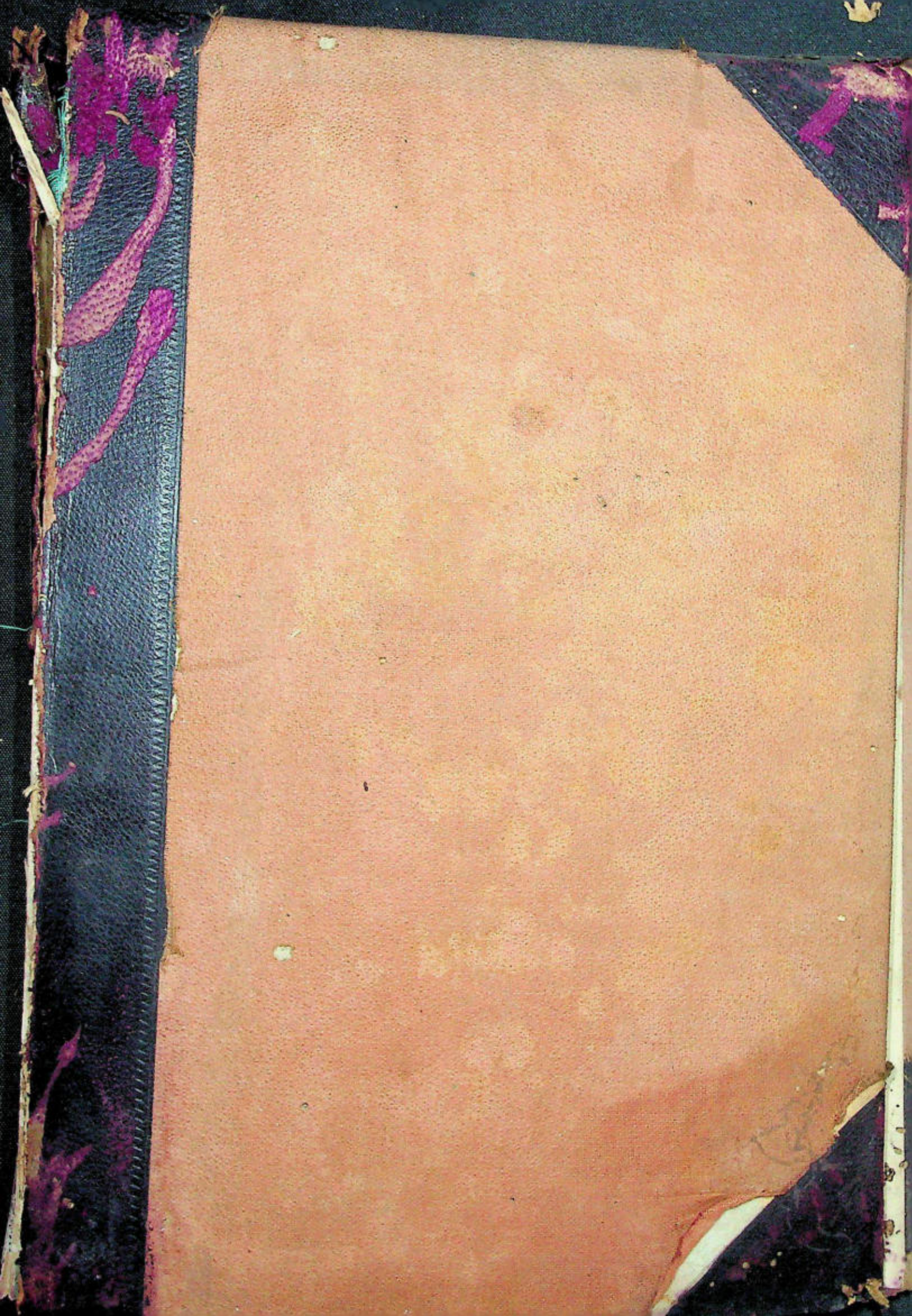




RECORDS



of the

INDIAN MUSEUM

(A JOURNAL OF INDIAN ZOOLOGY)

Vol. VI, 1911.

EDITED BY

THE SUPERINTENDENT

OF THE

INDIAN MUSEUM.

Calcutta :

PUBLISHED BY ORDER OF THE TRUSTEES OF THE INDIAN MUSEUM,
BAPTIST MISSION PRESS.

—
1912.

9119115
M88



Acc. no. P696
Dt. 15/5/67

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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 of *Thalamita zeylandica* from the Andamans (*Proc. Zool. Soc. London*, 1871, p. 144).

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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* (Galatheidæ) 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

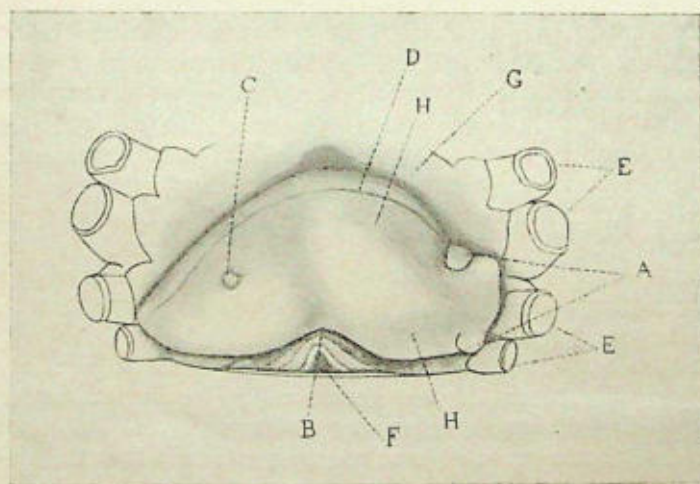


FIG. 1.—Type specimen of *Sesarmaxenos monticola*, $\times 4$. A = orifices; B = point of attachment; C = (?) sensory pit; D = line marking separation between ovaries; E = bases of ambulatory limbs of host; F = base of abdomen (which has been removed) of host; G = ventral surface of carapace of host; 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 $\frac{1}{2}$ 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

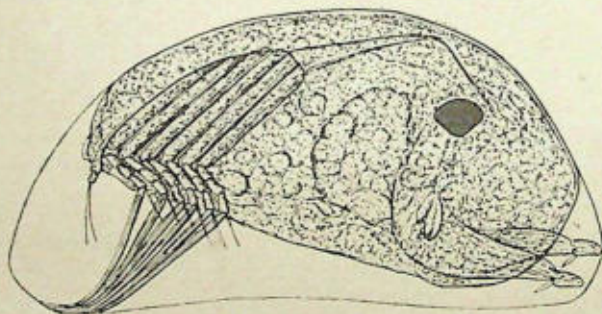


FIG. 2.—Advanced larva from brood-pouch of *S. monticola*, $\times 450$

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 0.149 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 $\times$ 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 *Aegeon* 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 Callinassidae, 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).

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

P. chiltoni, sp. nov.

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. 1029-30.)

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 51×33 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. 92+3.)

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. victoriensis*, 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 *Aegeon*, 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.

- 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. challenger*, 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. juncus*, 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. modumanuensis*, 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).

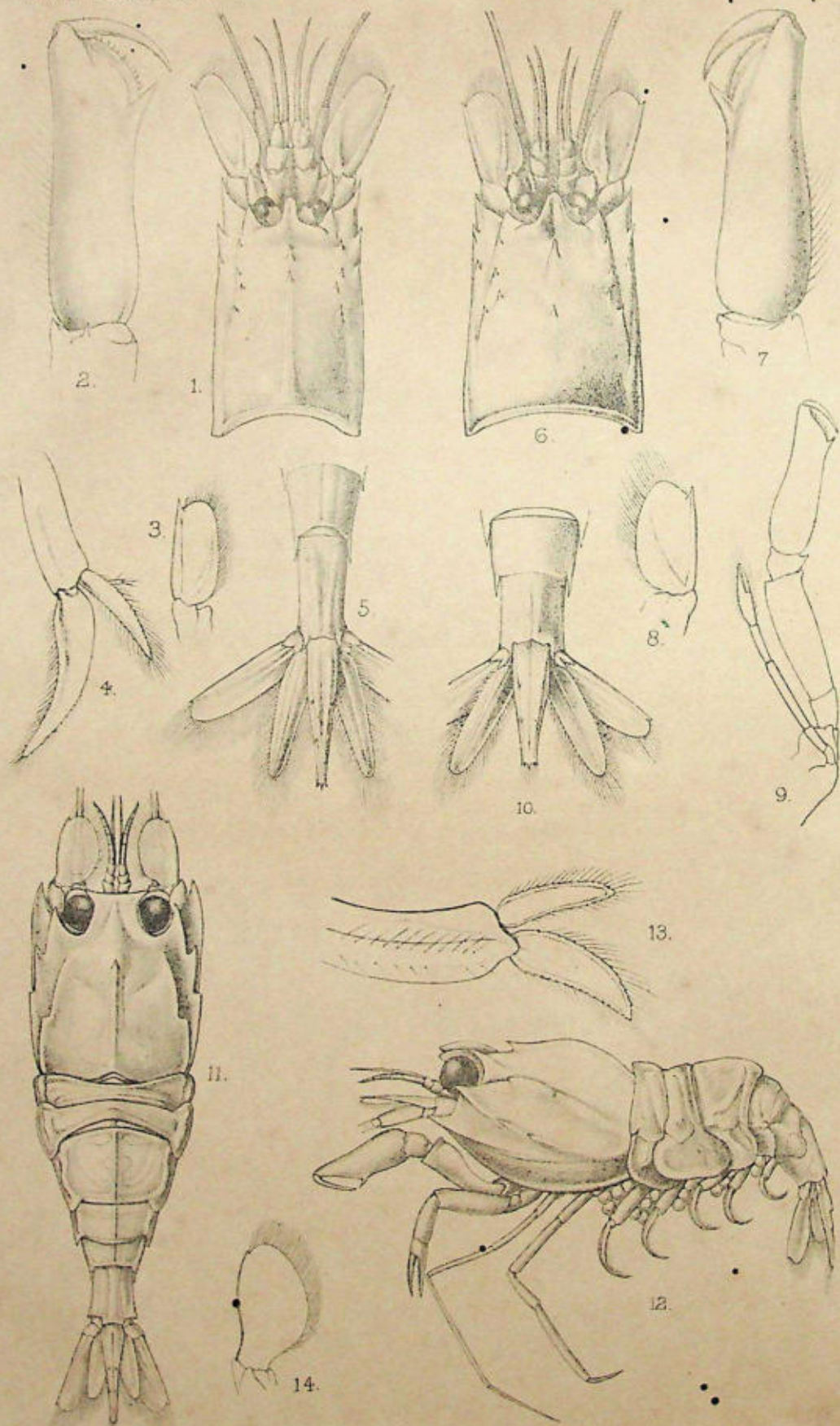
- FIG. 1.—Carapace of an ovigerous female in dorsal view, $\times 4$.
,, 2.—Propodus and dactylus of first peraeopods, $\times 8$.
,, 3.—Antennal scale, $\times 4$.
,, 4.—Third pleopod, $\times 8$.
,, 5.—Last two abdominal somites and caudal appendages, $\times 4\frac{1}{2}$.

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.

• 5. *Pontophilus australis*.

11-14. *Pontophilus subaecheta*.

6-10. *Pontophilus chiltoni*.

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 hybiscoides*, 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.

Hub.—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.

Teeth.—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, Sikkim 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 $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $3\frac{2}{3}$ to $3\frac{1}{2}$, length of middle (shortest) rays of caudal fin 9 and outer (longest) rays $4\frac{3}{4}$ 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 $1\frac{1}{2}$ 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 $1\frac{1}{2}$ times in the length of the maxillary and $4\frac{1}{2}$ 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, $3\frac{1}{2}$ 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. $\frac{49.50}{1}$ is a mature female, 102 mm. in length with caudal; F. $\frac{49.52}{1}$, female big in roe, 154 mm., total length with caudal; F. $\frac{49.53}{1}$, total length 133 mm (damaged); and F. $\frac{49.56}{1}$ 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 Sikkim, 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*, $4\frac{3}{4}$ in *B. yunnanensis*, $3\frac{3}{4}$ in *B. grahami* and $3\frac{3}{4}$ in *B. clavatus*, while it is $3\frac{3}{8}$ to $3\frac{1}{2}$ 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*, $\frac{1}{2}$ in *B. yunnanensis* and nearly $\frac{1}{2}$ 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. *Rohtec 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 Yungpëting 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 $3\frac{2}{3}$ 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.— $4\frac{2}{3}$ diameters in the length of head, $1\frac{2}{3}$ 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 $1\frac{2}{3}$ 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 $1\frac{1}{2}$ 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 $\frac{1}{2}$ 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 $1\frac{1}{2}$ 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 seenghala* (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 $2\frac{3}{5}$ 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 $1\frac{1}{2}$ 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 $\frac{1}{3}$ 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 $1\frac{1}{2}$ 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	$3\frac{1}{2}$ — $4\frac{1}{2}$	$5\frac{1}{4}$ — $5\frac{1}{2}$	5	$3\frac{1}{2}$ — $3\frac{3}{4}$
Height of body in the total length	$5\frac{1}{4}$ — $5\frac{1}{2}$	5	5	$3\frac{1}{2}$
Length of head in diameter of eye	5— $6\frac{1}{2}$	$4\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$ — $4\frac{1}{2}$
Length of dorsal spine in the length of head ..	$1\frac{1}{2}$ — $1\frac{3}{4}$	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 $1\frac{1}{2}$ 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. OPHIOCEPHALIDAE.

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.

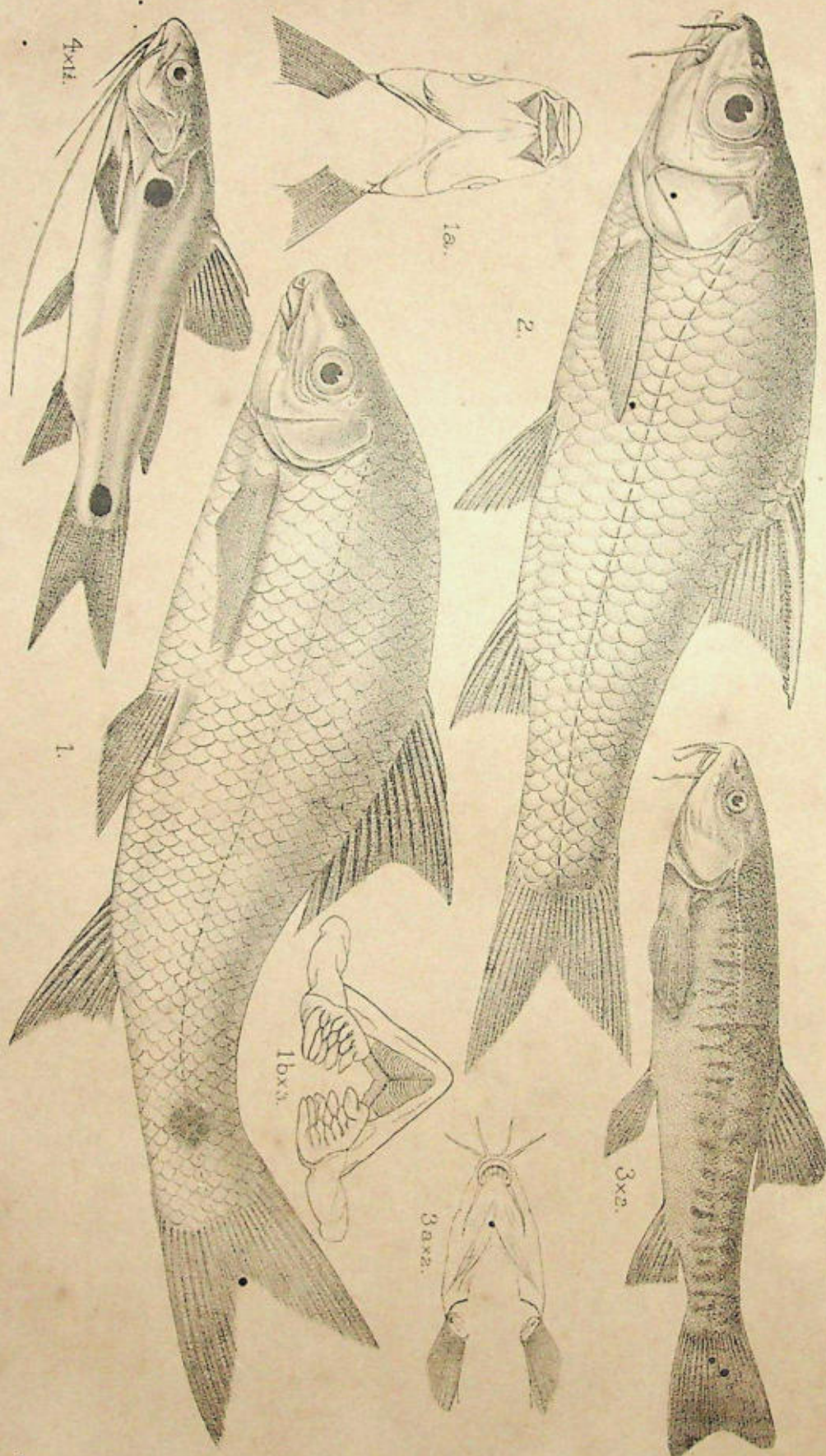
LIST OF FISHES ALREADY REPORTED FROM THE PROVINCE OF
YUNNAN AND ITS IMMEDIATE NEIGHBOURHOOD.

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

11. *Cirrhinna mrigala* (Ham. Buch.).
 12. *Catla buehanani*, Cuv. and Val.
 13. *Barbus sarana* (Ham. Buch.).
 14. „ *apogon*, Cuv. and Val.
 15. „ *margarianus*, Day.
 16. „ *tör* (Ham. Buch.).
 17. „ *grahami*, Regan.
 18. „ *yunnanensis*, Regan.
 19. *Achilognathus barbatulus*, Günther.
 20. *Barilius interrupta*, Day.
 21. „ *polylepis*, Regan.
 22. „ *andersoni*, Regan.
 23. *Rohtee 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 mento*, 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 javanensis*, Lacep.
 41. *Ophiocephalus 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.—*Macrones 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. nikaca*, Moore, prevailing in the Western Himalayas.

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

The Pieridae include—

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

Pieris melete, 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 déviant 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 tarses, 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 pince 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 Nemocera. 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

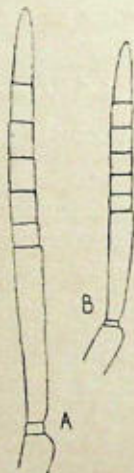


FIG. 1.—Foot of first leg of *Schizomus (Trithyreus) lunatus*, sp. nov., $\times 40$.
A. Male.
B. Female.

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 semilunar 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 $\frac{1}{2}$, $\frac{1}{2}$, and $\frac{1}{2}$ 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

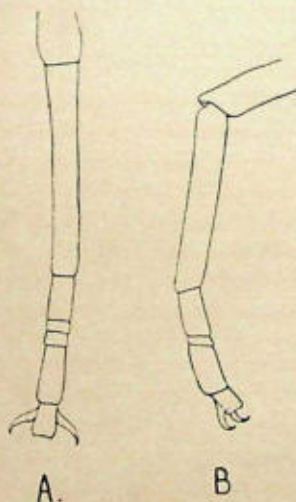


FIG. 2.—Tarsus of last leg of *Charinus* and *Charinides*, $\times 20$.

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.

φ . 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.

Acmaea 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.

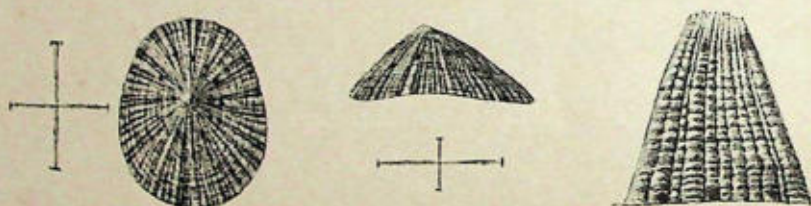


FIG. 1.—*Acmaea travancorica*, sp. nov.

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.)

Corbula chilkaensis, sp. nov.

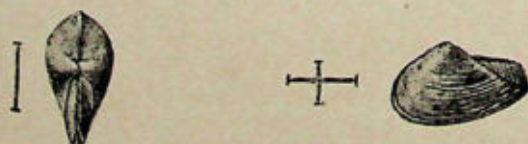


FIG. 2.—*Corbula chilkaensis*, sp. nov.

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. $\frac{5.2 \times 4.9}{1}$.)

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.

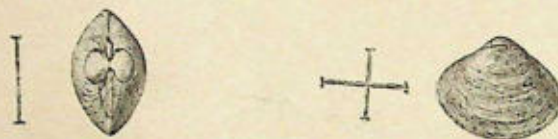


FIG. 3.—*Corbicula tribeniensis*, sp. nov.

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. $\frac{5.2 \times 5.0}{1}$.)

Modiola annandalei, sp. nov.

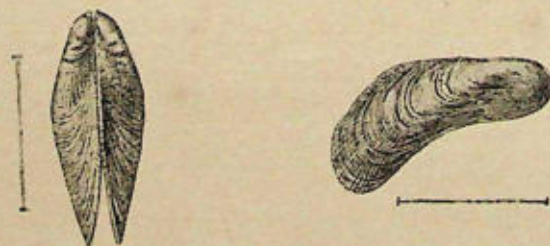


FIG. 4.—*Modiola annandalei*, sp. nov.

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. $\frac{5.2.5.3.1}{1}$.)

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

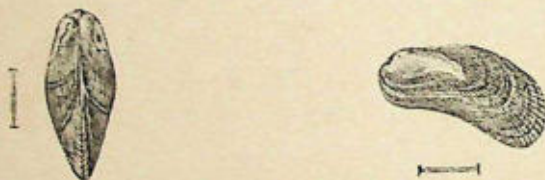


FIG. 5.—*Modiola celator*, sp. nov.

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. $\frac{5.2.4.5}{1}$.)

Modiola chilkaensis, sp. nov.

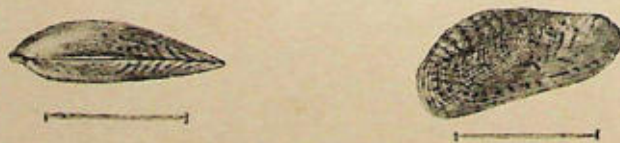


FIG. 6.—*Modiola chilkaensis*, sp. nov.

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. 5287.)

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 nesiotis, 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 $\times$ 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.

Berhampur, 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 temminckii*.

„ „; 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 hiliaris</i> , Wlk.	..	..	1 „
Oscinidae (not known to suck blood)	..	..	3 specimens.
Anthomyid (? <i>Caenosia</i>) (not known to suck blood)	..	..	2 „
<i>Stomoxys calcitrans</i> , L.	..	..	9 „
<i>Stomoxys indica</i> , Pic. (= <i>limbata</i> , Aus.)	..	..	7 „
<i>Liperosia exigua</i> , Meij.	..	..	29 „
<i>Liperosia 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 „

On cattle in the Surra ward during the day:—

<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 lineata</i> , Brun.	..	2 specimens.

On cattle in the open at night:—

<i>Culex ? microannulatus</i> , Theob., ♀	..	7 specimens.
<i>Leucomyia gelida</i> , Theob., ♀	..	7 „
<i>Mansonioides annulifera</i> , Theob., ♀	..	5 „
<i>Liperosia exigua</i> , Meij.	..	10 „

On cattle in general ward at night:—

<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 Canining 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.

VI. SOME SPONGES ASSOCIATED WITH GREGARIOUS MOLLUSCS OF THE FAMILY VERMETIDAE.

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

Among the most interesting of the specimens received at the Indian Museum as a result of the work of the trawler "Golden Crown" in the Bay of Bengal are a number of rocky masses consisting of the contorted and worm-like shells of molluscs of the family Vermetidae embedded in sponges. Unfortunately they did not reach us until they had been exposed to the air for some days and were in a dry or putrid condition, and only a few broken fragments were preserved in spirit; but as they offer material for certain observations and speculations of a general as well as a taxonomic nature I have prepared the following notes regarding them.

I.—GENERAL.

The masses received at the Museum can be readily separated into two series, one consisting of shells with strongly serrated external ridges and of sponges of an intense black colour and only of moderate hardness, the other of much smoother shells embedded in sponges that are of stony hardness and either of variegated grey and purple or of some shade of red, orange or yellow.

The masses of the first kind were apparently taken only off Gopalpur in the Ganjam district of Madras at depths between 30 and 38 fathoms. Only three specimens were sent us, but probably more were brought up in the trawl and thrown away. A description of the largest and most perfect specimen preserved (pl. viii, fig. 1) will apply equally well, so far as general characters are concerned, to the others also.

The mass is roughly heart-shaped, measuring 40.8 cm. in length, 40.8 cm. in greatest breadth and 16.6 cm. in depth, and weighing 9 lb. 15 oz. dry. It is possible to distinguish the upper from the basal surface by the fact that the shells open, in a more or less horizontal direction, on the former; the latter is irregular but nearly flat as a whole, there is no sign of it having been attached to any foreign object and the mass appears to be complete in itself, not merely a part of a larger mass. The shells, of which several hundreds are present, appear to radiate outwards from a number of different centres, but each is twisted and contorted in a manner different from its neighbour, although the main course of all is

horizontal rather than vertical. Although they do not actually twine round one another, they are so confused in their twistings that it is impossible to isolate a single shell from the mass; the length of the longer shells, measured along their loose and irregular whorls, would be considerable, if it could be accurately measured.

It is not my intention to give a technical description either of this shell or of the other Vermetidae mentioned in these notes, for they all represent well-known species and are admirably figured by Reeve in vol. xx of his *Conchologia Iconica*. Mr. H. B. Preston has identified the ridged species as *Siliquaria muricata* (Born.), but this species is believed by some authorities to be synonymous with *S. anguina* (Linn.). The mollusc is, in any case, widely distributed in Indo-Pacific seas.

The sponge associated with our specimens of *S. muricata* is identical with a species recently described from the Gulf of Manaar by Dendy under the name *Spongisorites topsenti*. The original specimens were not associated with *Siliquaria* shells, but one of them had grown over calcareous nodules and it is probable that the sponge makes use of any suitable support, living or dead, in its growth. As I have already stated, the colour of the specimens before me is an intense black. These specimens are dry, and there is evidence that they were dark green when fresh. The shells are of a dirty white, so that there is considerable contrast between them and the sponge. The latter fills up the spaces between the shells and covers the greater part of the base of the mass but leaves the distal part of the shells free, as a rule for several inches. As it possesses no definite skeleton, the sponge would not persist for long after its death, for the spicules to which its hardness is due would soon fall apart.

The masses of the second series may be further divided into two groups. At first sight they resemble one another closely as regards structure but are easily distinguished by colour. A closer examination, however, reveals the fact that colour is associated with structural peculiarities, and that we are dealing with different species of shell and with sponges that exhibit certain idiosyncrasies correlated with those of the shells with which they are associated. In those masses in which the sponge is red, yellow or orange, the shell is extremely delicate and fragile, has a lustrous appearance and is at no point tightly coiled, while the sponge is not very massive. In those in which the sponge is grey diversified with purple the molluscs have thicker shells which lack the lustre of those in the other masses and are more tightly coiled, while the sponge is more compact. The shells of the first kind have been identified by Mr. Preston as those of *Spiroglyphus cummingi* (Mörch), a species originally described from the Philippines; those of the second kind he has named *Siliquaria cochlearis*, Mörch, this species having originally been described from Ceylon.

It will be convenient in the following notes to refer to the denser masses as the *Siliquaria*-masses, to the others as the *Spiroglyphus*-masses; but it should be noted that *Siliquaria* and

Spiroglyphus are closely allied groups of species which many authorities recognize only as subgenera.

The sponges associated with these shells must be regarded as varieties of a species originally described by Carter from the Gulf of Manaar under the name *Discodermia sceptrifera* and now assigned to the genus *Racodiscula*. Those that help to form the *Siliquaria*-masses are hereafter described as the types of the new variety *siliquariae* of the species, those associated with the *Spiroglyphus* as the types of the new variety *spiroglyphi*. The two varieties differ not only in colour and compactness but also as regards certain details of spiculation.

The *Spiroglyphus*-masses must have when fresh a very gorgeous appearance, the sponge being red or orange, the shells of a delicate pink and the body of the molluscs yellow. The largest of the specimens (pl. viii, fig. 2), of which a considerable number were obtained, measures about 47·4 cm. by 38·6 cm. by 18 cm. (the last measurement being that of the depth), weighs (dry) nearly 22 lb. and has a regular oval or wreath-shaped form (pl. viii, fig. 2). The smallest, which is very irregular in outline, measures 17·5 cm. by 14·5 cm. by 7·5 cm. In the centre of each mass there is usually either a concavity at the base or an empty space extending from the base through to the upper surface. This concavity probably represents that formerly occupied by the object to which the *Spiroglyphus* shells originally attached themselves on quitting their active larval life—in one specimen this object remains in the form of an oyster-shell, in another in that of the shell of a gastropod; for there is evidence that molluscan shells when not occupied by a living animal dissolve rapidly in the Bay of Bengal, even in shallow water. "Dead" shells (to use a conchologist's phrase) from the Bay are usually very "dead," their surface being much corroded; and immediately north of the area on which the *Spiroglyphus*-masses occur, the bottom of the sea is coated with a recent conglomerate formed of partially dissolved shells consolidated with sand-grains into a layer of stony hardness. Most of the *Spiroglyphus*-masses seem from their regular outline to be complete in themselves, but some of the smaller specimens appear to have once formed parts of wreath-shaped masses which have been broken by some accident and have repaired the actual fracture in the course of growth. The collection offers no proof of the existence of masses larger than the larger one of which the measurements are given.

The *Siliquaria*-masses are not so numerous as the *Spiroglyphus*-masses and must have been much less conspicuous objects when fresh. None of our specimens appear to be complete, for all are irregular in form and show evidence of being merely fragments of larger masses. The largest fragments obtained are about half the size of the largest *Spiroglyphus*-masses. While the *Spiroglyphus* shells radiate more or less distinctly from a common centre, run mainly in a horizontal direction and have a very open and irregular spiral, those of *Siliquaria cochlearis* are coiled in almost

regular snail-shell fashion in their oldest portion, and although they become uncoiled and very irregularly spiral in their distal parts, adopt a course much nearer the vertical than that adopted by *Sp. cummingi*. The shell is thicker and stouter than that of the *Spiroglyphus*. The difference in growth between the two shells appears to produce or at any rate to be correlated with structural differences in the sponge associated with them, for there can be no doubt that the same *species* of sponge is associated with both molluscs.

Unfortunately our data as regards the *provenance* of the two species of shell with their associated varieties of sponge are not sufficiently precise for it to be possible to say whether they affected habitats in any way diverse. All that we know is that both species are common in an area that extends in a southerly direction from opposite Gopalpur on the coast of the Ganjam district at least to the neighbourhood of Vizagapatam, and that they are found in depths of between 15 and 30 fathoms.

The sponge *Racodiscula sceptrellifera* belongs to the Tetractinellid grade Lithistida, which is characterized by the possession of much proliferated spicules (primarily of the Tetractinellid type) welded together to form a compact siliceous skeleton. This skeleton, even after the death of the sponge, can be broken up only by the exercise of considerable violence.

It is probable that the masses, with which this paper deals, will be of considerable interest to the geologists of some future epoch, when the bottom of the Bay of Bengal has become dry land, if there be geologists then. This is especially the case as regards those masses in the formation of which *Racodiscula* plays a part, for, "The Lithistids are peculiarly well suited for preservation, owing to the massive, stony character of their skeletons; and their remains occasionally form thick deposits, especially in the Jurassic and Cretaceous." (Zittel's *Text-Book of Palaeontology*, vol. i, p. 47, Engl. ed., 1900.) We have no evidence, however, that the combined growth of the shells and the sponges is producing in Indian seas, reefs at all comparable to those now being formed by Vermetid shells alone off the coast of Florida. These reefs are described by Dall¹ as being of sufficient size for boats to be wrecked upon them at low tide, and as covering very large areas. But it is evident that masses of considerable weight and stability, and possibly larger than any that have as yet been examined, are being produced in enormous numbers off the coast of the Ganjam and Vizagapatam districts of the Madras Presidency. From a practical point of view these masses would interfere seriously with trawling operations off this coast, for the net of the "Golden Crown" was seriously damaged by them on more than one occasion; from a zoological point of view they seem to be characteristic of a definite faunistic area of somewhat limited

¹ Bull. Mus. Zool. Harvard, xviii, p. 262 (1889).

extent. Northwards the fauna they represent gives place to one consisting largely of sedentary organisms such as Alcyonaria and Antipatharia fixed to the recent conglomerate to which reference has already been made. Still further northwards, all round the head of the Bay, only those animals can exist which can endure muddy water and can live without a solid surface of attachment. Southwards the *Siliquaria*-beds are replaced, in the more sheltered and probably salter waters of the Gulf of Manaar, by coral reefs.

From a strictly biological point of view it is interesting to notice that neither of the two species of sponges found associated with the three species of Vermetidae is peculiar to these shells or, indeed, to a habitat or manner of life similar to that implied by the mollusc's peculiar method of growth. In two cases out of three, however, the sponge appears to be modified to some extent by the peculiarities of the shell with which it is associated, or at any rate in accordance with these peculiarities.

Several other organisms were found in large or considerable numbers and in some degree associated with the shells and sponges. Dead shells (of which there were a considerable number in some masses) of both *Siliquaria cochlearis* and *Spiroglyphus cummingi* were often inhabited by the peculiar little hermit-crab *Troglopagurus manaarensis*,¹ hitherto only known to frequent holes in corals in the Gulf of Manaar. A small bivalve mollusc (*Arca domingensis* var. *divaricata*) was also found in considerable numbers in dead shells of the two species, anchored to the inner surface by a byssus of horny consistency, while specimens of a larger species of the same genus (*A. adamiana*) were found in interstices of the sponges and between the shells. Sedentary organisms were not so numerous on the external surface of the masses as might perhaps have been expected, but a considerable number of small monaxon sponges and a few polyzoa occurred in this position and shells of the bivalve *Chama ruppellii* were common.

II.—DESCRIPTION OF THE SPONGES.

The sponges here described belong to two grades of the order Tetraxonida, namely the Lithistida and the Monaxonellida, if we adopt the nomenclature proposed by Prof. Dendy in his account of the sponges in part iii of Prof. Herdman's report on the pearl-fisheries of Ceylon; for two of the three forms found in association with *Siliquaria* shells off the Madras coast represent varieties of a species of *Racodiscula* (Lithistida) originally described by Carter from the Gulf of Manaar, while the third represents a species of *Spongosorites* (Monaxonellida) also described from the Gulf of Manaar, by Prof. Dendy in the report to which reference has just been made.

¹ Dr. J. R. Henderson, the author of the species, has been kind enough to identify specimens.

Racodiscula sceptrellifera (Carter).

Discodermia sceptrellifera, Carter, *Ann. Mag. Nat. Hist.* (5), vol. vii, p. 372, pl. xviii, fig. 2 (1881).

Racodiscula sceptrellifera, von Lendenfeld, *Das Tierreich*, Lief. 19 (Tetraxonia), p. 132 (1903).

Carter's description of this species was based on a specimen "not only small but imperfectly developed" and partially embedded in a nodule of the calcareous alga *Melobesia*. It is therefore unfortunate that the form he described must be regarded as the *forma typica* of the species. Among the specimens obtained by the "Golden Crown" two other forms may be distinguished, each associated in several or many instances with a particular species of *Siliquaria* or *Spiroglyphus*. Possibly they are mere phases, their peculiarities being due to the direct effects of environment, but it will be convenient to regard them provisionally as varieties of Carter's species, with which I have no doubt they should be associated.

Var. *spiroglyphi*, nov.

(Plate viii, fig. 2; plate ix, figs. 1—15.)

Sponge of a deep orange or bright red colour when fresh, yellow when dry, coating and filling the interstices between shells of *Spiroglyphus cummingi* (Mörch), often massive, but without definite form, very hard; the surface smooth, with scattered oscula of oval form and varying from 2×2.5 mm. to 3×4 mm. in dried specimens; pores sieve-like, scattered, minute, each aperture measuring about 0.33×0.5 mm. The main efferent channels run as a rule obliquely. The surface of the sponge, immediately under the dermal layer, is scored with narrow channels which enter the efferent canals close to the oscula. The lining of the latter is a collenchyma which is sometimes as much as 3 mm. thick and consists of numerous nuclei embedded without visible cell-limits in a gelatinous substance. This substance is not destroyed even by hot nitric acid, at any rate without prolonged boiling. Slender fibres can be detected in parts of the collenchyma, running vertically. (My material is not sufficiently well preserved to render a detailed description of the soft parts possible.)

Skeleton and Spicules.—The skeleton consists of stout desmas (pl. ix, figs. 8—14) of the typical form firmly welded together by means of the proliferations at the ends of the branches. The shafts are smooth or nearly so. Where the sponge is in contact with the shells with which it is associated the tips are flattened and splayed out in a horizontal plane. Towards the external part of the sponge, where growth is evidently most active, many of the desmas afford a transition, more apparent than real, to the phyllotriaene dermal spicules (pl. ix, figs. 8, 9; see also Carter, *op. cit.*, pl. xviii, fig. 2e). Their shafts are more slender, their terminal proliferations less developed than in other desmas, and often

one cladus is less well developed than the other three. They can always be distinguished, however, from true phyllotriaenes by the fact that in the former this cladus, although apparently vertical in direction and often only a little proliferated at the tip, has never the regular pointed form of the vertical spike of the phyllotriaene. I have no doubt that these "intermediate" desmas are simply young spicules that have not yet become firmly united with their fellows. The true phyllotriaenes are entirely confined to the external surface, on which they form a single reticulate layer, the branches of different spicules overlapping at the extremities and the spike pointing vertically downwards. The subdermal channels lie directly under this layer and the spikes project into their lumen. I have not found any of the discoidal forms figured by Carter, *op. cit.*, pl. xviii, figs. 2a, 2b; but spicules agreeing with his figs. 2c and 2d are abundant in my preparations (pl. ix, figs. 4-7). Possibly the discoidal spicules are only found in young or stunted sponges. The most noteworthy difference between Carter's specimens and those of this variety is the apparent absence in the former of the slender rhabdi that form a conspicuous feature in the latter. These rhabdi vary greatly in length but are always very slender, the longest measuring 0.9 mm. $\times$ 0.007 mm. They are not inflated in the middle or at the ends and their tips are bluntly pointed, but one end is often stouter than the other. The longer specimens are sinuous and hair-like. These rhabdi lie in a more or less vertical position in the interstices of the skeleton, and more especially in the walls of the efferent canals, sometimes forming loose strands in the latter situation. They do not project on the surface of the sponge. The microscleres (pl. ix, fig. 15) are somewhat irregular amphiasters with a circle of spines round the shaft; but the spines are often asymmetrical in form and disposition. The spicules measure about 0.01 mm. in length and 0.006 mm. in greatest breadth. The amphiasters are found chiefly in the dermal layer, in which they are densely scattered.

Habitat.—Off the coast of the Ganjam and Vizagapatam districts of the Madras Presidency in 15 to 30 fathoms: associated with *Spiroglyphus cummingi* (Mörch).

Var. *siliquariae*, nov.

(Plate ix, figs. 16-18.)

Sponge denser and more massive than that of var. *spiroglyphi*, of a dull grey colour diversified with large spots which are of a deep purple colour and have irregular but well-defined outlines; oscula larger, main efferent canals wider and more vertical.

Spicules and Skeleton.—The desmas, phyllotriaenes and amphiasters agree almost exactly with those of the var. *spiroglyphi*, except that the desmas are a little stouter; but the rhabdi are very few or altogether absent. The sponge has the habit of collecting spicules from other sponges that grow in its vicinity, and I

have found in different preparations of a considerable number of specimens, single spicules or small groups of spicules belonging to seven different types, the commonest of which consists of amphioxi that have clearly been derived from the skeletons of monaxons growing on the surface of the Lithistid. In several instances I have found the sponge from which they clearly originated. These adventitious spicules are scattered, together with small grains of sand, in the collenchyma of the efferent canals and in the outer parts of the sponge. In one preparation I found several rhabdi like those of the var. *spiroglyphi*. They apparently formed a small vertical strand in the collenchyma of an efferent canal, but it is impossible to be quite sure that they were not adventitious. The external surface has been rubbed off most of my specimens of the var. *siliquariae*, and with it the phyllotriaenes and amphiasters have disappeared, but I have found them both in one preparation, having the same forms and arrangement as in var. *spiroglyphi*, except that the amphiasters were perhaps a little shorter and more regular in shape.

Lying loose in the efferent channels near the osculum of a dried specimen of this variety I found several little siliceous bodies (pl. ix, fig. 18) that are probably the skeletons of embryo sponges. They are formed of closely welded spicules resembling the desmas of the adult sponge but smaller and more slender. Each body has the form of a figure of eight somewhat attenuated, and measures between 2 and 3 mm. in length; the proportions differ in different specimens, but one of the loops is usually rather larger than the other. One surface is flat, the other distinctly convex. Each loop contains three relatively large apertures, one on the convex surface, a corresponding but smaller aperture on the flat surface, and one (still smaller) at the free extremity. The last is surrounded by projecting cladi of desmas. There is no channel, so far as can be seen from a bare skeleton, between the two loops.

Habitat.—Off the coast of Ganjam and Vizagapatam in 15—30 fathoms; associated with *Siliquaria cochlearis*, Mörch.

It is unfortunate that the data supplied with the specimens of these two varieties are not sufficiently precise to enable me to state whether their peculiarities are correlated with any difference in habitat or environment. The colour of the two is of course strikingly different, while the absence or paucity of rhabdi in the var. *siliquariae* enables sections or other preparations of this form to be distinguished at a glance from those of the var. *spiroglyphi*. The former variety, therefore, seems to agree as regards spiculation (except in the absence of discoidal phyllotriaenes) with the typical form of the species, but to differ both from it and from the var. *spiroglyphi* in colour. It differs from both in its more massive structure. Colour is perhaps a more important character as regards the forms of *R. sceptrifera* than it is in most sponges, for in the case of all the specimens examined I have found it to some extent persistent. In the var. *siliquariae*, however, the purple patches are probably due to the sporulation of some

micro-organism, for they are produced by enormous numbers of minute morula-like masses contained in the soft parts of the sponge.

Spongisorites topsenti, Dendy.

(Plate viii, fig. 1.)

S. topsenti, Dendy in *Herdman's Report on the Pearl Oyster Fisheries of Ceylon*, pt. iii, p. 182, pl. xii, fig. 1.

Sponges of this species were found associated with *Siliquaria muricata* off the coast of Ganjam near Gopalpur in from 30 to 38 fathoms. They agree well as regards structure with Dendy's description of the type specimens from the Gulf of Manaar, one of which had grown partially round calcareous nodules; but certain differences may be noted as regards external form and colour, although these differences are perhaps due to the fact that my specimens are dry. Their surface is smooth, except where the sponge forms a thin layer over the spinose shells of the *Siliquaria*, and except for a few scattered and irregular cones less than 5 mm. high. I have not observed the vents. Externally the sponge is of an intense black colour, but the inner parts are dark green, which was probably the colour of the fresh sponge.

EXPLANATION OF PLATE VIII.

FIG. 1.—Mass formed of shells of *Siliquaria muricata* (Born.) and the sponge *Spongosorites topsenti*, Dendy, viewed from above. (Scale about $\frac{2}{3}$.)

„ 2.—Mass formed of shells of *Spiroglyphus cummingi*, Mörch, and the sponge *Racodiscula sceptrellifera* var. *spiroglyphi* nov., viewed from below. (Scale about $\frac{2}{3}$.)

In both figures the lower end of the mass is obscured to a slight extent.



Photo. by A. C. Chowdhury.

1.

SILICUARIA MURICATA Born.
with Spongosorites topsenti Dendy.



2.

SPIROGLYPHUS CUMMINGI Mörch.
with *Racodiscula sceptrifera* Carter, var. *spiroglyphi*, nov.

EXPLANATION OF PLATE IX.

FIGS. 1—15.—*Racodiscula sceptrellifera*, Carter, var. *spiroglyphi*, nov.—

Figs. 1—7.—Phyllotriaenes, $\times 75$.

„ 8—11.—Desmas, $\times 75$.

„ 12, 13.—Fragments of the skeleton (lateral view), $\times 75$.

„ 14.—Fragment of the skeleton in contact with a shell (surface view), $\times 75$.

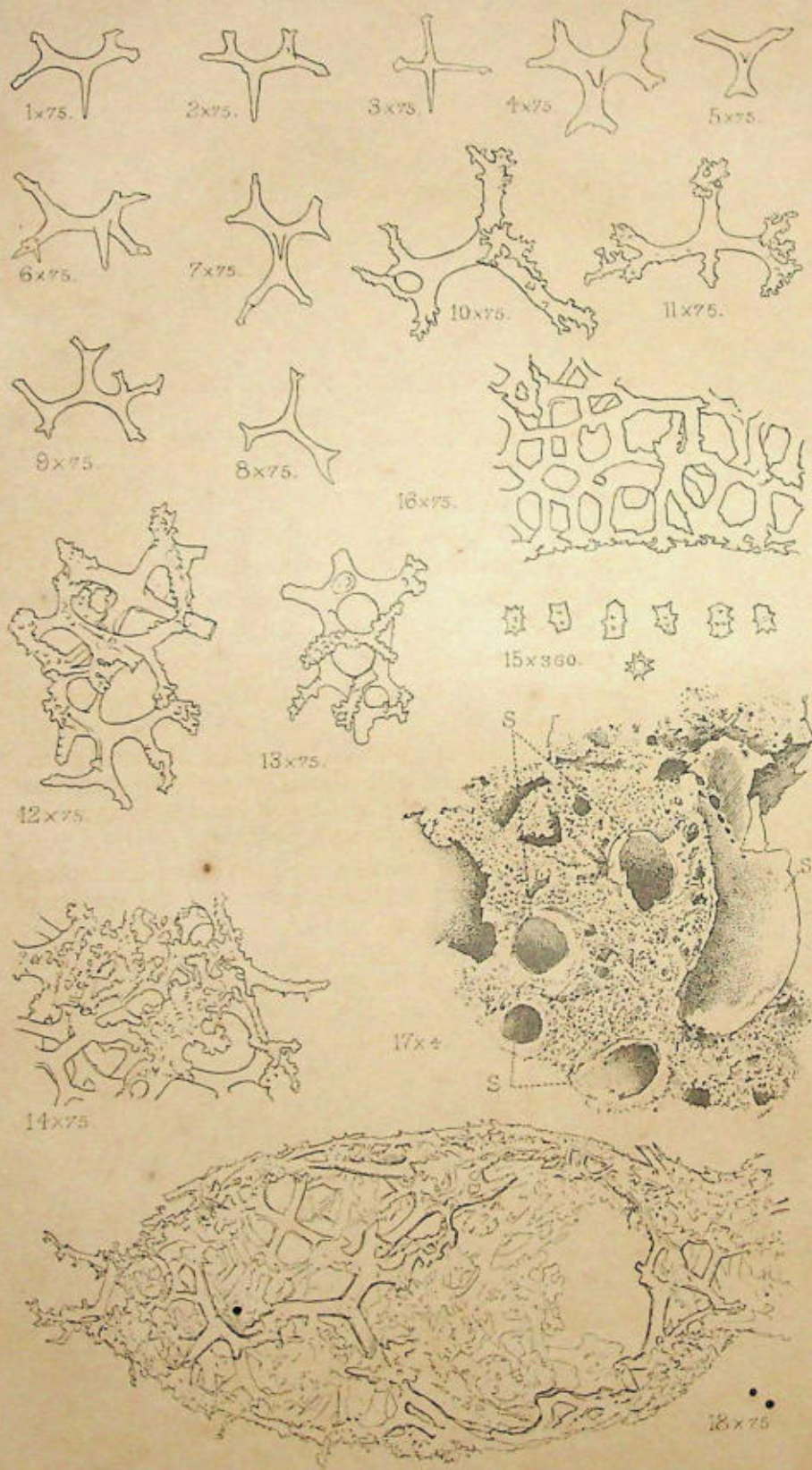
„ 15.—Microscleres (amphiasters), $\times 360$.

FIGS. 16—18.—*Racodiscula sceptrellifera*, Carter, var. *siliquariac*, nov.—

Fig. 16.—Vertical section of a fragment of the skeleton in contact with a shell, $\times 75$. (To show how the cladi of the desmas become splayed out horizontally in such positions.)

„ 17.—Vertical section of a fragment of the dried sponge with enclosed shells from near the surface of a mass, $\times 4$.

„ 18.—Half of (?) embryonic skeleton from efferent channel of the sponge, $\times 75$.



VII. REPORT ON A COLLECTION OF AQUATIC ANIMALS MADE IN TIBET BY CAPTAIN F. H. STEWART, I.M.S., DURING THE YEAR 1907.

PART III.—TURBELLARIA AND SUMMARY.

REPORT ON A COLLECTION OF TURBELLARIA MADE BY CAPT. F. H. STEWART, I.M.S., IN TIBET.

Von DR. A. MEIXNER und A. MUTH, Graz (Steiermark).

Die von Mitte Januar bis Anfang September 1907 von Capitän F. H. Stewart in sehr beträchtlichen Höhen der tibetischen Gebirge gesammelten Turbellarien gehören theils zu den Rhabdocoeliden, theils zu den Tricladen. Charakteristisch für alle ist die auffallende Kleinheit der Individuen (auch der geschlechtsreifen); man wird kaum fehlgehen, wenn man für diese interessante Thatsache die bedeutende Seehöhe (13,120—14,500 ft.) mit den damit zusammenhängenden klimatischen Verhältnissen verantwortlich macht.

I. RHABDOCOELIDA.

(Von DR. A. MEIXNER.)

Die Rhabdocoeliden des vorliegenden Materiales vertheilen sich auf drei Familien und vier Gattungen. Die meisten Exemplare sind nicht oder nicht völlig geschlechtsreif, so dass nur bei einer einzigen Form die Artzugehörigkeit festgestellt werden konnte.

System, Nomenclatur und Terminologie folgen *L. von Graff's* Bearbeitung der Turbellarien in *H. G. Bronn's* Klassen und Ordnungen des Thier-Reichs. Benutzt wurden ausserdem hauptsächlich:

W. E. Bendl, Rhabdocoele Turbellarien aus Innerasien. Graz 1909.

M. Braun, Die rhabdocoeliden Turbellarien Livlands. Dorpat 1885.

L. von Graff, Monographie der Turbellarien. I. Rhabdocoelida. Leipzig 1882.

A. Luther, Die Eumesostominen. Leipzig 1904.

In den folgenden Beschreibungen beziehen sich die Grössenangaben stets auf das conservierte Material; Breite und Dicke sind stets an der breitesten bez. dicksten Stelle gemessen. "Rostral-

und Caudal-Ende" des Körpers werden stets mit R. E. und C. E. abgekürzt.

Familie CATENULIDAE.

Stenostomum (?) sp.

No. 63. Small Rhabdocoel. Gyantse, 13,120 ft., Tibet, 4-viii-07, among algae, in hill stream.

Zwei conservierte Exemplare, 290 bez. 330 μ lang, 70 bez. 75 μ dick. Körper drehrund, gestreckt, in der Mitte am dicksten, rostral und caudal verjüngt, an den Enden mehr oder minder abgerundet. In Alkohol opak, schwarzgrau; in Cedernholzöl durchscheinend bräunlichgelb.

Die Mundöffnung liegt am Ende des ersten Körperfünftels. Der Pharynx, ein Ph. simplex, ist schwach gebogen und etwas mehr als ein Körpersechstel lang. Der sackförmige Darm füllt die beiden letzten Körperdrittel vollständig aus. Mehr lässt sich von der Organisation auch an Querschnitten nicht erkennen. Geschlechtsorgane fehlen.

Für die Zurechnung der beiden vorliegenden Exemplare zur Gattung *Stenostomum* O. Schm. sprechen folgende Erwägungen: Ein Pharynx simplex findet sich nur bei den *Catenuliden* und *Microstomiden*. Von den letzteren schliessen sich die *Microstominen* durch das Vorhandensein eines praeoralen Darmblindsackes, die *Macrostominen* durch den Besitz einer caudalen Haftscheibe aus. Unter den vier Gattungen der *Catenuliden* fällt *Rhynchosclex* Leidy durch den Besitz eines keulenförmigen Rüssels ausser Betracht; *Catenula* Ant. Dug. und *Fuhrmannia* Graff scheiden durch das Vorhandensein einer praeoralen Ringfurche aus, die ich an den vorliegenden Exemplaren vermisste, so dass nur *Stenostomum* O. Schm. übrigbleibt.

Familie DALYELLIIDAE.

Dalyellia sp.

Nos. 45 and 53. Microscopic Rhabdocoel. Gyantse, 13,120 ft., Tibet, 6-vi-07 and 7-vii-07, among algae in slow flowing water. Cocainised. Fixed with HgCl₂ sat. sol., $\rightarrow$ 70 % alcohol.

Zwei in oben angegebener Weise conservierte Exemplare, das grössere 530 μ lang und 180 μ dick. Körper drehrund, spindelförmig, in der Mitte am dicksten. R.E. abgerundet, C.E. zugespitzt. In Alkohol bräunlichgelb; in Glycerin oder Cedernholzöl scheinen Pharynx und Darm dunkler graubraun, das Uterusei bräunlichgelb durch.

Das Epithel ist 3 μ , gegen das C.E. 4.5 μ hoch, die über den ganzen Körper gleichmässig verbreiteten Cilien sind 3—3.5 μ (am C.E.) lang. Das C.E. trägt 4—6 Haftpapillen, in die ebenso viele grosse, birnförmige Schwanzdrüsen mit langgestreckten Ausführungsgängen münden. Die körnchenförmigen dermalen Rhabditen, die am zahlreichsten in der Nähe des C.E. vorkommen, messen höchstens 0.5 μ .

Die *Mundöffnung* liegt etwas vor dem Ende des ersten Körperteils. Der *Pharynx*, ein *Ph. doliiformis*, misst nicht ganz ein Körperviertel in der Länge und besitzt einen deutlich abgesetzten Saum. Der *Darm* ist nahezu kugelig, caudal durch den gefüllten Uterus etwas eingebuchtet. Die birnförmigen oder unregelmässig gestalteten Speicheldrüsen liegen in grosser Zahl unmittelbar unter dem Hautmuskelschlauch und münden mit langen Ausführungsgängen in die Uebergangsstelle von Pharynx und Darm. (Der Oesophagus ist nicht erkennbar.)

Das *Gehirn* liegt im zweiten Körpersiebel, über dem Pharynx, und besteht aus zwei, durch eine breite und dicke Quercommissur verbundenen, längsovalen Körpern. Auf Querschnitten lassen sich die kurzen und dicken *Nervi optici*, die etwas schwächeren Lateralnerven, sowie die noch schwächeren Längsnervenstämmen in ähnlicher Anordnung, wie sie Lippitsch¹ für *Phaenocora unipunctata* Oe. constatiert hat, erkennen.

Die *Augen* liegen zu beiden Seiten der vorderen Gehirnpartien. Von der Dorsalseite betrachtet erscheinen sie nierenförmig, schwarz. Auf Schnitten erkennt man die Becherform; das Pigment bildet grosse, fast opake schwarzbraune Kugeln, deren Zahl gering ist.

Genitalporus, *Copulationsorgane* und *Hoden* sind auch auf Schnitten nicht mehr erkennbar. Beide Exemplare befinden sich im Stadium der Trächtigkeit.

Das einfache, der rechten Körperseite angehörende *Germarium* ist von mässiger Grösse, retortenförmig, und liegt unmittelbar hinter dem Darms. Der Germiduct entspringt am caudalen Ende und zieht senkrecht ventralwärts. Die beiden compacten, langgestreckten *Vitellarien* beginnen in der hinteren Pharyngealregion und ziehen zu beiden Seiten des Darmes und über diesen hinaus caudalwärts; ihr Querschnitt ist oval, lateral stark abgeplattet, wobei sich die Vermehrungsherde der Dotterzellen in der dorsalen und ventralen Partie befinden, während der centrale Theil als Sammelgang functioniert. Die Vitelloducte entspringen an den caudalen Enden und steigen senkrecht ventralwärts. Das kugelige *Receptaculum seminis* liegt dem Germiduct seitlich an, die Art der Einmündung lässt sich leider nicht ermitteln. Der *Uterus* ist bei den vorliegenden Exemplaren fast kugelig; er nimmt den grössten Theil des hinter dem Darms liegenden Raumes ein und drückt die Copulationsorgane zu einer unkenntlichen Masse zusammen. Das Uterus-Lumen wird im Leben von dem einzigen, ausnehmlichen Dauerei jedenfalls ganz ausgefüllt; im conservierten Zustande ist letzteres stark geschrumpft, oblong-oval, etwas flachgedrückt, die Schale in starke Längsfalten gelegt; es misst dabei 113 μ Länge, 62 μ Breite und 50 μ Dicke. Die chitinartige bräunlichgelbe Schale ist kaum 2 μ dick und besitzt weder Sculpturen noch Stiele.

Zur selben Art gehört zweifellos auch—

No. 85. Te-ring Gompa, 28-viii-07.

¹ K. Lippitsch, Beiträge zur Anatomie von *Derostoma unipunctatum* Oe. Leipzig, 1890.

Skizzen (ohne Material) des lebenden und des mit Sublimat (anscheinend unter Deckglas) conservierten Thieres lassen erkennen, dass sich das äusserste, hinter dem Uterus (mit Dauerei) gelegene Körperende scharf schwanzartig absetzen kann. Am Epithel beobachtete Stewart: "Under action of HA 5%,¹ cellular (?) outlines appear in epidermis, each with tuft of cilia."

Ebenfalls zu dieser *Dalyellia*-Art gehören höchst wahrscheinlich sieben Exemplare, die z. Thl. in höheren Lagen und zu früherer Jahreszeit gesammelt wurden—

Nos. 29, 30, 31 and 44. Microscopic Rhabdocoel. Te-ring Gompa, 14,000 ft., Tibet, 15—24-v-07. Not common; only one found in an afternoon.

No. 47. Dto., 19-vi-07.

Sechs conservierte Exemplare von 280—420 μ Länge und 87—160 μ Dicke, die in Form, Farbe und Anatomie, soweit erkennbar, gut zu der oben beschriebenen *Dalyellia*-Art stimmen. Das gleiche gilt von—

No. 48. Changho, 24-vi-07.

Ein conserviertes Exemplar, das kleinste, nur 240 μ lang und 70 μ dick.

Die beigegebenen, z. Thl. wohl nach lebendem Material angefertigten Skizzen zeigen leider von der Anatomie auch nicht mehr als die conservierten, aufgehellten Exemplare so dass eine Bestimmung der Species nicht möglich ist. Der hinter dem Darm gelegene Körperabschnitt erscheint im Leben bei den unreifen Exemplaren als längerer, deutlich abgesetzter Schwanzanhang, der am Ende die Haftpapillen trägt.

Familie TYPHLOPLANIDAE.

Tribus Typhloplanini.

Castrada sp.

No. 86. Green planarians among green algae. Te-ring Gompa, 14,000 ft., Tibet, 3-ix-07.

Zwei conservierte Exemplare, 670 bez. 380 μ lang, 390 bez. 225 μ dick. Körper drehrund, plump spindelförmig, in der Mitte am dicksten. Ueber Gestalt und Farbe bemerkt Stewart zu einer beigegebenen Skizze: "Body appears fairly cylindrical, not flattened. Anterior end more rounded than tail. Length extended about 2 mm. Bright green colour. Green pigment in small granules. General diffused colour yellow by transmitted light. Central whitish area (Darm!) with more opaque white mass (Vesicula seminalis!)." Die grüne Farbe rührt von Zoochlorellen her, die fast unmittelbar unter dem Hautmuskelschlauch eine förmliche Schichte bilden, am R.E. aber im ganzen Mesenchym zerstreut vorkommen. Die conservierten Thiere sind in Alkohol völlig opak, bleich ocker-gelb; auch nach Aufhellung in Cedernholzöl lässt sich von der

¹ Jedenfalls 5% Essigsäure.

Organisation wenig erkennen. Die folgenden Angaben beziehen sich auf das grössere Exemplar, das in Querschnitte zerlegt wurde.

Die *Mundöffnung* liegt gerade in der Körpermitte, etwas hinter dem Mittelpunkt des Pharynx; der Excretionsbecher ist durch Vortreibung des Pharynx verstrichen. Letzterer, ein Ph. rosulatus misst im Durchmesser 190 μ , in der Höhe 120 μ . Der Darmmund liegt etwa 50 μ vor der Mundöffnung am Ende des ersten Darmdrittels. Der Darm beginnt 130 μ hinter dem R.E. und schliesst 50 μ vor dem C.E.

Das Gehirn liegt im zweiten Körpersechstel und ist in der Medianebene deutlich eingeschnitten. Augen fehlen.

Der *Genitalporus* liegt nahe (cca. 60 μ) hinter der Mundöffnung; er führt in ein geräumiges, caudal ziehendes *Atrium genitale commune*; in dessen caudales Ende öffnet sich, durch einen doppelten Sphincter scharf abgegrenzt, das *Atrium copulatorium*.

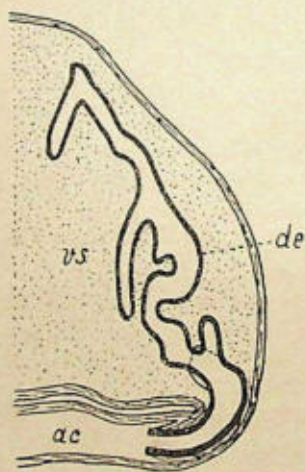


FIG. 1.—*Ductus ejaculatorius* von *Castraza* sp., von der linken Seite betrachtet. Reconstruction aus Querschnitten. 283 $\times$. ac, Atrium copulatorium; de, Ductus ejaculatorius; vs, Vesicula seminalis (Lumen punctiert).

Die beiden einfach keulenförmigen, transversal comprimierten Hoden liegen ungefähr in der Mitte zwischen Dorsal- und Ventralseite den Seitenwänden des Körpers an; sie beginnen bereits 120 μ hinter dem R.E. und gehen in der hinteren Pharyngealgegend in die Vasa deferentia über, die gemeinsam in die Dorsalwand der Samenblase einmünden. Das männliche Copulationsorgan befindet sich bei dem vorliegenden Exemplare in starker Expansion; es ist retortenförmig, fast kugelig, misst 180 μ im Durchmesser und liegt rostral dem Pharynx dicht an. Die stark ausgedehnte und daher dünn erscheinende Muskelhülle umschliesst die prall mit erythrophilem Kornsecret gefüllte *Vesicula seminalis*, deren ventraler Wand ein Spermatoblasten anliegt. Zahlreiche grosse, birnförmige Körnerdrüsen umgeben von allen Seiten das männliche Copulationsorgan. Der *Ductus ejaculatorius* (Text-fig. 1) ist

zweifelloos ganz ähnlich gebaut, wie Luther (*l.c.*, pag. 199) für *Castrada hofmanni* M. Braun, angiebt; er mündet in die caudalste Partie des Atrium copulatorium, an der Spitze einer winzigen Papille (*Penis s. str.*), proximalwärts spaltet er sich zunächst in einen ganz kurzen rechten und einen langen, gewundenen linken Ast, der neben kleineren zwei grössere Zweige bildet. Oeffnungen konnte ich leider nicht erkennen.

Die *Bursa copulatrix* ist ein musculöser Blindsack mit noch wenig entwickeltem Lumen, eine rostrale Ausstülpung des Atrium copulatorium. Chitinzähnen konnte ich weder in diesem noch in der *Bursa copulatrix* erkennen. Eine gemeinsame Muskelhülle umschliesst—typisch für die *Castrada*-Arten—Atrium copulatorium, männliches Copulationsorgan und *Bursa copulatrix*.

Germarium und *Receptaculum seminis* sind noch nicht entwickelt. Die Anlagen der beiden *Vitellarien* liegen den Hoden unmittelbar dorsal auf. Die *Uteri*, ebenfalls erst in Anlage begriffen, aber an der "geldrollenförmigen" Anordnung der Zellen bereits erkennbar, münden getrennt in die rostrale Wand des Atrium genitale commune.

In oekologischer Hinsicht erwähnt Stewart "wriggling motions in addition to ciliary gliding."

"The water and algae had stood for some time. These green forms appear to have taken the place of No. 44 as in spec. 85, which is from same water." Augenscheinlich findet sich diese *Castrada*-Art vergesellschaftet mit der oben beschriebenen *Dalyella*-Art.

Höchst wahrscheinlich gehört zur selben *Castrada*-Art, jedenfalls aber zu den Typhloplaninen, ein ganz junges, eben dem Ei entschlüpft Thier, das am gleichen Fundort, aber $4\frac{1}{2}$ Monate früher, gesammelt wurde—

No. 41. Te-ring Gompa, 14,000 ft., Tibet, 20-iv-07.

Ein conserviertes Exemplar, 470 μ lang, 190 μ dick. Körper drehrund, R.E. abgerundet, C.E. zugespitzt. Die beiliegende Skizze lässt am lebenden Thier die gleiche Gestalt erkennen. Das Verhältniss von Länge und Dicke wird mit 115 : 44 Micrometer-Theilstrichen angegeben.

Farbe in Alkohol gelblichgrau.

Der *Pharynx*, ein Ph. rosulatus, liegt am Ende des zweiten Körperfüntels, das Lumen der Pharyngealtasche steht noch nicht mit der Aussenwelt in Verbindung.

Das *Gehirn* liegt, der Ventralseite stark genähert, am Ende des ersten Körperfüntels; *Augen* fehlen.

Ein Paar compacter, keulenförmiger *Hodenanlagen* liegen in der Mitte zwischen Dorsal- und Ventralseite, zwischen Gehirn und Pharynx.

Tribus Mesostomatini.

Mesostoma craci, O. Schmidt.

Nos. 66 and 68. Mang-tsa, 14,500 ft., Tibet, July 1907, spring, among moss and stones.

Zehn conservierte Exemplare, 2.5—3.5 mm. lang, 0.8—1.3 mm. breit und 0.5—0.7 mm. dick. Körper länglich oval, R.E. mehr oder minder abgerundet, C.E. zugespitzt. Der Querschnitt (Textfig. 2) ist deutlich vierkantig, dorso-ventral meist etwas compriniert. An den Kanten treten besonders am R.E. (A) je ein Paar dorsaler und ventraler Leisten hervor; die dorsalen praevalieren in der Nähe des R.E. (A), nehmen aber caudal rasch an Grösse ab, so dass in der Gehirngegend (B) bereits die ventralen stärker hervortreten; diese erreichen eine Breite von 0.3 mm. und sind in ganzer Länge des conservierten Thieres deutlich erkennbar, während die dorsalen in der Gegend des Pharynx (C) und des Copulationsapparates ganz verstreichen, dahinter aber wieder hervortreten (D) und schliesslich in der Nähe des C.E. (E) zu einer unpaaren medianen Firste verschmelzen.

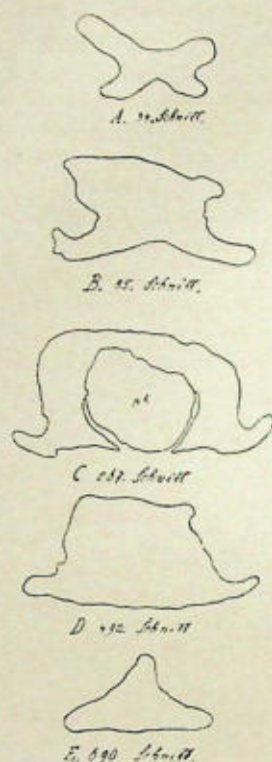


FIG. 2.—*Mesostoma craci* O. Schmidt: 5 charakteristische Querschnitte aus einer vollständigen Serie von 815 Schnitten, 26 $\times$.

Die Farbe des in Alkohol opaken Körpers ist dunkel lederbraun, die Leisten sind etwas durchscheinend, gelblichbraun. Die Farbe wird durch bräunlichgelbe, sternförmig verästelte Pigment-Körperchen hervorgerufen, die dicht unter dem Hautmuskelschlauch vertheilt sind, ausserdem aber Hoden, Vitellarien, Copulationsorgane und Gehirn umgeben und auch im Mesenchym des Pharynx sich vorfinden.

Die *Rhammiten* gerade oder einfach bis S-förmig gebogene Stäbchen von etwa 15 μ Länge und 1 μ Dicke, liegen in grösseren Paketen im Mesenchym zumal an den Körperenden und in den Leisten. Cyanophile *Schleimdrüsen* münden an der ganzen Ventralseite, mit Ausnahme der Leisten, aus.

Die *Mundöffnung* liegt am Anfang des zweiten Körperdrittels. Die Form des *Excretionsbeckers* ist infolge Vortreibung des *Pharynx* nicht erkennbar. Letzterer, ein *Ph. rosulatus*, ist kugelig bei einem Durchmesser von 0.7 mm. Der *Darmmund* liegt ziemlich senkrecht über der äusseren Mundöffnung, 1.45 mm. hinter dem R.E. Der *Darm* beginnt 0.55 mm. hinter dem R.E. und endet 0.4 mm. vor dem C.E.

Das *Gehirn* ist ganz unscharf begrenzt; in ihm vollständig eingebettet, liegen die beiden *Augen*, 0.45 mm. hinter dem R.E., der Ventralfläche bis auf $\frac{1}{4}$ der Körperdicke genähert; es sind lateral offene, aus unregelmässig verästelten Pigmentkörperchen gebildete Becher, die je einen Retinakolben umschliessen.

Der *Genitalporus* liegt nahe (0.2 mm.) hinter der Mundöffnung.

Die Hoden durchziehen den Körper 0.35 mm. vom R.E. bis 0.5 mm. vom C.E., der Dorsalwand mehr oder minder anliegend, als zwei im Querschnitt bald ovale, bald fast kreisrunde Stränge, die durch zwei tiefe Einschnitte in drei hintereinandergelegene Partien gegliedert sind. In ihrer vordersten Region verschmelzen sie in der Medianebene auf kurze Strecke (50 μ), und desgleichen kommt in den caudalsten Partien, wo beide Hoden einander dicht anliegen, eine local beschränkte, dorsale Verschmelzung vor.

Die *Vasa deferentia* münden in die dorso-caudale Wand der Samenblase. Das männliche Copulationsorgan liegt unmittelbar hinter dem Pharynx, etwas links von der Medianebene; es ist retortenförmig, 0.23—0.27 mm. dick. Die *Vesicula seminalis* enthält grobkörniges erythrophiles und feinkörniges cyanophiles Kornsecret. Ein Spermaaballen liegt im proximalen Ende. Der *Ductus ejaculatorius* ist von einem geraden, proximalwärts trichterartig erweiterten cuticularen Rohr ausgekleidet und von cyanophilem Kornsecret erfüllt. Der *Penis s. str.* ist eine kurze halbkugelförmige Papille.

Die birnförmige *Bursa copulatrix* liegt ungefähr in der Medianebene, unmittelbar hinter dem Pharynx und enthält bereits Sperma und beiderlei Kornsecret.

Das rechts neben dem Pharynx gelegene, wurstförmige, etwa 100 μ dicke *Germarium* geht allmählig in den ebenso dicken Gerniduct über, der sich zu einem kugeligen *Receptaculum seminis* (Durchmesser cca. 170 μ) erweitert, das bereits Sperma enthält.

Die folliculären *Vitellarien* begleiten die Hoden in ganzer Ausdehnung lateral und ventral; z. Thl. rücken sie auch in die dorsalen Leisten hinein. Der *Ductus communis* mündet in die Caudalwand des Atrium genitale commune; unmittelbar darunter münden von den Seiten her die beiden *Uteri* ein, die, wenn noch leer, cca. 90 μ weite, caudal ziehende Schläuche darstellen, bei einem anderen Exemplar enthalten sie 1 resp. 3 *Dauereier*, die in conserviertem Zustande halbkugelförmig sind und 250 μ im Durchmesser messen.

Nach den vorstehenden Angaben dürfte es kaum zweifelhaft sein, dass die vorliegenden Exemplare eine bedeutend kleinere (höchstens $\frac{1}{2}$ bis $\frac{1}{3}$ der von Braun und Luther angegebenen Grösse!) Hochgebirgsform von *Mes. craci* O. Schm. repraesentieren. Die bei beiden, in Schnitte zerlegten Exemplaren deutlich vorhandene Gliederung der Hoden erscheint mir zur spezifischen Abtrennung der tibetanischen Form nicht ausreichend.

II. TRICLADIDA.

(Von A. MUTH.)

SOROCELIS Grube (1872)

(Plate iv.)

Die vorliegenden Tricladen sind mit Rücksicht auf die Stellung der Augen dem Genus *Sorocelis* Grube einzureihen. Wie bei

den übrigen Arten des genannten Genus, so bilden auch hier die Augen Bogenreihen oder lang gestreckte, gegen die Mitte des Stirnrandes zu convergierende Haufen, in grösserer oder geringerer Entfernung vom Körperande. Verschiedenheiten in der Gruppierung derselben, fernerhin Verschiedenheiten in der Form des Kopflappens, sowie der Färbung deuten darauf hin, dass es sich um verschiedene Arten handeln dürfte. Mehr lässt sich jedoch nicht sagen, da sämtliche Exemplare der Copulationsorgane entbehren.

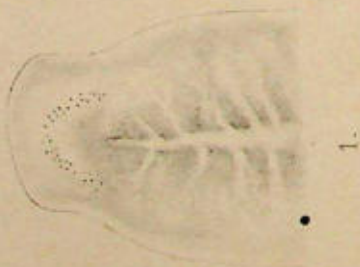
Das Material wurde teils in Te-ring Gompa, 14,000 ft., teils in High Hill Gompa ober Gyantse, 14,500 ft., gesammelt.

ERKLAERUNG ZU PLATE IV.

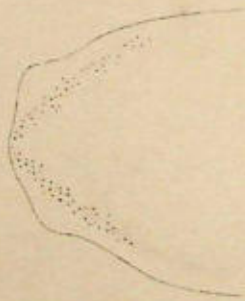
Zugleich Material-Verzeichnis.

FIGS. 1—8.—*Sorocelis* div. sp., Vorderende mit den Augen-
gruppen, Dorsalansicht, 20 × ; Fig. 2 und 7 in Alkohol, die übrigen in Xylol.

- Fig. 1. No. 18. Te-ring Gompa, 14,000 ft., Tibet, 22-ii-07.
Fixed HgCl_2 sat. solut., $\longrightarrow$ 70% alcohol. 9
Exemplare.
- „ 2. No. 33. High Hill Gompa above Gyantse, 14,500 ft.,
Tibet, 28-iii-07. Small mountain stream, among
moss and stones. 1 Exemplar.
- „ 3. No. 14. Te-ring Gompa, 14,000 ft., Tibet, 22-i-07.
Same stream (as No. 10). Fixed HgCl_2 sat. solut.,
70% alcohol. 3 Exemplare.
- „ 4. No. 15. Dto. 3 Exemplare.
- „ 5. No. 17. Te-ring Gompa, 14,000 ft., Tibet, 3-ii-07.
Formalin 5%. 4 Exemplare.
- „ 6. No. 10. Te-ring Gompa, 14,000 ft., Tibet, 15-i-07.
Small hill stream, among algae. Seen at edges
of stream only. Fixed alcohol form. acetic. 2
Exemplare.
- „ 7. No. 13. Te-ring Gompa, 14,000 ft., Tibet, 22-i-07.
Same stream (as No. 10). Fixed HgCl_2 sat. sol.,
 $\longrightarrow$ 70% alcohol. 3 Exemplare.
- „ 8. No. 54. High Hill Gompa above Gyantse, 14,500 ft.,
Tibet, 8-vii-07.



1.



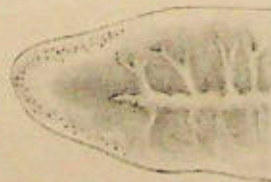
2.



3.



4.



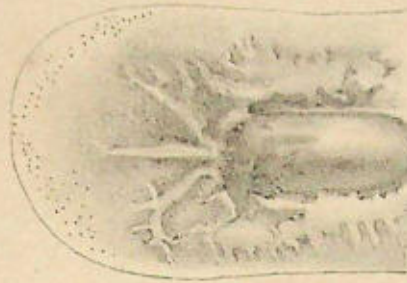
5.



6.



7.



8.

A. Muth, del.

TIBETANISCHE TRICLADEN.

A. C. Chowdhary, lith.

LIST OF THE AQUATIC ANIMALS HITHERTO RE-
CORDED FROM THE PROVINCES OF TSANG
AND Ü¹ IN CENTRAL TIBET, WITH A
TABLE SHOWING THEIR GEO-
GRAPHICAL DISTRIBUTION.

By F. H. STEWART, M.A., D.Sc., M.B., *Captain, Indian
Medical Service.*

The animals included in the following list fall into the follow-
ing groups:—

1. Hydroidea.
2. Turbellaria.
3. Nematoda.
4. Gordiidea.
5. Rotifera.
6. Gastrotricha.
7. Oligochaeta.
8. Hirudinea.²
9. Entomostraca.
10. Hydrachnida.
11. Mollusca.
12. Pisces.
13. Amphibia.

	Cosmopolitan.	Palearctic.	Oriental.	Not previously described.
Hydroidea—				
Hydra fusca, Linn. (= Hydra oligactis, Pall.).	{ Tsang Europe Lahore N. America }	..	..	..
Turbellaria—				
Stenostomum, sp. ..	..	Tsang	..	?
Dalyellia, sp. ..	..	Tsang	..	?
Castrada, sp. ..	..	Tsang	..	?

¹ The province of Tsang lies roughly north of Sikkim and Nepal and includes the district from the Tang-la to Gyantse and Shigatse. The province of Ü lies to the east of Tsang and includes Lhasa.

² The report on the Hirudinea has not yet been received.

	Cosmopolitan.	Palearctic.	Oriental.	Not previously described.
Mesostoma craci, O. Schmidt.	}	{ Europe Tsang Tsang }	..	..
Sorocelis, sp. ..				
Nematoda—				
Dorylaimus, sp. ..	..	..	..	?
Gordiidea—				
Parachordodes pustulosus, Baird.	}	{ Europe Central Asia }	..	..
Rotifera—				
Philodina erythrophthalma, Ehrenb.	{ Europe Natal Tsang }	..	..	..
Philodina roseola, Ehrenb.	{ Europe Turkestan Tsang Paraguay Natal New Guinea Darjiling Calcutta Tsang Cape Colony }			
Philodina citrina, Ehrenb.	{ Europe Turkestan Tsang Paraguay Natal New Guinea Darjiling Calcutta Tsang Cape Colony }	..	..	..
Rotifer tridentatus, Stewart.	..	Tsang	..	Yes.
Notommata aurita, Ehrenb.	{ Europe Tsang Cape Colony }	..	..	..
Copeus labiatus, Gosse	..	{ England Tsang England Tsang }	..	..
Proales gibba, Ehrenb.	..	{ England Tsang England Tsang }	..	..
Diglena catellina, Ehrenb.	{ England Tsang Paraguay }	..	..	..
Mastigocerca auchinleckii, Stewart.	..	Tsang	..	Yes.
Dinocharis pocillum, Ehrenb.	..	Europe	..	..
Scaridium longicaudum, Ehrenb.	{ Europe S. Africa Paraguay Calcutta }	..	..	..
Diaschiza exigua, Gosse.	{ England Rhodesia Tsang }	..	..	..
Diaschiza semiaperta, Gosse.	{ Europe New Zealand Tsang }	..	..	..
Salpina shapè, Stewart	..	Tsang	..	Yes.
Euchlanis dilatata, Ehrenb.	{ Europe N. Asia Ceylon Natal }	..	..	..
Cathypna ambau, Stewart.	..	Tsang	..	Yes.
Notholca scaphula, Stewart.	..	Tsang	..	Yes.

	Cosmopolitan.	Palearctic.	Oriental.	Not previously described.
Gastrotricha—				
Lepidoderma squamatum, F. Dujardin	{ Europe Tsang New Jersey }	..	..	..
Oligochaeta—				
Aelosoma hemprichii, Ehrenb.	} ..	{ Europe N. Africa Tsang }	..	..
Chaetogaster orientalis, Steph.	} ..	{ Lahore Tsang }	..	..
Nais, sp. ..	..	..	..	?
Fredericia stewarti, Steph.	..	Tsang	..	Yes.
Limnodrilus, sp. ..	..	..	..	?
Entomostraca—				
Cyclops viridis (Jur.)	..	{ N. Europe Siberia Turkestan Tsang }	..	..
Cyclops strenuus, Fisch.	{ Europe N. Asia N. America }	..	..	..
Cyclops serrulatus, Fisch.	Yes ..	..	..	..
Diaptomus tibetanus, von Daday.	..	Tsang	..	Yes.
Diaptomus paulseni, G. O. Sars.	} ..	{ Pamir Tsang }	..	..
Chydorus sphaericus (O. F. M.).	Yes ..	..	..	..
Dunhevedia crassa, King.	Yes ..	..	..	..
Aulana guttata, G. O. Sars.	Yes ..	..	..	..
Euryalona annandalei, von Daday.	..	Tsang	..	Yes.
Macrothrix hirsuticornis, Brady-Norm.	} ..	{ N. Europe Mongolia Tsang }	..	..
Moina rectirostris (Jur.).	..	N. America	..	..
Ceriodaphnia pulchella, G. O. Sars.	} ..	{ N. Europe Siberia Turkestan Tsang }	..	..
Scapholeberis mucronata (O.F.M.).	{ Ceylon Siberia Tsang }	..	..	..
Simnocephalus elizabethae, King.	Yes ..	..	..	..
Daphnia longispina (O. F. M.).	} ..	{ N. Europe Turkestan Tsang }	..	..
Eucypris tibetana, von Daday.	..	Tsang	..	Yes.
Eucypris minuta, von Daday.	..	Tsang	..	Yes.
Herpetocypris stewarti, von Daday.	..	Tsang	..	Yes

	Cosmopolitan.	Palaeartic.	Oriental.	Not previously described.
<i>Herpetocypris smaragdea</i> , von Daday.	..	Tsang	..	Yes.
<i>Potamocypris stewarti</i> , von Daday.	..	Tsang	..	Yes.
<i>Estheria davidi</i> , Simon	..	{ E. Mongolia Tsang }	..	..
<i>Branchinecta orientalis</i> , G. O. Sars. }	..	{ E. Europe Pamirs E. Mongolia Tsang }	..	..
Hydrachnida— <i>Eulais tibetana</i> , von Daday.	..	Tsang	..	Yes.
Mollusca— <i>Planorbis saigonensis</i> , Crosse and Fischer. }	..	{ Japan Tsang }	E. Asia Java	..
<i>Planorbis stewarti</i> , Germain.	..	Tsang	..	Yes.
<i>Planorbis himalayensis</i> , Hutton. }	..	{ Himalaya Tsang }	..	..
<i>Planorbis barrakporensis</i> , Clessin.	..	Tsang	India	..
<i>Limnaea hookeri</i> , Reeve	..	Tsang	..	..
<i>Limnaea bowelli</i> , Preston.	..	Tsang	..	Yes.
<i>Agriolimax tibetanus</i> , Godwin Austen.	..	Tsang	..	Yes.
<i>Pisidium stewarti</i> , Preston.	..	Tsang	..	Yes.
Pisces— <i>Parexostoma stoliczkae</i> (Day). }	..	{ Leh Ladak Tsang }	..	..
<i>Parexostoma maculatum</i> , Regan.	..	Tsang & Ü	..	..
<i>Nemachilus stoliczkae</i> , Day. }	..	{ Leh Ladak Tsang Varkand }	..	..
<i>Nemachilus lhassae</i> , Regan.	..	Ü	..	..
<i>Nemachilus tibetanus</i> , Regan.	..	Tsang & Ü	..	..
<i>Gymnocypris waddellii</i> , Regan.	..	Tsang & Ü	..	..
<i>Oreinus baileyi</i> , Lloyd	..	Tsang	..	Yes.
<i>Ptychobarbus conirostris</i> , Steind. }	..	{ Leh Ladak Tsang }	..	..
<i>Schizopygopsis stoliczkae</i> , Steind. }	..	{ Leh Ladak Pamirs Tsang }	..	..
<i>Schizopygopsis youngi</i> , husbandi, Regan.	..	Tsang & Ü	..	..

	Cosmopolitan.	Palaeartic.	Oriental.	Not previously described.
Gymnocypris (Schizopygopsis) <i>stewartii</i> , Lloyd.	..	Tsang ..	..	Yes.
Schizothorax <i>o'connori</i> , Lloyd.	..	Tsang ..	..	Yes.
Schizothorax <i>dipogon</i> , Regan.	..	Tsang & Ü ..	..	..
Schizothorax <i>waltoni</i> , Regan.	..	Tsang & Ü ..	..	..
Schizothorax <i>macropogon</i> , Regan.	..	Tsang & Ü ..	..	..
Amphibia— <i>Rana pleskii</i> , Günther	..	Central Asia ..	..	..
Number of species	18	57	2	21

It will be noticed in the above list that of those species which are not cosmopolitan all, with two exceptions, are Palaeartic. These two exceptions, *Planorbis saigonensis* and *P. barrakporensis*, are found in the Oriental as well as in the Palaeartic region.

Papers from which the above list is compiled.

1. Stewart, Annandale, de Man, Camerano, von Daday and Lloyd. Report on a collection of aquatic animals made in Tibet by Captain F. H. Stewart, I.M.S., during the year 1907. Part I. Introduction, Coelenterates, Nematomorpha, Rotifers and Gastrotricha, Entomostraca, Arachnids, Fish (Systematic) and Batrachia. *Rec. Ind. Mus.*, vol. ii, p. 309 (1908).
2. Stephenson, Preston, Germain and Stewart. Ditto. Part II. Oligochaete Worms, Mollusca and Fish (Geographical). *Rec. Ind. Mus.*, vol. iii, p. 105 (1909).
3. Meixner and Muth .. Ditto. Part III. Turbellaria. *Rec. Ind. Mus.*, vol. vi, p. 57 (1911).
4. Tate Regan .. Descriptions of five new Cyprinid fishes from Lhasa, Tibet. *Ann. Mag. Nat. Hist.* (7), vol. xv, p. 185 (1905).

5. Tate Regan Descriptions of two new Cypri-
nid fishes from Tibet.
Ann. Mag. Nat. Hist. (7), vol.
xv, p. 300 (1905).
6. von Daday Monographie systématique des
Phyllopo des anostracés.
Ann. Sci. nat., Zool. (9), t. xi,
p. 158 (1910).
-

VIII. NOTES ON CYPRINIDAE FROM TIBET
AND THE CHUMBI VALLEY, WITH A
DESCRIPTION OF A NEW SPECIES
OF *GYMNOCYPRIS*.

By F. H. STEWART, M.A., D.Sc., M.B., Captain, Indian
Medical Service.

I. *Schizopygopsis stoliczkae*, Steind., and *Schizopygopsis
severzovi*, Herz.

1. Source of recent collection. Stations with their altitude.
2. Source of older collections in Indian Museum.
3. Literature.
4. Geographical range. General characters of country inhabited.
5. Is the separation of the two species *S. stoliczkae* and *S. severzovi* justified?
 - (i) Five points of distinction by means of which the two species are separated from each other by Herzenstein and Alcock.
 - (ii) The specimens of which measurements are available divided into 11 groups.
 - (iii) Analysis of the five points of distinction in 8 of the groups.
 - (iv) Variation in the relative size of the head to the body.
6. Coloration.
7. Relative frequency of this and of other species of fish in the district under consideration.
8. Breeding and migration.
9. Summary.

1. *Schizopygopsis stoliczkae*, Steind., has been obtained lately from various localities between the Chumbi valley and the town of Gyantse in the Tibetan province of Tsang. I am indebted to Captain Kennedy, I.M.S., for the greater number of the specimens, and his collection is so much the more valuable in that it was made in the course of journeys between Chumbi and Gyantse, and contains specimens from a series of localities on both the south and the north faces of the Himalaya, and also from the immediate neighbourhood of the watershed (the Tang-la). Mr. F. M. Bailey, lately British Trade Agent at Gyantse, also kindly sent me

some specimens from the Chumbi valley and I myself had found this species in considerable numbers in the neighbourhood of Gyantse in 1906-1907.

The following is a list of the localities with their altitudes:—

- (1) Ling-ma-tang, Chumbi valley, 11,500 feet. In the Ammo-chu, a tributary of the Raidak. At this point the river traverses a sedgy plain. Its breadth is roughly 10—15 yards. The fish can be seen in considerable numbers.
- (2) Phari, at the head of the Chumbi valley, eight miles S. of the watershed, 14,300 feet. In a small tributary of the Ammo-chu.
- (3) Guru, 25 miles N. of the watershed, 15,000 feet. In a hill stream which disappears into the ground.

[The streams in the latter two localities are small rivulets running off the face of barren stony mountains, but ending in broad and marshy plains. They are frozen for at least six months of the year, but nevertheless both animal and vegetable life is remarkably abundant. It should be noticed that migration of fish from the third locality is out of the question. Not only do a number of the smaller streams end by disappearing in the ground, but the only river flowing out of the Rham Tso ends in the Kala Tso, 14,600 feet above the sea, from which there is no visible outflow. The aquatic population of this area is therefore unable at any time of the year to descend lower than 14,600 feet.]

- (4) Kang-ma, 30 miles S. of Gyantse, 13,900 feet. In the Nyang-chu.
- (5) Gyantse, 13,100 feet. In the Nyang-chu and its tributaries.

2. I was fortunate in being able to compare this collection with two other collections of *Schizopygopsis* from Central Asia which are stored in the Indian Museum. The first is that which Dr. Stoliczka obtained during Sir Douglas Forsyth's Mission to Yarkand in 1873-74. The second consists of the specimens of *S. severini*, Harz., which Dr. Alcock collected while serving with the Pamir Boundary Commission of 1895.

3. The measurements of the individual fish of these two species, in the collection of the Imperial Academy of Science in St. Petersburg, are also available in the report by Dr. Herzenstein (4).

4. Stoliczka found the fish which was afterwards honoured with his name in the headwaters of the Indus in the neighbourhood of Leh in Ladakh, at an elevation of 11,500 feet above sea level, of the Oxus (Aktash, 12,880 feet, Upper Kora-Kul and Panjah) and of the Yarkand river at Sarikol.

Day (2, p. 9) doubts the accuracy of this latter record: "I am very dubious of these specimens, and hardly think that they can have been obtained from waters that flow into the Yarkand

river, as the adults have not been obtained thence. The adult however has been taken in the Oxus; and I find by the diary that on the day the specimens in question were captured, the camp was at Sarikol a few miles from a valley where a stream enters the Aksu river, a tributary of the Oxus."

The species was also found by the brothers Schlagintweit in Nari-Khorsum, presumably in the upper reaches of the Sutlej.

Herzenstein (4) describes specimens of *S. stoliczkae* from the Amu-darya (Oxus) system on the Pamirs obtained by Ssewerzoff and Grumm-Grshimailo, and a single example obtained by Grombtschewski from "Abdu-Gafar-Tom" in the Khotan river basin.

Ssewerzoff obtained the specimens which were afterwards named after him from the Pamirs (Bulun-kul and Kurasu), while Alcock's examples of this species come from "a river near Oikul, Little Pamir."

It has not hitherto been found in any river of the south face of the Himalaya with the exception of the Ammo-chu.¹

According to our present knowledge, therefore, the two forms range from Badakshan, the Pamirs and Khotan, through Baltistan, Ladakh and Nari-Khorsum, along the northern face of the Himalaya to the Chumbi valley, in a tract of country 1,400 miles long by 150—300 broad, including the upper waters of the Oxus, the Khotan river, the Indus, Sutlej and Brahmaputra and the Ammo-chu.

The character of the country in the streams of which *S. stoliczkae* is found is very uniform. Alcock writing of the Little Pamir says (1, p. 56): "The Little Pamir . . . is the broad alluvial basin of the first fifty miles, or so, of the River Aksu. Its greatest breadth is not more than four or five miles . . . at an elevation of about 13,000 feet. It is bounded north and south by grassy downs which rise to a height of 18,000 feet and culminate in sharp-cut peaks, most of these, especially on their northern faces, being capped with perpetual snow. . . . The surface of the Pamirs although largely covered with tussocks of grass and other stunted vegetation, often consists of bare stretches of hard sand and shingle coated with a saline efflorescence. . . . The river runs with some rapidity in a broad bed of boulders and often expands into marshes and lakelets, one chain of which, known as Chakmak-tin Kul or Oi Kul, is of respectable size. . . . A very characteristic feature of the Pamir in summer are the tracts of deep grassy bog that skirt the river and all its tributaries. Equally characteristic is the rolled or beaten-down appearance of the surface soil everywhere, the evident result of a long-lying weight of snow."

These sentences might have been copied almost word for word as a description of the country between Ling-ma-tang and Gyantse. There are the same snow- or spring-fed streams and

¹ Since the above was written Erich Zugmayer has also reported the finding of large numbers of *Schizopygopsis stoliczkae* in the Indus and Western Tibet. *Zool. Jahrb., Syst., Geogr. und Biol.*, vol. xxix (1910).

ivers, in places running noisily and rapidly through channels filled with boulders, again spreading out into marshes and great shallow lakes in the broad flat upland valleys.¹ At Ling-ma-tang, Phari and around the Rham Tso are the same widespreading grassy downs, although it must be admitted that to the north of the watershed the grass is not very abundant. It is a region barren of trees,—for twenty miles on the south and forty miles to the north of the Tang-la not a single tree can be seen. It is a very different country from the south slope of the Himalayas with its narrow valleys, its plunging torrents, and hillsides covered with pines.

5. The collection with which the present notice deals contains some specimens which can be referred without hesitation to Stoliczka's species, others which obviously belong to Ssewerzoff's, and again others which appear to be intermediate between the two. It was necessary, therefore, to enquire into the validity of the separation of the two species, taking into consideration the knowledge gained by the study of this new collection.

Herzenstein (4, p. 199), in defining the species *S. severzovi*, writes: "Diese Form ist auf Grund von Exemplaren beschrieben worden, welche z. Th. schon vom verstorbenen Prof. Kessler von dem typischen *Sch. stoliczkae* als *Sch. macrophthalmus* oder *Sch. stoliczkae* var. *macrophthalma* getrennt worden sind. Der Hauptunterschied besteht meiner Meinung nach in der relativen Lage der Mundspalte und des unteren Augenrandes, wie ich es in der Synopsis angeführt habe. Freilich lassen sich einige der kleineren Exemplare weniger sicher nach diesem Kennzeichen bestimmen. Doch halte ich es vorläufig für mehr passend beide Formen zu trennen, da *Sch. severzovi* ausserdem noch einige besondere prävalierende Variations-Neigungen zu zeigen scheint, so namentlich ein in Durchschnitt grösseres Auge und dunklere Färbung."

Alcock also does not accept the separation without some doubt (1, p. 14), "I was at first inclined to disagree with Herzenstein in separating this species from *S. stoliczkae*, but on comparing the large series of the latter in the Indian Museum with those collected by myself among which are numerous spawning males and females, I can find five ripe males and a ripe female all taken at the same spot, which differ constantly from ripe adults of *S. stoliczkae* in the following characters:—

- (1) they are smaller, sexually mature individuals not being longer than 175 mm.; whereas I can find no sexually mature *S. stoliczkae* less than 200 mm. long, while most are about 250 mm. and some nearly 350 mm.;
- (2) the body is higher, its height in the adult being one-sixth of its total length; whereas in typical adults of *S. stoliczkae* the body-height is only one-seventh or one-eighth of the total length;

¹ See *Rec. Ind. Mus.*, vol. ii, part iv, pl. xxvi. The upper photograph represents Chalu Bridge.

- (3) as pointed out by Herzenstein, the anterior end of the mouth cleft is on a level with the lower edge of the orbit, whereas in *S. stoliczkae* it is altogether below the level of the orbit. This is due to the fact that in *S. severzovi*:—
- (4) the eye is larger, its diameter in sexually mature adults being one-fourth, or nearly one-fourth, the length of the head; whereas in sexually mature adults of *S. stoliczkae* its diameter is only one-fifth to one-sixth the length of the head.

The six adults here separated as *S. severzovi* all came from a small ice-cold streamlet which seems to have only a periodic connexion with larger waters, so that, after all, they may be only dwarfs of *S. stoliczkae*."

For the purpose of this enquiry the various specimens have been arranged in a series of groups. It will be well first to give a summary of these groups and then to discuss the various characters given as separating the two species.

- P. 1. The specimens of *S. severzovi* from the Pamirs described by Herzenstein. (For detailed measurements of the individuals see Herzenstein, 4, p. 199.)
- P. 2. The specimens of *S. stoliczkae* from the Pamirs described by Herzenstein. (*Ibid.*, p. 195. Nos. 8734—8812.)
- P. 3. Stoliczka's collection of *S. stoliczkae* from the Pamirs and Ladakh in the Indian Museum.
- P. 4. Alcock's six specimens of *S. severzovi* from the Little Pamir (Ind. Mus. Nos. 14141—14146): *vide* pl. iii, fig. 2.
- Ch. Four specimens from the Chumbi valley (Ind. Mus. Nos. $\frac{2570}{1}$ — $\frac{2572}{1}$ and $\frac{2553}{1}$): *vide* pl. iii, fig. 1.
- D. 1. Four specimens from Guru with head characters of *S. stoliczkae* (Ind. Mus. Nos. $\frac{2850}{1}$, $\frac{2851}{1}$, $\frac{2854}{1}$ and $\frac{2855}{1}$).
- D. 2. One specimen from Guru intermediate as regards head characters (Ind. Mus. No. $\frac{2856}{1}$).
- K. 1. Five specimens from Kang-ma with head characters of *S. stoliczkae* (Ind. Mus. Nos. $\frac{2857}{1}$ — $\frac{2861}{1}$): *vide* pl. iii, fig. 3.
- K. 2. Eleven small specimens from Kang-ma (Ind. Mus. Nos. $\frac{2864-2868}{1}$, $\frac{2869-2911}{1}$, $\frac{2946-2948}{1}$).
- G. 1. Four small specimens from the Nyang-chu at Gyantse.
- G. 2. Five small specimens from marsh pools near Gyantse.

The last three groups, K. 2, G. 1 and 2, consist of fish too small for the present purpose.

We can now proceed with an analysis of the five distinguishing characters in the groups.

Analysis of differences between *S. stoliczkae* and *S. severzovi*:—

Character (a). Body higher in *S. severzovi* than in *S. stoliczkae*.

.. (b). Eye larger ..

(c). Mouth: anterior margin on level with lower border of orbit in *S. severzovi*; below this level in *S. stoliczkae*.

(d). Darker colour of *S. severzovi*.

(c). Smaller size of sexually mature specimens of *S. severzovi*.

Character (a). The two groups named *S. severzovi* (P. 1, Ssewerzoff's, and P. 4, Alcock's) are both from the Pamirs. The relation of the body-length to the maximum body-height is 5.4 in both (see table i). That is, on the average they are higher in the body than the two groups of *S. stoliczkae* from the same region (P. 2, Ssewerzoff's, and P. 3, Stoliczka's). *Vide* table i. On consulting the table of extreme measurements, on the other hand (table iii, col. 3), it will be seen that this is only true for the average measurements: the lowest-bodied fish of the Ssewerzoff groups (6.20) is considerably lower than the highest-bodied fish of the Stoliczka groups (4.48), and indeed the latter is higher than even the highest-bodied of the Ssewerzoff groups (5.00).

Although the two Ssewerzoff groups from the Pamir (P. 1 and P. 4) have a greater average body-height than the two Stoliczka groups (P. 2 and P. 3), this average is lower than that of groups D. 1 and K. 1, which have the head of Stoliczka's type in a marked degree (character *c*).

Character (b). It is clear that the eye diminishes in size relatively to the head with the increase in size of the fish. Therefore groups of fish of the same average size only, can be compared in regard to this character. The two Ssewerzoff groups P. 1 and P. 4 taken together have an average length of about 150 mm. and the two Stoliczka groups from the Pamir-Ladakh region, P. 2 and P. 3, combine to very much the same average: these may be compared with the medium-sized Kang-ma K. 1 group (table i, col. 3). The three arrange themselves as follows:—Larger eye (4.3) *S. sewerzovi*; smaller eye (4.75) *S. stoliczkae* (Pamir-Ladakh and Kang-ma).

The characters *b* and *c* then do show some parallelism. But, again, there is considerable overlapping of the extreme measurements, some specimens in P. 3 having larger eyes (4.00) than some of P. 1 and P. 4 (4.32 and 5.00).

The evidence of the Chumbi group Ch. is, moreover, definitely against this parallelism. Their average length is only 136 mm. and therefore their eyes should be proportionately larger than in larger fish. They have the Ssewerzoff type of head (character c)

but their eyes are actually of the same average size (4.75) as the average of groups P. 2 and 3 (4.75), and are considerably smaller than the average of the other two Ssewerzoff groups P. 1 and 4 (4.30) (*vide* table i, cols. 4 and 5, Ch.).

Character (c) (*vide* pl. iii, figs. 1, 2 and 3). Herzenstein states that in *S. severzovi* the anterior end of the mouth-cleft is on a level with the inferior margin of the orbit, and that in *S. stoliczkae* it is below this level.

Alcock considers that this difference is due to the greater relative size of the eye in the former species. After examining the new collections from Tibet the present writer cannot agree with the view that this character is entirely dependent on the size of the eye. The heads of the two extreme types, Ssewerzoff's and Stoliczka's, differ in the following points:—

Stoliczka's (pl. iii, fig. 3)—

- (a) the lower surface of the head from the tip of the snout back to the pericardial region is almost perfectly flat;
- (b) the mouth, which opens on this flat surface some few millimetres from the tip of the snout, is entirely ventral;
- (c) since the tip of the snout lies in the lowest horizontal level, the angle formed by the frontal line curving from the snout to the occiput with the horizontal is greater than if the tip of the snout were in a higher level.

Ssewerzoff's (pl. iii, figs. 1 and 2)—

- (a) the lower surface of the head is curved, rising from the pericardium to the tip of the snout;
- (b) the mouth is thus more terminal than ventral and is only slightly overhung by the tip of the snout;
- (c) the snout being in a higher level the angle referred to is less than in Stoliczka's type.

Gradations between these two extremes occur. Stoliczka's type is more common than Ssewerzoff's.

The Ssewerzoff type of head occurs in groups P. 1 (Herz.) and Ch., and in half the specimens of P. 4; in the other half the heads incline more to Stoliczka's type as here defined.

Character (d), colour. There is no type of coloration absolutely characteristic of either the Stoliczka or Ssewerzoff head types. Spotted and uniformly coloured forms occur in both but the former is more generally uniform in colour, the latter spotted.

Character (e), smaller size of sexually ripe specimens of *S. severzovi*. In group D. 2, with the Stoliczka head type, the reproductive organs are at least as well developed as in P. 4, although the average length is 123 mm. in the former as compared with 145 mm. in the latter.

The two species, then, cannot be separated by all five characters, since different combinations occur in each group.

Table i shows the distribution of the characters distinguishing *S. stoliczkae* from *S. sewerzovi* among eight groups: col. 1 gives the group; col. 2, the average total length of the members of the group in millimetres; col. 3, average of the relation of total length to maximum body-height; col. 4, average of the relation of head-length to the diameter of the eye. In cols. 5, 6 and 7, E represents that the group belongs to the Ssewerzoff type for this character, T that it belongs to the Stoliczka type, ET that the group contains individuals of both types: col. 5 deals with the same proportion as col. 3; in Ssewerzoff's type the relation is 5.4 and less, in Stoliczka's 5.5 and more: col. 6 is the same proportion as col. 4; Ssewerzoff's type is 4.5 and below, Stoliczka's 4.6 and above: col. 7 represents the relation of the anterior end of the mouth-cleft to the lower margin of the orbit; in Ssewerzoff's type the former is on the same level or above the latter, in Stoliczka's it is below the latter.

TABLE I.

1	2	3	4	5	6	7
Group.	T. L. mm.	T. L. Mx. Bo. Ht. Charac- ter (a).	Hd. L. E. Charac- ter (b).	T. L. Mx. Bo. Ht. Charac- ter (a).	Hd. L. E. Charac- ter (b).	M. O. Charac- ter (c).
P. 1 ..	153	5.40	4.10	E	E	E
P. 2 ..	177	5.60	5.00	T	T	T
P. 3 ..	114	5.70	4.50	T	E	?
P. 4 ..	145	5.40	4.50	E	E	ET
Ch. ..	135.75	4.97	4.75	E	T	E
D. 1 ..	123	4.62	5.00	E	T	T
D. 2 ..	115	4.30	4.35	E	E	
K. 1 ..	148.8	4.51	4.70	E	T	TT

The question then arises whether the two species can be separated on the differences in the shape of the head alone (character c), and as a complete series of gradations between the two extremes occurs (pl. iii, figs. 1, 2 and 3) it does not appear to the present writer that this can be done.

If all the specimens from one particular narrow locality are brought together it will be found that one head type or the other predominates. One type may be present to the exclusion of the other but intermediates are also generally present and occasionally the opposite type as well. The specimens from Guru (D. 1 and 2) are of Stoliczka's type 4 specimens, intermediate 1; those from the Chumbi group consist of Ssewerzoff's type only; those from Kang-ma (K. 1) of Stoliczka's only. Alcock's specimens from Oikul, Little Pamir, of Ssewerzoff's 3, intermediates or Stoliczka's 3.

There is another character in which very considerable variation

exists in the species, namely in the proportion of the size of the head to the body. These differences are exhibited by the three proportions—

Length of body Length of body Length of body
Breadth of head' Length of head' Height of head'

In table ii the groups are arranged in order according to this measurement (cols. 3, 4 and 5), and it will be seen that the Pamir specimens have the smallest heads, the Kang-ma specimens the largest, while the Guru and Chumbi groups are intermediate. It is noteworthy that a classification by this character is a cross-classification to the division into the two species, since P. 1 and 4 are separated by P. 2 and 3 and P. 2 is widely separated from D. 1 and K. Table iii also shows that there is no overlapping of the extreme measurements between the Pamir and Kang-ma groups.

TABLE II.

Group.			T. L. mm.	B. L. Hd. B.	B. L. Hd. L.	B. L. Hd. Ht.	Number of species measured.
P. 1	..	..	153	9.2	4.4	6.6	5
P. 2	..	..	177	9.06	4.5	..	11
P. 3	..	..	114	8.5	4.7	6.5	12
P. 4	..	..	145	7.9	4.3	6	6
Ch.	..	..	135.75	7.42	4.15	5.90	4
D. 1	..	..	122.75	7.02	4.06	5.06	4
K. 1	..	..	148.8	6.28	4.35	5.21	5
K. 2	..	..	47	6	3.7	4.7	11
G. 1	..	..	40	6.5	3.8	5.3	4
G. 2	..	..	38	7.3	4	5.5	5
							67

The above table gives the average measurements of groups in regard to—

- col. 2, total length;
- „ 3, body length divided by head breadth;
- „ 4, „ „ „ „ „ length;
- „ 5, „ „ „ „ „ height.

Column 6 gives the number of specimens measured.

The following table (p. 82) gives the extreme measurements of individual specimens in the various groups:—

- Col. 2, total length in millimetres.
- „ 3, „ „ „ divided by maximum body height.
- „ 4, „ „ „ „ „ head breadth.
- „ 5, „ „ „ „ „ length.
- „ 6, „ „ „ „ „ height.
- „ 7, head length divided by diameter of eye.

Column 8 gives the number of specimens.

TABLE III.

Group.	Total body length. mm.	T. L. Mx. Bo. Ht.	T. L. Hd. Br.	T. L. Hd. L.	T. L. Hd. Ht.	Hd. L. E.	Number of specimens measured.	
P. 1	185 126 217 125.5 185	5.66 5.12 6.80 4.48 6.60	9.90 8.60 9.38 8.74 9.50	4.66 4.21 4.83 4.37 5.00	 7.30	4.32 3.83 5.70 4.14 5.25	5	<i>S. severzovi</i> , Herzenstein. Pamirs.
P. 2	185 60 154	5.00 6.20 5.00	8.00 8.50 7.20	4.25 4.50 4.22	5.50 6.30 5.50	4.00 5.00 4.00	11	<i>S. stoliczkae</i> , Herzenstein. Pamirs.
P. 3	130 150 128	5.20 4.70 5.00	8.30 7.00 7.35	4.30 4.00 4.25	5.50 6.25 5.25	5.00 4.50 5.00	12	<i>S. stoliczkae</i> , Forsyth M. Pamirs and Leh.
P. 4	113 116 133	4.35 4.75 4.25	6.75 6.50 6.00	3.75 4.50 4.20	5.75 5.00 5.00	5.00 4.50 4.00	6	<i>S. severzovi</i> , Alcock Little Pamir.
Ch.	60 34 45 33 45 33	4.50 4.00 5.00 4.50	6.25 5.50 6.70 6.25 7.23 7.00	3.70 4.00 4.00 3.50 4.00 4.00	5.00 5.50 5.00 5.50 6.00 5.30		4	Chumbi. Bailey, Kennedy.
D. 1	..	..	..	..	..	..	4	Kang-ma, medium.
K. 1	..	..	..	..	..	..	5	Kangna, small.
K. 2	..	..	..	..	..	..	11	Gyantse, river.
G. 1	..	..	..	..	..	..	4	Gyantse, marsh pools.
G. 2	..	..	..	..	..	..	5	

The differences between the specimens from the Pamir and those from the Nyang-chu at Kang-ma may be due to differences in the character of the waters they inhabit or to differences in nutrition. The Nyang-chu is a stream of a most muddy character and it is possible that muddiness of the water, by interfering with respiration, tends to cause an increase of the gill-surface and hence an increase in size of the gill-containing portion of the head.

It should be noted that the relative breadth of the head is less in group G. 2 than in group G. 1 although these two groups are composed of young fish of practically the same size. G. 1 were obtained in the muddy streams around Gyantse, G. 2 from marsh pools close to Gyantse the water of which was entirely free from mud. The value of this observation is of course considerably diminished by the small numbers of the fish in the two groups and their small size.

The specimens from the Nyang-chu were also exceptionally fat and well nourished, whereas those from the Pamirs were of a more hungry appearance.

6. There are considerable variations in the colour of different individuals. The Chumbi race is roughly separated in this respect from the Nyang-chu race.

The following is a note of the colour of a fresh fully grown fish from the Nyang-chu: "Head and body above the latera line a mixture of olive-green and slate-blue, this colour extending somewhat below the lateral line posteriorly. A faint purplish stripe about 3 mm. broad along each side of the dorsal line, commencing at the dorsal fin and extending backward. Flanks below the lateral line rather dull orange-gold; belly dull white."

In the Chumbi valley, on the other hand, the back is pale olive in the anterior half, pale steel-blue in the posterior, and the black pigment is concentrated into irregular spots which are not by any means closely set. The ground colour of the head in spirit is greyish white. The flanks have the golden tinge, but the belly is silvery. Altogether the Chumbi fish is more elegant than its heavily-built cousin from the north. Steindachner (7) describes the colour of the Leh specimens as follows: "Die obere Körper hälfte ist grau, die untere silberfarben. Kopf, Rumpf und Flossen sind mit kleinen schwarzbraunen Flecken und Pünktchen geschprenkelt,"—apparently they resemble the Chumbi specimens.

Specimens from Phari, Guru and Dochen are intermediate between those of Chumbi and the Nyang-chu in respect of colour as well as of general shape. They have the spots of the former but less clearly defined, and the olive ground colour of the back is lighter than in the Nyang-chu and darker than in the Chumbi race.

As I have stated above, the Ssewerzoff type is more often spotted than the Stoliczka: thus Ch. and P. 4 are mainly spotted whereas K. 1 are entirely plain. On the other hand several in D. 1 are spotted.

In the fry (70 mm. and under) the back is of a chocolate-brown with a slight tinge of slate, and there are two rows of irregular

spots on either side, one close to the dorsal line the other on the lateral line.

7. In the district between Chumbi and Gyantse *S. stoliczkae* is the predominant fish. The only species which at all approaches it in numbers is the small loach which also bears the name of *Stoliczka* (*Nemachilus stoliczkae*, Day). Our present subject is, however, much more numerous than even this common species. During the summer numbers were caught every day in the river at Gyantse, while the irrigation channels, the small shallow ponds amongst the fields, and the pools of the marshes at Sechen were alive with shoals of the fry.

In comparison with the above two very numerous forms other species are somewhat uncommon. During an entire summer, although I had about half a dozen men in my employment who all had some acquaintance with the art of fishing, I did not obtain more than four or five specimens of any other species. Arranged roughly in order of frequency the other species found would run (*vide* Lloyd, 5): *Ptychobarbus conirostris*, Steind., *Oreinus baileyi*, Lloyd, *Schizothorax macropogon*, Regan, and *S. o'connori*, Lloyd, *Gymnocypris* (*Schizopygopsis*) *stewartii*,¹ Lloyd, and *Paraxosoma stoliczkae*, Day.

It is clear that this fish is also one of the most common if not the most common of the inhabitants of the upper waters of the Indus, Oxus and Sutlej.

8. Breeding and migration.—The breeding season in the neighbourhood of Gyantse appears to occur about June. In the less favoured waters near the watershed it is probably somewhat later. Adults with large ovaries and testes are found in the former district as early as March when the river is still partially covered with ice and the smaller streams and channels are completely frozen over.

Small post-larval fish (*vide* pl. iii, fig. 4) measuring 14-15 mm. in length were caught among the water-weeds of a shallow pond near Gyantse on the 9th July. I believe that these are the young of *S. stoliczkae*; they are elongated narrow little beings, the maximum height including the fins being to the length as 1 : 7. The head is roughly cylindrical, the snout is rounded and projects beyond the mouth. There is an upper and a lower lip at the corners of the mouth; and the mouth and lower jaw closely resemble those of the reputed parent.

The following are the measurements of two specimens:—

Total length ..	..	..	14 mm.	15 mm.
Length of head ..	..	..	2.8 "	2.5 "
Snout to commencement of preanal fin	4.5 "	4 "		
" " " " dorsal "	6.8 "	6.5 "		
" " anus ..	..	..	9.5 "	10 "

¹ This animal was described by Lloyd as *Schizopygopsis stewartii*, but as the mouth is terminal and the lower jaw does not bear a sharp horny cutting edge, it appears more in place in the genus *Gymnocypris*.

Anus to tail ..	..	..	4.5 mm.	5 mm.
Pectoral fin, length ..	..	..	..	1.5 "
Maximum height ..	..	..	2	..

The caudal fin is in process of being formed on the upturned end of the cord. The pectoral fins arise close behind the gill-opening; ventral not present. The dorsal and anal fins are continuous round the tail. There is a preanal fin.

They are marked with pigment of two kinds—chocolate-brown and black. The former appears to be situated very superficially in the skin; the latter lies more deeply in mesodermal structures such as the peritoneum and periosteum. The skin is so delicate as to be transparent.

The brown pigment occurs in round corpuscles on the back of the head and body, and in stellate corpuscles on the flanks, on the caudal fin and on either side of the ventral-median fins. The black pigment, on the other hand, is found along the lateral line, on the abdomen and in a few corpuscles on the head.

In view of what is known regarding the development of other carp, such as *Cyprinus carpio*, *Leuciscus rutilus* and *idus*, and *Alburnus lucidus* (Ehrenbaum, 3), we will be safe in regarding these young forms as being from 10—20 days old, so that, allowing 4—5 days for hatching, the eggs must have been laid in the second half of June.

Coming to the older fry, the following table gives the measurements in millimetres of the specimens taken during different months of the year:—

March ..	30, 32, 42, 43, 45, 47.—Gyantse, in the Nyang-chu, under ice.
April ..	{ 22, 26, 27, 31, 34, 37, 42, 49.—Gyantse, in marsh pools. 125.—Ling-ma-tang.
July ..	{ 14, 15, 27, 31, 34, 45, 53, 60, 135.—Gyantse. 58, 103, 120.—Dochen. 135.—Ling-ma-tang.
August ..	70.—Phari.
November ..	32, 35, 36, 40, 42.—Gyantse.

The November group, clearly, are in their first year, the March and April groups from Gyantse in their second; there is, however, practically no difference in the measurements if we leave out of account the 125 mm. specimen from Ling-ma-tang. It is therefore probable that an average of 40 mm. represents the first summer's growth, that growth does not occur in the winter months or until May or June and that the 125 mm. specimen was in its third year. The reproductive organs of specimens of about this size are still immature.

Arranging the specimens in the order of their age we would probably get the following result:—

First year.

June	..	..	Spawning.
July 9th	..	..	14—15 mm.
„ 27th	..	..	26 „
„ „	..	..	34 „
November	..	..	32—42 „

Second year.

March	..	..	31—57 mm.
April	..	..	22—49 „
July	..	..	45—60 „
August	..	..	70 „

Third year.

April	..	..	125 mm.
July	..	..	103—135 „

All the inhabitants of Gyantse whom I consulted in regard to obtaining fish during the winter agreed that the larger fish migrated from the Nyang-chu to the Brahmaputra (Tsang-po) for the winter and returned to breed in spring. It is certain that I did not obtain any large fish during this season, but this fact could also be accounted for by the hibernation of either the fish or the fishermen. We shall see that in the neighbourhood of Dochen fish of the genus *Gymnocypris* attain to a great size and complete sexual maturity although unable to migrate below 14,600 feet.

Enemies.—The only predatory fish in the district under consideration is *Gymnocypris stewartii*, Lloyd. This animal undoubtedly preys on the fry of its ally *Schizopygopsis stoliczkae*, but it does not appear to be very numerous. I have heard from anglers who have had considerable experience in Kashmir that “snow trout” occur above the Mahseer. *Schizopygopsis stoliczkae* is certainly included in the vague group of snow trout, and it is highly probable that its descent to lower levels is prevented by the voracious *Barbus tor*. The geese and duck which occur in great numbers on the Rham Tso and along the Nyang-chu must be reckoned among its most active enemies.

9. Summary.—It is not justifiable to separate *Schizopygopsis severzovi* from *S. stoliczkae* as a distinct species, since they can only be distinguished by one character and a complete series of gradations occur from the one extreme type of head to the other. The fish from any single narrow locality appear to incline to one type or the other. Thus all specimens from Kang-ma are Stoliczka's type, from Guru Stoliczka's, the Chumbi valley Ssewerzoff's. The Oikul group P. 4, on the other hand, contains both the extremes as well as intermediates.

The western members of the species differ from the eastern Tibetan in the size of the head relatively to the body, the head

in the former being narrower, shorter and lower than in the latter. The Chumbi valley race is intermediate in this proportion. Variation in this character is independent of variation in head form.

The species inhabits an extensive but clearly defined area extending from Badakshan and the Pamirs to the Eastern Himalaya and including the upper waters of the Oxus, Indus, Sutlej, and Brahmaputra (Tsang-po). On the south face of the Himalaya it has hitherto been found in the Chumbi valley only.

Its characteristic habitat is in the streams and small rivers of the open, treeless, flat, grassy uplands at an elevation of 11—16,000 feet: broad valleys in the centre of which a river runs with moderate rapidity, while on either side are marshy pools fed by springs, shallow ponds or irrigated land.

It is a highly successful and very numerous species, closely adapted to its surroundings. It breeds in June and possibly also in May and July. Sexual maturity is not attained before the fourth year.

Table iv (p. 88) gives measurements of the individual fish in groups P. 4, D. 1, D. 2, K. 1 and Ch., in regard to the following characters. Column 2 gives the registered number of the specimen in the Indian Museum:—

Col. 3,	length of body in millimetres.
	$\frac{\text{total length}}{\text{total length}}$
„ 4,	$\frac{\text{maximum height of body.}}{\text{total length}}$
„ 5,	$\frac{\text{maximum breadth of head.}}{\text{total length}}$
„ 6,	$\frac{\text{length of head}}{\text{total length}}$
„ 7,	$\frac{\text{height of head.}}{\text{total length}}$
„ 8,	$\frac{\text{length of head}}{\text{diameter of eye.}}$
„ 9,	relation of anterior margin of mouth-cleft to the lower margin of orbit.

II. THE ADULT AND YOUNG FORMS OF *Gymnocypris waddellii*, REGAN.

Gymnocypris waddellii, Regan (6).

Ind. Mus. Nos. F. $\frac{2802}{1}$, $\frac{2803}{1}$ and $\frac{2844-2849}{1}$.

Two adults and six young were taken by Capt. Kennedy in a stream flowing into the Rham Tso near Chalu Bridge (*vide* pl. iii, fig. 5).

The following description is taken from the two adults:—

Length 417, 440 mm. D. ii. 7, 8. An. ii. 6. P. i. 21. V. i. 9.

TABLE IV.

Group.	Regd. No. of specimen.	Body length. mm.	B. L. Mx. Bo. Ht.	B. L. Mx. Hd. Br.	B. L. Hd. L.	B. L. Hd. Ht.	Hd. L. E.	Ant. margin Mouth, Lower edge of Eye.
P. 4	14142	154	5'3	7'2	4'22	5'5	5	2 mm. below.
	14141	149	5'2	8	4'5	6'1	4'5	3 mm. below.
	14143	150	5	7'8	4'3	5'8	4'8	"
	14144	140	5'2	8	4'3	6'1	4'1	1 mm. below.
	14146	144	5'6	8'3	4'3	6'3	4	At level.
Average of group P. 4 ..	14145	136	6'2	8'5	4'3	6'3	4'5	"
	..	145'5	5'4	7'9	4'3	6	4'5	
D. 1	2850	128	4'35	7'35	4'25	5'00	5'00	3 mm. below.
	2851	113	5'00	7'00	4'00	5'25	5'00	"
	2854	115	4'35	6'75	3'75	5'00	5'00	6 mm. below.
	2855	135	4'75	7'00	4'00	5'00	5'00	"
Average of typical Stol. Dochon group.	..	122'75	4'61	7'02	4'00	5'06	5'00	
D. 2 ..	2856	115	4'30	7'50	4'20	4'75	4'35	2 mm. below.
	2857	166	4'75	6'20	4'50	5'35	4'75	
K. 1	2858	133	4'25	6'35	4'35	5'50	4'50	
	2859	150	4'50	6'35	4'20	5'00	5'00	
	2860	155	4'35	6'00	4'35	5'00	4'75	
	2861	140	4'70	6'50	4'35	5'20	4'50	
	..	148'8	4'51	6'28	4'35	5'21	4'70	
Average of group K. 1 ..	2870	150	5'00	8'35	4'35	6'25	4'50	
Ch.	2871	130	4'70	7'35	4'00	6'00	4'50	
	2872	128	..	7'00	4'25	6'00	5'00	
	2873	135	5'20	7'00	4'00	5'35	5'00	
Average of group Ch. ..	..	135'75	4'96	7'42	4'15	5'90	4'75	

I was not able to find the small first dorsal spine described by Tate Regan in these specimens.

The snout is blunt, the mouth terminal, jaws equal. The greatest height of the body is attained very shortly behind the head. The distance from the anterior end of the dorsal fin to the snout is less than to the rudimentary rays of the caudal.

Colour—One specimen is of a dull slate colour on the back of head and body, with a dull white belly and a tinge of gold along the lateral line posteriorly; in the other the pigment of the back is aggregated into small spots about 1 mm. in diameter which are set closely with very narrow spaces between.

The detailed measurements are given in table v (p. 91).

Following Herzenstein's key (4)—

The second dorsal spine is well developed and has somewhat flat teeth; the anterior end of the mouth is below the level of the lower margin of the orbit; there are no scales on the belly in front of the ventrals; the gill-rakers on the first branchial bar number, outer row 17, inner 30. The distance from the beginning of the dorsal to the snout is less than to the rudimentary rays of the caudal. This species therefore comes near *Gymnocypris roborowskii*, Herz. It differs from the latter in the proportion of the maximum height of the body to the length: $6\frac{2}{7}$ — $5\frac{2}{5}$ in *roborowskii*, $4\frac{1}{2}$ in *waddellii*.

The specimens with which we are dealing at present differ from the description of *G. waddellii* given by Tate Regan in that the anterior edge of the upper jaw is distinctly below the lower margin of the orbit. In the specimen of the species (one of the types) which was kindly presented by the British Museum to the Indian Museum, I find, however, that it is somewhat doubtful whether the anterior edge of the upper jaw is not also below the lower margin of the orbit, and, taking into account the differences of size and of the methods of preservation of Waddell's and Kennedy's specimens, it does not appear justifiable to separate them by so small and doubtful a distinction.

Both specimens were females; one was ripe, the other was not so owing to extreme infection with hydatids. In the ripe specimen the largest ovarian ova attain the impressive size of 2.5 mm. in diameter, almost double that of the extruded eggs of *Cyprinus carpio* and *Gobio fluviatilis* (Ehrenbaum, 3, pp. 132 and 135). The snout bears a pad of sharp-pointed horny nuptial tubercles, giving a sensation like a nutmeg-grater to the finger. Rows of large glands are developed on the anal fin, which even between the rays is of almost cartilaginous consistency. The scales of the anal sheath are very prominent, are attached by their bases only and measure as much as 10×9 mm. The glands and the sheath are used presumably in attaching the eggs to the substratum.

It was mentioned above in dealing with *Schizopygopsis stoliczkae* that the waters of the Rham Tso and Kala Tso are isolated by the subterranean egress of the Nyang-chu from the latter

lake; these large fish are therefore never able to migrate below 14,600 feet.

Gymnocypris waddellii, Regan: young forms.

Six specimens from a stream running into the Rham Tso near Chalu Bridge, obtained by Capt. Kennedy, I.M.S., on 30th July, 1909. They are from the same stream as the two large specimens.

Br. iii. D. ii. 8. An. ii. 6. P. i. 19. V. i. 9.

General shape.—This is an elegant fish which does not offer the ground-feeding appearance of its low-born parents and of many of its relatives. This is due chiefly to the fact that there is no humping of the back in front of the dorsal fin. The mouth is practically terminal, being only very slightly overhung by the upper lip and is above the level of the lower margin of the orbit. The maximum height of the body is situated at the commencement of the dorsal fin. The length of body in front of the commencement of the dorsal fin is to that behind this point as 1 is to 1.14. The postdorsal height is to the maximum height as 1 is to 1.35. The height of the tail is to the maximum height as 1 is to 2.87. The length of the first spine of the dorsal fin is to that of the second as 1 is to 1½; the second is serrated in its lower two-thirds, pointed above.

Gill-rakers of first bar number, inner row 19—20, outer row 12.

Colour.—Black or blackish grey with moderate-sized darker brownish spots most marked along lateral line; belly silvery. Dorsal and caudal fins blackish grey; pectorals, ventrals and anals not pigmented.

The largest specimen contains fairly well-developed testes.

III. *Gymnocypris hobsoni*, sp. nov.

(Plate iii, fig. 6.)

A single specimen in the Indian Museum (No. $\frac{152}{1}$) presented by Mr. H. E. Hobson of the Imperial Chinese Customs Service. According to the entry in the register it was obtained from the eastern confines of Tibet.

It measures 145 mm. in length including the caudal fin, 120 without the caudal.

Br. iii. D. ii. 8. A. ii. 5. P. i. 15. V. i. 18.

The mouth is subterminal; the lower jaw slightly shorter than the upper. The anterior end of the mouth is slightly above the level of the lower margin of the orbit. The maximum height of the body is attained about the level of the anterior end of the dorsal fin. The distance from the anterior end of the dorsal to the snout is considerably less than from the same point to the base of the caudal (1 : 1.23). The second dorsal spine is strongly toothed in its lower half.

The animal is of delicate build; the fin-rays fine.

Colour in spirit.—Silvery with yellowish brown underlying colour on back of head and body.

Following Herzenstein's key (4)—

The dorsal spine: the upper half is segmented, the lower half bears well-developed teeth. The anterior end of the mouth-cleft lies slightly above the lower margin of the orbit. The gill-rakers on the first pharyngeal bar number, outer row 11, inner row 15. Among the species described by Herzenstein it appears to approach most closely to *G. maculatus*, Herz. It is separated from the latter by the differences in the fin formulae, by the absence of "humping" in front of the dorsal fin, by the smaller numbers of the pharyngeal teeth, by the forward position of the dorsal fin and by the colour. No grey coloration of back; no spots.

It differs from the young of *G. waddellii* in the following points: An. ii. 5 (not ii. 6); V. i. 18 (not i. 9). Does not slope so rapidly from the commencement of the dorsal fin, thus the maximum body height is to the post-dorsal as 1.10 to 1 (not 1.35 to 1). Maximum body height to the minimum is as 2.30 to 1 (not 2.87 to 1). The predorsal body height is to the postdorsal as 1 to 1.23 (not 1 to 1.14). The length of the first dorsal spine to that of the second is as 1 to 2 (not as 1:1 $\frac{1}{3}$). The numbers of the pharyngeal teeth, the forward position of the dorsal fin, and the difference of colour.

The following table gives the measurements of two adult specimens of *Gymnocypris waddellii*, Nos. $\frac{2862}{1}$ and $\frac{2863}{1}$, of one young specimen of this species, No. $\frac{2819}{1}$, and of *G. hobsonii*, sp. nov., No. $\frac{452}{1}$:—

TABLE V.

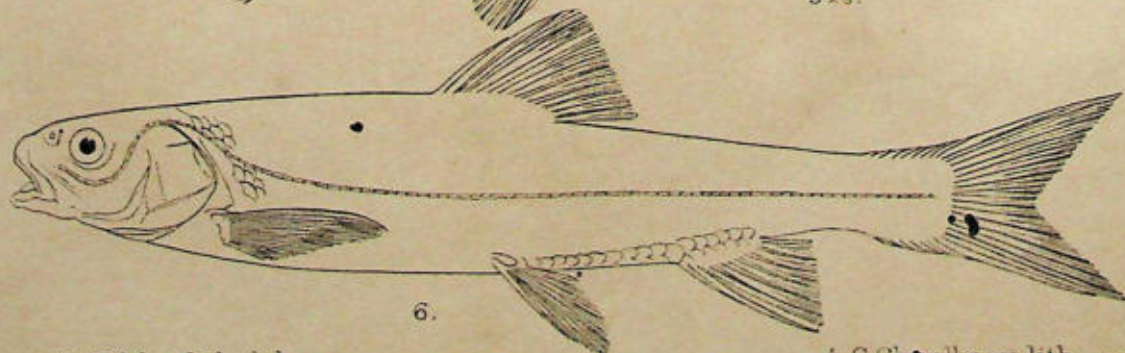
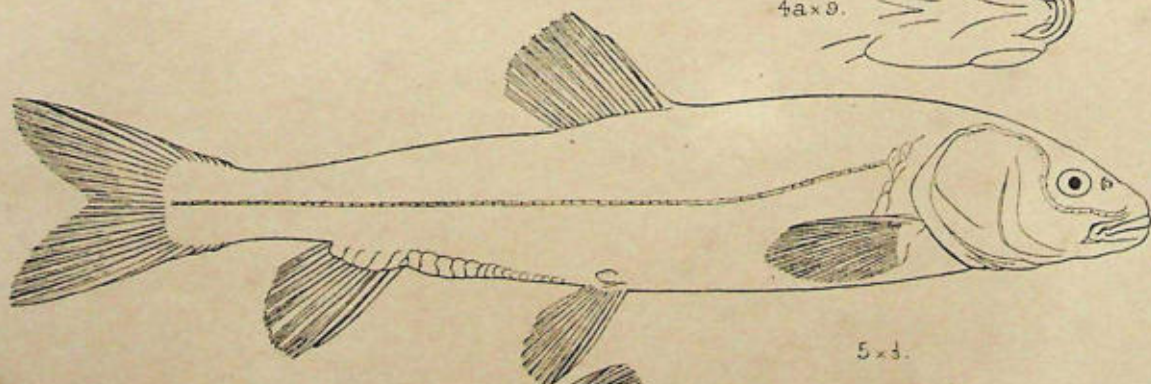
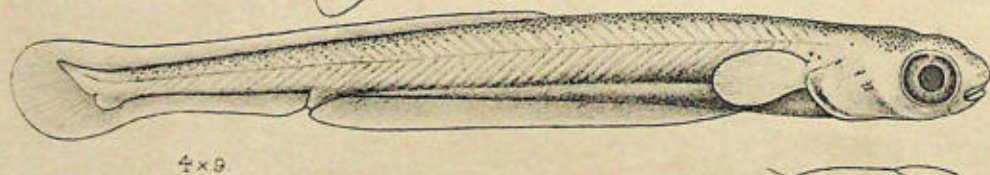
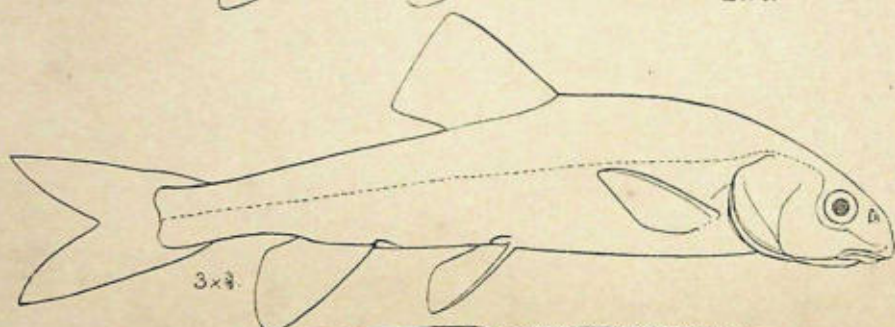
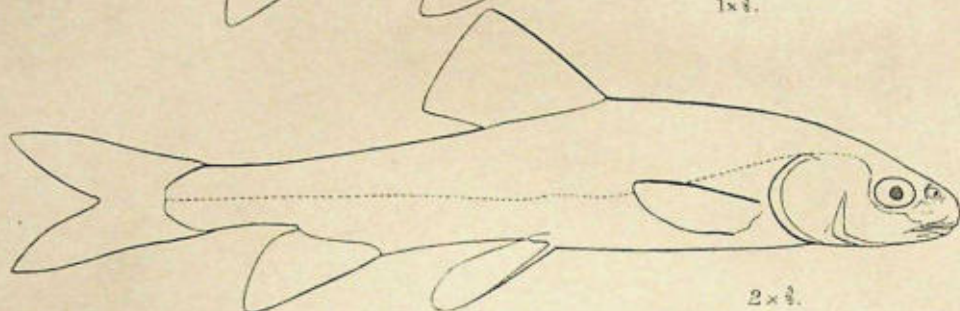
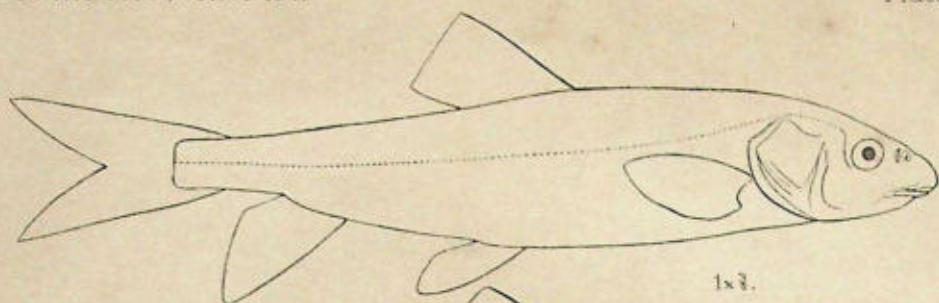
Indian Museum Register No.	..	..	$\frac{2862}{1}$	$\frac{2863}{1}$	$\frac{2819}{1}$	$\frac{452}{1}$
Total length in millimetres	..	..	417	440	125	145
Body length	..	..	360	380	101	122
Body length: maximum body height	..	..	4.50	5.00	5.40	5.50
Maximum body height: postdorsal	..	..	1.46	..	1.35	1.10
Maximum body height: minimum	..	..	3.10	..	2.87	2.30
Body length: length of tail from posterior of base of anal.	..	..	6.00	..	5.50	5.00
Length of tail: height of tail	..	..	2.50	..	2.30	2.00
Body length: head length	..	..	4.35	4.25	4.20	4.60
Head length: head breadth	..	..	1.50	..	1.80	1.90
Head length: head height	..	..	1.50	..	5.80	1.45
Breadth of mouth: length of mouth	..	..	1.65	..	1.20	1.50
Head length: diameter of eye	..	..	6.20	6.00	4.20	4.50
Interorbital: diameter of eye	..	..	2.30	..	1.10	1.60
Head length: postorbital head length	..	..	1.65	..	2.00	1.85
Body length: base of dorsal	..	..	8.00	..	6.60	7.30
Height of dorsal: base of dorsal	..	..	1.20	..	1.20	1.30
Maximum height of dorsal: minimum	..	..	2.30	..	2.00	2.00
Body length: pectoral fin length	..	..	6.30	..	5.20	5.50
Body length: ventral fin length	..	..	7.50	..	6.30	6.40
Body length: head breadth	..	..	6.50	7.00	7.50	9.00
Body length: head height at level of posterior edge of opercle.	..	..	4.75	5.50	5.35	6.50

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EXPLANATION OF PLATE III.

- FIG. 1.—*Schizopygopsis stoliczkae*, Steind., group Ch., No.
 " 2.— " " " " F. $\frac{2853}{1}$, $\times \frac{3}{4}$.
 " 3.— " " " " " P. 4, No. 14146, $\times \frac{3}{4}$.
 " 4.— " " " " " K. 1, $\times \frac{3}{4}$.
 " 4a.— " " " " " postlarval, $\times 9$.
 " 4a.—Lower surface of head of same specimen. $\times 9$.
 " 5.—*Gymnocypris waddellii*, Regan, adult, $\times \frac{1}{4}$.
 " 6.— " *hobsonii*, sp. nov., nat. size.



IX. PRELIMINARY DESCRIPTIONS OF
NEW SPECIES AND VARIETIES OF
CRUSTACEA STOMATOPODA IN
THE INDIAN MUSEUM.

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

The following short descriptions of twelve new forms are preliminary in nature and will be succeeded, at no distant date it is hoped, by a full illustrated account.

The late Mr. J. Wood-Mason took a special interest in this group and would doubtless have published an extensive memoir on them, had he lived. To a considerable number of the new forms he had assigned manuscript names and from the notes and figures which he had made Col. Alcock, in 1895,¹ was able to edit an account of nine species. Other forms were also recognized under manuscript names, but from the rough notes which were available it was found impossible to draft adequate specific descriptions.

Wherever possible I have retained the names adopted by Wood-Mason and, thanks to the considerable additions which have since been made to the collection, I have also to introduce a number of other new species, most of which have been obtained by the R.I.M.S.S. 'Investigator.'

Gonodactylus (Protosquilla) nefandus, sp. nov.

This species is allied to *Gonodactylus trispinosus*, Dana, *G. pulchellus*,² Miers, and *G. tuberosus*, Pocock. Its closest affinities are with *G. pulchellus* and along with that species it may be distinguished from *G. trispinosus* and *tuberosus* by the smooth and unsculptured median portion of the fifth abdominal somite.

Several examples of *G. pulchellus* from Ceylon (the type locality) are preserved in the Indian Museum and, compared with these, *G. nefandus* shows the following distinctive features:—

The antero-lateral pair of rostral spines are short and stout and though acute are not nearly so slender as the median; the distal concavities between the teeth are also much less deep with the result that the undivided basal part is considerably longer. The dorsal processes of the ophthalmic somite consist of two

¹ J. Wood-Mason. *Figures and descriptions of nine species of Squillidae in the Indian Museum*. Calcutta, 1895.

² *G. pulchellus* was originally described by Miers as a variety of *trispinosus*, but in my opinion is entitled to rank as a distinct species.

small plates with rectangular antero-lateral angles; in *G. pulchellus* these angles are narrow and acute and are produced obliquely outwards. The distal margin of the telson is in both species divided into four lobes on either side of the median line, but these in *G. nefandus* are merely bounded by grooves on the dorsal surface whereas in *G. pulchellus* they are separated by three incisions, cut right through the telson, which extend about half way to the outer of the three dorsal boss-like protuberances.

A number of specimens, the largest 39 mm. in length, from the Andamans, Cheduba (Arrakan Coast) and the Straits of Malacca.

Odontodactylus southwelli, sp. nov.

Odontodactylus southwelli is related to *O. hanseni*, Pocock, and *O. latirostris*, Borradaile, and, as in those species, the anterior half of the telson bears three carinae on either side between the median crest and the thickened lateral margin. The outermost of these three carinae is parallel to the external margin and does not diverge to the apex of the lateral spine as in *O. japonicus*. From all species with more than three teeth on the inner margin of the dactylus of the raptorial claw it may be distinguished at a glance by the enormous size of the eyes.

The rostrum is twice as broad as long and the anterior margin is evenly rounded from side to side. The breadth of the cornea is contained from two to two and a quarter times in the length of the carapace. The dactylus of the raptorial claw bears seven to nine teeth on its inner margin in addition to the terminal one. The lateral margins of the sixth and seventh thoracic somites are rounded, the former being a trifle broader than the latter. There are eight carinae on the dorsal surface of the sixth abdominal somite; the first intermediate carina, which alone does not terminate in a spine, is connected proximally by means of a ridge with the submedian. On the margin of the telson there are twelve to sixteen minute submedian spinules, two intermediate denticles and one lateral. In the uropod the outermost of the ten or eleven movable spines which fringe the exopod reaches almost or quite to the apex of the ultimate joint.

Several specimens, the largest 37 mm. in length, from the Andamans and Ceylon.

Lysiosquilla insignis, sp. nov.

This species does not appear to possess much affinity with any form previously described.

The rostrum is triangular, one and a half times as long as wide, and terminates in a sharply acute apex. The cornea is set obliquely on the eyestalk and its breadth is about one third the mid-dorsal length of the carapace. The dactylus of the raptorial claw bears seven or eight teeth including the terminal one, the penultimate tooth, as in *L. acanthocarpus*, being noticeably

shorter than the antepenultimate. The sixth thoracic somite has an angular dorsal elevation on either side near the anterior edge: antero-laterally the margin is deeply excavate and behind this it projects in the form of a truncate lobe with rounded subrectangular anterior and posterior angles. The postero-lateral angles of the last three abdominal somites are sharply spinous. The fifth somite is provided with two obscure longitudinal carinae on either side; the sixth bears laterally near the distal margin a pair of spines in addition to those at the postero-lateral angles. These spines form the terminations of irregular carinae. The telson is provided dorsally with a trilobed median prominence, on either side of which there is a sharp intermediate spine and an angular lateral lobe. This armature is placed near the distal edge and is homologous with the curved row of spines found in *L. acanthocarpus* and *L. latijrons*; in front of it there are eight longitudinal carinae the outermost of which is proximally bifurcate. On the margin of the telson there are two long movable submedian spines and two pairs of large fixed laterals. There are four short spines between the submedians and the first laterals, and one between the two laterals. Six movable spines fringe the outer margin of the basal joint of the exopodite of the uropod and of these the two outermost are curved and much longer than the next of the series.

One specimen found in the neighbourhood of the Andamans in 235 fathoms.

Squilla gilesi, Wood-Mason, MS.

Squilla gilesi is related to *S. lata*, Brooks, but may readily be distinguished from it by the following characters:—

The carapace in front of the cervical groove is wholly without trace of carinae and its anterior margin on either side of the rostrum is strongly sinuous. The lateral edges of the rostrum are not concave near the apex as in *S. lata* but are evenly convex, and the lateral spinous process of the fifth thoracic somite is longer than in that species and has a stronger forward inclination. There are sharp submedian carinae on the last two thoracic and on all the abdominal somites. The sublateral carinae on the last three or four somites and the lateral carinae on the last four, five, or six terminate in spines. On either side of the median crest of the telson the impressed parallel lines found in *S. lata* are not visible and on the margin there are two or three submedian denticles, five to eight intermediate and one lateral. The inner margin of the bifurcate process of the uropod is finely serrate, not spinous.

The median carina and margins of the telson are strongly swollen in the adult male and the raptorial dactylus, which bears six teeth including the terminal one, is, in this sex, strongly sinuous: convex in the female. In the adult male, also, the propodus of the raptorial claw is very strongly dilated near its distal end.

This species bears a somewhat close superficial resemblance to *S. scorpio*, Latr.; but, apart from such details as the form of the rostrum and the carination of the carapace, there is in *S. gilesi* a well-developed three-jointed mandibular palp, an appendage which in *S. scorpio* is entirely missing.

Thirteen specimens of *S. gilesi*, the largest 94 mm. in length, are in the collection. They were found between 35 and 80 fathoms in the Persian Gulf, Bay of Bengal and Gulf of Martaban.

Squilla hieroglyphica, sp. nov.

This species is closely allied to the little known *S. laevis*, Hess. a form which appears to be restricted to the coasts of New South Wales. Mr. D. G. Stead has kindly presented us with examples of that species and, on comparison, *S. hieroglyphica* shows the following differences:—

The anterior bifurcated portion of the median carina of the carapace is entirely absent; the carapace is much narrower than in *S. laevis*, the anterior width being only about half the median length, including the rostrum. The rostrum is as long as wide and its lateral margins converge to a narrow rounded apex. The cornea of the eyes is set transversely on the stalk. The dactylus of the raptorial claw is armed with only five teeth including the terminal one. The lateral process of the sixth and seventh thoracic somites is more broadly rounded and the sublateral carinae of the fourth abdominal somite end in spines. The denticles on the margin of the telson are represented by the formula 5, 10—12, 1, whereas in *S. laevis* the corresponding numbers are 2—3, 6—8, 1.

Both species agree in having the lateral process of the fifth thoracic somite bilobed and that of the two succeeding somites unilobed, differing in this respect from all other species with the same number (eight) of longitudinal carinae on the abdomen; from both species, moreover, the mandibular palp is absent.

A single specimen of unknown locality, 53 mm. in length, is preserved in the Indian Museum.

Squilla gonypetes, Wood-Mason, MS.

S. gonypetes is closely allied to Brooks' *S. quinquedentata*, but may be distinguished by the following characters:—

The rostrum is distinctly longer and its upturned lateral margins are rather more strongly convergent anteriorly. The cornea of the eyes is a little more expanded and is set very obliquely on the stalk. The antennular peduncle is longer than the carapace excluding the rostrum. The outer inferior margin of the merus of the raptorial claw is distally rounded and does not project in the form of a spine. The sublateral carinae of the last three, and the lateral carinae of the last four abdominal somites end in spines.

Four specimens, the largest 56 mm. in length, from the Persian Gulf, Andaman Is. and the Arrakan Coast.

Squilla boopis, sp. nov.

This species is allied, though not very closely, to *S. quinque-dentata* and *S. gonypetes*, and is easily distinguished from both by the enormous size of the eyes.

The rostrum bears a sharp median longitudinal carina in its distal half. The cornea is set very obliquely on the stalk and its greatest breadth is considerably more than one third the median length of the carapace. The antero-lateral angles of the carapace are produced as acute points which project outwards and downwards and scarcely reach at all forwards beyond the adjacent anterior margin. The lateral margin of the seventh thoracic somite is not bilobed but is angled acutely behind and rectangularly in front. The sublateral carinae of the last five and the lateral carinae of all the abdominal somites terminate in spines.

The dactylus of the raptorial claw bears five teeth including the terminal one and the lateral processes of the fifth and sixth thoracic somites are bilobed. In both these characters *S. boopis* resembles the two species mentioned above.

A single specimen, 89 mm. in length, from the Gulf of Martaban, 67 fathoms.

Squilla holoschista, Wood-Mason, MS.

This well-marked species is closely allied to *Squilla nepa*, Latr., and agrees with it in the form of the eyes, the number of spines on the raptorial dactylus and the shape of the lateral processes of the fifth to seventh thoracic somites. It may be distinguished by the following characters:—

The median carina of the carapace, in front of the cervical groove, is bifurcated anteriorly for less than one third of its length and is finely bicarinate throughout almost its entire extent. The cornea of the eyes is slightly but noticeably less expanded than in *S. nepa*, specimens of similar size being compared. The submedian carinae of the fourth abdominal somite never end in spines.

In the adult male the distal end of the propodus of the raptorial claw is much broader than in *S. nepa* of the same sex and the external margin of the dactylus is only very feebly sinuous.

Numerous specimens from the east coast of India, from Ceylon to the Ganges delta.

The three following forms are very closely allied to *Squilla oratoria*, de Haan (= *S. affinis*, Berthold), and in order to facilitate comparison the following short account of the principal features which separate that species from its near allies is given:—

The breadth of the carapace, measured at the antero-lateral angles is distinctly less than half its median length, including the rostrum. The median carina of the carapace is bifurcated anteriorly for about one quarter its length in front of the cervical

groove and is sharp and distinct throughout its course. The dorsal surface both of the carapace and abdomen is usually strongly punctate and never presents a polished appearance. The anterior margin of the ophthalmic somite, between the bases of the eye-stalks is squarely truncate or emarginate, never pointed. The dorsal carina of the carpus of the raptorial claw bears from three to five sharp tubercles; the outer margin of the dactylus is sinuous. In the bifurcate process from the basal joint of the uropod the margin anterior to the small lobe on the external edge of the longer spine is always strongly concave.

I have reason to believe that this species is found in its typical form only in Chinese and Japanese waters. Three specimens from the Hawaiian and Philippine Is. have also been examined, but these differ from the others in several minute details. They may possibly represent a distinct sub-species, but the material at my disposal is not sufficient to establish this with any certainty.

All previous references of *Squilla oratoria* or *affinis* from localities west of the Philippine Is. are, I believe, based on one or other of the new forms described below, and of this in several instances I have direct proof. In all, several hundreds of specimens have been examined, including a fine collection from many widely distant localities kindly lent by the Trustees of the British Museum.

Squilla oratoria, de Haan, var. *perpensa*, nov.

This variety is distinguished from the typical form by the following characters:—

The median carina of the carapace is interrupted and wholly absent for a short space at the base of the anterior bifurcation. The two arms of the bifurcate portion are frequently very fine and are rarely obsolete. The carpus of the raptorial claw has a sharp elevated carina on its dorsal aspect which terminates abruptly before reaching the anterior margin; apart from this there is no trace whatever of any dorsal tubercle.

Very numerous specimens from localities ranging from Hong-kong and N. Australia to the Persian Gulf. The largest example is 107 mm. in length. Four specimens only out of the large series examined exhibit characters intermediate between the variety and the typical form.

Squilla interrupta, Wood-Mason, MS.

This abundant species may be separated from *S. oratoria*, s.s., by the following characters:—

The median carina of the carapace is interrupted at the base of the anterior bifurcated part precisely as in the var. *perpensa*. The breadth of the cornea of the eyes is distinctly less than in either of the two preceding forms, specimens of similar size being compared. The carpus of the raptorial claw is constantly provided with two, and only two, stout dorsal tubercles. In the bifurcate

process from the base of the uropod the outer margin of the longer spine anterior to the well-developed lobe is never concave; it is occasionally feebly sinuous, but in nearly every instance is definitely convex.

Very numerous specimens, the largest 119 mm. in length, exhibit the above characters with most remarkable constancy. They were taken at localities ranging from Hongkong to the Persian Gulf.

Squilla wood-masoni, sp. nov.

Squilla polita, Wood-Mason, MS., *nec* Bigelow.

Squilla wood-masoni may be separated from *S. oratoria*, its variety *perpensa* and *S. interrupta* by the use of the following characters:—

The dorsal surface of the carapace and abdomen is smooth, highly polished and without trace of punctuation. The carapace is shorter and broader than in any of the preceding forms, its breadth at the antero lateral angles being *at least* one half its length including the rostrum. The anterior bifurcated portion of the median carina of the carapace is entirely obsolete. The distal edge of the ophthalmic somite is produced to a small point between the bases of the eyestalks and is not truncate or slightly emarginate as in the preceding forms. The eyes are large, much as in *S. oratoria*, and the carpus of the raptorial claw also resembles that species in bearing three or four tubercles on its dorsal edge. The dactylus of the same limb is strongly sinuate externally and is of a much more clumsy build than in any of the preceding forms. The bifurcate process of the uropod is similar to that of *S. oratoria*, but the lobe on the external margin of the longer spine is, in all except very young specimens, much smaller.

Numerous examples, the largest 109 mm. in length, from localities ranging from Hongkong to Aden.

Squilla annandalei, sp. nov.

This species is closely allied to the well-known *S. raphidea*, Fabr., and the propodus of the raptorial claw bears, as in that species, a number of large fixed spines along the margin opposed to the dactylus. It may be distinguished by the following features:—

The rostrum is shorter—more so than in the form of *S. raphidea* which de Haan described under the name of *harpax*—and its apex is more broadly rounded. The antennular peduncle is longer than the rostrum and carapace combined. The anterior lobes of the lateral margins of the sixth and seventh thoracic somites are quite distinct, whereas they are wholly obsolete in *S. raphidea*. The sublateral carinae of the last three thoracic and the submedian carinae of the last two abdominal somites end in spines. The marginal spines of the telson are sharper than in *S. raphidea* and the inner uropod is narrower in proportion to its length.

Spirit specimens differ noticeably from the allied species in the colour of the inner uropod. This in *S. annandalei* is entirely jet black, except for a pale median longitudinal stripe, whereas in *S. raphidea* the inner margin only is suffused with black pigment.

Four specimens, the longest 115 mm. in length, from the Gulf of Martaban between 53 and 67 fathoms.

X. NOTES ON THE DEVELOPMENT OF
SOME INDIAN ASCALAPHIDAE
AND MYRMELEONIDAE.

By F. H. GRAVELY and S. MAULIK.

[N.B.—The plate (v) illustrating this paper has not yet been received from Europe. It will be published in the next number of these "Records."]

CIRCUMSTANCES OF CAPTURE.

The three species of Ascalaphid and Myrmeleonid larvae described in this paper differ in habit from all larvae of these families whose habits have hitherto been described, in that they neither cover themselves completely with a cloak of debris in order to conceal their real nature from the insects on which they prey nor hide themselves under stones or in the ground, but live upon tree-trunks in hollows and crevices of the bark where the Ascalaphid larvae at least are rendered sufficiently inconspicuous by their form and colour alone (see plate v, figs. 2 and 3). The larvae of *Myrmeleon contractus*, Walk.¹ (figs. 5 and 6), were found by Mr. Paiva on December 20, 1909, at Bhogaon, Purneah District, Bengal, upon the trunks of some mango trees which were coated with dried mud. One specimen was found hidden in an actual pocket in this mud coat, from which only its jaws projected each in its own close-fitting groove; but all the rest (5 or 6) were lying on the surface, in at most a shallow depression, where, being somewhat pale in colour, they were seen without much difficulty. The larva (of an Ascalaphid) which has not yet been identified with any adult form (fig. 4) was obtained at the same place two days later on another mango tree with dark-coloured bark not plastered with mud, but hung with cobwebs and the debris which they catch. This specimen was found in a hollow of the bark where it was very hard indeed to discover. The *Pseudopteryx* larvae (figs. 1—3) were found by Dr. Annandale at Igatpuri in the Bombay Presidency on November 20, 1909. One of these was found by day on the rough bark of a tree-trunk where it was very inconspicuous, and two more were found on a recently whitewashed wall at night. In both cases the larvae were perfectly still when found.

¹ Our thanks are due to Prof. J. G. Needham, who is preparing an account of the Indian Neuroptera, for the identification of the mature insects reared from the larvae dealt with in this paper.

HABITS AND DEVELOPMENT IN CAPTIVITY.

Larvae.

The larvae were brought to Calcutta and kept in glass jars in one of the work-rooms of the Indian Museum. A thin layer of dry soil was placed at the bottom of the jar, a piece of rough bark was supported against the side in an upright position, and the top was covered with muslin. The food supplied consisted of flies, mostly "blue-bottles" (probably *Pycnosoma flaviceps*), but the larvae showed no special preference for any particular kind.

All the larvae hibernated during the winter, neither taking food nor caring to move about; but it was noticed in the case of a *Pseudoptynx* larva which happened to be moved from its chosen position on the bark, that it returned there during the following night. Most of the larvae hibernated immediately on being left to themselves in their cages, but the smaller of the two *Pseudoptynx* larvae kept alive took one or two flies on alternate days with considerable regularity till December 17. It remained inactive till February 21, 1910, and when flies were then again introduced into its cage it started feeding at once and continued to do so till March 23 when it died, still somewhat smaller in size than its companion.

Its companion commenced to feed again on February 24, but was not observed to eat anything more between this date and March 19 when it began to prepare for pupation—at most it cannot have eaten more than two or three flies during this time. The imago (which was deformed) emerged on April 4, 1910.

The other Ascalaphid larva commenced to feed again on February 28, and eat another fly on March 15, very shortly after which it was unfortunately lost. The *Myrmeleon* larvae eat nothing at all during the time of their captivity; one prepared to pupate on February 22 and emerged on March 21. Another prepared to pupate on February 26, but the pupa was not allowed to develop further.

The unidentified Ascalaphid larva not only resembled the *Pseudoptynx* larva in general form (compare figs. 1 and 4) but also in habits; and, except that in the former the mandibles always remained exposed in repose, the following account of the habits of the latter, which were more fully observed, is probably equally applicable to it and in large measure even to the *Myrmeleon* larvae also. It may be observed here that these last resemble the free-living larvae of other genera of Myrmeleonidae in not having the habit of walking backwards that is so well-known a characteristic of the pit-forming larvae of other species of the genus *Myrmeleon*. Their mandibles were kept continuously closed during their life in captivity and extended forwards in front of the head with their tips crossed.

The larva of the species of *Pseudoptynx* here described usually lies motionless in a depression of the bark on which it lives, and by flattening itself down as close as possible upon the bark the larva makes itself almost indistinguishable (see figs. 2 and 3). If

removed from the bark it will remain absolutely motionless for a time, feigning death.

When thus at rest on the bark the legs are entirely hidden beneath the body, and the long powerful mandibles are drawn back and held so widely open as to lie beneath the sides of the head and the lateral processes of the thorax. If, when the larva is hungry, a fly happens to touch it on any part of the head the mandibles are closed instantaneously and the fly captured between them. No suggestion of discrimination as to the qualities of the fly was ever observed in the process. After this the fly is shifted along towards the distal end of the mandibles, and if it is dropped before reaching its destination no effort is made to recover it. If the end is reached in safety the mandibles are thrust into the body, always between two segments—apparently they are too blunt to pierce any harder part of the integument. The sucking of the juices of the fly along the canal on the under side of each mandible is then commenced at once and the piston-like motion in these canals, by which suction is effected, may be seen under a hand-lens. From time to time one or other of the mandibles is withdrawn in order to commence sucking in another place, the fly being held aloft and quite clear of the bark throughout the whole time of feeding. Flies continued to move for a long time after they were caught; they did not appear to be poisoned as did those caught by Mr. S. Green's species in Ceylon (Westwood, 1888, p. 8). A fly is finished in from half an hour to an hour. The mandibles only—never the legs—are used in manipulating it.

Cocoons and Pupae.

The *Pseudopteryx* larva constructed its cocoon at the surface of the loose dry soil provided, by fastening together pieces of earth with tough silk (fig. 15).

The larvae of *Myrmeleon contractus* spun cocoons in crevices of the bark on which they were living, although all other Myrmeleonids of which the cocoon is known appear to spin in soil. Having found a suitable crevice the larva sits in it with the head erect and jaws projecting upwards, and proceeds to spin round the edge with silk extruded from a retractile spinneret at the posterior end of the abdomen, the abdomen being moved to and fro throughout the process. The edges of the cocoon become broader and broader, being carefully covered with dust as they are elaborated, and the aperture in the middle becomes narrower till finally the jaws are withdrawn and the cocoon or at least its outer covering completed. If a cocoon be opened it is found to consist of two layers of silk, the inner one being softer and more loosely spun together than the outer. When the mature insect emerges the pupal skin is left projecting from the aperture made in the cocoon (see figs. 9 and 10). Presumably the pupa eats its way through the silk with its peculiar jaws (fig. 12) as suggested by Westwood in the case

of a Ceylonese species of *Ascalaphus* (1888, pp. 11-12) and comes half out itself before the transformation takes place.

DESCRIPTIONS OF LARVAE AND PUPAE.

The following descriptions are based primarily on preserved specimens (in spirit); but a few notes on the living larvae have been incorporated with them.

Pseudoptynx, sp.

Larva (pl. v, figs. 1-3 and 14, and text-fig. A).—Length (excluding jaws 4 mm.) about 12 mm. Head cordate, flattened dorso-ventrally, somewhat broader than long, widest opposite the middle of the deep posterior sinus. Ocular tubercles (text-fig. A) not very prominent, somewhat flattened dorso-ventrally, each bearing six black ocelli all on the dorsal surface. Antennae scarcely reaching to the tip of the ocular peduncle, slightly swollen at the tip. Mandibles

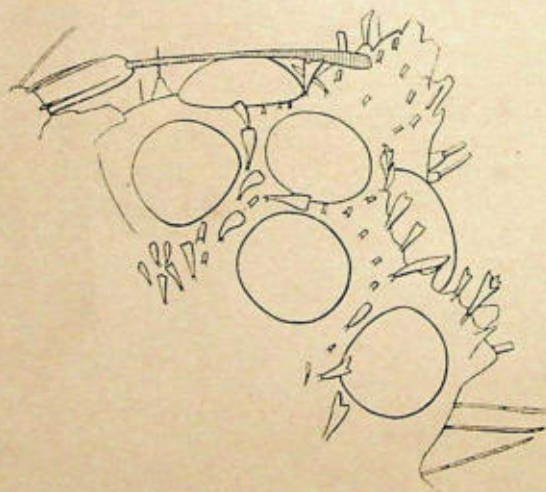


FIG. A.—Ocular tubercle of larva of *Pseudoptynx* sp., $\times 75$.

long, perfectly straight as far as the second and longest tooth, then strongly curved inwards to the tip; third tooth longer than first. Thorax flat: prothorax much narrower than head, broader than long, freely articulated with head and mesothorax. Mesothorax much broader than the head, bearing two pairs of lateral lobes each fringed with hairs—the anterior very large, bent back at an angle in the middle and slightly forwards again close to the tip, the posterior smaller, slenderer, and approximately straight. Metathorax broader than mesothorax and fused to it and to the abdomen; lateral lobes as in mesothorax but smaller, the anterior one not so strongly bent. Abdomen broad and flat; each segment except the last (9th) broader than long, and produced laterally to form a pair of processes fringed with hairs; last segment longer than broad, narrower behind than in front, truncate posteriorly, without lateral processes,

but with a pair of very distinct ventral lobes each bearing four stout blunt spines.

General dorsal colour dull, earth-like. Mandibles dark near the base, reddish in the middle, intense black from the longest tooth to the tip. Head dull brown, mottled with ochraceous between and for a short distance behind the ocular tubercles. Pronotum brown mottled with ochraceous. Mesonotum and metanotum brown near the mid-dorsal line, ochraceous speckled with brown laterally, these extensive pale lateral patches becoming more conspicuous as the larva grows older; the anterior pair of lateral processes of both meso- and metanotum paler than the posterior ones. Abdomen brown with a pair of transverse ochraceous bands on each of the first eight segments but most conspicuous on the anterior ones; these bands are arranged one behind the other so as to form a pair of pale longitudinal stripes continuous in front with the lateral patches of the thorax and fading gradually out behind; the ninth

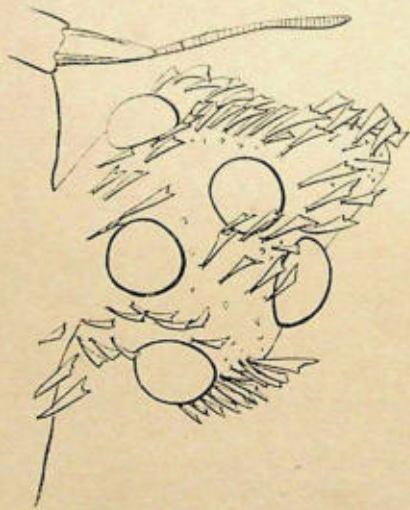


FIG. B.—Ocular tubercle of undetermined Ascalaphid larva from Bhogaon, $\times 75$.

segment is brown in front and ochraceous behind. The whole of the dorsal surface is rough in appearance, and the abdomen is much wrinkled transversely.

On the ventral side the colour of the mandibles resembles that of the dorsal; the head is polished and uniformly brown except for a spot in the middle line between the anterior parts of the two ocular tubercles, a short longitudinal stripe situated on each side about half-way between the ocular tubercles and the middle line, and a patch—bifid behind—at the base of each of these tubercles, all of which are ochraceous; the thorax and abdomen are ochraceous thickly speckled with brown.

Cocoon and Pupa (fig. 15).—Cocoon approximately spherical,

nearly 15 mm. in diameter. Composed of white silk; smooth and glistening inside, coated with attached pieces of soil on the outside. Pupa not examined before hatching for fear of interfering with the completion of its development. The empty skin shows the mandibles to have been stout and strongly toothed on the biting margin.

Undetermined Ascalaphid.

Larva (pl. v, fig. 4, and text-fig. B).—Total length (including mandibles) about 12 mm. Mandibles straight for a greater part of their length than in the *Pseudoptynx* larva; general dorsal coloration somewhat paler than in that larva; and anterior lateral processes markedly different from posterior instead of all being setose alike. As, however, the larva was lost before any complete description of it was drawn up, the figures alone will have to serve for further comparison with other larvae.

Myrmelcon contractus, Wlk.

Larva (pl. v, figs. 5—7 and 13, and text-fig. C).—Length (excluding mandibles 1.5 mm.) about 7 mm. Head approximately

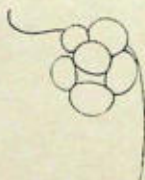


FIG. C.—Ocular tubercle of larva of *Myrmelcon contractus*, Wlk., $\times 90$.

rectangular with the anterior angles sharply re-entrant and the posterior ones rounded; broader than long. Ocular tubercles (text-fig. C) not prominent, bearing six black eyes all in a circular patch on the dorsal surface. Mandibles (fig. 7) long, straight as far as the third tooth (*i.e.*, for about two-thirds of their length), then curved rather sharply inwards; the second tooth the longest, the first the shortest. Thorax flat; prothorax semi-lunar above with the anterior margin faintly convex, much narrower than the head, freely articulated with head and mesothorax. Mesothorax much broader than head, metathorax broader than mesothorax, each with two pairs of minute lateral processes arising just above their margin and not projecting beyond them (fig. 5); these processes are however usually obscured by a coating of mud which gives them the appearance of broad flat discs which do project beyond the margin of the body (fig. 6); mesothorax and metathorax fused together and to the abdomen. Abdomen short and broad, without lateral processes. Eighth segment with a pair of minute conical yellowish horns on the posterior margin below; ninth segment with a pair of loosely opposed and very faintly developed lobes

below the posterior margin, each bearing four stout blunt spines which are quite black.

General colour in life dirty whitish faintly tinged with pink dorsally. Head, mandibles, and pronotum brownish above, the first and last of these covered with a thin layer of fine dust. Meso- and metanotum and abdomen whitish with a faint bluish mid-dorsal line, and a pair of conspicuous black dorso-lateral lines; a slightly irregular row of brown spots on each side between the mid-dorsal and dorso-lateral lines; and numerous spots of the same colour scattered more or less symmetrically outside the latter. The mesonotum however, and to a less extent the metanotum, are obscured in life, like the head and pronotum, by symmetrically arranged plate-like layers of fine dust. Below, the mandibles are brown and the front margin of the head black; the rest of the body is whitish.

Cocoon and Pupa (figs. 8—12).—Cocoon composed of white silk, specked with particles of fine dust; 7 mm. in diameter externally; constructed in a hollow of the bark; consisting of a tough outer and a soft inner layer, the latter almost spherical, the former simply stretched across the hollow so as to roof it in and protect the latter.

Pupa slightly more than 5 mm. long in its natural position with the head and abdomen flexed. Eyes large, greyish; antennae curved back above the eyes; mandibles strong and horny, each strongly toothed on the biting margin, the teeth becoming progressively smaller behind—the distal tooth especially being much larger than the penultimate one; third legs folded separately from the other two pairs and almost entirely concealed from view by the wings, from beneath the extremities of which the claw is seen projecting (fig. 8); wings very dark coloured, almost black; the rest of the pupa dirty whitish, speckled with brown.

COMPARISONS WITH PREVIOUSLY DESCRIBED SPECIES.

Ascalaphidae.

As noted above the two Ascalaphid larvae here described differ from all whose habits are at present fully known in that they live upon tree-trunks where their form and colour alone render them sufficiently inconspicuous to allow them to capture their prey; and they do not attempt to conceal themselves further.

One of them has been reared to maturity, and proves to belong to the genus *Pseudoptynx*, Weele. This genus belongs to the sub-family Acmonotinae, which only includes one other known genus *Acmonotus*. The only larvae belonging to this sub-family that have hitherto been described are of the latter genus. Van der Weele has described and figured the larva of *A. sabulosus*, Walk. (1908, pp. 204-5, fig. 157), and a comparison of his account with that of the *Pseudoptynx* of the present paper will show that the former differs from the latter in many respects: notably in the extraordinarily broad head (which is much broader than long), the long single

tooth on the mandibles, the almost circular body (meso- and metanotum and abdomen together), and the uniformly elongated lateral processes. These characteristics are precisely those noted by Hagen (1873 p. 59) as diagnostic of larvae of *Suphalasca*, a genus in which *sabulosus* and other species of *Acmonotus* were included before the latter genus was founded and made the type of a separate subfamily. Hagen's statement concerning the distinctive larval characters of *Suphalasca* appears to have been based on a description published by Brauer (see Hagen, 1873, p. 43), but the two species (*dictrichiae* and *subtrahens*) to one or other of which he (Hagen) provisionally refers Brauer's larva are retained in the genus *Suphalasca* in Van der Weele's Monograph of 1908. Froggatt (pp. 363-4) also describes a larva which he regards as that of *Suphalasca sabulosa*, Walk., but as Van der Weele himself points out, this is a very different form from his larva; and as a matter of fact it does not come within Hagen's definition of the larval characters of *Suphalasca*. Possibly, however, Froggatt's larva may belong to a true *Suphalasca*, and Brauer's, which was not determined with certainty, to some species now separated as *Acmonotus*, in which case Hagen's diagnosis would still appear to hold good, but only to the *Acmonotus* section of the undivided genus to which he applied it. Assuming this to be the case there are at present published the following descriptions of larvae of the Acmonotinae:—Van der Weele on *Acmonotus sabulosus*, Walk., Brauer (followed by Hagen) on some closely-allied (? the same) species; and the above description of a species, as yet undetermined, of *Pseudoptynx*.

As will appear from the above description, the larvae of *Acmonotus* are of a very abnormal form. The *Pseudoptynx* larvae, on the contrary, are in no way abnormal. Of all the larvae hitherto described the *Pseudoptynx* larvae most closely resemble Hagen's "*Glyptobasis incusans*? oder *Ascalaphus? cervinus*?" from Ratnapura, Ceylon (1873, pp. 44—46). This they resemble so closely that it is not at all impossible that the shrivelled larvae from which Hagen drew up his description may have been in reality the young of this very species. Up to the present, however, no *Pseudoptynx* of any species appears to have been recorded from Ceylon.

The undetermined Ascalaphid larva with its curiously modified lateral processes, is a much more abnormal creature and we are unable to connect it with any other form known to us.

Myrmeleonidae.

The larvae of *Myrmeleon contractus* are chiefly remarkable on account of their manner of life. Not only do they not form pits, a habit hitherto believed to be universal with the larvae of this genus, but neither do they hide under stones or rubbish, or cover themselves over with a cloak of foreign matter as do the larvae of some other genera. They only attach a little dust in a thin layer to the dorsal surface of the head and thorax, the abdomen being apparently always bare in spite of its pale colour. The abdomen is however much less conspicuous on a background of bark than

might be supposed; and if these larvae feed, like other Myrmeleons, upon ants, the covering of the anterior part of the body must be quite sufficient in itself to render them inconspicuous to any victim approaching from in front—for to an ant the rest of the body would appear so much foreshortened as to be scarcely noticeable. And it is very natural that in India an ant-eating insect should take to a life upon tree-trunks, up and down very many of which hosts of ants are perpetually streaming, numbers having their nests beneath the bark.

Redtenbacher (1884, pp. 544-5) divides Myrmeleonid larvae into two main classes:—A, those which walk forwards and do not construct pits; and B, those that construct pits. And he subdivides these according to structure, the latter being divided according to their method of progression also. Although the larvae of *Myrmeleon contractus* would clearly fall into class A, they are distinguished from all of the four groups of this class by the structure of the ninth segment. And of the three groups in class B they agree in structure (apart from a minor difference in the armature of the mandibles, which is referred to below) only with the *Myrmeleon* group, in spite of the fact that they always walk forwards and never backwards.

Thus in the classification of Myrmeleonid larvae habits may be misleading; and in this case at least the structure of the eighth and ninth segments is a safer guide to identity and may be relied on with absolute security. The larvae of *Myrmeleon contractus* differ however from all the Myrmeleonid larvae described by Redtenbacher in the much greater proportional breadth of the body, and from all the Myrmeleons in having the third tooth on each mandible slightly shorter instead of longer than the second. In the latter character they tend to resemble *Palparex* and some species of *Acanthaclis* among free-living forms, and *Creagris* and *Myrmecahurus* among pit-makers; but from all of these they differ in that the third tooth is longer and not shorter than the first.

The pupa resembles in general characters that of the "*Formica-leo*" (*Myrmeleon formicarius* of Hagen and *M. europaeus* of Redtenbacher) described by Reaumur (1742, pp. 368 and 373, xxxiv, figs. 3-5).

LIST OF PAPERS CONSULTED.

Those marked with an asterisk contain descriptions of larvae from the Oriental Region.

- 1742. Reaumur, M. de—"Mem. pour servir à l'Histoire des Insectes." Vol. vi, pp. 333-386, pl. xxxii-xxxiv.
- 1827. Guilding, L.—[On *Ascalaphus macleayanus*.] *Trans. Linn. Soc.*, xv, 1824-5 (1827), pp. 509-512.
- 1833. Percheron, A.—"Note sur la larve du *Myrmeleon libelluloides*." *Mag. Zool. des Années 1831 à 1838*, Section 3, classe ix; 4 pp., pl. 59.

1842. Lefebvre.—[On an Ascalaphid larva.] *Ann. Soc. Ent. France* (i), xi (1842), pp. xvii-xix.
1846. Guérin-Ménéville.—[On the larva of *Ascalaphus longicornis*.] *Ann. Soc. Ent. France* (ii), iv (1846), pp. cxv-cxvi.
1871. Emerton, J. H.—“The Ant-Lion.” *Amer. Nat.*, iv (1871), pp. 705-709.
1872. Hagen, H. A.—“On the Larvae of the Hemerobina.” *Proc. Boston Soc. Nat. Hist.*, xv (1872-3), pp. 243-248.
- *1873. Hagen, H. A.—“Die Larven von *Ascalaphus*.” *Stett. Ent. Zeit.*, Jahr. xxxiv (1873), pp. 33-62. [*Helicomitus* (?) sp. from Saugor, Central India, pp. 43-44; and *Glyptobasis incusans*? oder *Ascalaphus*? *cervinus*? from Ratnapura, Ceylon, pp. 44-46, from the Oriental Region.]
1873. Hagen, H. A.—“Die Larven von *Myrmeleon*.” *Stett. Ent. Zeit.*, Jahr. xxxiv (1873), pp. 249-295 and 377-398.
- *1873. M'Lachlan, B.—“An Attempt towards the Systematic Classification of the Family Ascalaphidae.” *Journ. Linn. Soc., Zool.*, xi (1873), pp. 219-276. [Eggs and larvae of a species from Saugor, Central India, very briefly described on p. 225.]
1878. Ragonot.—[Larva of *Ascalaphus longicornis*.] *Ann. Soc. Ent. France* (5), viii (1878), p. cxx.
1882. McCook, H. C.—“On the Habits of the Ant-Lion.” *Proc. Philadelphia Acad.* (1882-1883), pp. 258-260.
- *1884. Redtenbacher, J.—“Übersicht der Myrmeleoniden-Larven.” *Denkschr. Kais. Akad. Wiss. math. nat. Classe*, xlvi (1884), pp. 335-368, pl. i-vii. [Two species from the Oriental Region, one from Pondicherry, p. 358, pl. v, figs. 70-74 (genus?), and a *Myrmeleon* from the Dekkan, p. 361, pl. vi, figs. 88-89.]
- *1888. Westwood, J. O.—“Notes on the Life-History of Various Species of the Neuropterous Genus *Ascalaphus*.” *Trans. Ent. Soc. London* (1888), pp. 1-12, pl. i-ii.
1902. McClendon, J. F.—“The Life-History of *Ulula hyalina*.” *Amer. Nat.*, xxxvi (1902), pp. 421-429, text-figs. 1-15.
1902. Froggatt, W. W.—“Notes on Australian Neuroptera and their Life-Histories.” *Proc. Linn. Soc. N. S. Wales*, xxvi (1902-3), pp. 358-369.
1908. Rengel, C.—“Über *Myrmeleon formicarius*, L.” *Sitzb. Ges. Naturforsch. Freunde*, Jahrgang (1908), pp. 140-149, pl. viii.
- *1908. Van der Weele, H. W.—“Ascalaphiden, Monographisch Bearbeitet.” *Collections Zoologiques du Baron Edm. de Sélys Longchamps; Catalogue systématique et descriptif* Fasc. viii; Bruxelles (1908). [Larvae of *Acmonotus sabulosus*, Walker, from South Australia, pp. 204-205; *Hybris borneensis*, Weele, from Borneo, pp. 239-240; and *Ascalaphus cunii*, Sélys, from Spain and Portugal, pp. 302-303, all described and figured.]

MISCELLANEA.

INSECTS.

THE OCCURRENCE OF *Dactylopius citri*, RISSO, IN THE HIMALAYAS.—On May 27th last year, while collecting insects in the Himalayas, I met with a number of nymphs of a Coccid in the nests of a small black species of ant. The nests were constructed under loose stones on a mountain-side at elevations varying from approximately 12,300 to 12,500 feet. The locality was about 5 miles north-west of Badrinath, near the Satopanth Glacier in Garhwal. Some of the nymphs were sent to Mr. E. E. Green of Peradeniya who identified them as belonging to the cosmopolitan species *Dactylopius citri*, Risso, and remarked that it occurs commonly in ants' nests in Ceylon. The species secretes a honey-dew similar to that of Aphides, and is farmed by a number of species of ants. The distribution of this insect at this elevation is a fact of some interest, and I may add that the locality from which it was obtained is seldom visited by man, though it is less than 4 miles from the entrance to the Mana Pass into Tibet.

A. D. IMMS.

Muir College, University of Allahabad, 20-iv-11.

NOTE ON AQUATIC RHYNCHOTA.—Two new species (each representing a new genus) of marine Rhynchota have recently been described by Mr. W. L. Distant from the Andaman Sea (*Ann. Mag. Nat. Hist.* (8), v, pp. 146, 147; *Faun. Brit. Ind.*—Rhynchota, v, pp. 154, 155, figs. 82, 83); but unfortunately the specimens figured, having originally been preserved in alcohol, were evidently dried before being drawn, with the result that they have been represented in a shrivelled condition. The acquisition of fresh specimens enables me to add the following supplementary particulars to Mr. Distant's descriptions:—

Euratas formidabilis, Dist.

Specimens of both sexes were taken by Mr. S. W. Kemp on the surface of a backwater at Vizagapatam on the Coromandel Coast in April, 1910, and were preserved dry. They are somewhat stouter and smoother in appearance than Mr. Distant's figure would suggest and the impressions on the collar represented as deep pits are obsolescent. The colour is somewhat darker than that of de-alcoholized specimens.

Fabatus servus, Dist.

Female specimens were taken on the shore of Ross I., Andamans, in March, 1911, by Mr. C. A. Paiva. The body in the adult of this sex is somewhat elongate, the length being 5 mm. and the maximum breadth about 1.5 mm. The sides of the thorax are straight and nearly parallel, except that the collar is much narrower than the posterior part, the anterior angles of which are broadly rounded. A deep mid-dorsal groove runs along the whole length of the thorax. The coloration is very characteristic. The dorsal surface of the head is leaden grey, edged with chocolate-brown and with a pale line running parallel to the margin of each eye posteriorly; that of the pronotum is deep chocolate-brown, with a large transverse oval spot of leaden grey on each side of the mid-dorsal groove on the collar, a much larger and more elongate longitudinal spot of the same colour on each side of the posterior part and, posterior to this spot, a sinuous transverse bar of the same colour running from near the lateral margin to near the mid-dorsal groove a short distance in front of the insertion of each leg of the 3rd pair. The dorsal surface of the legs and abdomen is piceous, but the segments of the latter are edged with silvery grey posteriorly. The ventral surface of the head, thorax and abdomen is yellow, with a streak of leaden grey directed obliquely forwards and inwards in front of the insertion of each leg of the 2nd pair. The ventral surface of the limbs is dark, except that the base of the femora of the anterior legs is tinged with yellow. The eyes, antennae and rostrum are black.

Only the wingless form of the following species has hitherto been described:—

Perittopus rufus, Dist.

The apterous form of this species was originally described from the Siamese Malay States and Tenasserim (*Faun. Brit. Ind.*—Rhynchota, ii, p. 175, fig. 128). I found this form not uncommon in March, 1908, on the surface of pools in jungle streamlets flowing down the western slopes of the Dawna Hills near Kawka-reik in the interior of the Amherst district (Tenasserim) at altitudes of from 2,000 to 3,000 feet, and Mr. C. G. Rogers, I.F.S., has recently (Jan., 1911) taken a winged specimen on a small tributary of the Rangoon River, in Pegu.

The winged form has a pronotum resembling that of *Microvelia*, the postero-lateral angles being subprominent and the posterior part extensive and produced to a point at the extremity. The hemelytra reach the end of the body and are of an intense black colour. The membrane, which is of relatively great extent, is opaque and has a matt surface devoid of hairs, but the rest of the hemelytron is translucent and minutely and sparsely pilose. The veins are not prominent.

N. ANNANDALE.

XI. DESCRIPTION DE NOUVEAUX CHIRONOMIDES DE L'INDIAN MUSEUM DE CALCUTTA.

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

(Avec les Planches vi, vii.)

Le présent travail est la continuation de mon "Étude sur les Chironomides des Indes Orientales" (*Memoirs of the Indian Museum*, 1910, vol. ii, pp. 181—242). Il comprend la description de 87 espèces nouvelles, conservées à l'Indian Museum de Calcutta et recueillies principalement dans les Indes Orientales; nous avons ajouté quelques espèces provenant du Canal de Suez, comme nous l'avons déjà fait pour le premier travail. Toutes ces espèces m'ont été communiquées par Monsieur N. Annandale, conservateur à l'Indian Museum de Calcutta. Les dessins ont été exécutés à la camera lucida, sauf les figures 13, 14, 16, 19 et 32.

I. CERATOPOGONINAE.

1^{er} Genre, PALPOMYIA, Megerle.

Toutes les espèces qui suivent ont les yeux glabres et tous les fémurs spinuleux.

- | | |
|---|--------------------------------------|
| 1. Abdomen d'un roux pâle .. | 1. <i>P. roseiventris</i> , sp. nov. |
| — Abdomen noir ou d'un gris cendré .. | 2. |
| 2. Au moins le thorax cendré .. | 3. |
| — Thorax et abdomen d'un noir brillant et glabre .. | 2. <i>P. leucopogon</i> , sp. nov. |
| 3. Bord antérieur du mesonotum avec une minime spinule; abdomen noir .. | 6. <i>P. brevispina</i> , sp. nov. |
| — Bord antérieur du mesonotum inerme .. | 4. |
| 4. Abdomen mat et cendré; les tergites 2-5 ont, en avant, de chaque côté, une minime fossette circulaire .. | 3. <i>P. disticta</i> , sp. nov. |
| — Abdomen noir et brillant; les tergites 2-5 ont quatre fossettes circulaires .. | 5. |

5. Mesonotum cendré, avec 3 bandes longitudinales brunes; crochets tarsaux égaux et simples .. 4. *P. tetrasticta*, sp. nov.
 — Mesonotum cendré, sans bandes, scutellum jaune; crochets tarsaux inégaux et simples .. 5. *P. polysticta*, sp. nov.

1. *Palpomyia roseiventris*, sp. nov.

♀. Tête et thorax d'un gris cendré, abdomen d'un roux pâle; palpes, antennes sauf les 5 derniers articles, pattes en majeure partie, roux; 5 derniers articles antennaires bruns; scutellum et metanotum noirs; balanciers blancs; moitié distale des fémurs, moitié basale des tibias antérieurs et intermédiaires et les tibias postérieurs en entier noirs, tarses blanchâtres; segment anal assombri. Yeux confluent. Article 2^e des antennes plus long que le 3^e; articles 3-9 subcylindriques, deux fois aussi longs que gros, les cinq derniers réunis aussi longs que les précédents ensemble, subfiliformes, le 10^e deux fois aussi long que le 9^e, le 14^e le plus long. Thorax glabre. Ailes hyalines, nervure auxiliaire dépassant la transversale, le radius dépasse le milieu de l'aile, sa 3^e partie est un peu plus longue que la moitié de la 2^e; cellule radiale proximale 4 fois aussi longue que large, linéaire et aussi mince que la cellule distale, qui est presque trois fois aussi longue que la proximale; cubitus assez éloigné de la pointe alaire, dont il est distant de moins de sa moitié, un peu moins que le rameau inférieur de la discoïdale; bifurcation de la discoïdale un peu distante proximale de la transversale, bifurcation de la postcale un peu distante distalement de la transversale; anale bifurquée. Tous les fémurs ont 8-10 spinules noires, au tiers distal; métatarse antérieur égal au quart du tibia, un peu plus long que le 2^e article, le 3^e article deux fois aussi long que gros, le 4^e guère plus long que gros, le 5^e égal aux 3^e et 4^e réunis, avec 5 spinules noires sur le dessous; crochets inégaux et simples, le grand d'un tiers plus long que le petit, égal aux deux tiers de l'article; les autres pattes sont semblables aux antérieures, sauf que le métatarse postérieur dépasse à peine la moitié du tibia et est deux fois aussi long que le 2^e article. Abdomen déprimé, plus long que le reste du corps. Taille 2.5 mm.

Calcutta, 28-viii-1907.

2. *Palpomyia leucopogon*, sp. nov.

♂. D'un noir brillant et glabre; articles antennaires 1-9 et panache blanchâtres; pattes d'un blanc sale, les 4 tibias antérieurs d'un blanc brunâtre; un anneau au-dessus du milieu des fémurs antérieurs et intermédiaires, fémurs postérieurs sauf le tiers basal, et tibias postérieurs d'un brun noir; articles antennaires 10-14 assombris. Panache long et dense; articles antennaires 3-9 subcylindriques, pas deux fois aussi longs que gros; les 5 suivants

EXPLANATION OF PLATE V.

[The paper (No. X) to which this plate relates was published in part ii of the present volume of these "Records," pp. 101—110.]

- FIG. 1.—Larva of *Pseudoptynx* sp. from above.
,, 2 and 3.—Photographs of two larvae of *Pseudoptynx* sp. in repose, each on a piece of bark, $\times 2$.
,, 4.—Larva of undetermined Ascalaphid from above.
,, 5.—Larva of *Myrmeleon contractus* from above—the mud coverings of the thoracic lateral processes removed.
,, 6.—Larva of *Myrmeleon contractus* from below—the mud coverings of the thoracic lateral processes are seen projecting forwards beside the head.
,, 7.—Left mandible of larva of *Myrmeleon contractus* from below.
,, 8.—Pupa of *Myrmeleon contractus* from the right.
,, 9.—Cocoon and cast pupal skin of *Myrmeleon contractus* from the right.
,, 10.—The same from above.
,, 11.—Mouth-parts of the pupa of *Myrmeleon contractus* from the right.
,, 12.—The same, dorsal view.
,, 13.—Last two segments of larva of *Myrmeleon contractus*, from below.
,, 14.—Last two segments of larva of *Pseudoptynx* sp. from below.
,, 15.—Part of hatched cocoon of *Pseudoptynx* sp. showing part of the cast pupal skin.



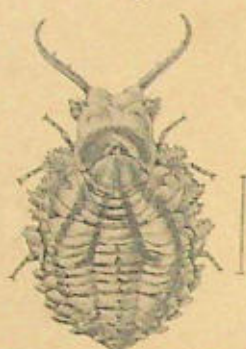
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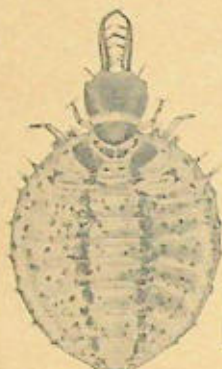
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3



4



5



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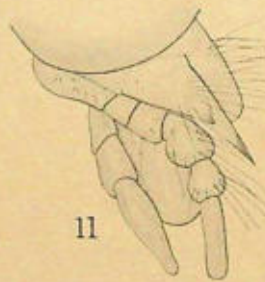
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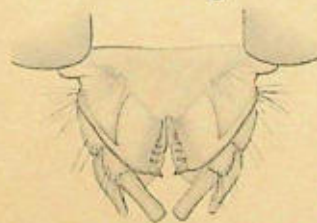
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12



14



13



10



15

réunis distinctement plus courts que le reste du flagellum, minces et filiformes. Ailes hyalines, atteignant presque l'extrémité de l'abdomen, nervation comme chez *P. polysticta*. Fémurs antérieurs n'atteignant pas la surface du mesonotum, armés de 6 spinules noires dans leur moitié distale, les 4 autres fémurs avec quelques spinules au tiers distal; métatarse antérieur un peu plus long que le tiers du tibia, métatarse postérieur un peu plus long que la moitié du tibia, plus de deux fois le 2^e article. 3^e deux à trois fois aussi long que gros, le 4^e un peu plus long que gros, le 5^e plus long que le 3^e et le 4^e réunis, dépourvu de spinules; articles tarsaux 1 et 2 des pattes postérieures avec 2 rangées de soies bulbeuses sous leur dessous; crochets tarsaux simples à toutes les pattes, égalant le tiers de l'article. Abdomen allongé, sublinéaire, sans pince ou pince brisée. Taille 3 mm.

Calcutta, 1-x-1907.

3 *Palpomyia disticta*, sp. nov.

(Pl. vi, fig. 1, aile.)

♀. Corps mat et cendré; antennes d'un jaune clair, les 5 derniers articles assombris; mesonotum avec 3 bandes d'un brun noir, dont la médiane occupe la moitié antérieure et se bifurque en arrière, les latérales occupent la moitié postérieure du mesonotum; de chaque côté de la bande médiane se voit une tache allongée, d'un brun noir; balanciers tantôt blancs, tantôt bruns; pattes rousses, hanches cendrées, quart distal des fémurs antérieurs et intermédiaires, les fémurs postérieurs sauf un anneau au-dessus du milieu, et tibias postérieurs sauf l'extrémité, noirs; parfois les tibias antérieurs et intermédiaires ont un anneau médian et leur extrémité bruns; 4 derniers articles des tarsi antérieurs blanchâtres; palpes d'un roux brun. Yeux confluent, bouche égale au tiers de la hauteur de la tête. Articles antennaires 3-8 subcylindriques, deux fois aussi longs que gros, avec des soies deux fois aussi longues que l'épaisseur des articles; article 9^e un peu plus long que le 8^e, son extrémité distale rétrécie en col; chacun des articles 10-13 est 3 fois aussi long que le 8^e, subcylindrique, aminci en col dans son quart distal; 14^e plus long que le 13^e, graduellement aminci. Occiput et mesonotum parsemés de soies noires et très courtes. Scutellum bordé de longues soies. Ailes (fig. 1) un peu enfumées, les grosses nervures d'un brun noir; auxiliaire atteignant la cellule radiale distale; radius dépassant le milieu de l'aile, sa 3^e partie un peu plus courte que la 2^e; cellule radiale proximale linéaire, 5 fois aussi longue que large, la distale 2 fois et $\frac{1}{2}$ aussi longue que la proximale; cubitus aboutissant très près de la pointe alaire, dont il n'est distant que du sixième de sa longueur; discoïdale bifurquée sous la transversale; posticale bifurquée distalement de la transversale; nervure anale bifurquée; surface couverte de soies dressées et très courtes. Fémurs antérieurs subcylindriques, deux fois aussi gros

que les tibias, avec environ 20 spinules noires dans sa moitié distale; tibias antérieurs avec un peigne dense et un éperon pointu, qui est deux fois aussi long que le peigne; métatarse à peine égal à la moitié du tibia, pas double du 2^e article, le 3^e deux fois aussi long que gros, le 4^e un peu plus long que gros, le 5^e plus long que le 3^e et le 4^e réunis, avec 5 paires de spinules noires; crochets égaux, simples, égalant les quatre cinquièmes de l'article; les autres pattes sont semblables aux antérieures, sauf que les fémurs ne sont spinuleux qu'au tiers distal; pattes poilues brièvement et assez densément. Abdomen déprimé, plus long que le reste du corps, mat et cendré; tergites 2-5 ayant de chaque côté, contre le bord antérieur, une minime fossette circulaire et brillante. Taille 2.5-3 mm.

Calcutta, 27-viii, 5-ix, 31-x, 1907.

4. *Palpomyia tetrasticta*, sp. nov.

♀. Tête d'un roux brun et prumineux, moitié basale des antennes jaune, moitié distale brune; thorax cendré, avec 3 bandes brunes, dont la médiane occupe la moitié antérieure et se bifurque en arrière, les externes occupent la moitié postérieure; pattes rousses, les hanches, les genoux, un large anneau avant l'extrémité des fémurs, un large anneau au milieu des tibias postérieurs, noirs; tarses blanchâtres; abdomen d'un noir brillant. Yeux confluent. Article 2^e des antennes plus long que le 3^e; 3-9 deux fois aussi longs que gros, soies un peu plus longues que les articles, 10-14 filiformes, 2 fois aussi longs que le reste du flagellum. Scutellum cilié longuement et densément, glabre comme le reste du thorax. Ailes subhyalines; les grosses nervures brunes; auxiliaire atteignant la 2^e cellule radiale; 3^e partie du radius égale à la moitié de la 2^e; cellule radiale proximale linéaire comme la distale, 5-6 fois aussi longue que large, la distale 2 fois $\frac{1}{2}$ aussi longue que la proximale; cubitus à peine plus distant de la pointe alaire que le rameau supérieur de la discoïdale; bifurcation de la discoïdale située sous la transversale; bifurcation de la posticale située notablement en arrière de la transversale; anale bifurquée. Tous les fémurs ont dans leur moitié distale, de nombreuses spinules, les antérieurs dépassent la surface du mesonotum; le métatarse antérieur dépasse un peu le tiers du tibia, article 3^e trois fois aussi long que gros, 4^e un peu plus long que gros, 5^e plus long que le 3^e et le 4^e réunis, avec 5-6 paires de spinules noires; crochets simples, égalant l'article tarsal; les 4 autres pattes sont semblables aux antérieures, sauf que le métatarse postérieur dépasse un peu la moitié du tibia; aux pattes postérieures, le tibia et le tarse sont longuement ciliés en dehors. Tergites 2-5 avec 4 fossettes circulaires, dont une de chaque côté au bord antérieur et deux plus rapprochées, situées au bord postérieur; derniers segments repliés en dessous. Taille 3-5 mm.

Calcutta, 7-ix-1907.

5. *Palpomyia polysticta*, sp. nov.

♀. Thorax cendré et parsemé de points noirs; scutellum jaune, à longs poils; balanciers blanchâtres; pattes rousses, hanches, fémurs antérieurs sauf l'extrême base, plus du tiers distal des 4 autres fémurs, moitié distale des tibias postérieurs et 5^e article de tous les tarsi, noirs. Ailes comme chez le précédent. Fémurs antérieurs aussi longs que les postérieurs, dépassant beaucoup la surface du mesonotum, avec environ 20 spinules noires dans leur moitié distale, les 4 autres fémurs sont spinuleux dans leur tiers distal; métatarse antérieur court, égal au tiers du tibia, de moitié plus long que le 2^e article; 3^e article deux fois aussi long que gros, 4^e un peu plus long que gros, 5^e plus long que le 3^e et le 4^e réunis, avec 5-6 paires de spinules noires; crochets tarsaux simples, inégaux, l'un égal aux quatre cinquièmes de l'article, l'autre aux deux tiers du grand crochet; les 4 autres pattes semblables aux antérieures sauf que le métatarse postérieur est plus long que la moitié du tibia, double du 2^e article; aux pattes postérieures, le tibia et le tarse sont longuement ciliés sur le dessus. Abdomen comme chez le précédent. Taille 3.5 mm.

Calcutta, 7-ix-1907.

6. *Palpomyia brevispina*, sp. nov.

♀. Tête et thorax cendrés; antennes jaunes, les 5 derniers articles bruns; balanciers blancs; mesonotum avec 3 larges bandes brunes, la médiane atteint le bord antérieur, les latérales sont raccourcies en avant; pattes rousses, hanches, genoux, un large anneau avant l'extrémité des fémurs, un large anneau au milieu des tibias postérieurs, d'un brun noir; tarsi d'un jaune sale. Yeux confluent. Articles antennaires 3-8 subcylindriques, 2 fois aussi longs que gros; 9^e trois fois aussi long que gros, son quart distal aminci en col; 10-14 deux fois aussi longs que le reste du flagellum, 10-13 rétrécis en col au quart distal, le 14^e graduellement aminci. Mesonotum parsemé de points noirs qui portent des poils très courts, bord antérieur avec une très courte épine au milieu. Scutellum avec de longs poils. Ailes subhyalines, les grosses nervures brunes; auxiliaire atteignant la 2^e cellule radiale; 3^e partie du radius seulement un peu plus courte que la 2^e; cellule radiale proximale 5-6 fois aussi longue que large, linéaire, la distale graduellement amincie et 3-4 fois aussi longue que la proximale; cubitus un peu plus distant de la pointe alaire que le rameau supérieur de la discoïdale; bifurcation de la discoïdale située sous la transversale, bifurcation de la posticale située bien distalement de la transversale, anale bifurquée. Pattes antérieures aussi longues que les postérieures; tous les fémurs sont spinuleux dans plus de leur moitié distale. Abdomen noir brillant, sans fossettes distinctes, sauf au 2^e tergite. Pour le reste, semblable à *P. tetrasticta*. Taille 4 mm.

Calcutta, 27-vii-1907.

Palpomyia interrupta, Kieff.

2 ♀. — Calcutta, 27-viii-1907.

2^e Genre, *SPHAEROMYIAS*, Curt., non Walk.

Les synonymes de ce genre sont : *Ceratolophus*, Kieff., et *Johannseniella*, Willist.

Sphaeromyias stictonota, sp. nov.

♂. Noir brillant ; antennes et panache bruns ; pattes brunes, tarsi blanchâtres, les deux derniers articles brun noir ; balanciers bruns. Articles du flagellum subcylindriques, deux fois aussi longs que gros, les 5 derniers plus minces, chacun d'eux est deux fois aussi long que le 3^e. Mesonotum densément et finement pointillé. Ailes hyalines ; radius dépassant le milieu ; cubitus 2 fois et $\frac{1}{2}$ aussi long que le radius, distant de la pointe alaire des 2-3 de sa longueur ; cellule radiale proximale 2 fois aussi longue que large et atteignant l'extrémité du radius, la cellule distale est $2\frac{1}{2}$ fois aussi longue que la proximale ; bifurcation de la discoïdale à peine proximale distante de la transversale, bifurcation de la posticale située sous la transversale ; les grosses nervures sont brunes, les autres hyalines. Fémurs et 5^e article tarsal sans spinules ; métatarse antérieur égal aux deux tiers du tibia, aussi long que les 4 articles suivants réunis, le 4^e article guère plus long que gros, 5^e un peu plus court que le 3^e et le 4^e réunis ; crochets tarsaux simples, égaux et petits ; les 4 autres pattes sont semblables aux antérieures, sauf que le métatarse postérieur, qui est égal aux deux tiers du tibia, est plus long que les 4 articles suivants réunis. Abdomen déprimé ; pince très petite et peu distincte. Taille 2 mm.

Calcutta, Jardin zoologique, 8-iii-1907.

3^e Genre, *STILOBEZZIA*, gen. nov.

Ce genre diffère de *Palpomyia* et de *Sphaeromyias* par la fourche de la discoïdale, qui est pétiolée, c'est à dire distante de la nervure transversale, à laquelle elle est réunie par une tige plus ou moins longue, tandis que chez *Palpomyia* et *Sphaeromyias* la fourche est sessile. Ce genre comprend *Palpomyia bimacula*, Kieff., et *P. viridiventrís*, Kieff. Nous y ajoutons l'espèce suivante que nous donnons comme type du genre.

Stilobezzia festiva, sp. nov.

(Pl. vi, fig. 2, aile ♀ ; fig. 3, articles tarsaux antérieurs ♀ ; fig. 4, articles tarsaux postérieurs ♀ ; fig. 5, articles tarsaux postérieurs ♂ ; fig. 6, pince.)

♂ ♀. Tête et thorax jaunes, abdomen vert ou d'un jaune verdâtre ; antennes d'un jaune blanchâtre ; panache du mâle jaune

dans la moitié proximale, noir dans la moitié distale ; palpes noirs et longs ; balanciers blanchâtres, moitié distale de la massue noire ; pattes blanches, les 4 postérieures ont un anneau brun au-dessus du milieu du fémur, le genou, l'extrémité du tibia et une tache ou un anneau à la base du tibia, d'un brun noir ; 1^{er} tergite parfois assombri, les 2 suivants ont chacun 3 points noirs, dont un de chaque côté et un au milieu du bord postérieur ; le 4^e tergite est noir, les 2 ou 3 suivants sans tache. Tête fortement aplatie d'avant en arrière, beaucoup plus haute que large, vertex presque en ligne, bouche égale au tiers de la hauteur de la tête, yeux glabres et confluent ; palpes de 4 articles. Antennes de la femelle à poils blanchâtres ; article 2^e plus long que le 3^e ; articles 3-9 subcylindriques, de moitié plus longs que gros ; 10-14 filiformes, chacun trois fois aussi long que le 9^e. Chez le mâle, les articles 3-9 sont subglobuleux, un peu plus longs que gros, avec un anneau auquel est inséré le verticille de poils ; 10-14 subcylindriques, chacun trois fois aussi long que le 9^e ; panache long et dense. Thorax lisse, brillant et glabre. Ailes blanchâtres, ciliées, surface couverte de soies microscopiques, avec 2 taches transversales et noires, situées l'une sur la transversale, l'autre à l'extrémité du cubitus (fig. 2) ; en outre, les deux rameaux de la discoïdale sont bordés de brun noir ; auxiliaire atteignant à peine l'extrémité du radius, qui ne dépasse guère le milieu de l'aile ; cubitus trois fois aussi long que le radius, épaissi à l'extrémité et distant de toute sa longueur de la pointe alaire ; cellule radiale proximale quadrangulaire, un peu plus longue que large, la cellule distale est deux fois aussi large que la proximale et quatre fois aussi longue ; transversale presque perpendiculaire ; fourche de la discoïdale deux fois aussi longue que sa distance de la transversale ; bifurcation de la posticale beaucoup plus éloignée de la transversale que de la bifurcation de la discoïdale, son rameau supérieur est relevé à sa base et arqué assez fortement, ainsi que l'inférieur ; anale simple. Chez le mâle, la cellule radiale proximale est plus étroite. Pattes non épaissies, fémurs dépourvus de spinules ; tibias antérieurs aussi longs que le fémur, égalant les 2 articles suivants réunis, avec un peigne très fin et un éperon glabre, qui est deux fois aussi long que le peigne ; métatarse antérieur $2\frac{1}{2}$ fois aussi long que le 3^e article, avec 2 rangées de soies bulbeuses sur le dessous ; article 3^e pas plus long que gros ; le 4^e transversal dorsalement, prolongé sous le 5^e ventralement ; 5^e beaucoup plus long que les 2 précédents réunis ; crochets tarsaux de la femelle inégaux, l'un presque aussi long que l'article tarsal, l'autre n'ayant que le tiers du grand et muni d'une dent basale (fig. 3) ; aux 4 pattes antérieures, le 5^e article tarsal porte à sa base, une paire de longues spinules noires ; les 4 pattes postérieures sont un peu plus longues que les 2 antérieures mais de même conformation, sauf que les tibias postérieurs sont un peu élargis à l'extrémité distale, qui est munie d'un double peigne, dont le plus court est dense, et que le 5^e article des tarsi postérieurs est dépourvu de spinules (fig. 4) ; les 2 premiers articles des tarsi postérieurs ont 2

rangées de soies bulbeuses sur le dessous. Le mâle a les pattes conformées comme la femelle, sauf que les crochets sont égaux, simples et courts (fig. 5). Abdomen déprimé; pince du mâle (fig. 6) à articles terminaux faiblement renflés dans la moitié basale; lamelle supérieure arrondie au bout. Taille 1.5 mm.

Calcutta, 24-viii, 11 ix, 1-x, 2-x, 11-x, 29-x.

4^e Genre, DIBEZZIA, gen. nov.

Ce genre diffère de *Palpomyia* par l'abdomen, dont la base est rétrécie en forme de pétiole. Le type est *D. clavata*.

- | | | | |
|----|--|---------|------------------------------------|
| 1. | Tous les fémurs inermes | .. | 1. <i>D. clavata</i> , sp. nov. |
| — | Fémurs armés de spinules, au moins en partie | | 2. |
| 2. | Fémurs intermédiaires inermes, les antérieurs et les postérieurs avec deux spinules; cubitus distant de la pointe alaire de plus de la moitié de sa longueur | .. | 2. <i>D. longistila</i> , sp. nov. |
| — | Fémurs intermédiaires avec 6 spinules; cubitus très rapproché de la pointe alaire | | 3. <i>D. brevistila</i> , sp. nov. |

1. *Dibezzia clavata*, sp. nov.

(Pl. vi, fig. 7, dernier article des tarses antérieurs;
fig. 8, dernier article des tarses postérieurs)

♀. Noir brillant et lisse; articles antennaires 2-9 et pattes antérieures testacés; tous les tarses sauf le 5^e article et l'extrême bout distal des autres, blanchâtres; balanciers d'un noir mat. Yeux confluent, vertex en triangle; bouche petite, égale au tiers de la hauteur de la tête; face fortement convexe; palpes noirs, le 4^e article petit. Articles antennaires 3-9 de moitié plus longs que gros, subcylindriques, le 2^e de moitié plus long que le 3^e; le 10^e égal aux 4 précédents réunis, 10-14 filiformes, ensemble deux fois aussi longs que les précédents réunis. Mesonotum glabre et densément ponctué; thorax un peu plus haut que long. Ailes hyalines, à soies microscopiques et denses, à bord postérieur cilié; les grosses nervures sont brunes; auxiliaire nulle; cubitus graduellement rapproché du bord, aboutissant près de la pointe alaire; cellule radiale proximale atteignant presque l'extrémité du radius, deux fois aussi longue que large; la distale pas plus large que la proximale mais 3-4 fois aussi longue; bifurcation de la discoïdale située à peine proximale de la transversale; bifurcation de la posticale située sous la transversale; anale bifurquée. Fémurs inermes; les intermédiaires plus longs que les antérieurs mais beaucoup plus courts que les postérieurs, les antérieurs subcylindriques, les intermédiaires et plus fortement les postérieurs renflés au-dessus du milieu; tous les tibias ont la longueur des fémurs, les antérieurs

avec un peigne jaune et simple, les intermédiaires sans peigne, les postérieurs avec un double peigne, dont le petit est très dense; tarsi beaucoup plus minces que les tibias; métatarse antérieur plus court que la moitié du tibia, égal aux 4 articles suivants réunis, sans soies bulbeuses; métatarse intermédiaire un peu plus long que la moitié du tibia; métatarse postérieur plus long que tout le tibia, égal aux 4 articles suivants réunis; 2 rangées de soies bulbeuses sur le dessous des deux premiers articles tarsaux; 4^e article des tarsi postérieurs égal aux $\frac{2}{3}$ du 5^e, six fois aussi long que gros; 5^e article de tous les tarsi avec 4 paires de longues spinules noires; crochets tarsaux antérieurs (fig. 7) inégaux, avec une courte dent basale, l'un dépassant d'un quart la longueur de l'autre et atteignant les $\frac{2}{3}$ de l'article tarsal; crochets intermédiaires semblables aux antérieurs; crochets des tarsi postérieurs (fig. 8) très inégaux, chacun avec une dent basale, le grand égalant les $\frac{2}{3}$ de l'article, le petit pas plus long que la dent basale du grand. Abdomen beaucoup plus long que le reste du corps; moitié antérieure rétrécie en un pétiole cylindrique, deux fois aussi long que gros et composé de 2 tergites, dont le 1^{er} n'atteint que la moitié du 2^e; moitié postérieure de l'abdomen élargie, déprimée, à tergites transversaux. Taille 3.5 mm.

Calcutta, 5-ix-1907; 9-ix.

Var.—♀. Scape et vertex d'un roux brun, tarsi antérieurs d'un brun noir. Pétiole trois fois aussi long que gros, occupant les $\frac{2}{3}$ antérieurs de l'abdomen; partie élargie repliée sur le dessous. Taille 3.5 mm.

Calcutta.

2. *Dibezzia longistila*, sp. nov.

♀. Noir; tête d'un roux brun; palpes, 9 premiers articles antennaires et pattes roux; 5 derniers articles antennaires bruns; hanches, genoux, 5^e article tarsal et aux pattes postérieures, le tiers basal des tibias, noirs; balanciers blanchâtres, extrémité de la massue noire. Yeux séparés au vertex par une ligne rousse. Articles antennaires 3-9 subcylindriques, deux fois aussi longs que gros; 10-14 filiformes, ensemble plus longs que les précédents réunis, chacun trois fois aussi long que le 9^e. Mesonotum glabre, faiblement luisant et densément ponctué. Scutellum sans longs poils. Ailes hyalines, les grosses nervures brunes; auxiliaire dépassant la transversale; radius dépassant le milieu de l'aile, sa partie distale plus courte que la moitié de la partie proximale; cellule radiale proximale 2-3 fois aussi longue que large; la distale un peu plus mince que la proximale; cubitus distant de la point: alaire de plus de la moitié de sa longueur, autant que le rameau inférieur de la discoïdale; bifurcation de la discoïdale à peine proximale distante de la transversale; celle de la posticale située sous celle de la discoïdale; anale bifurquée. Les fémurs antérieurs et postérieurs ont, au tiers distal, 2 spinules noires, les intermédiaires sont inermes; métatarse antérieur plus court que la moitié du tibia,

deux fois aussi long que le 2^e article; article 3^e deux fois aussi long que gros; 4^e un peu plus long que gros; 5^e plus long que le 3^e et le 4^e réunis; 5^e article de tous les tarses avec 5 paires de longues spinules noires; crochets tarsaux antérieurs égaux égalant les $\frac{2}{3}$ de l'article, avec une petite dent basale; pattes postérieures plus longues, leur fémur faiblement renflé distalement, leur tibia longuement cilié, métatarse égalant le tibia, trois fois aussi long que le 2^e article, tous deux avec des soies bulbeuses, le 4^e encore 2-3 fois aussi long que gros, 5^e plus court que le 3^e et le 4^e réunis, crochets des tarses intermédiaires et postérieurs inégaux, le grand égale les $\frac{2}{3}$ de l'article tarsal, avec une dent à sa base, le petit est très court, pas plus long que la dent basale du grand. Pétiole de l'abdomen 3-4 fois aussi long que gros, 2 fois plus long que la partie élargie, celle-ci repliée sur le dessous. Taille 3.5 mm.

Calcutta, 29-x-1907.

3. *Dibezzia brevistila*, sp. nov.

♀. Tête et scape roux; mesonotum roussâtre, avec 4 bandes noires, les deux médiales séparées seulement par une ligne, raccourcies en arrière, les latérales raccourcies en avant; scutellum d'un roux clair; metanotum noir mat; balanciers d'un blanc jaunâtre; pattes d'un jaune rougeâtre, picotées de noir (les antérieures manquent), métatarse blanc (les autres articles manquent); abdomen d'un noir brillant, sa partie antérieure avec une teinte roussâtre au milieu. Bouche pointue, égalant presque la moitié de la hauteur de la tête; yeux largement confluent; palpes à articles cylindriques. Thorax brillant, subglobuleux. Ailes hyalines, longues, dépassant de moitié l'abdomen, les grosses nervures sont jaunes, les autres hyalines; radius dépassant de beaucoup le milieu de l'aile, sa partie distale un peu plus courte que la proximale; cubitus $2\frac{1}{2}$ fois aussi long que le radius, aboutissant près de la pointe alaire; la cellule radiale proximale est linéaire comme la distale, 5-6 fois aussi longue que large: la distale est 4 fois aussi longue que la proximale; bifurcation de la discoïdale à peine proximale distante de la transversale; bifurcation de la posticale distalement et longuement distante de la transversale; anale bifurquée. Fémur intermédiaire plus long que le tibia, avec 6 spinules noires dans sa moitié distale, métatarse égalant presque la moitié du tibia; fémur postérieur égalant les intermédiaires. Abdomen plus long que le reste du corps: pétiole gros, seulement de moitié plus long que gros. Taille 4.5 mm.

Sylhet, Assam, 3-iv-1905 (Major Hall).

5^e Genre, BEZZIA, Kieff.

- | | |
|--|------------------------------------|
| 1. Fémurs antérieurs avec 2-3 spinules | 1. <i>B. trispinosa</i> , sp. nov. |
| — Tous les fémurs inermes | 2. <i>B. eucera</i> , sp. nov. |

1. *Bezzia trispinosa*, sp. nov.

(Pl. vi, fig. 9, antenne.)

♀. Noir brillant et glabre; antennes et pattes testacées; un anneau près de l'extrémité distale des fémurs antérieurs, un anneau près de chacune des extrémités des tibias antérieurs et tous les tarsi blanchâtres; balanciers d'un brun noir, tige plus claire. Bouche égalant le tiers de la tête. Antennes (fig. 9) à articles 3-9 ellipsoïdaux, verticilles presque deux fois aussi longs qu'un article; 10-14 ensemble aussi longs que les précédents réunis, un peu plus gros, subcylindriques, un peu amincis distalement, chacun double du 9^e. Ailes hyalines; radius aboutissant au milieu; cubitus $2\frac{1}{2}$ fois aussi long que le radius, distant de la pointe alaire des $\frac{2}{3}$ de sa longueur; bifurcation de la discoïdale située sous la transversale, celle de la posticale éloignée distalement de la transversale. Fémurs antérieurs avec 2-3 spinules noires dans leur moitié distale, les 4 autres fémurs inermes; tibias postérieurs avec un peigne double, dont le petit est très dense, tous les tibias ciliés en dehors; métatarse antérieur plus court que la moitié du tibia, égal aux articles 2 et 3 réunis; aux tarsi postérieurs les 3 premiers articles ont deux rangées de soies bulbeuses sur le dessous, métatarse plus long que la moitié du tibia, à peine plus court que les 4 articles suivants réunis, 3^e article 2 fois aussi long que gros, 4^e de moitié plus long que gros, 5^e égalant presque les 2 précédents réunis; crochets tarsaux égaux, simples, atteignant le tiers de la longueur de l'article. Abdomen déprimé. Taille 1.5 mm. Voisin de *B. armatipes*, Kieff.

Calcutta, 31-vii-1907.

2. *Bezzia cucera*, sp. nov.

(Pl. vi, fig. 10, antenne.)

♀. Brun; thorax un peu pruiné; antennes roussâtres; pattes jaunes, tarsi graduellement assombris; balanciers bruns. Yeux séparés par une ligne au vertex, front plus large que haut; bouche égale au tiers de la hauteur de la tête; palpes à articles cylindriques. Antenne (fig. 10) à articles 3-9 graduellement allongés, les premiers 2 fois, les autres 3 fois aussi longs que gros, leur milieu un peu grossi, leur verticille très long, 2-3 fois aussi long qu'un article; 5 derniers articles graduellement allongés, chacun 2-3 fois aussi long que le 9^e. Ailes à peine teintées, les grosses nervures sont brunes, radius dépassant notablement le milieu; cubitus un peu plus de 2 fois aussi long que le radius, distant de la pointe alaire de moins de sa moitié, à peine plus éloigné que le rameau inférieur de la discoïdale; bifurcation de la discoïdale à peine proximale distante de la transversale; celle de la posticale située sous la transversale. Fémurs inermes; tibias antérieurs à peigne simple, éperon glabre, deux fois aussi

long que le peigne, tarsi moins minces que d'ordinaire, métatarse égalant la moitié du tibia ou les 3 articles suivants réunis, 3^e article presque 3 fois aussi long que gros, 4^e de moitié plus long que gros, 5^e un peu plus court que le 3^e et le 4^e réunis, sans spinules; crochets simples, égaux, un peu plus longs que le tiers de l'article; les 4 autres pattes conformées comme les antérieures, sauf que les postérieures sont un peu plus longues et leur tibia muni d'un double peigne. Abdomen déprimé, beaucoup plus long que le reste du corps. Taille 3 mm.

Calcutta, 30-x-1907.

3. *Bezzia nigricans*, Kieff., var. *albipennis*, var. nov.

♀. Noir mat; antennes et pattes brunes, tarsi et balanciers blancs. Ailes blanches, cubitus un peu plus de deux fois aussi long que le radius. Bouche pointue, égale à la moitié de la tête. Le reste comme chez le type. Diffère de *lacteipennis* par le radius qui dépasse notablement le milieu de l'aile et les soies bulbeuses des 2 premiers articles des tarsi postérieurs. Taille 2 mm

Calcutta, 10-ix-1907, et 26-xi.

Remarque.—Chez le type de *B. nigricans*, le cubitus est $2\frac{1}{2}$ fois aussi long que le radius et non pas de moitié plus long.

6^e Genre, CALYPTOPOGON, Kieff.

Calyptopogon albitarsis, Kieff.

♂. Le mâle de cette espèce était inconnu, quand j'ai établi le genre *Calyptopogon*. Dans un récent envoi de M. Annandale, se trouvait, outre sept femelles, un mâle que je rapporte à la même espèce de sorte que je suis à même de compléter la diagnose primitive, en donnant la description du mâle.

Coloration comme chez la femelle, sauf que les pattes sont brunes, avec les tarsi blanchâtres. Les antennes sont brunes, sauf le scape; 2^e article deux fois aussi long que gros, 3-10 de moitié plus longs que gros, subcylindriques, arrondis aux 2 bouts; le 11^e est égal au 2^e, le 12^e deux fois aussi long que le 11^e; panache peu dense et peu long, d'un gris sombre. Mesonotum formant en avant une pointe plus courte que chez la femelle et n'atteignant pas le vertex. Ailes beaucoup plus courtes que chez la femelle, mais dépassant encore de moitié l'abdomen; nervation comme chez la femelle, sauf que la transversale est plus courte. Les pattes antérieures sont plus courtes que les autres et conformées comme chez la femelle, sauf que les crochets de toutes les pattes sont petits, égaux, avec une très petite dent au-dessus du milieu, et que le 5^e article tarsal est inerme; aux 2 pattes postérieures, la moitié distale des fémurs, les tibias et les 4 premiers articles tarsaux sont longuement ciliés, le tibia est plus court que le fémur, mais plus long que le métatarse, qui est un peu plus court que les

4 articles suivants réunis, ceux-ci graduellement raccourcis, le 4^e article des tarses intermédiaires et postérieurs est élargi, guère plus long que gros, plus court que le 5^e; les tarses postérieurs ne sont donc pas demesurément allongés comme chez la femelle. Pince assez longue et grêle, d'un noir profond comme le corps, les articles terminaux longs, filiformes et droits. Taille ♂ 1'8 mm. Parmi les femelles, l'une avait les pattes antérieures rousses.

Katihar, Purneah district, N. Bengal, 15-x-1907 (C. A. Paiva); Calcutta, 27-viii, 25-ix, 3-x, 25-x, 11-xi, 16-xi, 18-xi, 1907.

II. TANYPINAE.

1^{er} Genre, ISOPLASTUS, Skuse.

- | | |
|---------------------------------------|-------------------------------------|
| 1. Pattes blanchâtres, non annelées | |
| de noir | 1. <i>I. oriplanus</i> , sp. nov. |
| — Pattes d'un blanc de lait, annelées | |
| de noir | 2. <i>I. photophilus</i> , sp. nov. |

1. *Isoplastus oriplanus*, sp. nov.

♂. Tête, les longs palpes et le scape roussâtres: antennes d'un blanc brunâtre, panache gris avec l'extrémité blanchâtre; thorax d'un brun noir et mat, mesonotum avec 3 larges bandes d'un noir mat, la médiane raccourcie en arrière, divisée par une ligne longitudinale, médiane et enfoncée, les latérales raccourcies en avant; balanciers blancs; pattes blanchâtres, les 2 derniers articles tarsaux un peu assombris; abdomen blanchâtre, les segments 2-5 ont, en avant, 3 taches brunes et confluentes, dont une au milieu et une de chaque côté, au 5^e segment ces taches forment un large anneau, les segments 6 et 7 presque entièrement bruns, comme la pince. Articles du flagellum un peu transversaux, sauf les 2 derniers, l'avant-dernier est à peine plus long que tous les précédents réunis. Ailes blanches et densément poilues, avec des taches et une bande enfumées, nervures blanches, sauf dans les taches où elles sont brunes, les transversales sont noires et bordées de noir, comme aussi la base du cubitus et la bifurcation de la posticale; une large bande enfumée, transversale et irrégulièrement arquée, traverse l'aile distalement du milieu; elle a comme limite distale, l'extrémité de la 2^e longitudinale et l'extrémité du rameau supérieur de la posticale; son bord proximal traverse le milieu du radius et le milieu du rameau postérieur de la posticale; elle enclose une tache blanche située contre le bord inférieur de l'aile, entre les deux rameaux; une grande tache enfumée occupe l'extrémité alaire et a comme limites, le cubitus et la discoïdale; une tache transversale et large va de la bifurcation de la posticale jusqu'au bord postérieur; auxiliaire atteignant presque l'extrémité du radius, qui est relié à la 2^e longitudinale; celle-ci presque deux fois plus rapprochée du radius que du cubitus; la transversale ordinaire est très oblique, et 2-3 fois aussi longue que la transversale inférieure,

celle-ci perpendiculaire et aboutissant à la bifurcation de la posticale; cubitus arqué, notablement dépassé par la costale, qui atteint presque la pointe alaire; rameau inférieur de la posticale fortement arqué à son extrémité. Tibias antérieurs plus longs que le métatarse, 4^e article tarsal presque deux fois aussi long que le 5^e, qui est 3-4 fois aussi long que gros; tibias postérieurs longuement ciliés; empodium un peu plus court que les crochets tarsaux, filiforme et cilié; pulvilles non distincts. Abdomen très grêle, les segments 2-6 d'abord 2, puis 3 fois aussi longs que gros, le 7^e un peu élargi, articles basaux de la pince gros, les terminaux plus courts, minces, subfiliformes et arqués. Taille 5 mm.

Simla hills, à une altitude de 7000 pieds; 25-iv-1907 (N. Annandale).

2. *Isoplastus photophilus*, sp. nov.

(Pl. vi, fig. 11, antenne.)

♀. Brun noir et velu; antennes d'un blanc sale, 12^e article assombri; balanciers blanchâtres; pattes d'un blanc de lait; 3 anneaux sur les fémurs, 2 anneaux et l'extrémité distale des tibias, un anneau près de la base et le tiers distal du métatarse, la moitié distale des 3 articles suivants et le 5^e article en entier, noirs. Antennes de 12 articles (fig. 11); articles du flagellum sessiles et pas plus longs que gros; le dernier le plus gros, plus long que les deux précédents réunis, aminci au bout; les verticilles 2-3 fois aussi longs que la grosseur d'un article. Ailes enfumées, irisées et densément velues, avec quelques petites taches blanchâtres, éparses, peu délimitées et peu distinctes; la transversale ordinaire et celle de la base alaire sont noires et bordées de noir; la transversale inférieure est distante proximale de la transversale ordinaire et atteint la bifurcation de la posticale; cubitus non dépassé par la costale, 3-4 fois plus éloigné de la pointe alaire que la discoïdale. Article 4^e des tarses deux fois aussi long que le 5^e. Abdomen pas plus long que le reste du corps. Taille 1.5 mm.

Katihar, Purneah district, N. Bengal, 14-x-1907 (C. A. Paiva); capturé à la lampe.

2^e Genre, PROCLADIUS, Skuse.

Procladius ornatissimus, Kieff.

Une variété de cette espèce a les taches antérieures du mesonotum confluentes avec les médianes et formant ainsi deux bandes longitudinales, séparées seulement par une ligne et émettant chacune, sur son milieu, en dehors, un rameau très court; la tache alaire entre le bord inférieur et la nervure anale est à peine indiquée; le rameau inférieur de la posticale est longé par un trait enfumé.

2 ♂.

Calcutta, en septembre (R. E. Lloyd); capturé à la lumière, le 2 janvier (N. Annandale).

III. CHIRONOMINAE.

A Groupe, *Chironomus*.

Les quatre tibias postérieurs avec un peigne ou avec un anneau crénelé; métatarse antérieur plus long ou du moins aussi long que le tibia.

1^{er} Genre, *CHIRONOMUS*, Meigen.

[REMARQUE.—Le nom de *Chironomus*, Meig., qui a été employé dans ce travail, est à remplacer par celui de *Tendipes*, Meig., lequel est plus ancien et a droit à la priorité.—J. J. KIEFFER.]

Ailes glabres; les 4 tibias postérieurs ont un anneau crénelé; pince du mâle munie de deux appendices velus et de deux autres plus courts et glabres, situés plus haut.

- | | |
|--|--------------------------------------|
| 1. Ailes avec des taches ou des bandes | 2. |
| — Ailes non tachetées et sans bande | 9. |
| 2. Dernier article antennaire du mâle plus court que les précédents réunis; femelle inconnue .. | 1. <i>C. speciosus</i> , sp. nov. |
| — Dernier article antennaire du mâle 2-3 fois aussi long que les précédents réunis | 3. |
| 3. Ailes avec des bandes enfumées qui longent les nervures | 4. |
| — Ailes avec des bandes transversales ou avec des taches | 5. |
| 4. Mesonotum avec 4 bandes d'un brun roux, métatarse antérieur double du tibia | 2. <i>C. striatipennis</i> , Kieff. |
| — Mesonotum gris pruineux, sans bandes, métatarse antérieur de moitié plus long que le tibia .. | 3. <i>C. pruinosis</i> , sp. nov. |
| 5. Ailes avec une bande transversale, parfois encore avec des taches .. | 6. |
| — Ailes sans bande mais seulement avec des taches | 7. |
| 6. Ailes hyalines, avec une bande transversale enfumée, sans tache | 4. <i>C. fasciatipennis</i> , Kieff. |
| — Aile blanches, avec une bande transversale et des taches noires | 5. <i>C. nigrosparsus</i> , sp. nov. |
| 7. Ailes brunâtres et fortement irrises, avec des taches hyalines .. | 6. <i>C. nocticola</i> , sp. nov. |
| — Ailes blanches ou hyalines, avec des taches enfumées; articles 3 et 4 des tarsi antérieurs du mâle hérissés de longs poils | 8. |

8. Métatarse antérieur d'un tiers plus long que le tibia ; 14^e article des antennes du mâle 3 fois aussi long que les 12 précédents réunis .. 7. *C. ceylanicus*, sp. nov.
- Métatarse antérieur presque 2 fois aussi long que le tibia ; 14^e article antennaire du mâle 2 fois aussi long que les 12 précédents réunis .. 8. *C. polystictus*, sp. nov.
9. Corps sans couleur verte 10.
- Au moins l'abdomen vert en tout ou en partie 47.
10. Vertex muni de 2 lobes juxtaposés ; taille 9-10 mm. .. 9. *C. lobaticeps*, sp. nov.
- Vertex dépourvu d'appendices 11.
11. Taille 7-9 mm. 12.
- Taille de 1.5-6 mm. 13.
12. Pronotum bilobé au milieu .. 10. *C. lobaticollis*, sp. nov.
- Pronotum non lobé .. 11. *C. flaviventris*, sp. nov.
13. Tergites 2-7 avec une verrue ellipsoïdale sur le tiers ou la moitié antérieure .. 12. *C. verrucosus*, sp. nov.
- Tergites dépourvus de verrue 14.
14. Fémurs et tibias grossis ; corps noir brillant, tarses et antennes d'un jaune sale ; taille 2.5 mm... 13. *C. grossipes*, sp. nov.
- Fémurs et tibias non épaissis 15.
15. Mesonotum avec 3 bandes ferrugineuses bordées latéralement par une ligne noire 16.
- Mesonotum sans bandes ou à bandes non bordées de noir 17.
16. Abdomen brun noir, bord postérieur des tergites plus clair ; nervure transversale brun noir, située un peu avant la bifurcation de la posticale .. 14. *C. nigromarginatus*, sp. nov.
- Abdomen jaune blanchâtre, une tache arrondie sur les tergites 2-6, et les tergites 7 et 8 d'un brun noir ; transversale hyaline, située un peu en arrière de la bifurcation de la posticale .. 15. *C. callithorax*, sp. nov.
17. Corps noir, sauf les tarses, mesonotum sans bande, ailes sombres, toutes les nervures noires ou brunes 18.
- Corps autrement coloré 20.
18. Corps brillant ; métatarse antérieur sauf le quart distal, les 3-4

- | | | | |
|--|---|----|-----|
| premiers articles des autres tarsi
sauf l'extrémité, blancs .. | 16. <i>C. albiforceps</i> , Kieff. | .. | 19. |
| — Corps mat .. | .. | .. | .. |
| 19. Tarsi d'un jaune brunâtre,
métatarse antérieur de moitié
plus long que le tibia .. | 17. <i>C. melanostolus</i> , sp.
nov. | .. | .. |
| — Tarsi blancs, métatarse antérieur
plus de 2 fois aussi long que le
tibia | 18. <i>C. nigriforceps</i> , sp.
nov. | .. | .. |
| 20. Mesonotum brillant; antennes
du mâle de 14 articles .. | .. | .. | 21. |
| — Mesonotum mat .. | .. | .. | 27. |
| 21. Abdomen d'un jaune vitellin
avec une ligne longitudinale et
un étroit bord postérieur des
segments, noirs; thorax d'un
noir brillant | .. | .. | 22. |
| — Coloration autre .. | .. | .. | 23. |
| 22. Tarsi antérieurs pubescents,
mesonotum d'un roux marron en
avant | 19. <i>C. dolichogaster</i> , sp.
nov. | .. | .. |
| — Tarsi antérieurs en partie hérissés
de longs poils, thorax entière-
ment noir | 20. <i>C. seminiger</i> , sp. nov. | .. | .. |
| 23. Mesonotum sans bande, noir ou
brun; antennes de la femelle de
7 articles | .. | .. | 24. |
| — Mesonotum jaune avec 3 bandes;
métatarse antérieur de moitié
plus long que le tibia .. | .. | .. | 25. |
| 24. Thorax d'un jaune brun, meso-
notum brun noir | 21. <i>C. lampronotus</i> , sp.
nov. | .. | .. |
| — Thorax brun roux, métatarse
antérieur double du tibia .. | 22. <i>C. longicrus</i> , sp. nov. | .. | .. |
| — Thorax d'un noir brillant, méta-
tarse antérieur à peine plus long
que le tibia | 24. <i>C. callicomus</i> , sp. nov. | .. | .. |
| 25. Bandes du mesonotum noires;
antennes de la femelle de 6 ar-
ticles | .. | .. | 26. |
| — Bandes du mesonotum ferrugi-
neuses; panache jaune .. | 45. <i>C. psilochirus</i> , sp. nov. | .. | .. |
| 26. Fémur antérieur de $\frac{2}{3}$ plus long
que le tibia, tarsi jaunes en
grande partie | 25. <i>C. lamprothorax</i> , sp.
nov. | .. | .. |

- Fémur antérieur d'un quart plus long que le tibia ; tarsi brun noir 23. *C. fuscilarsis*, sp. nov.
27. Mesonotum sans bande distincte 28.
- Mesonotum avec 3 bandes longitudinales 31.
28. Antennes du mâle de 14 articles ; tarsi antérieurs hérissés de longs poils 27. *C. noctuabundus*, sp. nov.
- Antennes du mâle de 12 articles 29.
29. Article terminal de la pince aminci en pétiole dans la moitié terminale ; article 12^e des antennes $2\frac{1}{2}$ fois plus long que les autres réunis ; ♀ inconnue .. 28. *C. dolichotomus*, sp. nov.
- Article terminal de la pince aminci graduellement à l'extrême bout distal 30.
30. Tarsi antérieurs du mâle pubescents ; métatarse antérieur double du tibia ; article 12^e des antennes du mâle 2 fois aussi long que les autres réunis .. 26. *C. tenerrimus*, sp. nov.
- Tarsi antérieurs, du précédent ; 12^e article antennaire de moitié plus long que les autres réunis .. 43. *C. leucotarsus*, Kieff., var.
- Tarsi antérieurs du mâle hérissés de longs poils ; métatarse antérieur d'un $\frac{1}{2}$ plus long que le tibia ; 12^e article du mâle 4 fois aussi long que les autres réunis 46. *C. lasiochirus*, sp. nov.
31. Bandes du mesonotum noires ou brunes 32.
- Bandes du mesonotum ferrugineuses ou rousses 36.
32. Thorax brun noir, mesonotum vitellin comme le scutellum, avec 3 bandes noires 29. *C. callinotus*, sp. nov.
- Thorax autrement coloré 33.
33. Métatarse antérieur au maximum de moitié plus long que le tibia ; ♀ 34.
- Métatarse antérieur double du tibia ; tarsi antérieurs du mâle pubescents ; ♂ ♀ 35.
34. Antennes de 6 articles ; ailes

- hyalines, nervures pâles sauf la transversale 30. *C. melanophorus*, sp. nov.
- Antennes de 7 articles; ailes brunâtres, toutes les nervures brunes .. 31. *C. planicollis*, sp. nov.
35. Mesonotum à bandes noires; pince très petite; articles antennaires 3-5 de la femelle fusiformes [nov. 32. *C. breviforceps*, sp.
- Mesonotum à bandes brunes; articles 3-5 ovoïdaux 33. *C. nocturnalis*, sp. nov.
36. Antennes du mâle de 13 articles; moitié postérieure de l'article terminal de la pince amincie en pétiole; ♀ inconnue .. 34. *C. oriplamus*, sp. nov.
- Antennes du mâle de 12 articles 37.
37. Tarses antérieurs hérissés de longs poils; ♂ 38.
- Tarses antérieurs seulement pubescents; articles antennaires de 6 articles chez la femelle; ♂ ♀ 40.
38. Article terminal de la pince très long, presque linéaire, les appendices très courts; métatarse antérieur double du tibia .. 35. *C. forficularius*, sp. nov.
- Article terminal de la pince autrement conformé, les appendices très longs, atteignant presque l'extrémité de la pince; métatarse antérieur d'un $\frac{1}{4}$ plus long que le tibia 39.
39. Nervure transversale d'un brun noir; panache fauve .. 36. *C. barbatitarsis*, sp. nov.
- Transversale pâle comme les autres nervures; panache d'un gris blanchâtre 37. *C. callichirus*, sp. nov.
40. Métatarse antérieur double du tibia; article terminal de la pince aminci en pétiole dans sa moitié postérieure 41.
- Métatarse antérieur au maximum de moitié plus long que le tibia 46.
41. Tarses blanchâtres ou jaunâtres, sauf parfois le 5^e article ou les tarses antérieurs 42.
- Articles tarsaux de toutes les pattes noirs en partie .. 39. *C. melanostictus*, sp. nov.

42. Article 12^e des antennes du mâle
3 fois aussi long que les 10 précédents réunis, panache gris ; ♀ inconnue 47. *C. filitarsis*, sp. nov.
- Article 12^e des antennes du mâle
2 fois aussi long que les 10 précédents réunis 43.
43. Article 5^e des tarsi antérieurs
de la femelle 8-10 fois aussi long que gros ; transversale brune 44.
- Article 5^e des tarsi antérieurs de
la ♀ 4-5 fois aussi long que gros ; transversale pâle 45.
44. Nervures jaunes sauf la transversale ; articles antennaires 3-5 de la ♀ ellipsoïdaux, avec un col presque aussi long que l'article ; pattes jaunâtres 40. *C. callisphyrus*, sp. nov.
- Nervures hyalines sauf la transversale ; articles 3-5 fusiformes ; pattes blanchâtres 44. *C. leptochirus*, sp. nov.
45. Tibias et tarsi des pattes antérieures noirs 48. *C. lucernarum*, sp. nov.
- Pattes jaunes en entier 42. *C. aploneurus*, sp. nov.
46. Tibias antérieurs et tous les tarsi noirs 38. *C. melanochirus*, sp. nov.
- Pattes jaunâtres en entier 41. *C. aplochirus*, sp. nov.
47. Thorax d'un noir brillant, sternum jaune, dernier article antennaire du ♂ plus court que les précédents réunis 51. *C. callimorphus*, sp. nov.
- Thorax autrement coloré ; dernier article antennaire du mâle au moins de moitié plus long que les précédents réunis 48.
48. Mesonotum avec 6 taches circulaires disposées en arc 50. *C. sexpunctatus*, sp. nov.
- Mesonotum sans tache mais parfois avec des bandes longitudinales 49.
49. Nervure transversale noire ; tarsi blancs et noirs 50.
- Nervure transversale pâle comme les autres nervures 51.
50. Métatarse antérieur de moitié

- plus long que le tibia ; abdomen de la ♀ entièrement vert, fémurs et tibias verts 52. *C. viridiventris*, sp. nov.
- Métatarse antérieur 2 fois aussi long que le tibia ; abdomen de la femelle noir, sauf les 3 premiers segments ; fémurs et tibias jaunes 53. *C. atrosignatus*, sp. nov.
51. Article terminal de la pince subitement aminci en bec au tiers postérieur, appendices deux fois aussi larges que les articles ; taille 5.5 mm. 55. *C. rostratus*, sp. nov.
- Pince autrement conformée 52.
52. Article terminal des antennes du ♂ 2-2½ fois aussi long que les précédents réunis 53.
- Article terminal au maximum de moitié plus long que les précédents réunis 54.
53. Appendices de la pince plus larges que les articles .. 49. *C. calligaster*, sp. nov.
- Appendices de la pince pas plus larges que les articles .. 56. *C. prasiogaster*, sp. nov.
54. Pince et ailes blanches ; articles du flagellum aussi longs que gros 58. *C. semiviridis*, sp. nov.
- Pince d'un brun clair ; ailes hyalines 55.
55. Mesonotum avec 3 bandes roussâtres 54. *C. nudipes*, sp. nov.
- Mesonotum sans bande .. 57. *C. chlorogaster*, sp. nov.

1. *Chironomus speciosus*, sp. nov.

♂. D'un brun noir et mat ; scape noir, flagellum d'un brun clair ; balanciers blancs, extrémité de la massue noirâtre ; fémurs bruns avec un anneau jaune avant leur extrémité ; tibias sauf l'extrémité qui est noirâtre, et tarsi d'un brun clair. Yeux amincis supérieurement, où ils sont peu distants. Palpes de 4 longs articles. Articles antennaires 3-6 un peu transversaux, les suivants plus longs que gros, le dernier plus court que les précédents réunis, panache brun. Ailes enfumées et irisées, avec des taches blanches qui n'atteignent pas le bord, à savoir : 2 entre le cubitus et la discoïdale, l'une située sous le milieu du cubitus, l'autre, échan-crée distalement, se trouve avant l'extrémité du cubitus ; 2 autres taches blanches se trouvent entre la discoïdale et la posticale, l'une sous la transversale, l'autre près de l'extrémité de la discoïdale ;

une autre tache est située au-dessus de l'extrémité du rameau postérieur de la posticale et s'arrête au milieu du rameau antérieur; les trois dernières taches sont sur une ligne longitudinale entre le rameau postérieur et le lobe anal; toutes les nervures sont jaunes; extrémité du radius plus rapprochée de celle du rameau postérieur que du rameau antérieur; 2^e longitudinale très rapprochée du radius; cubitus non dépassé par la costale, plus rapproché de la pointe alaire que la discoïdale; transversale oblique, située notablement en avant de la bifurcation de la posticale. Pattes antérieures pubescentes, les quatre postérieures avec des poils deux fois aussi longs que leur épaisseur; métatarse antérieur égal au fémur, de moitié plus long que le tibia; 4^e article un peu plus court que le 3, plus du double du 5, qui est quatre fois aussi long que gros. Abdomen mince, les segments 1, 2 et 7 plus larges, segments 2-6 plus de deux fois aussi longs que gros, poils sombres; pince grêle, l'article terminal graduellement aminci aux deux bouts, deux fois aussi long que le basal, dont le lobe atteint le tiers antérieur de l'article terminal. Taille 3.5 mm.

Simla hills: Matiana, à une altitude de 2800 m. (N. Annandale).

2. *Chironomus striatipennis*, Kieff.

(Pl. vi, fig. 12, partie de la pince.)

♂ ♀. Le mâle, qui était inconnu jusqu'ici, a les antennes de 12 articles, dont le 2^e est plus long que gros, 3-11 très transversaux, 12^e trois fois aussi long que les 10 précédents réunis; panache fauve. Pronotum échancré au milieu (♂ ♀). Mesonotum, scutellum et base du metanotum d'un gris cendré et mat, les trois bandes du mesonotum d'un brun noir, la médiane divisée par une ligne longitudinale et reliée au bord postérieur par une ligne brune. Pattes postérieures du mâle à poils 2-3 fois aussi longs que leur épaisseur, sauf aux tarses. Lamelle de la pince avec un prolongement en bec; article terminal subitement aminci dans sa moitié distale, qui est cylindrique, glabre et munie de trois longues soies au côté interne (fig. 12).

Kumaon: Bhim Tal, à une altitude de 1500 m.; 27-ix-1906 (N. Annandale); 7 ♂ et 1 ♀. Cette espèce est voisine de *callipterus*, Kieff.

3. *Chironomus pruinosus*, sp. nov.

♀. Antennes d'un brun noir, scape gris prumineux, 2^e article jaunâtre; thorax d'un gris prumineux un peu jaunâtre, surtout le scutellum; balanciers sombres, tige claire; pattes jaunes, extrémité du fémur et tibia des pattes antérieures d'un brun noir; abdomen d'un brun sombre, plus clair en avant. Antennes de 6 articles, dont le 2^e est à peine rétréci au milieu, 3-5 fusiformes, pas deux fois aussi longs que gros, col plus court que la partie renflée, 6^e article mince, cylindrique, presque deux fois aussi long que le 5^e. Ailes subhyalines, sous un certain jour on y voit de faibles

bandes enfumées, longitudinales, bordant les nervures, mais moins distinctes que chez *striatipennis*; nervures jaunes, transversale et base du cubitus d'un brun noir, extrémité du radius également distant des deux rameaux de la posticale; 2^e longitudinale très rapprochée du radius, cubitus droit, non dépassé par la costale, un peu plus distant de la pointe alaire que la discoïdale, transversale oblique, située un peu avant la bifurcation de la posticale. Métatarse antérieur de moitié plus long que le tibia, 4^e article plus court que le 3^e presque deux fois aussi long que le 5^e, qui est 4 fois aussi long que gros. Taille 3 mm.

Lower Bengal: Barrackpore, 11-viii-1907 (N. Annandale).

4. *Chironomus fasciatipennis*, Kieff.

♀. Abdomen avec les segments 2, 3 et 6 noirs; bandes du mesonotum peu marquées, parfois presque nulles. Métatarse antérieur double du tibia; 4^e article égal au 3^e, double du 5^e.

Calcutta, 17-i et 3-viii. Un exemplaire avec la mention: "Larva feeds on *Hydra*"—see *Journ. As. Soc. Bengal*, 1906.

5. *Chironomus nigrosparsus*, sp. nov.

♀. D'un brun noir; antennes, palpes et tarses blanchâtres; balanciers blancs; fémurs et tibias d'un jaune sale. Palpes plus longs que les antennes. Yeux comme les précédents. Antennes de 6 articles dépourvus de verticilles; articles 3-5 un peu plus longs que gros, sans col, subcylindriques; 6^e deux fois aussi long que le 5^e, faiblement fusiforme. Ailes blanches, avec une bande transversale et des taches noires; la bande a comme limites antérieures la base et le milieu du cubitus, et s'amincit graduellement jusqu'au bord postérieur, sous le rameau inférieur de la posticale; elle est interrompue par les nervures et renferme une tache circulaire blanche située après le tiers proximal du cubitus, entre le cubitus et la discoïdale; trois petites taches noires sont situées le long du bord, l'une sous l'extrémité du cubitus, l'autre sous l'extrémité de la discoïdale, la 3^e sous l'extrémité du rameau antérieur de la posticale; une autre tache est située sous la bifurcation de la posticale; deux autres placées l'une au-dessus de l'autre et séparées seulement par une ligne, sont situées sous le milieu de la tige de la posticale, contre le bord alaire; nervures pâles; 2^e longitudinale non distincte; cubitus deux fois plus éloigné de la pointe alaire que la discoïdale; transversale oblique et très courte, située un peu en avant de la bifurcation de la posticale. Métatarse antérieur $2\frac{1}{2}$ fois aussi long que le tibia qui est beaucoup plus court que le fémur; 4^e article un peu plus court que le 3^e, $2\frac{1}{2}$ fois aussi long que le 5^e, qui est 4-6 fois aussi long que gros. Abdomen comprimé, guère plus long que le reste du corps. Taille 1.5 mm.

Upper Burma: Mandalay, en mars (N. Annandale).

6. *Chironomus nocticola*, sp. nov.

♀. Antennes, thorax et pattes jaunâtres, article 6^e des antennes et palpes bruns; mesonotum blanchâtre avec trois bandes d'un brun jaunâtre, la médiane raccourcie en arrière et reliée par une ligne au bord postérieur, les latérales raccourcies en avant; balanciers blancs; un anneau avant l'extrémité des fémurs, et un anneau près de la base des tibias, bruns, extrémité des quatre premiers articles tarsaux noirâtre; abdomen d'un brun noirâtre, bord postérieur des segments blanchâtre. Yeux comme d'ordinaire. Palpes longs. Antennes de 6 articles, dont le 2^e est deux fois aussi long que gros et non rétréci au milieu, 3-5 fusiformes et deux fois aussi longs que gros, verticille double de l'article; 6^e subcylindrique, mince et de moitié plus long que le 5^e. Pronotum blanc et un peu échancré. Ailes avec une teinte brunâtre à peine distincte, fortement irrisées, sauf 4 taches hyalines, allongées, non irrisées, situées l'une entre le cubitus et la discoïdale, l'autre entre la discoïdale et le rameau supérieur de la posticale, la 3^e entre les deux rameaux de la posticale et la 4^e entre le rameau postérieur et le lobe anal; nervures jaunes; transversale et base du cubitus noires; auxiliaire dépassant de beaucoup la transversale; extrémité du radius beaucoup plus près de celle du rameau antérieur que du rameau postérieur; 2^e longitudinale très rapprochée du radius; cubitus un peu arqué, non dépassé par la costale, plus proche de la pointe alaire que la discoïdale; transversale oblique, située bien avant la bifurcation de la posticale. Fémur antérieur de moitié plus long que le tibia, métatarse antérieur presque double du tibia, 4^e article un peu plus long que le 3^e, plus de deux fois le 5^e, qui est 6-8 fois aussi long que gros. Abdomen presque deux fois aussi long que le reste du corps, à poils gris et peu longs. Taille 3.5-4 mm.

"On board ship at night, Suez Canal, 9-ix-1907"; "Port Said, early morning, on board ship, 10-ix-1907" (N. Annandale).

7. *Chironomus ceylanicus*, sp. nov.

♂ ♀. D'un brun roux, abdomen parfois brun noir; antennes et pattes blanchâtres ou jaunâtres, 6^e article antennaire de la femelle d'un brun noir, flagellum du mâle brun; balanciers blancs. Yeux comme d'ordinaire; palpes longs. Antennes du mâle de 14 articles, dont le 2^e est plus de deux fois aussi long que gros, 3-13 trois à quatre fois aussi larges que longs, 14^e triple des 12 précédents réunis; panache brun. Antennes de la femelle de 6 articles, dont le 2^e est très rétréci au milieu, 3-5 fusiformes, deux fois aussi longs que gros, 6^e mince, cylindrique, de moitié plus long que le 5^e. Mesonotum avec trois rangées longitudinales de poils. Ailes blanches, avec des taches énumérées et irrisées qui, comme d'ordinaire, sont moins bien marquées chez le mâle que chez la femelle; 3 taches sont situées entre le cubitus et la discoïdale, dont l'une à la base du cubitus, l'autre au milieu, la 3^e à l'extrémité; 3 autres

qui correspondent aux trois précédentes, sont situées entre la discoïdale et le rameau supérieur de la posticale; une autre tache se trouve dans la bifurcation de la posticale; les deux dernières sont alignées longitudinalement entre le rameau postérieur et le lobe anal; nervures jaunes; auxiliaire dépassant notablement la transversale; extrémité du radius bien plus près du rameau antérieur que du rameau postérieur; 2^e longitudinale très rapprochée du radius; cubitus non dépassé par la costale, aussi près de la pointe alaire que la discoïdale; bifurcation de la posticale un peu en arrière de la transversale qui est oblique. Métatarse antérieur d'un tiers plus long que le tibia, fémur de moitié plus long que le tibia; articles 3 et 4 des tarsi antérieurs du mâle avec des poils très longs, 4^e article à peine plus court que le 3^e, double du 5^e, qui est quatre fois aussi long que gros. Pince d'un brun noir, lamelle sans prolongement, article terminal un peu plus long que le basal et faiblement aminci à l'extrémité, lobe dépassant à peine l'article basal. Taille ♂ 4.5 mm., 1 ♀ 3.5 mm.

Ceylon: Colombo, juillet 1901, 4 ♂ et 6 ♀.

8. *Chironomus polystictus*, sp. nov.

♂. Brun noir, flagellum brun clair, pattes d'un jaune sale, balanciers blanchâtres. Antennes de 14 articles, dont le 2^e est allongé; 3-13 un peu transversaux, 14^e deux fois aussi long que les articles 2-13 réunis, panache fauve. Ailes subhyalines, avec de faibles taches enfumées et irisées, dont une grande dans le tiers proximal de la cellule formée par la discoïdale et la cubitale, une autre tache occupe la moitié proximale de la cellule comprise entre les deux rameaux de la posticale, une petite tache relie le milieu du cubitus à la discoïdale, une autre petite est située sous le cubitus un peu avant l'extrémité et n'atteint pas la discoïdale, enfin sous l'extrémité du cubitus, de la discoïdale et du rameau proximal de la posticale se trouve une petite tache touchant le bord alaire; nervures pâles et finement bordées d'enfumé; cubitus droit, non dépassé par la costale, deux fois plus distant de la pointe alaire que la discoïdale; bifurcation de la posticale située un peu en arrière de la transversale. Métatarse antérieur presque deux fois aussi long que le tibia, 4^e article plus court que le 3^e, tous deux assez longuement poilus, le 4^e double du 5^e, qui est 4 fois aussi long que gros; les 4 pattes postérieures poilues, poils des tarsi très longs. Articles terminaux de la pince allongés, obtus, presque d'égale largeur sauf aux deux bouts qui sont subarrondis; appendices poilus n'atteignant pas la base des articles terminaux; lamelle prolongée en pointe. Taille 2 mm.

"At light in railway carriage, between Belpore and Rampore Haut, E. I. Ry., Bengal," 3-viii (C. Paiva).

9. *Chironomus lobaticeps*, sp. nov.

(Pl. vi, fig. 13, partie de la pince.)

♂ ♀. D'un jaune brunâtre ou fauve; antennes sauf le 6^e article de la femelle et le 12^e du mâle, qui sont d'un brun noir. balanciers, scutellum et pattes plus clairs; mesonotum jaune, pruinéux de gris, avec trois larges bandes d'un brun noir, la médiane raccourcie en arrière, les externes raccourcies en avant; metanotum brun; abdomen avec une mince bande longitudinale et médiane noire ou d'un brun noir, comme la pince. Yeux glabres, très amincis supérieurement où ils sont distants d'un peu plus de leur largeur terminale; vertex muni de deux prolongements juxtaposés en forme de deux petits lobes, dressés et situés entre les antennes mais un peu plus en arrière que les antennes. Chez la femelle, les antennes sont de 6 articles; le 2^e article un peu plus long que gros, rétréci au milieu; 3-5 composés d'une nodosité ellipsoïdale et d'un col aussi long que la nodosité, verticilles pas deux fois aussi longs que les articles; 6^e mince, cylindrique, presque double du 5^e, avec 2-3 longues soies à l'extrémité. Antennes du mâle graduellement amincies en pointe, composées de 12 articles, panache fauve; les articles 3-11 sont 3-4 fois plus larges que longs, le 12^e 3-4 fois plus long que les 10 précédents réunis. Pronotum non lobé, ou à peine échancré. Thorax subglabre. Mesonotum avec 3 sutures parallèles et bien marquées; bord postérieur du scutellum avec de longs cils blancs, sauf en son milieu. Ailes subhyalines, nervures pâles, transversale d'un brun noir; l'auxiliaire aboutit vis-à-vis de l'extrémité du rameau postérieur de la posticale, le radius un peu plus loin de la pointe alaire que le rameau antérieur; l'extrémité de la 2^e longitudinale est un peu plus près du radius que du cubitus; celui-ci droit, non dépassé par la costale, aboutissant aussi près de la pointe que la discoïdale; transversale oblique, la posticale se bifurque à peine en arrière de la transversale. Tibia antérieur un peu plus long que le fémur, à peine plus court que le métatarse, 4^e article tarsal plus long que le 3^e, presque deux fois aussi long que le 5^e, qui est 4 fois aussi long que gros; pulvilles larges, aussi longs que l'empodium, un peu plus courts que les crochets; chez le mâle la moitié distale du métatarse antérieur, les 2 articles suivants et les 4 pattes postérieures ont des poils deux fois aussi longs que l'épaisseur des pattes. Abdomen du mâle long et grêle, avec des poils dressés et assez longs; lamelle supérieure de la pince convexe et terminée par un long appendice lancéolé ou subfiliforme; l'article basal de la pince (fig. 13) porte au côté interne de sa base un lobe obtus, atteignant le milieu de l'article terminal et muni de poils incurvés; audessus de sa base, également au côté interne, se trouve un appendice plus mince et plus court, faiblement arqué et glabre; article terminal aussi long que le basal, son tiers postérieur est subitement aminci. Abdomen de la femelle aussi long que chez le mâle mais plus gros. Taille ♂ 10 mm., ♀ 9 mm.

Sylhet, Assam, en février (Major Hall); Bijnor, United Provinces, en janvier, 3 ♂ et 3 ♀; Calcutta, en novembre et en décembre; Port Canning, Lower Bengal, en décembre.

10. *Chironomus lobaticollis*, sp. nov.

(Pl. vi, fig. 14, partie de la pince.)

♀ ♂. Semblable au précédent, mais le vertex n'est pas lobé, son bord se replie en forme de V entre les antennes; palpes plus courts que les antennes. Chez la femelle, les articles antennaires 3-5 ont un col plus court que la moitié de la nodosité, verticilles 2-3 fois aussi longs que les articles; 6^e article mince, subcylindrique, 2-3 fois aussi long que le 5^e. Pronotum bilobé au milieu. Chez le mâle, les trois bandes du mesonotum sont traversées par de fines lignes transversales jaunes, de sorte qu'elles se composent de taches transversales; chez la femelle, les bandes du mesonotum sont dépourvues de lignes transversales, le bord antérieur porte de chaque côté une tache noire. Les ailes ont toutes les nervures pâles; cubitus aboutissant deux fois plus près de la pointe alaire que la discoïdale. Tibia antérieur un peu plus court que le fémur, brun noir comme les trois quarts proximaux du métatarse, celui-ci de moitié plus long que le tibia; chez le mâle, l'extrémité du métatarse antérieur et les articles 2 et 3 portent, sur la partie dorsale, des poils très longs, 5-8 fois aussi longs que l'épaisseur des articles, les quatre pattes postérieures ont des poils trois fois aussi longs que leur épaisseur; 4^e article des tarses antérieurs un peu plus long que le 3^e. Pattes de la femelle sans longs poils. Les quatre tergites antérieurs de l'abdomen sont traversés par une ligne longitudinale et médiane d'un brun noir; article terminal de la pince (fig. 14) graduellement et faiblement aminci à l'extrémité. Taille ♂ 9 mm., ♀ 7 mm.

Sylhet, Assam, en février (Major Hall); 3 ♂ et 3 ♀.

11. *Chironomus flaviventris*, sp. nov.

♂. Tête roussâtre; palpes et scape jaune roussâtre, flagellum brun; thorax blanchâtre, trois bandes du mesonotum, dont la médiane est raccourcie en arrière et les latérales raccourcies en avant, le metanotum, le sternum, trois petites taches sur les pleures, une de chaque côté, sur le devant du mesonotum et les balanciers ferrugineux; pattes d'un jaune blanchâtre, 5^e article de tous les tarses, extrémité du fémur antérieur, tibia antérieur, deux tiers proximaux du métatarse antérieur et extrémité des trois articles suivants, d'un brun noir; abdomen vitellin, avec une bande noire longitudinale, médiane et étroite, sur les tergites 2-6 cette bande est élargie triangulairement avant le bord postérieur. Yeux distants au vertex de leur largeur terminale; articles du flagellum très transversaux, le dernier plus de deux fois aussi long que les 10 précédents réunis; panache fauve. Pronotum non lobé. Scutellum non cilié. Ailes hyalines, toutes les nervures

pâles; 2^e longitudinale deux fois plus distante du cubitus que du radius; cubitus plus rapproché de la pointe alaire que la discoïdale, non dépassé par la costale; transversale oblique, située à peine avant la bifurcation de la posticale. Métatarse antérieur de moitié plus long que le tibia, qui est à peine plus court que le fémur; 4^e article plus long que le 3^e, plus du double du 5^e qui est 6-8 fois aussi long que gros; pulvilles grands; articles 2-4 des tarses antérieurs à poils 3-4 fois aussi longs que l'épaisseur des articles; les quatre pattes postérieures ont le fémur et le tibia munis de poils 2-3 fois aussi longs que leur épaisseur. Abdomen glabre, sauf quelques poils épars sur le dessous et sur les côtés; segments 2-6 plus de deux fois aussi longs que larges; pince jaune, article terminal pas plus long que le basal, à peine aminci à l'extrémité. Taille 8.5 mm. Côte d'Orissa: Puri, i-1908.

12. *Chironomus verrucosus*, sp. nov.

♂ ♀. Brun noir et mat, tête et scape d'un jaune brunâtre, flagellum et fémurs antérieurs d'un brun clair; balanciers d'un blanc brunâtre; mesonotum cendré avec trois bandes d'un brun noir, la médiane raccourcie en arrière et reliée au bord postérieur du mesonotum par une ligne, les latérales raccourcies en avant, et précédées d'une petite tache brune. Yeux très arqués, distants de leur largeur terminale; vertex en V entre les yeux. Palpes longs. Antennes du mâle de 12 articles, avec un panache brun; articles 3-11 très transversaux, 12^e 2½ fois aussi long que les 12 précédents réunis. Antennes de la femelle de 7 articles, dont le 2^e est globuleux et sans col, le 3^e ellipsoïdal avec un col très court; 4-6 amincis en pédicelle aux deux bouts, verticilles 2-3 fois aussi longs que les articles; 7^e article mince, cylindrique, presque aussi long que le 5^e et le 6^e réunis. Pronotum largement et faiblement échancré au milieu. Ailes brunâtres, nervures brunes; auxiliaire forte, aboutissant vis-à-vis de l'extrémité du rameau postérieur de la posticale; extrémité du radius située bien plus près de l'extrémité du rameau postérieur que de celle du rameau antérieur; 2^e longitudinale forte, aboutissant trois fois plus près du radius que du cubitus; celui-ci à peu près droit, non dépassé par la costale, aboutissant deux fois plus près de la pointe alaire que la discoïdale; transversale oblique; bifurcation de la posticale située un peu en arrière de la transversale. Tibia antérieur à peine plus court que le fémur; métatarse antérieur de moitié plus long que le tibia, 4^e article égal au 3^e, plus du double du 5^e, qui est huit fois aussi long que gros; pattes antérieures du mâle finement pubescentes, les 4 autres également sans longs poils; pulvilles larges, un peu plus courts que les crochets. Abdomen granulé ou verruqueux; chez le mâle, il est grêle et élargi en arrière, chez la femelle, de moitié plus long que le reste du corps; tous les tergites, sauf le 1^{er} et le dernier, ont au bord antérieur une verrue ellipsoïdale, peu élevée, longitudinale, occupant le tiers ou presque la moitié du tergite et traversée par un sillon longitudinal et médian; poils peu longs

et clairsemés; pince plus claire que l'abdomen; lamelle convexe, avec un prolongement filiforme et arqué; lobe de l'article basal obtus, dépassant à peine la base de l'article terminal qui est de moitié plus long que le basal, graduellement et faiblement aminci au tiers postérieur. Taille 5-6 mm.

Bhim Tal, à une élévation de 1500 m., Kumaon, 25-ix et 27-ix, 1906 (N. Annandale); Calcutta, 26-v, 14-vii, 28-xii, 1907.

13. *Chironomus grossipes*, sp. nov.

♀. D'un noir brillant et subglabre; antennes sauf le 6^e article, et tarsi d'un jaune pâle, balanciers et trochanters d'un brun clair. Antennes de 6 articles, dont le 2^e est rétréci au milieu, 3-5 ellipsoïdaux, à col très court, verticille 2-3 fois aussi long que l'article; 6^e article mince, cylindrique, égal aux trois précédents réunis. Ailes brunâtres, nervures brun clair; cubitus deux fois plus distant de la pointe alaire que la discoïdale, transversale oblique, située notablement avant la bifurcation de la posticale. Fémurs et tibia grossis comme chez *Palpomyia*, fémurs antérieurs légèrement amincis dans la moitié proximale, presque deux fois aussi longs que le tibia, tarsi antérieurs brisés; tibia postérieur égal au tarse, dont les deux derniers articles sont à peine deux fois aussi longs que gros; pulvilles grands. Abdomen comprimé de moitié plus long que le reste du corps. Taille 2.5 mm.

Calcutta, mai et juillet (N. Annandale)

14. *Chironomus nigromarginatus*, sp. nov.

♀. Antennes blanchâtres sauf le 6^e article, qui est d'un brun noir; thorax blanc brunâtre, mesonotum mat, pruinéux et blanchâtre comme le scutellum, avec 3 bandes ferrugineuses bordées latéralement par une ligne noire, la médiane est raccourcie en arrière, les latérales raccourcies en avant; balanciers et pattes blanchâtres ou jaunâtres, extrémité des fémurs antérieurs, tiers proximal des tibia antérieurs, extrémité des 4 premiers articles de tous les tarsi et le 5^e article, assombris; abdomen d'un brun noir, bord postérieur des segments plus clair. Article 2^e des antennes, cylindrique, 3-5 fusiformes, deux fois aussi longs que gros, verticille pas double de l'article, 6^e article mince, cylindrique, de moitié plus long que le 5^e. Ailes subhyalines, nervures pâles, transversale d'un brun noir, bifurcation située un peu en arrière de la transversale. Toutes les pattes finement pubescentes, métatarse antérieur au moins de moitié plus long que le tibia, dont l'extrémité a les longues soies ordinaires, 4^e article égal au 3^e, double du 5^e, qui est 6-8 fois aussi long que gros. Abdomen assez grêle, double du reste du corps. Taille 4 mm.

Ile Gopkuda: Lake Chilka, Ganjam, en avril; Lucknow, en avril; Calcutta en mars, mai et août, capturé aussi la nuit, à la lumière, le 7 mars, exemplaires ayant le métatarse antérieur presque double du tibia (N. Annandale); probablement la femelle de *C. callithorax*.

Var. *macrogaster*.—♀. Bande médiane du mesonotum prolongée par une ligne jusqu'au bord postérieur du mesonotum; 6^e article antennaire plus de deux fois aussi long que le 5^e. Taille 4.8 mm.

United Provinces: Maldhun, Naini Tal, 14-ii.

15. *Chironomus callithorax*, sp. nov.

♂. D'un jaune roussâtre; scape cendré, flagellum roussâtre; mesonotum et scutellum d'un gris cendré et mat, avec trois bandes ferrugineuses limitées latéralement par une ligne noire, la médiane raccourcie en arrière, les latérales raccourcies en avant; metanotum brun noir; balanciers blanchâtres; pattes d'un jaune roussâtre; abdomen d'un jaune blanchâtre, une tache arrondie en avant des tergites 2-6, les tergites 7 et 8, et la pince d'un brun noir. Palpes roussâtres et longs. Antennes de 12 articles, dont le 2^e est deux fois aussi long que gros, 3-11 très transversaux, 12^e deux fois et demie aussi long que les dix précédents réunis, panache d'un brun fauve. Ailes hyalines, les trois nervures antérieures jaunes, les autres hyalines; extrémité du radius à peine plus distante de la pointe alaire que le rameau antérieur de la posticale; 2^e longitudinale très rapprochée du radius; cubitus non dépassé par la costale, aussi près de la pointe alaire que la discoïdale; transversale oblique, située un peu en arrière de la bifurcation de la posticale, et non en avant comme d'ordinaire. Tibia antérieur plus court que le fémur; métatarse antérieur presque double du tibia, 4^e article un peu plus court que le 3^e, deux fois et demie aussi long que le 5^e, qui est 6-8 fois aussi long que gros; tarses antérieurs sans longs poils; 4 tibias postérieurs avec des poils 2-3 fois aussi longs que leur épaisseur. Abdomen à peine aminci au milieu, 2½ fois aussi long que le reste du corps, segments plus de deux fois aussi longs que larges; lamelle de la pince avec un prolongement en bec; article terminal de la pince aminci fortement en col dans sa moitié postérieure, lobe atteignant le milieu de l'article terminal. Taille 5-6 mm.

United Provinces, Bijnor District: Anaithpur 9-xi-1907; Amanghar, 12-xi-1907; Upper Burma: Mandalay, 12-iii-1908; Lucknow, 21-v-1907; Eastern Bengal: Rajshahi, 6-ii-1907; Calcutta, 30-iv-1907; "at light," 24-vi-1907. Les exemplaires de Mandalay ont le panache blanchâtre, la nervure transversale brune, le devant du mesonotum légèrement verdâtre de chaque côté de la bande médiane, les 4 fémurs postérieurs aussi longuement poilus que les tibias.

16. *Chironomus albiforceps*, Kieff.

♀. La femelle, inconnue jusqu'ici, a la couleur du mâle. Antennes de 6 articles, dont les cinq premiers sont d'un brun noir, le 6^e noir; articles 3-5 brièvement fusiformes à peine deux fois aussi longs que gros, verticille double de l'article, 6^e article subcylindrique, mince, de moitié plus long que le 5^e. Ailes tantôt

noirâtres, tantôt à peine teintées, très irisées, sans taches hyalines, cubitus droit et distant de la costale. Métatarse antérieur à peine de deux tiers plus long que le tibia; les quatre fémurs postérieurs moins élargis que chez le mâle. Taille 2 mm.

Calcutta, 7 exemplaires en juillet et en août; Port Canning Lower Bengal, 21 juillet; Katihar, Purneah district, 4-viii (C. Paiva). *Chironomus atripes*, Kieff., que j'ai considéré comme étant peut-être la femelle de *C. albiforceps*, est donc spécifiquement distinct.

17. *Chironomus melanostolus*, sp. nov.

♀. D'un brun noir, y compris les balanciers; trochanters et tarses d'un jaune brunâtre. Antennes composées de 7 articles; les articles 3-6 ellipsoïdaux, à col un peu plus court que l'article, sauf le 6^e qui est sans col, verticille deux fois aussi long que l'article, le 7^e article mince, cylindrique, de moitié plus long que l'avant-dernier. Thorax mat; ailes enfumées, toutes les nervures sont brunes, radius situé très près de la 2^e longitudinale, cubitus non dépassé par la costale, à peine plus distant de la pointe alaire que la discoïdale, auxiliaire aboutissant vis-à-vis de l'extrémité du rameau proximal de la posticale, bifurcation située sous la transversale. Toutes les pattes sont finement pubescentes; métatarse antérieur de moitié plus long que le tibia, 4^e article d'un tiers plus long que le 3^e, double du 5^e, qui est 6-8 fois aussi long que gros. Taille 5 mm.

Ganjam, Lake Chilka, Gopkuda Island, en août.

18. *Chironomus nigriforceps*, sp. nov.

♂. Noir ou brun noir; palpes et antennes bruns, balanciers blancs à massue sombre, tarses blancs, moitié proximale des fémurs antérieurs d'un brun clair. Yeux comme d'ordinaire. Palpes longs. Antennes de 13 ou de 14 articles, les articles 3-13 transversaux, le dernier deux fois aussi long que les 11 ou 12 précédents réunis, panache brun. Thorax mat et glabre. Ailes brunâtres, nervures brunes, auxiliaire dépassant à peine la transversale, qui est oblique et petite, radius à peine plus distant de la pointe alaire que le rameau postérieur; 2^e longitudinale plus proche du cubitus que du radius; cubitus droit, beaucoup plus distant de la pointe alaire que la discoïdale; bifurcation de la posticale située sous la transversale. Fémur antérieur renflé dans sa moitié distale, deux fois aussi long que le tibia, métatarse plus de deux fois aussi long que le tibia, 4^e article égal au 3^e, plus de deux fois le 5^e qui est 5-6 fois aussi long que gros; métatarse postérieur encore plus long que le tibia; pattes antérieures pubescentes, les postérieures à poils aussi longs que leur épaisseur. Abdomen faiblement poilu, 2½ fois aussi long que le reste du corps, segments intermédiaires plus de deux fois aussi longs que larges, 6^e et 7^e élargis; pince à articles subégaux, le terminal presque en ellipse, lobe dépassant un peu l'article basal, lamelle avec un appendice filiforme. Taille 5 mm.

United Provinces: Chandan Chowki, 8-v-1907. Cette espèce a l'apparence de *C. albiforceps*.

19. *Chironomus dolichogaster*, sp. nov.

♂. Tête et flagellum bruns; scape roussâtre; palpes noirs; thorax brun, le dessus d'un noir brillant, sauf la moitié antérieure de la partie médiane du mesonotum, qui est d'un roux marron; pattes d'un jaune blanchâtre; abdomen vitellin, avec une ligne longitudinale médiane et un étroit bord postérieur des segments noirs; articles de la pince noirs. Yeux distants de leur largeur terminale. Antennes de 14 articles, 3-13 très transversaux, 14^e graduellement aminci, plus de deux fois aussi long que les 12 précédents réunis; panache d'un brun noir. Pronotum non lobé. Scutellum cilié. Ailes subhyalines, toutes les nervures pâles; auxiliaire aboutissant vis-à-vis de l'extrémité du rameau postérieur; radius un peu plus distant de la pointe alaire que le rameau antérieur de la posticale; 2^e longitudinale deux fois plus distante du cubitus que du radius; cubitus non dépassé par la costale, aboutissant presque à la pointe alaire; transversale oblique, située à peine avant la bifurcation de la posticale. Pattes antérieures pubescentes, métatarse antérieur d'un tiers plus long que le tibia qui est égal au fémur; 4^e article à peine plus court que le 3^e, double du 5^e, qui est 6 fois aussi long que gros; les 4 pattes postérieures avec des poils 2-3 fois aussi longs que leur épaisseur. Abdomen grêle, plus de deux fois aussi long que le reste du corps, à poils longs et jaunes; 1^{er} segment aussi long que gros, 2-6 plus de deux fois aussi longs que larges, 7^e un peu élargi, deux fois aussi long que large; 8^e un peu plus long que large; article terminal de la pince un peu plus long que le basal, faiblement aminci au bout. Taille 5.6 mm.

Calcutta, ii-1908 (N. Annandale).

20. *Chironomus seminiger*, sp. nov.

♂. Tête et thorax d'un noir brillant. Panache d'un brun noir; extrémité blanchâtre. Aux tarses antérieurs, l'extrémité du métatarse et le 2^e article ont des poils 2-3 fois aussi longs que leur épaisseur. Abdomen presque trois fois aussi long que le reste du corps, cylindrique, sauf le 7^e segment qui est un peu élargi; segments à peine deux fois aussi longs que larges; article terminal de la pince presque deux fois aussi long que le basal, lobe atteignant la base de l'article terminal. Taille 5 mm.—Pour tout le reste, semblable à *C. dolichogaster*.

Calcutta, 3- et 23-iii-1907 (N. Annandale); 4 exemplaires.

21. *Chironomus lampronotus*, sp. nov.

♀. D'un jaune brunâtre; scape brunâtre, articles 2-6 blanchâtres, le 7^e brun noir; mesonotum très brillant, brun noir, un peu plus clair de chaque côté en avant; balanciers blancs; pattes jaunâtres. Antennes de 7 articles; 2^e article cylindrique,

3-6 fusiformes, deux fois aussi longs que gros, verticille 2-3 fois aussi long que l'article, 7^e article mince, au moins aussi long que les articles 5 et 6 réunis. Ailes faiblement jaunâtres, cubitus brun, les autres nervures plus claires, l'auxiliaire s'arrête vis-à-vis de l'extrémité du rameau postérieur de la posticale; extrémité du radius plus proche de celle du rameau antérieur que du rameau postérieur; cubitus droit, plus près de la pointe alaire que la discoïdale; bifurcation de la posticale située un peu en arrière de la transversale. Pattes antérieures pubescentes; leur fémur d'un tiers plus long que le tibia, tarsi brisés; pattes postérieures pubescentes sauf les tarsi, qui ont, sur le dessus, des poils épars et longs. Abdomen très brillant, un peu plus sombre en arrière, presque deux fois aussi long que le reste du corps, segments un peu transversaux et déprimés, leur bord postérieur faiblement assombri. Taille 4 mm.

Sylhet, Assam, 14-iv (Major Hall).

22. *Chironomus longicrus*, sp. nov.

♂. Antennes brunes, scape roux brun, palpes brunâtres et longs, thorax d'un brun roux et brillant, balanciers blancs, pattes d'un jaune sale, abdomen et pince brun noir. Antennes de 14 articles, dont le 2^e est allongé, 3-13 distinctement plus long que gros, 14^e un peu plus court que les articles 2-13 réunis, panache d'un gris sombre. Mesonotum un peu plus clair de chaque côté en avant. Ailes subhyalines, glabres et lobées comme d'ordinaire, nervures d'un jaune brunâtre, cubitus arqué, non dépassé par la costale, aboutissant presque dans la pointe alaire, bifurcation située notablement en arrière de la transversale. Fémur antérieur deux fois aussi long que le tibia, qui égale la moitié du métatarse, tarsi non poilus, les 4 pattes postérieures à poils assez longs, fémur postérieur de moitié plus long que le tibia, atteignant l'extrémité du 7^e segment abdominal, tandis que chez les congénères, il ne dépasse pas le milieu de l'abdomen. Articles terminaux de la pince lancéolés et un peu plus larges que les basaux; appendices poilus n'atteignant pas le milieu des articles terminaux. Taille 3.5 mm.

Simla hills: Matiana, à une altitude de 2700 m. (N. Annandale).

23. *Chironomus fuscilarsis*, sp. nov.

♀. Jaune; palpes, antennes sauf les deux premiers articles, et abdomen bruns; balanciers blancs; mesonotum avec trois bandes brillantes et d'un brun noir, la médiane raccourcie en arrière, les latérales raccourcies en avant; extrémité des fémurs antérieurs et de tous les tibias, ainsi que tous les tarsi d'un brun noir. Yeux comme d'ordinaire. Palpes longs. Antennes de 6 articles: les articles 3-5 ellipsoïdaux, col égal à la moitié de la partie renflée, verticille deux fois aussi long que l'article; 6^e article mince, cylindrique, égal aux deux précédents réunis. Pronotum indistinct

Ailes hyalines; les trois nervures antérieures d'un jaune brunâtre, les autres blanchâtres; auxiliaire peu marquée, ne dépassant pas la transversale; extrémité du radius plus près du rameau antérieur que du rameau postérieur; cubitus presque droit, non dépassé par la costale, plus proche de la pointe alaire que la discoïdale; transversale oblique, située un peu avant la bifurcation de la posticale. Métatarse antérieur au moins de moitié plus long que le tibia, qui est d'un quart plus court que le fémur; 4^e article un peu plus du double du 5^e, qui est 6 fois aussi long que gros. Abdomen comprimé, moins haut en avant qu'en arrière, deux fois aussi long que le reste du corps. Taille 4 mm.

Upper Burma: Mandalay, 12-iii-1908 (N. Annandale).

24. *Chironomus callicornus*, sp. nov.

♂. Thorax d'un noir brillant, avec une tache d'un brun noir, de chaque côté, en avant du mesonotum; tête, palpes, scape et pattes jaunâtres; flagellum, anneau au-dessus du milieu des fémurs antérieurs, tibias et tarses antérieurs, aux autres pattes les 2 ou 3 derniers articles tarsaux d'un brun noir; balanciers blancs; abdomen blanchâtre, tiers antérieur des segments 2-5, segments 6^e et 7^e presque en entier et pince brun noir. Palpes très longs. Antennes de 14 articles; 2^e article plus de deux fois aussi long que gros, 3-13 transversaux, 14^e de moitié plus long que les 12 articles précédents réunis; panache long, brun gris vers le bas, gris blanchâtre vers le haut. Ailes subhyalines, nervures pâles, extrémité du radius beaucoup plus près du rameau antérieur de la posticale que du rameau postérieur; 2^e longitudinale très rapprochée du radius; cubitus non dépassé par la costale, aussi distant de la pointe alaire que la discoïdale; transversale oblique, située au-dessus de la bifurcation de la posticale. Pattes antérieures sans longs poils, leur métatarse à peine plus long que le tibia, qui est plus long que le fémur; 4^e article plus court que le 3^e, double du 5^e qui est 6-8 fois aussi long que gros; les 4 pattes postérieures à poils deux fois aussi longs que leur épaisseur. Abdomen élargi aux deux bouts, plus de deux fois aussi long que le reste du corps, segments intermédiaires plus de deux fois aussi longs que larges, poils clairsemés et jaunâtres; lamelle de la pince terminé en bec; article terminal de la pince un peu plus long que le basal, fortement aminci au tiers postérieur, lobe atteignant le milieu de l'article terminal. Taille 5.6 mm.

Simla hills: Matiana, à une altitude de 2800 m. (N. Annandale).

25. *Chironomus lamprothorax*, sp. nov.

♀. D'un jaune roussâtre, antennes d'un brun noir, mesonotum très brillant, avec trois bandes, noires, dont la médiane est raccourcie en arrière, et s'arrête brusquement vis-à-vis de l'origine des latérales qui sont raccourcies en avant, metanotum brun, trois premiers segments abdominaux d'un jaune roussâtre, les suivants

Ailes hyalines; les trois nervures antérieures d'un jaune brunâtre, les autres blanchâtres; auxiliaire peu marquée, ne dépassant pas la transversale; extrémité du radius plus près du rameau antérieur que du rameau postérieur; cubitus presque droit, non dépassé par la costale, plus proche de la pointe alaire que la discoïdale; transversale oblique, située un peu avant la bifurcation de la posticale. Métatarse antérieur au moins de moitié plus long que le tibia, qui est d'un quart plus court que le fémur; 4^e article un peu plus du double du 5^e, qui est 6 fois aussi long que gros. Abdomen comprimé, moins haut en avant qu'en arrière, deux fois aussi long que le reste du corps. Taille 4 mm.

Upper Burma: Mandalay, 12-iii-1908 (N. Annandale).

24. *Chironomus callicomus*, sp. nov.

♂. Thorax d'un noir brillant, avec une tache d'un brun noir, de chaque côté, en avant du mesonotum; tête, palpes, scape et pattes jaunâtres; flagellum, anneau au-dessus du milieu des fémurs antérieurs, tibias et tarses antérieurs, aux autres pattes les 2 ou 3 derniers articles tarsaux d'un brun noir; balanciers blancs; abdomen blanchâtre, tiers antérieur des segments 2-5, segments 6^e et 7^e presque en entier et pince brun noir. Palpes très longs. Antennes de 14 articles; 2^e article plus de deux fois aussi long que gros, 3-13 transversaux, 14^e de moitié plus long que les 12 articles précédents réunis; panache long, brun gris vers le bas, gris blanchâtre vers le haut. Ailes subhyalines, nervures pâles, extrémité du radius beaucoup plus près du rameau antérieur de la posticale que du rameau postérieur; 2^e longitudinale très rapprochée du radius; cubitus non dépassé par la costale, aussi distant de la pointe alaire que la discoïdale; transversale oblique, située au-dessus de la bifurcation de la posticale. Pattes antérieures sans longs poils, leur métatarse à peine plus long que le tibia, qui est plus long que le fémur; 4^e article plus court que le 3^e, double du 5^e qui est 6-8 fois aussi long que gros; les 4 pattes postérieures à poils deux fois aussi longs que leur épaisseur. Abdomen élargi aux deux bouts, plus de deux fois aussi long que le reste du corps, segments intermédiaires plus de deux fois aussi longs que larges, poils clairsemés et jaunâtres; lamelle de la pince terminé en bec; article terminal de la pince un peu plus long que le basal, fortement aminci au tiers postérieur, lobe atteignant le milieu de l'article terminal. Taille 5.6 mm.

Simla hills: Matiana, à une altitude de 2800 m. (N. Annandale).

25. *Chironomus lamprothorax*, sp. nov.

♀. D'un jaune roussâtre, antennes d'un brun noir, mesonotum très brillant, avec trois bandes, noires, dont la médiane est raccourcie en arrière, et s'arrête brusquement vis-à-vis de l'origine des latérales qui sont raccourcies en avant, metanotum brun, trois premiers segments abdominaux d'un jaune roussâtre, les suivants

bruns avec les bords latéraux jaunâtres; pattes jaunes, aux antérieures l'extrémité du fémur, le tibia et les tarses sont assombris, aux quatre pattes postérieures les deux ou trois derniers articles tarsaux sont assombris; balanciers blancs. Antennes de 6 articles, dont le 2^e est à peine rétréci au milieu, 3-5 fusiformes, deux fois aussi longs que gros, col égal à la moitié de la partie renflée, verticille à peine deux fois l'article, 6^e article mince, cylindrique et de moitié plus long que le 5^e. Ailes hyalines, nervures jaunâtres, extrémité du radius également distante des deux rameaux de la posticale, 2^e longitudinale située contre le radius, cubitus arqué, non dépassé par la costale, un peu plus loin de la pointe alaire que la discoïdale, transversale oblique, située un peu avant la bifurcation de la posticale. Pattes sans longs poils. Fémur antérieur dépassant de deux tiers la longueur du tibia, métatarse de moitié plus long que le tibia, 4^e article d'un tiers plus long que le 3^e, plus de deux fois le 5^e qui est six fois aussi long que gros; aux quatre pattes postérieures le 4^e article est un peu plus long que le 5^e, qui est trois fois aussi long que gros. Taille 3 mm.

"At light in railway carriage, between Bolpore and Rampore Haut, E. I. Ry., Bengal," 3-viii-1907 (C. Paiva).

Var. *radialis*, var. nov.—Abdomen brun, les trois premiers segments plus clairs en avant, sur les individus jeunes; antennes brun noir, articles 2-3 ou 2-5 jaunâtres; aux pattes antérieures l'extrémité du fémur, le tibia et les articles tarsaux d'un brun noir, base du métatarse un peu plus claire, aux quatre autres tarses, les 2 derniers articles à peine assombris. Extrémité du radius beaucoup plus rapprochée de celle du rameau antérieur que du rameau postérieur de la posticale. Article 4^e des tarses antérieurs pas plus long ou guère plus long que le 3^e. Taille ♀ 3 mm. Pour le reste, semblable au type.

Calcutta, en juin, juillet et en août (11 exemplaires).

26. *Chironomus tenerrimus*, sp. nov.

(Pl. vi, fig. 15, partie de la pince.)

♂ ♀. Tête et thorax du mâle jaunes, palpes blanchâtres, scape jaune ou noir, flagellum brun noir, pattes blanchâtres, comme la tige des balanciers, massue des balanciers et metanotum bruns, abdomen d'un jaune blanchâtre, moitié postérieure des tergites 3 et 6, lamelle et articles basaux de la pince, et une grande tache sur chaque sternite brun noir; plus tard, l'abdomen est d'un roux brun ou presque brun noir. Chez la femelle, le corps est d'un brun noir, les pattes d'un jaune sâle comme les balanciers; antennes brunâtres, de 6 articles, dont le 2^e est un peu rétréci au milieu, les 3 suivants fusiformes, deux fois aussi longs que gros, à verticille double de l'article; le 6^e article très mince, brun noir, un peu plus long que les 2 précédents réunis; le cubitus est arqué et aboutit presque à la pointe alaire, métatarse presque double du tibia. Antennes du mâle de 12 articles, dont le 2^e est deux fois

aussi long que gros, 3-11 très transversaux, 12^e presque deux fois aussi long que les dix précédents réunis, panache d'un brun noir. Ailes hyalines, toutes les nervures pâles, extrémité du radius plus près du rameau antérieur de la posticale que du rameau postérieur, cubitus plus éloigné de la pointe alaire que la discoïdale, non dépassé par la costale, transversale oblique, située un peu avant la bifurcation de la posticale. Pattes antérieures pubescentes, tibia antérieur égal à la moitié du fémur ou à la moitié du métatarse, 4^e article un peu plus court que le 3^e, plus de deux fois le 5^e qui est 5-6 fois aussi long que gros; quatre pattes postérieures, y compris les tarsi, avec des poils 2-3 fois aussi longs que leur épaisseur. Abdomen 2½ fois aussi long que le reste du corps, à peine plus large aux deux bouts; lamelle de la pince avec un appendice en bec, article terminal un peu plus long et un peu plus large que le basal. Corps très grêle. Taille 2.8 mm.

Calcutta, 20-i; 28-i, "at light"; 7-ii; 2-iii; 7-iii, "at light"; 4-vii; 26-vii; 27-vii; 2-viii; 20-viii (N. Annandale).

Chironomus tenerimus, var. *leucotarsus*, var. nov.

♂. Brun roux; abdomen d'un brun noir; balanciers et pattes blanchâtres, tarsi d'un blanc pur; scape d'un roux brun, flagellum brun. Articles du flagellum un peu transversaux sauf le dernier, qui est d'un tiers plus long que les précédents réunis; panache gris. Ailes hyalines, nervures pâles; extrémité du radius plus proche de celle du rameau antérieur de la posticale que du rameau postérieur; cubitus droit, aussi proche de la pointe alaire que la discoïdale; bifurcation de la posticale située un peu en arrière de la transversale. Pattes antérieures finement pubescentes, leur métatarse double du tibia, 3^e article de moitié plus long que le 4^e, qui est plus de deux fois aussi long que le 5^e, celui-ci 4 fois aussi long que gros; pattes postérieures avec des poils 2-3 fois aussi longs que l'épaisseur des tibias ou des tarsi. Article terminal de la pince en ellipse allongée et beaucoup plus large que l'article basal. Taille ♂ 2 mm.

Calcutta, capturé à la lumière, en juin, par Annandale (3 exemplaires).

Var.—Thorax roux brunâtre; abdomen roux ou blanchâtre, segments 2 et 6 et la pince assombris, articles terminaux de la pince blanchâtres, panache brun, massue des balanciers d'un brun noir; 3^e article des tarsi antérieurs à peine plus long que le 4^e, métatarse un peu plus de deux fois aussi long que le tibia. Taille ♂ 1.8 mm.

Calcutta en août, capturé à la lumière en juin (N. Annandale), 5 exemplaires.

27. *Chironomus noctuabundus*, sp. nov.

(Pl. vi, fig. 16, partie de la pince.)

♂ ♀. Tête d'un brun clair, palpes d'un brun noir, antennes de la femelle brunâtres, le 6^e article noir, flagellum du mâle brun;

thorax d'un gris jaunâtre et prumineux; balanciers et pattes blanchâtres, genoux un peu assombris; abdomen et pince d'un brun noir, bord postérieur des segments plus clair. Yeux comme d'ordinaire. Palpes longs. Antennes du mâle de 14 articles, les articles 3-13 très transversaux, 14^e au moins deux fois aussi long que les 12 précédents réunis; panache brun. Antennes de la femelle de 6 articles, dont le 2^e est cylindrique et sans rétrécissement, 3-5 fusiformes, le col plus court que la partie renflée mais plus long que le pétiole, verticille 2-3 fois aussi long que l'article; 6^e article mince, pointue, de moitié plus long que le 5^e. Pronotum non échancré. Scutellum longuement cilié. Ailes blanchâtres, nervures jaunes, transversale brune et oblique; auxiliaire dépassant de beaucoup la transversale; extrémité du radius beaucoup plus près du rameau antérieur que du postérieur; 2^e longitudinale très rapprochée du radius; cubitus non dépassé par la costale, aussi proche de la pointe alaire que la discoïdale, bifurcation de la posticale située sous la transversale. Chez le mâle, le tiers distal du métatarse antérieur et le 2^e article ont des poils très longs, 3-4 fois aussi longs que leur épaisseur, les 4 tibias postérieurs à poils deux fois aussi longs que leur épaisseur; métatarse antérieur d'un tiers plus long que le tibia, égal au fémur; 4^e article égal au 3^e, double du 5^e, qui est 6 fois aussi long que gros. Abdomen poilu et un peu verruqueux; segments 2-5 au moins deux fois aussi longs que gros; lamelle de la pince avec un prolongement en forme de bec; article terminal subitement aminci après le milieu en un col cylindrique; lobe dépassant un peu la base de l'article terminal (fig. 16). Taille σ 4 mm., $\varnothing$ 5.5 mm.

"On board ship at night, Suez Canal," 9-x-1907; "Port Said, Suez Canal, on board ship early morning," 10-x-1907 (N. Annandale); 3 σ et 3 $\varnothing$.

28. *Chironomus dolichotomus*, sp. nov.

(Pl. vii, fig. 17, pince.)

σ . D'un roux sombre et mat; flagellum brun, pattes et abdomen d'un blanchâtre sale, les 6 premiers tergites avec une grande tache d'un brun noir, 7^e et 8^e et la pince d'un brun sombre. Antennes de 12 articles, dont le 2^e est pâle et allongé, 3-11 très transversaux, 12^e 2 fois $\frac{1}{2}$ aussi long que les articles 2-11 réunis, panache d'un gris brun. Ailes subhyalines, nervures pâles, sauf la transversale qui est d'un brun noir, cubitus droit et aussi près de la pointe que la discoïdale, extrémité du radius plus près de celle du rameau distal que du rameau proximal, bifurcation de la posticale située à peine en arrière de la transversale. Tibia antérieur égalant les $\frac{2}{3}$ du fémur, tarsi brisés; les 4 tibias postérieurs longuement poilus. Pince (fig. 17) à article terminal aminci, dans sa moitié postérieure, en un pétiole glabre, son extrémité armée de 4 longues soies au côté interne; les appendices poilus n'atteignent pas le milieu des articles terminaux, les appendices

glabres sont un peu plus courts, pas de moitié aussi larges et incurvés à l'extrémité. Taille 3.5 mm.

North Bengal : Purneah, 5-viii (C. Paiva).

20. *Chironomus callinotus*, sp. nov.

(Pl. vii, fig. 18, partie de la pince.)

♂. Scape noir, flagellum et tarses antérieurs brisés ; thorax d'un brun noir et mat ; mesonotum d'un jaune vitellin comme le scutellum, avec trois bandes noires, dont la médiane est rétrécie en arrière et les latérales en avant ; abdomen jaunâtre, tergites 2-5 avec une grande tache brun noir, tergites suivants et pince assombris ; balanciers blanchâtres ; pattes jaunâtres, les 4 derniers articles tarsaux des 4 pattes postérieures et les tibias antérieurs assombris. Ailes hyalines, nervures pâles, transversale d'un brun noir ; radius très rapproché de la 2^e longitudinale, son extrémité plus près de celle du rameau distal que de celle du rameau proximal, cubitus droit sauf à l'extrême bout terminal, plus rapproché de la pointe alaire que la discoïdale, bifurcation de la posticale située à peine en arrière de la transversale. Fémur antérieur d'un quart plus long que le tibia, assombri à l'extrémité, tibia postérieur à poils guère plus longs que son épaisseur, tarses pubescents. Pince (fig. 18) à article terminal aminci fortement en pétiole dans son tiers postérieur, cette partie amincie est glabre, convexe en dehors, concave en dedans, avec 5 longues soies au côté interne et une courte soie à l'extrémité ; appendices poilus dépassant à peine la base des articles terminaux, le prolongement de la lamelle est élargi à l'extrémité. Taille 6 mm.

United Provinces, Bijnor district, Abjulgur, 11-ii.

30. *Chironomus melanophorus*, sp. nov.

♀. Antennes roussâtres, sauf le 6^e article qui est noir ; thorax d'un jaune sale et mat, mesonotum plus clair, avec 3 bandes noires ou brun noir, dont les deux latérales sont raccourcies en avant, la médiane percurrente et graduellement amincie en arrière, metanotum brun noir ; balanciers blanchâtres ; pattes d'un jaune sale, 5^e article de tous les tarses et tiers proximal du tibia antérieur assombris, abdomen d'un brun noir, plus clair dans sa moitié antérieure, bord postérieur des tergites un peu pruinéux de gris. Antennes de 6 articles, dont le 2^e est fortement rétréci au milieu, 3-5 fusiformes, deux fois aussi longs que gros, verticille double de l'article, le 6^e article mince, cylindrique, égal aux 3 précédents réunis. Pronotum bilobé. Ailes hyalines, nervures pâles, transversale brune ; cubitus un peu arqué, plus près de la pointe que la discoïdale, non dépassé par la costale ; bifurcation de la posticale située un peu en arrière de la transversale. Pattes pubescentes, sans longs poils ; métatarse antérieur d'un quart plus long que le tibia, 4^e article tarsal à peine plus court que le 3^e. Taille 4 mm.

Calcutta, 13-vi.

31. *Chironomus planicollis*, sp. nov.

♀. D'un brun noir; tête, antennes et pattes d'un brun jaune; mesonotum cendré, prumineux, avec trois bandes plus sombres, la médiane raccourcie en arrière et reliée au bord postérieur par une ligne, les deux externes raccourcies en avant; tige des balanciers blanchâtre. Yeux séparés par leur largeur terminale. Antennes de 7 articles (sur les 2 exemplaires); 2^e article composé de deux nodosités; 3-6 ellipsoïdaux, à col très court, verticilles 3-4 fois aussi longs que les articles; 7^e cylindrique, mince, double du 6^e. Pronotum non échancré, perpendiculaire et plan en avant. Scutellum non cilié. Ailes brunâtres, toutes les nervures d'un brun clair; auxiliaire dépassant de beaucoup la transversale, 2^e longitudinale quatre fois plus distante du cubitus que du radius; cubitus à peine arqué au bout, non dépassé par la costale, plus proche de la pointe alaire que la discoïdale; transversale oblique, située à peine en avant de la bifurcation de la posticale. Métatarse antérieur de moitié plus long que le tibia, qui est à peine plus court que le fémur; 4^e article aussi long que le 3^e, au moins double du 5^e, qui est 6-8 fois aussi long que gros, pulvilles grands. Abdomen subcylindrique, double du reste du corps, 7^e segment un peu élargi; poils courts. Taille 5.6 mm.

Sylhet, Assam, en janvier et en mars (Major Hall).

32. *Chironomus breviforceps*, sp. nov.

♂ ♀. Antennes de la femelle et scape du mâle d'un brun noir, flagellum du mâle brunâtre; thorax d'un brun noir et mat, mesonotum blanchâtre et prumineux comme le scutellum, avec trois bandes noires, dont la médiane est raccourcie en arrière et les latérales en avant; balanciers blanchâtres; pattes jaunâtres, extrémité du fémur antérieur, tibia sauf le tiers distal, les tarses et les trois derniers articles tarsaux des quatre autres pattes, d'un brun noir; abdomen entièrement brun noir chez la femelle; chez le mâle, il est d'un jaune brunâtre, tergites 2-5 avec une grande tache arrondie brune, tergites 6-8 et la pince d'un brun noir. Antennes du mâle de 12 articles, les articles 3-11 très transversaux, le 12^e presque trois fois aussi long que les articles 2-11 réunis; panache d'un gris brunâtre; antennes de la femelle de 6 articles, dont le 2^e est cylindrique, 3-5 fusiformes et deux fois aussi longs que gros, 6^e de moitié plus long que le 5^e, cylindrique et mince. Ailes subhyalines, nervures pâles, transversale brune, située au-dessus ou un peu en arrière de la bifurcation de la posticale, extrémité du radius plus près de celle du rameau distal que du rameau proximal de la posticale, cubitus un peu arqué et plus rapproché de la pointe alaire que la discoïdale. Pattes antérieures pubescentes, leur métatarse deux fois aussi long que le tibia dans les deux sexes, 4^e article plus court que le 3^e dans les deux sexes, au moins double du 5^e, qui est 6-8 fois aussi long que gros; aux quatre pattes postérieures, le tibia et les tarses ont des poils deux

fois aussi longs que leur épaisseur. Pince remarquable par sa petitesse, elle est plus courte que son support qui simule un 9^e segment, tandis que chez les autres espèces, elle est plus longue ou au moins aussi longue que ce support; article terminal aminci en pétiole dans sa moitié distale, appendices poilus dépassant un peu les articles basaux. Taille ♂ 5 mm., ♀ 4 mm.

Simla hills: Theog, à une altitude de 2700 mètres, en mai (N. Annandale).

33. *Chironomus nocturnalis*, sp. nov.

♀. D'un brun noir; palpes blanchâtres comme les antennes, dont le 6^e article est sombre; mesonotum et scutellum mats et d'un gris cendré, avec trois bandes brunes, dont la médiane est raccourcie en arrière, les latérales raccourcies en avant; balanciers blancs; pattes blanchâtres, genoux et extrémité des tibias d'un brun noir, tarsi antérieurs brunâtres. Antennes de 6 articles, les articles 3-5 sont ovoïaux, à col presque nul, verticille deux fois aussi long que l'article, 6^e cylindrique, mince, double du 5^e. Scutellum cilié. Ailes subhyalines, nervures jaunes, auxiliaire dépassant de beaucoup la transversale, qui est oblique; extrémité du radius beaucoup plus près de celle du rameau antérieur que de celle du rameau postérieur; 2^e longitudinale très rapprochée du radius; cubitus faiblement arqué, non dépassé par la costale, plus près de la pointe alaire que la discoïdale; bifurcation de la posticale située notablement en arrière de la transversale. Métatarse antérieur deux fois aussi long que le tibia; 4^e article un peu plus court que le 3^e, double du 5^e, qui est 4-5 fois aussi long que gros. Abdomen de moitié plus long que le reste du corps. Taille 1.5 mm.

"Suez Canal, on board ship at night," 9-ix-1907 (N. Annandale).

Var. *nugans*, var. nov.—♀. D'un jaune brunâtre; antennes sauf le 6^e article qui est noir, et pattes plus claires, genoux, trois derniers articles tarsaux et, aux pattes antérieures, le tibia et les quatre derniers articles tarsaux assombris; mesonotum mat, avec trois bandes brunes, dont la médiane est raccourcie en arrière, les latérales raccourcies en avant; balanciers blancs; abdomen brun noir et fortement déprimé. Antennes du type. Ailes hyalines, nervures pâles; 2^e longitudinale très rapprochée du radius; cubitus un peu arqué, non dépassé par la costale, aussi près de la pointe alaire que la discoïdale; transversale oblique, située un peu avant la bifurcation de la posticale. Pattes comme chez le type. Taille 1.5 mm.

Canal de Suez, à bord du vaisseau pendant la nuit, 9-ix-1907 (N. Annandale).

34. *Chironomus oriplanus*, sp. nov.

♂. Scape d'un brun noir, flagellum brunâtre; thorax d'un roux brun, mesonotum blanchâtre comme le scutellum, avec trois bandes ferrugineuses dont la médiane est raccourcie en arrière et les latérales en avant; balanciers blancs, extrémité de la massue

noire; pattes jaune sale, moitié distale des tibias antérieurs, tous les genoux, tiers distal du métatarse des 4 pattes postérieures et les trois articles suivants en entier, d'un brun noir (tarses antérieurs brisés); abdomen d'un roux sombre, côtés des tergites 1-6 noirâtres; tergites 7 et 8 et pince d'un brun noir, moitié postérieure des articles terminaux de la pince blanchâtre. (D'après une indication marquée sur l'étiquette, les antennes seraient rouges pendant la vie de l'insecte.) Antennes de 13 articles, dont le 2^e est allongé, les 3 ou 4 suivants un peu transversaux, les autres aussi longs que gros, le 13^e 2 fois $\frac{1}{2}$ aussi long que les articles 2-12 réunis; panache fauve. Ailes subhyalines, nervures brunâtres, la transversale plus sombre, cubitus arqué faiblement, aboutissant près de la pointe, non dépassé par la costale; bifurcation de la posticale située à peine en arrière de la transversale. Fémur antérieur un peu plus long que le tibia; fémur postérieur dépassant un peu le milieu de l'abdomen, un peu plus long que le tibia, qui est d'un tiers plus long que le métatarse. Article terminal de la pince deux fois aussi long que le basal, moitié postérieure comprimée et amincie en pétiole; appendices poilus dépassant un peu les articles basaux. Taille 5.5 mm.

Simla hills: Theog, à une altitude de 2700 m., en mai (N. Annandale).

35. *Chironomus forficularius*, sp. nov.

(Pl. vii, fig. 19, pince.)

♂. Scape jaunâtre, flagellum brunâtre; thorax mat et roussâtre, mesonotum pruinéux et blanchâtre comme le scutellum, avec 3 bandes roussâtres dont la médiane est raccourcie en arrière, les latérales en avant; abdomen d'un jaune brunâtre, tergites 2-5 avec une bande transversale et plus sombre située sur la moitié postérieure, extrémité de la pince brune; pattes jaunâtres, tarses blanchâtres, 5^e article de tous les tarses et aux pattes antérieures, l'extrémité du tibia et des 4 premiers articles tarsaux d'un brun noir; balanciers blancs. Palpes de 4 articles courts. Antennes de 12 articles, le 2^e article deux fois aussi long que gros, 3-11 très transversaux, 3-4 fois aussi larges que longs, 12^e deux fois et demie aussi long que les articles 2-11 réunis; panache gris blanchâtre. Ailes hyalines, nervures pâles; auxiliaire dépassant la transversale; 2^e nervure très rapprochée du radius, dont l'extrémité est un peu plus près de celle du rameau antérieur que du rameau postérieur de la posticale; cubitus droit, non dépassé par la costale, aussi distant de la pointe alaire que la discoïdale, bifurcation de la posticale située un peu en arrière de la transversale. Pattes antérieures pubescentes, 3^e article tarsal à poils presque 2 fois aussi longs que l'épaisseur de l'article, les 4 pattes postérieures à poils deux fois aussi longs que l'épaisseur des tibias ou des tarses; métatarse antérieur double du tibia; 14^e article un peu plus court que le 3^e, double du 5^e, qui est 4 fois aussi long que gros. Abdomen plus de deux fois aussi long que le reste du corps; pince

longue (fig. 19), ressemblant à celle d'un *forficula*, articles terminaux presque linéaires et très longs, appendices très courts, non distincts d'en haut. Taille 4.6 mm.

Calcutta, 13-viii.

36. *Chironomus barbatitarsis*, sp. nov.

(Pl. vii, fig. 20, antenne de la ♀; fig. 21, pince.)

♂ ♀. Scape du mâle jaunâtre, flagellum brun; antennes de la femelle roussâtres, le 6^e article noir; thorax mat et roussâtre, mesonotum et scutellum à peine plus pâles, le mesonotum avec trois bandes roussâtres et peu marquées, dont la médiane est raccourcie en arrière et les latérales en avant; chez la femelle, le mesonotum est faiblement pruneux et les bandes sont moins marquées ou subnulles parfois; balanciers blanchâtres; pattes d'un blanc jaunâtre, 5^e article tarsal assombri; abdomen d'un brun noir chez la femelle; le mâle a les segments 1-5 jaunâtres, parfois avec un vestige de bande transversale plus sombre et située en leur moitié postérieure, moitié postérieure du 5^e segment et les segments 6-8, aussi que la pince d'un brun noir, articles terminaux de la pince plus clairs. Antennes du mâle de 12 articles, dont le 2^e est allongé, 3-11 très transversaux, le 12^e trois fois aussi long que les articles 2-11 réunis, panache fauve. Antennes de la femelle de 6 articles (fig. 20), dont le 2^e est cylindrique, les trois suivants fusiformes et deux fois aussi longs que gros, verticille deux fois aussi long que l'article, les deux appendices subuliformes, hyalins et courts; 6^e article subcylindrique et deux fois aussi long que le 5^e. Ailes subhyalines, nervures pâles, la transversale d'un brun noir, nervation comme chez *forficularius*. Métatarse antérieur d'un quart plus long que le tibia chez le mâle, d'un tiers chez la femelle; 4^e article tarsal aussi long que le 3^e plus de deux fois le 5^e, qui est 6 fois aussi long que gros chez le mâle ou 4 fois chez la femelle; chez le mâle, les articles 2-4 ont des poils 4-5 fois aussi longs que l'épaisseur des tarsi; les 4 pattes postérieures avec des poils 2-3 fois aussi longs que la grosseur des tibias. Abdomen du mâle plus de deux fois aussi long que le reste du corps, faiblement granulé surtout en arrière; pince (fig. 21) avec les articles terminaux amincis au quart postérieur, appendices poilus atteignant presque l'extrémité des articles terminaux, les appendices glabres sont minces et dépassent à peine les articles basaux. Taille ♂ ♀ 4.5-5 mm.

Calcutta, en avril, mai, juillet et août, 10 ♂ et 14 ♀ (N. Annandale); Upper Burma: Mandalay, en mars (N. Annandale).

Var. *semiflavus*, var. nov.—♂. D'un jaune sale, 5^e article tarsal brun noir; flagellum, 3 bandes du mesonotum dont la médiane est raccourcie aux deux bouts et les latérales raccourcies en avant, metanotum, pleures et sternum ferrugineux; segments abdominaux 6 et 7, et pince d'un brun clair. Yeux amincis au vertex, arqués, distants de leur largeur terminale. Articles du flagellum très transversaux, le 12^e plus de deux fois aussi long que les précédents

réunis; panache fauve. Pronotum non échancré. Scutellum non cilié. Ailes hyalines, à nervures pâles, sauf la transversale qui est brune et oblique; 2^e longitudinale très rapprochée du radius; cubitus droit, non dépassé par la costale, aussi proche de la pointe alaire que la discoïdale; bifurcation située sous la transversale. Métatarse antérieur d'un tiers plus long que le tibia, qui est un peu plus court que le fémur; articles 2 et 3 avec des poils très longs, trois fois aussi longs que l'épaisseur des articles; 4^e article un peu plus court que le 3^e, 2½ fois aussi long que le 5^e qui est 5-6 fois aussi long que gros; pulvilles grands; les 4 tibias postérieurs avec des poils doubles de leur épaisseur. Abdomen plus de deux fois aussi long que le reste du corps; segments 6 et 7 un peu élargis; article terminal de la pince guère plus long que le basal, graduellement aminci à l'extrémité. Taille 5 mm.

Jardin zoologique de Calcutta, en août (N. Annandale); 2 exemplaires.

37. *Chironomus callichirus*, sp. nov.

♂. Scape brunâtre, flagellum jaunâtre; mesonotum mat et blanchâtre comme le scutellum, avec trois bandes ferrugineuses, dont la médiane est raccourcie en arrière, les latérales raccourcies en avant; pattes jaunâtres, 5^e article tarsal d'un brun noir; abdomen jaunâtre sur les 4 segments antérieurs, graduellement assombri en arrière, pince brune, les deux grands appendices blanchâtres. Antennes de 12 articles; 3-11 très transversaux, 3-4 fois aussi larges que longs, le 12^e presque 3 fois aussi long que les articles 2-11 réunis; panache d'un gris blanchâtre. Ailes hyalines, dépassant de peu le milieu de l'abdomen, nervures pâles; cubitus droit, aussi distant de la pointe alaire que la discoïdale; bifurcation de la posticale un peu en arrière de la transversale. Pattes antérieures pubescentes finement, métatarse d'un quart plus long que le tibia, articles 2-4 subégaux, le 4^e à peine plus long que le 3^e, double du 5^e, qui est 5-6 fois aussi long que gros, articles 2-4 à poils trois fois aussi longs que leur épaisseur; les 4 pattes postérieures à poils 2-3 fois aussi longs que leur grosseur, sauf le 5^e article tarsal. Tiers distal des articles terminaux de la pince subitement aminci en bec, les grands appendices obtus, larges et atteignant presque l'extrémité des articles terminaux, les petits appendices minces et subfiliformes. Taille ♂ 5 mm.

Calcutta, Jardin zoologique.

38. *Chironomus melanochirus*, sp. nov.

♂ ♀. Tête et thorax ferrugineux, pronotum et mesonotum mats et blanchâtres, trois bandes ferrugineuses dont la médiane est raccourcie en arrière, les latérales en avant; balanciers blanchâtres, massue brune; abdomen brun jaune en avant, les segments 5-8 d'un brun sombre, les tergites 2-4 avec une grande tache d'un brun noir; articles antennaires 1-3 roussâtres, les suivants d'un brun noir; pattes roussâtres, tibias antérieurs et tous les tarses noirs ou d'un brun noir. Antennes de 6 articles, dont le 2^e

est cylindrique, 3-5 fusiformes et deux fois aussi longs que gros, verticille pas deux fois aussi long que l'article, le 6^e aminci, cylindrique, presque double du 5^e. Ailes hyalines, nervures brunes, sauf la 2^e et la posticale qui sont pâles; auxiliaire hyaline, dépassant la transversale; 2^e nervure adjacente au radius, dont l'extrémité est plus proche de celle du rameau antérieur que du rameau postérieur; cubitus un peu arqué, non dépassé par la costale, plus près de la pointe que la discoïdale; bifurcation de la posticale située à peine en arrière de la transversale. Fémurs antérieurs d'un tiers plus longs que le tibia, métatarse de moitié plus long que le tibia, 4^e article égal au 3^e, presque triple du 5^e, qui est 6-8 fois plus long que gros; toutes les pattes subglabres, tibias et tarses antérieurs à peine pubescents. Abdomen aminci en avant presque deux fois aussi long que le reste du corps. Taille ♀ 5.6 mm.

Une variété a les tarses antérieurs et intermédiaires bruns, les tarses postérieurs n'ont que l'extrémité des articles brune, le tibia antérieur d'un roux brun, l'abdomen brun noir avec un étroit bord postérieur des tergites blanchâtre.

Monts de Simla: Phagu, à une altitude de 3000 m., 3-x (N. Annandale).

39. *Chironomus melanostictus*, sp. nov.

♂. Jaune; scape roux, flagellum brunâtre; thorax d'un roux ferrugineux et mat, mesonotum jaunâtre comme le scutellum, avec trois bandes ferrugineuses, dont la médiane est raccourcie en arrière, les latérales en avant; balanciers et pattes blanchâtres; aux 4 pattes postérieures les 2 extrémités des articles 1-3 sont brièvement noires; aux antérieures, l'extrémité du métatarse, les deux extrémités des articles 2 et 3 sont noires, les articles 4 et 5 un peu obscurcis; abdomen faiblement assombri en arrière, pince brunâtre. Antennes de 12 articles; les articles 3-11 très transversaux, le 12^e 2 fois $\frac{1}{2}$ plus long que les articles 2-11 réunis; panache d'un gris blanchâtre, avec un espace brun au-dessus du milieu. Ailes hyalines; nervures pâles, sauf la transversale et la base du cubitus qui sont noires et bordées de brun; extrémité du radius un peu plus proche de celle du rameau antérieur de la posticale que du rameau postérieur; cubitus droit, non dépassé par la costale, plus distant de la pointe alaire que la discoïdale; bifurcation de la posticale un peu en arrière de la transversale. Pattes antérieures finement pubescentes, métatarse double du tibia, 4^e article plus long que le 3^e, plus de deux fois le 5^e, qui est 6-8 fois aussi long que gros; les 4 pattes postérieures avec des poils guère plus longs que l'épaisseur des tibias. Article terminal de la pince aminci en bec dans sa moitié distale. Taille 4 mm.

Calcutta, 1-viii.

40. *Chironomus callisphyrus*, sp. nov.

♂ ♀. Tête, palpes, deux premiers articles antennaires et thorax d'un jaune roussâtre, le reste des antennes brun; mesonotum

et scutellum d'un jaune grisâtre, le mesonotum avec trois bandes roussâtres, dont la médiane est percurrente ; balanciers, pattes et abdomen jaunâtres ; chez le mâle, les tergites 2-4 ont une tache arrondie plus sombre, les suivants sont graduellement assombris, la pince brunâtre ; chez la femelle, l'abdomen est d'un brun noir avec le bord postérieur des segments plus clair, ou d'un brun clair avec le milieu des tergites 2-4 plus sombre. Palpes longs. Antennes de 6 articles chez la femelle, 2^e article cylindrique, non rétréci au milieu, 3-5 ellipsoïdaux, avec un col plus clair et presque aussi long que la partie renflée, verticille 2-3 fois aussi long que l'article ; 6^e mince, presque deux fois aussi long que le 5^e, subcylindrique. Antennes du mâle de 12 articles, 3-11 très transversaux, 12^e double des dix précédents réunis ; panache fauve. Ailes hyalines, nervures jaunes, la transversale brune ; auxiliaire dépassant de beaucoup la transversale, extrémité du radius plus près du rameau antérieur de la posticale que du postérieur ; 2^e longitudinale très rapprochée du radius ; cubitus arqué plus fortement chez la ♀ que chez le ♂, non dépassé par la costale, un peu plus rapproché de la pointe alaire que la discoïdale ; transversale oblique, située à peine avant la bifurcation de la posticale. Chez la femelle, le fémur antérieur est d'un tiers plus long que le tibia, le métatarse presque double du tibia, le 4^e article d'un tiers plus long que le 3^e, plus de deux fois aussi long que le 5^e, qui est 8-10 fois aussi long que gros, les tarsi sont donc très grêles ; tibias postérieurs un peu plus courts que les 2 articles suivants réunis, 4^e d'un tiers plus court que le 3^e, presque double du 5^e qui est trois fois aussi long que gros ; chez le mâle, les 4 tibias postérieurs ont des poils 2-3 fois aussi longs que leur épaisseur, le 4^e article des tarsi antérieurs n'est pas plus long que le 3^e, le métatarse au moins double du tibia. Lamelle de la pince avec un prolongement ; article terminal presque deux fois aussi long que le basal, subitement aminci en bec après le milieu, lobe atteignant le milieu de l'article terminal. Taille 5-6 mm.

Sylhet, Assam, en janvier, février, mai, juin et novembre, 4 ♂ et 5 ♀ (Major Hall).

Var. *dolichomerus*, var. nov. — ♀. Métatarse antérieur double du tibia, 4^e article plus long que le 3^e ; 4 tibias postérieurs poilus ; nervure transversale non assombrie ; abdomen d'un brun noir, bord postérieur des segments d'un blanc brunâtre. Taille 4 mm.

Sylhet, Assam, 24-i-1905 (Major Hall).

41. *Chironomus aplochirus*, sp. nov.

♂ ♀. Couleur et caractères de *callisphyrus*, sauf ce qui suit : chez la femelle le col des antennes égale le tiers de la partie renflée ; mesonotum et scutellum cendrés, la bande médiane réunie par une ligne au bord postérieur du mesonotum ; cubitus droit, plus distant de la pointe alaire que la discoïdale ; métatarse antérieur d'un tiers plus long que le tibia, 4^e article à peine égal au

3^e, double du 5^e qui est seulement trois fois aussi long que gros; pattes postérieures plus courtes, tibia égal aux articles 1 et 2 réunis, 4^e article égal au 5^e, qui est trois fois aussi long que gros. Chez le mâle, l'abdomen est d'un roux brun, avec le milieu des tergites antérieurs d'un brun noir; métatarse antérieur de moitié plus long que le tibia, 4^e article égal au 3^e, plus de deux fois le 5^e qui est 6-8 fois aussi long que gros, pattes antérieures pubescentes, les 4 postérieures avec des poils trois fois aussi longs que leur épaisseur, 4^e article d'un tiers plus long que le 5^e qui est trois fois aussi long que gros. Taille 5 mm.

Sylhet, Assam, 6-i-1905; 8-i; 1-ii; 10-ii (Major Hall).

42. *Chironomus aploneurus*, sp. nov.

♀. Semblable à *C. aplochirus* dont il diffère par la nervure transversale qui est aussi pâle que les autres nervures; articles antennaires blanchâtres, le 6^e d'un brun noir, de moitié plus long que le 5^e; métatarse antérieur presque double du tibia, 4^e article égal au 3^e, le 5^e est 4-5 fois aussi long que gros; aux tarsi postérieurs le 4^e article est de moitié plus long que le 5^e, qui n'est pas deux fois aussi long que gros. Taille 3 mm.

Sylhet, Assam, 3-xii-1904 (Major Hall).

43. *Chironomus leucotarsus*, Kieffer, var.

(Pl. vii, fig. 22, partie de la pince.)

♂. Roussâtre, sans bandes; flagellum brunâtre, panache brun; balanciers brun noir à tige blanchâtre; pattes blanches; abdomen avec les segments 3-6 assombris, articles terminaux de la pince blanchâtres. Article 3^e des antennes allongé, les autres un peu transversaux, le dernier de moitié plus long que les précédents réunis. Ailes hyalines, nervures pâles. Pattes antérieures finement pubescentes, leur métatarse au moins double du tibia, 4^e article à peine plus court que le 3^e, double du 5^e qui est 4-5 fois aussi long que gros; tibias et tarsi postérieurs avec de longs poils. Article terminal de la pince (fig. 22) lancéolé, graduellement et faiblement aminci au bout, appendice velu dépassant peu l'article basal. Taille 1.8 mm.

Calcutta, viii-1907.

44. *Chironomus leptochirus*, sp. nov.

♂ ♀. Scape roux, flagellum du mâle blanc brunâtre, celui de la femelle blanchâtre, 6^e article noirâtre; thorax d'un roux ferrugineux, mesonotum mat, d'un gris blanchâtre, avec trois bandes ferrugineuses, dont la médiane est raccourcie en arrière, les latérales en avant; abdomen du mâle blanc brunâtre, les tergites 2-5 ont une grande tache plus sombre, en leur milieu, 6-8 et pince entièrement assombris; abdomen de la femelle d'un brun noir; balanciers et pattes blanchâtres. Antennes du mâle de 12 articles,

3-II très transversaux, 12^e deux fois aussi long que les articles 2-II réunis ; panache gris jaunâtre. Antennes de la femelle de 6 articles, 3-5 fusiformes, deux fois aussi longs que gros, verticille 2-3 fois aussi long que l'article, le 6^e article guère plus long que le 5^e, mince et cylindrique. Ailes hyalines ou blanchâtres, nervures pâles, transversale d'un brun noir, extrémité du radius plus près de celle du rameau antérieur que du rameau postérieur de la posticale, 2^e très rapprochée du radius, cubitus droit chez le mâle, arqué chez la femelle, aussi proche de la pointe alaire que la discoïdale, bifurcation de la posticale à peine en arrière de la transversale. Fémur antérieur au moins de moitié plus long que le tibia, qui égale à peine la moitié du métatarse, tarsi antérieurs très grêles, à peine pubescents, 4^e article égal au 3^e chez le mâle, plus long que le 3^e chez la femelle, plus de deux fois le 5^e, qui est 6-8 fois aussi long que gros ; les 4 pattes postérieures à poils plus longs que leur épaisseur. Abdomen du mâle 2 fois $\frac{1}{2}$ aussi long que le reste du corps ; lamelle prolongée en une pointe, article terminal de la pince subitement aminci en bec dans sa moitié distale, appendices dépassant à peine les articles basaux. Taille ♂ ♀ 4 mm.

Lower Bengal : Port Canning, 21-vii ; 6 ♂, 3 ♀ (N. Annandale).

45. *Chironomus psilochirus*, sp. nov.

♂. Tout comme *leptochirus* sauf ce qui suit : mesonotum, scutellum et moitié antérieure du metanotum d'un blanc jaunâtre, la bande médiane atteint presque le bord postérieur, abdomen brun et seulement 2 fois aussi long que le reste du corps. Article 12^e des antennes 2 fois $\frac{1}{2}$ aussi long que 2-II réunis, panache jaune. Mesonotum brillant. Nervure transversale aussi pâle que les autres. Tarsi antérieurs moins grêles, le métatarse de moitié plus long que le tibia, 4^e article égal au 3^e, le 5^e de 4-5 fois aussi long que gros. Article terminal de la pince non aminci dans sa moitié terminale, appendices atteignant le milieu des articles terminaux. Taille 4 mm.

Avec le précédent, 21-vii (N. Annandale).

46. *Chironomus lasiochirus*, sp. nov.

♂ ♀. Semblable à *leptochirus*, dont il diffère comme il suit : mesonotum mat et ferrugineux, sans bande, scutellum jaunâtre ; moitié antérieure de l'abdomen jaune sâle, moitié postérieure brune, pince blanchâtre, moitié distale des articles terminaux brune. Articles antennaires 3-II très transversaux, le 12^e 4 fois aussi long que les articles 2-II réunis ; 6^e article de la femelle double du 5^e, le 2^e rétréci au milieu. Métatarse antérieur d'un tiers plus long que le tibia (♂ ♀), 4^e article du mâle égal au 3^e, double du 5^e qui est 4-5 fois aussi long que gros, articles 2-4 du mâle à poils 3-4 fois aussi longs que leur épaisseur. Article terminal de la pince aminci seulement à l'extrême bout distal. Taille ♂ ♀ 4 mm.

Lower Bengal: Port Canning, 21-vii; 1 ♂, 2 ♀ (N. Annandale).

47. *Chironomus filitarsis*, sp. nov.

♂. Scape roux, flagellum brunâtre; thorax d'un roux brun, mesonotum blanchâtre comme le scutellum, avec 3 bandes rousses, dont la médiane est percurrenente et graduellement amincie en arrière, les latérales raccourcies en avant; balanciers blanchâtres; pattes blanchâtres, 5^e article tarsal assombri; abdomen d'un jaunâtre clair ou blanchâtre, 1^{er} tergite avec une tache brune de chaque côté, tergites 2-5 avec une grande tache brune subarrondie, tergites 6-8 brun noir comme la pince. Antennes de 12 articles, dont le 2^e est allongé, 3-11 deux fois aussi larges que longs, 12^e trois fois aussi long que les articles 2-11 réunis, panache gris. Ailes hyalines, nervures pâles, transversale brune, cubitus à peine arqué, au moins aussi proche de la pointe alaire que la discoïdale; bifurcation située à peine en arrière de la transversale. Pattes antérieures pubescentes, leur métatarse au moins deux fois aussi long que le tibia, 4^e article un peu plus long que le 3^e, double du 5^e qui est 10 fois aussi long que gros; tibias et tarses des 4 pattes postérieures longuement poilus. Pince conformée comme chez *dolichotomus*. Taille 3.5 mm.

Calcutta, 23-vii et 31-vii (N. Annandale).

48. *Chironomus lucernarum*, sp. nov.

♀. Antennes d'un roux jaunâtre, 6^e article brun noir; thorax roussâtre et mat, mesonotum blanchâtre comme le scutellum, avec 3 bandes ferrugineuses dont la médiane est raccourcie en arrière, les latérales en avant; balanciers blanchâtres; pattes d'un blanc jaunâtre, tibias et tarses antérieurs d'un brun noir; 5^e article de tous les tarses assombri; abdomen d'un brun noir. Palpes aussi longs que les antennes. Article 2^e des antennes un peu rétréci au milieu, 3-5 fusiformes et deux fois aussi longs que gros, verticille presque double de l'article, celui du 5^e article dépasse l'extrémité du 6^e article, qui est 2 fois aussi long que le 5^e, mince et cylindrique. Ailes hyalines, nervures pâles, transversale pâle, cubitus à peine arqué au bout, non dépassé par la costale, aussi près de la pointe alaire que la discoïdale; bifurcation de la posticale située un peu en arrière de la transversale. Pattes pubescentes, fémur antérieur de moitié plus long que le tibia, qui est égal à la moitié du métatarse, 4^e article pas plus long que le 3^e, le 5^e est seulement 4 fois aussi long que gros. Taille 3 mm.

Calcutta, capturé à la lumière, en juin et en août (N. Annandale).

49. *Chironomus calligaster*, sp. nov.

♂. Roussâtre et brillant; mesonotum blanchâtre avec trois bandes roussâtres, dont la médiane est percurrenente et les latérales sont raccourcies en avant; abdomen d'un beau vert clair, les deux

derniers segments et la pince bruns; scape roussâtre, flagellum brun clair; balanciers jaunâtres; pattes blanchâtres, 5^e article tarsal et, aux pattes antérieures, l'extrémité du fémur, le tibia et le tarse d'un brun noir. Yeux amincis supérieurement et très rapprochés. Antennes de 12 articles; les articles 3-11 très transversaux, le 12^e est $2\frac{1}{2}$ fois aussi long que les 10 précédents réunis; panache brun. Ailes subhyalines, très légèrement teintées, toutes les nervures jaunes; auxiliaire aboutissant vis-à-vis de l'extrémité du rameau postérieur de la posticale; l'extrémité du radius est beaucoup plus rapprochée de celle du rameau antérieur que de celle du rameau postérieur; 2^e longitudinale très rapprochée du radius; cubitus non dépassé par la costale, aussi rapproché de la pointe alaire que la discoïdale; transversale oblique, située à peine en avant de la bifurcation de la posticale. Métatarse antérieur de moitié plus long que le tibia, égal au fémur; 4^e article plus long que le 3^e, $2\frac{1}{2}$ fois aussi long que le 5^e, qui est 6 fois aussi long que gros; pattes sans longs poils. Abdomen deux fois aussi long que le reste du corps, cylindrique, non rétréci au milieu, segments 6 et 7 à peine un peu élargis; lamelle de la pince avec un prolongement en forme de bec, article terminal de moitié plus long que le basal, à peine aminci aux deux bouts, lobe de l'article basal plus large que l'article terminal dont il atteint le milieu. Taille 4 mm.

Port Canning, Lower Bengal, 21-vii-1907 (N. Annandale).

Var. *vilis*, var. nov.—Mesonotum roux, sans bande, couleur verte de l'abdomen plus pâle. Taille ♂ 4 mm.

Calcutta, 9-viii-1907, capturé à la lumière (N. Annandale).

50. *Chironomus sexpunctatus*, sp. nov.

♀. D'un jaune sale; mesonotum verdâtre, avec six taches circulaires noires qui forment un arc ouvert en arrière et dont le commencement est près des ailes, les quatre taches internes sont plus grandes que les deux externes; metanotum brun; abdomen vert, anus jaune; les quatre pattes postérieures verdâtres sauf les hanches; aux pattes antérieures l'extrémité du fémur, celle du tibia et les tarsi sauf la moitié proximale du métatarse, bruns; palpes et 6^e article antennaire brunâtres. Yeux arqués, fortement amincis supérieurement, où ils sont très rapprochés. Antennes de 6 articles, dont le 2^e est deux fois aussi long que gros, un peu rétréci au milieu; 3-5 amincis aux deux bouts, verticilles 2-3 fois aussi longs que l'article; 6^e article fusiforme, mince, de moitié plus long que le 5^e. Ailes hyalines, longuement ciliées, toutes les nervures blanchâtres; extrémité du radius plus près de celle du rameau antérieur de la posticale que du rameau postérieur; 2^e longitudinale indistincte; cubitus non dépassé par la costale, aussi rapproché de la pointe alaire que la discoïdale; transversale oblique, située un peu en avant de la bifurcation de la posticale. Métatarse antérieur de moitié plus long que le tibia, qui est distinctement plus court que le fémur; 4^e article plus du double du

5^e, qui est 4 fois aussi long que gros. Abdomen de moitié plus long que le reste du corps. Taille 2.5 mm.

Calcutta, 15-ii-1908 (N. Annandale).

51. *Chironomus callimorphus*, sp. nov.

♂. Thorax d'un noir brillant, sternum jaune, abdomen d'un vert clair, lamelle de la pince jaune blanchâtre, articles de la pince noirs, lobes blancs, balanciers noirâtres, à tige blanchâtre, palpes d'un brun noir, 4^e article blanc, antennes jaunâtres, le scape blanc; pattes jaunes, fémur antérieur, dessus de la moitié distale des quatre autres fémurs, tous les tibias et, aux tarsi antérieurs, l'extrémité des quatre premiers articles, d'un brun noir. Yeux sinueux, amincis et rapprochés au vertex. Palpes longs, 4^e article très mince et le plus long. Antennes de 14 articles, dont le 2^e est deux fois aussi long que gros; 3-13 graduellement allongés, les premiers aussi longs que gros, les derniers plus longs que gros, 14^e distinctement plus court que les précédents réunis, panache d'un gris blanchâtre, court, les poils plus courts que la moitié des antennes. Ailes hyalines, les trois nervures antérieures jaunes, les autres hyalines; auxiliaire faible, dépassant un peu la transversale; radius un peu plus distant de la pointe alaire que le rameau antérieur; cubitus aboutissant à la pointe de l'aile; discoïdale assez distante de l'extrémité du cubitus; transverse oblique, située un peu en avant de la bifurcation de la posticale. Pattes antérieures pubescentes, fémurs dépassant de deux tiers la longueur du tibia, métatarse de moitié plus long que le tibia, 4^e article au moins aussi long que le 3^e, plus du double du 5^e qui est 5-6 fois aussi long que gros; quatre tibias postérieurs à poils presque deux fois aussi longs que leur épaisseur, leurs tarsi seulement pubescents. Abdomen deux fois aussi long que le reste du corps, cylindrique, non élargi aux deux bouts; article terminal de la pince un peu plus long que le basal, faiblement aminci au bout, lobe obtus et atteignant le milieu de l'article terminal. Taille 2.8 mm.

Lower Burma: Dawna Hills, à une altitude d'environ 1000 m., en mars (N. Annandale).

52. *Chironomus viridiventris*, sp. nov., ♂ ♀.

♂. D'un vert clair; antennes brun clair, scape roux ferrugineux; mesonotum jaune, avec trois larges bandes ferrugineuses dont les latérales sont raccourcies en avant et la médiane en arrière; scutellum jaune; reste du thorax d'un roux ferrugineux; face, balanciers et pattes d'un vert blanchâtre, tarsi blancs, extrémité des quatre premiers articles tarsaux, base des articles 2-4 et 5^e en entier d'un brun noir; segments abdominaux 6 et 7 d'un vert très sombre, pince brun clair. Yeux très sinueux, séparés au vertex de leur largeur terminale. Panache d'un gris clair; articles du flagellum transversaux, dernier article deux fois aussi long que les précédents réunis. Ailes blanches; nervures

pâles; transversale et base du cubitus noires; extrémité du radius également distant de l'extrémité des deux rameaux de la posticale; 2^e longitudinale très près du radius; cubitus presque droit, pas plus distant de la pointe alaire que la discoïdale; transversale oblique, située au-dessus de la bifurcation de la posticale. Tibia antérieur d'un tiers plus court que le fémur, à peine plus long que la moitié du métatarse; 4^e article plus long que le 3^e aux deux pattes antérieures, plus de deux fois aussi long que le 5^e, celui-ci 6-8 fois aussi long que gros; pattes postérieures sans longs poils, à tibias brièvement ciliés; empodium égal à la moitié des crochets; pulvilles larges, aussi longs que l'empodium. Abdomen long, grêle, un peu rétréci après le milieu, segments 5-7 élargis; poils courts; lamelle supérieure de la pince terminée par un appendice filiforme et long; article terminal de la pince très aminci dans sa moitié apicale.

♀. Abdomen vert en entier; antennes jaunâtres, 6^e article d'un brun noir; mesonotum vert avec trois bandes ferrugineuses, la médiane réunie au bord postérieur par une ligne. Antennes de 6 articles; 2^e article subcylindrique, rétréci au milieu; articles 3-5 composés d'un renflement ovoïdal et d'un col aussi long que le renflement, verticilles deux fois aussi longs que les articles ou 4 fois aussi longs que l'épaisseur des articles; 6^e article de moitié plus long que le 5^e, subcylindrique, conique à l'extrémité, avec deux paires d'appendices sensoriels, les articles 2-5 avec une paire. Métatarse antérieur de moitié plus long que le tibia. Taille ♂ ♀ 4 mm.

Mandalay, Upper Burma, en avril (N. Annandale).

53. *Chironomus atrosignatus*, sp. nov.

♀. Ferrugineux; antennes sauf le 6^e article qui est d'un brun noir et pattes jaunâtres; palpes noirs et longs; extrémité des quatre premiers articles tarsaux, base des articles 2-4, article 5^e en entier, d'un brun noir; dessus du tiers distal des fémurs un peu assombri; mesonotum et scutellum d'un blanc jaunâtre, mesonotum avec trois bandes ferrugineuses, dont les latérales sont raccourcies en avant la médiane raccourcie en arrière et réunie par une ligne au bord postérieur du mesonotum; balanciers blancs, trois premiers segments abdominaux d'un beau vert clair, les suivants noirs. Yeux comme chez le précédent. Antennes de 6 articles, le 2^e faiblement rétréci au milieu, 3-5 ovoïdaux, avec un col un peu plus court que la partie ovoïdale; verticille deux fois aussi long que l'article; 6^e article mince, subcylindrique, de moitié plus long que le 5^e. Ailes blanchâtres et irisées, nervures pâles, transversale et base du cubitus noires et bordées de brun noir; auxiliaire bien marquée, dépassant à peine la transversale; extrémité du radius bien plus proche de celle du rameau antérieur que du rameau postérieur; 2^e longitudinale non distincte; cubitus faiblement arqué, aussi distant de la pointe alaire que la discoïdale, non dépassée par la costale; transversale oblique, située à peine

avant la bifurcation de la posticale. Métatarse antérieur double du tibia, 4^e article d'un tiers plus long que le 3^e, plus de deux fois le 5^e, qui est 8-10 fois aussi long que gros. Abdomen cylindrique, deux fois aussi long que le reste du corps. Taille 4 mm.

Calcutta, 30-vii (N. Annandale).

54. *Chironomus nudipes*, sp. nov.

♂. Tête, palpes, scape et thorax roussâtres, flagellum brun; mesonotum d'un blanc jaunâtre et brillant, avec trois bandes ferrugineuses, dont la médiane est graduellement amincie en ligne percurrente en arrière, les latérales raccourcies en avant; balanciers blancs; pattes jaunâtres, les 2 ou 3 derniers articles tarsaux assombris; moitié antérieure de l'abdomen verte, moitié postérieure brune comme la pince. Yeux distants de leur largeur terminale. Articles antennaires 3-13 un peu transversaux, 14^e de moitié plus long que les 12 précédents réunis, panache brun. Ailes hyalines, nervures pâles, radius aussi distant de la pointe alaire que le rameau antérieur, très rapproché de la 2^e longitudinale; cubitus non dépassé par la costale, plus distant de la pointe que la discoïdale; transversale oblique, située au-dessus de la bifurcation de la posticale. Métatarse antérieur presque double du tibia, qui est un peu plus court que le fémur, 4^e article plus long que le 3^e, plus de deux fois aussi long que le 5^e. celui-ci 8 fois aussi long que gros; pattes sans longs poils, subglabres. Lamelle de la pince avec un prolongement en bec, article terminal un peu plus long que le basal, faiblement aminci en arrière, lobe dépassant notablement le milieu de l'article terminal. Taille 4.5 mm.

Calcutta, 10-viii-1907 (N. Annandale).

55. *Chironomus rostratus*, sp. nov.

♂. D'un jaune roussâtre et brillant; antennes sauf les 4-6 premiers articles, brunâtres; premiers articles antennaires, tête, palpes et pattes jaunes, tibias et tarses antérieurs assombris; mesonotum avec une trace de trois bandes plus sombres, balanciers blanchâtres; moitié antérieure de l'abdomen d'un vert très pâle, moitié postérieure et pince d'un jaune brunâtre. Palpes très longs. Antennes de 12 articles, les articles 3-11 très transversaux, le 12^e presque trois fois aussi long que les dix précédents réunis, sub-sétiforme comme d'ordinaire; panache fauve. Ailes hyalines, nervures jaunes, extrémité du radius plus rapprochée du rameau antérieur de la posticale que du rameau postérieur; 2^e longitudinale très rapprochée du radius; cubitus arqué, non dépassé par la costale, un peu plus rapproché de la pointe alaire que la discoïdale; transversale longue et très oblique, située au-dessus de la bifurcation de la posticale. Pattes antérieures pubescentes, fémur de moitié plus long que le tibia, métatarse à peine double du tibia, 4^e

article égal au 3^e, plus de deux fois le 5^e, qui est 6-8 fois aussi long que gros; aux pattes postérieures le tibia est un peu plus court que les articles 2 et 3 réunis, 4^e de moitié plus court que le 3^e et de moitié plus long que le 5^e, celui-ci trois fois aussi long que gros; poils des quatre tibias postérieurs 2-3 fois aussi longs que l'épaisseur des tibias, tarsi pubescents. Abdomen 2½ fois aussi long que le reste du corps, faiblement élargi aux segments 1, 6 et 7; lamelle de la pince avec un appendice arqué et subfiliforme; article terminal de la pince deux fois aussi long que le basal, subitement aminci en forme de bec dans son tiers postérieur; lobe très large, deux fois aussi large que les articles, atteignant presque le milieu de l'article terminal. Taille 5.5 mm.

Sylhet, Assam, 3-i-1905 (Major Hall).

56. *Chironomus prasiogaster*, sp. nov.

♂. Tête, palpes, scape et thorax d'un jaune roussâtre, panache d'un gris jaunâtre, flagellum brunâtre; mesonotum d'un jaune clair, avec 3 bandes d'un jaune roussâtre et peu marquées; balanciers et tarsi blancs, fémurs et tibias verdâtres; abdomen d'un vert pâle, segment anal et pince d'un jaune brunâtre. Antennes de 12 articles; 3-II très transversaux, le 12^e deux fois aussi long que les articles 2-II réunis. Ailes hyalines, nervures pâles, 2^e longitudinale située contre le radius; cubitus droit, aussi distant de la pointe alaire que la discoïdale; transversale petite, située un peu avant la bifurcation de la posticale. Fémurs antérieurs d'un tiers plus longs que le tibia (tarsi manquent); les 4 tibias postérieurs avec des poils non deux fois aussi longs que l'épaisseur des pattes, leurs tarsi à poils encore plus courts; tibias postérieurs d'un tiers plus longs que le métatarse, 4^e article plus court que le 3^e, de moitié plus long que le 5^e, qui est 3 fois aussi long que gros, abdomen grêle, segments 6 et 7 élargis; articles terminaux de la pince presque deux fois aussi longs que les basaux, conformés comme chez *semiviridis*, les appendices atteignent le milieu de l'article terminal et ne sont pas pétiolés. Taille 3 mm.

Sylhet, Assam, 26-ii-1904 (Major Hall).

57. *Chironomus chlorogaster*, sp. nov.

♂. Vert; tête, antennes et thorax d'un jaune brunâtre; pattes d'un blanc brunâtre; pince d'un brun clair. Yeux très amincis, amincis supérieurement où ils sont distants de la moitié de leur largeur terminale. Panache gris; articles du flagellum transversaux, sauf le dernier qui est de moitié plus long que les précédents réunis. Ailes non blanches mais subhyalines, toutes les nervures claires, transversale perpendiculaire, radius un peu plus rapproché de la pointe alaire que le rameau inférieur de la posticale, cubitus presque droit, non dépassé par la costale et deux fois plus distant de la pointe alaire que la discoïdale, bifurcation

de la posticale située notablement en arrière de la transversale. Tibias antérieurs d'un tiers plus courts que le fémur; tibias postérieurs brièvement ciliés. Abdomen grêle, plus de deux fois aussi long que le reste du corps; article terminal de la pince plus de deux fois aussi long que le basal, graduellement aminci dans sa moitié postérieure, pas distinctement aminci à sa base. Taille 2.5 mm.

Upper Burma: Mandalay, en mars (N. Annandale).

58. *Chironomus semiviridis*, sp. nov.

(Pl. vii, fig. 23, aile; fig. 24, pince.)

♀ ♂. Vert; tête et thorax d'un ferrugineux brunâtre, avec un vestige de trois bandes plus sombres au mesonotum; antennes sauf le 6^e article de la femelle, qui est d'un brun noir, balanciers et pattes blanchâtres, tibias et tarsi des pattes antérieures et 5^e article tarsal des autres pattes d'un brun noir; pince du mâle blanche. Yeux arqués, amincis supérieurement où ils sont distants de leur plus grande largeur chez la femelle. Antennes du mâle à panache gris, articles du flagellum aussi longs que gros, sauf le dernier qui est aussi long que les précédents réunis. Antennes de la femelle de 6 articles, dont le 2^e est un peu rétréci au milieu, 3.5 à peine plus longs que gros, sans col, à verticille pas deux fois aussi long que leur épaisseur, 6^e article trois fois aussi long que le 5^e, à peu près cylindrique. Ailes (fig. 23) blanches, toutes les nervures pâles, cubitus deux fois plus distant de la pointe alaire que la discoïdale, non dépassé par la costale, droit; bifurcation de la posticale située bien en arrière de la transversale qui est oblique. Métatarse antérieur double du tibia chez le mâle, presque double chez la femelle; 4^e article plus court que le 3^e, de moitié plus long que le 5^e, qui est quatre fois aussi long que gros, pattes sans longs poils chez la femelle, les tibias postérieurs du mâle ont des poils deux fois aussi longs que leur épaisseur; pulvilles larges, à peine plus courts que l'empodium qui égale la moitié des crochets. Abdomen de la femelle guère plus long que le reste du corps, comprimé; article terminal de la pince (fig. 24) du mâle guère plus long que le basal, faiblement aminci à l'extrémité. Taille 1.8-2 mm.

Upper Burma: Mandalay, en mars; Lower Burma: Moulmein, en février (N. Annandale); Bettiah, Champaran, Bengal, en février; Nepal: Noalpur, en février; côte d'Orissa: Puri, en février (Paiva) et mars.

2^e Genre, TANYTARSUS, V. d. Wulp.

Ailes poilues au moins en partie, ordinairement non lobées à la base; nervure transversale souvent nulle, le cubitus semblant être la continuation de la partie proximale de la discoïdale, pince comme chez *Chironomus*, sauf qu'elle porte encore une 3^e paire d'appendices, qui est située ventralement.

- | | | |
|---|---|--------|
| 1. Abdomen d'un vert clair;
ailes non lobées et sans ner-
vure transversale .. | 1. <i>T. viridis</i> , sp. nov. | .. 2. |
| — Abdomen sans couleur verte .. | .. | .. 3. |
| 2. Ailes avec une nervure trans-
versale oblique, comme chez
<i>Chironomus</i> .. | .. | .. 5. |
| — Ailes sans nervure transversale .. | .. | .. 4. |
| 3. Ailes velues sur toute leur sur-
face; 14 ^e article antennaire
du mâle 2 fois aussi long que
les 12 précédents réunis .. | 2. <i>T. hirtipes</i> , sp. nov. | .. 6. |
| — Ailes glabres en partie; 14 ^e
article antennaire du mâle
un peu plus long que les 12
précédents réunis .. | 3. <i>T. lasiopterus</i> ,
sp. nov. | .. 8. |
| 4. Cubitus séparé de la costale sur
tout son parcours .. | 5. <i>T. adjacens</i> , sp. nov. | .. 7. |
| — Cubitus adjacent à la costale
dans son tiers distal .. | .. | .. 9. |
| 5. Ailes glabres en majeure partie
— Ailes velues en entier ou en
majeure partie .. | .. | .. 10. |
| 6. Abdomen blanchâtre, les 6 pre-
miers tergites avec une
tache brune qui se prolonge
en mince bande latérale-
ment; ♂ .. | 4. <i>T. confundendus</i> ,
sp. nov. | .. 7. |
| — Abdomen d'un brun jaune,
sans bande ni tache; ♀ .. | .. | .. 9. |
| Antennes de 6 articles; méta-
tarse antérieur 2½ fois aussi
long que le tibia .. | 6. <i>T. semiglaber</i> ,
sp. nov. | .. 10. |
| Antennes de 5 articles; métatarse
antérieur presque double
du tibia; yeux ovalaires, dis-
tants de toute leur longueur .. | 9. <i>T. nocticola</i> , sp. nov. | .. 9. |
| 8. Mesonotum avec 2 ou 3 bandes
plus sombres .. | .. | .. 10. |
| — Mesonotum sans bande .. | .. | .. 10. |
| 9. Yeux ovalaires, distants de
toute leur longueur; méta-
tarse antérieur triple du
tibia .. | 7. <i>T. macrochirus</i> ,
sp. nov. | .. 10. |
| — Yeux sinueux, amincis au ver-
tex, où ils sont distants de | | |

- moins de leur longueur;
 métatarse antérieur presque
 double du tibia .. 8. *T. nocturnus*, sp. nov.
 10. Pattes postérieures sans longs
 poils .. 10. *T. leptogaster*,
 sp. nov.
 — Pattes postérieures longue-
 ment poilues, surtout sur les
 tarsi .. 11. *T. lasiopus*, sp. nov.

1. *Tanytarsus viridis*, sp. nov.

(Pl. vii, fig. 25, aile du ♂.)

♂ ♀. Scape blanchâtre, flagellum du mâle brunâtre, celui de la femelle blanchâtre; thorax d'un brun clair ou d'un brun noir; balanciers et pattes blanchâtres; abdomen d'un vert clair, 8^e segment jaunâtre, pince blanchâtre. Yeux distants de leur largeur terminale au vertex. Articles du flagellum aussi longs que gros, chez le mâle, le dernier à peine plus long que les précédents réunis; antennes de la femelle de 6 articles, les articles 3-5 un peu plus longs que gros, verticille 2-3 fois aussi long que l'article; le 6^e de moitié plus long que le 5^e, subcylindrique et mince. Ailes (fig. 25, ♂) blanches, non lobées mais graduellement rétrécies à la base; celles du mâle presque glabres, poilues seulement à l'extrémité et sur une ligne entre le cubitus et la discoïdale, celles de la femelle avec des poils épars sur presque toute la surface; extrémité du radius un peu plus distante de la pointe alaire que celle du rameau postérieur de la posticale; cubitus ayant son origine avant la bifurcation de la posticale, continuant la direction de la partie proximale de la discoïdale, non dépassé par la cubitale. Métatarse antérieur 2 fois aussi long que le tibia chez la femelle, 2½ fois chez le mâle, 4^e article tarsal du mâle plus court que le 5^e, plus du double du 5^e, qui est 3-4 fois aussi long que gros; sans longs poils. Abdomen du mâle long et grêle, plus de 10 fois aussi long que le reste du corps. Taille ♂ 1.5 mm., ♀ 1.2 mm.

Côte d'Orissa: Puri, 2-iii (C. Paiva). Cette espèce est à confondre avec *Chironomus semiviridis*, si on ne prend garde à la conformation et à la pilosité de l'aile.

2. *Tanytarsus hirtipes*, sp. nov.

♂. D'un brun roux, abdomen plus clair; scape, fémurs, tibias et pince d'un jaune roussâtre, tarsi blancs, les antérieurs d'un blanc sale; balanciers blanchâtres. Antennes de 14 articles, 3-13 un peu transversaux, le 14^e un peu plus long que les 12 précédents réunis, panache fauve. Ailes non lobées, graduellement rétrécies à la base, poilues sauf dans la moitié proximale de la cellule comprise entre les deux rameaux de la posticale, et dans l'espace compris entre la tige de la posticale et la partie proximale de la discoïdale; transversale oblique, comme chez *Chironomus*, cubitus

plus distant de la pointe alaire que la discoïdale, non dépassé par la costale, bifurcation de la posticale située un peu en arrière de la transversale. Fémurs antérieurs poilus, métatarse $2\frac{1}{2}$ fois aussi long que le tibia, 4^e article un peu plus court que le 3^e, plus du double du 5^e, qui est trois fois aussi long que gros; les quatre pattes postérieures, y compris les tarses, ont des poils denses et 3-4 fois aussi longs que l'épaisseur des pattes. Lamelle de la pince avec un prolongement en bec arqué; article terminal plus long que le basal, pas sensiblement aminci au bout, lobe dépassant l'extrémité de l'article basal. Taille 2 mm.

Sylhet, Assam, 27-i-1905 (Major Hall).

3. *Tanytarsus lasiopterus*, sp. nov.

(Pl. vii, fig. 26, partie de la pince.)

♂. Roussâtre; scape, palpes et pattes jaunâtres, flagellum brun; mesonotum brillant, balanciers brun noir, à tige blanchâtre; abdomen d'un roux plus clair que le thorax, avec de larges bandes transversales plus sombres. Yeux très rapprochés au vertex. Antennes de 14 articles, dont le 2^e est deux fois aussi long que gros, 3-13 transversaux, 14^e deux fois aussi long que les 12 précédents réunis, panache brun. Ailes subhyalines, densément poilues sur toute leur surface, non lobées mais graduellement élargies à la base, transversale oblique, cubitus non dépassé par la costale, plus distant de la pointe alaire que la discoïdale; bifurcation de la posticale située un peu en arrière de la transversale. Fémur antérieur poilu, de moitié plus long que le tibia, métatarse presque double du tibia; les quatre pattes postérieures, y compris les tarses, densément et longuement poilues. Pince brune (fig. 26), article terminal un peu plus long que le basal et graduellement aminci, lobe dépassant un peu l'article basal. Taille 3.5 mm.

Eastern Bengal: Rajshahi, 6-ii-1907 (N. Annandale); 2 exemplaires.

4. *Tanytarsus confundendus*, sp. nov.

(Pl. vii, fig. 27, pince.)

♂. Très grêle; corps roussâtre, sans bandes; abdomen blanchâtre, les 6 premiers tergites avec une grande tache brune réunie latéralement, par une mince bande transversale, à une tache du sternite, segments 7 et 8, et pince bruns; scape brunâtre, flagellum brun; balanciers et pattes blanchâtres. Article 2^e des antennes allongé, les suivants à peine transversaux, le dernier un peu plus long que les précédents réunis, panache d'un brun noir. Ailes hyalines, graduellement amincies à la base, glabres sauf quelques poils à l'extrémité entre le cubitus et la discoïdale et quelques autres le long du bord alaire entre la discoïdale et le rameau distal de la posticale, nervures pâles, cubitus droit, 2-3 fois plus distant de la pointe alaire que la discoïdale, transversale nulle ou continuant la direction du cubitus, bifurcation située à peine en arrière de l'origine du cubitus. Tibia antérieur plus court

que la moitié du fémur, tarses brisés; tibias et tarses postérieurs longuement poilus. Pince (fig. 27) à article terminal aminci au quart postérieur en un pétiole glabre, armé de 4-5 soies au côté interne; appendices poilus atteignant presque le milieu des articles terminaux, les appendices glabres sont un peu plus courts mais aussi larges que les appendices poilus, faiblement arqués à l'extrémité, où ils portent 4-5 soies alignées au côté interne. Taille 2 mm.

Lower Bengal: Port Canning, 21-vii (N. Annandale); Calcutta (R. E. Lloyd), 23-vii. Cette espèce a le port et l'aspect général de *Chironomus leucotarsus*, avec lequel on pourrait facilement la confondre.

5. *Tanytarsus adjacens*, sp. nov.

♀. Roussâtre; palpes, antennes, balanciers et pattes blanchâtres. Antennes de 6 articles les articles 3-5 subglobuleux, à peine pétiolés, verticille 2-3 fois aussi long que l'article, 6^e article subcylindrique et aussi long que les deux précédents réunis. Ailes hyalines, pubescentes sur toute leur surface, graduellement amincies à la base, nervures pâles, transversale oblique comme chez *Chironomus*, cubitus arqué et adjacent à la costale dans son tiers distal, non dépassé par la costale, bifurcation de la posticale située un peu en arrière de la transversale. Fémur antérieur d'un tiers plus long que le tibia, qui dépasse un peu la moitié du métatarse. Abdomen aussi long que le reste du corps. Taille 1.2 mm.

E. Bengal, Rajshahi, 6-ii (N. Annandale).

6. *Tanytarsus semiglaber*, sp. nov.

♀. Tête et thorax d'un blanc brunâtre, abdomen d'un brun jaunâtre clair, balanciers blancs, pattes blanchâtres; antennes d'un blanc jaunâtre sauf le 6^e article qui est brun noir. Articles antennaires 3-5 subovoïdaux, le 6^e cylindrique mince et double du 5^e. Ailes hyalines, dépassant de beaucoup l'abdomen, glabres en majeure partie, pubescentes le long du bord depuis l'extrémité du cubitus jusqu'au rameau distal de la posticale; en outre, une ligne de poils se prolonge depuis la pointe alaire, entre le cubitus et la discoïdale, une autre, entre la discoïdale et le rameau distal de la posticale et se continue jusqu'à la base alaire; l'espace situé entre les deux rameaux de la fourche est également pubescent; base de l'aile graduellement amincie; nervures pâles, transversale nulle, extrémité du radius plus rapprochée de la base que de l'extrémité du cubitus, qui est droit, non dépassé par la costale et assez distant de la pointe alaire; discoïdale aboutissant à la pointe alaire; bifurcation de la posticale située notablement en arrière de l'origine du cubitus. Pattes pubescentes; métatarse antérieur 2 fois $\frac{1}{2}$ aussi long que le tibia, 3^e article tarsal de moitié plus long que le 4^e, qui est de moitié plus long que le 5^e, celui-ci 3-4 fois aussi long que gros. Abdomen guère plus long que le reste du corps. Taille 1 mm.

Calcutta, à la lumière en juillet.

7. *Tanytarsus macrochirus*, sp. nov.

♀. Roux ; trois bandes du mesonotum et abdomen d'un roux brun ; palpes, antennes, pattes et balanciers blanchâtres. Yeux ovalaires, distants de toute leur longueur. Antennes composées de 5 articles, dont le 2^e est rétréci au milieu, 3^e et 4^e coniques, verticilles 3-4 fois aussi longs que l'article, 5^e terminé en un appendice cylindrique et plus long que l'article. Ailes hyalines, nervures pâles, poils et cils jaunâtres ; base des ailes sans lobe, graduellement rétrécie ; cubitus continuant la direction de la partie proximale de la discoïdale, rapproché du bord, trois fois plus distant de la pointe alaire que la discoïdale, non dépassé par la costale ; bifurcation de la posticale située un peu en arrière de l'origine du cubitus, rameau antérieur continuant la direction de la tige. Métatarse antérieur triple du tibia qui atteint à peine la moitié du fémur ; 4^e article plus court que le 3^e, plus du double du 5^e, qui est six fois aussi long que gros ; sans pulvilles. Abdomen déprimé, élargi en arrière, un peu plus long que le reste du corps. Taille 1.5 mm.

Kumaon : Bhim Tal, à une altitude de 1500 m., 27-ix-1906 (N. Annandale).

8. *Tanytarsus nocturnus*, sp. nov.

(Pl. vii, fig. 28, trois derniers articles antennaires.)

♀. Brun jaune ; antennes et pattes blanchâtres, balanciers blancs ; mesonotum avec deux bandes externes plus sombres et raccourcies en avant. Yeux sinueux, amincis au vertex, où ils sont distants de moins de leur longueur, mais de plus de leur largeur. Antennes de 5 articles, dont le 2^e est cylindrique et sans rétrécissement, 3^e et 4^e un peu amincis aux deux bouts, presque deux fois aussi longs que gros, verticilles 2-3 fois aussi longs que l'article, 5^e terminé par une pointe aussi longue que lui (fig. 28). Ailes hyalines, non lobées mais graduellement rétrécies à la base, poils de la surface peu denses, presque nuls dans la moitié proximale ; nervation du précédent, radius un peu plus rapproché de la pointe alaire que le rameau postérieur. Métatarse antérieur presque double du tibia, qui dépasse un peu la moitié du fémur ; 4^e article plus court que le 3^e, double du 5^e ; pulvilles nuls. Abdomen presque double du reste du corps. Taille 1.3 mm.

A bord d'un vaisseau, au Canal de Suez, pendant la nuit, 9-ix-1907 (N. Annandale) ; 2 exemplaires.

9. *Tanytarsus nocticola*, sp. nov.

♀. Ne diffère du précédent que par les yeux non arqués ni amincis, distants de toute leur longueur ; par le mesonotum qui est blanchâtre et parcouru par trois bandes brunes dont la médiane est raccourcie en arrière, les latérales raccourcies en avant ; par les ailes dont le radius est un peu plus éloigné de la pointe

alaire que le rameau postérieur et dont la surface est glabre, avec 3 rangées longitudinales de poils situées dans la moitié distale. Taille 1 mm.

Avec le précédent (N. Annandale).

10. *Tanytarsus leptogastus*, sp. nov.

♂. D'un brun roux; scape jaune. 2^e article antennaire blanchâtre, les suivants assombris; thorax mat, sans bandes; pattes d'un jaune sale (les antérieures brisées). Antennes de 12 articles, les articles 3-11 au moins aussi longs que gros, le 12^e aussi long que les précédents réunis; panache gris. Ailes hyalines, poilues sauf la moitié proximale de la cellule comprise entre les 2 rameaux de la posticale et tout l'espace situé entre la discoïdale et la posticale; base alaire non lobée; transversale nulle; cubitus droit, aussi distant de la pointe alaire que le rameau distal de la posticale; discoïdale aboutissant à la pointe. Pattes postérieures sans longs poils. Abdomen très grêle, double du reste du corps; articles terminaux de la pince allongés, élargis, deux fois aussi larges que les articles basaux; appendices poilus dépassant la base des articles terminaux. Taille 1.5 mm.

Lower Bengal: Port Canning, 21-vii (N. Annandale).

11. *Tanytarsus lasiopus*, sp. nov.

♀. Brun; antennes sauf le 6^e article, balanciers et pattes blanchâtres. Article 2^e des antennes rétréci au milieu, 3-5 elliptiques et sessiles, 6^e cylindrique, mince, de moitié plus long que le 5^e. Ailes poilues sur toute leur surface; base non lobée; cubitus droit, bien plus rapproché de la pointe alaire que le rameau distal de la posticale; transversale nulle ou subnulle; bifurcation de la posticale située en arrière de l'origine du cubitus. Pattes antérieures non poilues, leur métatarse 2 fois $\frac{1}{2}$ aussi long que le tibia; les 4 pattes postérieures longuement poilues, surtout la partie dorsale des tarses, où les poils sont 2-3 fois aussi longs que la grosseur des articles tarsaux. Taille 1 mm.

Lower Bengal: Port Canning, 21-viii (N. Annandale).

3^e Genre, *HALLIELLA*, gen. nov.

Ce genre est dédié au Major Hall, qui a donné au Musée de Calcutta un grand nombre de Chironomides recueillis par lui dans les différentes parties des Indes. Les caractères du genre *HallIELLA* sont: Yeux glabres et sinueux. Palpes très courts, composés de trois articles transversaux. Antennes du mâle de 12 articles, dont le 12^e est long, panache court (fig. 29). Antennes de la femelle de 6 articles. Ailes nues, nervation de *Chironomus*. Les 4 tibias postérieurs sont munis d'un peigne semblable à celui des *Orthocladius* et non pas d'un anneau dentelé comme chez *Chironomus*; tibia antérieur égal au métatarse; crochets simples, pulvilles larges, un peu plus courts que les crochets, empodium non distinct.

Hallilla noctivaga, sp. nov.

(Pl. vii, fig. 29, antenne du ♂; 30, antenne de la ♀; 31, palpe;
32, pince.)

♂ ♀. D'un brun noir; pronotum, mesonotum et metanotum d'un gris cendré, le mesonotum avec trois bandes brunes, dont la médiane est raccourcie en arrière et prolongée par une ligne jusqu'au bord du mesonotum, les externes sont raccourcies en avant et précédées d'une petite tache brune; scutellum et balanciers blanchâtres; scape jaune, flagellum, pattes et bord postérieur des segments abdominaux d'un jaune brunâtre; chez le mâle, les pattes sont entièrement blanchâtres, sauf les genoux antérieurs, la pince et la moitié postérieure du 8^e segment abdominal sont jaunes; chez la femelle, les articulations des pattes, aux antérieures l'extrémité du fémur, la base du tibia et les quatre derniers articles tarsaux, aux autres pattes les trois derniers articles tarsaux sont d'un brun noir. Yeux amincis supérieurement, où ils sont distants de leur plus grande largeur. Antennes du mâle petites (fig. 29); 2^e article plus long que gros; 3-11 très transversaux; 12^e trois fois aussi long que les 10 précédents réunis, son tiers distal élargi et fusiforme; panache court, à poils n'atteignant que le quart de la longueur des antennes et d'égale longueur, sauf ceux de la partie fusiforme, qui sont très courts. Chez la femelle, les articles 2-5 (fig. 30) sont graduellement allongés, le 2^e cylindrique et à peine plus long que gros, le 5^e fusiforme et deux fois aussi long que gros; verticilles presque deux fois aussi longs qu'un article; dernier article aussi long que les 4 précédents réunis, sub-cylindrique, un peu aminci aux deux bouts, avec quelques soies courtes. Pronotum avec une échancrure à peine distincte. Ailes hyalines, lobées à la base, surface non ponctuée, bord postérieur fortement cilié, nervures subhyalines, transversale jaune, oblique; auxiliaire dépassant notablement la transversale; extrémité du radius plus rapprochée de celle du rameau antérieur de la posticale que du rameau postérieur; 2^e longitudinale faible, très rapprochée du radius; cubitus non dépassé par la costale, à peine arqué au bout, deux fois plus distant de la pointe alaire que la discoïdale; bifurcation de la posticale située à peine en arrière de la transversale. Peigne des quatre tibias postérieurs très petit; articles tarsaux graduellement raccourcis, aux pattes antérieures, le 4^e est presque double du 5^e qui est trois fois aussi long que gros; le tibia postérieur est aussi long que les trois articles suivants réunis; dans les deux sexes les pattes sont glabres. Abdomen du mâle deux fois aussi long que le reste du corps, sub-cylindrique, segments transversaux, deux fois aussi larges que longs, mats, lisses, à pilosité courte et éparse; lamelle de la pince allongée et pointue; article terminal (fig. 32) un peu plus long que le basal, un peu élargi au milieu, pointu à l'extrémité. Abdomen de la femelle de moitié plus long que le reste du corps, déprimé, segments 4-6 plus larges que les autres. Taille 3.5 mm.

Monsieur N. Annandale a capturé 6 ♀ et 2 ♂, à bord du vaisseau, dans le Canal de Suez, pendant la nuit, le 9 octobre 1907.

B Groupe, *Orthocladus*, V. d. Wulp.

Les 4 tibias antérieurs dépourvus de peigne et d'anneau crénelé ; tibias postérieurs avec un peigne ; métatarse antérieur plus court que le tibia.

1^{er} Genre, *Dactylocladius*, Kieff.

Ailes glabres et lobées ; empodium distinct, filiforme et assez long, pulvilles nuls ; yeux glabres ; palpes de 4 articles.

1. Tergites d'un roux clair, avec une grande tache noire, tibia antérieur plus de 2 fois aussi long que le métatarse 1. *D. tenuicrus*,
sp. nov.

- Tergites verdâtres, sans tache ; tibia antérieur de moitié plus long que le métatarse 2. *D. noctivagus*,
sp. nov.

1. *Dactylocladius tenuicrus*, sp. nov.

♂. D'un roux clair, scape, trois larges bandes du mesonotum, metanotum, mesosternum, une grande tache circulaire qui occupe presque tout le dessus des segments 2 et 3, moitié postérieure des tergites 5 et 6, le 8^e en entier et la base de la pince noirs ; flagellum et fémurs d'un jaune sale ; balanciers, tibias et tarse blancs. Palpes longs. Antennes de 13 ou de 14 articles transversaux sauf les 2 premiers et le dernier, ces deux aussi long que les précédents réunis et aminci en pointe ; palpes gris. Mesonotum brillant, la bande médiane est reliée au bord postérieur par une ligne, les latérales sont raccourcies en avant. Ailes blanches, glabres, à nervures pâles, radius égal à la moitié du cubitus, qui est droit, non dépassé par la costale et assez distant de la pointe alaire, 2^e longitudinale à peine visible, son extrémité est également distante du radius et du cubitus ; discoïdale aboutissant presque dans la pointe alaire ; bifurcation de la posticale située un peu en arrière de la transversale. Pattes antérieures non poilues ; fémurs assez gros, tibias très minces, aussi minces que les tarse ; tibia antérieur pas de moitié aussi gros que le fémur, plus de deux fois aussi long que le métatarse ; articles tarsaux graduellement raccourcis, le 5^e encore 2-3 fois aussi long que gros ; empodium filiforme, atteignant le milieu des crochets. Abdomen subcylindrique, deux fois aussi long que le reste du corps ; articles terminaux de la pince graduellement épaissis de la base à l'extrémité. Taille 2.6 mm.

E. Bengal, Rajshahi, 6-ii (N. Annandale).

2. *Dactylocladius noctivagus*, sp. nov., ♂ ♀.

♀. Tête, antennes et palpes blanchâtres; thorax d'un jaune brunâtre avec trois bandes plus sombres, dont la médiane est raccourcie en arrière, les latérales raccourcies en avant; balanciers blancs; pattes blanchâtres, les antérieures plus sombres; abdomen verdâtre dorsalement, roussâtre ventralement. Yeux non amincis supérieurement, où ils sont distants de toute leur longueur. Ailes hyalines, finement ponctuées, cubitus un peu dépassé par la costale, plus distant de la pointe alaire que la discoïdale; transversale oblique, située un peu avant la bifurcation de la posticale. Tibia antérieur de moitié plus long que le métatarse, égal au fémur; tibia postérieur avec un peigne; empodium presque aussi long que les crochets, pulvilles nuls. Taille 1.3 mm.

♂. Diffère de la femelle par la couleur brun noir de l'abdomen, pince d'un jaune brunâtre. Yeux un peu amincis au vertex et un peu plus rapprochés que chez la femelle. Antennes de 14 articles d'un brun clair; articles 3-13 transversaux, le 14^e égal aux 12 précédents réunis. Taille 2 mm.

Canal de Suez, à bord du vaisseau, pendant la nuit, 9-ix-1907 (N. Annandale).

2^e Genre, *METRIOCNEMUS*, V. d. Wulp.

Ailes velues. Pour le reste, semblable à *Dactylocladius*.

Metriocnemus callinotus, sp. nov.

♂. Tête d'un jaune vitellin; scape d'un noir brillant, 2^e article jaune, 3-14 bruns; thorax d'un brun noir, mesonotum d'un jaune vitellin et brillant, avec 3 bandes noires, dont la médiane est percurrente et graduellement amincie en arrière, les latérales tronquées et raccourcies en avant, pleures jaunes avec des taches d'un brun noir, balanciers blancs; hanches jaunes avec la base noire, pattes jaunâtres, tarsi d'un brun noir; abdomen d'un brun jaunâtre, plus sombre en arrière, ainsi que la pince. Palpes de 4 longs articles. Les premiers articles du flagellum sont un peu transversaux, les suivants aussi longs que gros, le 14^e un peu plus long que les articles 2-13 réunis; panache gris. Ailes hyalines, pubescentes sur toute leur surface, faiblement lobées à la base, nervures assez fortes et jaunâtres; transversale très longue et oblique, 3-4 fois aussi longue que la base du cubitus; bifurcation de la posticale située sous l'extrémité de la transversale; cubitus un peu dépassé par la costale, plus distant de la pointe alaire que la discoïdale. Tibia antérieur un peu plus long que le fémur, d'un tiers plus long que le métatarse; 4^e article tarsal plus court que le 3^e, presque deux fois le 5^e, qui est 4-5 fois aussi long que gros; empodium filiforme, plus court que les crochets, pulvilles nuls; tibias intermédiaires sans peigne, les postérieurs avec un peigne comme chez *Orthocladius*. Taille 6 mm.

Simla hills, en avril, à une altitude de 2300 m. (N. Annandale).

3^e Genre, *DOLICHOCLADIUS*, gen. nov.

Yeux sinueux, distants de plus de leur longueur au vertex. Palpes longs. Ailes glabres, non lobées mais graduellement amincies à la base, nervation comme chez *Orthocladus*. Tibias postérieurs avec un peigne; empodium filiforme, un peu plus court que les crochets, pulvilles nuls.

Dolichocladus heteropterus, sp. nov.

♂. Tête et thorax d'un jaune brunâtre; abdomen noir, 4^e segment d'un jaune clair, antennes brunes, avec un panache gris; mesonotum avec trois bandes confluentes d'un noir brillant, la médiane percurrente, les latérales raccourcies en avant; balanciers, scutellum et metanotum d'un noir brillant; pattes antérieures noires, avec un large anneau blanc au-dessus du tiers proximal des tibias; les quatre autres pattes d'un brun noir, base des fémurs plus claire. Antennes de 12 articles; 3-11 aussi longs que gros; 12^e égal à la moitié des précédents réunis. Mesonotum glabre et brillant. Ailes hyalines, toutes les nervures d'un brun noir, cubitus arqué, assez rapproché du bord, dépassé notablement par la costale, deux fois plus distant de la pointe alaire que la discoïdale, qui aboutit à peine en dessous de la pointe; bifurcation de la posticale située à peine en arrière de la transversale, qui est oblique. Pattes antérieures grêles et plus longues que les autres, leurs fémurs grossis dans leur moitié distale; tibia antérieur à peine plus court que le fémur, d'un tiers plus long que le métatarse; 4^e article plus court que le 3^e, trois fois aussi long que le 5^e, qui est deux fois aussi long que gros. Abdomen grêle. Taille 2 mm.

Base des Dawna Hills, Lower Burma, 4-iii-1908 (N. Annandale).

4^e Genre, *PSECTROCLADIUS*, Kieff.

Yeux glabres. Palpes de 4 articles. Pulvilles larges; empodium filiforme. Ailes comme chez *Orthocladus*.

Psectrocladius flavicollis, sp. nov.

♀. Fauve, pattes à peine plus claires; pronotum d'un jaune clair; mesonotum avec trois bandes ferrugineuses, dont la médiane est raccourcie en arrière, les latérales raccourcies en avant, avec une petite tache circulaire noire à leur extrémité; balanciers blancs. Yeux gros, ovalaires, non échancrés ni courbés, distants de deux fois leur longueur, au vertex. Palpes courts et assombrés. Antennes de 6 articles, dont le 2^e est un peu plus long que gros, 3-5 ovoïdaux, verticille guère plus long que l'article, 6^e en forme de stylet, plus long que les quatre précédents réunis. Pronotum mieux développé que d'ordinaire, très finement échancré au milieu. Ailes nues, blanchâtres, graduellement amincies vers l'extrémité distale, avec un lobe à angle droit à leur base, plus

longues que l'abdomen; nervures pâles, l'auxiliaire dépasse la bifurcation de la posticale, qui est située un peu en arrière de la transversale; extrémité du radius également distant de celle des deux rameaux de la posticale; la 2^e longitudinale est à peine plus distante du cubitus que du radius; cubitus droit, notablement dépassé par la costale, deux fois plus distant de la pointe alaire que la discoïdale; transversale oblique. Tibia antérieur de moitié plus long que le métatarse, articles tarsaux graduellement raccourcis, le 5^e trois fois aussi long que gros; pulvilles larges, aussi longs que l'empodium, qui égale presque les crochets; tibia postérieur avec un peigne jaune. Abdomen presque deux fois aussi long que le reste du corps, graduellement et faiblement aminci postérieurement. Taille 6 mm.

Calcutta, 31-i-1908 (N. Annandale); l'unique exemplaire n'a pu être examiné qu'à la loupe, je n'ai donc pas pu établir si les yeux sont glabres ou velus, ni connaître le nombre des articles des palpes.

5^e Genre, *TRICHOCLADIUS*, Kieff.

Diffère de *Orthocladus* par les yeux velus.

Trichocladus spatulicornis, sp. nov.

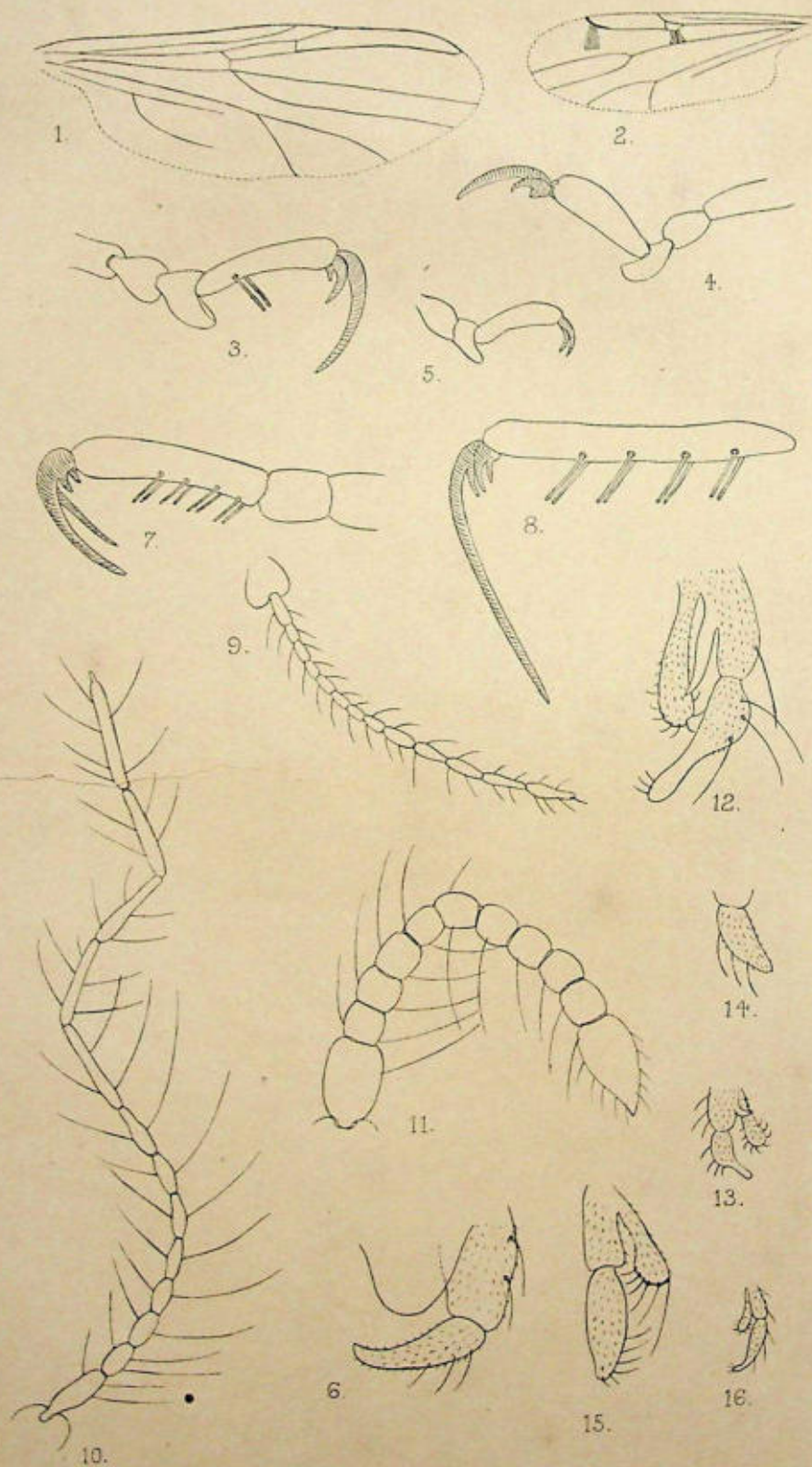
(Pl. vii, fig. 33, antenne; fig. 34, moitié de la pince.)

♂. Tête et thorax d'un jaune roussâtre; flagellum à peine brunâtre; mesonotum avec trois bandes noires et confluentes, la médiane percurrente, les latérales raccourcies en avant, scutellum, metanotum et sternum noirs; balanciers, pattes et moitié antérieure de l'abdomen blancs ou jaunâtres, moitié postérieure de l'abdomen noire, sauf les articles de la pince qui sont blanchâtres; fémur postérieur avec un anneau brun près de sa base. Yeux fortement proéminents, circulaires, pubescents, distants de deux fois leur longueur au vertex. Palpes? Antennes de 14 articles (fig. 33); les articles 2-13 un peu plus longs que gros, le 14^e plus court que les précédents réunis, renflé en une massue fusiforme un peu au-delà de son milieu; panache blanchâtre. Ailes blanches, nues, lobées à leur base; nervures pâles; cubitus droit, un peu plus rapproché de la pointe alaire que le rameau antérieur de la posticale, notablement dépassé par la costale; discoïdale fortement arquée à l'origine du cubitus; bifurcation de la posticale située à peine en arrière de l'origine du cubitus. Pattes sans longs poils; tibia antérieur d'un tiers plus long que le métatarse, 4^e article tarsal presque deux fois aussi long que le 5^e, qui est trois fois aussi long que gros; tibia postérieur avec un long peigne. Abdomen deux fois aussi long que le reste du corps, grêle; article basal de la pince (fig. 34) sans lobe, article terminal sans longs poils, graduellement et faiblement aminci à la base, avec un minime stylet au côté interne de son extrémité. Taille 1.2 mm.

"Between Manihari and Manshahi, E. B. S. Ry., Bengal, on railway track, 4-viii-1907."

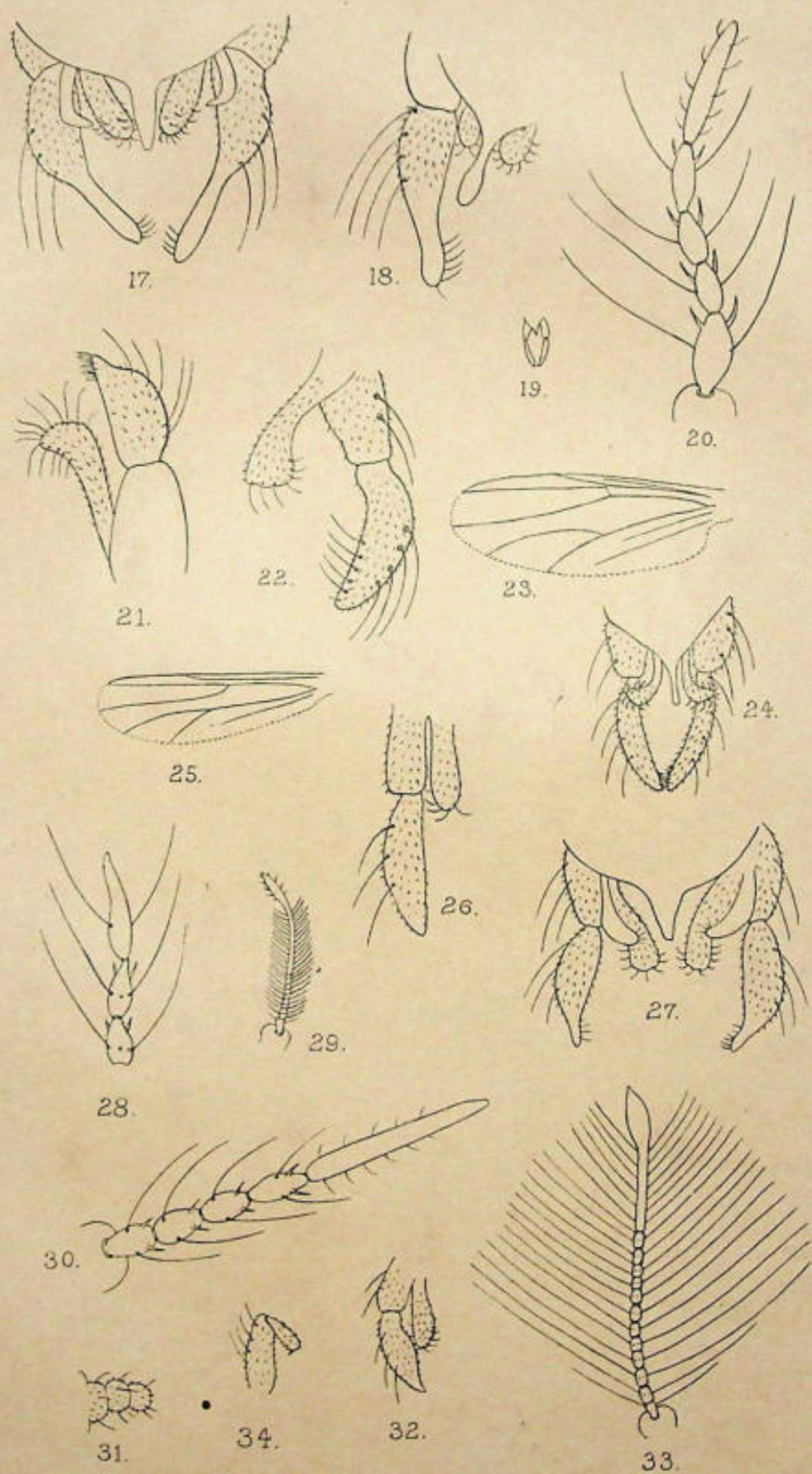
EXPLICATION DE LA PLANCHE VI.

- FIG. 1.—Aile de *Palpomyia disticta*, sp. nov.
,, 2.—Aile de *Stilobezzia festiva*, sp. nov., ♀.
,, 3.—Articles tarsaux antérieurs de *S. festiva*, sp. nov., ♀.
,, 4.—Articles tarsaux postérieurs de *S. festiva*, sp. nov., ♀.
,, 5.—Articles tarsaux postérieurs de *S. festiva*, sp. nov., ♂.
,, 6.—Pince de *S. festiva*, sp. nov.
,, 7.—Dernier article des tarsi antérieurs de *Dibezzia clavata*,
sp. nov.
,, 8.—Dernier article des tarsi postérieurs de *D. clavata*, sp.
nov.
,, 9.—Antenne de *Bezzia trispinosa*, sp. nov.
,, 10.—Antenne de *B. cucera*, sp. nov.
,, 11.—Antenne de *Isoplastus photophilus*, sp. nov.
,, 12.—Partie de la pince de *Chironomus striatipennis*, Kieffer.
,, 13.—Partie de la pince de *C. lobaticeps*, sp. nov.
,, 14.—Partie de la pince de *C. lobaticollis*, sp. nov.
,, 15.—Partie de la pince de *C. tenerrimus*, sp. nov.
,, 16.—Partie de la pince de *C. noctuabundus*, sp. nov.



EXPLICATION DE LA PLANCHE VII.

- FIG. 17.—Pince de *Chironomus dolichotomus*, sp. nov.
,, 18.—Partie de la pince de *C. callinotus*, sp. nov.
,, 19.—Pince de *C. forficularius*, sp. nov.
,, 20.—Antenne de *C. barbatitarsis*, sp. nov., ♀.
,, 21.—Pince de *C. barbatitarsis*, sp. nov.
,, 22.—Partie de la pince de *C. leucotarsus*, Kieffer, var.
,, 23.—Aile de *C. semiviridis*, sp. nov.
,, 24.—Pince de *C. semiviridis*, sp. nov.
,, 25.—Aile de *Tanytarsus viridis*, sp. nov., ♂.
,, 26.—Partie de la pince de *T. lasiopterus*, sp. nov.
,, 27.—Pince de *T. confundendus*, sp. nov.
,, 28.—Trois derniers articles antennaires de *T. nocturnus*, sp. nov.
,, 29.—Antenne de *HallIELla noctivaga*, sp. nov., ♂.
,, 30.—Antenne de *H. noctivaga*, sp. nov., ♀.
,, 31.—Palpe de *H. noctivaga*, sp. nov.
,, 32.—Pince de *H. noctivaga*, sp. nov.
,, 33.—Antenne de *Trichocladius spatulicornis*, sp. nov.
,, 34.—Moitié de la pince de *T. spatulicornis*, sp. nov.



XII. INDIAN ISOPODS.

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Some time ago Dr. Annandale entrusted me with a small collection of Isopoda from the Indian Museum, mostly terrestrial species, but some of aquatic though not marine habitat. The present paper is concerned with a part of this collection, distributed between the two tribes of the Flabellifera and the Oniscidea.

In the former tribe only the genera *Alitropus* and *Sphaeroma* are here represented. But I may take this opportunity of calling attention to two other generic names included in it. The elder of these is *Rhexana*, Schiödte and Meinert, 1883, in the family Cymothoidea. It has recently been again brought into notice by Dr. Thienemann in his excellent *Contributions to the knowledge of the Isopod-fauna of East Asia*, 1910. This name, however, which is not recorded in Scudder's *Nomenclator Zoologicus*, 1882, was preoccupied by Dr. Sørensen in 1879.¹ I therefore propose as a convenient substitute for it the form *Rhexanella*, still at present contented with the single species *R. verrucosa*, for which the genus was founded. The other generic name in question is *Brotherus*, Budde-Lund (in Voeltzkow's *Reise in Ostafrika*, vol. ii, p. 306, 1908), included by its author in the family Alcironidae, Hansen, which, as pointed out in 1904, should rather be called Corallanidae. But *Brotherus* is not distinguishable from *Argathona*, which I named in 1905, in a new family Argathonidae, unless the fusion of the fourth and fifth joints in the maxillipeds of *Argathona normani* suffices to distinguish that type species generically from *Brotherus longicornis*, Budde-Lund, 1908, and *Argathona reidi*, Stebbing, 1910, in which there is no such fusion. This distinction being disregarded, all three species will belong to *Argathona*, but if on the contrary it be thought to have generic value, *Argathona reidi* must be transferred to *Brotherus*.

With regard to the tribe Oniscidea it is well known that Budde-Lund's *Isopoda Terrestria*, 1885, was for long the leading treatise on the subject. Then for a considerable period the study was left almost entirely to the industry of M. Adrien Dollfus. During the last few years, however, there has been a great change. Many capable authors have found the group attractive. Instead of scanty illustrations or none at all, copious and elaborate drawings of structural details have been supplied, especially in the works of Sars, Racovitza and Budde-Lund. The new light is somewhat

¹ *Naturhistorisk Tidsskrift*, ser. 3, vol. xii, p. 124, footnote. *Rhexana* is here substituted by Sørensen for the preoccupied name *Anelasma* which he gave to a genus of Opiliones in 1873.

dazzling. It makes the inadequacy of earlier descriptions painfully felt. The systematist is warned against placing his trust in easily observed characters, for thereby he runs the risk of obscuring important variations and of mixing up new species with old. As might be expected, the fuller study of the various organisms has led to a multiplication of genera. Many of these indeed are introduced in the disguise of subgenera, like the rich heiresses in modern works of fiction, who hire themselves out as governesses or typists, just to see how it feels. As the ladies eventually come by their own, so subgenera in due course turn into genera. Surely they might as well have been so called from the outset. Whether the status of the names be generic or subgeneric, I have in this paper argued that *Metoponorthus*, Budde-Lund, must give way to *Porcellionides*, Miers. Also I have found it necessary to introduce two new genera by the names *Paraperiscyphis* and *Exalloniscus*. Two new species are proposed, *Sphaeroma annandalei* in one tribe and *Paraperiscyphis travancorensis* in the other.

Tribe FLABELLIFERA.

Family AEGIDAE.

1879. *Aegidae*, Schiödte and Meinert, *Naturhist. Tidsskrift*, ser. 3, vol. xii, p. 325.
 1890. „ Hansen, *Cirolanidae*, pp. 58 (294), 79 (315).
 Gen. *ALITROPUS*, Milne-Edwards.
 1840. *Alitropus*, Milne-Edwards, *Hist. Nat. Crust.*, vol. iii, pp. 234 (*Alitrope*), 245.
 1879. „ Schiödte and Meinert, *Naturhist. Tidsskr.*, ser. 3, vol. xii, p. 403.
 1890. *Rocinela* (*Alitropus*), Hansen, *Cirolanidae*, pp. 80 (316), 170 (406).
 1892. *Rocinela*, Max Weber, *Zool. Ergebnisse einer Reise in Nederl. Ost-Ind.*, vol. ii, p. 553.
 1893. *Alitropus* (*Rocinela*), Stebbing, *Hist. Crust.*, p. 348.

While Hansen and Max Weber quite rightly notice the close approximation of the genera *Rocinela* and *Alitropus*, there is a notable difference between the stout structure of the anterior limbs in most species of the former and their slenderness in *Alitropus typus*. If some species allotted to *Rocinela* have these limbs slender, it may prove advisable to transfer such forms to *Alitropus*, and so help to disburden *Rocinela*, which has recently received so many additions. It is not a little unsuitable to have a *Rocinela typus* (Milne-Edwards), which is in no sense typical of Leach's *Rocinela*.

Alitropus typus, Milne-Edwards.

1840. *Alitropus typus*, Milne-Edwards, *Hist. Nat. Crust.*, vol. iii, p. 247, pl. 33, figs. 1-7.

1879. *Alitropus typus*, Schiödte and Meinert, *Naturhist. Tidsskr.*, ser. 3, vol. xii, p. 404, pl. xiii, figs. 10-12.
1892. *Rocinela typus*, Max Weber, *Zool. Ergebn. einer Reise in Nederl. Ost-Ind.*, vol. ii, p. 553.

Of the two specimens which I refer to this species one measured about 14×6.5 mm., the other was only 6 mm. long, the front part much narrower than the remainder, and the fifth pereopod shorter than the fourth.

Locality.—The label states that they were obtained by Dr. Annandale, 7-xi-08, from Shasthancottah Lake, 12 miles N. N. E. of Quilon, Travancore.

Family SPHAEROMIDAE.

1910. *Sphacromidae*, Stebbing, "South African Crustacea," Part 5, in *Annals of the S. A. Mus.*, vol. vi, p. 426.

Under the above reference the history of this long-standing and much discussed family and its leading genus *Sphaeroma* can be traced.

Gen. SPHAEROMA, Bosc.

1802. *Sphaeroma*, Bosc, *Hist. Nat. Crust.*, vol. ii, p. 49.

Sphaeroma annandalei, sp. nov.

(Plate x.)

Superficially this species bears so great a resemblance to *Sphacroma walkeri*, Stebbing, that I was at first tempted to regard it as at most an interesting variety. Such differences as might be detected by minute comparison of the respective antennae, limbs, pleopods and uropods, could not easily be insisted on as of specific importance. Even the tuberculation of the dorsal surface, though distinctive, might be regarded as a very variable feature. In various points it also agrees with *Sphacroma terebrans*, Bate. But a thorough examination has shown that the three forms cannot possibly be confounded together.

In the new species distinct tuberculation begins on the seventh segment of the pereon. On the composite anterior portion of the pleon there are two strongly marked submedian tubercles, and on the telsonic portion there are two submedian pairs in succession followed by a single median tubercle and flanked on either side by a longitudinal row of three tubercles, besides some others more laterally placed. The telsonic apex is obtusely narrowed, not quite so much as in *S. terebrans*, but far more than can be truthfully shown in a dorsal view of the undissected specimen. In *S. walkeri* the apical margin is broadly rounded.

The first antennae have an elongate slender third joint, to which succeed eight to ten joints of which the first is the longest.

In the second antennae the third joint is rather shorter than the fourth, and the fourth than the fifth, all three being closely fringed with setules; the flagellum has eighteen joints each with an apical tuft of setae.

The upper lip has the margin obtusely triangular, not as in *S. walkeri* feebly trilobed and in *S. terebrans* evenly curved.

The mandibles have the cutting edge formed by two powerful well-separated teeth, not as in *S. terebrans* by what appears to be a consolidated piece. Between the cutting edge and the strong molar is a series of little spines, curving towards the molar, very different from the little tuft of spines in the other species.

The lobes of the lower lip are less narrowed distally than in *S. terebrans*. The first maxillae have three plumose setae on the inner plate, not four as in *S. walkeri*, the broad outer plate strongly setulose all along the outer margin, the apical bordered with spines, nine or more, most of them serrate, and two short smooth spines at the inner angle. The second maxillae are especially distinctive by the broad subquadrate form of the inner plate, very different from the oval apically acute shape in *S. walkeri*. The maxillipeds also differ by having the antepenultimate joint more narrowed distally.

The limbs of the peraeon are substantially alike in the two species, unless any importance can be attached to the stronger feathering in the specimens here dealt with. This armature in the second and third peraeopods, helped to some extent by extraneous accretions, gave those limbs the appearance of woolly masses, in which it was extremely difficult to determine either the outlines of the several joints or the articulations between them. The body of the animal carries some scattered setae, the borders of the side-plates of the pleon are furred, the plates of the uropods have setose margins, the number of teeth on the outer margin of the movable ramus being obscured by the thickness of the accompanying fringe.

The length of the specimen figured is about 9 mm., with a breadth about half the length.

Locality.—Port Canning, brackish water pool.

[Specimens of the species are often very abundant in the larger canals of the sponge *Spongilla alba* var. *bengalensis*, a form common in brackish water in the Gangetic delta. They are referred to on p. 78 of my forthcoming volume on the freshwater sponges, etc., in the "Fauna of British India" series, as representing a species allied to *Sphaeroma walkeri*, Stebbing.—N. A.]

The specific name is given out of respect to Dr. Annandale by whom the two specimens were obtained.

Tribe ONISCIDEA.

The species about to be considered are all included in the family Oniscidae as summarized by Budde-Lund in his Revision of 1904. Without presuming to criticise the learned author's

arrangement, except to deprecate the use of sub-families, I may observe that he places the genus *Saïdjahus* in his second sub-family Spherilloninae, and that probably his seventh sub-family will cover all the rest of the genera here considered. Thus *Paraperiscyphis* will naturally stand beside *Periscyphis* in the first section, which Budde-Lund calls Armadilloidea, *Hemilepistus* and *Porcellionides* belong to his second section called Oniscoidea, and the new genus *Exalloniscus* will find its place beside Dana's *Allo-niscus* in the third section Alloniscoidea. In 1908 Budde-Lund himself gives a very reasonable premonition that the last word has not yet been said on the classification of the terrestrial Isopoda. There are in fact many parts of the world and many parts of India so little explored for animals of this group, that the future may have much to learn about its constitution.

Gen. SAÏDJAHUS, Budde-Lund.

1904. *Saïdjahus*, Budde-Lund, *A Revision of "Crustacea Isopoda terrestria,"* pp. 36, 42, 49.

The genus was instituted to receive three species, *orientalis*, *elegans* and *guttatus*, all established by Dollfus in 1898 and by him referred to his genus *Mesarmadillo*, described with three other new species in 1892 (*Ann. Soc. Entom. de France*, vol. 61, p. 385). Budde-Lund assigns *Saïdjahus* to his family Oniscidae, sub-family Spherilloninae. In his synoptic view he distinguishes it from other genera of the family by the combination of characters, pleural parts of the head coalesced, flagellum of second antennae two-jointed, telsonic segment narrowed behind, sub-triangular, uropods of moderate size, reaching a little beyond the telsonic segment, the lateral margin of the first peraeon segment with a rather thick duplicature. In the formal definition on p. 49 he adds that the head has the vertical marginal line produced to the eyes, that the side-plates of the first peraeon segment are fissured behind, that the sides of the telsonic segment are incurved, and that the outer branch of the uropods is small, thin, inserted in the hind side of the peduncle. He describes, with some figures, a new species, *S. creper*, from Borneo.

Saïdjahus, sp.

Specimens procured by Dr. Annandale at Mandapam, Pamben Passage, S. India, in sand under stones, agree with this genus. In the length of 6 mm. these agree with *S. guttatus* (Dollfus). But in the shortness of the outer branch of the uropods they are nearer to *S. elegans*, from which they are separated by having the first joint of the flagellum of the second antennae little shorter than the second, just as is the case in *S. orientalis* (Dollfus). Not knowing how much variability the species may be liable to in these respects I abstain from giving a name to the present form.

Gen. PARAPERISCYPHIS, nov.

Periscyphus was instituted by Gerstaecker in 1873, according to Budde-Lund, who refers to the account then given of "Die Gliederthier-Fauna des Sansibar-Gebietes, nach dem Material der v. d. Deckenschen Expedition, p. 526." Budde-Lund gives a fresh definition of the genus in 1908 (*Results of the Swedish Zool. Exp. to Egypt*, No. 26A, p. 10), and names the species included under it ("Isopoda von Madagaskar und Ostafrika," Voeltzkow's *Reise*, vol. 2, p. 278). To the genus thus defined *Paraperiscyphus* is approximate in regard to the mouth-organs, but is separated from it by the following characters:—

In the second antennae the first joint of the flagellum is not longer than the second; the telsonic segment is very obtusely triangular, not narrowly produced at the apex; the inner branch of the uropods is attached not to a projection of the peduncle's base but to a notch far down the inner margin, while still further down is attached the outer branch, not especially small, both branches extending beyond the peduncle, and the peduncle itself extending beyond the telsonic segment.

Paraperiscyphus travancorensis, sp. nov.

(Plate xi.)

The present species should be taken as the type of the new genus. But *Periscyphus weberi*, Dollfus (in Max Weber's *Zool. Ergebn. einer Reise in Niederl. Ost-Indien*, vol. iv, p. 371, pl. 14, fig. 16, and in text-figs. 16 a—d, 1898), is probably congeneric.¹ For that species, however, no account is given of the mouth-organs, so that its generic position is rather uncertain. No reason is given for the spelling *Periscyphus* instead of *Periscyphis*, but there can be no doubt that Gerstaecker's genus was intended.

From the species taken at Sumatra, described and figured by Dollfus, the present form differs in various points. The rather broad conglobating body is not smooth, but covered with little minutely setulose warts. A much deeper transverse furrow than that shown by Dollfus separates the convex part of the head which carries the round prominent eyes from the forward part, which in both species shows a little median triangle between two broad lobes. While Dollfus speaks of the first segment of the peraeon as having the hind margin a little sinuous, in the present species the sides of that margin are angularly produced backward in quite an exceptional manner, with the second and third segments following suit hardly less conspicuously. In the second antennae Dollfus says that the flagellum of his species has the first joint one-third shorter than the second; in ours the second is but slightly longer than the first, apart from the apical seta which has

¹ In Lanchester's "Malay Crustacea of the Skeat Exp." (*Proc. Zool. Soc.*, p. 380, 1902) Budde-Lund, describing *Toradja conglobator*, n. sp., says of that genus, "The *Periscyphus weberi* Df. may be placed here."

its distal half abruptly narrower than the proximal. Dollfus describes and figures the peduncle of the uropods as obtusely quadrangular, which does not at all correspond with the graceful curves of both inner and outer margins in our species. He represents the branches as narrowly cylindrical, and says that the inner equals about half the length of the outer, though his figures no doubt rightly show that the inner is the longer, as in the new species, in which these branches reach about equally far back, the inner carrying two apical setae. The New Zealand species *Actaccia opihepsis*, Chilton, 1901, has uropods very similar to those of our species.

Between the antennae the head is ventrally carinate. In the first maxillae I could only make out eight apical spines, and the armature of the inner plate was undecipherable in the dried condition. The maxillipeds are very broad as in *Periscyphis*. The limbs are fringed with numerous spines, most of them pointed, but one on the apical border of the fifth joint is shown in the first gnathopod as having an obtuse plumose apex.

The larger of the two specimens measured 11 mm. in length, by about 6 mm. in breadth.

Locality.—Maddathorai, western base of Western Ghats, Travancore.

The specific name is taken from that of the region whence Dr. Annandale procured this species.

Gen. HEMILEPISTUS, Budde-Lund.

1879. *Hemilepistus*, Budde-Lund, *Prospectus Isop. terrestrium*,
p. 4.
1885. " " *Crustacea Isopoda terrestria*, pp.
76, 151.
1896. " Dollfus, *Mém. Soc. Zool. de France*, vol. ix,
pp. 526, 546.
1904. " Budde-Lund, *A Revision of "Crust. Isop.
terr.,"* p. 37.

According to Budde-Lund the first species known to science of this remarkable genus were observed by Pallas in his Russian journey, of which the account was published in 1771. The species there described were named *Oniscus ruderalis* and *Oniscus crenulatus*. The latter may be, in Budde-Lund's opinion, perhaps identical with *Porcellio klugii*, Brandt, 1833. Though Savigny (pl. 13, fig. 4) gave a few figures of the Egyptian species which Audouin named *Porcellio reaumurii*, the first author to deal seriously with illustrations of the structural characters was Uljanin in his Russian treatise of the Crustacea of Turkestan, 1875. He describes and figures *Porcellio fedtschenkoi* and *P. elegans* as new and *P. ornatus* as the species so named by Milne-Edwards in 1840. Budde-Lund refers all three of Uljanin's descriptions to *Hemilepistus*, but leaves *P. ornatus*, Milne-Edwards, under *Porcellio* and makes

P. ornatus, Uljanin, a synonym of that author's *Hemilepistus fedtschenkoi* (see *Isop. terr.*, pp. 113, 158, 305). Certainly the colouring of Uljanin's *ornatus* is very distinct from that described by Milne-Edwards for his like-named species, but the ornamentation of the peraeon is in both confined to the first two segments, not extending to three as in the description or even four as indicated in the figure of the species *fedtschenkoi*. This consideration does not seem to be affected by the circumstance that in this genus the full development of the dentate crests is only gradually attained in the animal's progress to maturity.

In 1885 Budde-Lund made *Hemilepistus* the third of seven subgenera under *Porcellio*, that genus standing first in the Oniscoidea, which was the second section of the family Onisci. In his Revision, 1904, the family Oniscidae contains eight subfamilies, of which the Oniscinae is the seventh, divided into three tribes, with the Oniscoidea standing second and comprising *Armadillidium*, *Porcellio* and *Oniscus*. To *Porcellio* are assigned *Hemilepistus* and eight other names, apparently as subgenera, two being indicated as doubtful, and *Porcellio* itself not being named as a subgenus, but presumably to be taken for granted. Here the term Oniscoidea has suffered a great loss of rank, and must not be confounded with the terms Oniscoidea, Oniscoida and Oniscidea which have been used as group-names, to include all the terrestrial isopods.

Hemilepistus klugii (Brandt).

(Plate xii, B.)

1833. *Porcellio klugii*, Brandt, *Conspectus Crust. Oniscodorum*, p. 17.
 1879. *Hemilepistus klugii*, Budde-Lund, *Prospectus Isop. terrestrium*, p. 4.
 1885. " " " *Isopoda terrestria*, p. 152.
 1908. " " " Voeltzkow's *Reise in Ostafrika*, vol. ii, p. 281.

The description given under the last reference agrees so well with the figures now, I believe, for the first time given of this species that the identification may be accepted with some confidence. *H. crenulatus* (Pallas) would have priority, could its agreement with Brandt's species be satisfactorily shown.

A very striking effect is produced by the prominent pale blunt or rounded teeth forming transverse crests on the front part of the animal, contrasted with the dark grey, smooth or only microscopically setulose remainder of the body. The nearly related *H. reaumurii* (Audouin) is described as occupying deep perpendicular burrows in stony and clayey parts of the Sahara desert. Dollfus was told by M. Eugène Simon that the species named dwelt at the upper part of the hole, using its head as a sort of stopper to the entrance. Noticing the resemblance of the burrows to those of

Cicindela-larvae, M. Simon could not decide whether the isopod borrowed its habitation from some insect, or whether its own excavating activity would account for the extreme rugosity of its anterior segments. This problem awaits solution.

In the specimens here dealt with the head shows at the middle anteriorly a set of four or more unequal warts followed on either side by a widely diverging line of four larger warts, or three sets of four subequal warts. The first pereon segment has fourteen, the second thirteen, large teeth cresting the hind margin, the third segment has twelve or thirteen smaller teeth or warts similarly placed. Laterally above the crests there are groups of four warts on the first, and of three on the second and third segments. The hind margin of the fourth segment has a fringe of very obscure little warts. The telsonic segment is considerably broader than long, with sinuous sides, faintly grooved down the middle to the very narrowly rounded apex.

Eyes small, dark, ocelli about 20.

The second antennae have the first joint of the flagellum a little longer than the second, the latter ending in a little process which, but for its minuteness, might pass for a joint rather than an apical spine.

Upper lip broad, in the dissected specimen showing no marginal hairs.

Mandibles with strongly dentate cutting-plates, adjoining which are a series of setules and several slender spines, to which succeeds the short stalked brush-like process implanted near a strong smooth projection of the trunk.

The first maxillae have the outer plate surmounted by three (or four, see Budde-Lund, 1908) strong and six very slender spines, all apparently smooth-edged. The inner plate has on the inner part of the apex two strong setulose setae of which the inner is the longer. At the apex of the outer margin is a minute spine. In Uljanin's *H. elegans* the margin is itself produced to a sharp point.

The maxillipeds have on or near the distal margin of the masticatory plate three minute spines, and two larger spines below. The short broad first joint of the palp displays one large spine; the conical second joint has on its inner margin one curved spine and a smaller spine between that and the small narrow third joint which carries two apical spines.

The first pleopods of the male have the inner plate ending in a broad pectinate spine, that plate in the second pair having a needle-like apex. The peduncle of the uropods is about as broad as long; the narrow inner rami reach a little beyond the telsonic segment, the conical outer rami reaching beyond the inner, but with a length not equal to the peduncles.

Length of measured specimen 15 mm., with a breadth of about 5 mm. Specimen figured rather larger.

Locality.—The specimens sent by Dr. N. Annandale were labelled as having been obtained at Quetta, under date 6-iv-08; by Mr. J. W. N. Cumming.

It scarcely needs saying that the distinctive characters borrowed from de Saussure, in which Miers placed confidence, are no longer adequate for modern requirements. But the acknowledged identity of *P. flavo-vittata* with *M. pruinus* determines the precedence of *Porcellionides*.

Porcellionides pruinus (Brandt).

1833. *Porcellio pruinus*, Brandt, *Conspectus Crust. Oniscodorum*, p. 19.
 1879. *Metoponorthus pruinus*, Budde-Lund, *Prospectus Isop. terrestrium*, p. 4.
 1885. " " Budde-Lund, *Crustacea Isopoda terrestria*, p. 169.
 1896. " " Dollfus, *Mém. Soc. Zool. de France*, vol. ix, p. 543.
 1898. " " Sars, *Crustacea of Norway*, vol. ii, pt. 10, p. 184, pl. 80, fig. 2.
 1901. " " (?) Chilton, *Trans. Linn. Soc.*, vol. viii, pt. 4, p. 141.
 1908 " " Carl, *Nouv. Mém. Soc. Helvétique Sci. Nat.*, vol. xlii, pt. 2, pl. 3, fig. 80 (Racovitza).
 1908. " " Racovitza, *Arch. Zool. expérimentale*, ser. 4, vol. ix, No. 5, p. 386, figs. xiii—xvii.
 1908 " " Budde-Lund, Voeltzkow's *Reise in Ostafrika*, vol. ii, pp. 281, 285.

The full synonymy of this species contains many specific names and the names of many authors. Recently Racovitza has remarked that, although it is considered cosmopolitan, little attention has been paid to the question of its local variations. He gives some comparative figures to illustrate this point of view and promises a further study.

Specimens sent from the Indian Museum are labelled as having been taken at "Kurseong, 5,000 feet, E. Himalayas, 15-vii-07." Though partial desiccation unfits them for elaborate research, the dissection of a male shows its close agreement with the figures of that sex as drawn by Professor Sars. The fifth and sixth joints of the first gnathopods are crowded with spines and spinules. A slight variation may consist in the fact that the sixth joint is attached close to the outer margin of the fifth, not subcentrally to its apex as in the figure by Sars. The proportions of the second antennae, the upper lip without hairs on the margin, the masculine apparatus of the first and second pleopods, and the shape of the telsonic segment correspond fully with what is shown in the *Crustacea of Norway*.

Porcellionides asiaticus (Uljanin).

1875. *Porcellio asiaticus*, Uljanin, *Crustacea of Turkestan*, p. 15, pl. 3, figs. 11-22.
 1879. *Metoponorthus asiaticus*, Budde-Lund, *Prospectus Isopodum terrestrium*, p. 4.
 1885. „ *orientalis* (partim?), Budde-Lund, *Isopoda terrestria*, p. 162.

Uljanin in 1875 describes and figures *Porcellio asiaticus* and *P. orientalis* as two quite distinct species, the largest male of the former measuring 14×6.5 mm., of the latter 13×8 mm. Budde-Lund, without noticing the difference in breadth, unites the two species as merely colour varieties. In his earlier work he adopts the specific name *asiaticus*, but in 1885 he makes this a synonym of *orientalis*, although the other species has precedence both in Uljanin's text and plates.

The specimens which I refer to *P. asiaticus* were obtained by Dr. Annandale at Lucknow, under date 22-i-08.

Gen. EXALLONISCUS, nov.

Body finely tuberculate, not adapted for conglobation. Eyes wanting. Second antennae short, flagellum three-jointed. Mandibles with four or five stout teeth divided between the cutting edge and its accessory plate; adjacent to the latter is a border fringed with spinules and setules, a feathered seta (at least on one of the mandibles) projecting between this border and the brush of setae on a short peduncle which represents the molar. First maxilla with two short feathered setae occupying the apex of the inner plate, the outer plate being surmounted by smooth spines only seven in number, the distal part of its outer margin setulose. The second maxillae with inner apical lobe much broader than the outer and showing a group of adpressed setae, only the tips of which project from its distal margin. Maxillipeds not very broad, the masticatory plate quadrate, its truncate distal border finely fringed, the palp carrying on the inner margin of its penultimate joint an apically feathered process similar to the somewhat larger terminal joint. The limbs of the peraeon have many spines with multifid apices. The first and second pleopods of the male are in near agreement with those in *Alloniscus*, Dana (judging by *A. pigmentatus*, Budde-Lund); the fifth pair have the gill-cover remarkably acute at the apex. Telsonic segment broad with obtuse apex. Outer ramus of uropods much projecting, longer than the stout peduncle, on the inner border of which the narrow inner ramus is attached, scarcely reaching half the length of the outer ramus.

In 1908 Budde-Lund, in the account of *Alloniscus brevis* (Voeltzkow's *Reise in Ostafrika*, vol. ii, p. 298), incidentally expresses the opinion that *A. coecus*, Dollfus, probably does not belong to the genus *Alloniscus*, at least in his limitation of it. That view is

most likely correct, if all the structural features described above have been rightly observed. Both pairs of maxillae appear to offer distinctive characters, and others may perhaps be drawn from the first antennae and the lower lip, but in regard to these my dissections do not enable me to put forward trustworthy evidence. The name of the genus refers to the removal of its type species from the home in which M. Dollfus had placed it.

Exalloniscus coecus (Dollfus).

(Plate xii, A.)

1898. *Alloniscus coecus*, Dollfus, in Weber's *Zool. Ergebn. einer Reise in Niederl. Ost-Indien*, vol. iv, p. 375, pl. xv, fig. 22, in text 22 a, b.

Dollfus gives the following description:—"Body broadly oval, little convex, a little depressed, covered with fine granulations, more accentuated anteriorly. Cephalon: frontal line sinuous, with a feeble median process and very oblique subacute lateral lobes. Prosepistome flat. Eyes none. Second antennae short, flagellum of three subequal joints. Peraeon: first segment with hind margin straight. Pleon, Telson—Lateral processes of the segments 3—5 rather broad, depressed. Pleotelson triangular with subobtusate apex, sides a little sinuous. Uropods: base equalling the length of the pleotelson, inner branches small but reaching beyond the pleotelson. Outer branches? Colour: white." The specimens were taken by Prof. M. Weber at Java and Sumatra. Lines indicating the natural size of specimen figured are 5×2 mm., not consistent with the description, body broadly oval. Dr. Annandale's specimens from Maddathurai, Travancore, measured about 5×3 mm. Perhaps a true representation lies between my figure a little too broad and that by M. Dollfus rather too narrow. That they are concerned with the same species can scarcely be doubted.

EXPLANATION OF PLATE X.

Sphacroma annandalei, sp. nov.

- n.s. Lines indicating natural size of specimen figured below in dorsal and lateral view.
a.s., a.i. First and second antennae.
l.s. Upper lip with epistome.
m., m., mx. 1., mx. 2., mxp. Mandibles (figure on the left without palp), first and second maxillae, maxillipeds.
gn. 1., prp. 2., prp. 5. First gnathopod, second and fifth pereopods.
plp. 4., plp. 5. Fourth and fifth pleopods, with further enlargement of the apical bulb in the fifth pleopod.

The mouth-organs and the above-mentioned bulb are more highly magnified than the antennae, limbs and pleopods, the scale being uniform for each of the two sets.



Dr. T. R. Stebbins

J. R. Hutton, Field Lib. Edin.

SPHAEROMA ANNANDALEI n. sp.

EXPLANATION OF PLATE XI.

Paraperiscyphis travancorensis, gen. et sp. nov.

n.s. Lines indicating natural size of specimen figured below in dorsal aspect not completely flattened; the figure above being a lateral view of a rather smaller specimen, of which the uropods are figured on the left in ventral view. All other figures are from the first-mentioned specimen.

Per.s. I. First pereopod segment with the head, in dorsal view more enlarged.

C.V. Ventral view of the head (cephalon).

a.i. Second antenna, with terminal spine more magnified.

l.s., m., m., mx. 1., mx. 2., mxp. Upper lip; mandibles, the upper from the outer side, the lower figure representing the other mandible from the inner side; the first maxilla without the inner plate; the second maxilla; the maxillipeds. These mouth-organs are figured to a uniform scale.

gn. 1. First gnathopod, with distal part more enlarged.

urp., T. Uropod in dorsal aspect, and telsonic segment, these figures with those of the second antenna and first gnathopod are on a uniform scale, only the extra enlargements of parts agreeing with the scale of the mouth-organs.



Del. T.N.R. Stebbing

IT. P. Stebbing

PARAPERISCYPHIS TRAVANCORENSIS n. g. et sp.

EXPLANATION OF PLATE XII.

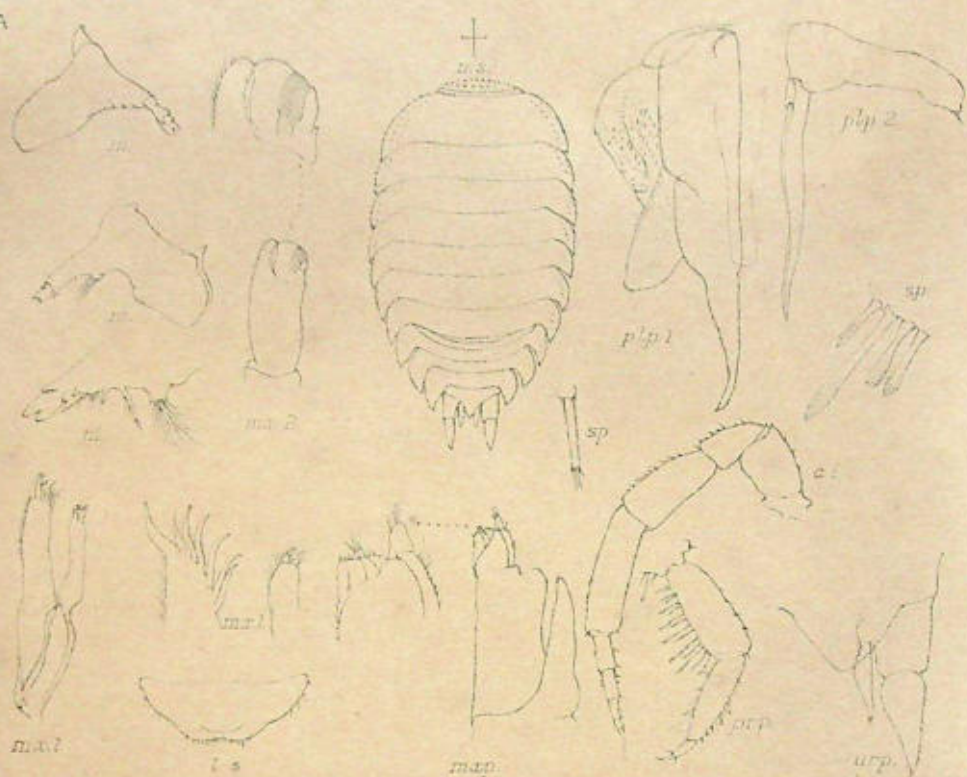
A.—*Exalloniscus coccus* (Dollfus).

- n.s. Lines indicating natural size of specimen figured below in dorsal view.
- l.s., m., m., mx. 1., mxp. Upper and lower lips; mandibles and first maxilla; and a maxilliped with further enlargement of the distal parts.
- m', mx. 1', mx. 2. Distal portions of a mandible and a first maxilla, second maxilla with its distal part further enlarged. These figures are drawn from a separate specimen, the distal portions uniformly magnified.
- a.i., prp., plp. 1., plp. 2., urp. Second antenna, part of one of the peraeopods, the first male pleopod, inner branch of the second, uropod in attachment to the telsonic segment. These figures are on a lower scale than the mouth-organs. The antenna and terminal joints of a peraeopod are from the separate specimen.
- sp. sp'. Terminal spine of second antenna, and spines from the antepenultimate joint of peraeopod, on the same scale as the distal parts of the mouth-organs.

B.—*Hemilepistus klugii* (Brandt).

- n.s. Lines indicating natural size of a specimen rather smaller than that from which the drawings were made.
- C., Per.s. 1—5, T.D.—Dorsal views of head, peraeon segments to end of the fifth, and telsonic segment with the uropods. The peraeon segments are slightly inclined, with the lateral margins visible on the left, concealed on the right hand.
- Pl.V. Ventral view of the pleon. This and the preceding figures are drawn to the same scale, less magnified than the rest, which also are on a uniform scale.
- a.i. Second antenna, with apex of flagellum more enlarged.
- l.s., l.i., m., mx. 1., mxp. Upper and lower lips; mandible, first maxilla, and a maxilliped, the last three with further enlargements.
- plp. 1., plp. 2. First and second pleopods, with further enlargements, the higher magnification being the same for all the figures.

A



B



Del T. R. Stebbing

From the Lethbridge

XIII. SYSTEMATIC NOTES ON THE CTENOSTOMATOUS POLYZOA OF FRESH WATER.

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

In preparing an account of the freshwater polyzoa for the "Fauna of British India" I have had occasion to examine specimens of most of the ctenostomatous species as yet known to occur in the rivers, lakes and ponds of different regions. It may therefore prove useful to publish the following supplementary notes. I have received much assistance in the preparation of specimens from Mr. F. H. Gravely, Assistant Superintendent in the Indian Museum, and am indebted for many of these specimens to Dr. K. Kraepelin, Dr. W. Michaelsen, Mr. C. Rousselet and Mr. R. Kirkpatrick. Full references to literature on the Indian species will be found in my volume in the "Fauna," only a few of the more important general works being cited in this paper.

Suborder CTENOSTOMATA.

Division PALUDICELLINA.

Ctenostomatous polyzoa in which the zoarium increases by a cruciform¹ system of budding, each zooecium giving rise normally to three daughter-zooecia (one on each side and one at its anterior end) and being connected posteriorly with its own mother-zooecium. No zooecium is ever connected by its base with more than four others. In the polypide that part of the alimentary canal which intervenes between the cardia and the main chamber of the stomach is always more or less modified but never forms an organ of compression or is provided with internal teeth.

All the Paludicellina are found in fresh or brackish water. Anatomically they appear to be related to the Alcyonellea rather than the Vesicularina,² to which many of them bear a certain superficial resemblance.

Family PALUDICELLIDAE.

Zooecia more or less tubular and at least partially vertical, often adherent by the base only or altogether free. In adverse

¹ Rousselet (*P.Z.S.*, 1907 (i), p. 252) refers to such forms as "Cruciform Stolonifera" but includes with them certain marine genera that do not exhibit the same regularity in their method of budding.

² Waters, *Journ. Linn. Soc. London—Zool.*, xxxi, p. 237 (1910).

circumstances resting buds with a hard chitinous coat are produced and lie dormant until the return of favourable conditions.

Key to the genera of the Paludicellidae.

1. No buds produced at the distal end of the zooecium.
 - (a) Zooecia narrowly flask-shaped, semi-recumbent or at any rate with the dorsal surface clearly distinct from the ventral *Paludicella*.
 - (b) Zooecia tubular, upright; the dorsal and ventral surfaces identical *Pottsiella*.
2. Buds produced at the distal end of the zooecia.

Zooecia (when adult) tubular, nearly upright, more or less swollen at the base *Victorella*.

Genus PALUDICELLA, Gervais.

Zooecia narrowly vase-shaped with the dorsal surface distinct from the ventral; the orifice situated on a tubular outgrowth from the former; no distal buds; collar without chitinous chaetae. No part of the alimentary canal of the polypide lined with chitin and only that part which surrounds the pyloric aperture of the stomach ciliated; no defined compressor muscle round the cardiac chamber, although separate fibres can be distinguished. The stomach connected with the zooecial wall by two funiculi, one of which bears the ovary, the other the testis, the former being situated nearer the pyloric orifice than the other. There are 16 tentacles.

Paludicella ehrenbergi, van Beneden.

(Pl. xiii, fig. 1.)

Syn. *Alcyonella articulata*, Ehrenberg; *Paludicella procumbans*, Hancock; *Paludicella elongata*, Leidy.

This is the only species I am able to assign to the genus. Its zoaria as a rule form upright branches consisting of zooecia arising directly one from another. Basal stolon-like tubules are never formed. The lateral basal buds are often suppressed, or only one of them is produced, so that budding is in linear series with only a few lateral branches instead of a cruciform figure. There is a slightly dilated but slender oval chamber between the cardia and the stomach proper. Its walls are glandular and not very thick.

P. ehrenbergi is common in Europe and America but probably does not occur in the Ethiopian and Oriental regions.

Genus POTTSIELLA, Kraepelin.

The zooecia differ from those of *Paludicella* in being entirely vertical and in being separated at the base by stolon-like tubules.

The anatomy of the two genera is very similar, but the whole alimentary canal (pl. xiii, fig. 2a) is more slender and elongate in *Pottsiella*, which has only 8 tentacles.

Pottsiella erecta (Potts).

(Pl. xiii, figs. 2, 2a.)

Syn. *Paludicella erecta*, Potts.

The zooecia are slender, elongate and somewhat constricted both at the base and at the tip. The orifice is pentagonal in cross-section. The basal tubules are often of considerable length; occasionally extra tubules are produced from the sides of the zooecium, but this is exceptional. Buds may, perhaps, be borne sometimes at the end of these adventitious lateral tubules.

This species is only known from the neighbourhood of Philadelphia, U.S.A. I have been enabled by the kindness of Mr. C. Rousselet to examine specimens from the type locality.

Genus *VICTORELLA*, Kent.

The adult zooecia are always nearly vertical but as a rule they pass through a stage at which they resemble those of *Paludicella* in form. They are separated by basal tubules resembling those of *Pottsiella*, and daughter-zooecia (distal buds), (with or without similar tubules intervening, are usually borne near the tip of the zooecium (pl. xiii, fig. 3) in addition to the basal buds.

The cardia closes off from the oesophagus proper an oval chamber lined with a thin chitinous coat and surrounded at its base by a stout compressor muscle. This muscle (pl. xiii, figs. 7, 8) serves to close off the chamber from the cardiac part of the stomach, which is produced upwards to meet it in tubular form. The arrangement of cilia in the alimentary canal is the same as that found in *Paludicella*. There is only one funiculus, attached to the base of the stomach, and the gonads are borne on the zooecial wall far from it. There are 8 tentacles.

Four "species" can be distinguished in this genus, but they are so closely allied that it might be better to regard them merely either as varieties or as subspecies (local races). They may be separated as follows:—

1. Parietal muscles present at the tip of the zooecium (pl. xiii, fig. 4). Young zooecium circular in cross-section at the tip, adult zooecium quadrate; distal buds only produced by adult zooecia; lateral basal buds rarely suppressed .. *V. mülleri*.
2. Parietal muscles absent from the tip of the zooecium (pl. xiii, fig. 5).
 - I. Both young and adult zooecia quadrate at the tip; basal tubules

- elongate; distal buds produced in profusion by the adult zooecia; lateral basal buds rarely suppressed *V. pavida*.
- II. Young zooecia usually quadrate, adult zooecia quadrate or circular at the tip; basal tubules often short; distal buds produced, often sparingly, by both young and adult zooecia; lateral basal buds present or absent *V. bengalensis*.
- III. Zooecia always circular at the tip; basal tubules short; distal buds often absent, never produced in profusion; lateral basal buds usually absent *V. symbiotica*.

Victorella mülleri (Kraepelin).

(Pl. xiii, fig. 4.)

Paludicella mülleri, Kraepelin, *Die deutschen Süßwasser-Bryozoen*, i, p. 159, figs. A, B (1887).

V. mülleri is the most distinct of the four forms and was originally described by Dr. K. Kraepelin as a species of *Paludicella*. I have, however, been enabled by the kindness of Dr. Kraepelin and Dr. W. Michaelsen to examine specimens from the type locality (Greifswald, Germany), in which they occurred together with examples of an undoubted *Victorella*. On a careful examination the latter were found to differ from specimens of *V. pavida* from the type locality in England and also from other German localities in having parietal muscles at the tip of the zooecium (pl. xiii, figs. 4, 5). A further search on the leaves to which the form *mülleri* was attached also revealed intermediate stages between that form and the *Victorella* associated with it. I have therefore no doubt that Kraepelin's types were merely young zoaria of a species of *Victorella* to which the specific name *mülleri* must be applied. In the young zooecium the cross-section of the distal part is almost circular, but in the adult zooecium it becomes quadrate. Apparently young zooecia in this species do not produce distal buds, which are borne in profusion by the zooecia of well-grown colonies.

V. mülleri has only been found in Germany (Ryckflusse at Greifswald) in brackish water.

Victorella pavida, Kent.

(Pl. xiii, fig. 5.)

This species only differs from *V. mülleri* in the following characters:—

- (i) There are no parietal muscles at the tip of the zooecium (pl. xiii, fig. 5);
- (ii) both the young and the adult zooecia are quadrate;
- (iii) young zooecia frequently bear stolon-like processes and buds near the distal end;
- (iv) the growth of the zoarium is perhaps as a general rule somewhat more irregular, particularly as regards the production of lateral basal buds.

Victorella pavida occurs in brackish and occasionally in fresh water in England, Belgium and Germany. It has also been reported from the littoral zone of the sea in Europe and is stated to have been found in Australia.

Victorella bengalensis, Annandale.

(Pl. xiii, figs. 3, 7 and 8.)

This form is distinguished from *V. pavida* mainly by its more luxuriant and irregular growth and by the fact that the distal end of the adult zooecium is usually circular in cross-section. Its zoaria have as a rule the appearance of a thick fur coating the roots and stems of grasses, etc. The swelling at the base of adult zooecia is never very large.

V. bengalensis has been found at various places near the coast of Bengal and Madras, as a rule in brackish but occasionally in fresh water.

Victorella symbiotica, Rousselet.

(Pl. xiii, fig. 6.)

Rousselet, *P.Z.S.*, 1907 (i), p. 255. pl. xv, figs. 7, 8.

V. symbiotica is distinguished by the following characters:—

- (i) The swelling at the base of the adult zooecium is very small and inconspicuous, the whole of the zooecium being almost cylindrical and practically vertical;
- (ii) distal buds are produced very sparingly;
- (iii) the distal end of the zooecium is always nearly circular in cross-section;
- (iv) the lateral basal buds are very often suppressed.

V. symbiotica was originally described from Lake Tanganyika and has more recently been taken by Mr. C. L. Boulenger and Dr. Cunningham in the salt-lake Birket-el-Qurun in Egypt. I have examined specimens from both localities.

Family HISLOPIIDAE.

This family is easily distinguished by its flattened and adherent zooecia. The structure of the polypide differs considerably from that of any Paludicellid genus, its most characteristic features being the presence (i) of a relatively large and practically spherical

chamber lined with smooth chitin and covered externally by circular muscles (pl. xiii, figs. 10, 11), and (ii) of strong cilia round the cardiac orifice of the stomach as well as the pyloric. The spherical chamber is separated from the cardia by a cylindrical glandular tract and opens almost directly into the main chamber of the stomach, from which it is only separated by a ring bearing stout and very active cilia.

So far as is known, resting buds are not formed in this family.

The family is only known from Central Africa and Eastern Asia and only two genera can be recognized, namely *Arachnoidea* Moore, and *Hislopia* Carter; they may be distinguished as follows:—

1. Zooecia provided with an upright orificial tubule, separated from one another by stolon-like processes *Arachnoidea*.
2. Orifice little raised above the dorsal surface of the zooecia, which arise directly one from another *Hislopia*.

Genus ARACHNOIDEA, Moore.

Syn. *Arachnoidia*, Moore; *Arachnidium*, Loppens (*nec* Hincks).

The zoarium consists of flattened zooecia of irregular outline joined together in the typical cruciform manner by slender and elongate basal tubules. Each zooecium is provided on the dorsal surface with a relatively long but slender orificial tubule which projects almost vertically upright. The polypide has 8 tentacles. It possesses in its alimentary canal an almost spherical, strongly muscular chamber lined with chitin and similar in structure to that possessed by *Hislopia* which is described below. The collar is supported by chaetae.

Arachnoidea ray-lankesteri, Moore.

Rousselet, *P.Z.S.*, 1907 (i), p. 255, pl. xiv, figs. 5, 6.

This, the only species, has the character of the genus, but its anatomy is imperfectly known and none of the specimens now in India or Europe appear to be in a sufficiently good state of preservation for its further elucidation.

A. ray-lankesteri is only known from Lake Tanganyika in Central Africa.

Genus HISLOPIA, Carter.

Syn. *Norodonia*, Jullien; *Echinella*, Korotneff.

Hislopia differs from *Arachnoidea* mainly in two characters, (i) the fact that zooecia arise directly one from another without the intervention of basal tubules, and (ii) the absence of an orificial tubule, the orifice being raised above the dorsal surface merely on a slight eminence. The form of the zooecia is also more regular and each is surrounded by a thickened margin. The

number of tentacles is variable but is usually some multiple of four. The collar is unusually ample and is supported by delicate chitinous chaetae. Immediately below the cardia there is a short glandular portion of the alimentary canal, tubular in form, which lies at right angles to the main axis of the zoecium when the polypide is retracted. This opens into the spherical chamber, which is relatively large and bears a thick chitinous lining that has the appearance in optical section of a couple of vertical ridges. The compressor muscle (pl. xiii, figs. 10, 11) covers the whole of the chamber but only extends over the glandular region above it in the form of isolated fibres. In preserved specimens the chamber appears to open directly into the stomach but in living specimens the ring separating the two and bearing the cardiac cilia can be extended in a vertical direction to some length. The parietal muscles are reduced to three or four stout strands on either side of the zoecium and there is not a definite funiculus. The gonads are borne on the zoecial wall at each side of the polypide.

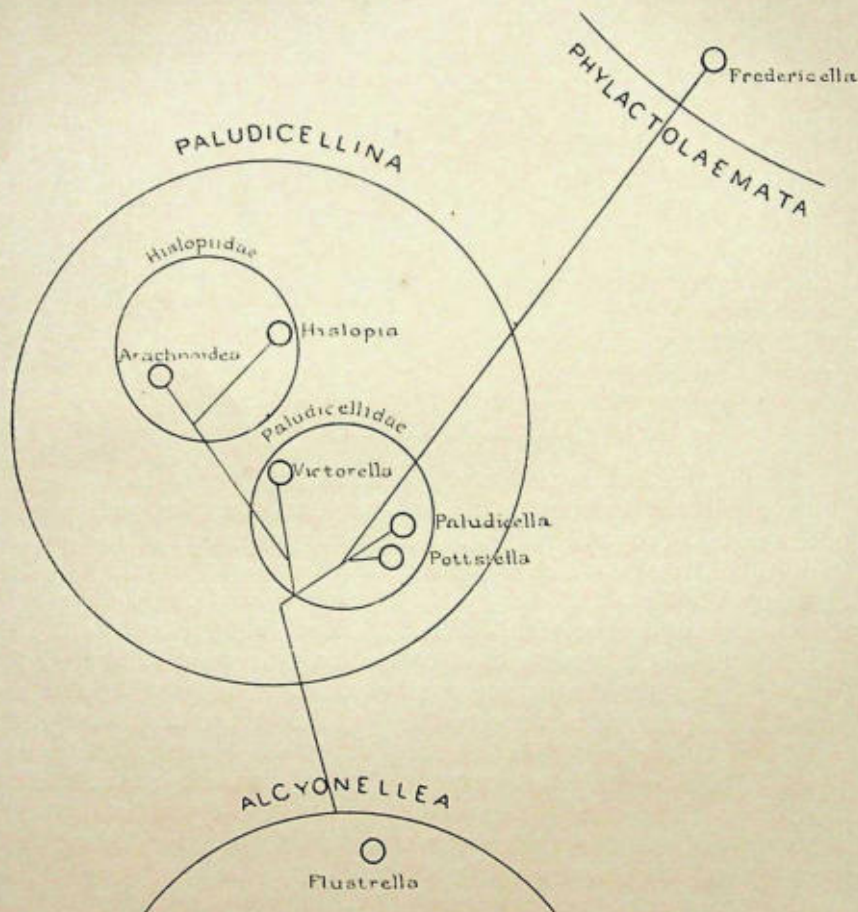
Hislopia lacustris, Carter.

(Pl. xiii, figs. 9, 10, 11.)

Owing to rapid lateral and terminal budding at the base of the zoecia and to the absence of intervening tubules, well-developed zoaria constitute, in the typical form of the species, an almost uniform flat layer which has much the same appearance as that of many Cheilostomata (e.g., *Membranipora*) and also of certain Ctenostomata of the division Alcyonellea (e.g., *Flustrella*). A careful analysis of the method of budding, however, shows that it is always of the cruciform type, whereas in *Membranipora* more than one lateral bud is produced at each side of the zoecium and in *Flustrella* the method of budding is radiate, numerous linear series of zoecia radiating out from a single parent-zoecium but pressed so closely together as to be practically parallel to one another. The form of the zoecium, especially in luxuriant zoaria, is very variable; it is typically oblong but may be oval, triangular or almost circular or even square. The dorsal surface is usually flat and always has a hyaline transparency, but if the zoecia are closely crowded together on a narrow support such as the stem of a slender water-plant they are often arched above and of a considerably greater depth (pl. xiii, fig. 9) than if they have plenty of room for expansion. In such cases the thickened margin is often practically obsolete. The orifice is surrounded by a thick chitinous rim which usually has a quadrate form and bears a spine at each corner; but sometimes it is circular, and the spines not only vary in length but are often reduced in number or altogether absent. The tentacles vary in number from 12 to 20.

The structure of the cardiac region of the alimentary canal has a certain resemblance to that found in *Bowerbankia* (Vesicularina), the spherical chamber having the same position as and

a certain similarity in structure to the gizzard of that genus (pl. xiii, figs. 12, 13). Its function is however totally different, and it differs structurally in not possessing horny internal teeth. Moreover, the walls do not contract automatically with the retraction of the polypide as they do in the gizzard of *Bowerbankia*.



The spherical chamber in the alimentary canal of *Histopia* is not a crushing organ but serves as an antechamber in which food may be stored until it is wanted for digestion. In it also the flagellate organisms that seem to form the greater part of the food undergo a process of encystment in the course of which food-material is pressed out from their bodies and apparently absorbed by the polyzoon. Further details as regards this process are given on pp. 200—202 of my volume in the "Fauna of British India."

Two forms which I believe to be merely varieties or at most local races (subspecies) of *H. lacustris* have been described as distinct species. They are—

Norodonia sinensis, Jullien, from China;

Norodonia cambodgiensis, Jullien, from China, Cambodia and Siam.

Echinella placoides,¹ Korotneff, from Lake Baikal in Siberia also appears to belong to the genus.

I have not seen any of these forms, but apparently *N. sinensis* is distinguished by having narrow zooecia with circular orifices, while in *N. cambodgiensis* the zooecia are nearly circular but constricted posteriorly. In both these forms the growth is less luxuriant than in the typical form of the species. *E. placoides*, which may be a distinct species, is distinguished by the great length of the spines at the four corners of the orificial rim.

A fourth form, for which the name subspecies *moniliformis* is proposed, occurs in Calcutta and is distinguished by the shape of the zooecia and the method of growth. The former are practically circular but truncated, not constricted posteriorly and surrounded by a flat membranous fringe. The lateral basal buds are very often suppressed and both are rarely produced, so that a linear zoarium with occasional side-branches is formed.

The diagram on p. 200 represents the relationships of the Paludicellina, as they appear to me.

LITERATURE.

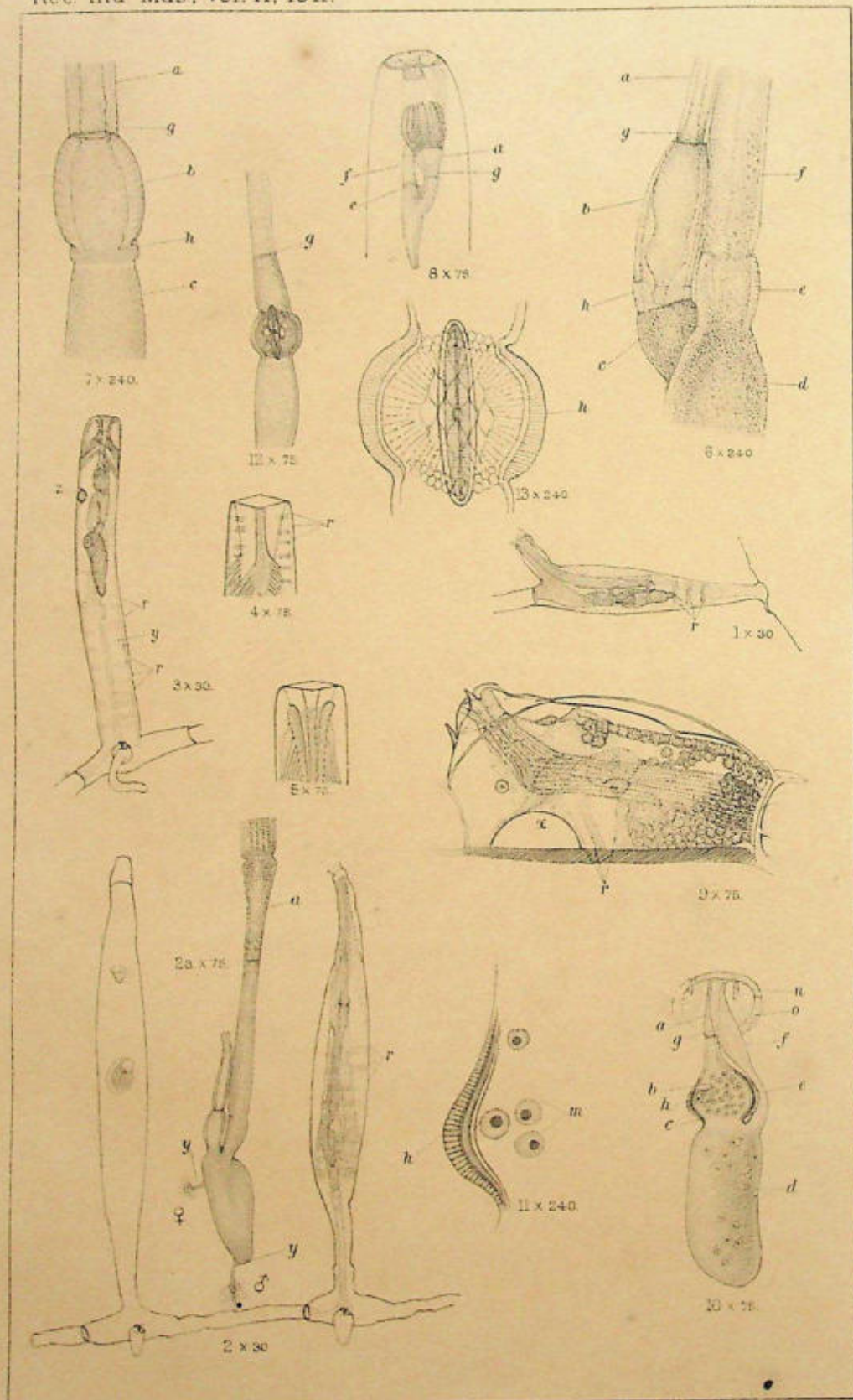
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1910. Loppens, "Catalogue des Bryozoaires d'Eau Douce avec une Note sur *Victorella pavidus*," *Ann. Soc. zool. et malacol. Belgique*, xlv, p. 97.
1911. Annandale, "Freshwater Sponges, Polyps and Polyzoa," *Faun. Brit. Ind.*

¹ *Biol. Centralb.*, xxi, p. 311, fig. (1901).

EXPLANATION OF PLATE XIII.

- FIG. 1.—Young zooecium of *Paludicella chrenbergi*, $\times 30$.
 „ 2.—Two zooecia of *Pottsiella erecta*, in one of which the polypide is undergoing regeneration, $\times 30$; 2a, alimentary canal, funiculi and immature gonads of the other polypide, $\times 75$ (only the upper part of the testis is shown).
 „ 3.—Young adult zooecium of *Victorella bengalensis* with a single distal bud commencing to develop, $\times 30$.
 „ 4.—Tip of an adult zooecium of *Victorella mülleri*, $\times 75$.
 „ 5.—Tip of an adult zooecium of *Victorella pavida*, $\times 75$.
 „ 6.—Lateral view of the upper part of the stomach and the adjacent parts of the alimentary canal in *Victorella symbiotica*, with the cardiac compressor muscle relaxed, $\times 240$. (The polypide is slightly macerated and the chitinous lining of the oval chamber shows very clearly.)
 „ 7.—Dorsal view of cardiac part of the stomach, etc., in *V. bengalensis*, with the cardiac compressor contracted, $\times 240$.
 „ 8.—Distal part of a zooecium of *V. bengalensis* containing a recently regenerated polypide, $\times 75$; to show the simple structure of the alimentary canal at this stage.
 „ 9.—Lateral view of a zooecium of *Hislopia lacustris* growing in a confined space, $\times 75$. The zooecium is much higher and narrower than usual.
 „ 10.—Alimentary canal of *Hislopia lacustris* from the dorsal surface, $\times 75$.
 „ 11.—Wall of the crop of *Hislopia* as seen in optical section from above, with green cysts, $\times 240$; to show the two cellular layers and the inner chitinous coat.
 „ 12.—Dorsal view of the gizzard of *Bowerbankia caudata* and the adjacent parts of the alimentary canal, $\times 75$.
 „ 13.—Gizzard of the same polypide in optical section, $\times 240$. (In both figures a diatom grasped by the teeth of the gizzard is shown.)

a = oesophagus; *b* = chamber lined with chitin; *c* = cardiac chamber of the stomach; *d* = pylorus; *e* = intestine; *f* = rectum; *g* = cardia or cardiac valve; *h* = cardiac compressor muscle; *m* = green cysts; *n* = orifice of the zooecium; *o* = retractor muscles; *r* = parietal muscles; *x* = base of lateral bud; *z* = distal bud.



A. C. Chowdhary, del.

Bentley L. 4 Derby.

XIV. ON SOME AQUATIC OLIGOCHAETA IN THE COLLECTION OF THE INDIAN MUSEUM.

By J. STEPHENSON, M.B., D.Sc. (Lond.), Government
College, Lahore.

During the past year I have, through the kindness of the authorities of the Indian Museum, received at various times specimens of small aquatic Oligochaeta for examination. An account of these is given in the present communication.

Our knowledge of the Oligochaeta fauna of the Indian region has of late years been very considerably increased through the researches of Michaelsen (*Mem. Ind. Mus.*, vol. i, No. 3, and *Abh. aus dem Gebiete der Naturwissenschaften*, Naturw. Verein, Hamburg, xix Band, 5 Heft) on the collections made by the Indian Museum. This increase in our knowledge however relates more especially to the terrestrial forms, and the number of aquatic Oligochaeta known from the Indian region is still very small. Especially is this the case with the large families of the Enchytraeidae and Tubificidae, so common in Europe; only one Tubificid, and one Enchytraeid, of which latter the genus is doubtful, having so far been recorded.

This may perhaps receive a partial explanation in the small size of these worms, and the fact that they consequently elude the collector, unless he happens to be specially interested in them or specially looking for them. Still, seeing that the Naididae, comprising the smallest or almost the smallest forms in the whole Order, are represented in the Indian fauna by about twenty species, it may not improbably be the case that Enchytraeids and Tubificids are actually somewhat rare.

Another hindrance to our knowledge of these small and delicate forms is the difficulty of adequately describing them—or even, it may be, of identifying them—from preserved specimens only. Most of those I have received from Calcutta have been preserved, since it is difficult to transport the living worms safely for 1,300 miles in this climate; of the species mentioned below, examples of *Aulophorus tonkinensis* however reached me alive. I am therefore conscious that the notes are not so full as is desirable, but considering the small amount that is known, it seems better to give the following descriptions, though incomplete in many ways, rather than to allow the material to be wasted.

Acolosoma bengalense, sp. nov.

Found in the Museum tank, Calcutta, Nov. 10th 1910, C. Paiva. Mr. Gravely's accompanying note stated that the oil-globules were of the colour of blue-green algae, the stomach deep orange.

In the preserved condition the specimens were white in colour, 1—1½ mm. long, and 2—3 mm. broad. The prostomium was semicircular in shape, and no broader than the succeeding segments; conspicuous cilia clothe its ventral surface.

The largest number of segments noted in an animal which did not show any signs of approaching fission was fourteen. Other specimens of fourteen segments showed the beginning of an approaching division after the eleventh, or perhaps after the tenth segment; specimens with larger numbers of segments also showed a line of division after the eleventh segment. I cannot state what number of segments, if any, are intercalated at this point before division takes place, since in none of the specimens examined were there any newly forming groups of setae in this region.

The setae are all of the capillary type; dorsal and ventral series both begin in the same segment (ii). The setae are quite straight, long and thin, tapering gradually to a very fine point. In each bundle there is as a rule one, or sometimes two, long setae together with a few shorter ones; this difference in length is a real difference of type, since no setae of intermediate lengths occur; all the shorter setae are of approximately the same length, while the long seta of the bundle is very considerably longer, and it may be added considerably thicker also. This may be illustrated by the following figures, which give the lengths of the setae in μ in nine bundles: the figures in heavy type represent the lengths of the long, the other figures those of the short setae. (1) **234**, 122, 112, 112, 108. (2) **187**, 122, 122, 112. (3) **234**, 112, 103. (4) **244**, 141, 108. (5) **206**, 122, 122, 112, 94. (6) **178**, 112, 112. (7) **169**, 141, 103, 94. (8) **234**, 103, 103. (9) **225**, 103.

The average length of the long setae is thus nearly twice that of the short ones; and since the above measurements are taken from the bottom of the setal sac, the disparity in length between those portions which project beyond the body-wall is still greater.

Bundles of setae were sometimes seen without any long setae; usually there was one, occasionally two; it is possible that in those cases where none was seen, one may have dropped out. The shorter setae were usually two, three or four per bundle.

The buccal cavity is large, in the shape of a narrow bell, placed vertically in segment i; it is lined by a tall epithelium. The oesophagus, beginning at the dorsal end of the buccal cavity, occupies segments ii and iii, and is somewhat sinuous. The stomach extends from iv to viii, and is the widest part of the alimentary tube; the intestine begins in ix and extends to the posterior end.

The dorsal vessel is very distinct in stained preparations, extending along the whole length of intestine and stomach; it dilates on the dorsal surface of the oesophagus to form a 'heart,' coextensive with the oesophagus and in diameter equal to it; the dorsal vessel can again be followed forwards from the anterior end of the heart, over the buccal cavity, to which it is attached as far as the anterior border of the mouth.

The cerebral ganglion is conspicuous, fused with the epithelium of the dorsal surface of the prostomium. Thin strands cross the cavity of the prostomium vertically, each with a nucleus in the middle of its course; strands attach the lower surface of the cerebral ganglion to the epithelium of the ventral surface where the latter turns inwards to become continuous with the lining of the buccal cavity.

The only species of *Acolosoma* in which the oil-globules are all of a green or blue-green colour are *A. headleyi*, Bedd., and *A. viride*, Stephenson. From the former the present species is distinguished by the setae being quite straight, and divisible into two kinds, long and short; from the latter by the deep orange colour of the stomach, the division of the setae into long and short, and apparently in the details of asexual multiplication (here $n = 11$, in *A. viride* $n = 8$). I therefore propose the following diagnosis:—

Length (preserved) 1—1.5 mm., breadth .2—.3 mm. Segments up to 16 (or? more); $n = 11$. Setae all capillary; bundles consist as a rule of one long and several shorter, the long (210 μ) averaging twice the length of the shorter (110 μ). Oil drops blue-green. Oesophagus ii—iii, sinuous; stomach iv—viii, deep orange. Prostomium not broader than succeeding segments.

Chaetogaster spongillae, Annand.

1906. *Chaetogaster spongillae*, Annandale, *Journ. As. Soc. Bengal* (N.S.), vol. ii, No. 5.

Through the kindness of Dr. Annandale I received a few specimens of the above species, discovered and described by him a few years ago. The original account, however, deals largely with the bionomics of the animal; and a few additional notes on its anatomy may therefore not be superfluous.

The specimens which I received were all preparing to divide, and it will be convenient to distinguish the anterior portion, in front of the line of future fission, as A, the posterior, behind it, as B. The whole animal, A+B, measured about .6 mm.; in one case A measured .41, B .18 mm.; in another A was .39, B .22 mm.; in each case the pharyngeal region (as far as the beginning of the oesophagus) was .12 mm. Even allowing for contraction therefore, this appears to be the smallest species of

Chaetogaster known (Annandale gives the length of an individual which is not budding as about 1 mm.).

The margin of the mouth does not reach quite to the anterior tip of the body: there is hence a small prostomium. The mouth is large, and leads directly into the pharynx, as in other species.

The setae (fig. 1) are slender, with a slight $\int$ -shaped curve, double-pronged: the distal prong is half as long again as the proximal, but only two-thirds as thick at its base: the nodulus is proximal to the middle of the shaft, the proportions being:—proximal to nodulus: distal to nodulus:: 2: 3. There is no difference in type between the setae of the most anterior bundles and those situated more posteriorly, but there is a considerable difference in length: those of segment ii average about .09 mm., those of the other segments about .06, or two-thirds the former. There are on the average four setae per bundle.

In the specimens which I received, A possessed eight fully formed segments, and B three or four; between the two was a budding zone, in which young setal bundles—the anterior destined to belong to the posterior end of A, the posterior to the anterior end of B after separation—were occasionally seen.



FIG. 1.—*Chaetogaster spongillae*: seta belonging to segment ii; $\times 890$.

The animals therefore begin to divide when they possess eleven or twelve segments: the budding zone forms posterior to viii ($n = 8$), and in the budding zone presumably eight or nine new segments are formed,—three or four to complete A, and five to form the anterior end of B (of these five only the second bears setae): the ninth segment of the original undivided animal ultimately becomes the sixth of B.

Annandale mentions "longitudinal rows of minute, irregular tubercles on the 'head'." I have described similar elevations in *C. orientalis* (= *C. pellucidus*: *Rec. Ind. Mus.*, vol. i, part 3, and cf. pl. ix, fig. 1). I have however more recently convinced myself that these appearances are due merely to the muscular fibres which pass between the pharynx and the body-wall, and represent in fact the outer ends of these fibres: the same may not improbably be the case in *C. spongillae*.

The pharynx is a simple wide tube: it is followed by a very short oesophagus, to which succeeds the dilated part of the alimentary tract that I have previously (*loc. cit.*) called the crop: a slight constriction separates this from another dilatation, the stomach, which is followed by the intestine. Of these sections of the tract, the pharynx occupies segments i—iii, as far as the first dissepiment ($\frac{3}{4}$, v. *inf.*): the oesophagus is restricted

to iv, its posterior limit coinciding with the second dissepiment (†); the crop occupies v—vi, the stomach vii—viii, but since septa are not to be made out behind the oesophagus, these limits are approximate only, and have been fixed by reference to the setal bundles.

In longitudinal sections the pharynx is seen to be lined by a thin layer of cuticle; its epithelium, like that of the oesophagus, is approximately cubical. The cells lining the 'crop' however are very much larger, of irregular shape and varying height: so that the epithelium of this portion of the tract has an uneven outline, reminding the observer somewhat of the inner layer of *Hydra*, and suggesting the possibility of intracellular digestion. Chloragogen cells are scanty or absent on the crop, abundant on the stomach.

The circulatory system could not be made out.

Annandale has noted the presence of an otocyst in the brain in this species,—a relatively large, globular, transparent cyst. I have not found any trace of such a cyst in the preserved specimens which I have examined, either mounted whole, or in longitudinal sections: the brain is large, and consists of two parts, an outer cellular surrounding a spherical granular looking mass. There are however a number of enigmatical appearances in connection with the brain of various species of *Chaetogaster*; thus, besides that which led in the present case to the suspicion of an otocyst, there is the structure described by Vejdovsky (*System und Morphologie der Oligochaeten*, p. 38) in *C. diastrophus* ("in dem Einschnitte zwischen den Gehirnlappen befindet sich eine glänzende, scharf contourirte braune Chitinplatte") and figured in his pl. vi, fig. 12: there is the densely pigmented body, possibly functioning as an eye, described by Annandale (*Journ. As. Soc. Bengal (N. S.)*, vol. ii, No. 5, p. 189) in a species not named, as well as the sense-organ in the brain of *C. bengalensis* (Annandale, *ibid.*, vol. i, No. 4, p. 117): there is the bright, refractile body, in the same situation as the brown chitinous plate of *C. diastrophus*, described by me in *C. punjabensis* (*Rec. Ind. Mus.*, vol. i, pt. 2: and *cf.* pl. v, fig. 7): and the opaque granular mass, again in a similar situation, in *C. orientalis* (= *C. pellucidus*, *Rec. Ind. Mus.*, vol. i, pt. 3: and *cf.* text-figs. 4, 5).

The anterior part of the ventral nerve cord is, in a number of species of the genus, covered by nerve cells which have no segmental arrangement. In the present species the cord is interesting as showing a fairly distinct aggregation of the nerve cells into separate ganglia. There are no intervals, in the anterior part, where the cord is bare of cells: the cells invest the whole length of the cord as far back as the second setal bundle (segment vi), so that their aggregation into ganglia, though distinctly indicated, is still incomplete. There are two such aggregations in the pharyngeal region, the first of the two being at the level of the first setal bundle (segment ii); and three behind the pharynx, the last of these being opposite the second setal bundle

(segment vi). The arrangement therefore corresponds to the accepted numbering of the segments in *Chaetogaster*, according to which the second setal bundle is assigned to the sixth segment. Behind this the ganglia have the usual discrete arrangement.

On the clitellum, *cf.* my remarks in *Rec. Ind. Mus.*, vol. i, pt. 3, pp. 249—51.

Nais pectinata, Stephenson, var. *inaequalis*, var. nov.

In *Rec. Ind. Mus.*, vol. v, part 4, I recorded a new species of *Nais*, the peculiarity of which consisted in the possession of ctenate needle-setae in the dorsal bundles. The same material from which this species was obtained was shortly afterwards returned to me, in order that I might pick out a number of specimens for separate preservation in the museum. During this re-examination I came across a single specimen of a *Nais* in which the dorsal needles, though ctenate, differed considerably from those found in the ordinary *N. pectinata*; as however in other respects the specimen closely resembled the latter, I describe it here as a variety.



FIG. 2.—*Nais pectinata* var. *inaequalis*: a needle-seta belonging to a dorsal bundle; distal portion only.

Segments 50, plus an undifferentiated growing region at the posterior end. No eyes.

The dorsal setal bundles, beginning in segment vi, consist usually of one hair-seta and one needle; occasionally of one hair and two needles, or of two setae of each type; in the last case one of the hair-setae is much shorter than the other. The hair-setae are usually about 250 μ long, the shorter ones however about 100 μ ; both are quite smooth. The needle-setae are 67—75 μ long, with a slight sickle-shaped curve which includes the distal third of the shaft; there is no nodulus. The end is ctenate; but the tooth of the comb which lies towards the inside of the curve of the shaft is very much stronger, and considerably longer than the others (fig. 2); the outer tooth is also slightly larger than the intermediate ones. There may be two, three, or four small intermediate teeth; in one case there were none, the seta being thus merely bifid at its end.

The ventral setae begin in segment ii, and are in bundles of three or four; the length is 60—65 μ throughout the body. These bundles may be divided into two groups, an anterior, comprising those of segments ii—v, and a posterior, from segment vi onwards. In the anterior bundles the setae are slighter in form, and less strongly curved, the distal prong of the forked end

being $1\frac{1}{2}$ times as long, but only $\frac{2}{3}$ as thick as the proximal; the nodulus is slightly proximal to the middle of the shaft (proximal to nodulus: distal to nodulus:: $30\ \mu$: $35\ \mu$). In the posterior bundles the setae are stouter, the proximal part of the shaft is more strongly curved, the prongs of the forked end are equal in length, but the distal is only half as thick as the proximal; the nodulus is slightly distal to the middle of the shaft, the former proportions being reversed (proximal portion: distal portion:: $35\ \mu$: $30\ \mu$).

On comparison with the original description of *N. pectinata*, the present specimen is seen to differ not only in the shape of the ends of the dorsal needle-setae, but in the considerably greater number of body-segments, the position of the nodulus, and the relative sizes of the prongs of the ventral setae; slighter differences are seen in the lengths of the dorsal needles and of the ventral setae, and in the respective numbers of ventral setae per bundle in the two forms. It seems advisable therefore to separate this specimen as a distinct variety; the name *inacqualis* is meant to refer to the great disparity in size of the teeth of the comb formed by the end of the dorsal needles.

It may be mentioned in passing that I again found a specimen of *Pristina longiseta*, Ehrbg., during this examination of the material (*cf.* the former paper, referred to above).

Stylaria laeustris, L.

The present species is one of the best known and most easily recognized of all the Naididae; so far, however, the only record of its occurrence in the Indian region is from Lahore (*Mem. Ind. Mus.*, vol. i, No. 3, p. 276), where I obtained a single specimen.

I received the present specimens in January of this year from Mr. Gravely, who obtained them from a pond in the Zoological Gardens at Calcutta. The first consignment was sent alive; but when the tube was opened, after three days, only one specimen was alive, and that was merely a mutilated fragment of fourteen segments, without either anterior or posterior end of the body complete. It was however interesting as embracing at its anterior end a part of the genital region, including some of the clitellum and a portion of the ovisac. Some individuals would therefore seem to become sexual in Calcutta in January.

Mr. Gravely next sent me some preserved specimens; unfortunately none of these had the sexual organs developed, but all were dividing asexually. The length of the chains was about 8 mm.—longer, presumably, during extension in life. The triangular *prostomium* ended in a very long narrow proboscis, and eyes were present, as usual. The total number of segments varied; from 36 to 54 could be counted bearing setae, and behind this was a growing zone, in which distinct segments were not yet differentiated. The body was covered with a very distinct cuticle, much thicker, I think, than is usual in the Naididae and especially

obvious as a clear glassy layer over proboscis, prostomium, and anterior segments, where it was 5—6 μ in thickness.

The *dorsal setae*, beginning in segment vi, were usually two per bundle, both hair-setae, but of unequal length. The longer of the two was about 530 μ in length, or double the diameter of the body; the shorter was about half the length of the longer. In addition, contained within the setal sacs, and reaching only to the level of the surface of the body, there were one or two fine pointed hair-like setae, 50 μ long, probably of the nature of 'replacing setae.'¹

The *ventral setae*, mostly six or seven in a bundle, but sometimes as many as nine, were in length about 130 μ . Of the two prongs at the outer end, the distal was very much longer and thicker than the proximal, so that on a superficial examination the setae sometimes appear to end in a single somewhat sharply curved hook; the nodulus was slightly proximal to the middle; and the proximal portion of the shaft was bent at a well-marked angle, instead of showing the usual even curve. These setae therefore resembled those of the specimen recorded from Lahore, as illustrated in *Mem. Ind. Mus.*, vol. i, No. 3, pl. xix, fig. 47.

The *alimentary tract* begins to be covered by chloragogen cells in segment vi. The stomach is a well-marked dilatation beginning in vii, either at the level of the setae, or close behind dissepiment $\frac{1}{2}$; it extends as far as the setae of viii; its wall is composed of large granular cells. The alimentary tube is again narrowed behind the stomach, dilating finally in x to become the intestine.

Body-cavity corpuscles were noted in the first (the mutilated living) specimen, as small clear homogeneous spindle-shaped bodies without visible nucleus; they were not visible in the preserved specimens.

The position of the first *nephridium* varied; in some specimens it was in vii, in about an equal number in viii, and once in ix. In cases where A (the first animal of the chain) had the first nephridium in viii, it was in viii in B also. Since B receives five segments from the budding zone (*v. post.*), segments vi and vii of B belonged originally to the middle part of the body of the parent or undivided animal, and hence presumably contained nephridia; the nephridia of these segments must therefore have degenerated, in these cases, at the onset of asexual division. My previous specimen from Lahore had the first nephridium in ix (*loc. cit.*).

The shape of the *cerebral ganglion* in the preserved specimens is shown in text-fig. 3; it is indented anteriorly and posteriorly, and is remarkable in possessing a pair of large antero-lateral lobes. It thus differs markedly from the Lahore specimen (*loc. cit.*, pl. xix, fig. 48).

¹ But see, on the subject of such supposed 'replacing setae', Pignet, *Rev. Suisse de Zool.*, T. 141, p. 290; and, in regard to another species, Michaelsen, *Mem. Ind. Mus.*, vol. i, No. 3, p. 134.

The process of *asexual division* could be fairly well followed from the preserved specimens. The value of n varies: 15, 17, 18, 20 and 21 were noted; in the budding zone are produced five segments which will form the anterior end of B, and an indefinite number forming the posterior part of A; the proboscis of B points backwards. The peculiarity of the process in these specimens is the situation of the second and third budding zones: the second zone of budding is established one original segment in front of the first, *i.e.*, behind segment $n-1$; and the third appears again one segment in front of the second, behind segment $n-2$. The fourth appears in B, *e.g.*, it may be behind original segment xxxvi. (Cf. Piguet, "Observations sur les Naididées," *Rev. Suisse de Zool.*, T. 14, 1906, p. 289.)

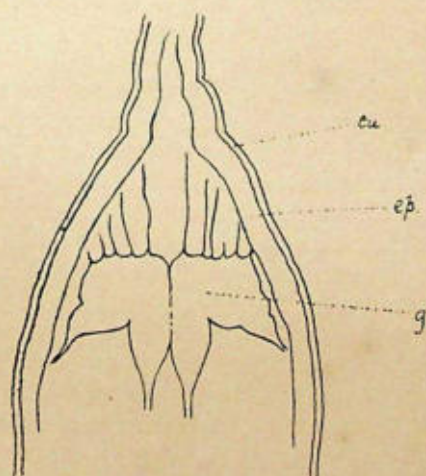


FIG. 3.—*Stylaria lacustris*: a small part of the anterior region of the body, including the base of the proboscis; to show the shape of the cerebral ganglion: $\times 210$. *cu.*, cuticle; *ep.*, epithelium; *g.*, ganglion.

Pristina proboscidea, Bedd., f. *typica*.

With the preserved specimens of *Stylaria lacustris*, just described, there occurred a single individual of the species discussed by Michaelsen, *Mem. Ind. Mus.*, vol. i, No. 3, p. 133, under the above designation. The specimens submitted to Michaelsen were found living in *Spongilla crassissima* and *S. carteri*, by Annandale in Calcutta; the individual which I examined was taken with the *Stylaria* from a pond in the Zoological Gardens and was therefore living freely at the time of its capture. The specimen agrees in most respects with what Michaelsen says; a short note will therefore be sufficient.

The specimen was considerably curled; its length was estimated at 5 mm. The 'proboscis' was much shorter than in the specimens of *Stylaria* amongst which it was found,

and was much less sharply marked off from the basal portion of the prostomium, of which it is an extension. There were no eyes. The segments numbered 36, plus an undifferentiated posterior region.

The *dorsal setae*, 2—5 per bundle, begin in segment ii; they are all hair-setae, and are not specially elongated in any particular segment. When, as often, they are 3 or 4 per bundle, all are of approximately equal length; in a bundle of 5 setae, three were longer than the rest ($540\ \mu$ —between two and three times the diameter of the body), one was somewhat shorter ($360\ \mu$), and one much shorter still (less than $180\ \mu$). These setae show the fine serrations noticed by previous observers; on the longer hairs the serrations are about $5\ \mu$ apart, or $6\ \mu$ towards the base; on a smaller hair they are rather closer—about $4\ \mu$ apart; they fade away altogether near the insertion of the setae into the body-wall; they are present on the setae of segments ii and iii as well as in all the other segments.

The *ventral setae* were 3 per bundle in segment ii, 4 and 5 on each side respectively in iii, 4 and 6 in iv, 6 in v; while in the middle part of the body 9 setae per bundle was not uncommon; the number per bundle increases therefore on passing from the anterior end towards the middle region of the body. The variations in the thickness of the shaft of the setae in the anterior segments were similar to those recorded by Michaelsen (*loc. cit.*); in segment ii the thickness was $3\ \mu$, in iii $2.5\ \mu$ and in iv less than $2\ \mu$.

Septal glands were present in segments iii, iv and v; the round *stomach* occupies viii; the alimentary canal narrows again behind the stomach, and dilates finally to become the *intestine* in x. The first *nephridium* was in ix.

As to the process of *asexual reproduction*, $n = 16$; of the segments produced in the zone of budding, the seven posterior ones are placed behind the plane where division will take place, and go to form the anterior end of B. The next zone of budding to be produced appears behind segment xv, *i.e.*, one original segment in front of the first; so that the animal which will ultimately be separated from this region contains only one of the original segments of the parent. The third zone of budding was being established after segment xxix of the original animal; thus, in B, $n = 29$ minus 16 (segments in front of the first zone of budding) plus 7 (segments added to form the head of B) = 20.

Aulophorus tonkinensis (Vejd.).

This interesting form, first described by Vejdovsky from a single incomplete specimen, has since been more thoroughly investigated by Michaelsen. The latter author's last reference to it (*Mem. Ind. Mus.*, vol. i, No. 3, p. 132, where the previous literature is given) records that it was collected by Annandale at several localities in India, and gives a note by Annandale on the habits of the living worm.

In December of last year (1910), I received, through the kindness of Dr. Annandale, a tube containing specimens of this worm, sent off alive from Calcutta. On their arrival in Lahore, about half the specimens were dead and disintegrating; a number were alive but motionless; and a few were still active, protruding themselves from their tubes. A subsequent consignment received in January of this year were unfortunately all dead.

Observations on the tubes, and on the mode of progression of the animal, confirmed Annandale's statements. The tubes were composed of bits of leaves, small fragments of wood, and black granular matter; they were always found floating on the surface. In the second batch of specimens the animals were all dead, as has been said, and the tubes were empty; here in all cases there was seen to be a thin and delicate transparent tube within the rough outer one; this was probably the case, though it was not observed, in the first batch also.

The mechanism of progression was much the same as noted by Annandale, modified by the fact that the tubes were floating on the surface. Thus, in a watch-glass, the animal protruded the anterior part of its body downwards and forwards till it touched the bottom, where it attached itself by means of its circular pharynx, using this latter as a sucker; it might then crawl slowly along, the tube still floating on the surface, without ever letting go its hold. Or it would contract its body, thus pulling the tube forward; then it would let go, and extending itself regain its hold on the substratum by means of its pharynx a little in advance of the former place.

The most distinctive characters of the species are to be found in the setae, gills and palps. These features have however been previously described: and I will therefore only add a few particulars concerning the internal anatomy, observed during the examination of the living worms.

The *pharynx* is large and wide, and extends backwards to dissepiment $\frac{3}{4}$; the *oesophagus*, which succeeds, reaches as far as $\frac{5}{8}$; chloragogen cells begin in segment vi; the *stomach* occupies ix; the alimentary tract narrows again in x, to dilate finally in xi, where it becomes the *intestine*.

Body-cavity corpuscles are present, as small circular or irregular homogeneous and refractile bodies.

The *blood* is a very pale red. The *dorsal vessel* is dorsal only in name throughout most of its length, as in related forms; it appears as a clear streak in the chloragogen covering of the intestine and stomach, being thus embedded in the alimentary wall; in segment ix it becomes lateral in position, having thus far been ventral; in viii it separates itself as a distinct vessel with walls of its own; and shortly after this takes up a dorsal position above the oesophagus. The *ventral vessel* is distinct from the alimentary canal throughout the body. *Contractile loops* are present in the hinder part of segments vii and viii respectively, lying on the septum.

The first *nephridium* occurs in segment vii.

In the asexual reproductive process, by fission, $n = 17$; of the segments produced in the budding zone, the posterior five (*i.e.*, four seta-bearing segments plus one without setae) go to form the anterior end of the posterior animal.

XV. CONTRIBUTIONS TO THE FAUNA
OF YUNNAN BASED ON COLLEC-
TIONS MADE BY J. COGGIN
BROWN, B.Sc.,
1909-1910.

PART VI.—BATRACHIA AND REPTILES.

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

Mr. Coggin Brown's collection of Batrachia and Reptiles is not a large one and the specimens have suffered much through leakage of spirit *en route*. Some interesting forms are, however, represented and I trust that the following records will prove interesting from a geographical point of view.

BATRACHIA.

1. *Tylototriton verrucosus*, Anderson.

Specimens from Tengyueh (5,600 feet) and Yang-pi (5,200 feet).

This newt was originally described from Yunnan and occurs also in Upper Burma and the Eastern Himalayas. It is very abundant at Kurseong (alt. 4,500-5,000 feet) in the Darjiling district, breeding there in small pools of rain-water in June and July. Larvae evidently just about to undergo their final metamorphosis are common in August, but I have seen quite young larvae also in April and it seems possible that the early spring showers induce a few individuals to breed, although the majority do not do so until the real break of the rains.

2. *Megalophrys carinensis* (Boulenger).

Leptobrachium carinense, Boulenger, *Faun. Brit. Ind.—Rept.*,
p. 511.
Megalophrys carinensis, *id.*, *P.Z.S.*, 1908 (i), p. 427.

A large specimen from Hsia-kuan (6,700 feet). Originally described from the Karin Hills; this frog also occurs in Tenasserim.

3. *Megalophrys major*, Boulenger.

? *Ixalus lateralis*, Anderson, *Anat. Zool. Res. Yunnan Exp.*, p. 844,
pl. lxxviii, fig. 5 (1879).
Megalophrys major, Boulenger, *P.Z.S.*, 1908 (i), p. 416, pl. xxiii.

No specimens of this species were taken by Mr. Brown in Yunnan, but he has recently sent me what may be its larva from the Hse-gna-Sang River, Panzi, Hsipaw, N. Shan States. The tadpoles from Hsipaw closely resemble those of *M. montana* and *M. parva* in structure but differ from the former in having the ventral surface pale and from the latter in not being mottled or spotted on the dorsal surface, which is of a uniform dark brown.

I take this opportunity to put on record the occurrence of tadpoles apparently identical with those of *M. parva* in a small spring on the road to the plains from Naini Tal at an altitude of about 5,000 feet. This record extends the known range of the family Pelobatidae, which does not appear to have been taken hitherto in the Western Himalayas. The specimens were taken by myself in October, 1906.

4. *Bufo melanostictus*, Schneider.

Specimens from Tengyueh. The common toad of the greater part of tropical Asia.

5. *Hyla chinensis*, Günther.

Mr. Brown has given me the following note on the species:—

"*Hyla chinensis* is very widely distributed in China, and has been obtained from Southern China and the island of Formosa by Swinhoe,¹ from Shanghai by the Szechenyi expedition,² from Lung-tan-ssi in southern Shensi by Blackwelder,³ from Tengyueh in Western Yunnan by Anderson⁴ and from Tengyueh and Pu-piao in the same province by myself. Günther has pointed out that this frog (which is extremely similar to the common European tree frog) appears to be peculiar to China. Anderson's specimens were found covering a few bushes around Momien (Tengyueh) in the month of July; whilst Blackwelder found a small company in a shallow temporary pool of water on the grassy side of a mountain ridge, 6,000 feet in elevation, in the month of April. The chorus made by them was so loud as to be plainly audible at a distance of 2,000 feet.

The frog is common around Tengyueh and appears to spend the cold months of the year on the ground, in secluded positions under old tree-trunks, etc. I have found them, usually in small groups of four or five, under stones in damp fields in December and January. As the weather gets warmer they appear to become more arboreal in their habits, taking then to bushes, trees and tall

¹ Catalogue of Batrachia Salientia in British Museum, p. 108, 1858.

² "Verzeichniss der Reptilien, Amphibien, und Fische," by Dr. Franz Steindachner in *Die wissenschaftlichen Ergebnisse der Reise des Grafen Bela Szechenyi in Ost-Asien, 1877-1880, Band ii.* p. 507.

³ "Report on Zoology," by Eliot Blackwelder in *Research in China*, part 2, p. 481. Washington, 1907.

⁴ *Anatomical and Zoological Researches of Yunnan Expeditions*, by Anderson, 1878, vol. i, p. 847.

plants. They are apparently nocturnal, for a group which were under observation in a garden for three months in the autumn of 1909, used to lie snugly together in the open end of a bamboo during the day, wriggling closer together if approached. At dusk they emerged one by one, remaining at the mouth of the bamboo for a few minutes before taking a leap on to the spray of an adjacent rose bush which was their favourite and apparently only hunting-ground. When approached with a light they showed great alarm, jumping rapidly and far, and apparently at random, their adhesive feet taking firm hold at the instant of contact with a twig or leaf. They seemed to like water, for a small quantity was always lying collected at the bottom of the bamboo in which they lived, and during rain or when water was poured in on them they invariably came up half way to meet it. During the three months of observation they made no sound; this was perhaps owing to it not being the time of the breeding season.

The specimens from Pu-piao were obtained at an elevation of 4,500 feet, living on the top of a thick high hedge. Tengyueh itself has an elevation of 5,365 feet."

The collection also includes specimens of several species of *Rana*, but their condition forbids a precise identification.

REPTILES.

6. *Japalura yunnanensis*, Anderson.

Anderson, *Anat. Zool. Res. Yunnan Exp.*, p. 803, pl. lxxvi, fig. 2 (1878).

A specimen from Yang-pi.

7. *Acanthosaura dymondi*, Boulenger.

Boulenger, *Ann. Mag. Nat. Hist.* (7), xvii, p. 567 (1906).

A specimen from Ta-lu, Yung-pe Ting district (alt. 7,800 feet). I have compared it with one of the types from Yunnan Fu (alt. 6,400 feet).

8. *Ablabes porphyraceus* (Cantor).

A young specimen from Mong Wan (alt. 3,100 feet).

9. *Zaocys nigromarginatus* (Blyth).

A specimen from Lu-shui-ho in the province of Ssu-chuan.

10. *Coluber taeniurus*, Cope.

Specimens from Tengyueh and Ma-chan-kai (6,000 feet) in the Tengyueh district.

11. *Coluber prasinus*, Blyth.

A specimen from Pu-piao (alt. 4,600 feet) in the Yung-chang Fu district.

12. *Helicops schistosus* subsp. *yunnanensis* (Anderson).

Atretium schistosum, Daud., var. *yunnanensis*, Anderson, *Anat. Zool. Res. Yunnan Exp.*, p. 822 (1878).

Helicops schistosus var. *andersoni*, Wall, *Rec. Ind. Mus.*, iii, p. 146 (1909).

A specimen from Mong Wan must be attributed to this race, the internasal being divided into three shields as in two of the three original specimens, which are the types of Wall's variety as well as of Anderson's. So far as I am aware this form has only been found in Yunnan. It is distinguished from the typical form of the species by the splitting of the internasal into either two or three shields.

13. *Tropidonotus stolatus* (Linn.).

A specimen from Lo-po-ssu-chuang (Mong Hum) (alt. ca. 5,000 feet). The markings are unusually conspicuous owing to the pale ground-colour of the dorsal surface, but I am not sure how far this is due to partial maceration of the specimen.

14. *Tropidonotus nuchalis*, Boulenger.

Boulenger, *Cat. Snakes Brit. Mus.*, i, p. 218, pl. xiii, fig. 1.

I attribute to this species, which was originally described from the upper basin of the Yang-tse-kiang, two small specimens, one (total length 31 cm.) from Tengyueh, the other (total length 43 cm.) from Pe-lien (alt. 5,800 feet) in the same district. They agree fairly well with Boulenger's description and have the mid-dorsal groove on the neck (which doubtless suggested the specific name) conspicuously present; but in one the suture between the internasals is distinctly and in the other slightly shorter than that between the fronto-parietals. The smaller specimen is dark with a pale transverse bar running across the neck and interrupted by the nuchal groove, and with a minute white spot on each side of a large number of the dorsal and lateral scales. In the larger specimen these minute spots have disappeared and the nuchal cross-bar is represented by a brownish spot on either side. The dark lines on the sides of the head were apparently faint or absent in both specimens, but their state of preservation is too bad to justify an exact statement on this point.

15. *Bungarus fasciatus* (Schneider).

A young specimen from Chu-tung (alt. 5,500 feet) in the Yung-ping Hsien district.

XVI. NOTES ON ASIATIC SPECIES OF
CRUSTACEA ANOSTRACA IN
THE INDIAN MUSEUM.

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

The publication of Prof. E. von Daday's valuable monograph on the Branchiopoda Anostraca¹ has enabled me to determine the unnamed specimens of this group in the Indian Museum without difficulty. Prof. von Daday was kind enough to examine the majority of species in the collection at the time when he was working at the group and the number of specimens which have since accumulated is not large.

No additions to the comparatively small number of species found in India were included in the material awaiting identification; but an enumeration of the forms at present known from India and the countries adjacent to it, with such details of their occurrence as are known, will perhaps be of some assistance to those interested in the freshwater crustacea of this region.

Owing to an unfortunate mistake the real types of Alcock's *Branchipus bobrinskii* were not sent to von Daday when he was preparing his monograph. The species is here identified with *Chirocephalus altaicus*, von Daday.

Six species of Anostraca, belonging to five genera, are now known from India, from the countries abutting on its northern frontier and from Ceylon.

***Branchinecta orientalis*, G. O. Sars.**

1910. *Branchinecta orientalis*, E. v. Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 156, fig. 12, a-o.

This species is known from Hungary and Russia and extends eastwards as far as the Pamirs, Tibet and Mongolia. The Tibetan specimens, which are preserved in the Indian Museum, were presented by Capt. R. E. Lloyd who obtained them in August, 1904. They were taken in a large muddy pond, evidently not permanent in nature, at the foot of Gyantse fort at an elevation of about 13,000 feet. Though they were found in August von Daday refers these specimens to the seasonal phase called 'forma vernalis' which differs from the 'forma aestivalis' only in its larger size.

¹ Von Daday, "Monographie systématique des Phyllopoètes Anostracés," *Ann. Sci. Nat. Zool.* (9), xi, 1910, pp. 91-492.

It seems probable that *B. orientalis* only occurs at great altitudes in the eastern part of its distributional range; the Pamir specimens were found at an elevation of about 13,000 ft.

***Pristicephalus priscus*, von Daday.**

1910. *Pristicephalus priscus*, von Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 224, fig. 29, a-k.

This species is known only from the Western Himalayas. It has been found on the following occasions:—

1. Suka Tal,¹ Kumaon, ca. 7,000 ft., Oct. 3rd, 1906, and May, 1909. N. Annandale, R. E. Lloyd.
2. Bhowali Bazar, Kumaon, ca. 5,500 ft., May, 1909. A. D. Imms, R. E. Lloyd.
3. Phagu, Simla Hills, ca. 9,000 ft., May 3rd, 1907. N. Annandale.
4. Theog, Simla Hills, ca. 8,000 ft., April 27th and May 3rd, 1907. N. Annandale.

Suka Tal and the ponds at Phagu and Theog were found quite dry on subsequent occasions.

The Phagu specimens, living in a pool of rain-water at a height of 9,000 ft. were considerably smaller than those obtained 1,000 ft. below in the village pond at Theog. At the latter place on the 27th of May, Dr. Annandale found both males and females in abundance; but five days later, although males were still numerous, not a single female could be discovered.

In May of the present year *P. priscus* appeared to be wholly absent from small pools in the neighbourhood of the Kumaon lakes.

***Chirocephalus bobrinskii*, Alcock.**

1898. *Branchipus* (*Chirocephalus*) *bobrinskii*, Alcock, *Rep. Nat. Hist. Results Pamir Boundary Comm.*, p. 17, pl. iii, figs. 1, 1a.
 1910. *Chirocephalus altaicus*, von Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 191, fig. 22, a-i.
 1910. *Chirocephalus bobrinskii*, von Daday, *ibid.*, p. 212.

It seems that two species of Anostraca were found by Alcock in the Chakmaktin Lake, Little Pamir, and were separated into two bottles; but by an unfortunate mistake both were labelled *Branchipus bobrinskii*. One bottle labelled 'types' is in the Indian Museum; the other was sent to von Daday who remarks that "par un hasard inexplicable au lieu de *Chirocephalus*, j'ai reçu *Branchinecta orientalis*, G. O. Sars."

An examination of the types shows that Alcock's species is unquestionably the same as that which von Daday has recently described under the name of *C. altaicus* from two males found in a

¹ The specimens which von Daday records from Naini Tal were in reality found in this temporary sheet of water.

valley of the Altai Mountains and from the vicinity of Sinjucha in the same range.

The only differences that I am able to detect between male *C. bobrinskii* and the figures and description which von Daday has given of *C. altaicus* are as follows:—

The large spine-like process on the under surface of the proximal segment of the second antennae, near its base, is longer, considerably more than half the length of the segment. In the trilobate process at the base of the second antennae the edge of the triangular emargination between the two basal laminae is entire—not denticulate as shown in von Daday's fig. 22 c. Von Daday states that the apex of the ultimate antennal segment is truncate or bilobate: in the types of *C. bobrinskii* it is truncate. The penis, when everted, has the same form as in *C. altaicus*, but the spinulose process at the base is distinctly broader.

Apart from the details mentioned above the second antenna with its curious pedicled digitate process at the base of the ultimate segment agrees precisely with von Daday's account; the trunk-limbs correspond closely with his figures and the characters which distinguish *C. altaicus* from its near allies *C. turkestanicus* and *C. sinensis* are well shown.

Von Daday was unable to examine any females of this species and the single female specimen from the Chakmaktin Lake is unfortunately in very poor condition. It is, however, clear that this sex shows much affinity with Thiele's *C. sinensis*. On each of the first two abdominal somites there is a stout outstanding spine on either side and on each of the succeeding somites except the last there is a pair of spines on the hinder margin, directed posteriorly and diminishing in size from before backwards. The egg-sac is as long as the first five abdominal somites combined and its aperture is terminal, transverse and V-shaped in lateral view.

The specimens are so contorted that accurate measurement is an impossibility. It seems, however, that they could not have exceeded 12-13 mm. in length. Von Daday's two specimens measured 12 and 19 mm. respectively.

C. bobrinskii is known only from the Pamir and Little Pamir. Those from the latter region were found at an elevation of about 13,000 ft.

***Branchipus stagnalis* (Linn.).**

1910. *Branchipus stagnalis*, von Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 312, fig. 54, a-h.

This widely-distributed species occurs in Europe, N. Africa and Asia, extending eastwards as far as Sind. The specimens from Sind, the only locality in the Oriental region from which the species has been recorded, were collected by Mr. A. W. Murray and are preserved in the Indian Museum; the precise date and circumstances of their capture are not available. Gurney in 1907¹ recorded these examples under the name of *B. pisciformis*, Schaeffer.

¹ Gurney, *Journ. A. S. B.* (n. s.), ii, 1907, p. 275.

Streptocephalus dichotomus, Baird.

Chirocephalus stoliczkae, Wood-Mason, MS. (= var. *simplex*, Gurney).

1896. *Branchipus (Streptocephalus) bengalensis*, Alcock, *Journ. A. S. B.*, lxx, p. 538, pl. x.

1910. *Streptocephalus dichotomus*, E. v. Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 349, figs. 63, 64.

This species is found only in India. It appears to be the common representative of the Anostraca in the plains; but, in the north-west and south, has been found at considerable elevations.

The precise locality of Baird's type specimen is unknown; it is stated to have been found alive in a pail of milk. The other records are as follows:—

1. Near Bangalore, Mysore, ca. 3,000 ft., Oct. 13th, 1910. N. Annandale and M. Travers.
2. Marikuppam, Mysore, ca. 2,500 ft., Oct. 21st, 1910. Mus. Collr.
3. Shevaroy Hills, Madras Pres., ca. 5,000 ft. J. R. Henderson.
4. Spur Tank, Madras (city), March, 1911. J. R. Henderson.
5. Near Calcutta, in flooded rice-fields, 1896, probably June or July. (Types of *B. bengalensis*, Alcock.) Mus. Collr.
6. Cutch, Sind. (Types of var. *simplex*, Gurney.) F. Stoliczka.
7. Dhurampur Kooa, base of Simla Hills, 2,500—3,000 ft., July 21st, 1911. Mus. Collr.

Gurney's var. *simplex*¹ is distinguishable only in the case of the male: the type specimens from Cutch all belong to this sex. Of twenty-four males from Dhurampur Kooa, ten are typical, while fourteen exhibit the characters of the variety. Forty females were found in the same locality, but it does not seem possible to distinguish two forms among them.

Although the two forms of male certainly occur together, there is a complete absence of intermediates and, in consequence, the retention of the varietal name appears to be justified. In several male examples the process characteristic of the typical form, near the apex of the upper ramus of the second antennae, is shorter than is shown in the figures given by Sars and von Daday; but the distinction in this respect between the typical form and the variety is always clear and is correlated with the number of cirriform appendages at the distal end of the proximal antennal segment (four in the typical form: three in the var. *simplex*).

A single male from the Shevaroy Hills, one of those determined by Sars, accords with the typical form. But von Daday notes that he received an example of the variety from the Norwegian carcinologist and it is probable therefore that both forms

¹ Gurney, *Journ. A. S. B.* (n.s.), ii, 1907, p. 276, pl. v, fig. 11.

occurred together in the Shevaroy Hills, for it does not appear that Sars examined specimens from any other locality. Von Daday records the var. *simplex* from Calcutta, but this is, I believe, due to an error.

The var. *simplex* has been obtained at Cutch unassociated with typical examples, the two forms have occurred together in the Shevaroy Hills and at the base of the W. Himalayas, and the typical form without any admixture of the variety has been found at Bangalore, Marikuppam, Madras and Calcutta.

***Streptocephalus spinifer*, Gurney.**

1906. *Streptocephalus spinifer*, Gurney, *Spolia Zeylanica*, iv, p. 126, pl. i.

1910. *Streptocephalus spinifer*, von Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 403, fig. 83, a-e.

This species is known only from the original specimens, found by Mr. E. E. Green in a stagnant pool at Maha Ilupalama, Ceylon. There are no examples in the Indian Museum.

XVII. NOTES ON FRESHWATER SPONGES.

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

XIII.—SPECIMENS COLLECTED IN THE POONA DISTRICT, BOMBAY PRESIDENCY, BY S. P. AGHARKAR.

The Indian Museum is indebted to Mr. Agharkar for an interesting little collection of sponges from the Bhima River in the Western Ghats (Poona district), among the specimens being the types of a new subspecies.

Genus SPONGILLA.

1. *Spongilla (Euspongilla) cinerea*, Carter.

This rare sponge was found encrusting the bed of the Bhima River at Khed in the Poona district on May 1st. The specimens, which retain a bright green colour in spirit, agree in structure with others obtained at Nasik on the western slopes of the Western Ghats and in Naukuchia Tal (alt. 4,200 feet) in the W. Himalayas. They differ from a piece of the type with which I have compared them in having smaller, radiate oscula and rather stouter and more distinctly spinous skeleton-spicules. They possess comparatively few gemmules.

2. *Spongilla (Stratospongilla) bombayensis*, Carter.

Specimens were found on the bed of the Bhima River at Khed with those of *S. cinerea*. They contained (in May) few gemmules.

Genus CORVOSPONGILLA.

In my volume on the freshwater sponges, etc., in the *Fauna of British India* I have proposed the recognition of a new genus (*Corvospongilla*) to include those species formerly assigned to *Spongilla* which have birotulate flesh-spicules and amphioxous or (more usually) amphistrongylous gemmule-spicules devoid of rotulae.

3. *Corvospongilla burmanica* subsp. *bombayensis*, nov.

Kirkpatrick¹ has described *C. burmanica* with such care that it is unnecessary to characterize the new subspecies here proposed otherwise than by indicating the points in which it differs from the typical form of its species.

¹ *Rec. Ind. Mus.*, ii, p. 97.

1. The sponge is green fresh and nearly black dry.
2. The oscula are almost flush with the external surface and show but slight traces of being elevated above it.
3. The vertical pillars or radiating fibres of the skeleton are rather close together, so that their free extremities are disposed densely on the surface, giving it a more spiny appearance.
4. The skeleton-spicules are slightly stouter.
5. The gemmule-spicules are extremely variable in size; indeed, there is an almost complete gradation between megascleres and microscleres, some of the largest of the latter being nearly smooth.

Habitat.—Bed of the Bhima River at Khed, Poona district; with *Spongilla cinerea* and *S. bombayensis*.

In his account of the gemmule of *C. burmanica* Kirkpatrick distinguishes three layers of spicules, an outer shell of skeleton-spicules, an intermediate layer of microscleres, and an inner layer of the latter in close contact with the gemmule. In many of the gemmules I have examined, however, I can only distinguish two distinct layers, an outer cage of skeleton-spicules mixed with amphistrongylous microscleres of very variable size and form, and an inner layer of much more uniform gemmule-spicules embedded like a mosaic in the outer wall of the gemmule.

Both forms of *C. burmanica* differ from *C. loricata*, Weltner, in the structure of the gemmule-spicule, the spines of which are much stouter in the latter; from *C. lapidosa*, Annandale, their much less stony hardness, spherical gemmules, well-defined radiating skeleton-fibres and conspicuous oscula will at once distinguish them.

MISCELLANEA.

INSECTS.

FURTHER NOTES ON SYNONYMY IN CORETHRINAE.—The history of *Corethra* and the allied genera has become somewhat confused of late, mainly due to the placing of the type species of that genus, *culiciformis*, Degeer, in a genus founded by Loew (*Mochlonyx*), for a congeneric species *velutina*, Ruthe; and partly to the discovery quite recently that a genus *Chaoborus*, Lichtenstein, erected in 1800, is synonymous with *Sayomyia*, Coq., which latter (proposed in 1903) has been adopted of late by the workers in Culicidae in place of *Corethra* (as applied to those species other than *culiciformis* and its congeners).

Corethra was established by Meigen in 1803 for *Tipula culiciformis*, Degeer; there can therefore be no argument against this being the type species. Two other species, *pallida*, Fab. (1781), and *plumicornis*, Fab. (1794), were added, and it was twenty years after the creation of the genus that a fourth species appeared. This was *punctipennis*, Say., followed by *flavicans*, Mg., in 1830, others being added subsequently.

Ruthe described *velutina* as a *Corethra*¹ and this species was made the type of *Mochlonyx* by Loew. When Loew set up *Mochlonyx* (in 1844), there were known only four species, *culiciformis*, *plumicornis*, *pallida* and *fusca*, all placed in *Corethra*. In separating those species with a metatarsus distinctly longer than the 2nd joint from those in which it is several times shorter than the 2nd joint, Loew was morphologically correct, but made the mistake of selecting the wrong group of species for his new genus.

Now this seems a strange thing for so sound a dipterologist as Loew to do, but if we premise that Loew *never actually saw culiciformis*, we have an explanation of the whole situation. This is on the assumption that neither Degeer nor any other early writer gave a specification of the relative lengths of the tarsal joints.²

In this case Loew would conclude that *culiciformis* as well as *plumicornis*, *pallida* and *fusca* possessed long metatarsi, and that in *velutina*, Ruthe, he had found an isolated case to the contrary, which he was justified in placing in a new genus.

¹ Isis, 1831, p. 1205. As though to complicate matters still further, even Ruthe contradicts himself, for in the two short preliminary diagnoses in Latin and German he says 1st tarsal joint much *shorter* (the italics are mine) but in the full German description following he says much "longer:" but that this is an error is obvious by the continuation that the fore pair are "shorter still," being only one fourth as long as the 2nd joint, which itself is twice as long as the 3rd.

² This is a point I have no means of verifying, Degeer's work not being accessible, but Coquillett (Can. Ent., xxx, 189), in establishing *Sayomyia*, says that the figures are useless for deciding the question.

Moreover, in the light of the definite information of the very short 1st tarsal joint in *culiciformis* as specially supplied me by Mr. Hill after an examination of examples of the species in the British Museum, it seems almost certain that Schiner also never saw the species, as otherwise he would have corrected Loew's error. It was not a case of the point being overlooked, since Schiner accepted the differentiation of the genera on Loew's character,—the relative lengths of the metatarsus and 2nd tarsal joints.

Coquillett, recognizing Loew's error in selecting the wrong group of species for his new genus, proposed *Sayomyia*¹ for those species with long metatarsi, taking as his type *punctipennis*, Say., a North American species,² and until recently this generic term has been in general use for those species of "*Corethra*" *sensu lato*, apart from the congeners of *culiciformis*.

The recognition quite recently (1910) by Coquillett himself that *Chaoborus*, Lichtenstein (1900), is synonymous with *Corethra* itself and antedates Meigen's genus by three years, throws all the species lately placed in *Sayomyia* into this ancient genus.

In my previous notes on this subject³ the identity is explained.

Regarding some other species, *manilensis*, Sch., was described only four years after that author published his "*Fauna Austriaca*," so that it is evident it must be a *Chaoborus* also.

"*Corethra asiatica*," Giles, has the metatarsus distinctly longer (about $1\frac{1}{2}$ to $1\frac{1}{2}$ times) than the 2nd joint, which latter is a little longer than the 3rd. It is therefore a *Chaoborus*.

"*Sayomyia cornfordi*," Theob., I am informed by Mr. Hill, who has kindly examined the type on my behalf, has the metatarsus $1\frac{1}{2}$ times as long as the 2nd which is $1\frac{1}{2}$ times as long as the 3rd, the remaining joints being subequal, each a little shorter than the 3rd. *Cornfordi* therefore is also a *Chaoborus*.

Although I quite agree with Prof. Kertész in believing only two sub-families should be allowed (Culicinae and Corethrinae⁴), as has been always customary until the connection between mosquitoes and malaria drew the attention of many students to the subject who were not dipterologists, it is difficult to understand why he places "*Mochlonyx*," Lw. (with the three species *culiciformis*, Deg., *velutinus*, Ruthe, and *effoetus*, Wlk.,⁵ which of course are true *Corethrae*), in the sub-family Culicinae, retaining "*Corethra*" in Corethrinae for those species that I have shown have to be relegated to *Chaoborus*.

So far as my information carries me, *Corethra*, Mg., *sensu stricto*, will contain only the two species *culiciformis*, Degeer, and *velutina*, Ruthe, the latter with *effoetus*, Wlk., as a synonym.

¹ Can. Ent., xxxv, 189. ² Journ. Acad. Sci. Phil., iii, 16 (*Corethra*, id.).

³ Rec. Ind. Mus., iv, 317 (1911).

⁴ In my catalogue of Oriental Culicidae published recently I admitted more than two sub-families merely out of compliment to workers in this family, and I may do so for the same reason in my forthcoming extensive supplement, but I am convinced that from a zoological point of view the two sub-families are quite sufficient.

⁵ This is synonymous with *velutina*, Ruthe.

In *Chaoborus*, Lichtenstein, must certainly be placed the following: *plumicornis*, F., *pallida*, F., *fusca*, Staeg., *flavicans*, Mg., *manilensis*, Sch., *punctipennis*, Say., the latter with *trivittata*, Lw., as a synonym.

Prof. Kertész's catalogue gives the following species under "*Corethra*" and there are no means to hand of testing their true generic position, but the probability is that the majority, perhaps all of them, belong to *Chaoborus*. It may be noted that the above-mentioned catalogue uses the term *Corethra* to embrace the species now certainly referred to *Chaoborus* as well as the following ones of uncertain position: *antarctica*, Huds. (New Zealand), *nyblaei*, Zett. (North Europe), *obscuripes*, Wulp (Central Europe), *pilipes*, Gimm (Eastern Europe), and *rufa*, Zett. (North Europe).

E. BRUNETTI.

CRUSTACEA.

ON THE DISTRIBUTION OF THE DIFFERENT FORMS OF THE GENUS *Ibla*.—Until a few years ago only two forms of the genus *Ibla* (*I. quadrivalvis* (Cuvier) and *I. cummingi*, Darwin) had been described, but in 1907 Hoek described a third under the name *Ibla sibogae* (*Siboga-Exped.*, Mon. xxxia—Cirripedia Pedunculata—p. 48, pl. iv, figs. 20—22, pl. v, figs. 1—8, 1907). The most curious difference between *I. quadrivalvis* and *I. cummingi* is, as Darwin pointed out, the fact that whereas the large individuals of the former are hermaphrodite and possess a well-developed penis, similar individuals of the latter are exclusively female and possess no penis (*Mon. Cirripedia*—Lepadidae, p. 204). The typical form of *I. cummingi* can be readily distinguished on superficial examination by blue markings on its valves which are quite absent from those of *I. quadrivalvis*. All other differences are trivial and, in my opinion, fall well within the limits of individual variation. *I. sibogae* (except for minute structural differences which I also consider of little importance) differs from *I. cummingi*, with which its sexual features are in agreement, in the absence of the blue markings; from *I. quadrivalvis* it can hardly be distinguished unless the animal be dissected out of its shell.

I have recently obtained cotypes or paratypes of *I. sibogae* and have examined considerable numbers of specimens of the genus from the Gulf of Oman, the coast of Burma, the Straits of Malacca, the Gulf of Siam, Port Jackson and New Zealand. With the exception of those from Australia and New Zealand, these specimens agree either with *I. cummingi* or (more commonly) with *I. sibogae*. The series from the coast of Burma is a large one and includes almost every grade in a transition between these two forms, and I have no doubt that the form *sibogae* must therefore be considered merely as a variety of *I. cummingi*, as Hoek himself thought might prove to be the case. Among the specimens that represent this variety in the collection before me are some of those

which Lanchester (*P. Z. S.*, 1902 (i), p. 372) recorded from Pulau Bidan near Penang as *L. quadrivalvis*. The specimens from Port Jackson and New Zealand clearly represent the true *I. quadrivalvis* and are hermaphrodite. This form was not taken in the Malay Archipelago by the "Siboga."

Taking these facts into consideration, I am inclined to believe that *I. quadrivalvis* and *I. cummingi* are merely local races, the one confined to the southern part of the Pacific, Madagascar and the east coast of Africa, the other to the waters of the Oriental Region and the Persian Gulf; and that all records of *I. quadrivalvis* from the Oriental Region refer actually to *I. cummingi* var. *sibogae*, which occurs on the coast of Burma, in the Straits of Malacca, the Gulf of Siam, the Malay Archipelago and also at Muscat in Arabia.

Neither the variety *sibogae* nor the typical form of *I. cummingi* is invariably associated with *Pollicipes* as was the case with Darwin's specimens of the latter from the Philippines—he does not state that it was the case with those he examined from Lower Burma. Capt. F. H. Stewart took numerous specimens of both forms on an island off the coast of Burma (*Mém. Ind. Mus.*, iii, p. 36), but no specimens of *Pollicipes*; while the specimens of the latter genus taken by Dr. W. Mortensen in the Gulf of Siam do not appear to have been found on the same date as those of *Ibla* from the same locality (*Sær. Vid. Medd. naturh. Foren. København*, 1910, pp. 81, 85). The sexual peculiarities of *I. cummingi* cannot therefore be correlated with a semi-parasitic mode of life, although they may possibly be due to climatic influences. Before theorizing on this point, however, it might be well to check the records of the different forms of the genus, and I would appeal to all students of the Cirripedia who have the opportunity of examining specimens of *Ibla* (or of any other genus) not to trust merely to an external examination of the shell in their determination of the species but to dissect the animal out before recording its name.

N. ANNANDALE.

XVIII. REVISION OF THE ORIENTAL
TIPULIDAE WITH DESCRIPTIONS
OF NEW SPECIES.

By E. BRUNETTI.

The present paper may be regarded as an annotated catalogue of Oriental Tipulidae; composed of (1) the species given in Van der Wulp's catalogue with such notes as appear to be of interest.¹ It is significant that no corrections are necessary as to their generic location. This is directly due to the fact that Osten Sacken, who must be regarded as, *par excellence*, the principal authority on this family, had already worked through them and placed practically all of them in their proper genera: (2) such species as have been described since Van der Wulp's catalogue: (3) the disposition of the types of as many species as possible with notes on their present condition: (4) over fifty new species herein described, preserved in the Vienna Museum, Indian Museum, Pusa collection or my own; and (5) the erection of eight new genera, formed, in two cases by the splitting of *Mongoma* and *Cladura* into three genera each, and in other cases through the discovery of several new forms that cannot be satisfactorily placed in any of the existing genera.

It is not without considerable hesitation that these new genera are proposed, since Osten Sacken repeatedly warned students in this family of the necessity of great circumspection in this matter, owing to a general tendency in the Tipulidae to adventitious variation, more especially in the venation. I have little doubt, however, of the generic stability of all those now suggested. Moreover there are several undescribed species in the Indian Museum the generic position of which is still most uncertain. One genus, *Trichocera*, I venture to remove from the Limnophilini to the Amalopini, regarding it, after mature deliberation, more akin to the genera of the latter section.

It may be noted that in addition to the new species herein described I have descriptions completed in MS. of nearly 140 others from different parts of the East, and these will be published in my forthcoming work on certain families of Nemocera in a volume for the "Fauna of British India" series.

This will make the total number of species of Tipulidae known to exist in the Oriental region, over 370, an *increase* of over 150 per cent. on the number known only fifteen years ago!

¹ Of these (about 140 in number), since Van der Wulp's catalogue is easily accessible, it seems unnecessary to add references, but references are given to all species described since the publication of that catalogue. These latter are forty-five in number.

It is with the greatest pleasure that I sincerely thank those gentlemen who have so kindly assisted me with notes on the types of many of the species; information which has enabled me to make the present paper far more complete than it would otherwise have been.

Through the kind introduction of my oldest friend in entomology, Mr. C. O. Waterhouse, I have obtained from Mr. Hill a very valuable series of notes on such types as repose in the British Museum, these including the bulk of Walker's species. Herr Handlirsch of the Vienna Museum has furnished me with most useful information respecting such of Doleschall's types as remain in the collection of that Institution, and Dr. F. A. Jentink has rendered me a like service concerning the types in the Leyden Museum. Dr. J. C. de Meijere has supplied information respecting types in the Amsterdam Museum, besides other notes of importance, whilst Prof. R. Gestro sent me a list of the species in the Genoa Museum; with their localities and the regret that they are "all in more or less mediocre condition." The useful notes from Dr. A. Brauer of Berlin, Mr. Lundbeck of Copenhagen, Mr. Bedot of Geneva and several others are incorporated, with due acknowledgment, under the species they concern.

A certain number of types are definitely known to be lost, whilst many others, owing to the extreme fragility of the species in this family, are reduced to mere fragments of no practical use for identification, except as regards a few species where the conspicuous markings of the wings would probably determine the species.

Several of Doleschall's types I have been unable to trace; Dr. Meijere writing me that they are certainly not in Holland, and (respecting some of Van der Wulp's species) that this author's collection was considerably damaged by anthrax, so that these are probably lost.

Of some of these species, however, there exist in the same collection other specimens in better condition, these presumably having been identified by means of the types before the latter were reduced to fragments.

A few of Osten Sacken's species described from the Philippine Islands have not been traceable, and also some of Walker's, described in his "*Insecta Saundersiana* (Diptera)." Saunders's collection was I believe disposed of in small portions in different directions, and some of these are, apparently, not to be found.

Subfamily *PTYCHOPTERINAE*.

PTYCHOPTERA, Mg.

Ptychoptera distincta, mihi, sp. nov.

♀. Darjiling. Long. 9 mm.

Head.—Frons, vertex and back of head, black: frons one-fourth width of head. Epistome bulbous, shining brown, bare;

proboscis normal, yellow; palpi long, yellow. Antennal scape brownish yellow; flagellum black, shortly pubescent.

Thorax wholly shining black, bare.

Abdomen black, microscopically pubescent; basal two-thirds of second joint and basal half of third joint reddish orange. Tip of last segment and the ovipositor reddish yellow.

Legs.—Coxae reddish yellow; femora at base concolorous, deepening to brown at tip; tibiae and tarsi black. Except the coxae, which are nearly bare, legs wholly shortly and thickly pubescent.

Wings very pale grey, yellowish brown on the costal part. A dark brown central cross-band along the middle cross-veins from the origin of the second vein to the tip of the fifth vein, also a large apical brown part enclosing the forks of the third and fourth veins, both these brown parts in the wing being connected with the costal darkening. Halteres black.

Described from one ♀ in the Pusa collection taken by Mr. Howlett, 3-9-vi-09, at Darjiling (7,000 feet).

Ptychoptera tibialis, mihi, sp. nov.

♂ ♀. Darjiling. Long. ♂ 7-8, ♀ 9 mm.

Head.—Frons shining black, smooth, bare: eyes widely separated: back of head brown: face below antennae, under side of head and palpi all bright yellow; antennae fifteen jointed; 1st joint cylindrical, yellow, brown towards tip; 2nd short, bead-like, dark yellow, mixed with brown; 3rd as long as the next two together; remainder elongated, compressed at each end, black; antennae minutely and thickly pubescent, and with moderately long scattered hairs throughout.

Thorax.—♂: Aëuous black, bare, shining, suture separating the prothorax rather deeply cut; humeri bright yellow, a white dusted patch in front on dorsum of prothorax. The mesothorax is divided from the metathorax by a distinct suture, which on reaching the extension of the prothorax, follows it posteriorly and divides the rear portion of the metathorax by a deeply cut suture with a small yellow V-shaped spot in the middle of it, this suture reaching the small bright yellow scutellum. Posterior calli raspberry-red, enlarged, elongated and extending from the scutellum to the base of the wings. Sides of thorax shining black, a yellow scaly mesopleura connected with the yellow base of the wings; metapleurae with silvery sheen, seen from above; metanotum large, shining aëuous black, square shaped, bare.

In the ♀ the thorax is orange, with a black stripe each side of the dorsum, the suture blackish: a large black mark below the scutellum, which latter, with the whole metanotum, is orange.

Abdomen.—♂: Bright light orange-brown, tending towards yellowish; 1st segment all blackish, 2nd elongated, black at base and tip; the next three segments black on posterior border.

♀ : Orange-brown, 2nd segment yellowish. Belly entirely orange-yellow ♂ ♀. The ♂ genitals very large, complex, bright reddish orange, with some close black pubescence; ♀ genitals narrow, cylindrical, concolorous.

Legs.—Coxae bright yellow, hind pair black on the outside of the basal half; femora bright yellow, hind pair black on the basal two-thirds except at the extreme base; anterior tibiae yellow with the extreme tips dark brown, the middle pair slightly darker on the basal half, the hind pair with basal half black except the extreme base; on the apical half the bright golden yellow hair is very thick; tarsi blackish-brown. The legs throughout are closely pubescent, the pubescence being concolorous with the ground colour.

Wings yellowish grey, beautifully iridescent, unmarked, minutely pubescent on posterior border; venation as in *P. contaminata*, veins dark brown; halteres bright yellow.

Described from several examples taken by me at Darjiling (7,000 feet), 7-16-x-05 and 30-ix-08. Type ♂ in Indian Museum. Type ♀ and cotype ♂ ♂ in my collection; cotype ♀ from Darjiling in the Vienna Museum.

N.B.—Normally *Ptychoptera* should have 16-jointed antennae, but the 3rd joint in this species is as long as the next two together, and occasionally it appears as if two joints were present, but a careful examination convinces me that it is single. In most of the specimens the whole antennae are certainly present and undamaged. The species, however, cannot possibly be removed from this genus, it being in every character a true *Ptychoptera*.

Ptychoptera atritarsis, mihi, sp. nov.

♀. N. Bengal. Long. 8 mm. (without ovipositor).

Head.—Whole upper part from the vertex down to the antennae, black, bare, shining; face below antennae, proboscis, palpi (except black tips) wholly orange-yellow. Antennae black, but microscopically covered with hoary dust; scapal joints orange-yellow, a few hairs on all the joints. Eyes black, the orbit at the sides brownish yellow, with a set of black hairs, orbit disappearing at the vertex. Neck yellow.

Thorax orange-yellow, practically bare, dorsum slightly ferruginous. A black stripe on the front of the prothorax, which is carried downwards as far as the fore coxae; two small black spots on the dorsum behind the upper end of this stripe. A black stripe begins widely on each humerus, extending narrowly backwards to the middle of the metanotum, spreading inwards slightly at the base of the wings, and narrowly interrupted immediately behind their insertion. Under side of thorax shining coal-black, but the sides of the mesothorax are orange-yellow, and a thick scaly process issues from the base of the wings, proceeds widely downwards nearly to the middle coxae, and then bends

hindwards and upwards, joining the scutellum, enclosing the base of the halteres in its path. A narrow black line runs interruptedly round the posterior border of the thoracic dorsum, replaced immediately in front of the scutellum by two small black spots. Metanotum oblong, large, traces of a black central streak. Scutellum oblong, elevated but moderately small, supported at each corner by a pronounced scutellar ridge.

Abdomen orange-yellow, with a few irregular hairs; 1st segment with a yellowish white shimmer at the extreme base in front; a narrow black cross-band on the dorsum near the base of the segment, which line is continued forwards along the sides of the abdomen as far as the base. Posterior borders of all the segments, including the 1st, on which it is widest, but excluding the last, with a blackish irregular band. Ovipositor in the shape of two blades close together, orange-yellow. Belly uniformly orange-yellow.

Legs.—Coxae lemon-yellow, the hind pair having two small black spots on the hinder side at the base. Femora and tibiae uniformly bright orange-yellow with minute closely-set concolorous pubescence. Tarsi wholly coal-black.

Wings yellowish grey, costal cell yellow, veins black, halteres yellow.

Described from two ♀♀ nearly perfect and in first class condition in the Indian Museum collection from Siliguri, at the foot of the Darjiling hills, taken 18—20-vii-07.

TANYDERUS, Phil.

ornatissimus, Dol., ♂ ♀ (*Cylindrotoma*). Amboina.

Of this species Osten Sacken (Berl. Ent. Zeits., xxxi, 228) gives a fuller description, based on an original coloured drawing of a ♂ by Doleschall but never published, and also on a ♀ in the Vienna Museum. He notes an error in Doleschall's description, in which the antennae are said to be 16-jointed whereas he distinctly observed 22 joints, both in the author's coloured drawing and in the type ♀ at Vienna, which latter is now somewhat damaged.

Subfamily TIPULINAE.

Section I. CTENOPHORINI.

CTENOPHORA, Mg.

Two species have been introduced as Oriental members of this genus. The first, *xanthomelaena*, Wlk. (List Dipt. Brit. Mus., i, 77, from East India), exists apparently in the type specimen only, which is in the British Museum, in good condition still; but as it is a ♀ it is impossible to be sure that the species does not belong to *Pselliophora*, Os. Sac.

If this latter is the case, then the genus *Ctenophora* does not occur in the East at all. *Ctenophora* is in fact confined to Europe, Siberia and North America, with the exception of a single species from Persia; whilst *Pselliophora* is confined to the eastern tropics, also with one exception, *jumiplena*, Wlk., from China. This species even might have been regarded as doubtful but that Osten Sacken has examined the type, at the British Museum, where some other specimens also from China appeared to him to be a variety of the species.

The other recorded species, *C. melanura*, Wlk. (List Dipt. Brit. Mus., i, 78), is not even a Tipulid at all, but is a large *Sargus* (Stratiomyidae), as stated by Osten Sacken, after an examination of the type in the British Museum.

It is true, however, that there is yet one species recorded as *Ctenophora* of which the locality is unknown (*C. constans*, Wlk., Ins. Saund. Dipt., 448, ♀), but the probability is that it is not Oriental.

PSELLIOPHORA, Os. Sac.

Table of species.

[The figures prefixed to the specific names represent the length in millimetres.]

- A Tibiae with at least the hinder pair with pale coloured ring near the base.
- B Wings mainly or wholly yellowish, or at least pale; usually with a brownish tip (very pale yellow in *stigmatica*).¹
- C Hind tibiae only with a pale ring.
- D Thorax reddish yellow, with three indistinct stripes ♀ 16 *ardens*, W.
- DD Thorax wholly black .. ♂ 17, ♀ 14 *nigrithorax*, Meij.
- CC All the tibiae with a pale ring.
- E Hind tibiae straight.
- F Wings practically without dark marks.
- G Reddish orange species; thorax unmarked ♂ *rubra*, Os. Sac.²
- GG Bright yellow species; thorax black marked and abdomen with a transverse black band on each segment ♀ 15 *stigmatica*, Meij.
- FF Wings with distinct brown marks.
- H Tip of wing only, brown, broadly so .. ♂ 14 *compedita*, W.
- HH Tip of wing broadly brown, a median band also present ♀ 16 *bifascipennis*, sp. nov.
- EE Hind tibiae curved. (Incl. ovip.) ♀ 16½ *curvipes*, Wulp.
- BB Wings brown or blackish, either unicolorous or with lighter spots (base yellow in *laeta*).

¹ In my *bifascipennis* there is a considerable quantity of brown in the wing but the prevailing ground colour is yellow.

² Osten Sacken omitted to give the length of his species.

- I Body reddish yellow, with black markings (in *divisa*, deep ferruginous, apical half of abdomen black).
- J Wings either with a pale longitudinal streak near middle, or wholly brown or blackish.
- K Femora wholly black 17 *divisa*, sp. nov.
- KK Femora black, with yellow bases
12 *fuscipennis*, Mcq. (*javanica*, Dol.)
- KKK Femora yellow, black towards tips 14-20 *gaudens*, Wlk.
- JJ Wings with distinct, bright yellow marks.
- L Wing with only two large spots and a small intermediate one ♂ ♀ 14 *lacta*, F.
- LL Wing with seven yellow spots, some of them confluent (variable).. .. ♂ ♀ 14 *laprobanes*, Wlk.
- II Body velvety black, with yellow markings.
- M Wing uniformly black or blackish
♂ 12-14, ♀ 15-16 *dolens*, Os. Sac.
- MM Wing blackish, with pale streaks and four white spots (three of them forming a band)
♀ 16 *jumi-plena*, Wlk.
- MMM Wing brown, with a white spot in the middle.
- N Scutellum black 14-15 *suspirans*, Os. Sac.
- NN Scutellum yellow 14-15 *idalia*, Os. Sac.
- AA Tibiæ without a pale ring on any of them.
- O Wings yellowish, with or without dark bands or markings.
- P Moderately large species, 12 to 16 mm. long.
- Q Wing with black or brownish marks.
- R Flagellum not serrate (presumably) 16 *chrysophila*, Wlk.
- RR Flagellum deeply serrate on under side
12 *serraticornis*, sp. nov.
- QQ Wing pale yellow, wholly unmarked
12 *immaculipennis*, sp. nov.
- PP Very large species ♀ 30 *terminalis*, sp. nov.
- OO Wings dark brown sometimes cells lighter in centre, or base yellow (*insignis*).
- S Moderately large species; at most 20 mm.
- T All femora wholly black.
- U Wing broader, darker brown (in type ♂ ♀), or with faint paler streaks (variety)
♂ 12 ♀ 18 *incunctans*, Wlk.
- UU Wing narrower, lighter; all cells with clear centres, except costal ones .. ♀ 20½ *annulosa*, Wulp.
- TT All femora with apical part yellow to a greater or less extent ♂ 17 *insignis*, Meij.
- SS Very large species (recorded as a *Ctenophora*)¹
♀ 28 *xanthomelaena*, Wlk.

¹ Recorded as a *Ctenophora*, but the ♂ not being known it may provisionally be removed here, as no species of *Ctenophora* is certainly known from the East. Inclusion in this table also shows its affinities.

LIST OF, AND NOTES ON, THE PREVIOUSLY DESCRIBED SPECIES OF
Pselliophora.¹

ardens, W., ♂ ♀. Type (♀), Java, in Westermann's collection in the Vienna Museum, in which institution there are seven specimens from Lombok, representing both sexes. The ♂ does not appear to have been previously recorded. It is in every way similar to the ♀ except for the sexual characters of antennae and genitalia, both of which are wholly black, the latter very large and conspicuous.

nigrithorax, Meij. (1904). *Bijd. tot. de Dierk.*, xvii, 87, ♂ ♀.

Prof. Meijere notes that the description offered was drawn up by Van der Wulp. The ♂ is from Tjibodas Gede, and the ♀ from Sakabumi (both Java). Types in Amsterdam Museum.

compedita, W., ♂ (?), ♀. Java.

Type in Westermann's collection from Java. Van der Wulp notes (*Notes Leyd. Mus.*, vi, 25) three ♂ ♂ that he considers belong to this species, though they differ from Wiedemann's description of the ♀. They are from Haroeke, Celebes and (?) Aru.

rubra, Os. Sac., ♂. The unique ♂ in the Berlin Museum is from Laos, Siam, taken by Mouhot.

stigmatica, Meij. (1904). *Bijd. tot. de Dierk.*, xvii, 88, ♀, pl. viii, 1 (full insect, coloured).

One ♀ from Lahago, Central Nias Island. Meijere adds some notes respecting its position in the genus. Type in Amsterdam Museum.

curvipes, Wulp, ♀. "Closely allied to *compedita*;" hind tibiae arcuate. Type (a single ♀ from Gorontalo) in the Leyden Museum.

fuscipennis, Mcq., ♂ ♀.

Ctenophora javanica, Dol.

Described originally (erroneously) from "Brazil," Osten Sacken (*Berl. Ent. Zeit.*, xxx, 172) doubted it being a South American species, and having subsequently (*V. d. Wulp Cat.*, p. 36) seen the type in Bigot's collection, found it labelled "Java" and identical with *C. javanica*, Dol. Van der Wulp was the first to describe the ♀ and observes that in this sex the antennae appear a little serrulated, by the slight dilation of the joints of the flagellum on the under side. From Java (in the woods round Djocjokata, and at Ardjoeno).

gaudens, Wlk., ♂ ♀. The type ♂ and ♀, with another ♀ (from Makassar), are in the British Museum. The Vienna Museum has two ♂ ♂ from S. Celebes. A variable species, as indeed many of the *Pselliophorae* appear to be.

chrysophila, Wlk. ♀. Incorrectly quoted *chrysopila* by Van der Wulp. Type (♀) in British Museum, from Singapore, in good condition, and apparently the only specimens seen since are two

¹ All the earlier species were described under *Ctenophora*, but it seems unnecessary to emphasize this point here after each species.

♀ taken by Dr. Annandale at Bhim Tal, 19—22 xi-06, one of which was laying its eggs in the damp hollow of a tree.¹

incunctans, Wlk., ♂ & ♀.

Ctenophora velutina, Wulp.

From Celebes, Tondano and Saugir.

Van der Wulp, in his catalogue (p. 37), notes that though Osten Sacken at first (Berl. Ent. Zeit., *l.c.*) thought *velutina* distinct from *incunctans*, Wlk., the inspection of a ♂ and ♀ from Celebes in Bigot's collection decided him as to the identity of the two forms, and the variability of the species; and he wrote the Dutch author to this effect. The type ♂ and ♀, and an original second ♀ are all still in the British Museum in good condition. Walker gave 8 to 10 lines as the length (presumably of both sexes); Van der Wulp, in redescribing *incunctans*, gives ♂ 12, ♀ 18 mm., and 19 mm. as the length of his "sp. nov. *velutina*," also from Celebes.

A ♂ and ♀ in the Vienna Museum have wholly black thorax, abdomen and legs; wings deep blackish brown without trace of any lighter streaks. The only colour in the insect is the deep orange-yellow of the head above the antennae, the colour extending behind the eyes and reaching the lower part of the head but leaving the whole face quite blackish. Both specimens are from Palawan.

In the same collection are a ♂ and ♀ with the whole head, thorax and coxae bright orange, the colour reaching in the ♂ to the base of the fore femora; also over the first, and across part of the second abdominal segment. The wings are wholly blackish brown. Both specimens from Samanga, Celebes, taken in November.

A fifth specimen in the same collection is from the latter locality also and answers exactly to Van der Wulp's *velutina*, having only the disc of the thorax orange, a broad band of the same colour across the vertex, and a small round dull orange spot in front of each wing. The lower part of the thorax, behind the wings, with the scutellum and metanotum, have a distinct brownish tinge, which gives the impression that in some individuals this part might quite possibly be brownish yellow in colour.

incunctans, Wlk. (if the above opinions are correct), may be described thus:—

Head and thorax ochraceous yellow (sometimes in ♀, disc of thorax only, of this colour). Abdomen ochraceous or reddish yellow at base (probably the extent of the colour is variable); the remainder black; sometimes the whole abdomen black. Legs black, occasionally (at least in the ♂) the fore coxae and base of fore femora orange-yellow. Wings rather dark brown, sometimes with some whitish streaks or pale centres to the cells, not very conspicuous.

¹ See Rec. Ind. Mus., i, 83.

laeta, F., ♂ ♀. Type in the Fabricius collection in the British Museum; but no information is to hand as to its condition.

Apparently commonly distributed throughout India. Van der Wulp records it from Bombay, Sind and Ceylon. The Indian Museum possesses it from Trivandrum, iv-1889; Bangalore; Dehra Dun; Calcutta, 13-vii-07.

In the Vienna Museum and my own collection, in both cases from Ceylon. This and the following species bear some considerable resemblance to each other, but are easily recognized by the characters given in the table.

Van der Wulp quotes "pl. ii. 1" as a figure of this species in Wiedemann, but I find no such figure. In the Pusa collection are a ♂ and ♀ taken *in cop* in the Shevaroy's (4,000 ft.), (Madras Presidency), 26-viii-07 on coffee bushes. In the Indian Museum are two specimens that represent well-marked varieties of this species, to one of which a name is given. The first specimen is from Katihar, Purnea District (N. Bengal), and is a ♀ in good condition taken by Mr. Paiva, 23-iii-09. It differs from the typical form by all the cells on the posterior half of the wing being pale grey in their centres; one or two cells being almost entirely clear. The 3rd, 4th and 5th abdominal segments have a subquadrate black spot on the dorsum of each.

The second specimen I term var. *trilineata*, from the presence of the usual three tipuliform black thoracic stripes, the median one extending over the anterior margin on each side as far as the front coxae. The outer stripes are replaced behind the suture by a large spot each side. There is a blackish mark on the pleura below the wing, and the hinder side of the metanotum is shining black. The wings have the clear spaces as in the preceding variety though not quite so obvious, and the last two or three abdominal segments are blackish, some distinct darkening of the preceding segments being noticeable. The yellow colour of the legs is deep chrome, not orange. It was taken by Mr. H. L. Andrewes, September 1910, in the Nilgiri Hills (3,500 ft.).

The yellow marks on the wing in both forms are so exactly like those in the typical form that they cannot be regarded but as varieties.

taprobanes, Wlk., ♂ ♀. Type (♀) with two other ♀ ♀ in good condition in the British Museum, from Ceylon, which seems its only habitat, where it is not at all uncommon. Also in the Vienna and Indian Museums and my collection. The ♂ is much less common than the female and I believe has not been described, but it is present in the Indian Museum and shows no peculiarities beyond the ordinary sexual differences.

dolens, Os. Sac., ♂ ♀. Described from two ♂ ♂ and one ♀ from the Philippines.

fumiplena, Wlk., ♀. China. Very variable in the proportionate amount of black and yellow colour in the body, according to Osten Sacken, who has examined the type in the British Museum (a ♀ in good condition) with some other examples from China.

uspirans, Os. Sac., ♂. Described from three ♂♂ from the Philippines, one of which has the usually yellow portion of the thorax almost whitish.

idalia, Os. Sac., ♂. One ♂ from the Philippines.

annulosa, V. d. Wulp, ♀. Type (a single ♀ from Java) in the Leyden Museum. As compared with *incunctans* this species may be described as with "wings narrower, lighter, all cells with clear centres except costal ones; thorax all black."

As Van der Wulp notes that the venation of his species is identical with that of *incunctans* and *velutina*, there is a possibility of this species also being synonymous with *incunctans*.

insignis, Meij. (1904). Bijd. tot. de Dierk., xvii, 87, ♂.

One ♂ from Tosari (Java). Apparently distinct by the apical part of the femora being yellow, the extent of the colour differing in each pair of legs. There is some resemblance in the abdominal markings to those of *incunctans*, and a similarity in the black antennae and brown wings with indistinct clearer spots. Type in Amsterdam Museum.

xanthomelana, Wlk., 1848. List Dipt. Brit. Mus., i, 77, ♀, *Ctenophora*. This, as stated in a footnote to the table of species, is only provisionally placed here, pending the discovery of the ♂. Recorded from East India, its size (28 mm.) easily distinguishes it from all other eastern species except my new species *terminalis* (30 mm.). Type in British Museum, from East India, apparently the only specimen known, in good condition.

Pselliophora bifascipennis, mihi, sp. nov.

♀. Shanghai. Long. 16 mm.

Head wholly dark mahogany-brown. Proboscis with a little brown hair at tip and at sides; palpi brownish yellow, last joint elongate, slender, marked with black. Antennae wholly bright chrome-yellow; 2nd joint of scape small and short; 1st flagellar joint about as long as 1st scapal joint, 2nd only half as long, broader at tip, 3rd sub-globular, the following seven annular, apical joint very small, conical.

Thorax dark mahogany-brown; prothorax, or collare, and dorsum of thorax, chrome-yellow, the latter part with a broad medium dark brown stripe from anterior margin (where it is broader) to the suture, and an outer stripe each side, broadly interrupted at the suture, behind which it is much wider and in the form of a shorter and a longer spot. These lateral stripes fail to reach the anterior margin by a considerable distance. Scutellum dark mahogany-brown, as is also a central spot on the metanotum, the rest of which is bright yellow. A small oval yellow spot on the pleurae between the first and second pairs of coxae.

Abdomen.—The 1st segment black, with a narrow bright yellow hind border carried round the sides, where it widens; 2nd segment bright yellow, hind margin black, the colour extending over the sides, where it gradually disappears. Following segments black,

the anterior part of the side of each, yellow. The ventral plates marked similarly to the dorsal ones, and well demarcated from them; ventral surface of 2nd segment wholly yellow. Ovipositor comparatively short, rich shining brown, the lower pair of valves much the shorter.

Legs.—Coxae dark brown, anterior pairs a little yellow in front. Femora and tibiae bright yellow, the latter very narrowly brown at the tips, and with a pale, hardly visible whitish ring near their bases. Metatarsi yellow, narrowly brown at tip, remainder of tarsi black.

Wings.—Venation normal; contact of 2nd posterior cell and discal cell almost punctiform, costal cell, stigmatic cell, and extreme base of wings pale lemon yellowish, remainder of wing pale yellow. Wings brown on apical part, the colour wholly filling the marginal and 1st posterior cell, the submarginal and discal cell all but narrowly at their bases, and encroaching on two-thirds of the 4th posterior cell and some part of the 5th. A similarly coloured broad brown band from the 1st longitudinal vein to the posterior margin, wide enough to fill more than the middle half of both basal cells, and dividing just behind the 6th longitudinal vein, leaving a comparatively clear spot of some size, touching the hind margin of the wing. The tip of the costal cell is a little brown also. Halteres deep dull yellow.

Described from a single ♀ labelled "Consul Haas," Shanghai.

Type in the Vienna Museum.

***Pselliophora divisa*, mihi, sp. nov.**

♀. East Indies. Long. 17 mm.

Wholly deep ferruginous, except the head, the last four abdominal segments with the ovipositor, and the legs, all of which are black, the latter possessing a narrow whitish band on the tibiae near the base, on the first and third pairs of legs (the middle pair is missing). Wings blackish, rather dark, the 2nd posterior cell scarcely sessile.

Described from a unique specimen marked "East Indies, Felder, 1892."

Type in the Vienna Museum.

(?) *Pselliophora serraticornis*, mihi, sp. nov.

? ♂. Ceylon. Long. 12 mm. (incomplete).

Head brownish yellow, vertex a little grey tinged. Palpi blackish. *Antennae very conspicuous*: scape brownish yellow, 1st joint a little over twice the length of the 2nd; flagellar joints very deeply serrate on under side in the shape of two pendant lobes to each joint, of equal size and length, the proximal one black, the distal one brownish yellow. The last flagellar joint (11th) has a conical tip, with a small distinct apical style. Each joint bears a verticil of hairs (four in number) at its base.

Thorax brownish yellow, more yellowish anteriorly. Three darker dorsal stripes; the median one rather broad, and bisected by a narrow dark brown line, with which all the stripes are rather sharply delineated. Two spots behind the suture of similar colour and delineation, of normal shape, the anterior one approximately rounded, the hinder one more oblongo-triangular. Pleurae a little greyish.

Abdomen brownish yellow; the segments blackish marked on the hind margins towards the sides. (The apical half of the abdomen is wanting.)

Legs.—Coxae and femora brownish yellow; tibiae and tarsi dark brown or blackish.

Wings pale grey, base and costal cell yellowish. Stigma dark brown but ill defined, and a brownish suffusion, irregular in extent below the stigma extending around the discal cell; also in less distinct manner, at the base of both basal cells, at the origin of the 2nd longitudinal vein and over the posterior cross-vein, and here and there over some of the veins. Halteres brownish yellow.

Described from a single example in excellent condition (except for the loss of the apical half of the abdomen). Taken by Mr. Felder in 1861 in Ceylon, marked "Alte Sammlung."

Type in Vienna Museum.

N.B.—The end of the abdomen being broken off, the sex of the specimen is indeterminable. The species is a very conspicuous one and quite unlike, in the antennae, any other that I have seen or read of. The abdomen, so far as the middle, shows no trace of any increase in width. It may not be a *Pselliophora*, but the antennae cannot by any stretch of imagination be associated with *Tipula*, yet the flagellum is distinctly verticillate, an essentially tipuline character.

Pselliophora immaculipennis, milii, sp. nov.

♀. Assam. Long. 12 mm.

Head bright shining orange-yellow, with scattered hairs; a frontal spot, almost bisected in the middle (just above the antennae), shining light yellow-brown, extending from eye to eye. Eyes small, black and placed well forward so that the back of the head is very wide, and joins the equally broad vertex which is orange-yellow. Face rather considerably covered with long yellow hair, antennae concolorous, covered with microscopically silver-grey dust: the 1st joint long, cylindrical, 2nd short, bead-like, 3rd and rest cylindrical, 3rd as long as 1st, remainder gradually shortening; the last three very short and close together, the 13th style-like. Palpi orange-yellow, tip black.

Thorax concolorous, with irregularly scattered hairs, shining, bare. The prothorax is reduced to a small circular thick disc, bright yellow; humeri brown. Mesothorax with three wide,

shining light brown stripes, tapering in width behind, the 1st central and attaining the anterior margin, the stripe on each side reaching the shoulders and terminating above the mesopleurae. Behind the middle transverse suture the dorsum widens out until the posterior corners form sharp angles. This posterior portion of the thoracic dorsum bears a wide brown stripe on each side, divided by a small longitudinal suture; the stripes beginning behind the ends of the two dorsal side stripes which are in front, and extending backwards to the small scutellum which is all yellow. Metanotum of moderate size, all yellow. Sides of thorax yellow, with a shining, very dark brown triangle just below the root of the wing, and a downward brown streak behind and rather above it. Under side of thorax dark brown; a prominent, small, circular, pale yellow callosity in front of the hind coxae.

Abdomen concolorous with irregularly scattered hairs. Bases of all the segments brown, this colour apparently varying in breadth; 2nd segment much contracted; 3rd and 4th suddenly widened; the rest tapering to a point. Ovipositor short, reddish brown, shining. Belly yellowish, with traces of some transverse bands, corresponding to those on the upper side.

Legs yellowish tawny; coxae brownish yellow, tarsi blackish, bare of long hairs or spines, with microscopically yellow pubescence on the femora, which is much mixed with black pubescence on the tibiae.

Wings yellowish, unmarked, stigma yellowish, indistinct, small; veins and halteres brown.

Described from one ♀ from Sylhet in the Indian Museum collection in perfect condition.

Pselliophora terminalis, mihi, sp. nov.

♀. Tonkin. Long. 30 mm. + ovipositor 3-4 mm.

Head bright chrome-yellow, vertex dark brown, the colour extending forward in the centre almost to the root of the antennae. Proboscis a little brown on upper side, labella dark brown, nearly black; palpi brownish yellow, black towards tips. Antennae bright yellow, scape normally shaped, 1st joint large, wider at tip, 2nd joint small, subannular: 1st flagellar joint $1\frac{1}{2}$ times the length of the next joint, deeply cut away below in the middle, as are the rest of the flagellar joints, but in the 1st joint the basal and apical halves are about equally deep, whereas in the remaining joints (except the apical one) the basal part is much deeper than the apical: apical joint elongate, narrow, constricted in middle below.

Thorax bright chrome-yellow. Dorsum with three rather dark brown stripes, the median one of which reaches the anterior border, being divided for the greater part of its length: the outer stripes foreshortened, barely interrupted at suture, behind which they take the form of a circular and an oval spot. On the rest of the thorax there are slight brownish traces here and there.

Scutellum yellow, with brownish dorsum, deeper on posterior margin; metanotum yellow, with traces of two brownish spots.

Abdomen brownish yellow; a well-defined dark brown band with parallel sides on posterior margins of 3rd, 4th, 5th and 6th segments; less distinct on 2nd, 1st segment unmarked, 7th and 8th much narrowed and elongate, reddish brown, blackish on dorsum, 8th with distinct black band on posterior margin. Ovipositor rather small, reddish yellow, the valves shining reddish brown, the lower pair much the shorter. Belly a lighter replica of dorsum.

Legs.—(Only one femur, tibia and metatarsus of fore leg, and femur and tibia of one hind leg remaining.) The femora are brownish yellow, rather broadly dark blackish brown at tips; tibiae dark brown, metatarsus nearly black.

Wings yellow; brown for a little distance at base of 1st basal cell; a small brown spot over origin of 2nd vein. The stigma is dark brown, the suffusion carried down the veins to the discal cell, passing through it and along the posterior cross-vein and the ultimate section of the 5th longitudinal vein. Tip of wing a little brown along the costa. Halteres brownish yellow.

Described from one ♀ in the Vienna Museum, in good condition except for the damaged legs. Taken by Fruhstorfer in Tonkin, Montes Mavson (2—3,000 ft.), in April or May.

Pselliophora, sp.

A male specimen of *Pselliophora* in the Vienna Museum, is distinguished by the very long antennae, which if bent back would reach the tip of the abdomen (exclusive of the genitalia). The wings being broken off, it is impossible to describe it, but it appears to represent an unknown species.

It is mainly yellow, except some black at the tip of the abdomen and on part of the genitalia. The legs are black, except the basal three-fourths of the femora, which are yellow, and there is the usual white ring (common to all the species in one section of the genus) beyond the base of all the tibiae. The fragments of wings that still remain are yellowish at the base, and blackish beyond.

Long. 12 mm. The specimen comes from Samanga, Celebes, taken November 1895 by Fruhstorfer.

PRIONOTA, Wulp.

nigriceps, Wulp, ♂ ♀. A single specimen of each sex from Java. The ♂ is 16 mm. long, the ♀ larger.

N.B.—A large species of *Tipula* in the Indian Museum has a considerable resemblance to this genus, and will be described by me later.

Section II. TIPULINI.

TIPULA, L.

LIST OF, AND NOTES ON, DESCRIBED SPECIES.

pedata, W., ♀. Widely distributed throughout the East; Van der Wulp records it from Java, Sumatra, Borneo and the Philippines; the Vienna and Indian Museums have it from Assam and Ceylon, from which latter locality I have seen several specimens if I have correctly identified the species. It appears to be variable unless several closely allied species exist.

Type in Westermann's collection, in the Vienna Museum. Meijere records the species being bred from a pupa by Dr. Van Leeuwen in Java.

praepotens, W., ♂ ♀. East Indies. Recorded also from Japan, but I do not know if the identity is established. Type in the Leyden Museum, where in the old collection are three specimens, of which one is a ♂, one a ♀, the third being damaged. Wiedemann quotes no sex.

monochroa, W., ♂ ♀. Java. Type in Leyden Museum. Wiedemann only mentions the ♀ but Dr. Jentink informs me there are two ♂♂ and two ♀♀ in the old collection; an additional specimen in bad condition from Sumatra, identified by Van der Wulp, and another specimen from Celebes. Meijere records a ♀ from Java and notes the affinity of the species with *T. pilosula*, Wulp.

umbrina, W., ♂ ♀. East Indies. Type and three other examples in the "old collection" of the Leyden Museum, with a ♂ and ♀ from Gorontalo (Celebes), two ♂♂ from Obi Island, all identified by Van der Wulp. I accept this latter dipterologist's synonymy of *castanea*, Meq., and *incongruens*, Wlk. It is not rare in Java.

venusta, Wlk. Described from Sylhet, the type, of which no sex was announced, being then in the British Museum, but it is now no longer to be found there. There is a closely allied species found in India, which at first I mistook for Walker's *venusta*. This will be described later on in my volume for the "Fauna" series.

walkeri, mihi, nom. nov.
(*fulvipennis*, Wlk.)

This species of Walker's has to be renamed, *fulvipennis* being preoccupied by Degeer in 1776 for a European species. Walker's type is in the British Museum, valueless for comparison; its sex is not recognisable, and no other specimen appears to be known. Its sex was not stated.

reposita, Wlk., ♂ ♀. Both sexes were described by Walker from Nepal; of the types, in the British Museum, the ♂ is in sufficiently good condition to be useful but the ♀ is reduced almost to a fragment.

melanomera, Wlk., ♂. The type ♂ in the British Museum is in good condition, two other ♂♂ from the same locality (Nepal) being present in the national collection.

nova, Wlk., ♀. Hongkong. I retain this species in the list though I think both Hongkong and Shanghai more fitted to rank in the Palaearctic Region than the Oriental. The type, in the British Museum, is useless for comparison.

vicaria, Wlk., ♂. "India" is sent me as the locality after an examination of the type by Mr. Hill, Walker's quotation being East India. The name *vicaria* is preoccupied by Walker himself in 1848 for a South African species, but as the type (British Museum) is in too bad condition for identification and no other specimen is (apparently) known, I refrain from setting up a new name, as it might be as well to let the species sink, since it would be extremely difficult if not impossible to satisfactorily set up a new type from the author's description.

vilis, Wlk., ♂. Sarawak. Type in British Museum, but useless for comparison, no other specimens being present, but Meijere describes the ♀ from Java. (Tijd. v. Ent., liv, 69.)

schummeli, mihi, nom. nov. Amboina. No sex stated.

(*longicornis*, Dol., *preocc.*)

The name of this species has to be changed, as Schummel used it in 1833 for a European species. It has moreover been used several times since for species which have not been renamed.

infidens, Wlk., ♂. Ceram, Celebes. The type (British Museum) is a unique specimen from Ceram in fairly good condition, and Mr. Hill informs me it is a ♂ and not a ♀ as quoted by Walker. Van der Wulp adds Celebes as a locality.

inordinans, Wlk., ♂. Celebes (Makessur). Type in British Museum in good condition; the only specimen.

fumifinis, Wlk., ♂. Amboina. Van der Wulp spells this erroneously, *fumifines*. Walker thought his species identical with *longicornis*, Dol., but Van der Wulp considers them distinct. The type, a unique specimen, in the British Museum in good condition.

pallida, Wlk., ♂. Papua. Type in the British Museum in good condition, a unique specimen.

punctifrons, Rond., ♀. Sarawak, Borneo. Type not traceable.

serrata, Wulp, ♂ ♀. Serahan. In addition to the type ♂ in the Leyden Museum from Serahan, there is also a ♀ from Sumatra.

pilosula, Wulp, ♂. Java. The described ♂ is in the Leyden Museum, in fair condition. Meijere records a ♂ from Gunung Kenepai, Borneo.

leucopyga, Wulp, ♂ ♀. Java. The described type ♂ and ♀ are still in the Leyden Museum.

* * *

Since Van der Wulp's catalogue, five new species have been described by Meijere, the types being in the Amsterdam Museum. These are—

thibetana, Meij., ♂. Bijd. tot. de Dierk., xvii, 89, pl. viii, 2, 3, wing (1904). Tibet. Technically this should not be included in Oriental lists but it may quite possibly occur at places in the Himalayas, and it is well for the student to be aware of the species, which is described from Tatsienlou in Tibet.

T. cinctipes ♂, *gadchana* ♀, *cinereifrons* ♂ and *inconspicua* ♂ are the other species described by Meijere,¹ all from Java.

It will be seen that, so far as I have been able to ascertain, all the species of *Tipula* given in Van der Wulp's catalogue are good ones. I refrain from compiling them in tabular form, until fuller information is obtainable respecting many of them. A large number of undescribed species have come before me and some of these are herein characterized.

Tipula majestica, mihi, sp. nov.

♂ ♀. Darjiling district. Long. 33 mm. + proboscis 3 mm. and ovipositor 3 mm.

Head.—Back of head light brownish grey, with a very narrow median dark line. Frons and proboscis reddish brown, more greyish above in ♀. Palpi blackish, antennal scape and basal joints of flagellum yellowish red, rest of flagellum black; first three joints of flagellum elongated, remainder much shorter and slightly enlarged below in their centres.

Thorax.—Sides of thorax and ground colour of dorsum, rich deep yellow ochre, bare. Dorsum with a pair of median dark grey contiguous stripes forming the usual centre stripe, with a shorter outer stripe on each side, almost contiguous. The whole of the dorsum of the post-sutural callosity occupied by a concolorous spot; the dorsum of the thorax just above the centre of the suture showing the bright yellow ground colour. Scutellum and metanotum dark grey, a narrow dark brown stripe joining roots of wings to the scutellum. Pleurae gold-yellow, with shining yellow reflections in certain lights.

Abdomen dark brown, microscopically pubescent; posterior margins of segments very slightly darker. In the ♀ there is a tendency to a narrow irregular dorsal stripe, formed by the rather paler centres of the segments. Belly dark blackish grey.

Genitalia in ♂ consisting of a comparatively small dorsal plate bilobed almost to its base, narrower behind, with yellow hair; a pair of claspers with a very large approximately conical black-haired basal joint and a much smaller scoop-shaped second joint, with yellowish hairs. The eighth ventral segment has its edge emarginate in the middle, bent in a sharp curve and clothed in

¹ Tijd. v. Ent., liv, 64, et seq. (1911).

that part with bright golden yellow hair. Intermediate organs invisible. Ovipositor in ♀ shining brown, with reddish tips.

Legs.—Coxae gold-yellow, rather shining, with a little hair; femora and tibiae brownish yellow, tarsi rather darker; tips of femora with a rather narrow black ring.

Wings brownish yellow, veins a little deeper coloured. The centres of most of the cells on the posterior half of the wing rather clearer and there is an indistinct transverse clear streak just before the hardly visible stigma. Halteres blackish.

Described from a ♂ (type) and two ♀♀ all from Darjiling, taken by Mr. F. M. Howlett, 3—9-vi-09, and a ♀ (type) from Kurseong, 24-vi-10 [Annandale].

Type ♂ in the Pusa collection, type ♀ in the Indian Museum.

***Tipula fulvolateralis*, mihi, sp. nov.**

♂. Himalayas. Long. 31 mm. from tip of nose to tip of genital organs.

Head.—Vertex grey; frons one-fourth the width of the head, yellow, with a little grey. Proboscis yellowish, dark brown at tip and on under side, also the labella and the palpi. Antennae yellow, brown towards the tips.

Thorax.—Dorsum brownish grey, forming the usual three dorsal stripes which are nearly contiguous, the middle one reaching the anterior margin and being just perceptibly divided in front, the outer ones short, not reaching the shoulders. Dorsum behind suture, scutellum and metanotum brownish grey.

Sides of thorax rather bright yellowish, the colour extending round the front below the shoulders; a dark brown thin line on each side, below the yellow portion, separating it from the lower part which is almost livid in the type but unicolorous yellow in the second specimen.

Abdomen chestnut-brown. Under side light yellowish grey on basal half, genitalia brownish yellow, pubescent, complex. A dorsal small elongate curved plate, bilobed on posterior half. A pair of large claspers, two-jointed, the 2nd joint rather shorter, scoop-shaped. An internal pair of organs, sub-globular, with narrow stems; a ventral curved plate with a small semicircular piece cut away in the centre, closely pubescent around the emargination with golden yellow hairs.

Legs brownish yellow, coxae livid, with a few whitish hairs, tips of femora with a rather narrow black ring.

Wings moderately dark grey, costal cell brownish yellow (in one specimen with a number of fine but distinct upright lines); stigma hardly distinct from the colour of the costal cell. A small, nearly hyaline spot just above the discal cell, of which the distal side is nearly double the length of the proximal. Posterior cross-vein narrowly but distinctly suffused near its junction with the 5th vein. Petiole of 2nd posterior cell very short. Halteres blackish.

Described from four ♂♂. Type from Bhim Tal (4,500 ft.), Kumaon District, 19—22-ix-06 [Annandale], one from Dhikala, Garhwal District, base of Himalayas, 11-iii-10, and two from Sikkim, the latter in the Vienna Museum.

GEOGRAPHICAL DISTRIBUTION.—Western Himalayas.

Type in Indian Museum (also the Dhikala specimen).

Tipula fumifasciata, mihi, sp. nov.

♂ ♀. Assam, China. Long. 15 mm.

Head almost wholly yellowish grey. Antennae: scape, 1st joint slightly contracted in middle, with a few hairs, 2nd very short; flagellum yellow, with microscopic whitish pubescence, and a verticil of 4 or 5 black bristly hairs at base of each joint.

Proboscis and palpi yellow, both with short stiff black hairs.

Thorax pale yellowish grey. The three normal dorsal stripes pale brownish grey, the median one abbreviated in front, and continued to the anterior margin only in the form of three very narrow lines. Sides of thorax pale yellowish grey, rather darker behind, with a slight brownish tinge behind the wings. Scutellum and metanotum very pale yellowish grey, almost with a greenish tinge.

Abdomen light brown, with microscopic golden yellow hairs, extreme bases of segments very narrowly black, posterior margins of segments narrowly pale yellowish.

Genital organs concolorous, concealed, but large and apparently complex.

Legs yellowish, tips of femora and tibiae a little brownish; tarsi dark brown or blackish.

Wings pale brown, a little darker on anterior half. Distal third of both basal cells nearly clear, the hyaline part continued through the discal and 1st posterior cells to the wing margin. A narrow, irregular clear streak transversely across the marginal cell, just beyond the barely obvious, small blackish stigma, which clear streak joins the clear part of the 1st basal cell. Veins brown, 3rd and 5th longitudinal veins, and the cross-vein connecting the 5th with the discal cell, deeply but narrowly dark brown suffused. Pedicle of fork of upper branch of 4th vein nearly as long as discal cell. Halteres brown.

Described from two ♂♂ and one ♀ (types) in the Indian Museum collection from Ukhrul, Manipur State (6,400 ft.), taken by the Rev. W. Pettigrew in August 1908; also from a cotype ♀ from Central China in the Vienna Museum.

Tipula fumipennis, mihi, sp. nov.

♀. Darjiling. Long. 20 mm. + proboscis 2 mm. and ovipositor 2 mm.

Head mainly dark brown, a little yellow around the base of the proboscis; dark grey on back of head, except a broad median

brown part extending over the frons to the antennae; which latter are yellowish brown; scape paler. Palpi dark brown.

Thorax.—Dorsum dark brown, almost bare, and with the three usual stripes black; the middle one divided down its centre by a narrow pale line. The outer spots normal. Behind the suture, a small yellowish spot on the base of each post-sutural elevation, the dorsum of which is darker brown. The sides of the thorax immediately below the dorsum are occupied by a distinct though rather narrow pale yellowish stripe: below this the pleurae are lighter, shining brown, practically bare. Prothorax rather prominently divided from mesothorax by a deep suture. Scutellum and metanotum brownish yellow, with lighter reflections and some pale hair.

Abdomen uniformly shining dark brown, bare. Belly lighter, with a little light hair. Ovipositor shining dark brown.

Legs.—Coxae light yellowish brown, with pale yellow hairs: femora and tibiae yellowish; femora with a rather broad black ring at tip.

Wings uniformly blackish brown; posterior part slightly lighter, veins blackish. Posterior cross-vein somewhat thickened and infuscated, a character in which the veins in the immediate vicinity appear inclined to partake.

Discal cell distinctly longer than the petiole of the 2nd posterior cell, this petiole rather more than half the length of the terminal veinlets. Halteres blackish.

Described from one ♀ in the Pusa collection, taken by Mr. F. M. Howlett at Darjiling, 3—9-vi-09. I have a damaged specimen from Mussoorie that I captured there in June 1909.

Tipula pluto, mihi, sp. nov.

♀. Tonkin. Long. 32 mm. + 4 mm. proboscis and 7 mm. ovipositor.

Head wholly dull black, as are also the antennae and other organs.

Thorax wholly dull black, unmarked, a very little whitish hair about the posterior margins, scutellum and metanotum.

Abdomen.—First segment brownish yellow, with a blackish mark at the base; 2nd bright yellow with a broad black posterior margin; remainder of segments dull black, with a basal, somewhat narrow, dull leaden grey band on each; last segment wholly black. On the under side the ventral plates almost wholly yellow, narrowly brownish on hind margin. Ovipositor long, shining black; from between the two pairs of valves protrude two narrow, pale, tentacle-like pubescent filaments.

Legs wholly dull black; hind metatarsus as long as the tibia.

Wings blackish grey, veins pale brownish; petiole of 2nd posterior cell only one-fourth the length of the cell. Halteres black, stems very slender.

Described from one ♀ in the Vienna Museum, from Montes Mavson (2—3,000 ft.), taken in April or May by Fruhstorfer.

***Tipula cinerea*, mihi, sp. nov.**

♀. Lombok. Long. 27 mm, including proboscis and ovipositor.

Head dark cinereous; basal joints of antennae a little yellowish; flagellum (mostly broken off) dark brown; palpi dark brown.

Thorax moderately light brownish grey, with the usual three stripes, the median one divided on its anterior half, the outer stripes continued in the usual form of a large approximately oval spot on each side behind the suture. Scutellum and metanotum rather lighter in shade. Sides of thorax light grey cinereous, almost ash-grey, with a median horizontal narrow brown line.

Abdomen dark blackish grey. Ovipositor brownish yellow, shining, of moderate length. Belly whitish at the base.

Legs wholly light brown-yellow, except for a rather broad apical black ring on all the femora.

Wings wholly pale grey; costal cell yellowish; pedicle of 2nd posterior cell half the length of the cell. Halteres blackish.

Described from a ♀ in good condition from Lombok (2,000 ft.), May or June 1896 [Fruhstorfer].

Type in the Vienna Museum.

***Tipula flava*, mihi, sp. nov.**

♂. Sikhim. Long. 30 mm. including proboscis.

The whole body deep orange-yellow. Palpi, labella and antennae a little darker.

Thorax unstriped. Genitalia consisting of a bilobed, oblong dorsal plate, a pair of claspers, of which the first joint is very large, obtusely triangular; the second joint elongate-triangular; the whole organ concolorous.

Legs concolorous, femora tips minutely black; tarsi tips a little darker.

Wings pale grey, veins brownish yellow. Halteres brownish yellow.

Described from a single ♂ taken by Mr. Fruhstorfer in Sikhim in March or April.

Type in the Vienna Museum.

***Tipula himalayensis*, mihi, sp. nov.**

♂ ♀. Himalayas. Long. to tip of nasus ♂, 11—14 mm.; ♀, 11—20 mm. + 3 mm. ovipositor.

Head yellowish, yellowish grey, occasionally with a slight greenish cinereous tinge. A narrow fuscous stripe from behind the head, passing over the vertex, descending to just above the

antennae, where it forms an elongated spot. Antennal scape yellow; flagellum normally dark brownish black, with one or two hairs on each side at the base of each joint; each joint being slightly notched on the upper side just beyond the base and fairly long. In some specimens the flagellar joints are shorter, and when this is the case they are generally mainly yellow with a narrow black line. Occasional intermediate forms, both in the matter of length of the joint and colour, prove that the differences are not specific. Proboscis brownish; palpi more or less brown, first three joints subequal in length, 3rd the shortest; 2nd and 3rd stouter, 4th thin, twice length of 2nd; all the joints moderately pubescent. Eyes black; frons at narrowest part barely one-third of head. Back of head concolorous, a few hairs, especially just behind, but not contiguous to the eyes, also on lower part.

Thorax mainly yellowish grey, varying to ash-grey, often with a slight greenish tinge. Dorsum with three stripes on anterior part, the middle one divided behind, reaching to the suture, and with a darker middle line in front; the outer stripes short, forming elongate spots, all three stripes greenish grey in colour. Each post-humeral callosity bears three similarly coloured spots, an inner oval one, more or less in a straight line with the outer stripe in front of the suture; and two smaller outer ones just above the base of the wings; all the three spots being in some specimens confluent. Shoulders more or less lighter grey, sutural emargination yellowish or greyish. Scutellum yellowish or yellowish grey, with a more or less distinct narrow median line. Metanotum yellowish grey, hinder half more ash-grey, an indistinct median line. Sides of the thorax usually concolorous, but always more yellowish than the dorsum.

Abdomen variable. Generally in the ♂ the first five segments yellowish or yellowish brown, the remainder dull black, but the latter colour sometimes encroaches on the major portion of the abdomen, leaving only one or two basal segments yellow. In the ♀ yellowish or brownish, with three dorsal black lines, but the black colour is even more irregular in its extent in this sex than in the ♂, often covering nearly all the dorsum. In both sexes a narrow black line on each side of the abdomen, which is sometimes lost in the nearly wholly black abdomen in certain specimens.

Male genitalia moderately large, concolorous, composed of an outer pair of firm conical claspers, the basal joint cut away somewhat on the outer side, the second joint comparatively large, with pointed tip; a dorsal narrow plate with yellow hair on its posterior margin. An inner pair of spoon-shaped organs bearing yellow hair.

Ovipositor in ♀ very long (3 mm.), consisting of a long basal cylindrical piece, hard, shining blackish brown, with at each side of it a grey plate with rounded edges, protruding from the last abdominal segment; these plates do not meet above or below. To the end of the basal piece is affixed a pair of long, pointed, slightly arcuated lateral valves, distinctly serrate on the under

side. The lower pair of valves is extremely short, and very liable to be overlooked unless closely searched for.

Legs black. Coxae, knees, femora at the base and a broad ring near the tip pale yellow.

Wings yellowish grey, veins brown, costal cell more or less yellowish. Clearer spots occur in the wings generally towards the tip of the costal cell, at the base of and in the middle of the subcostal, surrounded by the stigma; a streak just beyond the stigma, extending hindwards; a roundish spot in the posterior part of the distal half of the second basal cell, and sometimes small ones at the end of the 6th and 7th longitudinal veins, all these pale spots being more or less indistinct and ill defined, the wing occasionally being nearly wholly clear, and having no yellow in it except in the neighbourhood of the costa. Stigma always brownish, of varying intensity. Halteres yellow, knobs black.

Described from a good series of both sexes in good condition taken by me at Darjiling, 22-ix-08, to 1-x-08, in bushes on the hillside and attracted by the lamps in houses during the evenings. Frequently seen *in cop.* I also took several in the same locality from 10 to 20-x-05, and again from 23 to 29-v-10. The type ♂ and ♀ are in the Indian Museum; cotypes of both sexes are also both in that collection and my own. The Museum series comprises specimens from Bhim Tal (4,500 ft.), 19-22-ix-08, and Naini Tal (6,400 ft.), both taken by Dr. Annandale; Darjiling, 20-x-05; 22-ix-08 to 1-x-08; and 22-29-v-10, all taken by me.

N.B.—The species is variable but within certain limits and can be easily recognised by the pale yellow wide ring on all the femora about as far from the tip as the width of the ring, a peculiarity I know of in no other Oriental species with marbled wings except *elegans*. I describe this species rather fully because it seems the type of a small set of very closely-allied but distinct species frequenting the Himalayas. Three or four of these are present in the Indian Museum. Possibly *himalayensis* or some of the allied species referred to may prove identical with Palaearctic forms.

Tipula robusta, mihi, sp. nov.

♂. Western Himalayas. Total length 20 mm.

Head dark grey: frons one-fifth width of head. Antennae brownish yellow, base of joints very narrowly black. Proboscis and palpi dark brown, pubescent.

Thorax.—Dorsum practically all blackish brown, with the exception of the suture, hind margins of the post-sutural callosities and a broad side and hind marginal border to the metanotum, all of which parts are reddish yellow. Metanotum with some short golden yellow hairs towards its sides, its dorsum dark grey. The median dorsal thoracic stripe attains the anterior margin and is slightly darkened on its edges. The prothorax is very distinct, brown, somewhat divided by a depression from the mesothorax. Neck yellow. Sides of thorax light orange-yellow.

Abdomen brown, 1st segment reddish yellow; 2nd reddish yellow on upper side, last segments blackish. Belly lighter brown, yellowish at base, tip blackish. Genital organs mainly dark brown, large and complex, but considerably concealed between the two large side plates, apparently consisting of a small upper dark brown pubescent plate; a pair of pale yellow flat, pointed organs; the usual pair of large claspers of which each bears a brush-like appendage; and there are apparently intermediate organs also.

Legs.—Coxae yellow, with a little pale gold hair, femora light brownish yellow, tips rather broadly blackish. Tibiae brownish yellow with blackish tips; tarsi yellowish brown, very long; hind pair nearly twice as long as the tibiae.

Wings pale yellowish grey, with darker brownish yellow parts, such as the costal cell, the major part of the 1st basal cell, a large area near the distal part of 2nd basal cell, a squarish spot in the middle of the 6th posterior cell, the whole of the two submarginal cells, and the base of the 1st posterior cell. Stigma yellowish brown, well defined. Veins dark brown, fifth with a tendency to a narrow suffusion. Halteres brownish yellow.

Described from one ♂ in my collection from Mussoorie, taken by me 22-vi-05.

Tipula elegans, mihi, sp. nov.

♀. Western Himalayas. Full length about 20 mm.

Head yellowish grey, more yellow on back of head, from which a narrow, not very distinct fuscous stripe runs over the vertex, but terminates before reaching the base of the antennae. Nasus rather produced, pale yellow, with a pinkish tinge, and some yellow hairs at tip, pointing forwards. Frons one-fourth width of head; eyes black; palpi dark brown, pubescent. Antennae: scape yellow; flagellum dark brown, the base of each joint narrowly black ringed, and with one or two hairs each side, the joints having a microscopic pale pubescence which gives a grey shimmer when seen in certain directions. Proboscis dark brown, tip black.

Thorax.—Dorsum brownish grey, with the three usual stripes shortened and confluent, thus forming a central spot of dark blackish brown colour, which in certain lights has a reddish tinge. Two almost contiguous broad grey stripes (each darkened on its inner side) proceed from the front of the dorsal spot to the anterior border of the thorax.

Two dark reddish brown spots on each side, behind the suture, the upper one circular, the hinder one oval: the hinder half of this latter one, seen from behind, bears a greyish shimmer. A small yellowish cavity just below the shoulders. Prothorax more or less ash-grey, with slightly darker markings and a small brown streak on its upper part.

Scutellum and metanotum very pale brown; posterior half of latter with ash grey reflections seen from behind, with a narrow, dark median line, as has also the scutellum. The scaly ridge in

front of the base of the wings, yellow. Sides of thorax wholly pale greenish grey, with a whitish grey shimmer in certain lights; the elongated metapleura whitish shimmered.

Abdomen tawny yellow, with a median dark brown shining stripe, and a narrow side stripe, below which the extreme edges of the 2nd to the 7th segments are distinctly whitish on the posterior part.

Belly pale yellow, with indistinct median dark line. Ovipositor 3 mm. long; the first part shining black, cylindrical, with a whitish tip, the second consisting of two elongated red-brown sheaths. A reddish yellow ventral plate and an intermediate grey part apparently completes the genital apparatus.

Legs almost exactly as in *himalayensis*, but more brown than black; the tarsi not much longer than the tibiae.

Wings.—A general resemblance to both *himalayensis* and *robusta* in appearance. Costal cell yellow, with only a single small clear spot near tip. A wide, but pale brown band begins on the costa near the base but only reaches the fifth longitudinal vein, and there is an irregular row of nearly clear spots from the base of the 1st basal cell, hindwards to posterior margin of wing, one spot in each cell. The darker parts of the wing are slightly darker than in *robusta*, and the clear spots have a tendency to be still clearer, larger, and possibly more numerous. Halteres black, apical part of club pale.

Described from a single perfect ♀ in my own collection taken by me at Mussoorie, 18-vi-05.

Tipula interrupta, mihi, sp. nov.

♀. Darjiling. Long. 25 mm. including proboscis + 2 mm. ovipositor.

Head.—Frons dark brownish grey, one-fourth width of head. Proboscis dark brown; palpi black. Antennae yellowish, last joints blackish, with a few greyish reflections.

Thorax.—Dorsum, scutellum and metanotum dark yellowish grey, with a little microscopic pubescence. The usual three dorsal stripes barely darker than ground colour. Sides pale yellowish, bare; a little more orange immediately below the dorsum, from shoulder to wing base.

Prothorax prominent, separated by a deep suture, brownish yellow.

Abdomen blackish, with microscopic pale yellowish and dark brown close pubescence; bases of segments with a fairly wide, bare, shining blackish band, not very obvious but distinctly present. Ovipositor short, shining dark reddish brown.

Legs brownish yellow; coxae with a few soft pale hairs; femora and tibiae narrowly black at tips.

Wings pale yellowish; costal cell a little darker; veins blackish. The 5th longitudinal vein infuscated towards tip and at its juncture with the cross-vein. Stigma yellowish brown, occupying

nearly half the marginal cell. A clear streak crosses the marginal cell, apparently cutting away the stigma abruptly, and crosses the proximal end of the discal cell, which latter is pentagonal. Halteres blackish.

Described from one ♀ from Darjiling in the Pusa collection taken by Mr. F. M. Howlett, 3—9-vi-09.

N.B.—Very near *fumipennis*, but differing by the absence of the distinct pale side stripe on the thorax just below the dorsum; by the lighter colour of the head and thorax; by the narrow (not wide) black tips to the femora; the yellowish instead of blackish brown wing; the absence of red on the dorsum of the abdomen, and by the pentagonal shape of the discal cell.

***Tipula nigroapicalis*, mihi, sp. nov.**

♂ ♀. Darjiling. Full length ♂ 15 mm., ♀ 16 mm. + 2 mm. ovipositor.

Head cinereous grey, frons forming one-third the width of the head, with a not very distinct fuscous stripe, continued behind the vertex. Proboscis yellowish brown, with blackish tip; palpi blackish brown, both organs pubescent. Antennal scape yellow, 1st joint of flagellum yellow, the remaining joints yellow, narrowly black at their bases, where there is a verticil of four hairs on each. Under side of head more yellowish.

Thorax cinereous grey, with the usual three dorsal stripes olive or greenish brown, the middle one reaching the anterior margin, the outer stripes in the form of elongated oval spots, almost contiguous with the median stripe. Two post-sutural concolorous spots on each side in the shape of two triangles placed almost base to base. Scutellum and metanotum yellowish, with yellowish grey reflections if viewed from certain directions. Sides of thorax yellowish; below the level of the wings, dark grey.

Abdomen yellowish, with some soft yellow hairs, a dorsal and a lateral blackish stripe, last two segments black. In the ♀ the last segment greyish, penultimate segment grey on under side.

Genitals very complex in ♂, but considerably withdrawn within the two side plates, which themselves appear to be furnished with a thick hook-like appendage each. In addition there are at least two distinct pairs of organs, the larger pair are the usual claspers, conical, black; the other pair are yellowish, flatter and with yellow hairs, a black edge and a strong brown inner tooth. A lower additional pair of black hook-like organs are visible near the ventral plate, and there appear to be other organs not easily discernible in the present specimen.

Ovipositor shining black, with shining reddish brown valves.

Legs.—Coxae and femora yellowish; latter with a blackish ring at the tip; tibiae and tarsi brownish or brownish yellow, tarsi darker towards the tips.

Wings yellowish, a little iridescent in the ♂, rather paler at base of submarginal and 1st posterior cells, also in the middle of the 2nd basal cell, and irregularly, just before the stigma. Costal cell rather darker; stigma yellowish in ♂, brownish in ♀, distinct but ill defined. Veins dark brown. Halteres black.

Described from a type ♂ and ♀ taken 16-20-x-05, and two other ♀♀ 10-16-x-05, all taken by me at Darjiling.

GEOGRAPHICAL DISTRIBUTION.—Darjiling.

Type ♂ and ♀ in my own collection.

***Tipula ornatithorax*, mihi, sp. nov.**

♂ ♀. East and West Himalayas and Sumatra (?). Long. 20 mm. + proboscis 2 mm., and ovipositor 4 mm.

Head tawny orange, tip of proboscis slightly darker; palpi and antennae dark brown, scape of latter orange-yellow.

Thorax uniformly tawny orange. On the dorsum are eight conspicuous bluish grey spots, narrowly edged with black, arranged as follows: two elongated nearly contiguous central ones (forming the usual median stripe) from the anterior margin nearly to the suture. On each side is a shorter one, nearly contiguous. A small circular one at the base of each wing with a nearly contiguous elongated one posterior to it.

Scutellum and metanotum in ♂ light orange-yellow, concolorous with posterior part of thorax; in ♀ scutellum slightly brownish and metanotum with two very indistinct brown streaks.

Abdomen in ♂ blackish, major portion of dorsal surface of basal two-thirds, tawny orange, with a small black spot towards each side of the base of the second segment.

In the ♀ blackish, yellowish above at base, the colour showing a tendency to form a short dorsal stripe.

Belly in ♂ tawny, except last three segments, blackish; in ♀ similar to upper side of ♀ but more yellowish, the posterior borders of the segments narrowly lined with yellow.

Genital organs in ♂ large and complex. A rather large squarish dorsal black plate, the posterior part bilobed, the hind margins with thick bright golden yellow hair. Two large blackish side plates, from within which protrude what are apparently the second joints of a pair of large claspers, conical and scoop-shaped, yellowish. An inner palp-like organ is attached to the second joint.

In the ♀ the ovipositor is also large, dark shining brown, with an upper longer and lower shorter pair of yellow lateral valves.

Legs yellowish brown, tarsi darker, extreme tips of femora and tibiae blackish.

Wings light grey, subcostal cell pale yellowish brown, ending in a pale similarly coloured stigma. Halteres blackish brown.

Described from a type ♂ in the Pusa collection from Darjiling, 3-9-vi-09 [Howlett], and type ♀ in the Indian Museum from Bhowali (Kumaon Dist., 5,700 ft.), July 1909, taken by Mr. A. D. Imms. A specimen (subsequently broken) was seen by me from Kurseong (Darjiling), 21-29-v-06, taken by Dr. Annandale, and the Vienna Museum possesses a ♀ from Sumatra which may be this species or a closely allied undescribed one. The markings on the thorax are less distinctly outlined, the whole insect paler, with clearer wings.

***Tipula sciariformis*, mihi, sp. nov.**

♀. Tonkin. Long. 8 mm.

Head including proboscis, palpi, antennae, wholly black; frons considerably arched.

Thorax wholly bright orange. *Abdomen* somewhat short, wholly black except the base of the first segment, which is orange. Ovipositor not visible.

Legs.—Coxae wholly, the femora narrowly at base, bright orange, remainder of legs black; *tarsi* very long, twice the length of the tibiae.

Wings dark grey, distinctly broader than usual; stigma dark brown, petiole of 2nd posterior cell about half the length of the cell; discal cell small, placed rather more anteriorly than usual. Halteres black.

Described from a single ♀ in good condition taken by Fruhstorfer at Tonkin.

Type in the Vienna Museum.

N.B.—A very peculiar-looking species, having the appearance of a very large *Sciara* with exceedingly long legs. Quite different in general appearance from any other species of the genus seen by me yet the venation and other generic characters are quite normal. Quite likely a new genus may be required for it.

***Tipula demarcata*, mihi, sp. nov.**

♀. Ceylon. Long. about 15 mm. + 1½ mm. ovipositor.

Head brownish yellow, frons dark grey or yellowish grey; about one-third of the head in width. In one specimen are two small black spots on each side, contiguous to the eye margins, and connected thereon by a narrow black line. Proboscis brownish yellow, palpi thin, brownish yellow, darker at tip; labella blackish. Antennal scape yellowish, 1st joint with some black hairs at the tip, making it appear darker in colour, 2nd scapal joint very short; flagellar joints much elongated, brownish yellow or grey, base of each joint very narrowly black, a verticil of four hairs at the base of each joint, two hairs on the upper and two on the lower side.

Thorax.—Dorsum mummy-brown (type) or yellowish; with a slight admixture of yellowish; a narrow dorsal median dark brown line from the anterior border to the suture. Scutellum

concolorous, metanotum pale semi-livid brownish yellow, moderately shining. Sides of thorax very pale pinkish or whitish grey, the colour extending across the neck; it is sharply separated from the dark dorsum, the line of demarcation running from just above the shoulders to below the root of the wing, thence posteriorly to the metanotum.

Abdomen.—Ground colour brownish yellow, but the greater part of each segment blackish, including the sides, except on the sides of the basal segments. In one specimen an indistinct pale yellowish narrow ring towards the base of many of the segments. A very narrow, more or less indistinct pale brownish yellow transverse line in front of the middle of each segment. Belly yellowish. Ovipositor brownish yellow, sometimes marked with black, normal, lower valves shorter than upper one.

Legs.—Coxae pale yellowish grey or pinkish grey, fore pair more yellowish, trochanters very pale yellow; remainder of legs dark brownish yellow, femora may be darker or rather lighter, broadly blackish at tips: tibiae and tarsi black.

Wings very pale yellowish grey, costal cell yellowish. Stigma brown, or the stigmatic region brown, merged proximally in the yellowish costal cell, the basal half of the marginal cell of the same colour as the rest of the wing. Discal cell pentagonal, rather small, the three upper sides forming a rectangle, the lower two sides forming a wide open "V": pedicle of upper branch of 4th longitudinal vein one-fourth as long as the veinlets. Halteres blackish.

Described from one ♀ from Kandy, May 1910, taken by Mr. Green, and another ♀ from Peradeniya, also from a cotype in the Vienna Museum from Peradeniya, taken 25-xii-01 by Dr. Uzel.

GEOGRAPHICAL DISTRIBUTION.—Ceylon.

Type in Indian Museum; cotype in Vienna Museum.

Tipula ochripes, mihi, sp. nov.

♂ ♀. Ceylon. Long. ♂ 18, ♀ 20—22 mm. + 2 mm. ovipositor.

Head yellowish, vertex a little brownish grey in the middle. Back of head similar. Proboscis blackish, robust and rather long; palpi blackish, with base and tips of first three joints more or less pale yellow. Antennae rather short, blackish or very dark brown: tip of the long scapal 1st joint and the whole of the very short 2nd joint, pale yellow; base of 1st flagellar joint, which is long and cylindrical, sometimes yellow also. The remaining joints setaceous, much narrower at the base and tip on the under side of each joint: very minutely pubescent and with a verticil of very short hairs in the middle of each joint.

Thorax.—Dorsum vandyke-brown, tinged with ochraceous here and there around the edges; with three narrow stripes (which sometimes appear as a pair of closely parallel lines, the stripe itself contained by them being practically concolorous with the

dorsum). Scutellum and metanotum similar. Sides of thorax, including the prothorax, yellowish; the colour rather distinctly marked off from the dorsum.

Abdomen blackish brown, with microscopic pale yellow hairs. Sides and belly yellowish grey dusted.

Legs.—Coxae yellowish; femora brownish yellow, tips broadly blackish; tibiae and tarsi to their tips rather bright yellowish, sometimes the tibiae a trifle more brownish yellow.

Wings pale grey, costal cell brownish, brownish yellow or yellowish. A very slight dark brown suffusion over the juncture of the posterior cross-vein with the 5th longitudinal vein. Stigma brownish, comparatively small; a pale streak obliterating the veins runs from in front of the stigma to beyond the discal cell, which it cuts just before or at the middle. Halteres pale, clubs darker.

Described from one type ♂ from Kandy, 20-v-10 [*Gravelly*], one other ♂ from Peradeniya, Ceylon, a type ♀ from Kandy, 31-x-09 [*Green*], and two other ♀♀ from Kandy, May 1907 [*Green*]: all these being in the Indian Museum. One ♂ in the Vienna Museum from Ceylon.

GEOGRAPHICAL DISTRIBUTION.—Ceylon.

Type ♂ and ♀ in the Indian Museum; cotype ♂ in Vienna Museum.

NOTES.—This species is near *T. vicaria*, Wlk. The discrepancies appear to be that in Walker's species the abdomen has two darker brown stripes, the femora have no black rings at their tips, and the tarsi are brown. *T. vicaria* is described from the "East Indies," not "East India" as given in Van der Wulp's catalogue. Walker's "incomplete whitish band by the stigma" I presume to represent my "obliterative streak."

Tipula divisa, mihi, sp. nov.

♂. Darjiling. Long. 11 mm.

Head.—Frons, at level of antennae, nearly one-third width of head, yellow, as is the face and proboscis, sides of latter brown, with some short black hairs. Palpi dark brown. Antennal scape yellow, second joint very short; flagellum black, each joint microscopically pubescent, rather elongated, and slightly swollen at base and towards tip, with a verticil of hairs just above the base. Last joint very minute. Back of head yellowish, with some hairs.

Thorax mainly bright chrome yellow, bare. Dorsum with the three usual stripes, of which the median one attains the anterior margin and is divided by a narrow line, and is much less distinct than the outer shorter ones. These are somewhat velvet-brownish in colour. Post-sutural surfaces brownish yellow. A brown indistinct stripe from just below shoulders to the middle coxae. Scutellum, metanotum and sides of thorax uniformly chrome-yellow.

Abdomen shining brown, base yellowish; posterior margins of segments with a distinct, well-defined pale yellowish white

border which bears pale yellow hairs; the rest of the dorsal surface bears rather thick short dark brown hairs. Anal segments dark brown.

Genitalia dark brown, consisting of a strong upper piece, with two small pubescent appendages. Two side plates, meeting on under side enclose a complex pair of large claspers, which bear terminal pale yellow pubescent finger-like processes, and a strong pair each of bifid black claws pointing upwards. A pair of yellow-haired, comb-like processes are just below the large claspers.

Legs (hind pair missing).—Femora brown, paler at base and blackish towards tips. Knees a little pale. Tibiae and tarsi black.

Wings nearly clear; costal cell and stigma brownish. 5th longitudinal vein slightly darkened; an indistinct hyaline streak from just in front of the stigma to the discal cell.

Described from a single ♂ in the Pusa collection taken by Mr. Howlett at Darjiling, 3—9-vi-09.

Tipula gracilis, mihi, sp. nov.

♀. Darjiling. Long. 12 mm. + ovipositor.

Head.—Antennal scape yellow, with a few hairs on upper side, flagellum black, with microscopic grey pubescence and a verticil of hairs at base of each joint. Proboscis, palpi, frons and back of head, brownish yellow, with a few pale hairs on each side of the centre.

Thorax ferruginous brown; the three dorsal stripes and a large one on each post-sutural callosity, all united; the suture very narrowly pale. Scutellum, basal half yellowish, posterior half light ferruginous brown. Metanotum and sides of thorax yellowish brown with a little shining yellowish grey colour about the pleurae.

Abdomen dull black, with very short sparse grey hairs; yellowish at base, posterior border of segments whitish. Ovipositor shining black, terminal sheaths brownish yellow.

Legs brownish yellow, microscopically pubescent; coxae with a few short hairs; femora yellowish with black tips; tibiae and tarsi dark brown.

Wings yellowish; costal cell and stigma deep yellow, the latter distinct. An indistinct subhyaline streak from the inner side of the stigma to the basal half of the discal cell. Fifth longitudinal vein on distal part apparently double, forming a flattened triangle at its junction with the cross-vein connecting it with the fourth vein. Seventh vein very close to hind border of wing, and parallel to it. Halteres blackish.

Described from one specimen in my collection taken by me at Darjiling, 7-x-05.

PACHYRHINA, Macq.

LIST OF, AND NOTES ON, DESCRIBED SPECIES.

javana, W., ♂. Type in Westermann's collection in the Vienna Museum.

bombayensis, Macq., ♂ ♀. Bombay, Bengal, East Indies. Type in Bigot's collection. A good series of what can hardly fail to be this species is in the Pusa collection, from Pusa, where it occurs all the year round except (apparently) May, June and December. Meijere thinks this may be synonymous with the preceding species, and records it from Java. Three specimens are in the Indian Museum. The principal characters of the species appear to be the ferruginous colour, the fading away of the thoracic stripes in front, and the black triangular spot on each abdominal segment which often combine and form an interrupted or uninterrupted dorsal stripe.

N.B.—An undescribed species in the Indian Museum is very near, but I think quite distinct from, Macquart's species.

delta, Wlk., ♀. East Indies, according to my information, not East India as quoted by Van der Wulp. Type in British Museum with a second ♀.

tripartita, Wlk., ♂.

tenuis, Wlk., ♂.

colorata, Wlk., ♀.

Of these three species the types appear to be lost, Mr. Waterhouse informing me that they were evidently never in the British Museum. Of *colorata* Meijere records a ♀ from Dutch South Papua which agrees pretty well with Walker's description, to which he adds further notes.

doleschalli, Os. Sac., ♂ ♀. Java, Sumatra, Amboina, Ceylon.
fallax, Meij.

Of this species Van der Wulp gives two synonyms, *P. javensis*, Dol., of which the type is in the Vienna Museum, a ♂, in somewhat damaged condition, a certain amount of identification being possible; and *fasciata*, Macq. I have no means of testing these synonyms, the bare descriptions not being sufficient, but think that Osten Sacken must have accepted them as such, as he seems to have inspected all the described species of his time. The type of *doleschalli* is a ♀ from Buitenzorg, Java, in the Genoa Museum, where is also a specimen from Ajer, Mankior (Sumatra). Herr Meijere sinks his own *fallax* (Bijdr. tot. de Dierk, xvii. 90) as a synonym of *doleschalli*, in his latest paper.¹ Three ♀ ♀ in the Indian Museum from Naini Tal are almost certainly this species. A description of this form is added further on.

familiaris, Os. Sac., ♂ ♀. Sumatra. Types in Genoa Museum (four specimens) from Mt. Singalang. Meijere in recording a ♀ from Java adds some notes to the description of the species.

melanura, Os. Sac., ♀. Papua. Type in Genoa Museum.

laconica, Os. Sac., ♀.

ortiva, Os. Sac., ♀. These two species, described from the Philippines, were in Osten Sacken's collection. Present location unknown to me.

¹ Tijds. v. Ent., liv (1900).

nigro-annulata, Wulp, ♂ ♀. Morotai. A type ♂ in good condition and two ♀ ♀ in fair condition determined by the author of the species are in the Leyden Museum.

quadrivittata, Wulp, ♂. Java. Type in Leyden Museum.

triplasia, Wulp, ♂ ♀. Java. Types in Leyden Museum.

immaculata,¹ Wulp, ♂. Java. Type in Leyden Museum.

Four species have been comparatively recently described by Meijere² from Java, the types being in the Amsterdam Museum. These are *dorsalis* ♀, *fallax* ♂ ♀, *scurroides* ♀, and *dimidiata* ♀, but *fallax*, as noted above, is now considered by its author synonymous with *doleschalli*. Os. Sac. He describes the ♂ of *scurroides* subsequently.³

N.B.—Although no species is definitely here sunk as a synonym, it is possible that further study of this genus may reduce their number. Many of the species are described from single specimens, and nearly all of them seem likely to prove variable; in fact since working at the Oriental Tipulidae *Pachyrhina* has always proved the most refractory genus of all.

Pachyrhina doleschalli, Os. Sac.

Tipula javensis, Dol.

Pachyrhina fasciata, Macq.

I think there can be no doubt that three ♀ ♀ in the Indian Museum are this species and that it is very variable. Osten Sacken surmised as much, noting the variability of the abdominal marks and the spots on the pleurae; whilst various remarks in the three different descriptions of this species (Doleschall's, Macquart's and Osten Sacken's) support this view. The three examples before me are distinctly lemon-yellow, especially on the thorax, thus agreeing with Doleschall's "citrino-flavo," Macquart's remark that the metathorax is all yellow is probably an error for metanotum, which in one of the three specimens is very conspicuously lemon-yellow, unmarked, in another bright lemon-yellow with an orange hind border, and in the third orange with a blackish hind, or rather lower margin. The scutellum also varies, being in two specimens shining black, in the third shining brownish yellow, sublucid. The abdominal marks are quite certainly very variable. The first example has the basal segment black, a broad black band on hind margins of 2nd and 3rd segment, a narrow one on the 4th and 5th, the 6th being mainly blackish. In the second specimen the only black is the tips of the 2nd and 3rd segments, the whole of the 6th and the base of the 7th. In the third specimen the marks are similar, but narrower, and rather less intense. The fore femora have a broad blackish central band which is quite distinct in one specimen, much less so in the second, the third having these legs missing. This character has

¹ Van der Wulp quotes page 126 incorrectly for 196.

² Bijdr. tot de Dierk., xvii, 89—90.

³ Tijds. v. Ent., liv, 75.

not been noted before. In one specimen the pleurae are a little black marked, in another they are entirely lemon-yellow except for a rather large pale orange spot below the wing root.

Macquart notes the second posterior cell is nearly petiolate. In two of the three examples before me it is quite distinctly so, as much as in many species of *Tipula*; in the third it is very shortly, but still practically so, and slightly more in one wing than the other. All these points prove the variability of the species in many particulars, and the comparatively small size of the discal cell, which is emphasized in the present specimens, is also a strong specific character.

Described from three ♀♀ in the Indian Museum collection, two from Bindukhera (Naini Tal Distr.), 3-iv-10, and one from Gangapur' Pattia (Naini Tal Distr.), 4-iv-10.

Pachyrhina dorsopunctata, mihi, sp. nov.

♂ ♀. Bengal, South India, Ceylon. Long. ♂ 12-14, ♀ 15-18 mm.

Head deep yellow. Proboscis, labella and palpi more or less brownish. Antennal scape deep yellow, flagellum wholly black.

Thorax.—Dorsum between the stripes orange-yellow, the colour fading at the edges of the dorsum to paler yellow; sometimes the whole dorsum pale yellow. Thoracic stripes dark blackish brown, the median one sometimes a little paler towards the anterior margin. The dark marks on the prothorax and behind it, as in the other species, sometimes appearing as a definite continuation of the median thoracic stripe. Post-sutural stripes more of a flattened triangle in shape, not joined to the outer stripes in front of them. Scutellum black or dark brown, shining; metanotum yellowish on upper half, with or without narrow dark median line, black on lower half. Sides concolorous, or a little paler, upper and lower parts of sternopleurae a little more orange.

Abdomen yellow or orange-yellow, with a row of dorsal elongate triangular black spots in the ♂ which have a tendency to spread out on the hind margin, actually doing so on the last two segments. In the ♀, one specimen has the marks as in the ♂ but they are rather more extensive; the other has a black band on the hind margin of each segment. Traces of a black narrow side line in both sexes; belly yellowish.

Legs wholly yellow; tips of femora and tibiae narrowly black; tarsi blackish.

Wings very pale grey; subcostal cell dark brown, prongs of fork of upper branch of 4th longitudinal vein issuing quite separately from discal cell. Halteres yellowish.

Described from two ♂♂ and two ♀♀ in the Indian Museum from Katihar, 30-xi-09, type ♂, Bhogaon, 20-xii-09 [both Purneah District and *Paiva*]; Maddathorai, Travancore, South India, 17-xi-08, type ♀ [*Annandale*]. One ♀ from Ceylon is in the Vienna Museum.

GEOGRAPHICAL DISTRIBUTION.—Bengal, South India, Ceylon.
Type ♂ and ♀ in Indian Museum.

N.B.—The South Indian example, which has to be erected as the type ♀, the remaining ♀ being incomplete, has black bands on the abdomen instead of spots, but this is the only difference. It is somewhat akin to *P. doleschalli*, Os. Sac.

***Pachyrhina consimilis*, mihi, sp. nov**

♂ ♀. Himalayas. Long. 9—14 mm.

Head deep chrome-yellow; proboscis generally a little lighter, with a wide dark brown stripe on upper side and dark brown labella; palpi also dark brown. Back of head at junction with thorax, with a dark brown triangular mark. Antennal scape deep yellow, flagellum black, the joints distinctly but only slightly thickened at the base, verticillate hairs short. Sometimes in the ♀ the antenna is dark brown, the second joint of the scape being also brown tinged.

Thorax deep chrome-yellow. The three dorsal stripes deep black, shining, very clear cut; the median one, which attains the anterior margin, more or less extended downwards along the edge behind the prothorax, on which there is often a brown spot or streak on each side in this vicinity. The outer dorsal stripes turn sharply down over the sides at their tips, their limits sharply defined. The post-sutural elongate spots are equally deep shining black and clearly cut, reaching from above the root of the wing to the scutellum. Scutellum light livid brown, sometimes yellowish, with or without a brownish or blackish mark in the centre. Metanotum bright chrome-yellow, with a more or less distinct narrow or moderately wide brownish longitudinal stripe. Sides of thorax rather lighter yellow, sternopleurae with a tawny brown, semi-transparent spot on the upper and lower part, leaving the middle concolorous.

Abdomen normally bright or deep yellow, with, in the ♂, a longitudinal median black stripe of moderate width, composed of a row of elongate spots more or less united to one another, the black colour towards the tip spreading more or less over the whole dorsal surface. A lateral narrow stripe similarly formed.

In the ♀, the abdomen is wrinkled and bears a large, more or less square, blackish spot on each segment, generally of sufficient size to form an apparently continuous dorsal stripe, but the posterior margin itself of each segment is yellow and well defined. There are also numerous irregularly placed small black spots between the dorsal stripe and the rather broader (than in the ♂) lateral stripe each side. Belly similar to dorsal surface.

Genitalia in ♂ complex: a side plate is present, and a small yellow V-shaped ventral plate, protecting a somewhat conspicuous keel-like protuberance immediately above it, joined to the large swollen base of the claspers.

Legs variable; normally yellow, the femora becoming brownish

on apical half, sometimes quite blackish on that portion; but often the femora are mainly yellowish with an indistinct brownish or blackish ring of varying width at the tip. The tibiae vary from yellowish to brownish; the tarsi generally brownish yellow or brown.

Wings pale grey; the forks of the upper branch of the fourth longitudinal vein vary in their emergence from the discal cell, sometimes being distinctly separated, sometimes issuing simultaneously, and sometimes forming a short petiole. Stigma moderately large, varying from pale yellow to brown; subcostal cell varying from yellowish to rather dark brown. Halteres yellow.

Described from a lengthy series in the Indian Museum from Darjiling, 23-28-v-10 [*Brunetti*]; 5-10-viii-09 [*Paiva*]; 1-x-08 [*Brunetti*]; Kurseong, 19-24-vi-10, 5-vii-08, 5-8-ix-09, and Bhim Tal, 19-17-ix-06 [all *Annandale*]; Mussoorie, 22-v-05 [*Brunetti*], and Gangtok, Sikkim, 22-v-05. In the Vienna Museum is a ♀ from Sikkim.

GEOGRAPHICAL DISTRIBUTION.—Probably the greater part of the Himalayas.

Type ♂ and ♀ in Indian Museum.

NOTES.—Apparently the commonest species to be found in the hilly parts of North India, but no specimen has occurred either from the plains or even from a hilly locality apart from the Himalayas.

Section III. DOLICHOPEZINI.

SCAMBONEURA, Os. Sac.

vittifrons, Wlk. (*Limnobia*). Amboina. The type, a ♀ in the British Museum, is reduced to a thorax and a wing only. I can trace the existence of no other specimen. Osten Sacken (writing from memory of the type) removed the species to the present genus, presumably on the strength of the characteristic venation.

dotata, Os. Sac. Described from two ♂♂ from the Philippines.

MEGISTOCERA, W.

fusca, W. Java. This genus is unknown to me, but Meijere records it from Java recently. Quite a number of species have been included in this genus which do not belong here yet the two original species included by Wiedemann are congeneric, *filipes*, Fab., from Guinea and *fusca*, from Java. The sexes have also caused much confusion on account of the small size of the ♂ genitalia and the fact that some species have long (sometimes extraordinarily long) antennae in the ♂ only, whilst others have these organs short in both sexes. Osten Sacken clears up a number of mistakes (Berl. Ent. Zeits., xxx, 158) and recharacterises the genus, *loc. cit.* Species of *Eriocera* with very long antennae have several times been considered *Megistocerae*, but the very different

venation should prevent further error. It is as well to note that Macquart's figure gives an incorrect representation of the wing.

TANYPREMNA, Os. Sac.

omissinervis, Meij., Nova Guin. Results, 71, fig. 4 (1906). Recorded from Papua. The only other three species known are from Central America, Brazil and Australia.

DOLICHOPEZA, Curt.

Herr Meijere introduces a species, *gracilis* ♂ (Tijd. v. Ent., liv, 60, pl. iv, fig. 46, wing), from Java, and the Indian Museum possesses two others that I shall describe later.

Subfamily LIMNOBIINAE.

Section I. CYLINDROTOMINI.

This section has not been previously recorded from the East, but I am able to describe a species which appears to be a *Cylindrotoma* of a slightly different type to the other species known from Europe and elsewhere, or it may later on be regarded as the type of a new genus.

Cylindrotoma quadricellula, mihi, sp. nov.

♂. Darjiling. Long. 6-6½ mm.

Head viewed from above, oval; blackish, bare above; frons short, much wider on vertex where it is about one-fourth the width of the head. Face below antennae a little lighter; palpi small, black. Antennae: scapal joints short, yellowish, the fourteen joints of the flagellum dark brown, the joints very elongate, somewhat difficult to distinguish from one another, especially towards the tip, each joint covered with very long thin verticillate hairs quite irregularly arranged. *The whole antenna is as long as the whole body.*

Thorax reddish brown, *closely punctured* round the edge of the dorsum, a little in front of and between the three dorsal, almost concolorous stripes, the configuration of which is distinct although they show only a slightly darker shade of colour. A narrow band, a little lighter in colour, just below the dorsum, is free of punctures, but the sides of the thorax, below this band, the scutellum and the metanotum are all closely and conspicuously punctured.

Abdomen linear, narrow, dark red-brown, a little blackish here and there, practically bare; belly similar. Genitalia blackish, rather small; a pair of slightly pubescent two-jointed claspers, with some internal organs, protected by an upper and lower plate.

Legs.—Coxae brownish yellow, bare; remainder of legs similarly coloured, gradually becoming darker towards the tips, the tarsi being blackish.

Wings grey. Auxiliary vein apparently turns downward into the 1st longitudinal vein at some little distance beyond the middle of the wing, and it is connected just before its tip, by a short cross-vein with the costa.¹

The 1st vein turns distinctly into the 2nd a little beyond the level of the anterior cross-vein, and a little way before its tip it is connected itself with the costa by a cross-vein, presumably the marginal cross-vein. The 2nd longitudinal, which begins some distance before the middle of the wing, gently arcuating, turns abruptly up (at the point where it meets the anterior cross-vein, in a similar angle to that taken by the fourth vein in *Musca* and *Lucilia*) until it meets the 1st vein; thence running parallel to the costa and ending in it some little distance before the tip of the wing. The 3rd vein, which runs nearly straight to the exact tip of the wing, and the anterior cross-vein, originate together from the angle in the 2nd vein where the latter marks the end of the praefurca, this section being longer than the rest of the 2nd vein. Discal cell hexagonal, the lower half consisting of three sides, the cell twice as long as broad and about as long as the second and third posterior cells. Anterior cross-vein shorter than proximal side of discal cell; posterior cross-vein just beyond middle of discal cell; 5th vein sharply angled at its juncture with the posterior cross-vein, whence it runs straight to the wing-margin; 6th and 7th veins nearly straight. The first, second and third veins near their tips are microscopically spinose.

Described from three ♂♂ in the Indian Museum from Kur-seong, taken by Dr. Annandale, 18-vi-10 (type), 23-vi-10 and 6-vii-08.

DISTRIBUTION.—Darjiling district.

Type in Indian Museum.

Section II. LIMNOBINI.

DICRANOMYIA, Steph.

saltans, Dol., ♂ ♀ (*Limnobia* ? *id.*), Os. Sac.²

Recorded from Java and the Philippines. The whereabouts of the type is very uncertain. It is not in the Amsterdam Museum, but other specimens of this species, taken by Herr Jacobson in Java, are present. Specimens in the Indian Museum (four ♂♂ one ♀) are from Travancore, South India.

I should not be surprised to find the *Limnobia apicalis* of Wiedemann identical; if so the latter name has priority.

¹ It may be considered that the auxiliary vein turns upward to the costa, with a cross-vein joining it to the first vein, but it does not at all convey that impression.

² Berl. Ent. Zeits., xxvi, 88, notes.

Mr. F. W. Edwards, writing recently¹ on some Ceylonese Limnobiinae, puts this species in the genus *Thrypticomys*, Skuse, and emends the spelling of the specific name to *sallens*.

cuneiformis, Meij. Tijd. v. Ent., liv, 23 ♂, pl. i, 2 (wing).

Very closely allied, as the author says, to *D. sallans*, Dol., but quite distinct. One ♀ in the Indian Museum collection is undoubtedly this species, and is from the Dawna Hills, Lower Burma (2—3,000 ft.), 2—3-iii-08 [Annandale]. The difference in the wings is sufficiently striking when the two species are placed side by side. Besides being distinctly narrower in *cuneiformis*, the 2nd longitudinal vein originates beyond three-quarters the length of the wing, and (reckoning from the origin of the 4th longitudinal) the inner end of the discal cell is placed at four-fifths of the wing's length, whilst in *sallans* it occurs very distinctly before that distance. In Meijere's species the veins from the 2nd longitudinal hindwards are much more removed to the tip of the wing than in *sallans*.

N.B.—It may be noted that both Doleschall and Meijere describe the tarsi of their respective species as snow-white. This is indeed so, but the basal part of the metatarsus (varying from a third to a half) is dark, like the tibiae. This is apparently an oversight, as it is not always easy to define the exact limits of each tarsal joint.

Mr. Edwards refers this species also to *Thrypticomys*, a genus in which the basal part of the wing is extremely narrowed, without any vestige of anal angle. Personally I have my doubts of the validity of *Thrypticomys* on account of intermediate forms (*vide post.*).

kobusi, Meij., ♂ ♀. Bijd. tot. de Dierk, xvii, 91, pl. viii, 5—6, Java. The type is in the Amsterdam Museum, from Java. Specimens in the Indian Museum identified by me as this species are from Kurseong, Darjiling district.

N.B.—If *Thrypticomys* be valid, this species also will fall in it. *pulchra*, Meij., *loc. cit.* (*Rhipidia*).

id., *id.*, Tijd. v. Ent., liv (*Dicranomyia*).

* * * *

N.B.—In addition to *cuneiformis*, Meijere in the same paper describes the following species from Java, the types being in the Amsterdam Museum: *D. convergens*, ♂ ♀; *umbrata*, ♂ ♀; *punctulata*, ♂; *nervosa*, ♀; *tenella*, ♂ ♀. The genus must be extensively represented in the East, as I have in manuscript the description of no less than nearly twenty additional species, all from India.

longivena, Edwards, ♀. Ann. Mag. Nat. Hist. (8), viii, No. 43, 59. One ♀ from Dondra, Ceylon, taken 3-xii-07 by Mr. T. B. Bainbrigge-Fletcher.

¹ Ann. Mag. Nat. Hist. (8), viii, No. 43, p. 58 (1911).

Mr. F. W. Edwards, writing recently¹ on some Ceylonese Limnobiinae, puts this species in the genus *Thrypticomys*, Skuse, and emends the spelling of the specific name to *saltens*.

cuneiformis, Meij. Tijd. v. Ent., liv, 23 ♂, pl. i, 2 (wing).

Very closely allied, as the author says, to *D. saltans*, Dol., but quite distinct. One ♀ in the Indian Museum collection is undoubtedly this species, and is from the Dawna Hills, Lower Burma (2—3,000 ft.), 2—3-iii-08 [Annandale]. The difference in the wings is sufficiently striking when the two species are placed side by side. Besides being distinctly narrower in *cuneiformis*, the 2nd longitudinal vein originates beyond three-quarters the length of the wing, and (reckoning from the origin of the 4th longitudinal) the inner end of the discal cell is placed at four-fifths of the wing's length, whilst in *saltans* it occurs very distinctly before that distance. In Meijere's species the veins from the 2nd longitudinal hindwards are much more removed to the tip of the wing than in *saltans*.

N.B.—It may be noted that both Doleschall and Meijere describe the tarsi of their respective species as snow-white. This is indeed so, but the basal part of the metatarsus (varying from a third to a half) is dark, like the tibiae. This is apparently an oversight, as it is not always easy to define the exact limits of each tarsal joint.

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¹ Ann. Mag. Nat. Hist. (8), viii, No. 43, p. 58 (1911).

LIMNOBIA, Meig.

costalis, W. East India. No sex stated. This is probably a good species but may not be a true *Limnobia*. The type still exists in the Copenhagen Museum, marked "Ind. or." and is in rather bad condition. The wings are intact but the sex is indeterminate, as the tip of the abdomen is gone. My thanks are due to Prof. Lundbeck for the above information.

apicalis, W., ♂. Sumatra. Of this species nothing remains of the type but the thorax and wings. In the Winthem collection at Vienna Museum. As stated just previously I am inclined to think this species identical with *Dicranomyia saltans*, Dol. (v. *D. saltans*).

bibula, W., ♀. China. Osten Sacken says it is probably a true *Limnobia*. It may possibly be identical with a species in the Indian Museum.

(L. ?) *aterrima*, Wlk., ♀. East India. The type is not to be found in the British Museum, but Osten Sacken thought it might be an *Eriocera*. From this opinion it is almost certainly not a *Limnobia*.

infixa, Wlk., ♂. Papua. The type (the only specimen known, apparently) is in the British Museum, and though now in too bad condition for comparison, it was identified as a true *Limnobia* by Osten Sacken years ago.

sanguinea, Dol. Java. Of this species there is no information available beyond the original descriptions. The whereabouts of the type is unknown. No sex is stated but from the figure it appears to be a ♂.

N.B.—I have in MS. the descriptions of nearly a dozen new species from India.

CERATOSTEPHANUS, mihi, gen. nov.

General appearance and structure identical with *Limnobia*, Mg., and *Dicranomyia*, Steph. Venation as in *Limnobia*, except that the auxiliary vein, ending a little beyond the middle of the wing, is almost exactly opposite the origin of the 2nd longitudinal vein, with the subcostal cross-vein at its tip.

Eyes closely touching on upper side for the whole distance from the vertex, also contiguous on under side. Proboscis of moderate length, palpi stout, rather long, 4-jointed, 1st joint the shortest.

The second generic character of importance is the extraordinary appendages to the antennae. The 1st scapal joint is normal, moderately long, rather broader at the tip, the 2nd is large, wider, oval, both joints with stiff hairs. The flagellum consists of twelve elongate joints, each with a pair of diverging strong long bristly hairs on the upper side; situated a little beyond the base and furnished on the under side at about the same place with a pair of large elongate conspicuous palp-like pubescent appendages.

The legs are very thin and much lengthened.

NOTES.—The peculiar formation of the antennae in this genus immediately distinguishes it from all others known from the East. There is a resemblance in the antennal appendages to Westwood's illustration of *Ozodicera gracilis*,¹ Westw., but that genus belongs to the subfamily Tipulinae.

Ceratostephanus antennatus, mihi, sp. nov.

♂. Western Himalayas. Long. 4 mm.

Head.—Back of head blackish, with a few bristles. Owing to the construction of the eyes, which are absolutely contiguous from the vertex downwards, there is no frons, but a row of irregular-sized bristles set between the eyes shows the only line of demarcation between them. Proboscis brown, palpi dark brown, pubescent, first joint the shortest, the others comparatively long. Antennae: 1st scapal joint elongate, broader at tip, 2nd enlarged considerably, oval, both with stiff hairs. The flagellum is of twelve elongated cylindrical pale yellow joints, with a pair of strong long diverging bristles on the upper side just beyond the base. On the under side at about the same place are two dark brown elongate palp-like processes, very conspicuous, pendant and of considerable size, with whitish pubescence.

Thorax brownish, darker on the dorsum; scutellum and metanotum of similar colour.

Abdomen brownish yellow, sides of abdomen and posterior margins of segments distinctly blackish; belly similar. Genitalia consisting of a pair of large linear fleshy claspers of two joints of equal length and size, below which is a horny narrow elongate style, apparently immovable.

Legs brownish yellow; tips of femora and tarsi barely darker.

Wings.—Venation as in typical *Limnobia*, except that the auxiliary vein ends just above the origin of the second longitudinal vein, with the subcostal cross-vein at its tip. Colour of wing almost clear, with very numerous very small pale grey spots and short streaks covering the surface. A very slightly darker grey, just sufficient to be perceptible, over the cross-veins, the origin of the 2nd vein, tip of 1st vein, tip of 7th vein, and at two places on the costa, the first nearly basal, the second opposite the tip of the 7th vein. In all the darker grey spots along the costa the 1st longitudinal vein is black.

In the rest of the wing the veins are generally brownish, but here and there for a short distance they are sometimes pale yellow, sometimes black. Halteres pale yellowish, clubs barely darker.

Described from a single ♂ from Simla, 24-iv-07 [Annandale].

GEOGRAPHICAL DISTRIBUTION.—Western Himalayas.

Type in the Indian Museum.

¹ Trans. Ent. Soc. Lond., 1881, pl. xviii, fig. 8a, antenna, 8b, wing.

ATYPOPTHALMUS, mihi, gen. nov.

Allied to *Limnobia*, Meig., from which it differs only in the eyes being *absolutely contiguous in both sexes* from the vertex to half-way to the base of the antennae; they are also contiguous on the lower side in both sexes.

There is a distinct neck; the proboscis is about half the height of the head; the male genitalia are large and conspicuous.

Atypophthalmus holopticus, mihi, sp. nov.

♂ ♀. Calcutta. Long. $4\frac{1}{2}$ —5 mm.

Head.—Vertex and back of head yellowish grey with long stiff hairs. *Eyes contiguous above in both sexes* for a considerable distance, below which is a very narrow, short grey frons; they are also contiguous on the under side. The surface of the eyes is bent inwards.¹ Proboscis, palpi and antennae brownish yellow or pale brown, the joints subcylindrical, a little elongated; the last joint attenuated, "pinched" towards the tip, making it appear almost like two joints.

Thorax.—Dorsum brownish yellow. Three brownish oval spots, the upper one taking the place of the usual median stripe, situated just in front of the suture, but only extending half-way to the anterior margin, the other two spots placed behind the suture in the usual position. Scutellum of the same colour as these spots. Sides of thorax and metanotum brownish yellow, the centre of the latter brownish, a lateral dark brown stripe across the pleurae.

Abdomen in ♂ blackish, in ♀ more dark brownish, shining; belly in ♂ with the basal part of the basal segments yellowish, in the ♀ belly almost wholly yellowish.

Genital organs in ♂ large, conspicuous and complex:—

A large squarish brown dorsal plate, with the corners rounded and the hind margin emarginate, with stiff black hairs on its dorsum and long yellow hairs on the hind margin. The large first joint of the claspers is irregularly shaped, longer than broad, narrower apically, where from an invaginated recess issue from each joint a strong black hook and a moderately long cylindrical, yellowish appendage of softer texture with hairy tip. A very distinct inner pair of claspers are two-jointed, the first joint approximately ovate, narrower at the tip, the second joint evidently hard, horny, shining brown, in the shape of a long hook. There is also a peculiar, large central piece, apparently fleshy, yellowish in colour, with an obtuse tip which reaches posteriorly not beyond the first joint of the inner pair of claspers. This central piece is enlarged below into a sort of cup-shaped cavity

¹ This may be accidental, or due to shrinking after death, but the specimens are in perfect condition otherwise, and show no trace of damage; moreover, the feature indicated is present in both eyes of both specimens.

facing hindwards, and appears to be attached to the root of the hypopygium immediately above the ventral V-shaped plate.¹

Ovipositor in the ♀ apparently normal but somewhat large, especially the basal portion.

Legs brownish yellow, tips of femora darker.

Wings pale grey, venation practically normal; auxiliary vein ending nearly half-way between the beginning of the 2nd vein and the tip of the auxiliary vein. Discal cell nearly square, about as long as the 2nd and 3rd posterior cells, its inner side in a direct line with the posterior cross-vein. Stigma distinct but ill defined, blackish, a faint small infuscation at the base of the 2nd vein. Halteres: stem yellow, clubs blackish.

Described from a single male and female taken by Dr. Annandale in Calcutta, the ♂ (8-ix-10) in a spider's web, the ♀ (20-viii-09) in the house, at night.

GERANOMYIA, Hai.

sorbillans, W., ♀ (*Limnobia*). Sumatra. Types in Dr. Trentepohl's and the Wiedemann collection, at Vienna.

Four new species are described by Meijere² from Java: *nitida* ♀; *argentiifera* ♂ ♀; *montana* ♂ ♀; and *notata* ♀. The types of these are in the Amsterdam Museum. Mr. Edwards adds one from Ceylon,³ *G. fletcheri*, ♀, from Madulsima, 19-v-08 (type), and 21-xii-07 [*T. B. Fletcher*].

In addition to the three herein described, I have descriptions in manuscript of six others from various parts of the Indian Empire.

Geranomyia vinaceobrunnea, mihi, sp. nov.

♀. Western Himalayas. Long. 6 mm.

Head dark grey: frons narrow, narrower on vertex, whitish grey. Proboscis black, a little longer than head and thorax together. Antennae: scape yellowish except tip of second joint which is, with the flagellum, dark brown.

Thorax mainly brownish yellow, with three dorsal claret-brown stripes, the outer ones short and quite united with the median one, which is moderately wide, attaining the anterior margin, and continuing narrowly on the brownish yellow neck. Dorsum behind suture claret-brown. Scutellum yellow; metanotum grey. Sides of thorax yellowish, with light claret-coloured reflection just below the dorsum.

Abdomen dark brown, with a little pale hair; posterior margins of segments pale yellowish. Belly yellowish; ovipositor brownish yellow.

Legs.—Coxae brownish yellow, with a trace of claret-coloured reflections; remainder of legs yellowish, femora tips barely darker.

¹ This so-called ventral plate appears to be the sternum of the eighth segment.

² Tijds. v. Ent., liv (1911).

Ann. Mag. Nat. Hist. (8), viii, 60.

Wings pale yellowish grey, glassy, iridescent. Auxiliary vein ends nearly half-way between the base of the 2nd longitudinal and the marginal cross-vein, which latter is placed exactly at the tip of the 1st longitudinal, and just beyond the middle of the marginal cell. Base of 3rd vein oblique, two and a half times the length of the anterior cross-vein. Discal cell twice as long as broad, as long as the 2nd and 3rd posterior cells; posterior cross-vein barely beyond base of discal cell. Veins on distal part of wing practically parallel. Stigma light brown, ill defined but distinct, situated over the marginal cross-vein. Halteres brownish yellow.

Described from one ♀ taken by Mr. Howlett at Simla, x-08.

Type in the Pusa collection.

***Geranomyia genitalis*, mihi, sp. nov.**

♂ ♀. South India, Assam. Long. 5 mm.

Head blackish. Proboscis as long as head and thorax together, palpi, placed at the middle, all black. Antennae black, joint not very distinct.

Thorax light grey. Dorsum mainly occupied by a *large shining black spot*, projecting broadly forwards to the anterior margin. The linear depression behind the suture wide, light grey, as are also the scutellum and the middle part of the metanotum, the sides of the latter, with the pleurae, being shining dark brown. Sides of thorax light grey.

Abdomen.—Dorsum blackish, belly yellowish, genitalia in ♂ unusually formed. A small square upper brown plate with an underlying pointed piece. A large pair of complicated claspers, the first joint thick, hairy, brownish black, shining; the second of equal or greater length, rather larger, oval, of roughened, sponge-like appearance. The first joint bears a small concolorous, hairy palp-like organ on the inner side, near the dorsum; below which is a slender yellow semi-transparent hook, and below which again is a rather small, bifid, interior appendage. The whole organ lightly hairy, except the second joint of the claspers, which is practically bare. In the ♀ the ovipositor is normal, blackish, the terminal blades reddish yellow.

Legs mainly brown; coxae, base of femora and basal half of tarsi, yellowish.

Wings pale yellowish grey, conspicuously iridescent. Stigma oval, moderate-sized, brown, placed over marginal cross-vein. Auxiliary vein ends nearly half-way between the origin of the 2nd longitudinal vein and the marginal cross-vein. The 2nd vein originates at the middle of the wing, the praefurca two-thirds as long as the remainder: base of 3rd vein three or four times as long as anterior cross-vein: submarginal cell considerably longer than 1st posterior cell. Discal cell twice as long as broad, barely shorter than 2nd and 3rd posterior cells: posterior cross-vein immediately after base of discal cell. Halteres blackish brown.

Described from two ♂♂ (including type) from Tenmalai, Western Ghats (western side), Travancore, 21-xi-08 [Annandale]: nine ♂♂ (Pusa coll.) from Nongpoh, Assam, ix-06; a type ♀ and three other ♀♀ from the latter locality taken during September also.

Type ♂ in Indian Museum; ♀ in Pusa collection.

N.B.—The conspicuous shining black spot on the light grey thorax, and the unusually constructed male genitalia will render this species easily distinguished.

Geranomyia semifasciata, mihi, sp. nov.

♀. Darjiling. Long. $5\frac{1}{4}$ mm.

Head light grey. Frons very narrow. Proboscis black, as long as head and thorax together. Antennae brownish yellow, flagellum darker than scape.

Thorax.—Neck yellowish, a dorsal distinct dark brown stripe and a lateral less distinct one on each side. Dorsum of thorax yellowish, with a brownish tinge. Three very narrow ill-defined but obvious reddish brown stripes, well separated; the median one barely reaching the anterior margin.

Behind the suture the space wholly occupied, except the wide greyish post-sutural depression, by two large brownish spots, the colour gradually merging in that of the sides.

Sides of dorsum with whitish reflections. Sides of thorax yellow; scutellum and metanotum brownish.

Abdomen brownish yellow, posterior border of each segment blackish, the colour extending along the sides more or less, ovipositor yellowish.

Legs pale yellowish, tips of femora a little blackish.

Wings pale yellowish grey. Auxiliary vein ends midway between the base of the 2nd vein and the tip of the 1st. The 2nd begins at the middle of the wing; the praefurca is nearly as long as the rest of the vein, which is a little sinuous and curved upwards at tip. Marginal cross-vein placed distinctly beyond the middle of the marginal cell. Base of 3rd vein two and a half times as long as anterior cross-vein. Discal cell much broader distally, a little longer than double its average width, and a little longer than the 2nd and 3rd posterior cells. Posterior cross-vein in a line with the base of the discal cell, the anterior cross-vein is in the same straight line.

The markings of the wing are brown in colour, and are placed as follows: Three narrow streaks begin (anterior to the middle of the wing) on the costa, and extend posteriorly nearly to the middle of the wing, the first streak nearly basal. A fourth narrow costal streak begins at the tip of the auxiliary vein and extends to the base of the 3rd vein. The next costal streak (the widest of all) is over the marginal cross-vein, and is clear cut, being suddenly reduced to half its width at the 2nd longitudinal vein, beyond which it is continued, terminating abruptly at the 3rd vein. The two

remaining costal marks are a conical (reversed) and a triangular spot, both touching the 3rd vein. The anterior cross-vein, the inner side of the discal cell, and the posterior cross-vein bear a small spot each, these spots being practically contiguous. The distal side of the discal cell is brown suffused and the 1st posterior cell contains two lighter spots, the 2nd posterior cell containing one. The 2nd basal cell has three small spots, the tip of the 7th vein is suffused. Halteres, stem brownish yellow, clubs black.

Described from a single specimen taken by Mr. F. M. Howlett at Darjiling, 3—9-vi-09.

Type in the Pusa collection.

***Geranomyia semistriata*, mihi, sp. nov.**

♀. Western Bengal. Long. nearly 5 mm.

Head dark grey, frons narrow. Proboscis black, distinctly longer than head and thorax together; palpi black, inserted before the middle of the proboscis. Antennae brownish yellow, sometimes darker. Back of head and neck blackish grey.

Thorax.—Dorsum brownish or light grey, grey dusted. Three narrow reddish brown stripes: the median one from the anterior margin to about the middle of the dorsum; the outer ones begin behind the shoulders and are carried over the suture without interruption to the posterior margin; an additional narrow intermediate stripe between them commencing behind the suture and continued to the base of the scutellum: a short narrow stripe on each side above and in front of the wing-root. Prothorax brownish yellow in one specimen, edge of dorsum and sides of thorax (in type specimen) light grey, pleurae yellowish, with some grey reflections. Scutellum and metanotum concolorous with dorsum of thorax, edge of former brownish yellow.

Abdomen dark claret-brown, roughened, belly yellowish; ovipositor large, robust, black, barely shining, terminal blades reddish yellow.

Legs.—Coxae and femora brownish yellow, tips of femora slightly thickened and blackish; tibiae and tarsi brown.

Wings pale grey, with seven moderately dark brown spots on the costa placed approximately equidistantly: the third enclosing the origin of the 2nd longitudinal vein; these first three spots extending posteriorly barely to the 4th longitudinal vein; the fourth spot terminates over the fork of the 2nd vein; the fifth (the largest, enclosing the marginal cross-vein) extends posteriorly to the 3rd vein; the seventh is very small, triangular, placed at the extreme tip of the 3rd vein. A narrow brown irregular line encloses the anterior and posterior cross-veins, with the basal side of the discal cell, and there is a small suffusion over the proximal side of the discal cell. The venation is normal; basal part of 3rd longitudinal vein long, the remainder of the vein parallel to the 2nd; anterior cross-vein short. Discal cell twice as long as wide; posterior cross-vein distinctly but not greatly before the base of the discal cell.

The 5th and 7th veins very narrowly brown suffused. Halteres: stem pale yellow, knobs blackish brown.

Described from two ♀♀ from Paresnath, Western Bengal (4,300–4,500 ft.), 15-iv-09 [Annandale].

Type and cotype in Indian Museum.

G. fletcheri, Edwards, Ann. Mag. Nat. Hist. (8), viii, No. 43, 58 (1911).

One ♀ from Dondra, Ceylon, 3-xii-07, taken by Mr. T. B. Fletcher.

RHIPIDIA, Mg.

javensis, Meij., ♂. Tijd. v. Ent., liv, 31 (1911).

A recently described species from Java.

N.B.—The *Rhipidia pulchra* described by Meijere (Bijd. tot. de Dierk., xvii) is now referred by him to *Dicranomyia*.

GONIODINEURA, Wulp.

nigriceps, Wulp, ♀. Java. The type, which was in Amsterdam Museum, is now lost.

DAPANOPTERA, Os. Sac., in Westw.

perdecora, Wlk., ♂ (*Limnobia*). Papua. The type, from Dorey, New Guinea, is still in good preservation in the British Museum.

auroatra, Wlk., ♀ (*Limnobia*). Mysol. Type in British Museum in good condition.

plenipennis, Wlk., ♂ (*Limnobia*). Papua.

Westw., Tr. Ent. Soc. (1881), 366, pl. xviii, 2.

Type in fair condition in the British Museum, the extraordinary wing markings making comparison easy.

latifasciata, Wlk., ♀ (*Limnobia*). Papua. Type in British Museum in good condition.

N.B.—Of all these four species the only specimens known, so far as I can ascertain, appear to be the original types.

LIBNOTES, Westw.

aurantiaca, Dol., ♂ (*Limnobia*). The type, from Amboina, in the Vienna Museum is damaged, but comparison is possible. Osten Sacken notes the species (Berl. Ent. Zeit., xxxi, 181).

imprensa, Wlk., ♀ (*Limnobia*). From Sarawak. The type (in British Museum) is useless for comparison.

imponens, Wlk., ♀ (*Limnobia*). Again here the type (in British Museum) is in too bad condition for comparison. Makassar.

strigivena, Wlk., ♂ ? ♀ (*Limnobia*). Papua. Type in British Museum in bad condition, a ♀, from Dorey; the wing-markings alone being available for comparison. Meijere has

The 5th and 7th veins very narrowly brown suffused. Halteres: stem pale yellow, knobs blackish brown.

Described from two ♀♀ from Paresnath, Western Bengal (4,300–4,500 ft.), 15-iv-09 [Annandale].

Type and cotype in Indian Museum.

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GONIODINEURA, Wulp.

nigriceps, Wulp, ♀. Java. The type, which was in Amsterdam Museum, is now lost.

DAPANOPTERA, Os. Sac., in Westw.

perdecora, Wlk., ♂ (*Limnobia*). Papua. The type, from Dorey, New Guinea, is still in good preservation in the British Museum.

auroatra, Wlk., ♀ (*Limnobia*). Mysol. Type in British Museum in good condition.

plenipennis, Wlk., ♂ (*Limnobia*). Papua.

Westw., Tr. Ent. Soc. (1881), 366, pl. xviii, 2.

Type in fair condition in the British Museum, the extraordinary wing markings making comparison easy.

latifasciata, Wlk., ♀ (*Limnobia*). Papua. Type in British Museum in good condition.

N.B.—Of all these four species the only specimens known, so far as I can ascertain, appear to be the original types.

LIBNOTES, Westw.

aurantiaca, Dol., ♂ (*Limnobia*). The type, from Amboina, in the Vienna Museum is damaged, but comparison is possible. Osten Sacken notes the species (Berl. Ent. Zeit., xxxi, 181).

impressa, Wlk., ♀ (*Limnobia*). From Sarawak. The type (in British Museum) is useless for comparison.

imponens, Wlk., ♀ (*Limnobia*). Again here the type (in British Museum) is in too bad condition for comparison. Makassar.

strigivena, Wlk., ♂ ? ♀ (*Limnobia*). Papua. Type in British Museum in bad condition, a ♀, from Dorey; the wing-markings alone being available for comparison. Meijere has

received from Java what he believes is the ♀ of this species and adds some notes.

quadrifurca, Wlk., ♀ (*Limnobia*). Dorey, Papua. The type, in the British Museum, is considerably damaged, but being conspicuously marked could be used for identification.

innotabilis, Wlk., ♀ (*Limnobia*). Ceram. Type, in the British Museum, too badly damaged to determine the species with certainty.

N.B.—Of the above five species I can trace the existence of no other specimens than the types.

thwaitesiana, Westw., ♂. Ceylon. Type in Hope collection, Oxford University Museum. Prof. Poulton kindly informs me that recognition of the species would be possible, though the specimen is not in good condition.

notata, Wulp., ♂ ♀.¹ Originally described from a type ♂ in the Amsterdam Museum, but now lost. The Museum has other examples of the species taken in Java by Jacobson and identified by Dr. Meijere, who has recently described the ♀.²

simplex, Os. Sac., ♂. Ternate. The type is the only specimen known, apparently, and is in the Genoa Museum, in rather damaged condition.

poeciloptera, Os. Sac., ♂ ♀. Java, Sumatra. Of this species both sexes were originally described, but Prof. R. Gestro informs me that there is now only one specimen left, but does not state which sex it is. They were from Mount Singalang. Mr. Edwards records a ♀ from Pundaluoya, Ceylon, taken by Mr. E. E. Green.

semperi, Os. Sac. Philippines. A single ♀.

termitina, Os. Sac. Philippines. A single pair.

familiaris, Os. Sac. Philippines. A single ♂. Meijere notes a ♂ and ♀ from Java probably representing this species.

N.B.—The types of these last three species are presumably in the Osten Sacken collection. I cannot definitely trace them.

Prof. Meijere describes four new species recently:³ *punctipennis*, ♂; *nervosa*, ♂; *forcipata*, ♂ ♀; and *rufa*, ♀. The first I had already described (but not published) from four specimens in the Indian Museum (two ♂♂, two ♀♀), from Darjiling (7,000 ft.), 6-viii-09 [*Paiva*]; Mazbat, Mangaldai District, Assam, 11-15-x-10 [*Kemp*]; and Peradeniya, Ceylon, 5-viii-10. A ♀ in the Vienna Museum from Ceylon. The sexes are identically marked.

There is no doubt that another of my MS. species is identical with *rufa*, and of this also both sexes are present amongst the four specimens in the Indian Museum.

In the ♂ the costal cell is bright yellow as far as the stigma, which is brown. Meijere describes only the ♀, in which the costal cell is black or blackish. A ♀ from Ceylon is present in the Vienna

¹ Wulp also notes the species in Med. Sum. Exped. Dipt., 12.

² Tijds. v. Ent., liv, 34 (1911).

³ Tijds. v. Ent., liv, 35, et seq. (1911).

Museum collection. In the Indian Museum are yet two undescribed species which will be characterized by me in my "Fauna of British India" volume.

Section III. RHAMPHIDINI.

ELEPHANTOMYIA, Os. Sac.

argentocincta, Wlk., ♀ (*Limnobia*). Sarawak. The type (in British Museum) is beyond use for comparison, and is the only specimen known, apparently.

delectata, Wlk., ♂ ♀ (*Limnobia*). Ceram. One of each sex is present (types) in the British Museum, in bad condition, but the conspicuous markings would make the species recognisable.

filiformis, Wlk., ♂ (*Limnobia*). A unique type from Salawatti in the British Museum, useless for recognition, both wings being gone.

N.B.—These species were placed provisionally in *Elephantomyia* by Osten Sacken many years ago, and do not appear to have been met with since.

DICRANOPTYCHA, Os. Sac.

signaticollis, Wulp, ♂. Java. The type of this species, originally in the Amsterdam Museum, is now totally lost, and I have seen no further record of it. The author's excellent coloured plate and description should make identification easy.

Orimarga borneensis, mihi, sp. nov.

♀. Borneo. Long. 3 mm.

Head dark grey, with black hairs, frons comparatively narrow, especially towards the antennae. Proboscis dark brown; palpi brownish yellow. Antennae brownish yellow; the flagellum of 14 uniformly oval joints.

Thorax dark brownish yellow, almost blackish grey, scutellum and metanotum similar, sides a little more yellowish.

Abdomen brownish yellow or reddish brown. Ovipositor rather swollen at the base, blackish, the blades normal, brownish yellow, the upper pair the longer.

Legs brownish; the coxae and femora a little lighter.

Wings pale grey. Auxiliary vein ends half-way between the origin of the 2nd vein and the marginal cross-vein, the 1st longitudinal ends some little distance beyond the tip of the auxiliary, the marginal cross-vein near its tip. The 2nd vein begins before the middle of the wing, the marginal cross-vein just beyond the middle of the marginal cell. The 2nd gently bisinuate; the 3rd vein originating at a rounded angle a little before the marginal cross-vein, running parallel to the 2nd vein. Anterior cross-vein a little beyond the marginal cross-vein,

the 1st posterior cell with almost parallel sides, very slightly narrower at the tip. The 4th longitudinal forks just before the anterior cross-vein, the lower branch forking again widely at its middle. Posterior cross-vein in the middle of the wing, half-way between the origin of the 2nd and of the 3rd veins. The 5th vein practically straight, the 6th very gently sinuate, the 7th approximate to the 6th for some distance at its base, afterwards running straight to the hind margin. Halteres pale yellowish, clubs blackish.

Described from three ♀♀ in the Indian Museum from Borneo, taken 27-vi-10 by Mr. Beebe 10 miles south of Kuching, Sarawak.

Type in Indian Museum.

GYMNASTES, mihi, gen. nov.

Head set closely on to the thorax without any neck. Eyes rounded, bare, widely separated above by a very broad frons, separated on under side by a moderately wide, parallel, rather convex space. Proboscis stout but very short; palpi four-jointed, narrow, cylindrical, normal length. Antennae of sixteen joints; the 1st scapal joint rather short, cylindrical, 2nd much narrowed, about the same length; flagellar joints cylindro-ovate, the 1st longer than the rest, about equal to the 2nd scapal joint.

Thorax moderately arched; collare rather enlarged and distinct, suture distinct, post-sutural depression not very pronounced. Scutellum small.

Abdomen linear, of only seven obvious segments. Genitalia normal.

Legs moderately long and slender; anterior femora slightly enlarged towards the tip, hind femora longer than the others and very considerably enlarged at the tip, having the appearance of "Indian clubs." Metatarsus more than half the length of the tibiae, the other joints short. Tibiae without spurs at the tip, but the hairs are considerably stronger about the tibia tip.

Wings elongated, narrowed at base and slightly curved inwards near the basal part of the costa. One submarginal cell, four posterior cells, a discal cell. Auxiliary vein barely apparent; so closely approximate to the 1st longitudinal vein that it is only visible just before the middle of the latter vein, where that vein takes a sudden V-shaped bend downwards, forming a "kink." The 1st vein sinuous towards its tip, ending beyond the middle of the wing; 2nd longitudinal vein begins just before the middle of the wing, running nearly straight to the margin; the marginal cross-vein near, but not close to, the tip of the 1st vein. The 2nd vein unforked, the 3rd vein originating just before the marginal cross-vein, its basal section short, the rest of the vein straight. Anterior cross-vein nearly in a line with the basal section of the 3rd vein, situated at the base of the discal cell, the 1st posterior cell having approximately parallel sides. The 4th vein emerges from the 5th at some considerable distance from

its base, forming a right angle, and in contact with the "kink" in the 1st longitudinal vein immediately above. Upper branch of 4th vein forked immediately on quitting the discal cell, the two veinlets springing simultaneously and diverging, making the 2nd posterior cell pointed at its basal end. Discal cell quadrangular, very narrow, slightly broader at the tip. Lower branch of 4th vein forming, with its basal section, a gentle curve; posterior cross-vein situated at the base of the discal cell, making the 4th posterior cell nearly as long as the 2nd basal cell. The 5th vein gently curved at the tip, the 6th nearly straight, the 7th nearly straight, moderately short, the wing-margin a little emarginate where the vein ends.

Gymnastes violaceus, mihi, sp. nov.

♂. Ceylon. Long. $2\frac{1}{4}$ — $2\frac{1}{2}$ mm.

Head.—Frons brilliantly shining violet-blue, with an isolated hair here and there. Proboscis yellowish, palpi brownish. Antennae brownish yellow, becoming a little darker brown towards the tips, closely yellowish white pubescent on the flagellum, the scape bearing only a few short bristly hairs. Face below antennae blackish, dull.

Thorax brilliantly shining violet-blue, an irregular row of dorso-central short, yellowish hairs; scutellum blackish grey, dull.

Abdomen brilliantly shining violet-blue, traces of pale yellow very short hairs on posterior margins of segments, and more distinct, similar hairs at the sides of the abdomen. Belly similar, genitalia moderately large, a basal pair of cylindro-ovate large fleshy claspers, with a second joint consisting of a long narrow horny slightly curved appendage.

Legs yellowish; a sub-apical broad dark brown ring on femora and tibiae, both bands darker and broader on the hind pair of legs. Tarsi black except the yellowish basal half to all the metatarsi.

Wings.—Venation in accordance with the generic characters; nearly clear; with four cross-bands, moderately blackish, all beginning on the costa. The first two are narrow, beginning respectively over the "kink" in the 1st longitudinal vein (in front of the origin of the 4th vein), and the origin of the 2nd vein, both continuing posteriorly as far as the 7th vein, where they meet, the 7th vein being clouded anteriorly. The third band is the widest and begins on the costa widely each side of the marginal cross-vein, continuing posteriorly, embracing the cross-veins and the whole of the discal cell, to the posterior margin of the wing, where it becomes fainter.

The fourth band is apical, fairly wide, its proximal edge a straight line, cutting the 1st posterior cell at two-thirds its length from the base. Halteres with narrow black stem, the clubs with conspicuous chalk-white tips.

Described from three ♂ taken at Kandy, 22-v-10 (type), and Peradeniya, 15-vii-10, by Messrs. Green and Gravely.

GEOGRAPHICAL DISTRIBUTION.—Ceylon.

Type in Indian Museum.

N.B.—A very distinct and conspicuous species belonging to a peculiarly distinctive genus.

TEUCHOLABIS, Os. Sac.

exclusa, Wlk., ♀ (*Limnobia*). Papua. The type in the British Museum is much damaged, all the legs being gone.

bicolor, Os. Sac., ♂. Sumatra. Type in Genoa Museum, from Mount Singalang (Sumatra), in indifferent condition.

fenestrata, Os. Sac., ♂ ♀. Described from a ♂ and ♀ in Bigot's collection and also from specimens in the Leyden Museum, but the author does not designate any actual type specimen. The three specimens in the Leyden Museum are in very bad condition.

It is quite a common species in Ceylon, the males hovering in small clusters under trees overhanging roads. The ♀ seems much the scarcer sex. The Indian Museum has a good series from Ceylon and I have seen it from the Khasi Hills (Assam) and from Darjiling.

Present also in the Vienna Museum, the Pusa and my own collection, in all three from Ceylon.

determinata, Os. Sac., ♂. Sula (Indo-Malay Archipelago). The author says, "I preserve the name-under which I found it in the British Museum." A unique ♂.

ATARBA, Os. Sac.

Of this genus Meijere introduces three species (Tijd. v. Ent., liv, 42, 43 (1911)), *nebulosa* (no sex stated), *pilifera* (♂ ♀) and *diffusa* (♀), all from Java.

Section IV. ERIOPTERINI.

CONOSIA, Wulp.

irrorata, W., ♂ ♀ (*Limnobia*). Originally described from Java but probably the most widely distributed species of Tipulidae in the Orient. It has the appearance of a cross when at rest, which fact gives the name to one of its synonyms, *Limnophila crux*, Dol.

The CLADURA group.

Table of genera.

- A Subcostal cross-vein placed near the tip of the auxiliary vein. Discal cell present, its proximal end rectangular. Antennal scape long, normal;

- flagellum of fourteen *oval* joints. The 7th longitudinal vein normal .. CLADURA, Os. Sac.
- AA Subcostal cross-vein placed *very far before* the tip of the auxiliary vein, just after the origin of the 2nd vein, *near the middle of the wing*.
- B The 1st longitudinal vein nearly as long as the anterior branch of the 2nd vein, ending close to it near the wing-tip. Marginal cross-vein placed soon after the fork of the 2nd vein, a considerable distance from the tip of the 1st vein. Discal cell *present*, its proximal end *pointed*. Antennal scape *very short*, the joints almost annular; flagellum of *fifteen very elongate* joints. The 7th longitudinal vein less than half the length of the 6th, turning sharply into the margin at its tip .. PARACLADURA, gen. nov.
- BB The 1st longitudinal vein ends (turning sharply up to the costa) just beyond the tip of the auxiliary vein and *some distance from* the tip of the anterior branch of the 2nd vein, also a *considerable distance* from the wing-tip. Marginal cross-vein at the tip of the 1st longitudinal vein. Discal cell *absent*, coalescent with the *second* posterior cell, the proximal end of which is *pointed*. Antennal scape normal (long), flagellum of *thirteen oval* joints. The 7th longitudinal vein normal, as in *Cladura* .. CLADUROIDES, gen. nov.

CLADURA, Os. Sac.

Cladura flavescens, mihi, sp. nov.

♂ ♀. Darjiling. Long. 3—3½ mm

Head.—Frons broad, more than one-third the width of the head; vertex convex, both brownish yellow; back of head concolorous, with long brown stiff hairs. Proboscis brownish yellow, palpi a little darker. Antennal scape brownish yellow; first scapal joint moderately long and stout, subcylindrical, second joint shorter and broader; flagellum of fourteen oval joints, gradually diminishing in breadth but increasing in length as the tip of the antenna is reached; minute whitish pubescence, each joint with a single verticil of apparently three or four long hairs.

Thorax elongate and rather convex above; produced forward into a distinct but short, stout neck. Brownish yellow, shining, unmarked; some black hairs on posterior part of dorsum above the wings. Scutellum and metanotum concolorous, the former with a few hairs. Sides of thorax brownish yellow.

Abdomen in ♂ yellowish brown with sparse pale yellow hairs; in ♀ dark brown on dorsum, yellowish on belly. Genitalia in ♂ brownish yellow (not easily viewed, as the claspers in the

single σ are tightly closed), apparently consisting of the normal pair of claspers of which only the thick subconical basal joint can be seen. In the φ the ovipositor is brownish yellow, rather long, conically produced at the base, to which are attached two pairs of nearly straight, elongate valves, the lower pair much shorter, and twisted round somewhat to the side.

Legs uniformly brownish yellow, slightly darker towards the tips of the tarsi.

Wings pale yellowish grey, moderately iridescent, unmarked. Auxiliary vein ends at some distance beyond the middle of the wing, the subcostal cross-vein placed shortly before its tip, connecting it with the 1st longitudinal, which latter ends a little before half the distance between the tip of the auxiliary vein and the tip of the wing. The 2nd vein begins distinctly before the middle of the wing, well arcuated, forking before the tip of the 1st vein; the praefurca fully as long as the lower branch. The marginal cross-vein, which is not very distinct, but obviously present, is placed just at the fork of the 2nd vein, the upper branch of which is a good deal shorter than the lower one. 3rd vein originating at right angles from a little anterior to the fork of the 2nd, its basal part short (shorter than the anterior cross-vein), thence running straight to just below the wing-tip. Anterior cross-vein and base of discal cell practically in a line with the basal part of the 3rd vein. Discal cell pentagonal, much broader distally, its proximal side somewhat oblique, about as long as the 4th posterior cell.

Anterior branch of 4th vein forked near tip, making *five posterior cells*, of which the 1st is of the same length as the 2nd submarginal, the 2nd is triangular, the 3rd and 4th subequal, the 5th normal, the posterior cross-vein being situated a little before the middle of the discal cell.

The 5th, 6th and 7th longitudinal veins nearly straight. Halteres pale brownish yellow.

Described from a single specimen of each sex taken respectively, 7-viii-09 and 6-viii-09, at Darjiling by Mr. Paiva.

Types in Indian Museum.

N.B.—The wing agrees exactly with Needham's figure (pl. 22, fig. 2) of the North American species *indivisa*, Os. Sac., except that the marginal cross-vein in my species is a little more proximad and the second posterior cell is triangular, instead of what may be described as attenuated bell-shaped as in Needham's figure of *indivisa*.

Incidentally this author's figure shows no subcostal cross vein, which however is distinctly present in *flavescens*, placed, as stated by Osten Sacken, near the tip of the auxiliary vein.

Note on CLADONEURA, Scudd.

Needham figures a fossil genus, *Cladoneura*, which closely resembles *Cladura*, and may well have been its immediate ancestor.

The wing appears larger and broader, the veins more separated, generally speaking. The subcostal cross-vein is at the absolute tip of the auxiliary vein. The tip of the wing is represented in the figure as missing, but the end of the 1st longitudinal vein can be plainly seen, and it is shorter than in *Cladura*, running straight to the wing-margin; the marginal cross-vein being placed shortly after the fork of the 2nd vein, which forking takes place just opposite the tip of the auxiliary vein. The praefurca originates at one-third of the length of the wing, and is nearly as long as the remainder of the vein, and nearly in a line with the 3rd vein, which ends much below the tip of the wing, in which latter peculiarity it differs from *Cladura* and my two new genera, in all of which it ends exactly at the tip of the wing or immediately below it. Discal cell pointed at proximal end, the anterior cross-vein joining the 3rd vein immediately after its origin, and the lower end of it situated at one-third of the discal cell. Anterior branch of 4th vein simple, parallel with the 3rd vein; lower branch widely forked soon after the cross-vein which closes the discal cell. The discal cell is composed of a proximal triangle combined with almost a distal square; four sided: the whole upper side forming a slightly curved line, the lower side two lines; the outer side is the discal cross-vein, upright; the posterior cross-vein placed at the angle formed by the two lower sides of the discal cell. The 5th vein bent considerably at its junction with the cross-vein; the 6th vein nearly straight; the 7th gently bisinuate. Between the 6th and 7th is shown what is apparently a spurious vein of some length, entirely disconnected.

PARACLADURA, mihi, gen. nov.

Allied to *Cladura*, Os. Sac. Type *P. gracilis*, mihi, sp. nov.

Two submarginal cells, five posterior cells, a discal cell.

Differing from *Cladura* in the face being *distinctly though not conspicuously gibbose*. The antennae are of a totally different construction altogether; the scapal joints both being *very short*, subglobular, no longer than broad, whilst the flagellum is composed of *fifteen* joints, a very unusual number throughout the family Tipulidae. All the joints are *very elongated*, minutely pubescent. The whole antenna if bent backwards would reach the basal segments of the abdomen.

The venation affords several very marked differential characters. The *subcostal* cross-vein is situated a *long distance before the tip of the auxiliary vein*, only a short distance beyond the base of the 2nd longitudinal.

The auxiliary vein ends gradually in the costa at about two-thirds the length of the wing. The 1st longitudinal vein is very long, following the line of the costa nearly to the tip of the upper branch of the 2nd longitudinal vein, and parallel to that section of that vein; thus ending itself much nearer the tip of the wing than is usually the case.

The subcostal cross-vein is placed near the middle of the wing, joining the auxiliary vein to the 1st longitudinal not very far beyond the beginning of the 2nd vein.

The 2nd vein commences almost before the first third of the wing, at a moderate angle, forking just opposite the tip of the auxiliary vein, the branches practically parallel; the praefurca longer than the lower branch, which itself is rather longer than the upper one.

Marginal cross-vein just beyond the fork, and a little beyond the tip of the auxiliary vein. The 3rd vein originates a little before the fork of the 2nd vein in an almost punctiform manner, meeting the anterior cross-vein at the same point. The 3rd longitudinal vein runs straight to immediately below the wing-tip. Anterior cross-vein of moderate length, meeting the discal cell before its middle, which cell is pointed at its proximal end. Upper branch of 4th longitudinal vein forked at half that portion of it lying beyond the discal cell, the veinlets nearly parallel.

Lower branch of 4th vein acutely forked at middle of discal cell, the posterior cross-vein situated just beyond the fork. The 5th longitudinal bent at its union with the cross-vein; 6th vein nearly straight. *The seventh longitudinal vein remarkably short*, much less than half the length of the 6th vein, its tip bent down sharply to the wing-margin.

***Paracladura gracilis*, mihi, sp. nov.**

♂ ♀. Darjiling. Long. $2\frac{1}{2}$ mm.

Head.—Eyes separated above by a frons wider than one-third the width of the head.

Face above antennae distinctly gibbous. Proboscis rather long, narrow, pale yellow, a little hairy; palpi, 1st joint pale yellow, 2nd, 3rd and 4th black. Antennae: scape pale yellow, slightly pubescent, joints very short, almost annuliform; flagellum of *fifteen very elongate joints*, closely but shortly pubescent, with one or two longer hairs at the tip of each.

Thorax considerably gibbous, uniformly pale yellow, quite bare. Scutellum, metanotum and sides of thorax concolorous.

Abdomen brownish yellow, a little pale hair at the sides, segments in the ♂ towards the tip of the abdomen, both above and on belly, with more or less distinct blackish irregular marks.

Genitalia in ♂ rather longer than usual, especially the second joint, which is nearly as long as the first, the latter being less robust than usual, the second equally fleshy, subcylindrical, pointed, both bearing numerous soft hairs. Some further appendages are visible below the claspers, also a large ventral V-shaped dark brown plate. The upper plate is also dark coloured, narrow. In the ♀ are a pair of moderately long lateral valves, blackish at the tip; below these, a pair of pale yellow soft, hairy, short, conical appendages, apparently a pair of small claspers.

Legs uniformly very pale yellow.

Wings.—Venation in accordance with the generic description. Very pale yellowish, unmarked, veins yellow.

Halteres yellowish, knobs a little dusky.

Described from a single specimen of each sex taken by me at Darjiling, 28 and 29-v-10.

GEOGRAPHICAL DISTRIBUTION.—Darjiling.

Types in the Indian Museum.

Paracladura elegans, mihi sp. nov.

♀. Darjiling. Long. 2—3 mm.

Head rather bright yellow. Frons fully one-third the width of the head. Face above antennae gibbous. On the vertex a blackish streak joining the upper angle of the eyes. Proboscis yellowish; palpi blackish, pubescent, basal half of 1st joint yellowish. Antennal scapal joints very short, pale yellowish, with a few hairs, flagellum blackish brown, closely and shortly pubescent.

Thorax almost wholly brownish yellow; a trace of a dusky median stripe. Scutellum, metanotum and sides of thorax concolorous.

Abdomen brown, hind margin of the distinctly emarginated segments very pale yellow; pale hairs at the sides. Belly similar. Ovipositor of moderate size, resembling that of *P. gracilis*.

Legs pale brownish yellow.

Wings.—Venation in accordance with the generic description, the 7th longitudinal vein being only one-third as long as the 6th. Colour pale yellow, veins yellow, apical part of wing with slight pubescence.

A narrow blackish infuscation runs from the costa, beginning just beyond the tip of the auxiliary vein and passing over the marginal vein, the fork of the 2nd, the base of the 3rd and the anterior cross-vein. The infuscation, here shortly interrupted, is resumed on the posterior cross-vein and along the last section of the 5th longitudinal vein to the wing-margin. Halteres yellowish, clubs dusky.

Described from two ♀ ♀ taken by me at Darjiling, 26 and 29-v-10.

GEOGRAPHICAL DISTRIBUTION.—Darjiling.

Type (and second specimen) in the Indian Museum.

NOTES.—Whilst portraying all the generic characters, this species is easily distinguished from the previous one by the light but very distinct infuscation running across the middle of the wing.

CLADUROIDES, mihi, gen. nov.

Allied to *Cladura*, Os. Sac., and *Paracladura*, mihi. Type *C. fascipennis*, mihi, sp. nov.

Two submarginal cells, five posterior cells, discal cell open.

Antennae practically normal in the scape, which consists of the usual elongate cylindrical 1st joint and a shorter broader

2nd joint, but the flagellum shows a distinct peculiarity in possessing the unusual number of *thirteen joints*, oval and well separated, with minute pubescence and with verticils. Face above antennae prominent as in *Paracladura*. Thorax equally gibbous as in that genus.

In venation the present genus is also distinctly characteristic. The 1st longitudinal vein is shorter than in *Cladura*, the marginal cross-vein being at its exact tip, where it turns up into the costa somewhat abruptly. The subcostal cross-vein is at one-third the length of the wing as in *Paracladura*, situated a great distance from the tip of the auxiliary vein, and a considerable distance before the origin of the 2nd vein, which takes place in the middle of the wing. Discal cell open, pointed at proximal end, coalescent with 3rd posterior cell. Anterior branch of 4th vein forked acutely and widely near its tip, the 2nd posterior cell being triangular, not elongate bell-shaped.

Posterior cross-vein situated just beyond the proximal end of the 2nd posterior cell; the posterior branch of the 4th vein similarly forked as in *Cladura*.

The 7th longitudinal vein normal, as in *Cladura*.

Claduroides fascipennis, mihi, sp. nov.

♂ ♀. East and West Himalayas. Long. ♂ $3\frac{1}{2}$, ♀ $5\frac{1}{2}$ mm.

Head grey. Frons one-fourth the width of the head, considerably convex. Proboscis brown, palpi blackish. Antennae dark brown; 1st scapal joint subcylindrical, wider at tip, 2nd shorter, elongate oval, narrower at base: *flagellum of thirteen oval joints*, the first the longest, all very distinctly separated, with close pubescence and a verticil of longer hairs each.

Thorax distinctly gibbous and high; the short neck placed at the lowest point of the under side (seen best in profile). Thorax, including dorsum, scutellum, metanotum and sides, mainly dark grey, the dorsum in one specimen with a moderately wide blackish brown stripe from anterior margin to suture. A blackish brown smaller mark on each shoulder connected by a very thin line on the anterior margin. Two small stripes in front of the suture, with two spots behind it, irregularly shaped, of the usual nature, occupying most of the post-sutural dorsum. Scutellum somewhat produced and thickened; metanotum a little brownish. Sides of thorax grey.

Abdomen dark blackish brown, emargination of segments distinct: some pale hairs at the sides, belly similar. Genitalia in ♂ blackish brown, a little pubescent, composed of an upper plate, a pair of claspers, with a second pair of appendages below. The ♀ ovipositor barely thickened at the base, terminal valves reddish brown.

Legs.—Coxae slightly brownish grey dusted; remainder of legs brownish yellow, tarsi darker.

Wings.—Venation in accordance with generic description. Pale grey. A small pale blackish brown spot on the costa, near the subcostal cross-vein; another over the base of the 2nd vein; a large oblong stigmatic spot, ending at the marginal cross-vein, proximally continued along the cross-veins narrowly but uninterruptedly to the 5th longitudinal vein, along which the colour runs to the hind margin of the wing. Tips of all the veins (except the 3rd and 6th) and the bases of the forks of both branches of the 4th longitudinal, slightly infuscated. Halteres yellowish.

Described from three ♂♂ and two ♀♀ in the Indian Museum with the following data: Darjiling, 9-viii-09, type ♂ and ♀ taken by Mr. Paiva, and an additional ♂ and ♀ taken by Dr. Annandale at Phagu, 12-v-09, and Kurseong, 7-ix-09, respectively.

Claduroides sordida, mihi, sp. nov.

♂ ♀. East and West Himalayas. Long. 4—5 mm.

Head dark grey, with scattered hairs. Proboscis brownish yellow; palpi dark brown. Antennae brownish yellow: scapal 1st joint cylindrical, moderately long, 2nd shorter and broader as usual; *flagellum of thirteen oval joints*, diminishing in size towards the tip, the first being distinctly but not conspicuously larger than the rest.

Thorax dark grey, no obvious marks on dorsum, though the impression is given that in some specimens there may be indistinct stripes. Scutellum and metanotum similarly coloured; sides of thorax with a very slight brownish tinge.

Abdomen dark brown. Genitalia in ♂ consisting of a pair of rather large brownish yellow claspers with small, narrow horny appendages towards the tips: a narrow dorsal plate. In ♀ ovipositor as in preceding species.

Legs brownish yellow, darker towards tarsi tips.

Wings.—Venation in accordance with the generic description, pale grey, iridescent. An elongate blackish stigma is indistinctly but obviously present over the tip of the 1st longitudinal vein, ending rather sharply at the marginal cross-vein. Halteres brownish.

Described from two ♂♂ and one ♀. The type ♂ and ♀ taken respectively at Simla, 10-v-09, and Kurseong, 4-ix-09, by Dr. Annandale; an additional ♂ from Simla, 12-v-09.

Type ♂ and ♀ (also additional ♂ referred to) in the Indian Museum.

The **MONGOMA** group.

It seems necessary to establish two new genera in connection with the species hitherto referred to *Mongoma*, Westw., based on

apparently well-defined differences in the venation. These genera may be characterized as follows:—

Table of genera.

Four posterior cells¹ (anal cell closed, 3rd longitudinal vein present; discal cell present) .. MONGOMA, Westw.
(*sensu str*)

Three posterior cells.¹

Anal cell open; 3rd longitudinal vein either absent, in consequence of the punctiform contact of the 2nd longitudinal vein with the discal cell (*albitarsis*), or very short (*pallida*); discal cell present .. PARAMONGOMA, gen. nov.

Anal cell closed; 3rd longitudinal vein present; discal cell absent .. MONGOMIOIDES, gen. nov.

As *fragillima*, Westw., was the original type of *Mongoma*, Westw., that species must, of course, remain the type of the restricted *Mongoma*. Two other Oriental species belong here also, *tenera*, Os. Sac., and *pennipes*, Os. Sac., the former from the Philippines and India, the latter from Borneo, India and Ceylon. The Australian species *australasiae*, Skuse, is a strict *Mongoma*, and a new species from India will be described by me later.

Of *Paramongoma* I designate *albitarsis*, Dol., the type; the two North American species *manca*, Will., *pallida*, Will., being I think congeneric.

Mongomioides is represented by *trentepohlii*, Wied., as the type, with *exornata*, Bergr., as an African species, to which I shall later add three new species from India.

These species comprise all the known ones previously referred to *Mongoma* and they all conform with considerable exactitude to one or other of the three forms of venation herein described.

N.B.—Mr. Edwards resurrects Bigot's genus *Trentepohlia* to take the place of *Mongoma*, but this genus cannot stand, being insufficiently characterized: in fact, its simple inclusion in a table with such incongruous material as *Dixa* (a separate family), *Ptychoptera* and *Dolichopeza* (the latter appearing a second time as *Apeilesis*), both representing totally different subfamilies; with such genera as *Anisomera*, *Ula*, *Erioptera* (as *Octavia*), each belonging to a different section of Limnobiinae, and finally with "*Zigoneura*" (= *Zygoncra*, Mg., belonging to the Mycetophilidae!), is most certainly no characterization whatever. Moreover, the nomination of a type species in itself does not constitute a generic diagnosis.

¹ As regards the names of the posterior cells it must be remembered that, technically, as the anterior cross-vein is wanting, the first posterior cell is absent, and that the uppermost of the posterior cells, whether four or only three be present, is, strictly speaking, the second, and not the first. This view is confirmed by Williston.

Notes on **MONGOMA**, **PARAMONGOMA** and
MONGOMIOIDES.

Including the three new ones herein introduced, seven species have been recorded from the East, all of which, except *albitarsis*, Dol., occur in India. This latter, described from Java, and apparently not recognized since its discovery, may very likely be found in South India, Ceylon or in some parts of the Malay Peninsula.

The genus is highly interesting as presenting one of the most conspicuous variations from the normal type of venation in this family. Previous to describing the genus Prof. Westwood wrote to Osten Sacken for his opinion, and the latter's reply is indicative of its abnormality in his words: "The systematic position of this species (*M. fragillima*) is very puzzling" He pointed out that the apparent resemblance between its venation and that of *Paratropesa*, Sch.,¹ was only superficial and that it was certainly a new genus.

Westwood's figure of the original species, *fragillima*, from Central Africa, is excellent, and distinctly portrays the distinctive features of the genus: the long auxiliary vein ending only just before the tip of the 1st longitudinal; the wide forking of the 2nd vein which, with the marginal vein, gives a first impression of the marginal cell being divided by two cross-veins into three portions; the merging of the 3rd longitudinal vein in the 4th² at the upper basal corner of the discal cell, thereby causing the absence of the anterior cross-vein; the abrupt curve downwards of the end of the 5th vein, closing, in most cases (speaking *sensu lato*), the anal cell; the shortening of the two basal cells and the very short 7th vein, all characteristic features of this singular genus.³

Even Osten Sacken, than whom I consider no better authority in Tipulidae has existed, recognized the difficulty in allotting to the veins their correct names (Berl. Ent. Zeits., xxvi, 90), and in describing his first new species in the genus, *tenera*, from the Philippine Islands, he says in a footnote (referring to the words "the presence

¹ For description of *Paratropesa* see Verh. zool.-bot. Ges. Wien, xvi, 932 (1866).

² This view is in accord with Williston's opinion (Tr. Ent. Soc., 1896, p. 292) but I only recently saw this author's paper, long after I had studied the question personally. It is satisfactory to find my resultant view coincides with that of so good an authority as Prof. Williston.

³ Of course, if the short vein joining the 2nd vein with the discal cell (or the corresponding part of the 4th vein when the discal cell is absent) be considered the anterior cross-vein instead of the 3rd longitudinal vein, it follows that there would be only one submarginal cell in any of the three genera concerned, and the cell exterior to the anterior cross-vein will become the 1st posterior cell. This would give *Mongoma* five posterior cells, and *Mongomioides* and *Paramongoma* four posterior cells each. In support of this suggestion it may be urged that the 3rd vein is not known elsewhere to terminate in the interior of the wing. Personally I know of no case where it does so, but it must be remembered that excessive abnormalities are not rare in Tipulidae. It may also be urged in analogy that in *Sciara*, a very extensive and dominant genus in Mycetophilidae, the anterior cross-vein invariably takes a longitudinal position.

To my thinking, however, the vein has every appearance of the 3rd longitudinal vein by its manner of origin, its superior length to the usual anterior cross vein, and the cell concerned has much more the appearance of a submarginal cell than of that of the 1st posterior cell.

In connection with this point, *conf.* footnote 1, p. 294.

of the two cross-veins inside the marginal cell" used in the text): "I call them cross-veins merely for shortness' sake, because one of them may also be considered as a branch of the 2nd vein." He spoke of the genus as representing "a form of venation which is of very rare occurrence among diptera, and we must suspend our judgment on this point¹ until we have an opportunity of seeing the insect from Java described by Doleschall."

At this time he was accepting three species as congeneric, *fragillima*, Westw., *albitarsis*, Dol., which it is evident from the above quotation he had never seen, and his new species *tenera*. In pointing out the difference of Doleschall's species only having three posterior cells instead of four, as in *fragillima* and *tenera*, it is obvious that he was guided by Doleschall's figure alone. The Dutch author's remark "two marginal cells" does not help in the question of terminology.

Osten Sacken, in the paper quoted, notes the relationship of the three species he treats of, with "*Limnobia*" *trentepohlii*, W., of which Wiedemann gives a not very good figure of the wing (Auss. Zweifl., i, pl. vi b, 12). Here again Osten Sacken speaks of the marginal cell being divided by two cross-veins, thus leaving only three posterior cells; he notes the open discal cell and the abruptly curved 5th vein. In his invaluable work "Studies on Tipulidae," ii (Berl. Ent. Zeits., xxxi, 203, 1887), he recognizes that the 2nd longitudinal vein is forked, the obliquity of the upper branch giving it the appearance of a cross-vein; he also notes the position of the marginal cross-vein, the full contact of the second sub-marginal cell with the discal cell "so that there is no anterior cross-vein," and other points of generic importance. In the same work he describes a species, *pennipes*, from Borneo; reiterates that the apparent resemblance between the venation of this genus and that of *Paratropesa*, Sch., is only superficial, not being in any way supported by the structure of the rest of the body; and for the first time relegates *Mongoma* to its natural position, very near *Gonomyia* and its allies.

Coming to non-Oriental species, four others have been recorded, *manca*,² Willis., and *pallida*,³ Willis., from North America and the West Indies; *australasiae*,⁴ from Australia, and *exornata*,⁵ from Africa A brief study of the wings of the two American species shows characters in common with *albitarsis*, the presence of only three posterior cells and a widely open anal cell. Apart from the question of the length of the auxiliary vein, which is illustrated as very short in Doleschall's figure,⁶ these three species may be regarded as certainly congeneric. There is, however, assuming

¹ i.e., the correct identification of the veins.

² For figure of wing see Needham, N. Yk. State Mus. Bull. No. 124, pl. xxi, 6 (1897).

³ Figured in Tr. Ent. Soc. Lond. (1896), pl. x, 67.

⁴ Skuse, Pr. Linn. Soc. N. S. Wales (2), iv, 834, pl. xxii, 17, xxiv, 59 (*Trentepohlia*) (1890).

⁵ Bergr., Entom. Tidskr., ix, 135, pl., fig. 3 (*Trentepohlii*, id.).

⁶ The costal part of the wing does not agree with the other species, but may have been difficult to examine, from the tendency of the costal border in many species after death to curl over, and therefore too much importance must not be placed upon the apparent abnormality in Doleschall's figure, in which, moreover, no 7th vein is shown, which must surely be an omission.

Doleschall's figure to be correctly drawn, a point of discrepancy, which, nevertheless, as a similar variation occurs in *Gonomyia*, may not be regarded as of generic distinction. In *albitarsis*, the contact of the upper basal corner of the discal cell with the 2nd longitudinal vein is punctiform, so that there is *neither 3rd longitudinal vein nor anterior cross-vein*. This is the only species in which I have noted this extraordinary feature. In *manca* and *pallida*, as in all other species, what I am compelled to regard as the 3rd longitudinal vein is always short, but always of quite a reasonable length, merging in the 4th vein at the upper basal corner of the discal cell, and at about the same spot in the 4th vein, when the discal cell is absent.

Regarding the correct terminology it might have been assumed in studying the wing of, let us say, *trentepohlii*, that the 3rd longitudinal vein was continued to the wing-border, forking soon after quitting the 2nd vein; that the anterior cross-vein was present, and that the 4th longitudinal vein was simple; but on comparing this wing with *Mongoma*, *sensu stricto*, it becomes obvious that such a suggested anterior cross-vein is in both types of wing the normal base of the discal cell, the closed or open nature of this cell not affecting the question. Adopting this view, the 3rd longitudinal vein is restricted to a comparatively short length, the anterior cross-vein is then seen to be absent, and in the case of *albitarsis*, as before noted herein, the discal cell is formed at the very juncture of contact with the 2nd vein, thus, in this species, obliterating the 3rd vein altogether as well as the anterior cross-vein.¹

¹ It seems advisable here to make reference to the genus *Paratropesa*, Sch., a genus which Osten Sacken considered not to be allied to the *Gonomyia* and *Mongoma* group, in spite of its apparent affinity by virtue of a somewhat similar venation. Subsequently, in his "Studies on Tipulidae" he confirmed this lack of real affinity, yet, although I have not seen any specimen of it, a study of the wing, as figured by Schiner, convinces me of its real kinship, and this view is supported by the position it holds in Prof. Kertész's recent catalogue of Diptera.

The genus is quite likely to be found within the geographical region embraced by this volume and therefore a few notes on the terminology bearing important references to *Gonomyia* and *Mongoma* may not be out of place. The 2nd longitudinal vein starts before the middle of the wing in a very wide sweep, forking widely close to the wing-tip; the upright marginal cross-vein placed at about the middle of the praefurca, joining the 1st vein some distance before its tip.

Posterior to the 2nd vein there is only a cross-vein, in a direct line with the marginal cross-vein connecting the 2nd vein with the discal cell. The rest of the veins are more or less normal, though rather widely separated.

The point, however, to which attention is called, is the short upright cross-vein joining the 2nd vein and the discal cell. In *Mongoma* there is a short *very oblique* vein at this point which I term the *3rd longitudinal vein*, losing itself in the 4th vein, the anterior cross-vein being absent. In *Paratropesa*, this *upright* short cross-vein seems to assert itself self-evidently as the *anterior cross-vein* and *not* as the beginning of the third vein. This being so, it is to be understood that I recognize in *Mongoma* a short oblique 3rd vein merging in the 4th vein, the anterior cross-vein being absent; and in *Paratropesa* an upright anterior cross-vein joining the 2nd vein to the discal cell, the 3rd vein being absent. It is so seldom that either the 3rd vein or the anterior cross-vein is absent that it is difficult to decide which should be considered of the more anatomical value; personally I think at first sight the latter.

The value of the exact position of the posterior cross-vein is not of primary importance, as not only in the closely allied genus *Gonomyia*, but in other genera throughout the family, the position of this vein is not by any means precisely constant even in the same species.

Osten Sacken emphasizes "No empodia and no spurs" in his generic notes, but observes that in some *Gonomyia*, as well as in the allied genus *Lipsothrix*, the empodia are wanting.

The seven Indian species before me fall easily into the genera *Mongoma* and *Mongomioides*, three in the former and four in the latter.

MONGOMA, Westw.

Type of genus *M. fragillima*, Westw. (from Tropical Africa).

pennipes, Os. Sac., ♂ ♀. Described from Borneo, but it occurs in India and Ceylon in both of which it is apparently widely distributed. Meijere records (Tijd. v. Ent., liv, 50) that Jacobson bred the species from rotten vegetable matter in Java. In the Indian Museum from India and Ceylon. Dr. Brauer of the Berlin Museum informs me that the type therein preserved is still in good condition. Mr. Edwards records it recently from two localities in Ceylon.

tenera, Os. Sac., ♂ ♀. Philippines. Two ♂ ♂ and a ♀ in the Indian Museum from South India and the base of the Himalayas can hardly fail to be this species. One specimen in the Vienna Museum.

Type (a unique ♂) presumably in the Osten Sacken collection.

PARAMONGOMA, mihi, gen. nov.

Type of genus *Cylindrotoma albitarsis*, Dol.

Mongoma id., Wulp, et auct.

This genus differs from *Mongoma*, Westw., only in the venation, principally in the (typically) punctiform contact of the 2nd longitudinal vein with the discal cell, thus *obliterating the 3rd longitudinal vein* (*albitarsis*, Dol., generic type); or the presence of only a very short 3rd longitudinal vein. The discal cell emits only three veins (arguing from analogy and comparing the wing with that of *Mongoma*, it should be the anterior branch of the 4th longitudinal vein that is forked), thus making *only three posterior cells*, the first and second of which are of equal length, with pointed bases.¹ The anal cell is open, somewhat narrowly but distinctly.

¹ Vide footnote 1 on p. 291.

Two North American species come in *Paramongoma*—*pallida*, Will., and *manca*, Will., both described under *Mongoma*.

Both differ by the presence of a short 3rd longitudinal vein, of about the length of that in *Mongoma pallipes*, Os. Sac., the contact between the 2nd longitudinal vein and the discal cell not being punctiform. As the length of the 3rd longitudinal vein varies in different species, I think these two with very short ones may be included in *Paramongoma*, the remainder of the venation being practically identical. In *manca* a further (comparatively minor) difference is apparent by the marginal cross-vein joining, not the praefurca as usual, but the *upper* branch of the 2nd longitudinal vein,¹ thus making the 1st submarginal cell nearly square.

The only Oriental species definitely referable to *Paramongoma* is *albitarsis*, Dol.,² described from Java, but *australasiae*, Skuse, is certainly congeneric.

albitarsis, Dol. (*Cylindrotoma*). Amboina.

I have never met with this, nor seen it recorded since the foundation of the species, nor is the location of the type ascertainable.

MONGOMIODES, mihi, gen. nov.

Type of genus *Linnobia trentepohlii*, Wied.

Differs from *Mongoma*, s. s., by possessing only *three* posterior cells instead of four, and by the discal cell being *absent*. It agrees with *Mongoma* in the presence of the 3rd longitudinal vein, and in the anal cell being closed at a greater or less distance before the border. The marginal cross-vein (in the four species known to me) is more distad than in *Mongoma*, and the first section of the 2nd longitudinal vein (*i.e.*, that portion up to the origin of the 3rd vein) is shorter than in *Mongoma*, not longer than one-third the length of that vein. Upper branch of 4th longitudinal vein nearly straight or gently curved: posterior cross-vein distinctly, but not much, before the fork of the 4th longitudinal vein. (This may be found a variable character, when additional species are discovered.) Remainder of venation and all other characters as in *Mongoma*.

¹ Williston (Tr. Ent. Soc. Lond., 1896, p. 292) includes this amount of variation in the position of the marginal cross-vein, in the generic diagnosis.

² Doleschall's figure is rather slovenly drawn, as the 1st longitudinal vein is shown emerging from the auxiliary vein near its tip; the 2nd vein is straight, after the bend, which takes place at the exact corner of the discal cell, there being *neither 3rd longitudinal vein nor anterior cross-vein*. There are only three posterior cells, of which the first two are subequal, with obtuse pointed bases: the posterior cross-vein is a little beyond the base of the discal cell, which is about twice as long as broad. The anal cell is open; apart from this, the 5th and 6th veins bear the same relation to each other as in *Mongoma*. The 7th vein is not shown, perhaps due to the full insect being illustrated, with the wings rather close to the body; in this position the 7th vein would be easily obscured by the proximity of the wing to the abdomen.

trentepohlii, W., ♂ ♀ (*Limnobia*). Described originally from Sumatra, this species is common in different parts of India, Burma and Assam, including Calcutta, and is probably generally distributed throughout the East. Meijere has it from Java and Mr. Edwards records it recently from two Ceylonese localities.

Type in Dr. Trentepohl's collection, presumably at the Vienna Museum.

Three new species from India in the Indian Museum will be described by me later.

Mongoma exornata, Bergr., from Africa is a true *Mongomioides*.

STYRINGOMYIA, Lw.

First described by Loew in 1845 (Dipt. Beit., i, in "Zu der öffentlichen Prüfung der Schüler d. Königl. Fried. Wilh. Gymn. zu Posen," p. 6) from a specimen in amber, it was for many years considered an extinct genus. The late Baron Osten Sacken, in his Monograph of the North American Tipulidae Brevipalpi (p. 102), describes a second species (without naming it) from a piece of copal from Zanzibar. He figures a wing, copied from Loew's figure, and characterizes the genus, adding from Loew's original description such details as were not distinctly visible in his own species. He suggested, but did not assume the relationship of the genus to *Toxorhina*. Later on (1887) the same author, in his historical "Studies on Tipulidae," ii (Berl. Ent. Zeits., xxxiii, 185), records the existence of recently captured specimens from Caffraria taken by Wahlberg, in the collection of the Stockholm Museum. Needham (New York State Museum, Bulletin 124, pl. xxvi, 6) reproduces an enlarged figure of Osten Sacken's copy of Loew's wing. Prof. Kertész in his exhaustive catalogue of the world's diptera, now in progress of publication, does not mention the genus, from which I presume the Caffraria specimens were not named. Loew's original species was *S. venusta*, ♀.

Incidentally it may be noted that there exists another genus with a very similar name—*Steringomyia*, Pokorny—erected in 1889 (Verh. zool.-bot. Ges. Wien, xxxix, 568) for a single species from the Alps allied to the genus of Muscidae, *Cynomyia*, Rob. Desv.

I had hoped to introduce this genus to the East by the description of three species in the Indian Museum collection from Nepal and South India but am forestalled by Meijere's discovery in Java of Grimshaw's *S. didyma*, described from Hawaii recently. Dr. Meijere places the genus in the Rhamphidini, but it seems to me much more nearly related to the *Gonomyia* group, with *Mongoma*, *Lechria*, and the closer allies of *Gonomyia*. Mr. Edwards also describes the following species from Ceylon.

ceylonica, Edwards, Ann. Mag. Nat. Hist. (8), viii, No. 43, 58, ♂ (1911).

Described from a single ♂ in the British Museum from Weligama, Ceylon, 9-ii-08 [T. B. Fletcher].

Styringomyia ceylonica, Edwards.*Redescription.*

♂ ♀. Base of Himalayas and Bengal. Long. 3—6 mm.

Head, and the rather short, blunt proboscis, yellowish; the wide frons bearing several strong long bristles. Eyes black, almost contiguous below the head, for a short space. Antennae yellowish, with somewhat sparse, moderately long hairs; scape brown, 1st joint elongate, 2nd wider at tip; flagellum of fourteen oval joints, narrowing in size towards tip. Palpi yellowish, with some hairs, 4-jointed, each of about the same length, the 1st rather the shortest, the 4th slightly the longest, with a blackish tip which is sometimes bent at a right angle; 2nd broadest, and widening towards tip, which is black.

Thorax.—Neck moderately long, with strong black bristles on upper side. Thorax brownish on upper half, yellowish below, with two irregular rows of short bristles, separated by a rather wide median space. Some bristles on the sides, and a long one on each posterior callus and two in each humeral region. Scutellum and metanotum brown, bare.

Abdomen about three times as long as the thorax, linear, consisting of the usual short basal segment, and six other longer ones of about equal length, moderately pubescent. Variable in colour; in ♂ mainly dirty yellow with posterior borders of segments a little blackish, or with an indistinct dorsal stripe; in ♀ dark brown. Genital organs in ♂ prominent and highly complicated, consisting of two large (wider than the terminal abdominal segment) basal segments, the 2nd pointed above posteriorly. This latter segment bears a pair of large subchitinous claspers of which the upper arm of each is bluntly conical, terminating in a black sharp elongated point; the lower arm being attenuated, elongated, nearly transparent, apparently flexible and terminating in a very long black filamentous bristle. Below this upper pair of large claspers is a second, much smaller pair, the upper arm of each being bifid and stout, the lower arm longer, comparatively thin, and ending in a small expansion bearing four blunt strong teeth, there being two small black spines at the middle of this lower arm. Between this lower pair of claspers is a small bristly organ, apparently the penis, and below all the organs is a rather large ventral plate.

In the ♀ they are also large and complicated, consisting of a pair of nearly perpendicular sheaths, terminating in filamentous points, and enclosing two internal lamellae and two bristly fleshy organs, the whole being supported below by a ventral plate which possesses a small appendage towards the tip, below. In both sexes the genital organs are conspicuous and large, generally concolorous or a little lighter in colour than the abdomen.

Legs mainly yellow, with black rings, pubescent. Coxae rather strong, trochanters rather well developed, half as long as coxae. Fore coxae with some strong bristles on upper side; all coxae with scattered short hairs.

Fore femora with a few long hairs (longer than the general pubescence): middle femora with an irregular row of short bristles on upper and anterior sides, including several rather longer ones placed near together towards the tip of the anterior side: hind femora with four rows (one on each side, also above and below) of long soft hairs: all the femora distinctly broader at tip than at base. Fore tibiae with a row of 5 or 6 long, equidistant bristles on front side, and a row on the outer side: middle tibiae with a row of 5 or 6 bristles on *hinder* side, and a row of 5 or 6 on outer side: hind tibiae with a row of 10 or 12 stronger stiff hairs on hinder side, and a row of 5 or 6 stiff long hairs on outer side, in addition to rows of longer, soft hairs, which are also in addition to the general pubescence. All the tarsi with some longer hairs; hind metatarsus, which is as long as the rest of the tarsus, with a row of 5 or 6 pairs of diverging bristles on outer side; 2nd, 3rd and 4th tarsal joints with some longer hairs in sets of from two to four, on outer side; claws black.

In coloration, all the femora have two blackish rings on apical half, the tips also being narrowly black; the tibiae have a narrow ring in the middle and a rather broad one at the tip; all the tarsal joints are black tipped, all these rings on the legs being variable in width and still more so in intensity.

Wings clear grey; considerably iridescent; costa very shortly bristly, quite bare at base, posterior margin of wing with soft short hairs, longest at base of wing and shortest towards tip of wing. 1st longitudinal vein with a row of distinct, rather long bristles throughout its entire length; deflected suddenly downwards near its base, shortly afterwards merged in the costa, just after the origin of the 2nd longitudinal, which, at about half the distance from its origin to the wing-tip, turns up almost at right angles to the costa. The 3rd longitudinal springs from this angle and is nearly straight. The anterior cross-vein very short, placed very near base of 3rd longitudinal, united to upper basal corner of discal cell. The upper branch of the 4th vein is forked, the two prongs divergent; lower branch simple. Discal cell practically rhomboidal, twice as long as broad, rather broader at apical end; posterior cross-vein exactly below middle of discal cell.

The 5th and 6th longitudinal veins are nearly straight, 7th bristly at the base, rather more than half as long as 6th, sharply curved near its tip towards the border.

A slight brownish suffusion over the anterior cross-vein, the outer side of the discal cell, and the posterior cross-vein. Halteres dirty yellow; knobs blackish.

Described from a pair in the Indian Museum taken *in cop.* at Sukhwani, Nepal, 15-16-ii-08, a pair taken by Dr. Annandale at Sukna, Darjiling district, 1-vii-08, and from other specimens.

N.B.—The above description was written some months before the publication of Mr. Edwards's *ceylonica*, under the assumption it was a new species. Being drawn up from a series of more than a dozen specimens representing both sexes, it seems advisable not

to withdraw it. The species shows considerable variation, and a form which I had intended to describe as a variety has the wings more yellowish, the veins paler and the tip of each one very slightly but distinctly darkened at the wing-margin. In the Indian Museum are one ♂ and three ♀ from Sukna (500 ft.), 1-vii-08; Puri, Orissa, 22-x-08 [both *Annandale*]; and Calcutta, 9-xii-07. I took it at first for a "plains" variety of my supposed new species, but intermediate individuals connect it with the typical form.

The precise mathematical distinctions appertaining to the bands on the legs, as given by Mr. Edwards, do not hold good, as they exhibit considerable variation.

Styringomyia obscura, mihi, sp. nov.

♂. Nepal. Long. 5 mm.

Head.—Frons brownish yellow, antennal scape dark brown, flagellum (of fourteen oval joints) yellowish, pubescent, palpi dark brown, pubescent. Proboscis brown. Back of head light reddish brown, with some bristly hairs.

Thorax.—Neck (with strong bristles), dorsum of thorax, scutellum and metanotum, uniformly dark brown; traces, on hinder part of dorsum, of a pale median line, extending over the scutellum and metanotum. Two rows of dorsal bristles as in *ceylonica*, and a few bristles above and in front of the wings. Sides and lower part of thorax brownish yellow.

Abdomen moderately dark brown, minutely pubescent, blackish towards tip, emargination of segments black; belly concolorous.

Genital organs conspicuous and large, consisting of a rather large upper part, with two small terminal lamellae bearing long hairs; a pair of large fleshy claspers and a pubescent ventral plate, bilobed at tip.

Legs (middle pair wanting).—Coxae and trochanters reddish yellow, with some black hairs on anterior pairs, and yellow hairs on hind pair. Femora (fore pair distinctly but not greatly, thickened towards the tip) yellow; apical fourth black, and with a black ring in the middle which is very wide on the fore pair and moderately wide on the hind pair. Tibiae blackish brown, pale at extreme base. Fore tarsi blackish brown, hind pair yellowish white, claws black, apart from the minute pubescence of the whole legs. The only bristles are a row of weak ones on the outside of the hind tibiae, and on the lower side of the hind tarsi; a few stiffer hairs on fore tibiae.

Wings grey, unmarked, venation as in *ceylonica*, but the veins dark brown and much more distinct. Halteres black, stem brownish yellow.

Described from a single ♂ in the Indian Museum from Thamaspur, Nepal, base of Himalayas, 18-20-ii-08.

Styrgomyia flava, mihi, sp. nov.

♂. South India. Long. 5 mm.

Whole body mainly pale dirty yellow. 1st joint of scape dark brown on under side; flagellum of fourteen joints more elongated than in the other species. A strong long spiny bristle just above the wing, four small, dorso-central ones arranged in a curve, two long ones on the scutellum and a large one on each shoulder: also a strong one a little below each wing. Pleurae with some minute bristles. Abdomen with rather longer soft pubescence. Posterior margins of abdominal segments with a moderately wide brown band, interrupted in the middle.

Genitalia concolorous, conspicuous. A pair of large pubescent fleshy claspers, each bearing at its end a long, filamentous semi-transparent tentacle and three strong black spines. On the inside of each clasper is a slightly prominent comb-like organ and also possibly a pair of lamellae. Above, and almost between these large claspers is a smaller fleshy projecting pubescent organ. Below all is an onion-shaped ventral plate, which, as well as the whole genitalia, is covered with long bristly hairs.

Legs pale yellow, minutely pubescent, especially on the tibiae. Coxae with bristles; femora with a faint trace of the two apical black rings as in *ceylonica*, fore pair barely enlarged at tip, with a row on upper and under sides of longer, stiff hairs. Posterior femora with rows of stiff hairs, mainly on upper and outer sides, but with a tendency to general distribution, especially on hind pair. Fore tibiae with some bristles on front side and a double row of more numerous ones on outer side. Posterior tibiae with bristles on outer and hinder sides. Tarsi with a few bristles below.

Wings distinctly pale yellow, very iridescent, quite unmarked; venation exactly as in *ceylonica*, and the costa with a distinct fringe of short bristly pale hair, which is nearly absent at the base, both on front and hind margins. Halteres pale dirty yellow.

Described from a single ♂ taken at light by Dr. Annandale, 22-xi-08, at Tenmalai, Travancore State, South India.

LECHRIA, Skuse.*Lechria bengalensis*, mihi, sp. nov.

♂ ♀. Bengal. Long. 4 mm.

Head blackish grey, frons rather broad and flat, with short sparse hairs; proboscis yellowish, palpi dark. Antennae black; 1st joint of scape long, 2nd short, both broader than the 14-jointed flagellum, which has traces of white at the tip of each joint and at the base of the 1st joint.

Thorax yellowish, well arched, mesonotal suture deep, posterior to which the colour of the dorsum is pale livid brown,

as is the scutellum; metanotum blackish grey. Sides of thorax yellowish, pleurae a little white dusted.

Abdomen moderately dark yellowish grey, with short yellow hairs; belly concolorous, genitalia in both sexes small, brownish yellow.

Legs brownish yellow, thin and long; femora with some stiff black hairs at the tip which, if viewed from certain directions, give almost the appearance of two black spines; tibiae unspined.

Wings clear yellowish grey, veins distinct. Auxiliary vein ends just beyond middle of wing, the subcostal cross-vein at its tip. The 1st longitudinal ends in the 2nd at the point where this latter vein forks. The 2nd vein originates at or just beyond the middle of the wing, at a sharp angle and turns at one-fifth of its length suddenly upward, forking beyond its middle, where it meets the tip of the 1st vein, the upper branch shorter than the lower one. The 3rd vein issues from the 2nd at the angle in the praefurca, the anterior cross-vein placed just before this point. The latter is of moderate length, placed over the middle of the discal cell which is in the middle of the wing, three times as long as broad, the proximal end pointed, emitting three nearly parallel veins to the wing-margin. Posterior cross-vein near base of discal cell; 5th, 6th and 7th veins nearly straight.

Described from a ♂ and three ♀♀ dated respectively Pusa, 15-viii-08 (type ♂); Calcutta, 19-viii-07 (type ♀) and 18-vi-09; Pusa, 16-vii-10.

Type ♂ in Pusa collection, ♀ in Indian Museum.

NOTES.—The venation of this genus is distinctly abnormal, the only previously known species, *singularis* Skuse,¹ coming from Australia. The 1st longitudinal vein ends in the 2nd at the point where the latter forks widely, thus giving the appearance of two long veins crossing one another at an angle of 45°, the point of contact in *singularis* being punctiform. In my species the point of contact appears almost as a small cross-vein. Skuse's description of his genus not being accessible I have had to rely on Needham's figure (plate 19, fig. 5) copied from Skuse's work and there can be no possible doubt of the new species being congeneric at least as far as the wings go.

Prof. Kertész places *Lechria* in the Eriopterini near *Gonomyia*, to one species of which, *G. incompleta* mihi, it bears a remarkable resemblance in this part of the wing, and to which genus, *bengalensis* as a species at any rate, is eminently akin.

The only other possible interpretation of the wing as figured by Needham would be to consider the 1st vein as angled towards the tip and continuing to the wing-margin, meeting at the angle the 2nd vein, which in this case would be simple, not forked, thus making only one submarginal cell, which in its turn would necessitate the genus, theoretically at least, being removed to another

¹ With the exception of *lucida*, Meij., recently described from Java. Tijd. v. Ent., liv, 53, ♀ (1911).

section of this subfamily. Its position near *Gonomyia* seems hardly questionable.

N.B.—I had anticipated the pleasure of introducing this peculiar genus to the Oriental Region, but have been forestalled by the publication of Meijere's *lucida*.¹

GONOMYIA, Mg.

Of this genus Dr. Meijere introduces² two species from Java, *metatarsata* and *nubeculosa*. I have descriptions of several additional species from India, showing some important variations of venation, which prove Osten Sacken's remarks on the variability of this character in *Gonomyia*.

EMPEDA, Os. Sac.

gracilis, Meij. Tijds. v. Ent., liv, 49 (1911), pl. iv, 37, wing. The author states no sex. An additional species from Darjiling will be described by me later.

GNOPHOMYIA, Os. Sac.

Two Javan species are described by Meijere (*loc. cit.*), *orientalis*, ♂ ♀, and *ornatipennis*. The Indian Museum possesses about half a dozen undescribed species.

SYMPLECTA, Mg.

punctipennis, Meig., ♂ ♀. This common European species is to be found rather freely at Darjiling, the Indian Museum possessing a good series, identified by me.

ERIOPTERA, Mg.

Dr. Meijere introduces two species from Java,² *javanensis*, ♂, and *notata*, whilst I have descriptions of twelve others from different parts of the Indian Empire.

MOLOPHILUS, Curt.

One species from Java, *bicolor*, ♀, described by Meijere (*loc. cit.*, 45), the Indian Museum possessing two additional undescribed species.

¹ Since writing the above I have obtained a copy of Skuse's works and the species proves to be correctly placed in *Lechria*.

² Tijds. v. Ent., liv (1911).

DASYMALLOMYIA, mihi, gen. nov.

Head, thorax and abdomen of the normal Eriopteriniid type, with light conspicuous hair on thorax and abdomen. Eyes separated above by a hairy frons, less than one-third the width of the head, below contiguous for a short space.

Antennae missing, except the scape, which is normal but rather less in size, and the three basal joints of the flagellum, which also have every appearance of normality, rounded, verticillate.

Abdomen narrowed at base, widened beyond the middle; genitals of moderate size, normal.

Legs conspicuously pubescent throughout with moderately long hair.

Wings moderately broad, anal angle rounded but distinct, two submarginal cells, four posterior cells, discal cell open, coalescent with 3rd posterior cell. Auxiliary vein lies close to 1st longitudinal, ending at about the middle of the wing, the 1st longitudinal ending a little beyond. The 2nd longitudinal begins at one-third of the wing, forked; marginal cross-vein just before tip of 1st vein. The 3rd vein begins a little before the fork of the 2nd; the 4th forks close to the anterior cross-vein, both branches forked; posterior cross-vein just beyond fork of 4th vein; 3rd posterior cell pointed at base, 6th and 7th veins slightly sinuous.

GEOGRAPHICAL DISTRIBUTION.—Darjiling district.

NOTES.—Although this genus stands out as quite distinct from others it is difficult to define its peculiar characters.

Perhaps the robustness of the body generally (affording some general resemblance to *Teucholabis*), the narrowed abdomen near the base and specially the somewhat shortened, thickened, very hairy legs, are the best distinguishing features from *Gnophomyia*, Os. Sac., which seems to be its nearest eastern ally.

Dasymallomyia signata, mihi, sp. nov.

♀. Darjiling district. Long. $7\frac{1}{2}$ mm. to tip of ovipositor.

Head.—Frons forming one-fourth the width of the head; grey, with some long, rather shaggy yellow hair. Back of head similar. Proboscis brownish yellow, short, rather stump-like; palpi normal, elongate, four-jointed, pubescent. Antennae with apparently two scapal joints nearly alike, rather short, slightly wider at the tip, the flagellar joints oval (only three are remaining, the rest being broken off): scape dark, flagellum brownish yellow.

Thorax.—Dorsum yellowish; a moderately broad, very shining black stripe in the middle from the anterior margin to the suture, slightly narrowed in front; a short, very shining, black stripe on each side of the median one, with an isolated black spot in front of it near the shoulders. Behind the suture, near the dorsal margin on each side is a very black shining triangular spot,

and on the dorsum (behind the suture) a pair of wide blackish stripes of normal nature reaching to the scutellum, which latter is small and yellow, the base a little blackish. Sides of thorax with a pinkish tinge, some short yellow hair on the pleurae and near the wing-roots; metanotum blackish. Prothorax of moderate enlargement, produced into a short stout neck.

Abdomen black, roughened; posterior margins of segments narrowly pale yellowish; belly similar. Ovipositor brownish yellow, enlarged at the base, the lower pair of valves much shorter than the upper ones, straight, and set a little further back.

Legs.—Coxae and trochanters both somewhat small, legs comparatively robust, yellow, with rather long close pubescence, the femora a little incrassated at the tip, and bearing a subapical blackish not very well-defined ring, tips of tibiae and tarsal joints narrowly blackish.

Wings nearly clear, very iridescent, a faint yellowish impression caused by the yellow veins; the "cross-veins" rather black. Auxiliary vein lying close to the 1st longitudinal vein, ending at about the middle of the wing, the 1st longitudinal ending a little beyond. The 2nd longitudinal vein begins at one-third of the wing, forks at about half its length, just under the end of the 1st vein, with the marginal cross-vein just before the tip of the latter.

The 3rd longitudinal vein originates a little before the fork of the 2nd, at a right angle, thence forming nearly another right angle before proceeding almost straight to the border parallel to the veins in front of and behind it. Basal section of 3rd vein fairly long, nearly in a line with the anterior cross-vein, which is of about the same length. The 4th vein forks close to the anterior cross-vein, the upper branch forks at about its middle, the branches parallel. The lower branch of the 4th vein simple, parallel with the 5th; posterior cross-vein just beyond fork of 4th vein; 3rd posterior cell pointed at base; 6th and 7th veins slightly sinuous. A small indistinct stigma over the tip of the 1st vein.

Described from a single ♀ in the Indian Museum from Kurseong, 7-ix-09, taken by Mr. D. F. Lynch.

Section V. AMALOPINI.

TRICHOCERA, Mg.

ocellata, Wlk., ♀. East Indies. Specimens agreeing with Walker's description are in the Indian Museum from Simla, whilst I have three other species described in MS. from India.

N.B.—After due deliberation I remove this genus from the Limnophilini to the Amalopini, with the characters of which it seems to agree much better. This is the only instance in which I have suggested the removal of any genus to a new section.

Three species of *Amalopsis* in the Indian Museum will also be described by me subsequently.

Section VI. LIMNOPHILINI.

LIMNOPHILA, Macq.

terminalis, Wlk., ♀. Papua. Of the type (British Museum) there now only remains the head, thorax and one leg. Possibly may not be a *Limnophila*.

euchroma, Wlk., ♀. Gilolo. Type in British Museum, but legless. Being conspicuously marked it would be useful for comparison. Possibly does not belong to *Limnophila*: the antennae are missing.

selectissima, Wlk., ♂. Mysol. Type in fair condition in British Museum.

contingens, Wlk., ♂. Papua. Type has lost abdomen and legs. British Museum.

trisignata, Wlk., ♀. Papua. Type in fair condition in British Museum; being conspicuously marked, would be useful for comparative purposes.

N.B.—Of all these five species the types are the only specimens known, apparently. Osten Sacken has vouched for the last three species belonging to this genus.

opaca, Meij. Tijds. v. Ent., liv, 52 ♀, pl. iv, 44, wing.

EPIPHRAGMA, Os. Sac.

insignis, Wulp, ♂. Sumatra. Type in Amsterdam Museum in bad condition.

signata, Meij., ♂. Java. Tijds. v. Ent., liv, 52, pl. iv, 43, wing.

POECILOSTOLA, Sch.

pallens, Wulp, ♂. Java. Type in Leyden Museum.

GYNOPLISTIA, Westw.

jurgiosa, Wlk., ♂ ♀. Aroe Isles. The type ♂ and ♀ are still in good preservation at the British Museum.

fulviceps, Wlk., ♀. Papua (Dorey). Type in British Museum in good condition except for the missing abdomen.

melancholica, Wlk., ♂ ♀. Mysol. The types of both sexes are in the British Museum in good condition except for the missing abdomen of the ♀.

insolita, Wlk., ♀. Salawatti I. Type in good condition in the British Museum.

N.B.—I can trace no record of any of these four species having been taken since they were described.

jucunda, Os. Sac., ♂ ♀. Celebes. The two sexes were originally present in the Genoa Museum (from Kandari, South Celebes) but only one specimen now remains.

Gynoplistia 8-fasciata, mihi, sp. nov.

♀. S. Celebes. Long. 8 mm.

Head black; proboscis and palpi yellowish; antennae (damaged) yellowish, elongate.

Thorax wholly shining black; traces of greyish reflections at the sides.

Abdomen yellow, shining black at base, and brown on the emarginations of the segments, blackish at extreme tip. Ovipositor shining brownish yellow. Belly of the same colour as the upper side.

Legs.—Coxae, femora and tibiae bright yellow; tips of femora and tibiae narrowly blackish; tarsi brownish yellow, tips darker.

Wings pale yellowish grey, costal cell yellow. Three brown, moderately wide, indistinct bands across the wing. The first two begin at the 1st longitudinal vein; they are interrupted by the 2nd basal cell, and do not reach the posterior margin of the wing. The first band is near the base of the wing, the second begins at the origin of the 2nd longitudinal vein, the third is placed over the stigma at the costal margin, and in diminished form attains the hind margin of the wing through the posterior cross-vein and the last section of the 5th longitudinal vein. A brownish round spot around the apical half of the discal cell. The wing-tip is also rather broadly brownish. Halteres bright orange-yellow.

Described from one ♀ in the Vienna Museum from Patuhuang, South Celebes, taken January 1896 by Fruhstorfer.

Section VII. ANISOMERINI.

ERIOCERA, Macq.

acrostacta, W., ♂ ♀ (*Limnobia*).

Oligomera javensis, Dol.

? *Limnobia diana*, Macq.

The types are in the Westermann and Wiedemann collections, from Java. Both sexes are described.

basilaris, W. (*Limnobia*). Java.

Both sexes described; types in Westermann's collection. Meijere has received it from several localities in Java.

mesopyrrha, W., ♂ ♀ (*Limnobia*). Java. Types (two ♂ ♂ and two ♀ ♀) in the Leyden Museum, with a fresh ♂ from Sumatra. The four "type" (?) specimens are referred to by Dr. Jentink in his notes to me as of the "old collection," and were presumably examined by Wiedemann, but this latter author in his descriptions only refers to the ♂.

verticalis, W., ♂ (*Megistocera*). Java. Type and other specimens in bad condition in the Leyden Museum. Also present, a ♂ in good condition from Java determined by Van der Wulp.

Megistocera atra of Doleschall is considered synonymous with this species. Meijere notes this and the previous species (Tijd. v. Ent., liv, 55).

nepalensis, Westw. (*Caloptera*). Nepal.

? *velutina*, Wlk.

This species is tolerably well distributed along the Himalayas in Nepal and in Assam, and is present in all the collections I have examined.

It seems to me that *velutina*, Wlk., is a synonym of it and that that author by error speaks of a large *brown* spot across the wing instead of a whitish one. Apart from this discrepancy the description applies perfectly, and being such a conspicuously marked species the synonymy is at least probable. (See *E. velutina*.)

bicolor, Mcq. (*Limnophila*). Bengal, Sumatra, Java. Meijere reports a ♂ from Java.

hilpa, Wlk., ♀ (*Pterocosmus*). Hongkong. The type (a ♀) is still in good condition in the British Museum. The species is not deleted from this list but Hongkong can hardly be considered in the Oriental Region.

velutina, Wlk., ♂ ♀ (*Pterocosmus*). ?=*nepalensis*, Westw. Assam, Nepal, Himalayas, South China. The type ♂ and ♀ in the British Museum are still sufficiently well preserved for comparison. Numerous other specimens are present in this collection, but I am almost certain that this species is synonymous with Westwood's *nepalensis*.

sumatrensis, Mcq., ♂ (*Limnobia*). Sumatra.

albonotata, Loew, ♂ ♀ (*Limnobia*). Ceylon, also extends to Mozambique. Two ♀ ♀ in the Vienna Museum from Ceylon are probably this species. Mr. Edwards records it from several places in Ceylon, where it is seemingly common. It is also likely to be a variable species.

leucoteles, Wlk., ♂ (*Limnobia*). Singapore. Type (♂) in British Museum, legless, but otherwise in good condition.

plecioides, Wlk., ♂ (*Limnobia*). Singapore. Type in fair condition except that only one leg remains. In British Museum.

dichroa, Wlk., ♀ (*Limnobia*). Mount Ophir, Malacca. Type (♀) in British Museum in bad condition. A second ♀ is in better condition, but legless, yet, as the species is conspicuously marked it would be useful for comparison.

rubescens, Wlk., ♂ (*Limnobia*). Borneo (Sarawak). The type ♂ in the British Museum is in fair condition.

pyrrhochroma, Wlk., ♂ (*Limnobia*). Borneo. Type is too bad for comparison. British Museum.

lunigera, Wlk., ♂ (*Pterocosmus*). Sarawak, Borneo. Type in British Museum in bad condition, except that the wing-markings are distinguishable.

infixa, Wlk., ♂ ♀ (*Pterocosmus*). Sarawak. Type ♂ and ♀ still in fairly good condition in the British Museum. Two more recent ♀ ♀ (from Sarawak also) have been added.

optabilis, Wlk., ♂ (*Pterocosmus*). Sarawak. Type (British Museum) (♂) valueless, reduced to a thorax and head. No further specimens have been recorded.

combinata, Wlk., ♀ (*Pterocosmus*). Sarawak. Type in British Museum, a ♂, damaged, but useful for comparison owing to conspicuous markings.

diluta, Wlk. (*Pterocosmus*). Sarawak. The British Museum type is valueless, the abdomen and other parts being missing. The sex is now undiscoverable, and was not stated by Walker.

albipuncta, Wulp, ♀. Java. The type is totally lost, but the Amsterdam Museum (where it had been) has other specimens in good condition, from Java, taken by Jacobson. Meijere reports recently a ♂ and several ♀ ♀ from Semarang, Java.

lunata, Westw. No sex stated. Sarawak.

morosa, Os. Sac., ♀. Makassar, Celebes.

selene, Os. Sac., ♀. Mt. Singalang (Sumatra). The types of both these species in mediocre condition in the Genoa Museum.

perennis, Os. Sac., ♂ ♀. Philippines.

mansueta, Os. Sac., ♂ ♀. Philippines. Types (presumably) in the Osten Sacken collection.

ferruginosa, Wulp, ♀. Java. The two type ♀ ♀ are still present in the Leyden Museum, but one is in bad condition. Meijere records a ♀ from Semarang, Java.

humberti, Os. Sac., ♀.

meleagris, *id.*, ♀.

pachyrrhina, *id.*, ♂ ♀ (*in cop.*).

The types of these three are in the Geneva Museum, all from Ceylon. Mr. Edwards records *humberti* from Pundaluoya, Ceylon, with an extra specimen from Uva P., Madulsima, with an all velvet-black thorax. This may be the undescribed ♂, he thinks. It agrees otherwise with *humberti* ♀.

crystalloptera, Os. Sac., ♂. Ceylon. A single imperfect type ♂ in the Berlin Museum. Mr. Edwards records it from Madulsima Pundaluoya and Haputale, all in Ceylon. He says the ♀, which appears not to have been met with before, is very like the ♂ but larger.

nigripennis, Meij., ♀. *Bijd. tot. de Dierk.*, xvii. 92 (1904). Java.

cingulata, Meij., ♂ ♀. *Tijd. v. Ent.*, liv. 58 (1911).

Mr. Edwards has recently described (*Ann. Mag. Nat. Hist.* (8), viii, No. 43, p. 64, 1911) four new species from Ceylon, the types of which are in the British Museum. These are *ctenophoroides*, ♂ ♀, p. 64 (including a ♀ variety with an all velvet-black thorax), from Kandy, 19-v-92, Kottawa, 24-v-92, and Pallamadulla, 17-vi-92, *scutellata*, ♂ ♀, p. 65, from Pundaluoya, Sept. and Oct. '92, *tuberculifera*, ♀, p. 66, Pundaluoya, Nov. '88 and July '89, and *fusca*, ♂ ♀, p. 66, Pundaluoya, April 1889.

N.B.—Quite a number of new species have come to my notice, and some of these are described below.

Eriocera badia, mihi, sp. nov.

♀. Ceylon. Long. 18 mm.

Head wholly blackish grey, vertex, under side of head, and proboscis with black hairs. Antennal scape blackish grey, flagellum pale yellow, short, of eight distinct joints. Palpi a little greyish white at the emargination of the joints on the under side.

Thorax rather deep reddish brown, with traces of four somewhat darker stripes. Scutellum and metanotum on the upper part a little lighter. Sides of thorax darker and more brownish.

Abdomen reddish brown, a little yellowish towards the sides of some of the segments; 2nd and 3rd segments wholly yellow on dorsum with very narrow black hind margins; base of each of the rest of the segments with a shining black band. (The abdomen has the appearance of being rather stretched longitudinally, and possibly a considerable part of these basal black bands would be invisible normally.) Ovipositor reddish brown, of moderate size.

Legs.—Coxae dark brown, pubescent; trochanters brownish yellow; femora and tibiae yellow with blackish tips; tarsi yellowish, blackish towards the tips.

Wings moderately dark brown; four posterior cells. A minute white spot or two near the tips of the marginal and 1st submarginal cells, and a small one lying across the tips of the 2nd submarginal and 1st posterior cells.

Halteres pale brownish grey.

Described from a single ♀ from Peradeniya, Ceylon, taken by Dr. Uzel, 25-xii-01.

Type in Vienna Museum.

Eriocera rufibasis, mihi, sp. nov.

♀. Lower Burma. Long. 16 mm.

Head, antennae, proboscis, palpi, all dark blackish grey.

Thorax wholly deep velvet-black.

Abdomen wholly deep velvet-black, except the first two segments which are orange-yellow. Belly similar to dorsum. Ovipositor black, the valves shining brownish yellow.

Legs dark brown, femora, tibiae and tarsal joints blacker.

Wings brown, darker anteriorly, clearer on hind margin: four posterior cells. Clear spots are placed as follows: a rather large one extending over the apical part of both basal cells; two smaller, round spots, one over the base of the 2nd longitudinal vein, the other above the fork of the 2nd vein. One at the tip of the marginal cell; two small ones (possibly in some specimens united) in the 1st submarginal cell; a larger one extending over the 2nd submarginal cell and 1st posterior cell;—all these latter spots placed on the border. All the posterior cells are somewhat clear, as is also the wing to some extent behind the 5th longitudinal vein. Halteres small, black.

Described from a single ♀ in the Vienna Museum from Tandong (4,000 ft.), Tenasserim, taken in May [*Fruhstorfer*].

Eriocera semilimpida, mihi, sp. nov.

♂. Assam. Long. 12 mm.

Head wholly black, vertical protuberance with some black hairs; antennae black, shortly pubescent; palpi nearly black.

Thorax shining black, a little dark brown hair about the sides; mesonotal suture deeply cut; greyish reflections behind and below base of wing; scutellum shining black, soft black haired; metanotum shining black.

Abdomen.—1st segment livid on basal half, remainder black; next four segments reddish orange, hind borders a little darker, that of 5th blackish. Rest of abdomen black, including the genitalia, which are of moderate size, the only obvious parts being a tolerably large pair of claspers. Belly mainly as dorsum, 1st segment all black, 2nd black, except at base.

Legs wholly black, shortly pubescent.

Wings dark grey, slightly tinged with yellowish. Costal cell, 5th longitudinal vein, and distal part of wing from about the inner side of discal cell, rather dark brown, the colour extending not quite so far, proximally into the marginal and 5th posterior cells. Hind basal corner of wing more or less brown. Inner cross-vein placed soon after origin of 3rd vein, and before fork of 2nd; branches of 2nd rather close together, fork of upper branch occurs before one-fourth the length of that branch. Discal cell 6-sided, upper branch of 4th vein forked near tip, making five posterior cells; the three veinlets from the discal cell being equidistant; outer cross-vein just beyond middle of discal cell. Halteres black.

Described from one ♂ in the Pusa collection, taken in the Khasi Hills in September 1906.

Type in the Pusa collection.

N.B.—This species bears a close general resemblance to Macquart's *bicolor*, but there are several quite good points of difference between them. In *semilimpida* the head is black, not greyish; the thorax shining black, unmarked, not brownish grey with three black bands and some small spots; the basal segment of the abdomen is black, not orange; the coxae black, not tawny; the costa dark brown throughout its length, not clear on the whole proximal half as distinctly mentioned by Macquart and illustrated in his plate; and the whole proximal two-thirds of the wing (apart from the costa) in my species is pale grey, whereas in *bicolor* the whole wing is brown, with a broad clear median band, and a narrower one at the base. The venation is identical in both species.

Eriocera plumbicincta, mihi, sp. nov.

♂. Assam, Darjiling. Long. 13 mm.

Head.—Frons and back of head deep velvet-black, with a little black pubescence. Frons with a cone-like projection above

each antenna. Eyes black, bare, 1st joint of scape long, cylindrical, black; 2nd very short, globular, yellowish: flagellum yellowish, with short black hairs; of five very elongated joints of diminishing length, the last one black. Palpi black, pubescent, 2nd joint the widest, 1st and 4th the longest.

Thorax deep velvet-black with short black pubescence; a slight dark reddish tinge above the neck. Scutellum deep black. Dorsum of metanotum bright reddish orange, bare.

Abdomen deep velvet-black. On the 2nd, 3rd, 4th and 5th segments, a broad shining lead-coloured band extending round the whole segment and covering it with the exception of a posterior marginal band of a width of one-fifth of the segment; 6th segment wholly deep black; 7th, basal half occupied by a similar leaden band, apical half black. Seen from behind, there is a silver sheen on the sides of the segments, genitalia conspicuous, bright orange-red, protected below by a blackish plate. Whole abdomen nearly bare.

Legs.—Coxae black, pubescent: femora and tibiae orange-yellow (the latter rather darker), both with black tips: tarsi dark brown, all the legs minutely pubescent.

Wings brown, deeper in the centre; costal border to just beyond the 1st longitudinal vein distinctly orange-yellow, the colour ending at tip of the auxiliary vein. Wing grey from just in front of the 6th vein to posterior margin. A good-sized white spot (approximately oval) placed obliquely across the basal cells, towards the distal ends, but quite clear of the discal cell. A smaller, circular white spot just above, and a little in front of the larger one, situated just beyond the middle of the marginal cell, and a white oval spot at apex of wing, just covering the tips of the two submarginal cells. Five posterior cells. Halteres black.

Described from one ♂ in the Indian Museum (type) from Ukhral, Manipur, captured by the Rev. W. Pettigrew, viii-08; and a second specimen (in the Pusa collection) taken by Mr. F. M. Howlett at Darjiling, 3-9-vi-09.

Eriocera fenestrata, mihi, sp. nov.

♂ ♀. Assam, Tonkin. Long. 20 mm.

Head.—Frons broad, flat, dull black with sparse hair; ocellar triangle small; proboscis, antennae and palpi dark brown.

Thorax.—Dorsum orange-red, not shining, the colour at the sides sharply ending on a level with the wing-roots, but it gradually becomes bright orange on scutellum and metanotum; pleurae semi-translucid brown, slightly tinged with orange.

Abdomen with the basal half of each segment sublucid leaden grey, shining, posterior half dead black. The abdomen gradually widens from the base to the 6th segment, which is the widest, thence sharply narrowing. Ovipositor somewhat robust, dark brown, practically bare, the long terminal points shining red-brown.

Legs wholly very dark mahogany-brown, nearly black.

Wings brown on anterior half, the colour gradually fading away posteriorly to the grey hind margin.

A small (roughly crescent-shaped) hyaline spot across the 1st basal cell, entering the cell above and below, and situated close to the origin of the 3rd vein. Four posterior cells; discal cell 5-sided, the veinlets from its outer upper side almost parallel. Anterior cross-vein opposite fork of 2nd; posterior cross-vein at lower corner of discal cell; fork of upper branch of 2nd longitudinal vein just before its middle. Halteres black.

Described from a type ♂ in the Vienna Museum from Central Tonkin and a single ♀ (type) in the Pusa collection, taken in April 1905 in the Khasi Hills, Assam, at 1,000 to 3,000 feet altitude.

Eriocera greenii, mihi, sp. nov.

♀. Ceylon and Java (?). Long. 16 mm.

Head dark grey, with black hairs. Frons broad, but very short, of uniform width, one-third the width of the head. Proboscis dark brown, with peculiar large, pale yellow, flattened, apparently two-jointed lamellae at the tip. Palpi dark blackish brown. Antennal scape blackish, with stiff black hairs, the tip of the 1st joint with a circlet of stronger ones; 2nd joint short; flagellum brownish yellow, becoming brown at the tip, covered with irregularly placed black hairs.

Thorax.—Dorsum very dark rich velvet-brown, with a few isolated short black hairs on anterior part. Two short blackish stripes towards the sides; no trace of a median stripe. Scutellum, metanotum and sides concolorous, all bare of pubescence; the region round the root of the wing blackish.

Abdomen rich dark brown; extreme base of 1st segment with a slightly yellowish grey tinge; base of 2nd and 3rd segments and posterior margin narrowly of remaining segments blackish. The abdomen bare except for a few short pale hairs on the hind margins of some of the apical segments. Ovipositor conical, blackish, dull, bare, terminal blades reddish yellow.

Legs.—Coxae rich dark brown, trochanters bright, lighter reddish brown, femora and tibiae bright brownish yellow, tips of both black, tarsi darker. All the legs finely black pubescent.

Wings wholly dark brown, a little darker on the costa near the base, and a little lighter in the anal and axillary cells. A small white spot near the tip of the marginal cell, and a still smaller similar one in the 1st submarginal cell; a larger (but still small) marginal white spot extending transversely over the tip of the 3rd vein. Venation as in *semilimpida*, except that the upper branch of the 4th vein not being forked, there are only four posterior cells. Halteres all black.

Described from a single specimen collected by Mr. E. E. Green at Kandy, 24-xi-09.

Type in Indian Museum.

N.B.—This species has some general resemblance to at least three others: to *albonotata*, Lw., from which the all-brown abdomen separates it; to *rufithorax*, mihi, and *fenestrata*, mihi, from which the brown thorax and yellow legs separate it. Three specimens (of which two are in very poor condition) in the Vienna Museum from Ceylon and Java are probably this species.

XIX. DESCRIPTIONS OF FIVE NEW
INDIAN SPECIES OF CLAVICORN
COLEOPTERA.

By A. GROUVELLE.

Fam. MYCETOPHAGIDAE.

Mycetophagus fraternus, sp. nov.

Oblongus, modice convexus, nitidulus, pube strata, fusco-cinerea et passim fulvo-testacea vestitus, ater, in elytris fulvo-variegatus; antennarum duobus primis articulis fusco-rufis. Ultimi articuli antennarum ad apicem paulatim incrassati; 3° articulo sesquilongiore quam latiore, 6°—10° transversis, 11° subconico, modice elongato. Caput transversum, fronte convexiusculum et subasperum, inter antennarum bases arcuatim striatum; epistomo antice truncato, sublaevi; labro minimo, apice late rotundato. Prothorax apice angustus, lateribus antice valde arcuatus, basin versus parallelus, marginatus, magis basi duplo latior quam longior, subasperatus et valde profundeque punctatus, pilis fulvis in basis medio et ad angulos posticos paulo longioribus et crassioribus vestitus; apice medio subtruncato; angulis anticis rotundatis, posticis rectis, hebetatis; basi medio subtruncata et ante scutellum late subimpressa, utrinque subbreve sinuata et punctata. Scutellum subhemicirculare, punctatum. Elytra basi prothorace haud latiora, humeris rotundata, lateribus praecipue apicem versus arcuata, vix ampliata, apice conjunctim breviter rotundata, circiter 1 et $\frac{1}{2}$ tam elongata quam simul lata, punctato-striata; striis ad apicem attenuatis; intervallis latis, subasperatis; singulo elytro macula humerali, subquadrata, intus oblique producta, callum humeralem haud obtegente et maculis minimis, plurimis ad secundum longitudinis trientem positis fulvo-notato; maculis dilutis pilis fulvis vestitis. Long. 3 f. mm.

E. Himalayas: Kurseong. One specimen. Collection of the Indian Museum, Calcutta.

Fam. DRYOPIDAE.

Helichus waterhousei, sp. nov.

Elongatus, convexus, niger, pubescens, tenuissime scaber et subparce punctulatus; punctis in capite minoribus; antennis tarsisque rufo-piceis. Caput transversum; fronte in latitudinem

modice, in longitudinem valde convexa, antice substrictè concavo-explanata, inter antennarum bases angulatim producta, tenuissime pruinosa, pilis modice elongatis, tenuibus, haud densatis vestita, antice subbreve cinereo-pubescenti; epistomo inflexo, inter antennarum bases constricto, in longitudinem plicato, antice late arcuato; labro brevissimo, antice subtruncato; intervallo inter oculos circiter duplo longiore quam hoc inter antennarum bases; oculis subbreve pilosis. Prothorax antice parum angustus, flavo-cinereo-pruinosis et pilis fuscis, subbrevis, erectis subdense vestitus; margine antico medio antrorsum arcuatim producto; lateribus praecipue ad apicem stricte concavis, canaliculo in posticis angulis haud dilatato; basi medio subtruncata, utrinque sinuata; angulis posticis acutis, extus oblique subproductis. Elytra subparallela, 2 et $\frac{1}{2}$ tam elongata quam simul lata, apice conjunctim subrotundata, tenue, breve denseque flavo-cinereo pubescentia; pilis flavis, brevibus vel subelongatis intermixtis, pilis longioribus in disco sublineato-dispositio. Long. 5 mm.

Bengal: Rajmahal (*Annandale*). Two specimens. Collections of the Indian Museum, Calcutta, and of A. Grouvelle.

Helichus annandalei, sp. nov.

Elongatus, convexus, niger, pubescens, tenuissime scaber et subparce punctulatus; pedibus piceis, antennis tarsisque rufifuscis. Caput transversum; fronte in latitudinem modice, in longitudinem valde convexa, antice substrictè subconcavo-explanata, in longitudinem breviter subcarinata, cinereo-pruinosa, pilis tenuibus, sat elongatis vestita, antice subbreve albido-cinereo pubescenti; epistomo inter antennarum bases constricto, in longitudinem subplicato, antice truncato et pilis albido-cinereis densatis ornato; labro transversissimo, antice latissime arcuato, utrinque fusco-testaceo; intervallo inter oculos sesquolongiore quam hoc inter antennarum bases; oculis pilosis. Prothorax antice quam postice paulo angustior, transversus, cinereo-pruinosis et pilis fuscis, erectis, elongatis subdense vestitus; marginibus lateralibus stricte concavis, albido-cinereo pubescentibus, canaliculo in postico angulo dilatato. Elytra subparallela, ultra medium parum ampliata et apice conjunctim rotundata, circiter 2 et $\frac{1}{2}$ tam elongata quam in maxima latitudine lata, tenuiter, breve denseque cinereo-pubescentia, pilis flavo-cinereis, plus minusve elongatis, subdensatis intermixtis. Long. 6 mm.

Bengal: Sara Ghat, R. Ganges (*J. T. Jenkins*). Two specimens. Collections of the Indian Museum, Calcutta, and of A. Grouvelle.

Stenelmis indica, sp. nov.

Ovata, sat elongata, convexa, nitida, pilis elongatis, parum pruinosis, vestita (haud integrum est insectum) nigra; antennis testaceis, apice breviter subinfuscatis; elytris subsordido-ochraceis, coxis, basi femoribus praecipue posticis, tibiis, tarsis

extra ultimi articuli apicem testaceis; corpore subtus infuscato. Antennae breves; articulis 7—10 quadratis. Caput tam elongatum quam ad basin latum, antice subtruncatum, postice dense, antice subparce tuberosum; fronte tuberculo basilari, minimo, laevi et duabus striis tenuissimis, ad oculos divergentibus ornata; labro magno, antice strictissime testaceo-marginato. Prothorax antice capite haud latus, ad basin dilatatus, lateribus subrectus, paulo longior quam basi latior, crebre plus minusve valide punctatus, punctis saepius confluentibus, ante basis medium bipunctatus. Elytra prothoracis basi haud latiora, humeris sat late rotundata, lateribus subparallela, apice conjunctim subacuminata, magis sesquolongiora quam simul latiora, punctato-lineata; punctis impressis, ad apicem et ad latera attenuatis; callo humerali manifesto. Coxae anticae remotae. Long. 3 f. mm.

Travancore: Kulattupuzha. One specimen. Collection of the Indian Museum, Calcutta.

Fam. HETEROCERIDAE.

Heterocerus bellus, sp. nov.

Oblongus, subelongatus, convexus, vix nitidus, nigro-brunneus; capite prothoraceque subrufescentibus; antennis, elytrorum margine laterali haud late pedibusque testaceis; corpore subtus dilute rufo-brunneo. Antennae 11 articulae. Caput extra labrum transversissimum, convexiusculum, antice apud marem profunde sinuatum, apud feminam subtruncatum, pilis cinereis, brevissimis, subdense vestitum, velutinum; labro magno, antice late modice arcuato. Prothorax basin versus angustus, antice arcuatus, albido-ciliatus, lateribus rotundatus, juxta angulos anticos brevissime sinuatus, juxta angulos posticos subparallelus, angulis posticis obtusus, basi arcuatus, tenuiter marginatus, 2 et $\frac{1}{2}$ tam in maxima latitudine latus quam in maxima longitudine elongatus, crebre punctulatus, pilis flavo-cinereis, brevibus, tenuibus et stratis sat dense vestitus; pilis in marginis antici medio crassioribus et densioribus, in disco pubescentem lineam efficientibus. Elytra basi subsinuata, humeris breviter rotundata, parallela, paulo magis duplo longiora quam simul latiora, apice conjunctim rotundata, pilis flavo-cinereis, brevissimis dense vestita; pilis ad latera et ad apicem longioribus. Stria marginalis posticarum coxarum cum primi segmenti abdominis apice angulum obtusum efficiens. Long 4 mm.

Bengal: Rajmahal, edge of R. Ganges (*Annandale*). Collections of the Indian Museum, Calcutta, and of A. Grouvelle.

XX. LES CHIRONOMIDES (TENDIPEDIDAE) DE L'HIMALAYA ET D'ASSAM.

Par J. J. KIEFFER, Dr. phil. nat. (Bitsch).

(Avec la Planche xiv.)

Deux de mes précédents travaux intitulés: "Étude sur les Chironomides des Indes Orientales"¹ et "Description de nouveaux Chironomides de l'Indian Museum de Calcutta"² renferment les premières Contributions à la connaissance des Chironomides de l'Himalaya. Le présent travail en forme la continuation; il est consacré exclusivement à la description des Chironomides recueillis dans ces hautes régions ou en Assam et conservés à l'Indian Museum de Calcutta.

I. CULICOIDINAE (Ceratopogoninae).

I. Genus FORCIPOMYIA, Meg.

- | | |
|---|------------------------------------|
| I. Métatarse postérieur plus court que le second article .. | 1. Subg. <i>Prohelea</i> , Kieff. |
| — Métatarse postérieur plus long que le second article .. | 2. Subg. <i>Forcipomyia</i> , Meg. |

I. Subgenus *Prohelea*, Kieff.

- | | |
|---|--|
| I. Ailes sans tache ou avec une tache blanche | 2. |
| — Ailes enfumées, avec un point blanc et cinq taches blanchâtres, dont quatre au bord postérieur, séparées par quatre stries enfumées | 1. <i>F. (P.) tetraclada</i> , Kieff. |
| 2. Mesonotum à pubescence jaune et dense, entremêlée de longs poils .. | 2. <i>F. (P.) cubicularis</i> , sp. nov. |
| — Mesonotum subglabre .. | 3. <i>F. (P.) himalayae</i> , sp. nov. |

¹ *Memoirs of the Indian Museum*, vol. ii, p. 181-242, pl. viii-xi (1910).

² *Records of the Indian Museum*, vol. vi, p. 113-178, pl. vi, vii (1911).

1. *F. (P.) tetraclada*, Kieff.

♀. Taille 1.5 mm.—Himalaya oriental: Kurseong, à une altitude de 1570 à 1700 mètres, 23 juin, 1910. Cet insecte n'était connu que pour l'île de Ceylan.

2. *F. (P.) cubicularis*, sp. nov.

♂. Noir mat; hanches et pattes testacées, balanciers blancs à tige sombre, bord postérieur des tergites blanchâtre. Panache noirâtre, articles 2—10 des antennes globuleux, 11—14 allongés, 11^e le plus long, globuleux à la base, 3—4 fois aussi long que le 10^e. Second article des palpes long mais non grossi. Mesonotum et scutellum avec une pubescence jaune et dense, entremêlée de longs poils, surtout au scutellum. Ailes densément velues, un peu assombries, radius et cubitus juxtaposés, aboutissant un peu avant le milieu de l'aile, bifurcation de la discoïdale distante proximale-ment de la transversale, bifurcation de la posticale distante distale-ment de l'extrémité du cubitus, le rameau supérieur continue la direction de la tige, l'inférieur est oblique. Dessus des pattes à longs poils dressés, épars, 3—4 fois aussi longs que l'épaisseur des pattes, fémurs et tibiaux un peu épaissis, métatarse postérieur égalant le tiers du 2^e article, 5^e article plus court que le 4^e, à peine plus long que gros, empodium égalant les crochets, à poils deux fois aussi longs que sa largeur. Abdomen à poils longs, dressés, jaunâtres; article terminal de la pince pointu et grêle. Taille 3 mm.

Himalaya oriental: Kurseong, à une altitude de 1570 à 1700 mètres, capturé la nuit sur le mur d'une chambre à coucher; 3 exemplaires

3. *F. (P.) himalayae*, sp. nov.

♂. Tête, scape et thorax roux, antennes testacé brunâtre, hanches et pattes jaune clair, balanciers blancs, abdomen brun noir, les quatre premiers tergites ont le tiers postérieur jaune, les suivants n'ont que le bord postérieur jaune. Panache gris, articles antennaires 2—10 globuleux, 11^e globuleux à sa base, où il est muni d'un long verticille, puis cylindrique et oblique, aussi long que les trois suivants réunis, 12^e et 13^e cylindriques, deux fois aussi longs que gros, avec un renflement en calote à leur base, où ils sont ornés d'un court verticille, 14^e trois fois aussi long que gros, avec un court stylet. Mesonotum subglabre. Ailes subhyalines, densément velues, bord antérieur noirâtre, ainsi qu'un trait le long du bord sauf au tiers distal, cubitus et la partie du bord qui est longée par le cubitus blancs; radius et cubitus juxtaposés, aboutissant au bord au milieu de l'aile, vis-à-vis de la bifurcation de la posticale, bifurcation de la discoïdale distante proximale-ment de la transversale. Dessus des pattes à poils longs, dressés, 3—4 fois aussi longs que l'épaisseur des pattes; tarsi non spinuleux, métatarse postérieur égalant les deux tiers du second article, l'intermédiaire seulement un peu plus court que le second article,

le 5^e plus court que le 4^e, pas deux fois aussi long que gros, empodium égal aux crochets, mince, à longs poils. Abdomen avec des poils longs et jaunes. Taille 1.5 mm.

Himalaya oriental: Kurseong, à une altitude de 1570 à 1700 mètres, capturé la nuit sur les murs d'une chambre à coucher, 22 juin, 1910.

4. *F. (P.) decipiens*, Kieff.

Himalaya occidental: montagnes de Simla (*Memoirs Ind. Mus.*, vol. ii, p. 182).

2. Subgenus **Forcipomyia**, Meg.

- | | |
|---|-------------------------------------|
| 1. Ailes tachetées, ciliées postérieurement par de longs poils dentelés | 1. <i>F. calotricha</i> , sp. nov. |
| — Ailes non tachetées ou avec une tache blanchâtre, cils non dentelés | 2. |
| 2. Cubitus aboutissant au quart ou au tiers distal de l'aile | 3. |
| — Cubitus ne dépassant pas ou dépassant à peine le milieu de l'aile | 6. |
| 3. Articles antennaires 10—14 égalant chacun 4—5 fois le 9 ^e , milieu du mesonotum et scutellum roux | 2. <i>F. montivaga</i> , sp. nov. |
| — Articles antennaires 10—14 égalant chacun 2—3 fois le 9 ^e , mesonotum sans tache jaune | 4. |
| 4. Article 2 ^e des palpes non renflé | 5. |
| — Article 2 ^e des palpes fortement renflé, mesonotum prumineux .. | 3. <i>F. alticola</i> , sp. nov. |
| 5. Seulement le tiers distal de l'aile faiblement velu, mesonotum mat, scutellum roux | 4. <i>F. rivicola</i> , sp. nov. |
| — Ailes velues en entier, mesonotum brillant, scutellum noir .. | 5. <i>F. oriphila</i> , sp. nov. |
| 6. Dessus des pattes avec des poils dressés et très longs, corps brun noir | 6. <i>F. macrothrix</i> , sp. nov. |
| — Dessus des pattes sans longs poils, corps roux ou jaune sauf l'abdomen | 7. |
| 7. Métatarse postérieur un peu plus long que le 2 ^e article; antennes de 13 articles | 7. <i>F. urbicola</i> , sp. nov. |
| — Métatarse postérieur aussi long que les 4 articles suivants réunis, antennes composées de 14 articles | 8. <i>F. xanthophila</i> , sp. nov. |

1. *F. calotricha*, sp. nov.

(Fig. 1, partie de l'aile avec les poils écailleux et les cils.)

♀. Noir; scape jaune roussâtre, flagellum blanchâtre, sternum brun clair, balanciers blancs, hanches et pattes jaunâtres, tarsi brun noir, extrémité des quatre premiers articles jaune. Tête, dessus du thorax et abdomen à poils jaune d'or, denses et fort longs, surtout sur les côtés des tergites et au segment anal, où ils atteignent trois à quatre fois la longueur d'un tergite; pattes à poils jaunes, longs et épars. Bouche plus longue que la tête, subcylindrique. Second article des palpes long mais non renflé, 3^e plus court que le 2^e, plus long que le 4^e. Antennes de 14 articles, les articles 3—9 subcylindriques, deux fois aussi longs que gros, munis à leur base, d'un verticille jaune et deux fois aussi long que l'article, les 5 derniers cylindriques, chacun presque deux fois aussi long que le 9^e, également ornés d'un verticille de poils à leur base. Thorax plus long que haut. Ailes densément velues et longuement ciliées, blanchâtres ou jaunâtres, avec de grandes taches noires ou d'un brun noir; une large bande brun noir entoure la tige de la posticale et se bifurque avec cette nervure, en longeant d'une part proximale le rameau inférieur, et en se dirigeant d'autre part obliquement jusqu'au bord avant l'extrémité du radius; cette bande oblique est réunie en son milieu, par un prolongement, à une large bande transversale, percurrente et située un peu avant la pointe alaire; extrême bord de la pointe alaire également d'un brun noir, cette teinte interrompue par les deux rameaux de la discoïdale; un trait noir longe le bord antérieur, en englobant le radius et le cubitus; sur le bord postérieur, entre les deux rameaux de la posticale, se trouve une grande tache brun noir; les poils sont appliqués et en écaille lancéolée (fig. 1), les uns sont dentelés, les autres, c'est-à-dire, ceux de la surface opposée, sont plus longs et simples; les cils de la pointe alaire et du bord inférieur (fig. 1) sont fort longs, blancs et dentelés, ceux du bord antérieur sont courts et dentelés seulement à l'extrémité; radius soudé au cubitus, qui est deux fois plus long que lui et dépasse notablement le milieu de l'aile, bifurcation de la discoïdale très distante proximale de la transversale, bifurcation de la posticale un peu distante distale de la transversale. Poils écailleux des pattes dentelés et striés en long, les poils dressés et longs sont simples; fémurs et tibia plus gros que les tarsi, métatarse postérieur presque deux fois aussi long que le 2^e article, 2—5 graduellement raccourcis, le 5^e pas plus long que gros, empodium aussi long que les crochets. Abdomen sublinéaire, déprimé, 4—5 fois aussi long que large. Taille 2.8 mm.

Himalaya oriental: Kurseong, à une altitude de 1570 à 1700 mètres, capturé la nuit sur le mur d'une chambre à coucher, 22 juin 1910.

2. *F. montivaga*, sp. nov.

♀. Noir; tête, scape, scutellum et une tache sur le milieu du mesonotum roux, balanciers blancs, hanches et pattes jaune

clair. Yeux glabres, confluent au vertex. Articles antennaires 2—9 globuleux, à verticille atteignant le milieu de l'article suivant, articles 10—14 cylindriques, deux fois aussi longs que les 8 précédents réunis, chacun 4—5 fois aussi long que le 9^e, muni à sa base, d'un verticille, et distalement, de soies disposées sans ordre. Mesonotum subglabre. Ailes hyalines, à poils peu denses, presque nuls le long des nervures. 1^e cellule radiale très étroite, 2^e cellule radiale linéaire, un peu plus large que la 1^e et quatre fois plus longue qu'elle, son extrémité est un peu dépassée par la costale, atteint le quart distal de l'aile et est bien plus rapprochée de la pointe alaire que le rameau distal de la posticale, fourche intercalée très distincte, à tige évanouie avant la transversale, bifurcation de la discoïdale oblitérée vers la transversale, bifurcation de la posticale distante distalement de la transversale, qui est à peine oblique, rameau supérieur continuant la direction de la tige, l'inférieur presque perpendiculaire. Poils des pattes peu longs, guère plus longs que l'épaisseur des pattes, métatarse postérieur un peu plus long que les quatre articles suivants réunis, 2^e article d'un tiers plus long que le 3^e, qui est double du 4^e, 5^e pas plus long que gros, à peine plus court que le 4^e, crochets gros, très arqués, égalant à peine l'empodium. Abdomen sublinéaire, de moitié plus long que le reste du corps, à peine pubescent. Taille 3 mm.

Himalaya oriental: Darjiling, à une altitude de 2340 m.; 28 mai 1910 (N. Annandale).

3. *F. alticola*, sp. nov.

♀. Brun noir; tête et mesonotum prumineux de gris, tergites prumineux de brun, scutellum et balanciers blancs, hanches, pattes et lamelles testacées. Face renflée, bouche longue, yeux confluent; 2^e article des palpes long et fortement grossi. Articles antennaires 2—9 subglobuleux, à verticille atteignant le milieu de l'article suivant, les cinq articles suivants cylindriques, chacun deux fois aussi long que le 9^e. Mesonotum presque glabre, scutellum avec quatre ou six soies. Ailes hyalines, très faiblement velues, plus densément au tiers distal, nervure auxiliaire atteignant l'extrémité de la 1^e cellule radiale, qui est à peine plus longue que la nervure transversale et très étroite, le radius étant presque juxtaposé au cubitus, 2^e cellule radiale atteignant le tiers distal de l'aile, trois fois aussi longue que la 1^e, linéaire et très étroite, tronquée obliquement à l'extrémité, transversale oblique, fourche intercalée bien marquée, bifurcation de la proximale distante proximement de la transversale, bifurcation de la posticale située vis-à-vis de l'extrémité du radius. Pattes grêles, sans longs poils, tibias postérieurs à double peigne, dont le grand est quatre fois plus long que le petit, tibias antérieurs avec un peigne simple et un éperon assez fort, métatarse des pattes antérieures et postérieures égalant les quatre articles suivants réunis, avec des spinules ventrales denses et aussi longues que sa grosseur, 4^e article presque deux fois aussi long que gros, un peu plus court que le 5^e,

empodium à peine plus court que les crochets, filiforme et à longs poils. Abdomen sublinéaire, sans longs poils. Taille 1.8 mm.

Himalaya oriental: Darjiling, à une altitude de 2340 m.; 8 avril 1910.

4. *F. rivicola*, sp. nov.

♀. Brun ou noir et mat, presque glabre; scutellum roux, balanciers d'un blanc de lait, hanches et pattes testacées. Bouche longue, face renflée en bosse. Article 2° des palpes long mais non renflé. Articles antennaires 2—9 globuleux, à verticille égalant l'article, 10—14 plus longs que les huit précédents réunis, chacun 2—3 fois aussi long que le 9°, cylindrique. Ailes hyalines, velues seulement au tiers distal, costale, radius et cubitus noirs, les autres nervures pâles, radius très rapproché du cubitus et parallèle à lui, sa 1° partie égale à la transversale, deux fois aussi longue que la 2°, 2° cellule radiale triple de la 1°, très étroite, linéaire, atteignant presque le quart distal de l'aile, à peine dépassée par la costale, transversale un peu oblique, fourche intercalée bien marquée, bifurcation de la discoïdale située sous la transversale, bifurcation de la posticale sous l'extrémité du radius. Poils des pattes peu longs, pas plus longs que la grosseur des pattes, tibias postérieurs avec un double peigne, métatarse des pattes antérieures et postérieures égalant les quatre articles suivants réunis, le 4° article à peine deux fois aussi long que gros, pas distinctement plus long que le 5°, empodium égal aux crochets, tibias antérieurs (ou intermédiaires?) sans peigne et sans éperon. Abdomen elliptique, déprimé, aussi long que le reste du corps. Taille 1.5 mm

Himalaya occidental: Barogh, montagnes de Simla, capturé par N. Annandale, le long d'un petit ruisseau, 10 mai 1910, à une altitude de 1700 m.

5. *F. oriphila*, sp. nov.

♀. Noir; face rousse, balanciers blancs, hanches et pattes testacées. Bouche longue et pointue, suçoir grossièrement dentelé en scie, yeux glabres et confluent; 2° article des palpes renflé au milieu, aussi long que les deux suivants réunis. Articles antennaires 2—9 subglobuleux, à verticille de soies brunes et un peu plus longues que les appendices subuliformes, qui sont hyalins, d'autres appendices hyalins et beaucoup plus courts ont l'apparence de verrues allongées. Mesonotum brillant. Ailes velues en entier, sauf le long des nervures par endroits; 1° cellule radiale deux fois aussi longue que la nervure transversale, égalant le tiers de la 2°. Article 4° des tarses postérieurs à peine plus long que gros, égal au 5°. Abdomen mat. Pour tout le reste, semblable à *F. rivicola*. Taille 2 mm.

Himalaya oriental: Darjiling, altitude de 2340 m.; 29 mai 1910.

6. *F. macrothrix*, sp. nov.

♀. Brun noir; balanciers blancs, hanches et pattes blanchâtres. Articles antennaires 2—9 globuleux, 10—14 subcylindriques, chacun deux fois aussi long que gros. Mesonotum à pubescence jaunâtre et assez dense; scutellum avec quelques longues soies. Ailes densément velues, cubitus dépassant à peine le milieu, double du radius qui est lui est juxtaposé et beaucoup plus long que la transversale; bifurcation de la discoïdale proximale de la transversale, fourche intercalée faisant défaut, bifurcation de la posticale située un peu proximale de l'extrémité du cubitus. Pattes à poils très longs, épars sur le dessus, dressés et 3—4 fois aussi longs que la grosseur des pattes; tibias antérieurs (ou intermédiaires ?) armés, à leur extrémité, de quatre longues soies, aussi longues que le métatarse, métatarse postérieur à peine plus long que le second article, 4^e et 5^e article de moitié plus longs que gros, empodium filiforme, égal aux crochets, longuement poilu. Abdomen déprimé, en ellipse allongée. Taille 1 mm.

Himalaya oriental : Kurseong, altitude de 1570 à 1700 mètres, 20 juin 1910 (N. Annandale).

7. *F. urbicola*, sp. nov.

♂. Tête, scape, thorax, hanches et pattes roux, antennes testacé brunâtre, balanciers blancs, abdomen brun noir, moitié ou tiers distal des trois premiers tergites et bord postérieur des suivants blanchâtres. Bouche longue et pointue; 2^e article des palpes long, non renflé. Panache gris, extrémité blanchâtre; antennes de 13 articles, 2—9 globuleux, 10^e article aussi long que les trois suivants réunis, globuleux à sa base, où il est muni d'un long verticille, cylindrique ensuite et oblique, 11^e et 12^e cylindriques, deux fois aussi longs que gros, avec un renflement basal en calote, qui est muni d'un court verticille, 13^e trois fois aussi long que gros, terminé par un court stylet. Ailes subhyalines, densément velues, bord antérieur et un mince trait le long du bord, noirâtres sauf le tiers distal, cubitus et la partie du bord qu'il longe, blanchâtres, cubitus juxtaposé au radius, aboutissant au milieu de l'aile, vis-à-vis de la bifurcation de la posticale, bifurcation de la discoïdale distante un peu proximale de la transversale. Poils des pattes peu longs, seulement 1—2 fois aussi longs que l'épaisseur des pattes, métatarse postérieur un peu plus long que le second article, tous deux avec des spinules ventrales jaunes et denses; empodium assez large, un peu plus court que les crochets. Abdomen mince, subcylindrique, à poils longs, jaunes et assez denses, de moitié plus long que le reste du corps. Taille 1.5 mm.

Himalaya oriental : Kurseong, altitude de 1570 à 1700 mètres, capturé la nuit sur le mur d'une chambre à coucher, 22 juin 1910 (N. Annandale).

8. *F. xanthophila*, sp. nov.

♀. Jaune; mesonotum sauf le tiers antérieur, et dessus de l'abdomen brun noir, balanciers blancs, flagellum graduellement assombri. Articles antennaires 2—9 globuleux, verticille égalant l'article, 10—14 deux fois aussi longs que les huit précédents réunis, chacun 3 à 4 fois aussi long que le 9^e, filiforme. Mesonotum luisant, à peu près glabre. Ailes hyalines, faiblement velues au tiers distal et par endroits sur la surface, radius presque juxtaposé au cubitus, aboutissant avant le milieu de l'aile, cubitus atteignant le tiers distal, 2^e cellule radiale linéaire, un peu plus large que la 1^e, et trois fois aussi longue, fourche intercalée bien marquée, bifurcation de la discoïdale distale de la transversale, son pétiole aussi long que la transversale, bifurcation de la posticale distante proximale de l'extrémité du radius. Pattes sans longs poils, tibias postérieurs avec un double peigne, métatarse postérieur égal aux quatre articles suivants réunis, densément spinuleux dessous, 4^e article à peine deux fois aussi long que gros, plus court que le 5^e, empodium égal aux crochets. Abdomen plus large que le thorax, déprimé, elliptique, pubescent. Taille 3 mm.

Himalaya oriental: Kurseong, altitude de 1700 mètres, 13—16 juillet 1907.

2. Genus CULICOIDES, Latr.

- | | |
|--|--------------------------------------|
| 1. Ailes hyalines, avec trois bandes
enfumées et transversales .. | 1. <i>C. himalayae</i> , sp. nov. |
| — Ailes hyalines, sans tache .. | 2. <i>C. pictiventris</i> , sp. nov. |

1. *C. himalayae*, sp. nov.

♂ ♀. Noir et presque glabre; abdomen roux sombre chez la femelle, brun noir chez le mâle, balanciers blancs, pattes brun clair. Antennes du mâle à articles 2—11 subglobuleux, un peu plus longs que gros, ayant outre les poils gris du panache, de chaque côté, distalement, une soie hyaline et double de l'article; les trois articles terminaux allongés, cylindriques, chacun 2—3 fois aussi long que le 9^e article, sans renflement basal sauf au 12^e article. Chez la femelle, les articles 2—9 sont graduellement allongés, les premiers subglobuleux, les suivants cylindriques, verticille un peu plus long que l'article, sans autres soies ni appendices, articles 10—14 cylindriques, plus longs que le 9^e, le dernier le plus long, tous les cinq avec un verticille basal et, dans les deux tiers distaux, avec des soies aussi longues et éparses. Mesonotum mat et à peu près glabre. Ailes hyalines, avec trois bandes transversales enfumées et irrégulières, l'une s'étend du bord antérieur jusqu'à l'extrémité du rameau supérieur de la posticale, elle envoie encore deux traits le long des deux rameaux de la discoïdale jusqu'à l'extrémité alaire; la seconde bande couvre le cubitus, où elle est noire, et s'étend de là jusqu'à l'extrémité du

rameau inférieur de la posticale, entre les deux rameaux de la posticale il ne reste qu'une tache hyaline; la troisième bande va du bord antérieur jusqu'au lobe alaire, en ne laissant qu'une tache hyaline sur le milieu de ce dernier; surface alaire à soies presque ponctiformes, tiers distal parsemé de soies plus longues, au moins chez la femelle; cubitus d'un tiers plus long que le radius, dépassant le milieu de l'aile, 1^e cellule radiale très étroite, les deux nervures se touchant presque, la 2^e plus large mais pas plus longue que la 1^e; transversale oblique, égalant la 1^e cellule radiale, discoïdale pétiolée, son pétiole un peu plus court que la transversale, bifurcation de la posticale distante à peine proximement de l'extrémité du cubitus. Pattes sans longs poils, métatarse postérieur égalant les trois articles suivants réunis, 5^e article à peine plus long que le 4^e, mince, deux fois aussi long que gros, crochets avec des soies basales, empodium non distinct. Abdomen de la femelle en ellipse allongée et déprimée, celui du mâle sublinéaire. Taille 1.8 mm.

Himalaya oriental: Kurseong, altitude de 1570 à 1700 mètres, 23 juin 1910 (N. Annandale).

2. *C. pictiventris*, sp. nov.

♀. Noir mat et glabre; balanciers, scutellum et une tache sur les côtés du bord postérieur des quatre ou cinq premiers tergites blancs, tarsi brunâtres. Article 2^e des palpes allongé et renflé. Antennes de 14 articles, dont les derniers ne sont pas allongés, les deux ou trois premiers du flagellum globuleux, les suivants subconiques et un peu plus longs que gros. Ailes hyalines, faiblement velues, radius et cubitus noirs, juxtaposés l'un à l'autre, le cubitus presque double du radius, dépassant le milieu de l'aile, fourche intercalée bien marquée, transversale oblique et longue, bifurcation de la discoïdale située sous la transversale, celle de la posticale située vis-à-vis de l'extrémité du radius. Pattes grêles, poils des tibias 2—3 fois aussi longs qu'eux, tibias antérieurs à peigne simple, tibias intermédiaires sans peigne, tibias postérieurs à peigne double, métatarse des pattes antérieures un peu plus long que les deux articles suivants réunis, celui des quatre autres pattes égale les trois articles suivants réunis, 4^e article trois fois aussi long que gros, 5^e plus mince et à peine plus long, crochets à soies basales, empodium non distinct. Abdomen allongé et sublinéaire. Taille 1.5 mm.

Himalaya oriental: Tonglu, dans le district de Darjiling, altitude de 3400 mètres, 22 avril 1910 (C. W. Beebe).

3. *C. montivagus*, Kieff.

Himalaya occidental: monts de Simla (*Memoirs Ind. Mus.*, vol. ii, p. 188). Un autre exemplaire a les pattes brun noir, tarsi blanchâtres, 5^e article des tarsi postérieurs plus mince que le 4^e, empodium distinct mais très petit. Simla, 11 mai.

3. Genus PALPOMYIA, Meg.

P. rivularis, sp. nov.

♀. Noir brillant; scape roux (flagellum manque), hanches et pattes jaune clair, genoux, extrémité des tibias et articles tarsaux 4 et 5 bruns, abdomen roux clair, balanciers noirs, tige plus claire. Yeux séparés au vertex par une ligne. Mesonotum subglabre. Ailes hyalines, 1^e cellule radiale fusiforme, plus large que la 2^e, qui atteint au moins le quart distal de l'aile et est $2\frac{1}{2}$ fois aussi longue que la 1^e, 1^e partie du radius d'un tiers plus longue que la 2^e, qui aboutit bien au-delà du milieu de l'aile, bifurcation de la discoïdale distante proximale de la transversale, bifurcation de la posticale située entre celle de la discoïdale et la transversale. Pattes antérieures brisées, fémurs des quatre autres pattes inermes, cylindriques et grêles, tarse postérieur égal au tibia, métatarse aussi long que les 4 articles suivants réunis, 4^e article pas plus long que gros, 5^e plus mince, égal aux deux précédents réunis, crochets simples, très petits, guère plus longs que la grosseur de l'article. Abdomen subfusiforme, glabre, presque deux fois aussi long que le reste du corps. Taille 2.5 mm.

Himalaya occidental: vallée de la rivière du Sutlej, en dessous de Simla, 6 mai 1910 (N. Annandale).

4. Genus DIBEZZIA, Kieff.

1. *D. himalayae*, sp. nov.

♀. Tête, scape et thorax roux clair, brillants et presque glabres; palpes, flagellum et abdomen noirs, hanches et pattes jaunes, extrémité des fémurs et des tibias et les articles tarsaux 3—5 noirs, balanciers blanchâtres, extrémité un peu assombrie. Face proéminente en bosse, bouche pointue, aussi longue que la tête, yeux séparés au vertex par un espace triangulaire; article 2^e des palpes long mais non grossi. Article 2^e des antennes un peu plus long que le 3^e, 3—9 subcylindriques, trois fois aussi longs que gros, à soies disposées sans ordre et de moitié plus longues que l'article, appendices subuliformes en forme de deux soies hyalines et peu longues, articles 10—14 chacun au moins deux fois aussi long que le 9^e. Thorax aussi haut que long, milieu du bord antérieur avec une spinule à peine distincte. Ailes hyalines, 1^e partie du radius double de la 2^e, cubitus à peine plus éloigné de la pointe alaire que le rameau inférieur de la discoïdale, 2^e cellule radiale $2\frac{1}{2}$ fois aussi longue que la 1^e, bifurcation de la discoïdale distante un peu proximale de la transversale, posticale à peine pétiolée, rameau supérieur continuant la direction de la tige, l'inférieur à peine arqué. Pattes sans longs poils, fémur antérieur plus gros que les quatre autres et beaucoup plus court qu'eux, aussi long que le tibia, armé de 18—20 spinules noires disposées sur plusieurs rangées et un peu sur le côté interne, le tibia non arqué, un peu plus court que le tarse, métatarse antérieur

égalant les trois articles suivants réunis, 4^e article à peine plus court que le 3^e, un peu grossi, pas plus long que gros, cordiforme, 5^e article inséré avant l'extrémité du 4^e, arqué faiblement, un peu plus long que les deux précédents réunis, égal au 2^e, crochets égaux, petits, deux fois aussi longs que la grosseur de l'article, tarse intermédiaire égal au tibia, le postérieur un peu plus long que le tibia, métatarse des 4 pattes postérieures égal aux 4 articles suivants réunis, articles suivants et crochets comme aux pattes antérieures. Abdomen de moitié plus long que le reste du corps, un peu déprimé, pétiole plus de deux fois aussi long que gros, subcylindrique, creusé sur le dessous, les bords latéraux formant arête ou carène, les cinq segments suivants subégaux, de moitié plus larges que le pétiole, deux fois aussi larges que longs, faiblement pubescents, plans sur le dessous, un peu arqués par en bas, les quatre premiers tergites élargis ont, de chaque côté de la ligne médiane, un peu en arrière du milieu, un point enfoncé. Taille 3.5 mm.

Himalaya oriental: Kurseong, altitude de 1570 à 1700 mètres, 26 juin 1910.

2. *D. brevistila*, Kieff.

Assam (*Records Ind. Mus.*, vol. vi, p. 122).

5. Genus *BEZZIA*, Kieff.

1. *B. flaviventris*, Kieff.

Himalaya central: Nepal (*Memoirs Ind. Mus.*, vol. ii, p. 204).

2. *B. vaga*, sp. nov.

♀. Noir mat, y compris le scape, bouche brun noir, balanciers et quatre premiers articles tarsaux blancs. Front transversal, yeux confluent au vertex. Articles du flagellum subcylindriques, deux fois aussi longs que gros, verticilles assez réguliers, sans appendices subuliformes, les cinq derniers articles sont chacun plus de deux fois aussi long que le 9^e. Ailes blanchâtres, nervures pâles, radius dépassant notablement le milieu de l'aile, cubitus dépassant les trois quarts de l'aile, à peine plus de deux fois aussi long que le radius, non dépassé par la costale, transversale oblique, bifurcation de la discoïdale oblitérée, proximale de la transversale, rameau inférieur un peu plus proche de la pointe alaire que le cubitus, bifurcation de la posticale à peine distale de la transversale. Fémurs inermes et subcylindriques, tibia antérieur avec un long éperon, sans peigne, mais avec un amas de soies groupées sans ordre sur le dessous du tibia, près de l'extrémité qu'elles ne dépassent pas, métatarse égalant les trois articles suivants réunis, ceux-ci graduellement raccourcis, le 4^e à peine plus long que gros, 5^e égal aux deux précédents réunis, avec six paires de spinules noires, les deux crochets égaux, égalant les trois quarts de l'article, bifides, leur rameau inférieur atteignant

le tiers de la longueur du supérieur, tibia de toutes les pattes aussi long que le fémur, l'intermédiaire sans peigne, tibia postérieur avec un double peigne, sa longueur égale celle des trois articles suivants réunis, métatarse postérieur égal aux quatre articles suivants réunis, 4^e article de moitié plus long que gros, aux quatre pattes postérieures le 5^e article tarsal et les crochets sont comme aux pattes antérieures. Abdomen large, fortement déprimé, un peu rétréci à la base. Taille 2 mm.

Himalaya central: Nepal, Noalpur, 22 février 1908. (Voisin de *B. lacteipennis*.)

II. PELOPIINAE (Tanypinae).

1. Genus PROCLADIUS, Skuse.

1. *P. atratus*, Kieff.

Assam (*Memoirs Ind. Mus.*, 1910, vol. ii, p. 219).

2. *P. fuscusignatus*, Kieff.

Assam (*Memoirs Ind. Mus.*, 1910, vol. ii, p. 218).

2. Genus TRICHOTANYPUS, Kieff.

Subgenus *Protenthes*, Johannsen, 1908 (*Tanypus*, Kieff., 1906).

T. (P.) bilobatus, Kieff.

Assam, Sylhet (*Memoirs Ind. Mus.*, vol. ii, p. 222).

3. Genus PELOPIA, Meig., 1800.

(*Tanypus*, Meig., 1803; *Isoplastus*, Skuse; *Ablabesmyia*, Johannsen.)

- | | |
|---|-----------------------------------|
| 1. Cubitus non dépassé par la costale | 1. <i>P. saltatrix</i> , sp. nov. |
| — Cubitus notablement dépassé par la costale | 2. |
| 2. Ailes blanchâtres, sans tache .. | 4. <i>P. himalayae</i> , sp. nov. |
| — Ailes blanchâtres, avec des taches enfumées ou noires | 3. |
| 3. Tergites 2—7 avec deux traits bruns formant une croix .. | 2. <i>P. brunettii</i> , sp. nov. |
| — Tergites 2—7 ayant les côtés bruns. 4—7 bruns en outre sur le milieu en majeure partie .. | 3. <i>P. riparia</i> , sp. nov. |

1. *P. saltatrix*, sp. nov.

♂. Tête, scape et thorax roux, tête et mesonotum un peu pruineux, balanciers, pattes et abdomen blanchâtres, flagellum brun, tergites 2 et 3 avec une tache jaunâtre ou brunâtre au bord

antérieur et une ligne longitudinale et médiane de même couleur, tergites 4—7 et pince presque entièrement brunâtres. Yeux fortement arqués, très amincis supérieurement, où ils sont séparés de deux fois leur largeur terminale. Palpes longs. Antennes de 15 articles, panache gris blanchâtre, 2^e article obconique, à peine plus long que gros, 3^e annuliforme comme les suivants, 2^e et 3^e entiers, 4—15 largement fendus, cette fente d'abord étroite, puis s'élargissant graduellement, dans la moitié distale les antennes ne forment plus qu'un demi cylindre, articles 2 et 3 avec un verticille unique, 4—13 avec deux verticilles, tous les verticilles sont interrompus deux fois, leurs poils sont insérés à de grosses papilles alignées et se touchant presque, article 14^e 1½ fois plus long que les 12 précédents réunis, 15^e conique, pas distinctement séparé du 14^e, aussi long que les articles 2—5 réunis. Ailes blanches, velues, avec une bande et plusieurs taches enfumées; la bande est assez large, transversale, percurrente, et a son origine à l'extrémité du radius; une tache se trouve au bord antérieur, à l'extrémité du cubitus, trois autres sont situées sur le bord postérieur, l'une à l'extrémité du rameau supérieur de la posticale, l'autre, transversale, est un peu proximale des nervures transversales et réunit le bord postérieur à la tige de la posticale, la 3^e, plus petite et plus pâle, est plus rapprochée de la base de l'aile; en outre, les deux transversales ainsi que les deux autres transversales situées à la base alaire sont noires et finement bordées de brun noir, l'extrémité de la discoïdale est bordée d'une teinte enfumée, le reste des nervures est blanchâtre; radius bifurqué à l'extrémité, dépassant un peu le milieu du cubitus, qui est très rapproché du bord distalement, arqué, non dépassé par la costale et aboutit un peu plus loin de la pointe alaire que la discoïdale, extrémité distale de la discoïdale arquée, transversale ordinaire très oblique, aboutissant à la 2^e transversale, qui est perpendiculaire et atteint la base arquée du rameau supérieur de la posticale. Fémurs et tibias sans longs poils, tibia antérieur d'un tiers plus long que le métatarse, sans peigne distinct, avec un éperon unique, élargi dans ses deux tiers basaux, poils de tous les tarses 3—5 fois aussi longs que l'épaisseur des articles, ceux-ci graduellement raccourcis, cylindriques, le 5^e encore 4 fois aussi long que gros, crochets simples, empodium presque nul, sans pulvilles; les tibias intermédiaires ont deux éperons bruns, peu inégaux, élargis et dentelés dans leur moitié basale, sans peigne; les postérieurs ont un peigne comme dans le groupe *Orthocladus* et deux éperons conformés comme aux intermédiaires, sauf que l'un est deux fois aussi long que l'autre. Abdomen grêle, subcylindrique, plus de deux fois aussi long que le reste du corps; article terminal de la pince presque aussi long que le basal, mince, subcylindrique, incurvé et aminci en pointe. Taille 5 mm.

Himalaya occidental: Simla, à une altitude de 2340 mètres, 9 mai 1910. Les insectes se réunissent en troupes nombreuses, au crépuscule du soir, pour exécuter des danses dans l'air; ceux qui furent capturés étaient tous des mâles (N. Annandale).

2. *P. brunettii*, sp. nov.

♂. Tête, scape et thorax roux, balanciers, tibias et abdomen blanchâtres, fémurs roussâtres avec un anneau enfumé avant leur extrémité, tergites 2—7 traversés par un trait longitudinal et brun, qui, avant le milieu de chaque tergite, se prolonge de chaque côté sous forme de trait transversal, pince brunâtre (tarses brisés). Yeux et palpes comme chez le précédent. Antennes de 15 articles, les articles 3—14 un peu transversaux, le 14^e à peine égal aux 12 précédents réunis. Ailes blanches, à poils peu denses,¹ finement ponctuées entre les poils, tiers distal avec une teinte à peine enfumée, un point noir à l'extrémité de la 2^e nervure longitudinale et du radius; la base arquée du cubitus et du rameau supérieur de la posticale, les deux transversales ainsi que les transversales de la base alaire sont noires; auxiliaire atteignant presque le milieu du radius, qui égale la moitié du cubitus et se bifurque au bout, 2^e longitudinale bien marquée, son extrémité un peu plus rapprochée du radius que du cubitus, celui-ci arqué, très près du bord, dépassé notablement par la costale qui atteint presque la pointe alaire, discoïdale arquée distalement, aussi éloignée de la pointe alaire que le cubitus, 1^e transversale très oblique, double de la 2^e, qui est perpendiculaire et aboutit à la 1^e et à la base arquée du rameau supérieur de la posticale. Rameau inférieur arqué distalement. Abdomen grêle, plus de deux fois aussi long que le reste du corps. Pince comme chez le précédent. Taille 4.5 mm.

Himalaya oriental: Darjiling, à une altitude de 2340 mètres, 28 mai 1910 (Brunetti).

3. *P. riparia*, sp. nov.

♂. Tête, scape, palpes et thorax brun noir et mats, mesonotum avec trois bandes longitudinales noires et peu distinctes, la médiane divisée par une ligne longitudinale, raccourcie en arrière, les latérales raccourcies en avant, balanciers blancs, pattes jaune brunâtre, extrémité des fémurs, base et extrémité des tibias brun noir, deux ou trois derniers articles tarsaux un peu assombris, abdomen blanchâtre, côtés des tergites brun noir, tergites 4—7 en outre brunâtres ou bruns en majeure partie dorsalement, pince brune. Palpes longs. Antennes de 15 articles, panache brun noir articles 3—13 un peu transversaux, le 14^e un peu plus long que les 12 précédents réunis, 15^e conique. Ailes blanchâtres, faiblement poilues; une tache enfumée et circulaire est située entre la discoïdale et la cubitale, vis-à-vis de l'extrémité du radius; une tache noire et transversale englobe les deux transversales qui, comme la base arquée du cubitus et du rameau supérieur de la posticale, sont noires; une teinte le long du rameau supérieur de la posticale et un trait arqué se prolongeant le long du rameau inférieur,

¹ Les poils comme les cils étaient tombés, mais leur présence est prouvée par les papilles auxquelles ils étaient insérés et dont les ailes sont parsemées.

enfumés; auxiliaire dépassant le milieu du radius, qui est bifurqué au bout, et dépasse un peu le milieu du cubitus, 2^e nervure longitudinale de moitié plus près du radius que du cubitus à son extrémité, cubitus arqué distalement, très rapproché du bord, dépassé notablement par la costale, discoïdale fortement arquée distalement, comme le bout distal du rameau inférieur de la posticale, transversales comme chez le précédent. Abdomen plus de deux fois aussi long que le reste du corps. Taille 5.6 mm.

Himalaya occidental: Barogh, dans les montagnes de Simla, à une altitude de 1700 mètres, voltigeant le long d'une petite rivière, 10 mai 1910 (N. Annandale).

4. *P. himalayae*, sp. nov.

♂. Thorax roux brun, mesonotum un peu cendré et mat, avec trois bandes brunes et peu distinctes, dont la médiane est raccourcie en arrière, les latérales en avant, balanciers blanchâtres, pattes brunâtres ou blanc sâle, tarsi plus sombres, abdomen roux ou brun roux. Panache brun noir, article 14^e beaucoup plus long que les 12 précédents réunis. Ailes blanchâtres, velues, sans tache, nervation du précédent, les deux transversales du milieu et les deux de la base de l'aile brun noir. Tibia antérieur plus long que le fémur, d'un tiers plus long que le métatarse, 4^e article tarsal de moitié plus long que le 5^e, qui est 4—5 fois aussi long que gros. Abdomen deux fois aussi long que le reste du corps; pince comme chez *saltatrix*. Taille 5 mm.

Himalaya occidental: Barogh, dans les montagnes de Simla, à une altitude de 1700 mètres, 10 mai 1910 (N. Annandale).

5. *P. macrocerus*, Kieff.

Nepal (*Memoirs Ind. Mus.*, vol. ii, p. 212). Un autre exemplaire capturé également à Thamaspur, le 18 février 1908, a les articles antennaires 3—5 un peu plus longs que gros, les suivants deux fois, 10^e et 11^e deux fois et demie, 12^e deux fois aussi long que le 11^e, appendices subuliformes aussi longs que les articles.

III. TENDIPEDINAE.

A. Groupe TENDIPEDARIAE.

1. Genus TENDIPES, Meig. (*Chironomus*, Meig.).

- | | | | |
|--|----|----|----|
| 1. Pulvilles nuls, thorax noir brillant, sans bande. (Probablement genre nouveau.) | .. | .. | 2. |
| — Pulvilles larges, atteignant ou dépassant le milieu des crochets | .. | .. | 3. |

- | | |
|---|--------------------------------------|
| 2. Métatarse antérieur deux fois aussi long que le tibia .. | 1. <i>T. melanothorax</i> , sp. nov. |
| — Métatarse antérieur à peine plus long que le tibia .. | 2. <i>T. digraphis</i> , sp. nov. |
| 3. Mesonotum, sauf trois bandes rousses, et scutellum verts .. | 3. <i>T. choricus</i> , sp. nov. |
| — Mesonotum autrement coloré .. | 4. |
| 4. Thorax noir brillant avec une bande rousse .. | 4. <i>T. himalayanus</i> , sp. nov. |
| — Thorax ferrugineux presque en entier ou bien le mesonotum est blanchâtre avec trois bandes ferrugineuses .. | 5. |
| 5. Bifurcation de la posticale notablement distale de la transversale .. | 6. |
| — Bifurcation de la posticale située sous la transversale .. | 7. |
| 6. Pattes en entier, scutellum et mesonotum sauf les trois bandes blanchâtres, corps ferrugineux .. | 5. <i>T. fulvescens</i> , sp. nov. |
| — Pattes verdâtres, en partie brun noir, abdomen jaunâtre, segments 6 et 7 verts .. | 6. <i>T. polius</i> , sp. nov. |
| 7. Nervure transversale brun noir, plus sombre que le cubitus, métatarse antérieur 2—2½ fois aussi long que le tibia .. | 8. |
| — Nervure transversale pas plus sombre que le cubitus .. | 9. |
| 8. Article 4° des tarsi antérieurs distinctement plus long que le 3°, métatarse antérieur deux fois aussi long que le tibia .. | 7. <i>T. nepalensis</i> , sp. nov. |
| — Article 4° des tarsi antérieurs égal au 3°, métatarse antérieur 2½ fois aussi long que le tibia .. | 8. <i>T. macroscelus</i> , sp. nov. |
| 9. Métatarse antérieur de moitié plus long que le tibia; tergites 2—4 blanchâtres, avec une tache subcirculaire et 4 points brun noir | 9. <i>T. stictogaster</i> , sp. nov. |
| — Métatarse antérieur au moins deux fois aussi long que le tibia; abdomen autrement coloré .. | 10. |
| 10. Abdomen entièrement ferrugineux | 10. <i>T. rufescens</i> , sp. nov. |
| — Abdomen blanc sale, sa moitié postérieure brun noir .. | 11. <i>T. sessilis</i> , sp. nov. |

1. *T. melanothorax*, sp. nov.

(Fig. 2, moitié de la pince.)

♂ ♀. Palpes brunâtres et très longs; antennes brun noir, scape noir, thorax noir brillant, balanciers blanchâtres, pattes jaunâtres, genoux et extrémité des tibias obscurcis, tarsi et abdomen brun noir, chez le mâle la moitié antérieure de l'abdomen et la pince sont roussâtres. Yeux très arqués, amincis supérieurement, où ils sont distants d'un peu plus de leur largeur terminale. Antennes du mâle à panache blanchâtre, articles du flagellum aussi longs que gros, le dernier guère plus long que les précédents réunis. Antennes de la femelle de 6 articles, dont le 2^e est sub-cylindrique, un peu rétréci au milieu, 3—5 fusiformes, deux fois aussi longs que gros, à verticille trois fois aussi long que leur grosseur, 6^e article presque deux fois aussi long que le 5^e, sans longs poils. Mesonotum sans trace de sillon. Ailes presque hyalines, toutes les nervures fortes et brunâtres, l'auxiliaire dépasse un peu la transversale, radius un peu plus long que la moitié du cubitus, très rapproché de la 2^e longitudinale, cubitus presque droit, aussi rapproché de la pointe alaire que la discoïdale, transversale oblique, bifurcation de la posticale notablement distale de la transversale. Pattes antérieures sans longs poils, leur tibia égalant les deux tiers du fémur, métatarse presque deux fois aussi long que le tibia, double du 2^e article, 2—4 graduellement et très faiblement raccourcis, le 5^e dépassant un peu le tiers du 4^e, 5—6 fois aussi long que gros, empodium filiforme, plus court que la moitié des crochets, à poils bifurqués, pulvilles nuls. Articles terminaux de la pince (fig. 2) également pubescents, à longs poils épars sur toute la partie dorsale, le tiers postérieur aminci graduellement et très faiblement, ayant sur la partie ventrale six stylets très courts, 2 fois aussi longs que gros, alignés et se touchant, les deux tiers antérieurs de l'article sont cylindriques; lamelle graduellement aminci en une pointe terminée par un renflement ellipsoïdal et atteignant presque l'extrémité des articles basaux de la pince; grands appendices ne dépassant pas les deux tiers des articles basaux, leur extrémité et leur côté externe à longs poils arqués. Taille 3.5—4 mm.

Himalaya central: Népal, Thamaspur, le 20 février 1908, Tharbanî, le 27 février 1908, cinq exemplaires.

2. *T. digraphis*, sp. nov.

(Fig. 3, moitié de la pince.)

♂ ♀. Noir brillant, palpes, antennes et scutellum brun noir, hanches et pattes roux jaune, aux pattes antérieures l'extrémité du fémur, le tibia et le tarse noir profond, aux quatre pattes postérieures l'extrémité du fémur et les trois ou quatre derniers articles tarsaux brun noir, balanciers blancs, abdomen et pince noir mat, base du premier tergite avec une tache brun clair.

Palpes longs et grêles. Antennes du mâle de 14 articles, les premiers articles du flagellum sont aussi longs que gros, les suivants plus longs, le dernier de moitié plus long que les 12 précédents réunis, panache brun noir. Antennes de la femelle de 7 articles, articles 2—6 avec un verticille de six soies qui sont trois à quatre fois aussi longues que la grosseur des articles, appendices subuliformes nuls au 2^e article, fixés au col des articles 3—6 et dépassant à peine la base de l'article suivant; articles 2^e et 3^e presque deux fois aussi longs que gros, un peu grossis au milieu, articles 4—6 plus allongés, avec un col dépassant le tiers de leur longueur, 7^e article graduellement aminci, un peu plus long que les deux précédents réunis. Ailes hyalines, nervures antérieures brunâtres, auxiliaire atteignant presque le milieu du radius, cubitus un peu arqué, presque double du radius, aboutissant aussi près de la pointe alaire que la discoïdale, 2^e longitudinale aussi bien marquée que le radius, dont elle est 7 à 8 fois plus proche que du cubitus, transversale oblique, bifurcation de la posticale située sous la transversale, les deux rameaux déviant peu de la direction du pétiole. Pattes antérieures à peine pubescentes (♀ ♂), les quatre autres à poils plus longs que la grosseur des pattes, tibia antérieur à peine plus court que le fémur, métatarse à peine plus long que le tibia, presque double du 2^e article, 2—4 graduellement et faiblement raccourcis, 4^e 2½ fois aussi long que le 5^e, qui est 5—6 fois aussi long que gros, empodium très court, à peine visible, pulvilles nuls (♂ ♀). Abdomen sans longs poils; pince (fig. 3) avec l'article terminal aussi long que le basal, arqué, à peine plus mince aux deux bouts, pubescent partout et avec de longs poils sur la partie dorsale, grand appendice dépassant les articles basaux, larges, pubescents, sans longs poils mais ayant, sous le milieu du côté interne, un faisceau de poils jaunes et longs, petits appendices glabres, brun chitineux et incurvés à l'extrémité, qui est pointue. Taille 5 mm.

Himalaya occidental: Simla, à une altitude de 2340 mètres, 6 ♂ et 4 ♀, 9 mai 1910; Mundali, Jaunsa Division, Dehra Dun district, à une altitude de 3000 mètres, 12 mai 1910.

3. *T. choricus*, sp. nov.

(Fig. 4, deux derniers articles antennaires de la femelle; fig. 5, moitié de la pince.)

♂ ♀. Palpes et antennes roux chez le mâle, brun noir chez la femelle, avec le scape roux. Thorax roux ferrugineux, mesonotum et scutellum vert clair, trois larges bandes du mesonotum ferrugineuses et mates, la médiane pointue en arrière et atteignant plus ou moins distinctement le bord postérieur du mesonotum, les latérales raccourcies en avant, balanciers blancs, abdomen vert clair, tergites 2—5 avec une grande tache brune au milieu, segments 6 et 7 et pince presque entièrement brun noir, pattes blanc sâle ou brunâtres, aux antérieures le tibia et le tarse sont noirs

chez la femelle, aux quatre tarsi postérieurs les 3 ou 4 derniers articles sont assombris. Yeux arqués fortement, séparés par leur largeur terminale. Palpes très longs. Antennes du mâle de 12 articles, dont le 2° est un peu allongé, 3—11 un peu transversaux, chacun à deux verticilles interrompus deux fois, 12° $2\frac{1}{2}$ fois aussi long que les 10 précédents réunis, terminé en fuseau; panache gris. Ailes hyalines, nervures antérieures brunâtres, transversale à peine plus sombre et oblique, auxiliaire atteignant presque le milieu du radius, qui égale les deux tiers du cubitus, 2° longitudinale faible, à peine séparée du radius, cubitus faiblement arqué distalement, aussi proche de la pointe alaire que la discoïdale, bifurcation de la posticale située sous la transversale, les deux rameaux ne déviant guère de la direction du pétiole. Pattes antérieures à peine pubescentes, les quatre postérieures à poils 2—3 fois aussi longs que leur épaisseur, tibia antérieur égalant les deux tiers du fémur, métatarse de deux tiers plus long que le tibia, presque deux fois aussi long que le 2° article, 2—4 à peine graduellement raccourcis, 4° $2\frac{1}{2}$ fois aussi long que le 5°, qui est 8—10 fois aussi long que gros, empodium un peu plus long que les pulvilles qui sont larges et atteignent le milieu des crochets. Antennes de la femelle (fig. 4) de 6 articles dont le 2° est un peu rétréci au milieu, avec un col égalant la moitié de sa longueur, deux verticilles de poils et deux appendices subuliformes; 3—5 subfusiformes, à col un peu plus court que l'article, verticille de poils 10—12 fois aussi longs que la grosseur des articles, appendices subuliformes trois fois; 6° article 2 fois aussi long que le 5°, sans longs poils. Pince (fig. 5) avec une lamelle terminée par un long pétiole en forme de bec, article terminal presque deux fois aussi long que le basal, un peu arqué et subfusiforme, sa moitié proximale pubescente et munie dorsalement de longues soies, sa moitié distale glabre, amincie graduellement en lame de couteau et ayant à l'extrémité du côté interne cinq petites soies alignées; grands appendices atteignant le milieu des articles terminaux, larges et munis de longs poils incurvés. Taille 6—7 mm.

Himalaya occidental: Simla, à une altitude de 2340 mètres; se réunit en troupes nombreuses pour exécuter des danses en l'air, au crépuscule du soir; les exemplaires capturés étaient tous des mâles; Barogh, dans les montagnes de Simla, à une altitude de 1700 mètres, deux exemplaires σ capturés le long d'un petit ruisseau; Himalaya central: Nepal, Sukhwani, 15 février 1908, Dahawangahary Hill, 16 février 1908; United Provinces: Bijnor District, Amangarh, 24 février 1910.

4. *T. himalayanus*, sp. nov.

σ . Tête et palpes bruns, scape roux jaune, thorax noir brillant, avec une large bande médiane d'un roux jaune, qui parcourt sa moitié antérieure, antennes brunes dans la moitié basale, blanchâtres dans la moitié distale, balanciers, pattes et abdomen blanc jaunâtre, anneau au-dessus du milieu du fémur antérieur, extrémité

du même fémur, base du tibia antérieur, extrême bout distal de tous les tibias et des quatre premiers articles des tarses antérieurs noirs, dernier segment abdominal et pince brun noir. Palpes longs. Antennes de 14 articles, panache brun dans la moitié basale, blanchâtre dans la moitié terminale, articles 3—13 aussi longs que gros, 14^e un peu plus de deux fois aussi long que les 12 précédents réunis, tous, sauf les deux premiers, sont fendus et portent deux verticilles interrompus deux fois et à papilles pilifères en forme de grains alignés et se touchant presque. Ailes hyalines, nervures antérieures jaunes, auxiliaire atteignant le tiers du radius, qui égale presque les deux tiers du cubitus, 2^e longitudinale non visible, cubitus presque droit, plus rapproché de la pointe alaire que la discoïdale, transversale oblique, bifurcation de la posticale située sous la transversale, les deux rameaux déviant peu de la direction du pétiole. Pattes antérieures à peine pubescentes, leur métatarse d'un quart plus long que le tibia, 2½ fois aussi long que le 2^e article, les quatre pattes postérieures ont des poils 3—4 fois aussi longs que la grosseur des pattes, leur tibia n'atteint que la moitié du tarse, pulvilles larges, égalant la moitié des crochets, un peu plus courts que l'empodium. Abdomen à poils pâles et peu denses, article terminal de la pince plus long que le basal, arqué, plus gros au milieu, sa moitié basale pubescente et munie de longs poils sur sa partie dorsale, sa moitié terminale graduellement amincie et subglabre; les grands appendices sont larges et dépassent un peu les articles basaux. Taille 6 mm.

Himalaya occidental: Mundali, Jaunsa Division, Dehra Dun district, à une altitude de 3000 mètres, 10 mai 1910.

5. *T. fulvescens*, sp. nov.

(Fig. 6, deux derniers articles antennaires.)

♀. Ferrugineux; antennes, sauf le 6^e article qui est brunâtre, balanciers, mesonotum, scutellum et les pattes en entier blanchâtres, mesonotum avec trois bandes ferrugineuses et mates, les latérales interrompues en avant, la médiane en arrière. Palpes longs. Antennes de 6 articles (fig. 6), dont le 2^e est subcylindrique, plus de deux fois aussi long que gros, un peu rétréci au milieu, à col guère plus long que gros, les articles 3—5 subfusiformes, moins de deux fois aussi longs que gros, le 3^e à col égalant sa demie longueur, le 4^e à col égal à sa longueur, le 5^e sans col; les articles 2—5 ont deux appendices subuliformes qui dépassent un peu la base de l'article suivant, et un verticille 3—4 fois aussi long que leur grosseur, le 2^e article porte deux verticilles; 6^e article étroit, subcylindrique, plus de deux fois aussi long que le 5^e, avec deux longues soies près de l'extrémité. Ailes subhyalines, nervures antérieures brunâtres, la transversale oblique et pas plus sombre, auxiliaire ne dépassant guère la transversale, radius atteignant presque les deux tiers du cubitus, 2^e longitudinale indistincte, cubitus arqué et aboutissant presque à la pointe alaire, bifurcation

de la posticale notablement distale de la transversale. Tibia antérieur un peu plus long que la moitié du fémur, tarse antérieur brisé. Taille 2.5 mm.

Himalaya central: Nepal, Butal, le 12 février 1908.

6. *T. polius*, sp. nov.

(Fig. 7, pince du mâle vue de dessus.)

♂. Tête et les longs palpes blanchâtres, flagellum brun, scape et thorax jaune roussâtre, mesonotum blanchâtre, avec trois bandes ferrugineuses et mates, dont la médiane est raccourcie en arrière, les latérales en avant, scutellum blanc verdâtre, balanciers blanchâtres, pattes vertes, tibia antérieur un peu obscurci, tarse antérieur brun noir, les 4 autres tarsi jaunâtres et graduellement obscurcis, abdomen et pince jaunâtres, segments 6 et 7 verts. Antennes à panache blanchâtres, articles du flagellum très transversaux, le dernier presque deux fois aussi long que les précédents réunis. Ailes hyalines, radius pâle, dépassant le milieu du cubitus qui est droit et 2—3 fois plus distant de la pointe alaire que la discoïdale, transversale oblique, bifurcation de la posticale notablement distale de la transversale. Tibia antérieur dépassant la moitié du fémur, métatarse double du tibia, 2^e article plus court que le tibia, plus long que le 3^e, qui est égal au 4^e, 5^e n'atteignant pas la moitié du 4^e, 6 fois aussi long que gros, pulvilles larges, égalant la moitié des crochets; pattes antérieures sans longs poils, tibia des 4 pattes postérieures à poils 4—5 fois aussi longs que sa grosseur et dressés sur tout son pourtour. Pince (fig. 7) à articles terminaux pubescents partout, mais plus densément sur leur partie ventrale, presque coniques, terminés par une courte spinule et portant de longues soies éparses sur leur partie dorsale; lamelle terminée par une pointe cylindrique, grêle, très longue, atteignant presque l'extrémité des articles terminaux; appendices courts ou indistincts. Taille 3 mm.

Himalaya occidental: Kasauli, dans les montagnes de Simla, à une altitude de 2100 m., le 16 mai 1908 (N. Annandale).

7. *T. nepalensis*, sp. nov.

♂ ♀. Tête blanchâtre, scape roux clair, flagellum du mâle brun, celui de la femelle roussâtre, thorax roux, mesonotum, scutellum et balanciers blanchâtres, le mesonotum avec trois bandes ferrugineuses et mates, dont la médiane est divisée par une ligne et raccourcie en arrière, les latérales en avant, pattes jaunâtres, tiers proximal du tibia antérieur, l'extrême bout distal des 4 premiers articles du tarse antérieur et le 5^e article en entier, et les deux derniers articles des 4 tarsi postérieurs brun noir; abdomen blanchâtre, chez le mâle le 1^{er} tergite a, de chaque côté, une grande tache brune, au milieu ces deux taches se réunissent presque, les tergites 2—4 avec une tache brune longitudinale,

ellipsoïdale et non percurrente, tergites 5—8 et pince bruns, partie amincie des articles terminaux de la pince jaunâtre; chez la femelle, les tergites 4—8 sont bruns avec le bord postérieur pâle. Yeux très arqués, amincis supérieurement, où ils sont distants de leur largeur terminale. Palpes longs. Antennes du mâle de 12 articles, les articles 2—11 très transversaux, le 12^e presque trois fois aussi long que les dix précédents réunis. Antennes de la femelle de 6 articles, dont le 2^e est subcylindrique et un peu rétréci au milieu, 3—5 subfusiformes, à col au moins aussi long qu'eux, 6^e non assombri, de moitié plus long que le 5^e, avec deux longues soies près de l'extrémité. Thorax non pruiné, mesonotum non traversé par un sillon. Ailes subhyalines, nervure transversale brun noir, les nervures antérieures faiblement brunâtres, cubitus un peu arqué, plus près de la pointe alaire que la discoïdale, bifurcation de la posticale située sous la transversale. Pattes antérieures sans longs poils, leur tibia atteignant les deux tiers du fémur, métatarse double du tibia, 2^e article égal la moitié du métatarse, pas distinctement plus long que le 3^e, 4^e distinctement plus long que le 3^e, plus de deux fois le 5^e, qui est 8—10 fois aussi long que gros, pulvilles larges, atteignant le milieu des crochets. Pince comme chez *T. breviforceps* (fig. 8). Taille 6 mm.

Himalaya central: Nepal, Noalpur, le 23 février 1908, Sicktan, le 13 février 1908; Simla, à une altitude de 3400 m., le 11 mai 1908 (N. Annandale).

8. *T. macroscelus*, sp. nov.

♀. Tête, scape et thorax jaune roussâtre, flagellum et les longs palpes brun noir, mesonotum, scutellum et balanciers blanchâtres, le mesonotum avec trois bandes ferrugineuses et mates, dont la médiane est raccourcie en arrière, les latérales en avant, pattes jaunâtres, tibia et tarse des pattes antérieures brun noir, tarse des autres pattes graduellement assombri, abdomen brun noir, bord postérieur des tergites blanchâtre et pruiné. Antennes de 6 articles, dont le 2^e est subcylindrique, presque trois fois aussi long que gros, faiblement rétréci au milieu, avec 2 verticilles de poils et deux appendices subuliformes, col égalant presque la moitié de l'article, les articles 3—5 sont subfusiformes et à peine plus longs que leur col, avec un verticille 10 fois aussi long que leur grosseur et deux appendices subuliformes 4 fois aussi longs que leur grosseur, 6^e article moins gros, subcylindrique, de moitié plus long que le 5^e article et sans longs poils. Mesonotum sans sillon longitudinal. Ailes presque hyalines, nervures antérieures brunâtres, la transversale brun noir et oblique, auxiliaire atteignant le milieu du radius, qui est très rapproché de la 2^e longitudinale, cubitus presque double du radius, à peine arqué, plus éloigné de la pointe alaire que la discoïdale, bifurcation de la posticale située sous la transversale. Tibia antérieur atteignant les deux tiers du fémur, métatarse 2½ fois aussi long que le tibia, double du 2^e article, qui n'est guère plus long que le 3^e, 4^e égal au 3^e, double

du 5^e, qui est 10—12 fois aussi long que gros, pulvilles larges et atteignant le milieu des crochets; pattes sans longs poils. Taille 6.5 mm.

Himalaya central: Nepal, montagne de Dahawangahary, le 16 février 1908.

9. *T. stictogaster*, sp. nov.

♂. Tête et scape jaune roussâtre, flagellum et les longs palpes brun noir, thorax roussâtre et mat, mesonotum, scutellum et balanciers blanchâtres, le mesonotum avec trois bandes ferrugineuses dont la médiane est raccourcie en arrière, les latérales en avant, hanches et pattes d'un jaune clair, extrême bout distal des trois premiers articles tarsaux et les deux derniers en entier assombris; abdomen blanchâtre, tergites 2—4 avec une tache brun noir subcirculaire, située au milieu, et quatre points bruns, dont deux sont situés au bord antérieur et deux au bord postérieur, tergites 5—8 assombris et pruineux de gris, pince brisée. Antennes de 12 articles, panache fauve, articles 3—11 très transversaux, le 12^e 2½ fois aussi long que les 10 précédents réunis. Mesonotum sans sillon. Ailes subhyalines, nervures antérieures brunâtres, la transversale oblique et un peu plus sombre, radius atteignant presque les deux tiers du cubitus, qui est arqué et à peine plus distant de la pointe alaire que la discoïdale, bifurcation de la posticale située sous la transversale. Pattes antérieures sans longs poils, leur tibia égalant les deux tiers du fémur, métatarse de moitié plus long que le tibia, double du 2^e article, 2—4 graduellement et très faiblement raccourcis, 4^e double du 5^e qui est 8—10 fois aussi long que gros, pulvilles larges, atteignant le milieu des crochets. Taille 7 mm.

Himalaya occidental: Simla, à une altitude de 2340 m, le 12 mai 1908 (N. Annandale).

10. *T. rufescens*, sp. nov.

♂. Tête et les longs palpes jaunâtres, flagellum roux brun, scape, thorax et abdomen en entier ferrugineux, une tache de chaque côté du bord antérieur du mesonotum et balanciers blanchâtres, pattes jaunâtres, aux pattes antérieures le genoux et le tibia sont un peu obscurcis, et le tarse est d'un brun noir comme les deux derniers articles des quatre tarsi postérieurs. Panache roussâtre, articles du flagellum très transversaux, le dernier deux fois aussi long que les précédents réunis. Pronotum à 2 lobes bien distincts et non pas seulement échancré. Mesonotum mat, sans sillon. Ailes subhyalines, nervures antérieures et transversale brunâtres, auxiliaire atteignant le milieu du radius qui égale les deux tiers du cubitus, 2^e longitudinale très rapprochée du radius, cubitus droit, un peu plus distant de la pointe alaire que la discoïdale, transversale oblique, située au-dessus de la bifurcation de la posticale. Pattes antérieures sans longs poils, métatarse double du tibia, 2^e article égal au tibia, un peu plus long que le

3°, 4° au moins égal au 3°, plus de deux fois aussi long que le 5°, qui est 6 fois aussi long que gros. Articles terminaux de la pince non amincis distinctement à l'extrémité, presque d'égale largeur, grands appendices atteignant le milieu des articles terminaux. Taille 6 mm.

United Provinces: Chandan Chowki, le 8 mai 1907.

11. *T. sessilis*, sp. nov.

♀. Palpes, scape, 5° et 6° article antennaire, 3° et 4° sauf leur col, brun noir, col des articles antennaires 3 et 4 blanchâtre, thorax brun sombre, mesonotum, scutellum et balanciers blanchâtres, le mesonotum avec trois bandes luisantes et d'un brun sombre, dont la médiane est raccourcie en arrière, les latérales en avant, pattes blanchâtres, abdomen blanc sâle comme les lamelles, moitié postérieure brun noir. Antennes de 6 articles, dont le 2° est subcylindrique, plus de deux fois aussi long que gros, faiblement rétréci au milieu, à col deux fois aussi long que gros, avec 2 verticilles de poils et deux appendices subuliformes, 3° et 4° articles subfusiformes, à col plus long qu'eux, 5° subfusiforme et sans col, verticille 4—5 fois aussi long que la grosseur des articles, appendices subuliformes guère plus longs que la grosseur des articles, 6° article peu gros, cylindrique, aussi long que les deux précédents réunis, avec trois longs poils près de l'extrémité. Ailes subhyalines, nervures antérieures et transversale brunâtres, auxiliaire atteignant le quart proximal du radius, qui égale presque les deux tiers du cubitus, 2° longitudinale juxtaposée au radius, cubitus arqué, aboutissant presque dans la pointe alaire, bifurcation de la posticale notablement distale de la transversale qui est oblique. Aux pattes antérieures le tibia est un peu plus long que le milieu du fémur, métatarse plus de deux fois aussi long que le tibia, 2° article plus long que le tibia, 2—4 graduellement raccourcis, 5° plus court que la moitié du 4°, 5—6 fois aussi long que gros, pulvilles larges. Taille 2.5 mm.

Himalaya central: Nepal, Thamaspur, le 18 février 1908.

12. *T. aplochirus*, Kieff.

Assam (*Records Ind. Mus.*, 1911, vol. vi, p. 157).

13. *T. aploncurus*, Kieff.

Assam (*Records Ind. Mus.*, 1911, vol. vi, p. 158).

14. *T. brevisforceps*, Kieff.

(Fig. 8, moitié de la pince.)

Himalaya occidental: Simla (*Records Ind. Mus.*, 1911, vol. vi, p. 151). Je rapporte à la même espèce, des individus mâles et

femelles provenant de Dharampur, dans les montagnes de Simla, à une altitude de 1700 mètres. Le mesonotum est parcouru par un étroit sillon longitudinal et médian, les pulvilles sont larges, égalant la moitié des crochets tarsaux, les tergites de la femelle bordés de jaune brunâtre en arrière, la pince du mâle (fig. 8) aussi longue que le segment qui lui sert de base.

15. *T. callicomus*, Kieff.

Himalaya occidental: Simla (*Records Ind. Mus.*, 1911, vol. vi, p. 146).

16. *T. callinotus*, Kieff.

United Provinces: Bijnor (*Records Ind. Mus.*, 1911, vol. vi, p. 150).

17. *T. callisphyrus*, Kieff.

Assam (*Records Ind. Mus.*, 1911, vol. vi, p. 156).

T. callisphyrus, var.

♂. Diffère du type par la coloration des pattes, dont le 5^e article tarsal, l'extrémité des quatre autres articles et la base du tibia antérieur sont brun noir; par le métatarse antérieur qui est un peu moins de deux fois aussi long que le tibia, par la transversale qui n'est pas plus sombre que le cubitus, par la bifurcation de la posticale qui est située sous la transversale, par le 12^e article antennaire qui est trois fois aussi long que les dix précédents réunis. Thorax mat comme chez le type, mais la bande médiane est raccourcie en arrière. Pulvilles larges, égalant la moitié des crochets, à peine plus courts que l'empodium. Taille 6.5 mm.

Himalaya occidental: Simla, à une altitude de 2340 mètres, 9 mai 1910; Himalaya oriental: Kurseong, à une altitude de 1540 à 1700 mètres, 20 juin 1910.

18. *T. callithorax*, Kieff.

United Provinces: Bijnor (*Records Ind. Mus.*, vol. vi, p. 142).

19. *T. fimbriatus*, Kieff.

Himalaya central: Nepal (*Memoirs Ind. Mus.*, vol. ii, p. 238).

20. *T. halli*, Kieff.

Assam (*Memoirs Ind. Mus.*, vol. ii, p. 237).

21. *T. lampronotus*, Kieff.

Assam (*Records Ind. Mus.*, vol. vi, p. 144).

22. *T. lobaticeps*, Kieff.Assam (*Records Ind. Mus.*, vol. vi, p. 138).23. *T. lobaticollis*, Kieff.Assam (*Records Ind. Mus.*, vol. vi, p. 139).24. *T. longicrus*, Kieff.Himalaya occidental: Simla (*Records Ind. Mus.*, vol. vi, p. 145).25. *T. melanochirus*, Kieff.Himalaya occidental: Simla (*Records Ind. Mus.*, vol. vi, p. 155).26. *T. nigriforceps*, Kieff.Unit. Prov.: Chandan Chowki (*Records Ind. Mus.*, vol. vi, p. 143).27. *T. nigromarginatus*, Kieff.

(*Records Ind. Mus.*, vol. vi, p. 141.) Cette espèce était connue pour Orissa. Elle a encore été observée à Chandan Chowki, United Provinces, le 8 mai 1907. Chez la femelle, les articles antennaires 3—5 ont un col égalant les deux tiers de leur longueur; articles 2—4 des tarses antérieurs subégaux.

28. *T. oriplanus*, Kieff.Himalaya occidental: Simla (*Records Ind. Mus.*, vol. vi, p. 152).29. *T. planicollis*, Kieff.Assam (*Records Ind. Mus.*, vol. vi, p. 151).30. *T. prasiogaster*, Kieff.Assam (*Records Ind. Mus.*, vol. vi, p. 165).31. *T. prussicus*, Kieff.Himalaya occidental: Simla (*Memoirs Ind. Mus.*, vol. ii, p. 229).32. *T. rostratus*, Kieff.Assam (*Records Ind. Mus.*, 1911, vol. vi, p. 164).33. *T. speciosus*, Kieff.Himalaya occidental: Simla (*Records Ind. Mus.*, 1911, vol. vi, p. 133).

34. *T. striatipennis*, Kieff.

Himalaya central: Kumaon (*Memoirs Ind. Mus.*, 1910, vol. ii, p. 236).

35. *T. verrucosus*, Kieff.

Himalaya central: Kumaon (*Records Ind. Mus.*, 1911, vol. vi, p. 140). Encore deux mâles provenant de la même localité, mais ayant les pattes d'un roux jaunâtre, sauf les hanches, derniers articles tarsaux graduellement obscurcis; les antennes se composent de 12 articles imparfaitement fendus, 3—11 plus de deux fois aussi larges que longs, 12^e 3½ fois aussi long que les dix précédents réunis. Radius atteignant presque les deux tiers du cubitus. Pulvilles larges, atteignant le milieu des crochets tarsaux. Taille 6.5—7 mm.

Bhim Tal, à une altitude de 1500 m., le 25 septembre 1907.

2. Genus TANYTARSUS, V. d. Wulp.

1. *T. hirtipes*, Kieff.

Assam (*Records Ind. Mus.*, 1911, vol. vi, p. 168).

2. *T. macrochirus*, Kieff.

Himalaya central: Kumaon (*Records Ind. Mus.*, 1911, vol. vi, p. 171).

B. Groupe ORTHOCLADIARIAE.

1. Genus TRICHOCLADIUS, Kieff.

Deux espèces sont à rapporter à ce genre.

- | | |
|--|------------------------------------|
| 1. Abdomen blanc pur avec cinq anneaux noirs, pince blanche .. | 1. <i>T. pentazonus</i> , sp. nov. |
| — Abdomen entièrement noir mat | 2. <i>T. oriplanus</i> , sp. nov. |

1. *T. pentazonus*, sp. nov.

♂. Tête, mesonotum et scutellum roussâtres, scape brun roux, flagellum brun, mesonotum très brillant, avec trois bandes noires ou brun noir, dont la médiane est raccourcie en arrière, les latérales en avant, pleures et sternum brun roux, metanotum noir, balanciers, abdomen et pince blanc pur, l'abdomen avec cinq anneaux noirs, les deux premiers sur les segments 2 et 3, dont le bord antérieur et le bord postérieur demeurent libres, les deux autres sur les segments 4 et 5, en laissant au segment 4^e le tiers antérieur et un étroit bord postérieur, au 5^e le bord antérieur et le bord postérieur libres, le dernier sur le segment 8^e ou base de la pince; pattes jaunâtres, extrémité du fémur antérieur un peu obscurci, tibias et tarses blanchâtres, les tarses antérieurs un peu obscurcis. Yeux velus, longuement distants au vertex. Palpes médiocrement longs. Antennes de 14 article panache gris, articles 3—5 transversaux, les suivants d'abord aussi gros que longs puis

plus longs que gros, le 14^e égal aux 12 précédents réunis; le 2^e article port un verticille, les suivants en ont deux et sont munis d'une étroite fente longitudinale comme le 14^e. Ailes glabres, hyalines, toutes les nervures brunâtres, radius atteignant le milieu du cubitus; 2^e longitudinale à peine plus éloignée du cubitus que du radius, à son extrémité; cubitus droit, dépassé par la costale, aussi distant de la pointe alaire que le rameau supérieur de la posticale, transversale oblique, bifurcation de la posticale un peu distale de la transversale, les deux rameaux déviant peu de la direction de la tige, base alaire avec un lobe. Pattes grêles, pubescentes, sans longs poils, les deux premiers articles tarsaux avec des soies courtes et alignées sur le dessous, tibia antérieur plus long que le fémur, de $\frac{2}{3}$ plus long que le métatarse, articles tarsaux graduellement raccourcis, le 5^e encore 4—5 fois aussi long que gros, empodium filiforme, à poils bifurqués sur le dessous, égalant presque les crochets, pulvilles nuls, tibia antérieur et intermédiaire sans peigne, le tibia postérieur avec un peigne comme chez *Orthocladus*. Abdomen grêle, sans longs poils. Taille 2.3 mm.

Himalaya central: Nepal, Thamaspur, 18 février 1908 (2 exemplaires); Tharbani, 27 février 1908 (1 exemplaire).

2. *T. oriplanus*, sp. nov.

♂. Noir mat; balanciers brun noir, pattes brun sombre. Yeux densément velus, distants de plus de leur longueur au vertex. Palpes de quatre articles, dont le premier est le plus court, trois fois aussi long que gros. Ailes hyalines, glabres, nervures pâles, radius atteignant à peine le milieu du cubitus, 2^e longitudinale aussi distante du cubitus que du radius à son extrémité, cubitus droit, notablement dépassé par la costale, aboutissant aussi loin de la pointe alaire que le rameau supérieur de la posticale. Tibia antérieur de moitié plus long que le fémur et que le métatarse, les quatre premiers articles tarsaux graduellement raccourcis, le 4^e encore quatre fois aussi long que gros, le 5^e aussi long que le 4^e mais seulement de moitié aussi large, crochets grêles, avec deux ou trois soies sur le dessous, au tiers basal, pulvilles nuls, empodium égal au tiers des crochets; tibia postérieur à poils deux à trois fois aussi longs que son épaisseur, avec deux éperons d'inégale longueur et un peigne comme chez *Orthocladus*. Abdomen grêle, deux fois aussi long que le reste du corps. Taille 1.8 mm.

Himalaya oriental: Tonglu, Darjiling district (C. W. Beebe).

2. Genus CAMPTOCLADIUS, V. d. Wulp.

C. monticola, sp. nov.

(Fig. 9, aile.)

♀. Noir; balanciers et pattes brun noir. Antennes de six articles, articles du flagellum subcylindriques, deux fois aussi longs

que gros, sans col, le 6^e un peu plus long que le 5^e et plus mince. Ailes nues (fig. 9), cubitus plus de deux fois aussi long que le radius, arqué, graduellement rapproché du bord, longuement dépassé par la costale, transversale oblique, bifurcation de la posticale distale de la transversale, rameau supérieur déviant peu de la direction de la tige, aussi distant de la pointe alaire que le cubitus, rameau inférieur fortement courbé en S, costale aboutissant presque à la pointe alaire. Pattes sans longs poils, tibia antérieur deux fois aussi long que le métatarse, articles tarsaux graduellement raccourcis, le 5^e aussi long que le 4^e, empodium égalant presque les crochets, filiformes, à longs poils bifurqués, pulvilles non distincts. Taille 1.5 mm.

Himalaya occidental: Simla, à une altitude de 2340 m., 11 mai 1908.

3. Genus RHOPALOCADIUS, gen. nov.

Caractères génériques. Yeux velus densément. Palpes de quatre articles. Ailes glabres, à nervation de *Orthocladus*. Tibia postérieur avec un peigne, comme chez *Orthocladus*, les quatre antérieurs sans peigne et sans anneau, pulvilles larges, empodium filiforme. Article 14^e des antennes du mâle en massue, pas plus long que les trois précédents réunis.

R. himalayae, sp. nov.

♂. Brun noir; thorax noir brillant, pattes brunâtres. Yeux distants de plus de leur longueur au vertex. Les deux premiers articles des palpes deux fois aussi longs que gros, les deux suivants plus longs. Antennes de 14 articles, panache brun noir, articles 2—4 transversaux, le 5^e aussi long que gros, les suivants graduellement allongés, 8—13 deux fois aussi longs que gros, tous cylindriques, non fendus, avec deux verticilles interrompus deux fois et composés de poils très longs, appliqués comme chez les *Culicoides* et non insérés à des papilles en forme de grains; article terminal en massue, pas plus long que les trois précédents réunis. Ailes subhyalines, nervures brunes, cubitus droit, plus de deux fois aussi long que le radius, aboutissant aussi loin de la pointe alaire que le rameau supérieur de la posticale, notablement dépassé par la costale, 2^e longitudinale aboutissant deux fois plus près du cubitus que du radius, bifurcation de la posticale distale de la transversale, qui est oblique, les deux rameaux déviant peu de la direction du pétiole. Pattes à poils deux fois aussi longs que leur épaisseur, tibia antérieur de moitié plus long que le métatarse, 5^e article tarsal deux à trois fois aussi long que gros, empodium aussi long que les crochets, pulvilles atteignant le milieu des crochets. Abdomen grêle, article terminal de la pince plus court que le basal, pubescent, subcylindrique, droit ventralement, à peine convexe dorsalement, terminé par un stylet très court et dirigé ventralement. Taille 1.8 mm.

Himalaya occidental: Barogh, montagnes de Simla, à une altitude de 1670 mètres, 10 mai 1910 (N. Annandale).

4. Genus METRIOCNEMUS, V. d. Wulp.

1. *M. callinotus*, Kieff.

Himalaya occidental: Simla (*Records Ind. Mus.*, vol. vi, p. 175).

2. *M. fusiger*, sp. nov.

♂ ♀. Tête, scape et thorax roussâtres, mesonotum et scutellum plus clairs, le mesonotum avec trois bandes longitudinales d'un brun roux, la médiane raccourcie en arrière, les latérales en avant, balanciers, hanches, pattes et abdomen d'un blanc jaunâtre, tarsi et chez le mâle, l'extrémité de l'abdomen et la pince assombris, flagellum brun. Yeux très arqués, amincis supérieurement, où ils sont largement distants. Palpes assez longs. Antennes du mâle de 14 articles, panache gris, articles du flagellum plus longs que gros, le 14^e plus court que les 12 précédents réunis, terminé par un renflement fusiforme, qui est deux fois aussi large que les articles précédents et comprimé fortement. Antennes de la femelle de 6 articles, à verticilles blanchâtres, 2^e article un peu rétréci au milieu, 3—5 en fuseau court, deux fois aussi longs que gros, 6^e à peine plus long que le 5^e, aminci à la base. Ailes poilues, lobées à la base, radius atteignant à peine le milieu du cubitus qui est droit, notablement dépassé par la costale et aussi distant de la pointe alaire que le rameau supérieur de la posticale, transversale oblique, bifurcation de la posticale distale notablement de la transversale, rameau supérieur de la posticale déviant peu de la direction de la tige, l'inférieur fortement arqué dans sa moitié distale. Pattes pubescentes seulement, tibia antérieur un peu plus long que le métatarse, articles tarsaux graduellement raccourcis, le 5^e deux à trois fois aussi long que gros, empodium filiforme, égalant presque les crochets, pulvilles non distincts. Abdomen grêle chez le mâle, gros et conique chez la femelle, poils blanchâtres. Taille ♂ 1.5 mm., ♀ 1.8 mm.

Himalaya occidental: Simla, à une altitude de 2340 mètres, le 12 mai 1908 (N. Annandale).

C. Groupe NEPALIARIAE.

Genus NEPALIA, gen. nov.

Antennes conformées comme chez les deux groupes précédents. Thorax en capuchon. Tibia de toutes les pattes dépourvu de peigne et d'anneau dentelé. Métatarse de toutes les pattes plus long que le tibia. Ailes glabres. Cubitus éloigné de la pointe alaire.

N. filipes, sp. nov.

♂. Tête, palpes, scape, thorax et balanciers jaune blanchâtre, sternum, scutellum roux brun, mesonotum avec trois larges bandes, dont la médiane est rousse, bordée de noir, raccourcie en arrière, les deux latérales brun noir et raccourcies en avant,

metanotum, abdomen et articulations des pattes noirs, sauf les genoux qui sont brunâtres seulement, flagellum brun noir, extrémité blanche. Antennes de 12 articles, panache brun noir, conformé comme chez *Orthocladius*, son extrémité blanchâtre, articles du flagellum plus longs que gros, le dernier un peu plus long que les précédents réunis. Ailes hyalines, avec un lobe basal, surface non ponctuée, mais la tige de la discoïdale se bifurque, avant le milieu de l'aile, en un cubitus et une discoïdale faiblement et également déviant de sa direction, le cubitus paraît donc sortir de la discoïdale et non du radius, il est plus de deux fois aussi long que le radius, droit, et deux fois plus distant de la pointe alaire que le rameau supérieur de la posticale, 2^e longitudinale peu visible, aussi éloignée du cubitus que du radius, discoïdale aboutissant à la pointe alaire, bifurcation de la posticale notablement distale de la transversale, les deux rameaux déviant peu de la direction de la tige. Pattes très grêles, à poils deux fois aussi longs que leur grosseur, aux antérieures le fémur est de moitié plus long que le tibia, aux quatre postérieures le fémur est deux fois aussi long que le tibia, métatarse de toutes les pattes presque deux fois aussi long que le tibia, éperon brun, aussi long que la grosseur du tibia, articles tarsaux graduellement raccourcis, le 4^e encore huit fois aussi long que gros, le 5^e plus mince et guère plus long que la moitié du 4^e, crochets simples, empodium filiforme, atteignant presque le milieu des crochets, pulvilles non distincts. Abdomen grêle. Taille 2 mm.

Himalaya central: Nepal, Noalpur, 23 février 1908.

EXPLICATION DE LA PLANCHE XIV.

- FIG. 1.—Partie de l'aile de *Forcipomyia calotricha*, sp. nov., avec les poils écailleux et les cils dentelés.
- „ 2.—Moitié de la pince de *Tendipes melanothorax*, sp. nov.
- „ 3.—Moitié de la pince de *Tendipes digraphis*, sp. nov.
- „ 4.—Deux derniers articles antennaires de la femelle de *Tendipes choricus*, sp. nov.
- „ 5.—Moitié de la pince de *Tendipes choricus*, sp. nov.
- „ 6.—Deux derniers articles antennaires de *Tendipes fulvescens*, sp. nov.
- „ 7.—Pince du mâle de *Tendipes polius*, sp. nov., vue de dessus.
- „ 8.—Moitié de la pince de *Tendipes brevisforceps*, Kieff.
- „ 9.—Aile de *Camptocladius monticola*, sp. nov.



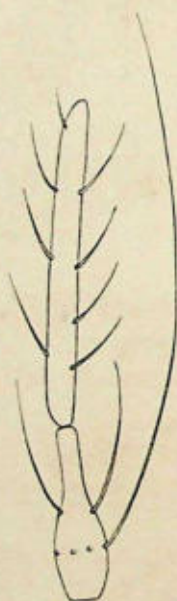
1.



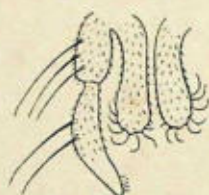
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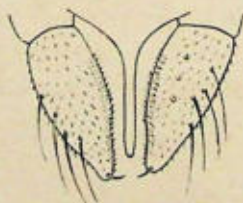
3.



4.



5.



7.



6.



8.



9.

J. J. Kieffer, del.

A. C. Chowdhary, lith.

XXI. NOTES ON THE OCCURRENCE OF *APUS* IN EASTERN ASIA.

By MAJOR H. J. WALTON, M.D., F.R.C.S., I.M.S., and
STANLEY KEMP, B.A., Assistant Superintendent, Indian Museum.

I.—ON THE OCCURRENCE OF *APUS*, LATREILLE, IN THE UNITED PROVINCES OF INDIA.

By MAJOR H. J. WALTON, M.D., F.R.C.S., I.M.S.

Dr. Annandale informs me that the only species of *Apus* known to occur in India is *A. himalayanus*, described many years ago by Packard in his 'Monograph of Phyllopod Crustacea.' Vredenburg records the occurrence of a species of this or an allied genus in Baluchistan, but has not identified the species (*Journ. As. Soc. Bengal*, 1905, p. 33). The geographical distribution of the genus *Apus* appears to be imperfectly known. Geoffrey Smith (*Camb. Nat. Hist.*, Crustacea) only refers to species occurring in Europe, North Africa and Central Australia. As mentioned below, I feel confident that a species occurs in North China.

It becomes, therefore, a matter of some interest to place on record the fact that an *Apus* occurs in the plains of India. On March 20th, 1911, the late Major C. J. Robertson Milne, I.M.S., and I found this Phyllopod to be tolerably numerous near the village of Banel, in the Bulandshahr District of the United Provinces. The animals occurred in three or four very small muddy pools formed by leakage from a "distributory" of the Upper Ganges Canal. The pools were in fact scarcely more than puddles, the largest not being more than a couple of yards in diameter. Our discovery of *Apus* was quite a coincidence. About half an hour previously, I had mentioned to Major Milne that I had seen what I believed to have been a species of *Apus* or *Lepidurus* at Pekin, about ten years ago; and I remarked that I believed that neither genus occurred in India. When we arrived at the pools we saw some moderately large animals moving about in the mud: on capturing one, I recognized *Apus* at once. With the aid of some boys we secured about three dozen specimens.

The erratic distribution of *Apus* has been commented on by several authors, and was borne out by the present experience. We only found the animals in a few pools; many adjoining, and apparently similar ones containing none. Subsequently for several days I searched unsuccessfully for more specimens in other parts of the Bulandshahr District, both in the Ganges Canal and in many pools in its neighbourhood. Considering the conspicuous size of

the animals, their active movements, and the fact that they occur in shallow pools, one is led to believe that they cannot be very widely distributed in India: otherwise, they would have been found before. Most natives to whom I have shown them do not recognize them at all; but a few persons have told me that they have seen them before, but only during the "rains."

In colour the animals are chiefly a dull olive-green, with the shield mottled with dark spots. In life, the long filiform endites of the first thoracic limb and in some animals the abdominal segments, have a decidedly rufous tinge. The average length of 31 specimens, measured from the anterior end of the cephalic shield to the posterior end of the abdomen (not including the furcal styles) is 33 mm., that of the styles being 35 mm. The maximum measurements are respectively 40 mm. and 41 mm. A very large specimen measures 80 mm. from the anterior end of the shield to the extremities of the furcal styles. The average length of the shield in the mid-line (eleven specimens) is 24 mm., and its breadth (not flattened out) is 18 mm. Dr. Keilhack ("Süsswasser fauna Deutschlands") gives 10—30 mm. and 9—28 mm. for these latter measurements in German examples of *Triops*¹ (*Apus*) *cancriformis*.

I have dissected five specimens, all of which were females: this is in harmony with the fact that in *Apus* and allied genera males are of rare, possibly seasonal, occurrence. The limbs and appendages of my specimens agree very closely with the admirable description of those of *A. cancriformis* given by Professor Bourne (*Comp. Anat. of Animals*, vol. ii); and in most other respects of their external structure the animals appear to be quite similar.

It is impossible to say without comparison of specimens (which are not available for me) whether this Indian *Apus* is a new species or not. For the determination of this point I am sending specimens to the Indian Museum.

¹ The substitution of the name *Triops* for the universally known *Apus*, though it may be justified in the strict letter of the law, is much to be deprecated as being liable to lead to great confusion.—S. K.

II.—NOTES ON MAJOR WALTON'S SPECIMENS AND ON OTHERS FROM KASHMIR WITH A LIST OF PREVIOUS RECORDS FROM EASTERN ASIA.

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

In addition to the fine specimens of *Apus* sent to us by Major Walton a number have been obtained during the present year from Kashmir. For these we are indebted to Mr. T. Bainbrigg Fletcher of the Agricultural Research Institute, Pusa, who received them from the Settlement Commissioner of Jammu and Kashmir State.

When forwarding the specimens the Commissioner remarks that they "occasionally do much damage to rice seedlings in the Banihal ilaka south of the Pir Panjal range at a height of about 6,000 ft. The damage occurs in the first few days of growth only, mainly where the irrigation water is particularly cold, and is greater in a year like the present, when the winter snow-fall is exceptionally heavy and melts late." He also remarks that as far as he is aware it does not occur in the extensive rice cultivation of the Kashmir valley, a region separated from the Banihal district by the Pir Panjal range, in this part from 9,200 to 14,000 ft. in height; nor does it seem to occur in the lower hills to the south.

While the re-discovery of this genus in India in two widely separated localities after a lapse of forty years is of considerable interest, it coincides with our knowledge of its erratic occurrence in other countries. But the statement that *Apus* has become an agricultural pest in Kashmir calls for further investigation.

No males occur in either collection.

I have carefully examined Major Walton's specimens and also those from Kashmir and have reached the conclusion that all are specifically identical with the European *A. cancriformis*. It must however be confessed that this determination is made with no great confidence; the taxonomy of the Notostraca stands in urgent need of revision and a study of the literature seems to indicate that the characters used for specific differentiation are few in number and for the most part subject to much variation. There can be little doubt that when the group is monographed a considerable reduction in the numbers of known species will be effected.

There are, indeed, noticeable distinctions between the specimens from Kashmir and those from Bulandshahr; but it appears probable that these are due merely to differences in biological conditions correlated with altitude and, until the importance of

this factor has been ascertained, it seems best to refrain from further additions to the nomenclature.

The Bulandshahr specimens range from 30 to 40 mm. in length excluding the furcal rami and according to Major Walton the average length of all obtained is 33 mm. In a perfect individual 30 mm. in length, the length of the shield in the middle line is 22 mm., that of the median carina 16 mm. and that of the furcal rami 29 mm.¹ The long ramus or fifth endite of the first trunk-limbs reaches well beyond the posterior extremity of the shield; it measures 22.5 mm. in length and is composed of about 58 segments.

On comparison the appendages were found to agree very closely with those of specimens of *A. cancriformis* from Lombardy and with those figured by Lankester² from examples obtained at Munich, Prag and Padua. The segments of the first trunk-limbs, while distinctly longer than is indicated in Lankester's figure, are similar to those of the Italian specimens. As regards the number of these segments there again appears to be considerable variation. Lankester gives the number as 80, but Packard³ states there are only 50 and points to the greater number (80) found in *A. himalayanus* as an important feature of that species. In the Bulandshahr specimens, as mentioned above, the number does not seem to exceed 60 and in this respect direct comparison with the Italian examples in the Museum collection is unfortunately impossible, for in them these appendages are all broken.

In the specific determination of Apodidae great significance has been attributed to the length of the body as shown by the number of segments uncovered dorsally behind the median notch of the carapace and ventrally behind the last pair of trunk-appendages. Perhaps too much stress has been laid on the former character, for, while it is true that in certain cases it affords a very obvious distinction between species, it seems that it is to some extent dependant on the amount of shrinkage that has taken place during preservation, and a glance at Wolf's figures of *Lepidurus viridis*, vars. *elongatus* and *setosus*,⁴ yields convincing proof of the great variation of this character within the limits of a single species. In the Bulandshahr specimens from 8—11 segments are exposed in dorsal view.

The number of segments seen from below behind the last pair of trunk-limbs appears to constitute a more valuable feature; five such segments are found in Major Walton's specimens and five also occur in the Italian examples of *A. cancriformis*. According to Packard (*loc. cit.*) there are six in this species, while Braem⁵ found that in females from the neighbourhood of Breslau the number varied from five to seven.

¹ See also the other measurements given by Walton, *ante*, p. 352.

² *Q. J. Micr. Sci.* (n. s.), xxi, p. 343, pl. xx (1881).

³ *Ann. Mag. Nat. Hist.* (4), viii, p. 335 (1871).

⁴ Wolf, *Fauna Südwest Australiens*, iii, lf. 9, pp. 267—9, text-figs. 11, 13 (1911).

⁵ Braem, *Zeitschr. Wiss. Zool.*, lvi, p. 183 (1893).

The average diameter of the eggs is .49 mm.

The Kashmir specimens appear to differ from those found at Bulandshahr only in two respects:—

- (1) The size is much smaller, the average length of the body in 20 specimens is 20.6 mm. (excluding the furcal rami), the extremes being 15 and 25 mm.
- (2) The surface of the carapace, when the moisture has been removed, is seen to be covered with fine and short irregular ridges, giving it a wrinkled and reticulate appearance which is specially well-marked in the neighbourhood of the shell-gland.

In addition the spines on the posterior margin of the carapace appear relatively a trifle larger than in the examples from the United Provinces.

Twenty specimens yield the following measurements (in mm.):—

	Maximum.	Minimum.	Average.
Total length excluding furcal rami ..	25	15	20.6
Length of carapace in median line ..	18	12	15.2
Length of median carina of carapace	12.5	8	10.4

The furcal ramus, when unbroken, is as long as, or a trifle longer than, the total body-length and the fifth endite of the first thoracic limbs reaches beyond the posterior margin of the carapace and is composed of about 55—60 segments. Dorsally from 10 to 15 abdominal somites are exposed behind the carapace and ventrally there are 5 or 6 (the latter rather more often than the former) behind the last pair of appendages. The average diameter of the eggs is .47 mm.

As regards colour, the specimens are of a dull olivaceous green obscurely mottled with a darker shade.

In their large size and smooth carapace the specimens from the United Provinces agree with the Italian examples of *A. cancriformis*; but Lilljeborg¹ in his description of large individuals of this species from Sweden remarks "Scutum ad latera supra folliculos testae plures carinas obliquas humiliores et breviores praebens" a statement which seems to accord well enough with the Kashmir specimens.

As has already been noted, the possibility that the characters of the species are deeply influenced by external conditions is great,

¹ *Synopsis Crust. Suecicorum Branchiopodorum et Phyllopororum*, p. 8 (1877).

and, until further evidence on this point is forthcoming, the Kashmir and Bulandshahr specimens are best regarded as local races, or perhaps merely phases, of *A. cancriformis*. The descriptions of this species, which I have been able to consult contain many discrepancies and it may well be that distinct races exist in different parts of Europe and Asia.

Cavalier¹ has recently published a brief note on the occurrence of *A. cancriformis* at a height of 10,000 ft. on the Bingöl Dag in Armenia and remarks that "as Crustacea at such heights are rarely discovered I think it worthy of record that these are practically identical with the common European species, though this is only in accordance with the results of Grube on *Apus* from L. Baikal and of Gerstaecker on the Siberian *Branchipus*; but there are some slight differences in the appendages." Grube's paper is cited as *Jahres-Bericht schl. Gesell.*, 1872, p. 53, and although this does indeed refer to an account by that author of the L. Baikal fauna, I have been unable to find therein any mention of *Apus*; nor in any other work which I have examined have I found Cavalier's citation repeated.

Previous records of *Apus* from Eastern Asia do not appear to be numerous; the following list contains all that I have been able to discover:—

Apus himalayanus, Packard, *Ann. Mag. Nat. Hist.* (4), viii, 1871, p. 334.

I have only been able to consult Packard's preliminary account of this species. It is stated to be closely allied to *A. cancriformis* and the distinctions noted do not suffice to separate it from that species: the range of variation in the European form, as judged by a comparison of several descriptions, appears to cover all the differential features mentioned by Packard.² Considered in the light of this paper only, the specimens from Kashmir and Bulandshahr agree with *A. cancriformis* rather than *A. himalayanus*.

Packard records two specimens "collected from a stagnant pool in a jungle four days after a shower of rain had fallen. For five months previous to this rain there had been no rain upon the earth. Himalaya Mountains, North India, near where the Sutlege river debouches into the plains—April, 1870."

Apus dukianus, Day, *Proc. Zool. Soc. London*, 1880, p. 392 (text-fig.).

The specimens from which this species was described were found in April, 1877, in a pond near Kelat in Afghanistan. The great length of the body, coupled with the

¹ *Ann. Mag. Nat. Hist.* (7), viii, p. 160 (1901).

² Some error seems to have crept into the measurements which Packard gives, for the length of the carina of the carapace plus the pre-carinal length is far greater than the total length of the shield.

shortness of the furcal rami readily distinguish it from *A. cancriformis* and *A. himalayanus* and there does not seem any probability in Lankester's suggestion¹ that it is synonymous with the latter species.

The specimens which Vredenburg found at Thalonk in Kharan State, Western Baluchistan,² belong, as far as can be judged, to the same species as that described by Day: Vredenburg's rough sketch is at any rate sufficient to show their close affinity with that form.

The possible identity of *A. dukianus* with one of the long-bodied forms described from other countries must not be over-looked; but this point cannot be decided until the group is subjected to revision.

Apus sudanicus var. *chinensis*, Braem, *Zeitschr. Wiss. Zool.*, lvi, 1893, p. 180.

The variety³ *chinensis* was described by Braem from eight specimens found in the Breslau Museum labelled '*Apus*, China.' *A. sudanicus*, the typical form, was described by Brauer⁴ from specimens taken at Khartoum in the Soudan.

Apus granarius, *vide* Gerstaecker, Bronn's *Thierreich*, v, 1866-79, p. 1063.

Gerstaecker in a distribution table of the Branchiopoda notes the occurrence of this species at Peking. I have not been able to find the original description or any other record of the species. Major Walton has also recorded a species of this genus or of *Lepidurus* at Peking (*ante*, p. 351).

Apus sp., Schlagintweit, *Reisen in Indien und Hochasien*, iii, 1872, p. 217 (Jena).

A brief notice of the occurrence of a species in the Salt Lakes of Tibet. The lakes were partially dry on the occasion of Schlagintweit's visit; dead specimens were found round the margins, but a few examples were discovered alive under stones in water of considerable salinity.

¹ *Loc. cit.*, p. 344 (footnote).

² *Journ. A. S. B. (n. s.)*, i, p. 33 (1906).

³ *Sitz. Kais. Akad. Wiss. Wien*, lxxv, abth. i, p. 590 (1877).

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