. Palpes très longs, plus longs que les antennes. Yeux fortement sinueux, séparés au vertex. Antennes composées de six articles, dont le second est allongé et rétréci au milieu, 3—5 subfusiformes, col un peu plus court que l'article, verticilles 4-5 fois aussi longs que la grosseur des articles, 6^e article sans longs poils, un peu plus long que les deux précédents réunis, graduellement aminci. Mesonotum brillant. Ailes subhyalines, nervures pâles, bifurcation de la posticale, moitié antérieure du rameau inférieur et tiers antérieur du rameau supérieur noirs, sous un certain jour, on voit un vestige d'une large bande enfumée, transversale et percurrente qui traverse la partie noire des deux rameaux de la posticale; radius atteignant presque les deux tiers du cubitus, 2^e longitudinale non distincte, cubitus un peu arqué, aboutissant presque à la pointe alaire, non dépassé par la costale, discoïdale bien plus éloignée de la pointe alaire que le cubitus, transversale oblique, bifurcation de la posticale un peu distale de la transversale, les deux rameaux dévient peu de la direction du pétiole. Pattes sans longs poils, tibia antérieur égalant les $\frac{2}{3}$ du fémur. Taille 4 mm.

Yunnan: Tengyueh.

2. *T. sinensis*, sp. nov.

♀ Palpes, tête et antennes roux brun, thorax roux, mesonotum blanchâtre. à trois bandes longitudinales rousses, la médiane divisée par une ligne longitudinale, raccourcie en arrière, les latérales raccourcies en avant, balanciers blancs, pattes jaunâtres. genoux antérieurs, un vestige sur les quatre autres genoux, extrémité du tibia antérieur et des deux premiers articles de tous les tarsi, la moitié distale du 3^e article et les deux derniers en entier brun noir, abdomen brun noir, tiers postérieur des segments jaunâtre. Antennes de six articles, dont le 2^e est rétréci au milieu, 3-5 fusiformes, deux fois aussi longs que gros au milieu, leur col égal à la moitié de la partie renflée, verticilles 3-4 fois aussi longs que la grosseur des articles, 6^e article sans longs poils, de moitié plus long que le 5^e, subcylindrique. Mesonotum mat. Ailes hyalines, nervures antérieures brunâtres, la transversale un peu plus sombre, radius dépassant un peu le milieu du cubitus, 2^e longitudinale peu distincte et très rapprochée du radius, cubitus arqué, non dépassé par la costale, aussi distant de la pointe alaire que la discoïdale, transversale oblique, bifurcation de la posticale distale de la transversale, les deux rameaux déviant peu de la direction du pétiole. Tibia antérieur égalant les trois quarts du fémur, métatarse de moitié plus long que le tibia, double du 2^e article, 2-4 subégaux, 5^e n'atteignant pas la moitié du 4^e, 8 fois aussi long que gros, pulvilles larges, égalant la moitié des crochets tarsaux, pattes antérieures à peine pubescentes. Taille 4 mm.

Yunnan: Man-nau, 23 avril 1910.

3. *T. browni*, sp. nov.

♀ Antennes brunes, thorax brun roux, mesonotum, scutellum, balanciers et deux premiers segments abdominaux blanchâtres, mesonotum avec trois bandes ferrugineuses et mates, dont la médiane n'est pas divisée mais raccourcie en arrière, les latérales raccourcies en avant, pattes jaunâtres, tibia antérieur brun noir sauf le tiers distal (tarse brisé), aux autres pattes, l'extrémité des 2 ou 3 premiers articles tarsaux et les 2 ou 3 derniers en entier brun noir, cinq derniers segments abdominaux bruns. Bifurcation de la posticale située sous la transversale. Tibia antérieur égalant les deux tiers du fémur. Quant au reste, semblable au précédent. Taille 5 mm.

Yunnan: Man-nau, le 23 avril 1910.

Tanytarsus sinarum, sp. nov.

♂. Tête, scape et thorax brunâtres, mesonotum et scutellum blanchâtres, mesonotum avec trois bandes roussâtres, dont la médiane est raccourcie en arrière, les latérales en avant, balanciers blancs, pattes et abdomen brunâtre clair, deux derniers segments abdominaux et piuce plus sombres. Yeux très arqués, amincis au

vertex, où ils sont séparés. Antennes de 14 articles, panache brun noir, articles 2-13 transversaux, le 14^e presque deux fois aussi long que les 12 précédents réunis. Ailes lobées à la base, hyalines, fortement velues, radius égalant presque les deux tiers du cubitus, qui est droit, éloigné de la costale et non dépassé par elle, discoïdale arquée à sa base, son extrémité un peu plus rapprochée de la pointe alaire que le cubitus, transversale oblique, bifurcation de la posticale un peu distale de la transversale, les deux rameaux déviant peu de la direction du pétiole. Pattes antérieures sans longs poils, leur fémur deux fois aussi long que le tibia, le métatarse au moins double du tibia, 2^e article égal au tibia, presque double du 3^e, 4^e à peine plus court que le 3^e plus de deux fois aussi long que le 5^e qui est 5 à 6 fois aussi long que gros, empodium filiforme, un peu plus court que les crochets, pulvilles égalant la moitié des crochets, médiocrement larges, les quatre tibias postérieurs à poils dressés tout autour du tibia et 3-4 fois aussi longs que son épaisseur. Abdomen grêle; pince à articles terminaux plus longs que les basaux, sublinéaires, à peine amincis à l'extrémité, grands appendices assez larges, dépassant à peine les articles basaux. Taille 2.6 mm.

Yunnan: Man-nau, le 23 avril 1910.

Pelopia callicoma, sp. nov.

♂ Tête et thorax brun roussâtre, mesonotum blanchâtre, avec trois bandes brun roussâtre, larges et presque confluentes, antennes blanches, comme les balanciers et les pattes, abdomen roux de chair, fémurs avec un anneau brun et mince avant le bout distal, tibias avec l'extrémité et deux anneaux noirs, ceux-ci, situés l'un avant, l'autre après le milieu du tibia, métatarses avec un anneau avant le milieu et l'extrémité noirs, les quatre premiers articles tarsaux sont noirs au tiers distal ou dans la moitié distale, le 5^e brun noir en entier. Palpes longs et grêles. Panache blanc. Bandes du mesonotum séparées par des lignes de poils longs et blanchâtres. Ailes velues, blanches, tachetées d'enfumé, une bande transversale et en zigzag englobe la base du cubitus, les deux transversales et la bifurcation de la posticale, une autre bande en zigzag et percurrente va de l'extrémité du radius à l'extrémité du rameau supérieur de la posticale, une minime tache se trouve au bord antérieur, à l'extrémité de la 2^e longitudinale, une autre sous l'extrémité du cubitus, une à l'extrémité de la discoïdale, une tache en zigzag sur l'extrémité du rameau inférieur et remonte jusqu'au rameau supérieur, trois autres taches sont situées à proximité du bord inférieur, dans la moitié proximale de l'aile; radius dépassant le milieu du cubitus, peu distinctement bifurqué au bout, 2^e longitudinale un peu plus rapprochée du radius que du cubitus, qui est arquée, rapproché du bord, non dépassé par la costale, discoïdale arquée au bout, un peu plus rapprochée de la pointe alaire que le cubitus, transversale touchant la base arquée du rameau supérieur de la posticale.

Tibias postérieurs à poils 3-4 fois aussi longs que l'épaisseur du tibia. Abdomen grêle, à poils assez denses et aussi longs que la largeur de l'abdomen. Taille 3 mm.

Yunnan: Man-nau, le 23 avril 1910.

PART V.—BIBIONIDAE, MYCETOPHILIDAE AND ANOPHELINAE.

[Among the Diptera brought back by Mr. Coggin Brown there are few Nematocera. Two species of Bibionidae and one of Mycetophilidae have been identified by Mr. Brunetti and two of Anopheline mosquitoes by Major S. P. James, I.M.S., as follows:—]

BIBIONIDAE.

Plecia melanaspis, Wied.

Localities.—Mong-Wan; Lahsa; between Tengyueh and Tali-Fu.

[A common Himalayan species the range of which extends to eastern China and the Malay Archipelago.—N. A.]

Dilophus graciosus, Big.

Locality.—Between Tengyueh and Tali-Fu.

[Not uncommon in the Himalayas, along the whole of which it is apparently found.—N. A.]

MYCETOPHILIDAE.

Sciara rufithorax, v. Wulp.

Locality.—Tengyueh.

[Common almost all over India and in many parts of Malaysia.—N. A.]

ANOPHELINAE.

Nyssorhynchus maculipalpis, James and Liston.

Localities.—Chu-Chih and Lahsa.

[According to Theobald (*Mon. Culic.*, v, p. 62, 1910) this is *N. indiensis*, Theob., which he now regards as a distinct species. It occurs in W. and Central India. Theobald's name has priority.—N. A.]

Myzorhynchus sinensis, Wied.

Localities.—Chu-Chih and Man-Nau.

[This species is apparently common in India, but its synonymy is very doubtful.—N. A.]

IV NOTES ON PEDIPALPI IN THE COLLECTION OF THE INDIAN MUSEUM.

By F. H. GRAVELY, M.Sc., Assistant Superintendent, Indian Museum.

I.—NEW PEDIPALPI FROM CALCUTTA.

The species described in this paper were both originally found in the compound of the Indian Museum. They are two in number, both of them new, one belonging to a new genus.

TARTARIDES.

Schizomus (Trithyreus) lunatus, sp. nov.

Localities.—This species is to be found under bricks resting on the ground in the Indian Museum compound; and one specimen has been obtained from jungle at Tollygunge (near Calcutta), also under a brick. It is apparently a somewhat rare form, but may possibly be more abundant during the rains. This appears to be the first record of a Tartarid from India proper.

♂. *Cephalothorax.*—A pair of small ill-defined whitish eye-spots present; cephalic sternum about twice as long as broad and very slender behind between the coxae of the second pair of legs.

Arms.—Anterior margin of lower part of trochanter slightly concave, its angle being slightly sharper than in the male of *S. (T.) suboculatus*, Poc., to which this species is closely allied; otherwise as in that species.

First legs (fig. 1, A).—Resemble those of the male of *S. suboculatus* except in the following respects: second metatarsal joint only three-quarters the length of the tarsus; second tarsal joint about equal to the third in length; terminal joint considerably longer than the two proximal tarsal joints combined and more than one-third as long as the second metatarsal.

Fourth legs.—As in the male of *S. suboculatus*.

Tail.—Blade as seen from above less abruptly tapering and more evenly rounded behind than in *S. suboculatus*—postero-lateral margins not even slightly concave. When seen from the side the dorso-lateral lobes are found to terminate obliquely, their posterior margin forming an obtuse angle with the horizontal.

Colour (in spirit).—Carapace reddish in front, bearing a pair of whitish eye-spots; the rest of the carapace and the other dorsal plates dark olive-green. Beneath, the colour is similar but paler,

and the anterior margins of abdominal segments 5, 6 and 7 respectively bear a pair of conspicuous reddish semi-lunar patches. Appendages and tail greenish, becoming reddish distally.

Length.—4 to 5 mm. (two specimens both with tails of the form characteristic of maturity).

♀ *Cephalothorax*.—Eye-spots much less conspicuous than in the male on account of the paler coloration of the carapace. Otherwise as in the male.

Arms.—Almost exactly half as long as the body. As in the male the lower front angle of the trochanter is slightly sharper than in the corresponding sex of *S. suboculatus*; the sexual differences found in other parts are identical in the two species.¹

First legs (fig. 1, B).—As long as body, but no longer. Femur slightly longer than tibia; foot five-sixths as long as tibia, fifteen times as long as deep. Second metatarsal joint two-thirds as long

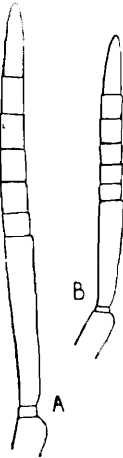


FIG. 1.—Foot of first leg of *Schizomus (Trithyreus) lunatus*, sp. nov.. × 40.
A. Male.
B. Female.

as the whole tarsus, equal to the sum of the five proximal tarsal joints. Second tarsal joint scarcely as long as the third; terminal tarsal joint as long as the three proximal tarsal joints and three-fifths as long as the metatarsus.

Fourth legs.—Not quite as long as body; femur little more than twice as long as deep.

Tail.—Remarkably long and slender in adults, being eight or nine times as long as broad and distinctly longer than in the male. This sexual distinction in the length of the tail

¹ In the female of *S. lunatus* the tibia of these appendages is nearly half as deep as long, that of the male being slenderer. Hansen—see Hansen and Sorensen's "The Tartarides" in *Arkiv för Zoologi*, Bd. 2, No. 8, pp. 1—78, pls. i—vii (Upsala, 1905)—does not mention this difference between the sexes of *S. suboculatus*, but his figures show it to exist.

appears at an early age and gradually increases so that large immature males which still bear a cylindrical tail are at once recognizable as such, this appendage being only five or six times as long as broad. In very minute specimens the tail is relatively short and stout in both sexes, that of the female becoming longer and slenderer with increasing age whilst that of the male remains practically unchanged.

Colour (in spirit).—Pale greenish brown, almost greyish, becoming slightly rufescent in front. A pair of brownish semi-lunar areas present on the anterior margins of segments 5 to 7, but barely distinguishable as their colour scarcely differs from that of the rest of the under surface of the abdomen.

Length.—About 5 mm.

TARANTULIDAE.

CHARINIDES, gen. nov.

This genus closely resembles *Charinus* (Sim.) Kraep., but differs therefrom in that the foot of each of the walking-legs is four-jointed instead of five-jointed, and that the tibia of the last pair is three-jointed (as in *Catageus*) instead of four-jointed. It is distinguished from *Catageus*, Thor., by the *Charinus*-like arrangement of the spines on the arms.

Charinides bengalensis, sp. nov.

Localities.—This species is abundant among old bricks that have been loosely heaped together in the Museum compound and left alone for several years; I have also found it in similar heaps on some waste land belonging to the Zoological Gardens at Alipur, at the Botanical Gardens at Sibpur, and beside a ruined cottage in jungle at Tollygunge. It is probably therefore abundant throughout Calcutta and its suburbs wherever there is suitable cover for it. I have not yet had much opportunity of looking for it in other parts of Bengal. Dr. Annandale on one occasion found a specimen on the wall of a staircase in the Museum; and we have specimens collected in Calcutta by J. Wood-Mason and B. Aitken, the former probably in 1876 and the latter in 1899.

♂. *Cephalothorax.*—Rostrum small, triangular. Carapace broadly heart-shaped, the anterior margin usually rather prominent and flattened; this margin is armed with six (sometimes seven) spines, two (or three) placed near together in front of the median eyes, and two on each side by the antero-lateral angle. Lateral eyes situated not far from the slightly sinuous antero-lateral margin of the carapace, their distance from the antero-lateral angle being about one-half as great as that from the lateral angle. Postero-lateral margin convex and about one-third of the length of the antero-lateral. Posterior margin excavate, about twice as long as the postero-lateral margin. A somewhat

indistinct furrow extends along the mid-dorsal line of the carapace from the median ocular tubercle to the middle of the posterior margin. Length of carapace in the middle line up to 2.5 mm., maximum breadth up to 3.5 mm.

Abdomen.—Rounded; usually plump.

Arms.—Relatively short in immature specimens and of much greater but somewhat variable length in mature ones; femur up to 5.5 mm. in length. Armature as in the genus *Charinus*.

Walking-legs.—Tarsi four-jointed; first tarsal joint (exclusive of metatarsus) of the anterior, middle, and posterior walking-legs respectively $\frac{1.2}{7.5}$, $\frac{1.3}{8}$, and $\frac{1.4}{8}$ of the total length of the three remaining tarsal joints; the metatarsus scarcely exceeding the sum of the tarsal joints in length.

Colour.—Somewhat brownish below, almost black above except

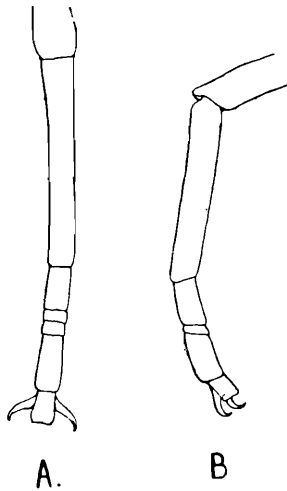


FIG. 2.—Tarsus of last leg of *Charinus* and *Charinides*, $\times 20$.

A. *Charinus seychellarum*, σ .

B. *Charinides bengalensis*, σ .

for the various spines and hairs on the appendages and carapace, the chelicerae, and the sunk margin of and somewhat variable markings on the carapace, which vary from dull reddish to almost black in life, but become much brighter and more conspicuous after the specimen has been soaked in spirit for a short time.

♀ Differs from the male chiefly in having very much shorter arms resembling in their proportions those of immature specimens of both sexes. Femur about 2 mm. in length only.

II.—A PRELIMINARY NOTE ON A NEW SARAX FROM SINGAPORE.

Mr. Ridley, of the Botanical Gardens, Singapore, has very kindly sent me a number of small "scorpion-spiders." They were

found under bricks among dead leaves at the edge of a wood in the gardens and prove to belong to the genus *Sarax*, Sim. Only two species of this genus have as yet been described, *S. sarawakensis*, Thor., recorded from various islands between (and including) the Andamans and the Solomon Isles; and *S. brachydactylus*, Sim., from the Philippines. The specimens sent by Mr. Ridley closely resemble the former species, and but for the presence among them of ovigerous females it would be difficult in the present state of knowledge to be certain that they were distinct; for otherwise, in spite of their uniformity, their maturity might have been doubted. But the fact that ovigerous females from Singapore are only about three-quarters as large (in diameter) as the type of Thorell's Bornean species (concerning the maturity of which, moreover, there appears to have been some doubt) is in itself sufficient to distinguish the two; and this difference is found to be associated with differences in the proportions that the lengths of the several femora bear to the width of the carapace.

The Singapore specimens and Thorell's description of the type of *S. sarawakensis* taken by themselves certainly indicate that full separate specific rank should be accorded to the former; for the differences between the two are quite as great as those between several recognized species of Tarantulidae. But an examination of two specimens of *Sarax* from Borneo (kindly lent by Mr. Moulton of the Sarawak Museum) and one from Narcondam Island (Indian Museum collection) shows clearly the necessity of examining good series of specimens from all possible localities before a satisfactory conclusion can be arrived at, a necessity which is no doubt responsible for the inclusion by previous writers of all forms found between the Andamans and the Solomon Isles (and including Singapore) in the one species *sarawakensis*. Provisionally, therefore, it will probably be most convenient to regard the Singapore form as a geographical sub-species only, in order that the term *sarawakensis* may retain its present broad significance. The Singapore form may then be designated *Sarax sarawakensis*, sub-sp. *singaporeae*, nov., and distinguished from *S. sarawakensis*, Thorell, s. str. by its smaller size and the proportionally shorter femora of its antenniform legs. The following are measurements in millimetres of two ovigerous females of the Singapore form (correct to the nearest half millimetre only):—

Total length.	Length of carapace.	Breadth of carapace.	Length of femur of arms.	Length of femur of 1st (antenniform) legs.	Length of femur of 2nd legs.	Length of femur of 3rd legs.	Length of femur of 4th legs.
5.5	2.0	2.5	1.0	3.5	2.5	3.0	2.5
6.0	2.5	3.0	1.5	4.0	3.0	3.0	3.0

A more elaborate description (with figures) will be published later; and in the meantime the loan of further specimens of *Sarax* from any localities will help me greatly in my attempt to elucidate the various geographical forms of this genus.

V DESCRIPTIONS OF SIX NEW SPECIES
OF SHELLS FROM BENGAL
AND MADRAS.

By H. B. PRESTON, F.Z.S.

Acmaca travancorica, sp. nov.

Shell oval with subcentral apex, pale brownish yellow with occasional blotches of dark purple, sculptured with moderately coarse, radiate riblets crossed by somewhat fine, concentric striae, presenting a slightly cancellate appearance; margin arcuate, finely denticulate by the terminations of the radiate riblets, regularly spotted with purple; interior of shell iridescent.

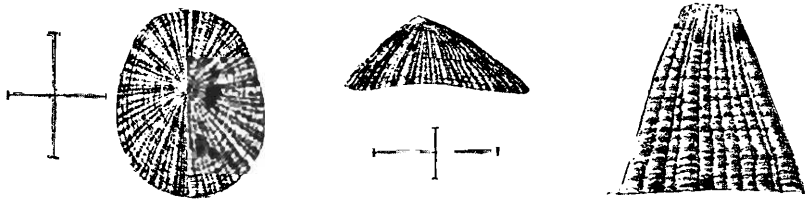


FIG. 1.—*Acmaca travancorica*, sp. nov.

Altitude	..	5 mm.
Diam., major	..	12 „
„ minor	..	16.5 „

Hab.—Vurkalay, Travancore Coast (Dr. N. Annandale): on rock between tide marks. Type in Indian Museum, Calcutta. (M. ⁴⁷⁶³/₁.)

Corbula chilkaensis, sp. nov.

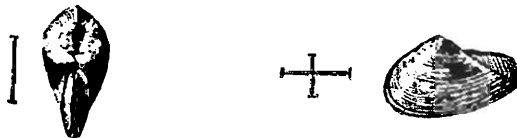


FIG. 2.—*Corbula chilkaensis*, sp. nov.

Shell thin, greyish white, concentrically striate, posteriorly rostrate where it is covered by a blackish, foliaceous periostracum; umboes rather large, but not very prominent, situate one behind the other, a keel descending from these in a posterior direction; right valve somewhat sinuous, especially posteriorly; dorsal

margin sloping posteriorly; ventral margin very gently rounded; anterior side somewhat angularly rounded; posterior side truncate.

Long.	5 mm.
Lat.	8 „

Hab.—Rambha, S. end of Lake Chilka (Dr. N. Annandale): on stones between tide marks. Type in Indian Museum, Calcutta. (M. $\frac{5.2 \pm .9}{1}$.)

Corbicula tribeniensis, sp. nov.

Shell ovately subtrigonal, somewhat inflated, dark brownish olive; umboes rather large, prominent, iridescent; dorsal margin arched; ventral margin gently rounded; anterior side acuminate rounded; posterior side angled above, almost truncate below; both valves very finely and closely striate, covered with a slightly laminiferous periostracum.



FIG. 3.—*Corbicula tribeniensis*, sp. nov.

Long.	8.5 mm.
Lat.	10.5 „

Hab.—Tribeni, near Calcutta (B. L. Chaudhuri): on the edge of the river. Type in Indian Museum, Calcutta. (M. $\frac{5.2 \pm .9}{1}$.)

Modiola annandalei, sp. nov.



FIG. 4.—*Modiola annandalei*, sp. nov.

Shell narrow, curvedly oblong, moderately solid, anteriorly olive, posteriorly dark green, both valves marked with concentric growth lines and sculptured at the anterior extremity and posteriorly with indistinct but fairly regular costulae and markedly angled from the umboes to the posterior side; umboes small, stained with purple, very anteriorly situate; dorsal margin sloping, very slightly arched; ventral margin curved, excavated;

anterior side abruptly rounded; posterior side sloping above, very obtusely rounded below; interior of shell pinkish violet, except for the scars, which are black.

Long. 7 mm.
Lat. 19.75 „

Hab.—Rambha, S. end of Lake Chilka (Dr. N. Annandale): on stones between tide marks. Type in Indian Museum, Calcutta. (M. $\frac{5.2}{1} \pm .1$.)

Modiola celator, sp. nov.

Shell small, convex, subtrapezoidal, slightly curved, dark olive, sculptured at the extreme anterior side and posteriorly with rather coarse, well-defined, radiate riblets; umboes small, flattened, not prominent, very anteriorly situate; dorsal margin



FIG. 5.—*Modiola celator*, sp. nov.

sloping; ventral margin excavated in the middle; anterior side gently rounded; posterior side very obtusely rounded.

Long. 3 mm.
Lat. 7 „

Hab.—Puri Beach, Orissa Coast: in drift wood (Dr. N. Annandale). Type in Indian Museum, Calcutta. (M. $\frac{5.2}{1} \pm .1$.)

Modiola chilkaensis, sp. nov.



FIG. 6.—*Modiola chilkaensis*, sp. nov.

Shell trapezoidal, rather inequivalve, the right valve being more convex than the left, thin, pale green, streaked and spotted with reddish purple, both valves marked with concentric lines of growth and radiately sculptured at the extreme anterior side and posteriorly with somewhat irregular costulae; umboes small, not very prominent, very anteriorly situate; dorsal margin sloping,

somewhat crooked; ventral margin not excavated, also rather crooked; anterior side acuminate rounded; posterior side sloping above, rounded below.

Long.	..	7.5 mm.
Lat.		17.5 ,,

Hab.—Rambha, S. end of Lake Chilka (Dr. N. Annandale): found on stones between tide marks. Type in Indian Museum, Calcutta. (M. ⁵²⁴⁷₁.)

MISCELLANEA.

INSECTS.

REPORT ON A SMALL COLLECTION OF FLEAS FROM INDIA AND CHINA.

[The following report on a small collection of fleas belonging to the Indian Museum has been received from the Hon. Charles Rothschild.]

Pulex irritans, Linnaeus.

1758. *Systema Naturae*, Ed. x, No. 614.
Tengyueh, Yunnan, W. China; ca. 5,400 ft.
Ukhrul, Manipur, Assam; 6,400 ft.
Darjiling, E. Himalayas; 7,000 ft.

Ceratophyllus alladinis, Rothschild.

1904. *Novitates Zoologicae*, vol. xi, p. 632, No. 23, pl. xii,
fig. 53.

Garhwal, W. Himalayas; from *Pteromys inornatus*.

[Described from Sidapur, India; from "small jungle squirrel."]

Xenopsylla nesiotes, Rothschild and Jordan.

1908. *Parasitology*, vol. i, p. 47, No. 10, pls. iii, vi, figs. 3, 4.
Calcutta; from rat (? *Mus rattus*).
[Described from Christmas Island; from *Mus macleari*.]

Xenopsylla pallidus, Taschenberg.

1880. *Die Flöhe*, p. 65, pl. i, fig. 9.
Karachi, Sind, W India; from *Erinaceus collaris*.

Ceratophyllus fasciatus, Bosc.

1800. *Bulletin des Sciences par la Société Philomatique*, ii,
p. 156, No. 44.

Amritsar, Punjab; from various species of rats.

„ „ ; from *Mus rattus*.

Ctenocephalus canis, Curtis.

1826. *British Entomology*, iii, No. 114, figs. A—E × 8.
Amritsar, Punjab.

Below Phagu, Simla Hills, 7,000 ft., Western Himalayas; from sheep.

[Specimens of Mallophaga and of the tick *Haemaphysalis flava*, Neum., were obtained on the same sheep.—N. A.]

Ctenocephalus felis, Bouche.

1835. *Nova Acta Physico-Medica Academiae Caesareae Leopoldino Carolinae Naturae Curiosorum*, vol. xvii, p. 505.

Berhanpur, Murshidabad District, Bengal; from cat.

Calcutta Zoological Gardens; from domestic cat.

„ „ „ ; from *Hyaena striata*.

„ „ „ ; from domestic goat.

Agra, United Provinces; from *Erinaceus grayi*.

Calcutta; from *Canis aureus*.

[Numerous specimens of lice and of a small variety of the tick *Haemaphysalis leachi* (types of var. *indica*, Warburton) were obtained from the same jackal.—N. A.]

Amritsar, Punjab: from *Mus rattus*.

„ „ ; from various species of rats.

Xenopsylla cheopis, Rothschild.

1903. *Entomologist's Monthly Magazine*, 2nd series, vol. xiv, p. 85, pls. i-ii, figs. 3, 9, 12, 19.

Amritsar, Punjab; from *Scotophilus temmincki*.

„ „ ; from *Mus rattus*.

„ „ ; from various species of rats.

N. CHARLES ROTHSCHILD.

SOME FLIES FOUND ASSOCIATED WITH CATTLE IN THE NEIGHBOURHOOD OF CALCUTTA.—By permission of Col. Raymond, C.V.D., the museum collector spent a few days about August 20th of last year (1910) at the Veterinary College, Belgatchia, Calcutta, collecting flies from the cattle there. These have now been identified, mostly by Mr. Brunetti, as shown in the following list:—

On cattle in the open during the day:—

<i>Tabanus albimediis</i> , Wlk.	1 specimen.
<i>Tabanus hilaris</i> , Wlk.	1 „
Oscinidae (not known to suck blood)	3 specimens.
Anthomyid (? <i>Cacosia</i>) (not known to suck blood)	2 „
<i>Stomoxys calcitrans</i> , L.	9 „
<i>Stomoxys indica</i> , Pic. (= <i>limbata</i> , Aust.)	7 „
<i>Liprosia exigua</i> , Meij.	29 „
<i>Liprosia minuta</i> , Bez.	16 „

<i>Philaematomyia insignis</i> , Aust.	185 specimens.
Various species of Muscidae not known to suck blood	60 ,, (abt.)
<i>Hippobosca maculata</i> , Leach (= <i>variegata</i> , W.)	2 ,,
<i>On cattle in the Surra ward during the day:—</i>	
<i>Stomoxys calcitrans</i> , L.	3 specimens.
<i>Stomoxys indica</i> , Pic. (= <i>limbata</i> , Aust.)	46 ,,
<i>Stomoxys</i> , sp. (possibly <i>calcitrans</i> , L.)	2 ,,
<i>Philaematomyia insignis</i> , Aust.	1 specimen.
<i>Pristirhynchomyia lincata</i> , Brun.	2 specimens.
<i>On cattle in the open at night:—</i>	
<i>Culex</i> ? <i>microannulatus</i> , Theob., ♀	7 specimens.
<i>Leucomyia gelida</i> , Theob., ♀	7 ,,
<i>Mansonioides annulifera</i> , Theob., ♀	5 ,,
<i>Liperosia exigua</i> , Meij.	10 ,,
<i>On cattle in general ward at night:—</i>	
<i>Procladius fuscusignatus</i> , Kief. (not known to suck blood)	1 specimen.
<i>Hippobosca maculata</i> , Leach (= <i>variegata</i> , W.)	2 specimens.

F. H. GRAVELY.

MOSQUITO SUCKED BY A MIDGE.—Early in December, 1910, when some of the officers of the Indian Museum visited Port Canning in the Sunderbunds, we found a mosquito (*Myzomyia rossii*) on one side of whose abdomen a small Chironomid fly was seated, evidently imbibing nourishment from it. So tight was its hold that it retained its position when put into spirit, and it was successfully “cleared” *in situ*. The proboscis of the Chironomid—which appears to belong to the genus *Culicoides*—was then seen to be well embedded in the tissues of the mosquito, removing all doubt as to the object of the association of the flies together. The mouth parts of the *Culicoides* very closely resemble in structure those of the well-known blood-sucking fly *Simulium indicum*, Beecher, ♀; much more so than they do those of either sex of a species of the closely allied genus *Ceratopogon* I have examined which probably feeds on vegetable juices. Probably the *Culicoides* sucks mammalian blood, and was taking it second-hand from the mosquito.

F. H. GRAVELY.

LARGE EGG LAID BY A BEETLE.—Towards the end of last October (1910), the museum collector obtained at Marikuppam near Kolar, Mysore, a living specimen of the Buprestid beetle *Sternocera dasypleura*, Koll. This specimen was placed in a cyanide killing-bottle, but before it died it produced an egg, ovate

in shape, and 8.5 mm. long by 5.5 mm. broad, the beetle itself being 43 mm. long by 16.5 mm. broad. The superficial covering of the egg is of a somewhat leathery consistency, and is whitish in colour.

F. H. GRAVELY.

Part V.—Revision of the Oriental Leptidæ. Revised and annotated Catalogue of Oriental Bombylidæ, with descriptions of new species.

Vol. III, 1909.

Part I.—The Races of Indian Rats.

Part II.—Notes on Freshwater Sponges, X. Report on a collection of aquatic animals made in Tibet by Capt. F. H. Stewart in 1907, II. Note on some amphibious Cockroaches. Description de quelques nouvelles Cécidomyies des Indes. Description of new land and marine shells from Ceylon and S. India. Description of two new species of *Caranx* from the Bay of Bengal. Remarks on some little known Indian Ophidia. Remarks on some forms of *Dipsadomorphus*. A pelagic Sea-Anemone without tentacles. Rhynchota Malayana, II.

Part III.—Notes on the Neuroptera in the collection of the Indian Museum. New Indian Leptidæ and Bombylidæ, with a note on *Comastes*, Os. Sac., v. *Heterostylum*, Macq. Notes on the Trichoptera in the collection of the Indian Museum. Diagnoses of new species and varieties of Freshwater Crabs, 1—3. Report on a small collection of Lizards from Travancore. Descriptions of three new Cicindelinae from Borneo. The relation between fertility and normality in Rats. Description of a Barnacle of the genus *Scalpellum* from Malaysia. The Hemipterous family Polyctenidæ. Notes on Freshwater Sponges, XI. Descriptions of two new shells from S. India. Preliminary note on a new genus of Phylactolæmatous Polyzoa. Miscellanea.

Part IV.—Description of a minute Hymenopterous insect from Calcutta. The Insect Fauna of Tirthut, No. 1. Descriptions of new species of *Botia* and *Nemachilus*. New Oriental Sepsinæ. A new species of *Fredericella* from Indian lakes. Diagnoses of new species and varieties of freshwater crabs, No. 4. On some new or little-known Mygalomorph spiders from the Oriental region and Australasia.

Vol. IV, 1910-1911.

No. I.—Second report on the collection of Culicidæ in the Indian Museum, with descriptions of new genera and species.

Nos. II and III.—The Indian species of Papataci Fly (*Phlebotomus*). Taxonomic values in Culicidæ.

No. IV.—Revision of the Oriental blood-sucking Muscidæ (*Stomoxinæ*, *Philæmatomyia*, Aust., and *Pristirhynchomyia*, gen. nov.).

No. V.—A new arrangement of the Indian Anophelinæ.

No. VI.—A revision of the species of *Tabanus* from the Oriental Region, including notes on species from surrounding countries.

Vol. V, 1910.

Part I.—The Hydroids of the Indian Museum, I. Notes on Freshwater Sponges, XII. Descriptions of new Shells in the collection of the Indian Museum from Burma, Siam and the Bay of Bengal. Materials for a revision of the Phylactolæmatous Polyzoa of India. Studies on the aquatic Oligochaeta of the Punjab. An undescribed Burmese Frog allied to *Rana tigrina*. Miscellanea.

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Vol. I, 1907.

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- Part III.*—Report on the Marine Polyzoa in the collection of the Indian Museum. The Fauna of Brackish Ponds at Port Canning, Lower Bengal, VI. A third note on Earwigs (Dermaptera) in the Indian Museum, with the description of a new species. Notes on Oriental Diptera, III. Description of a new snake from Nepal. Notes on a collection of marketable fish from Akyab, with a description of a new species of *Lactarius*. Description of two freshwater Oligochæte Worms from the Punjab. Notes on Phosphorescence in Marine Animals. Notes on the rats of Dacca, Eastern Bengal. Notes on Freshwater Sponges, I—V. Miscellanea.
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Vol. II, 1908-1909.

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- Part II.*—Gardiens du Musée Indien. The Fauna of Brackish-Ponds at Port Canning, Lower Bengal, IX. Description of a new species of *Danio* from Lower Burma. Rhynchota Malayana, I. *Cimex rotundatus*, Signoret. Notes on Freshwater Sponges, IX. Fruit Bats of the genus *Pteropus* inhabiting the Andaman and Nicobar Archipelagos. A new species of Sun-Bird obtained near Darjiling. Three Indian Phylactolemata. On two new species of Eagle-Rays (Myliobatidæ). Description of a new species of the genus *Sesarma*, Say., from the Andaman Islands. Descriptions of new species of Land, Marine, and Freshwater Shells from the Andaman Islands.
- Part III.*—The Fauna of Brackish Ponds at Port Canning, Lower Bengal, X, XI. On some Oriental Solifugæ with descriptions of new forms. The difference between the Takin (*Budorcas*) from the Mishmi Hills and that from Tibet, with notes on variation displayed by the former. On *Caridina nilotica* (Roux) and its varieties. Description of a new species of *Charaxes* from the Bhutan Frontier. First Report on the Collection of Culicidæ and Corethridæ in the Indian Museum, with descriptions of new genera and species. Miscellanea.
- Part IV.*—Report on a collection of aquatic animals made in Tibet by Capt. F. H. Stewart in 1907, I. Notes on Aculeate Hymenoptera in the Indian Museum, I. Indian Psychodidæ. Description of a new species of mouse from the Madura District, Madras. Some Cleridæ of the Indian Museum. The Fauna of Brackish Ponds at Port Canning, Lower Bengal, XII. Description of a new species of Saw-Fish captured off the Burma Coast. A new Sting Ray of the genus *Trygon* from the Bay of Bengal. New Micro-lepidoptera from India and Burma. Notes on some Chrysomelid Beetles in the collection of the Indian Museum. Six new Cicindelidæ from the Oriental Region. Description of a new slug from Tibet.